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The Official Magazine of



Indian Machine Tool  
Manufacturers' Association

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# TRANSFORMATION IS A PROCESS



OPED  
Towards Self-Reliance

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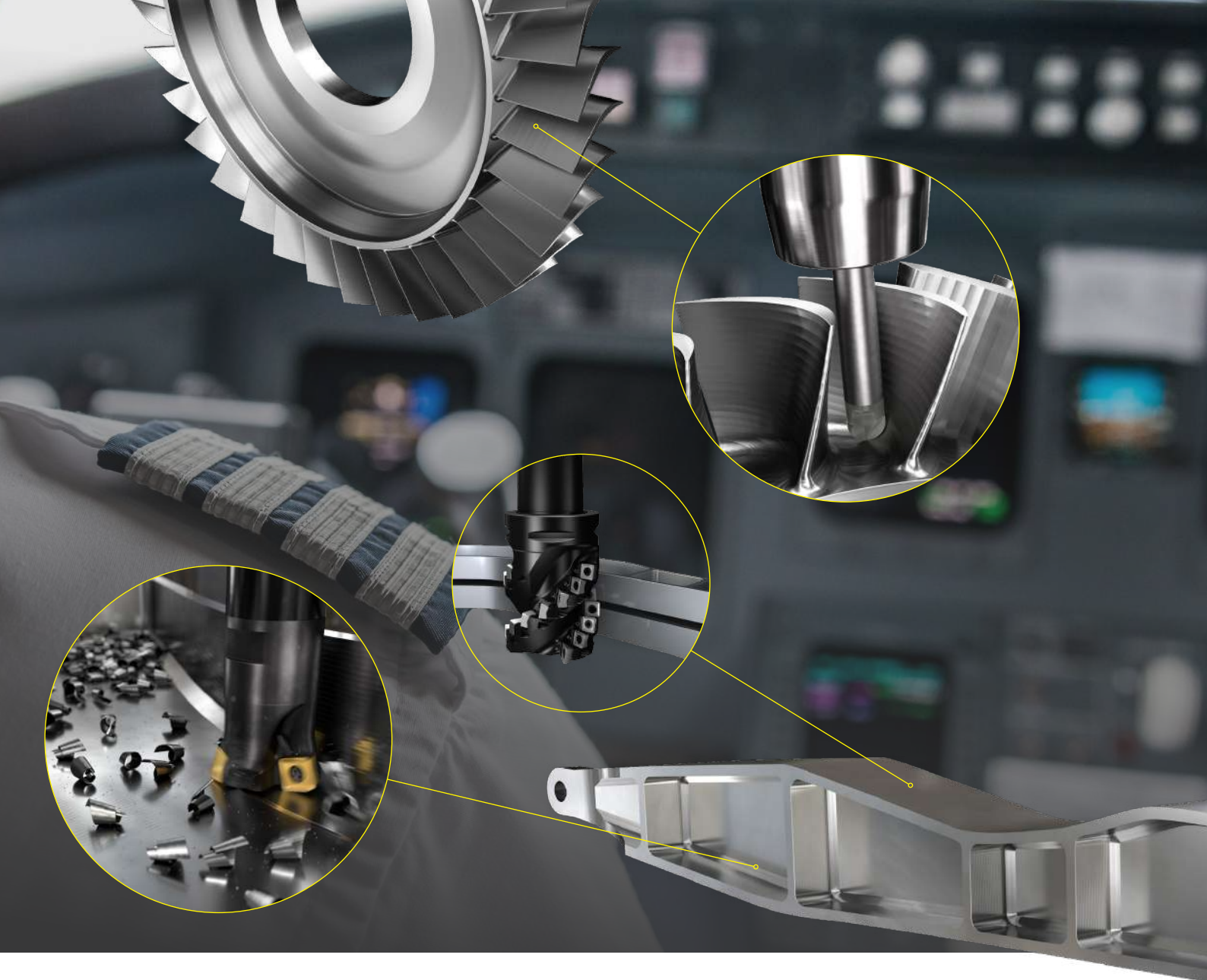
AEROSPACE  
Up in the Air



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DR SUSANNE BIELLER  
General Secretary  
International Federation of  
Robotics (IFR)

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## tachyon<sup>1</sup>

/tæki.on/ or tachyonic

noun

is a hypothetical particle that always moves faster than light. Conceptualized by a team of scientists Which includes Indian scientists Mr. V.K. Deshpande and Mr. E.C.G Sudarshan in 1962.



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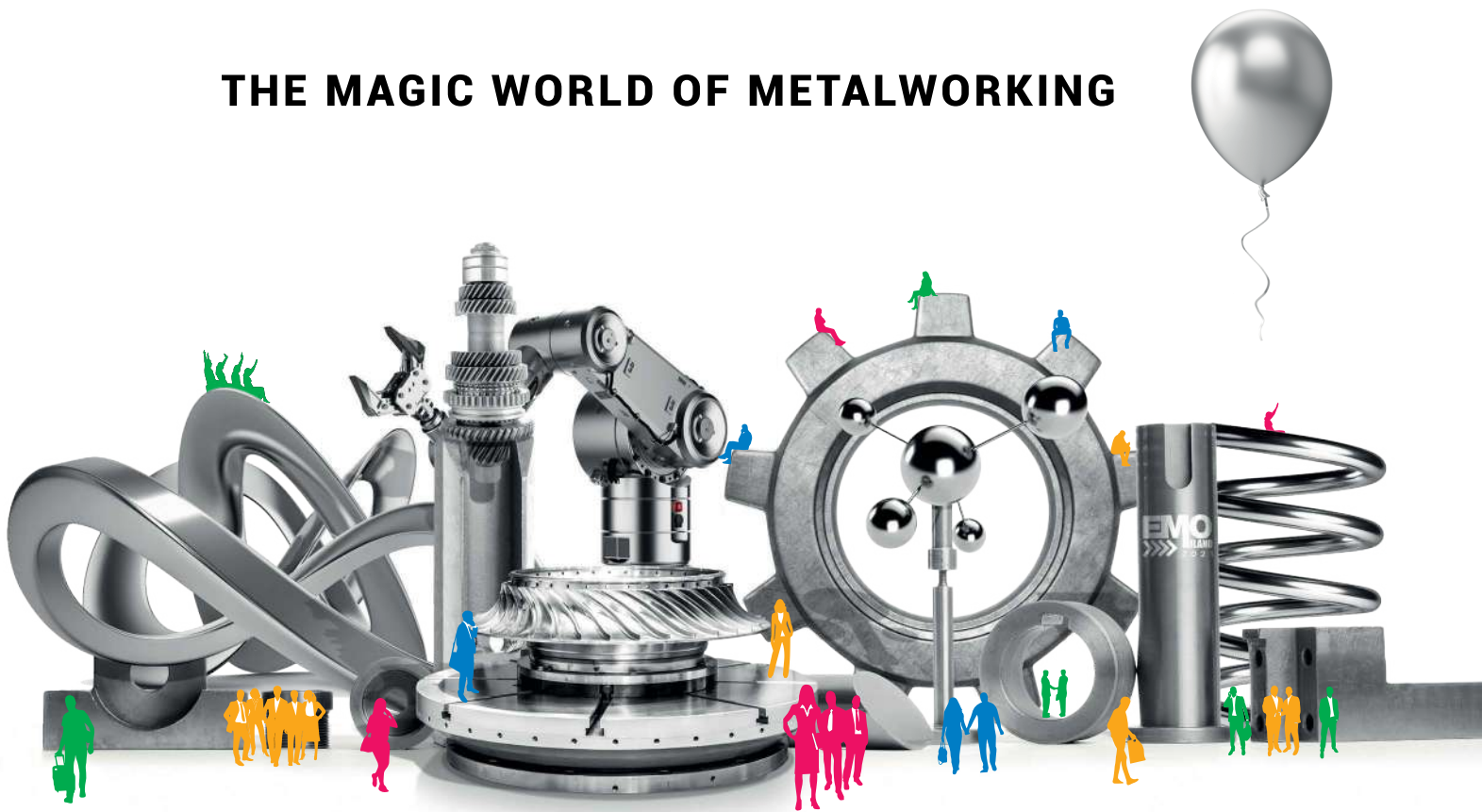
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# LEADING IN TIMES OF CRISIS



**INDRADEV BABU**  
**PRESIDENT**  
**INDIAN MACHINE TOOL**  
**MANUFACTURERS' ASSOCIATION**  
**(IMTMA)**

Dear Readers,

The world economy, including that of India, has been deeply impacted by the Covid-19 crisis. Nevertheless, we must pick ourselves up and continue with our endeavor to steer past this to safer shores. In its efforts to help industries override the economic slowdown, the Union Government has announced the ambitious 'Atmanirbhar Bharat' campaign to provide the Indian manufacturing industry a platform to become self-reliant and develop indigenous products.

The Government of India has identified certain key sectors where India can become self-reliant. Some of these, including Food Processing, Electronics, Industrial Machinery, Furniture, Leather, Auto Parts, Textiles and Ventilators, can provide good domestic and export opportunities. Furthermore, the Indian machine tool industry can expect substantial orders from other sectors earmarked by the Union Government such as Agricultural Machinery, Medical Equipment and Defence as well.

Senior officials from various government departments are in high-level talks with representatives from Europe, Asia, and many other parts of the world to market investment opportunities in India. Interestingly, many foreign companies are in the process of identifying local partners to tie up with and do business. The Government at the Centre as well as various State Governments in India are engaging senior management from these firms to arrive at an understanding and ink deals.

*Many foreign companies are in the process of identifying local partners to tie up with and do business. The Government at the Centre as well as various State Governments in India are engaging senior management from these firms to arrive at an understanding and ink deals.*

Large industry associations representing various industries are reaching out to potential investors including trade bodies from foreign nations. Although we face stiff competition, our country has many advantages. India has a huge domestic market, friendly workforce, land availability, good knowledge of English, and so on, which bodes well for foreign companies seeking to expand their base in India. As this happens, the Indian manufacturing industry will be firmly placed as a manufacturing destination over a long term.

It is to be noted that the Government has announced its series of measures including for MSMEs to improve liquidity and meet cashflow requirements. It is now up to the industry to make the best from these announcements, invest in innovation and R&D, explore market opportunities and chalk out future plans judiciously.

IMTMA has actively participated in various interactions with Government departments / agencies / association level meetings and put forth various suggestions and policy measures to the Government of India on matters concerning finance, public procurement, tender term related issues, ramping up expenditures on government projects, support for R&D and technology development, etc.

IMTMA organised webinars with financial experts for enabling financial assistance to MSMEs. The Association is also intensely doing desktop research to explore opportunities in non-auto sectors like Electronics, Furniture, Medical devices, Agriculture equipment and machinery, etc. and sharing information with Membership. Networking and connecting with user sector associations is also being taken up for expanding the sectoral reach. All these would help in demand creation, new business and growth opportunities.

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*Considering the uncertainties surrounding the manufacturing industry and the business outcome, IMTMA has rescheduled its flagship IMTEX 2021 & Tooltech 2021 to June 17 - 23, 2021 at Bangalore International Exhibition Centre (BIEC) in Bengaluru.*

Dear MMI Readers,

Indian Machine Tool Manufacturers' Association (IMTMA) is happy to bring to you the July-August edition of its Modern Manufacturing India (MMI) magazine. We thank you for your continued interest in our endeavor.

As you all know we have been facing difficult situations with the outbreak of the coronavirus pandemic and the economic slowdown. However, industries have adopted well and learnt to operate and manage Covid challenges. They are working aggressively towards generating orders and increasing their capital utilization and retaining their trained workforce.

Our MMI editorial team, with its rigorous research and analysis, continue to bring forth the latest information on the developments in the manufacturing industry. This month's edition focuses on aerospace. Additionally, there is an opinion piece by IMTMA that aims to provide a quick peek into the revival and growth of the machine tool industry.

Considering the uncertainties surrounding the manufacturing industry and the business outcome, IMTMA has rescheduled its flagship IMTEX 2021 & Tooltech 2021 to June 17 - 23, 2021 at Bangalore International Exhibition Centre (BIEC) in Bengaluru. Shifting the show to June 2021 will provide the much-needed room for the machine tool and the manufacturing industries to recover, the economic situation to improve, and allow exhibitors and visitors to participate with their innovative products and solutions with a stronger resolve.

As we continue to share inspirational stories from the industry, we also reach out to you for your feedback, comments and thoughts to make MMI more insightful and interesting. This will help us understand your requirements and enable us to meet your expectations.

I thank you once again for your interest in the activities of IMTMA. You can download previous issues of MMI from the IMTMA website.



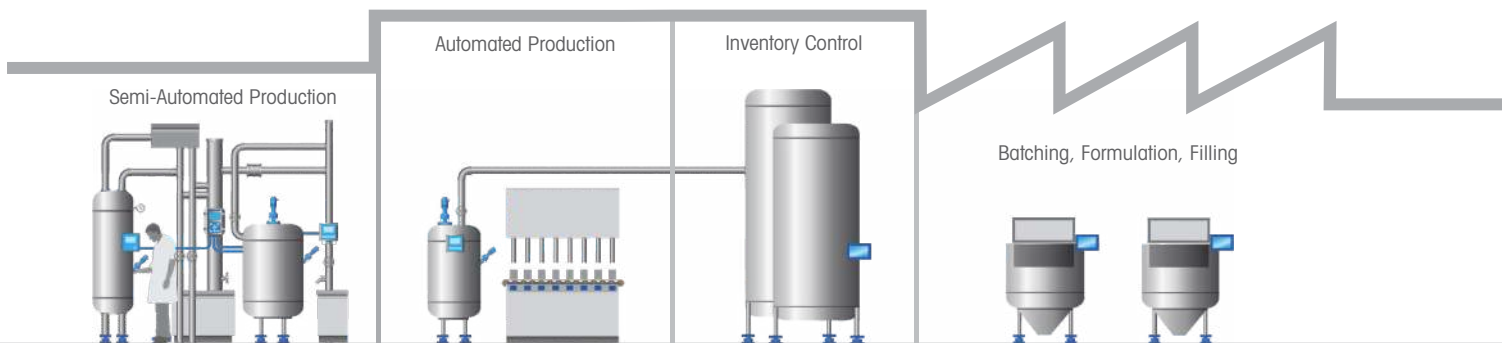
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*Soumi Mitra*

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## CONNECTED IN A REMOTE WORLD

**U**ntil a few months ago, the term ‘Global Pandemic’ was perceived as a futuristic sci-fi movie concept. Then the Covid-19 crisis hit that changed businesses and the way of working across the world, leaving us with no choice but to adapt to the ‘New Normal’.

The usage of extensive technologies, an integral part of the new normality, has become essential for our regular work life. Remote working, digital meetings, and witnessing virtual reality events seem the most normal extension of work life suddenly. It is believed that most organizations worldwide are encouraging their task force to work remotely. They are looking at it as an opportunity of working sustainably and weighing the benefits that can be reaped out of this setting.

The pandemic has brought about an unprecedented change in our means of communication, collaboration, learning, and evolving. It has hastened the deployment of advanced technologies to integrate the production, supply chain, marketing, and sales together.

Digitally-adept companies are at an advantage of adjusting faster to this crisis. It is slated that in the coming days the manufacturing industry will rely more

*“When written in Chinese, the word ‘crisis’ is composed of two characters - one represents danger, the other represents opportunity.”*  
 - John F Kennedy

on advanced automated technologies and benefit from it. The changing work landscape calls for more innovative ways to stay afloat in the competitive market.

We have curated this issue against this backdrop and collated industry experts’ take on how they view the

situation and ways to cope with it. As always, we have included success stories from the industry. We, once again, solicit your feedback as that is what has made MMI the most sought-after trade publication.

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# GEARING UP FOR A NEW WORLD ORDER

The Covid-19 pandemic has posed tough challenges for the manufacturing industry. More indigenization at individual and sectoral levels will help combat them, gradually giving rise to a new India that can become the factory of the world.



Source: Magic Wand Media

**T**raditionally in India, agriculture has been the mainstay of its economy with more than half of the country's population depending on it, directly or indirectly. However, manufacturing has been catching up and the think-tanks in the government, as well as industries, are working towards making this a major part of the economy in the long run. The Government of India, in its recent announcements with some path-breaking policies, has perhaps widened the scope for the manufacturing industry, including the creation of a separate indigenous budget, reservation of tenders up to ₹200 crore in government procurements and stress on localization.

## Towards self-reliance

India is on the 'Atmanirbhar Bharat' journey for the creation of a self-reliant, confident, vibrant, and globally competitive country. There is a need to enhance the production of goods and services competitively and judiciously evoke protection clauses when a foreign entity indulges in unfair trade practices. Indian industries must be able to hold its own in terms of quality and pricing against global players. Often, foreign suppliers position their products as superior in quality. Hence, there is a need to match their products in quality, features, functionality, and cost. With the right investments, R&D and innovations, marketing, and commitment

there is no reason why Indian products should not get their place in the global market especially with its long history of machine tools.

## Machine tool industry's key role

Today, when we look at the four levers of the economy: investment, consumption, net exports, and government expenditure, the Indian machine tool industry can play an important role in two of these four aspects of the GDP. One is the capital goods investments, which will enable the industry to become a core part of the investment revival. The other is private investment, which has been subdued for some years and must start rolling now.


As this happens, capital goods will also get in the flow and the machine tool industry will be able to sell its goods. Since true competitiveness lies in exports, there is an urgent need to acquire technologies from wherever possible, enter into joint ventures and develop globally competitive products. What is also required is developing products for exports and for the global market which then will naturally become competitive domestically. Products built for the domestic industry also will be addressing tough local conditions - power failures, dusty environments, etc. They are bound to be more robust and find acceptance globally. To this end, Indian Machine Tool Manufacturers' Association (IMTMA) will continue to play an active role in developing them through its collaborations with various industry associations.

### Together towards growth

In this journey of nation building, the engineering industry's core manufacturing is highly crucial for the machine tool industry to raise its share of products in the global market. Although we are facing extreme times being in the midst of a pandemic that has thrown unprecedented challenges in terms of demand, supply, labor, and the external environment, the industry has to do everything possible in its means to survive and thrive.

It is imperative for the governments at the center and state levels to work together as one team to find the right solution. The onus of the economic growth cannot lie solely on the center, states which are an integral part of India, also need to play an important role and in that context, lives, and livelihoods both matter with growth being an inevitable part of this.

Moving on, the machine tool industry also needs to explore how well and competitive it is in the context of extensive technological development and digitalization and how well it can align with the changing world. It is important that capital investments are made to develop cutting edge tools which will help us have the surgical and efficient ability to build cutting-edge products not just for India but for the whole world.

Well, for some time now, with the general slowdown beginning from July 2019 and the Covid-19 pandemic outbreak that followed it, we are facing some tough challenges. However, it is a matter of time before the wheel spins again in the right direction. This will happen when we do more indigenization at every level, individual as well as sectoral, and gradually we may see a new India which can rise to be the factory of the world. 

**Moving on, the machine tool industry also needs to explore how well and competitive it is in the context of extensive technological development and digitalization and how well it can align with the changing world.**



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## ACMA Appeals Rapid Import Clearance

**New Delhi, India** - It is understood that import consignments from China are being subjected to one-hundred percent manual inspection resulting in inordinate delays in clearance. Explaining the complexity of the automotive value chain and the need for permitting clearance of imports, Deepak Jain, President, Automotive Component Manufacturers Association of India (ACMA) remarked, "The Auto Component industry in India is committed to the 'Atmanirbhar vision' of our Hon'ble Prime Minister, Shri Narendra Modi. The entire automotive value chain in the country is around \$118 billion of which import of auto components is \$4.75 billion, 4 percent of the total Auto industry turnover. Some of the items imported from China are critical components such as parts of engines and electronics items for which we are yet to develop domestic competence. The automotive value chain is an overly complex, integrated and interdependent one; non availability of even a single component can, in fact, lead to stoppage of the vehicle manufacturing lines. Post the lockdown, production in the component industry is gradually

picking up in tandem with growth in vehicles sales, it is therefore in the best interest of the industry and the economy that any further disruptions are best avoided."



Source: Magic Wand Media

## CHIRON Group Realigns to Secure its Future

**Tuttlingen, Germany** - Leading global supplier of machining centers, the CHIRON Group has initiated a comprehensive restructuring to secure its future. This includes the bundling of production and assembly in Tuttlingen and Neuhausen o. E., the concentration on service and sales of Stama products at the Schlierbach location and the sale of Scherer Feinbau GmbH, based in Alzenau.

The Group recorded a significant decline in demand in 2019, triggered by the upheaval in the Automotive industry and the weakening of the global economy. While it achieved sales of around EUR 500 million in 2018, sales in 2019 fell to EUR 443 million (-11%). In 2020, the situation was aggravated by the effects of the corona pandemic, so a further decline is expected.

"Our goal is to keep the Group capable of acting in the short term and to create competitive advantages in the medium term to secure as many jobs as possible. We have carefully

examined all the alternatives and consider the initiated reorganization as necessary and future-proof," says Dr Armin Schmiedeberg, Chairman, the Supervisory Board.



Source: CHIRON Group

## NSDC and Simplilearn to Upskill Professionals

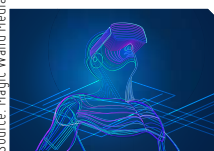
**New Delhi, India** - The temporary shutdown of institutions and universities due to the Covid-19 lockdown has affected the overall learning of many students and professionals alike. To support the continuity of digital skilling of the Indian workforce, Simplilearn, a global provider of digital skills training, has announced its partnership with National Skill Development Corporation (NSDC).

Aligned with the Skill India Mission, the collaboration aims to create a future-ready workforce by leveraging the power of technology. Strengthening the digital learning ecosystem, both Simplilearn and NSDC will enable access to over 1,000 hours of digital programs and technologies under the categories of AI and Machine Learning, Big Data, Data Science and Business Intelligence, Cyber Security, Software Development, Project management, and Digital marketing. Aspirants can find program details on NSDC's eLearning portal - eSkill India - and access the learning programs on the Simplilearn Android and iOS mobile apps.

Commenting on the collaboration, Dr Manish Kumar, Managing Director & CEO, NSDC, said, "The dissemination of future-ready skills requires technology platforms with high outreach capabilities. Through its partnerships, NSDC promotes online learning for accessing exciting work-opportunities that the fast-changing world offers."

Krishna Kumar, Founder and CEO, Simplilearn, added, "We are happy to support and contribute to NSDC's efforts in the skilling of India's workforce to prepare for a digital future. Through Sim-

pillearn's mobile apps, learners will have the opportunity to upskill in IT and new technologies, including artificial intelligence, machine learning, and data science, making for a job-ready workforce."



Source: Magic Wand Media

## DRDO Launches Contest for Innovators and Startups

**New Delhi, India** - Defence Research and Development Organisation (DRDO) launched its innovation contest 'Dare to Dream 2.0' on the 5<sup>th</sup> death anniversary of former President and noted scientist Dr APJ Abdul Kalam.

Also known as the missile man of India, Dr Kalam had the vision of self-reliance. The open contest, which is in alignment with his plans for the future of the country, aims to promote and encourage individuals and startups for innovation in defence and aerospace technologies in India after the call of 'Atmanirbhar Bharat' given by Hon'ble Prime Minister Shri Narendra Modi.

An expert committee after a thorough evaluation will be handpicking the winners of the contest. A cash award of up to ₹10 lakh for the startup category and ₹five lakh to the individual category has been allocated.



Source: Magic Wand Media

## EMAG Takes Over Scherer Feinbau

**Salach, Germany** - With the view to expand its product range and customer base, the Southern German machine builder EMAG has taken over the Lower Franconian company Scherer Feinbau based in Alzenau, a specialist for CNC vertical lathes and vertical shaft turning machines.

Both partners benefit from the current acquisition: on the one hand, Scherer's CNC vertical lathes are marketed worldwide by EMAG. EMAG's excellent global network within the Automotive industry provides an ideal basis for future success. The worldwide EMAG service network will also be available as a contact for Scherer customers in the future.

On the other hand, EMAG is expanding its technological know-how with this takeover, especially in the field of brake disc machining. Markus Heßbrüggen, CEO, the EMAG Group, said, "Over the past few years, Scherer has developed robust solutions for this application, which will continue to be of great

importance for the automotive industry in the future - across all types of drives. We expect new market impulses and development chances from this know-how."



Source: EMAG

## Opportunity for India to Engage with the World: CII

**New Delhi, India** - In line with the Prime Minister's vision of 'Atmanirbhar Bharat', the Confederation of Indian Industry (CII) has outlined a ten-point agenda for increasing India's exports of goods and services. The CII report, entitled 'Re-orienting India's Export Endeavour in the Covid-19 World', states that India must aim to achieve five percent share in world merchandise exports and seven percent in services exports by 2025.

"As more and more countries are looking at realigning their trading strategies and diversifying their import sources post the Covid-19 outbreak, India must leverage the present situation to emerge as an alternative destination for sourcing cost-effective, quality products," said Chandrajit Banerjee, Director General, CII. "A key point in India's export strategy must be to strengthen its participation in Global Value Chains (GVC)," he added.

The CII report includes specific measures for nine manufacturing sectors such as Automotive, Chemicals, Electronics, Steel and Textiles etc. Education and Healthcare are covered under services. In the Agriculture and Allied sector, CII has brought out recommendations for agri produce, fruits and vegetables, marine products and processed foods.

India's goods exports declined to US\$ 313 billion in 2019-20. Its share in global merchandise exports is 1.67 percent, with a low share in top globally traded items. In services, it enjoys 3.54 percent share.



Source: Magic Wand Media

## ABB India Opens New Robotics Facility

**Bengaluru, India** - ABB India has opened a new robotics facility to support the digital transformation of manufacturing in India. Spread over 3,600 sqm at the ABB Nelamangala factory premises in Bengaluru, the new facility will enable the company to deliver robotic applications and digital solutions for industries including Automotive, Food & Beverage, Electronics and other upcoming sectors. The facility houses a state-of-the-art shop floor that can run proof of concepts and factory acceptance tests for 1000 ABB robots every year, which doubles the company's capacity.

"With the help of the new and improved robotics facility, we will be able to share our knowledge and encourage Indian manufacturers to embrace our game changing technologies and become best-in-class manufacturers for local and global markets," said Sanjeev Sharma, Managing Director, ABB India.

The facility includes a demonstration center to showcase the latest technologies in robotic welding, gluing and material handling and carry out joint prove-out sessions with customers. ABB will also integrate an ABB Ability™ Connected Services team that can remotely monitor an installed base of ABB robots to conduct predictive maintenance and high uptime.



Source: ABB

## Atlas Copco Acquires ZEISS' iTrap

**Oberkochen, Germany / Nacka, Sweden** - Sweden-based provider of industrial productivity solutions Atlas Copco Group has acquired iTrap mass spectrometry technology from ZEISS. The business will become part of the Semiconductor Chamber Solutions Division in Atlas Copco's Business Area Vacuum Technique.

iTrap, a technology for highly sensitive, real-time gas analysis, is used for process analytics and advanced process control in the semiconductor market. It can analyze and control important chemical processes in vacuum chambers of semiconductor manufacturing equipment and other applications. This is the first external sale of a ZEISS venture. Atlas Copco will integrate iTrap in the Edwards business to synergize with other vacuum technology solutions of the

worldwide market leader. At Edwards, the technology will benefit from a worldwide sales and service network as well as from innovation and application centers close to all relevant major customer sites worldwide.



Source: ZEISS

# GAUGING THE PANDEMIC IMPACT

Post the lockdown phase, VDMA conducted a third survey to assess the impact of Covid-19 on the engineering industry and the business activities of VDMA members in India. Here's the result:

**V** DMA India Flash Survey 3.0 on Coronavirus 2020 was conducted with the aim to gauge the impact of the prevailing situation on the business activities of VDMA members in India. Held between July 07 - 11, 2020, the survey comprised 11 basic questions and gathered 202 responses across 35 sectors of the mechanical engineering industry. The participants of the survey needed on average 02 minutes 18 seconds to answer the questions with their characteristics. The survey results were then analyzed to capture a holistic overview of the economy and the business situation that lies ahead of us.

VDMA India's prior two flash surveys on Covid-19 were conducted with lockdown in full affect between March 30 - April 03, 2020 and April 21 - 25, 2020.

### Key highlights

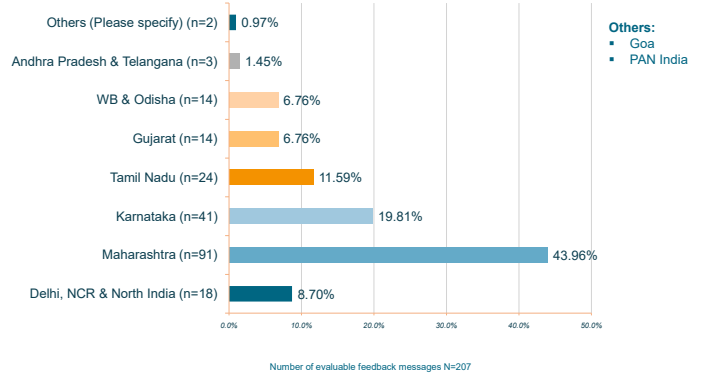
As per the latest survey (VDMA Flash Survey 3.0), it can be observed that for the next four-six months, order intakes, new business orders and a push in business and economy is looking difficult.

- Sixty percent of the respondents felt that it would take more than a period of six months to attain normalcy. During Flash 2.0, 50 percent of the participants estimated a period of three to six months to return back to normal conditions, whereas during the first survey, 44 percent of the respondents expected three to six months to normalcy.

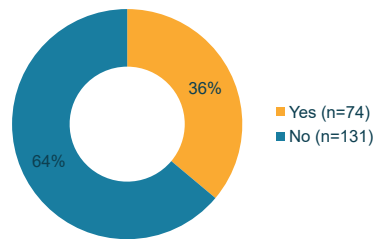
- Eighty five percent of the respondents felt that the Pharmaceutical and Medical industry would grow in

the near future. Industries like Mining, R&A, Defence, Railways, Textile & Garment, Machine tools, Online Edu-

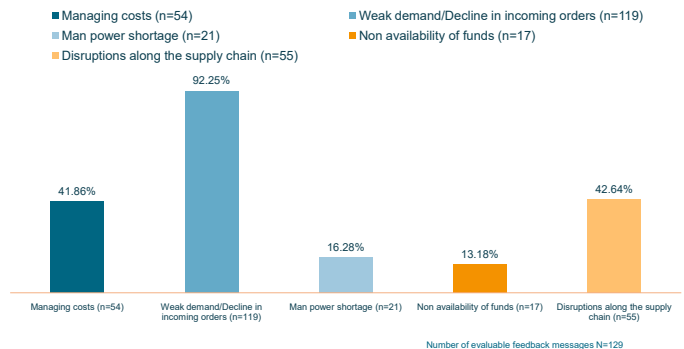
### Respondent Location Distribution



### Is there any significant improvement in your business activities post lockdown?



### If No, what are the key challenges that are still impacting your business (Multiple answers possible)



Source: VDMA India

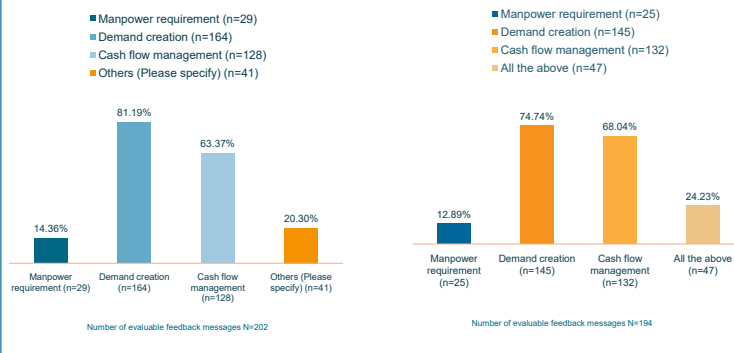
Source: VDMA India

ation Technology, Packaging are also expected to grow as we move forward.

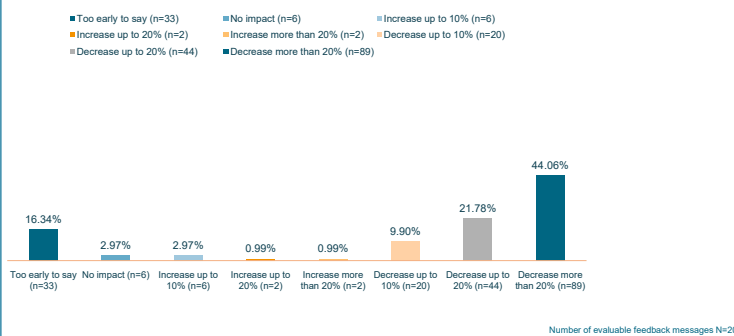
## Results

- Even post lockdown, 86 percent of the respondents felt that they will not be able to achieve their targets in 2020. While only 14 percent were hopeful of achieving their target.
- 44 percent of the organizations felt that they would witness a loss of more than 20 percent revenue for the financial year 2020-2021. While 15 percent felt that it is still too early to be able to predict precisely.
- 50 percent of the companies estimate 50-70 percent of capacity utilization in the financial year 2020-2021.
- During Flash Survey 2.0, 41 percent of the companies estimated 70-80 percent of capacity utilization in the financial year 2020-21. This number has significantly come down to almost 28 percent during the latest VDMA India survey.
- Hence, it is evident that the business sentiment has been impacted further adversely even after the lockdown restrictions being removed.
- 84 percent of the survey participants reported that their customers have postponed investments under the prevailing COVID-19 scenario.
- Almost 62 percent feel that it would still be more than six months for everything to get back to normal.
- 40 percent during the second flash survey and 33 percent during the flash survey 1.0 estimated a period of more than six months to return back to normal conditions during the second flash survey. Response from the mechanical engineering industry is pessimistic than before.

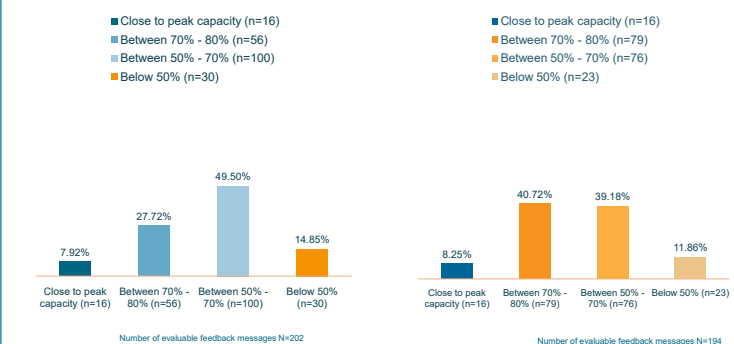
### Priority of your business post lockdown (Left-Flash 3.0 & Right-Flash 2.0) (Comparison)



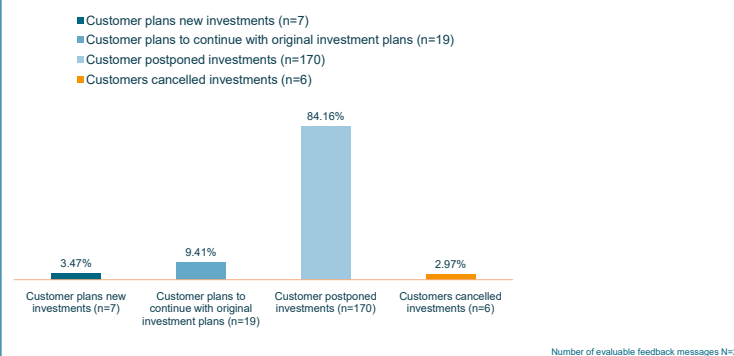
### How would you assess the impact on revenue in the financial year 2020-21 due to the outbreak of COVID-19?




### How do you view the capacity utilization for your business in the financial year 2020-21? (Answer to the same question during 2.0 on right)



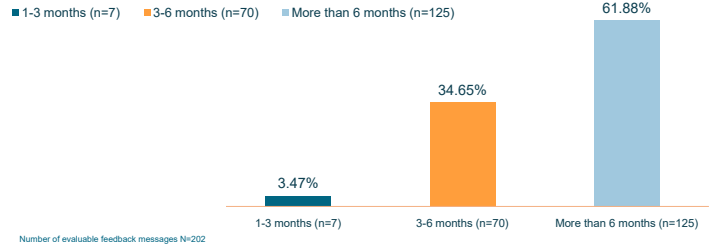
### How do you evaluate your customers current investment behavior?



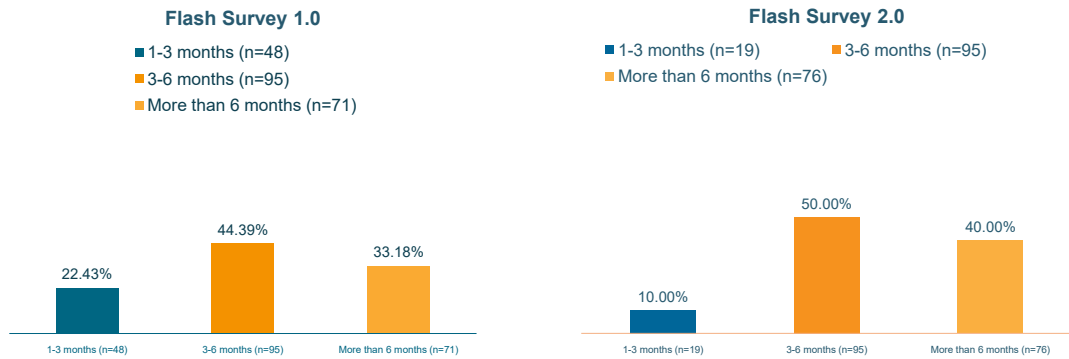
Source: VDMA India

- 85 percent of the respondents feel that the Pharmaceutical and Medical industry would grow in the near future.
- Industries like Mining, R&A, Defense, Railways, Textile & Garment industry, Machine tools, Online Education Technology, Packaging are also expected to grow as we move forward. 

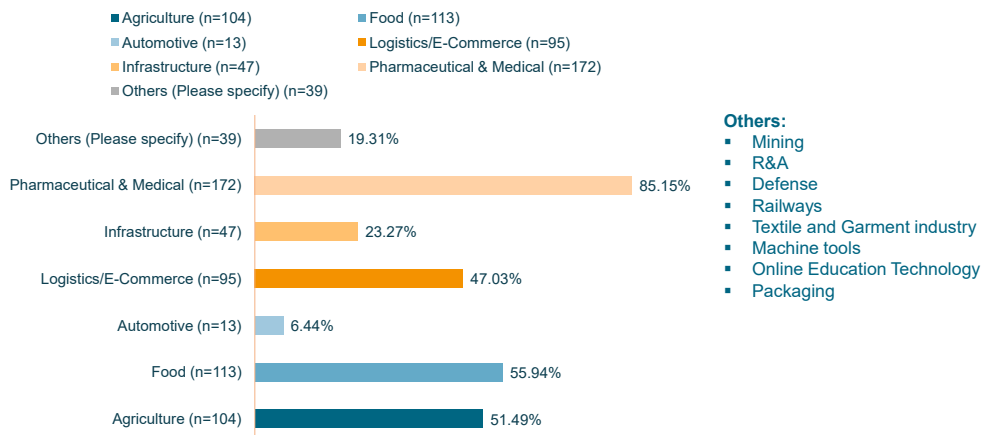
### Post lockdown what do you now feel about the expected time to normalcy?



### Answer to the same question on normalcy during the previous two surveys



### Which sectors do you see growing? (Multiple answers possible)



Source: VDMA India

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# DMG MORI

# TOWARDS SELF-RELIANCE

Indian Industry players offer their two cents on the crucial bilateral relation between India and China and how feasible will be a blanket ban of Chinese products in India...



**Deepak Paul**  
Managing Director  
Iigus (India) Pvt Ltd

**R**ecently, we heard from our forwarder that one of our containers was held up following the scrutiny on containers from China. The quantum in question was in excess of 4000T at Bangalore ICD. We could not verify this information, but on the other hand it certainly made us wonder about the quantum of Indian imports from China and the dependency that it creates.

Business is always done on merit. So, if we or, for that matter, any country or company prefers imports or purchase from a particular entity, it is definitely based on merit. There is nothing wrong with that. But any business enterprise, to remain healthy, must plan well and be proactive to balance various risks; over dependency is surely a risk.

As a company that largely caters to Indian markets with products sourced from Germany and locally in India, we are not impacted. Consequently, we do not follow the import trends from China. A knee jerk reaction to correct the anomaly may not

work and a more holistic and sustainable approach is required for a permanent correction.

## Building competencies is solution

If we expect to build competencies and capacities overnight, it is also fraught with its own inherent risks of quality management, logistics, compliances etc. A prudent and pragmatic approach with long-term gains must be envisaged, evaluated and implemented. Like the saying goes, you do not get stronger by making someone else weaker. The focus must be to become stronger by innovation, creativity and discipline leading to fast turn around and high productivity.



**Nitin Deshpande**  
Director  
Indirect Channel Sales - Asia  
Industrial Business Segment  
Kennametal (Singapore) Pte Ltd

**C**hina accounts for a sizable portion of India's top imports, especially where intermediate products or components and raw materials are concerned. Banning the imports of raw materials from China without which products over here cannot

be manufactured will make things difficult and expensive.

There are strategic and key raw materials that India imports from China due to which Indian exports of finished goods are more competitive.

China accounts for 80 percent of raw materials for making medicines, lifesaving antibiotics in India. The country, with its rich natural resources, has certain essential and critical raw materials in abundance e.g. rare earth products, natural graphite, tungsten, and magnesium. Hence, India and the world will continue to depend on China for these essential raw materials.

## Raising manufacturing standards

Today, world economies are interconnected. Globalization process has evolved over a period of time for obvious reasons and benefits.

China is Asia's largest economy, one of the India's leading trade partner and the third largest destination for Indian shipments. Given Chinese businesses were slowly opening up even as India and other countries were under lockdown, the neighboring country could cater to a lot of cross-border trade. The latest improvement in India's export can also be partly attributed to the increased demand from China.

Decoupling of economies will evolve over time and the blanket ban is not the way to drive that shift!

The Covid-19 situation has certainly offered excellent opportunity for India to accelerate localization efforts to reduce reliance

POONAM PEDNEKAR  
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on imports. However, in the first place, Indian companies need to achieve world-class manufacturing standards through high quality, low cost, fast delivery to compete on merits (raw materials to finished goods). This will then help to gradually reduce reliance on Chinese imports, else we would only be hurting ourselves by putting restrictions and blanket ban.



**Ajeet Samani**  
Managing Director  
Khushbu Engineers

**A**s of now, in many sectors, we are heavily dependent for raw materials or semi-finished goods from China. It's about time we break free of this dependence and work towards becoming self-reliant. Indians have engineering as well as financial capability to cope with challenges and cater to diverse demands. The recent Covid-19 situation reflects on our ability to take charge and manufacture PPE kits or ventilators etc. The Government is aggressive on being 'Atmanirbhar Bharat' and I see a huge opportunity for the Indian Industry to accept the challenge and prove its mettle. Associations like IMTMA are highly instrumental as a medium between the machine tool manufacturers and the Government policy makers.



**Nikhil Agrawal**  
Managing Director  
Nagel Special Machines Pvt Ltd

**T**he key raw materials for the machine tools industry, such as, ferrous and non-ferrous metals, particularly steel and aluminum, are available in abun-



**Sia Bakshi**  
General Manager  
SMW Autoblok Workholding (P) Ltd

**L**ike many other countries, we too are dependent on China and are importing from the country because the materials are cheaper. Otherwise, we could have imported from other countries or sources. In a globalized world, we have to look for optimum options or internally develop the resources.

Looking at the present sentiment, we can experiment developing the alternatives internally or look for other countries for sourcing. This is the perfect time

dance in India. In addition, we require high-quality, complex castings for which India has a well-established foundry industry to support the sector.

Hence, in my view, the machine tool industry has no dependence on the Chinese imports, particularly, the raw materials.

### **Ban not needed**

It is impossible to place a blanket ban on the import of Chinese goods. The government of India should place curbs if there are quality issues or if the imports are subsidised or dumped. Here again, the machine tool industry's exports would not be affected by the curbs placed on Chinese imports.

for that because the people of India want to reduce their dependence on the Chinese imports. Since we cannot stop the imports immediately or completely, we have to do it in a phased manner.

### **Indian exports to be affected**

You cannot ban anything from any country completely. If we do that, it will surely affect our exports because of the price increase and we may end up not being competitive in our exports. China's exports to India may be a small share compared to their global exports, so they may not be hit but we will be affected, so we have to reduce the dependency in a planned and gradual manner.

Instead of banning any imports from China or any country we must take this problem as an opportunity and challenge the situation and come up as a winner. This needs lot of planning, hard work, major infrastructure boost and advancement in technology.



## SUCCESS IS SUCCESSFUL ADAPTATION

**T**he pandemic has brought forth considerable changes in the human behavior that are here to stay and get stronger, affecting us all personally and professionally. Organizations need to quickly understand and adapt to them in order to survive, let alone grow and thrive. Although the nature and the enormity of the impact, and the pace to get used to those changes will differ from organization to organization, depending upon the kind of their business and segment, re-imagination has to happen across the board. The Education sector has been significantly disrupted leading to an overhaul in the ways we learn and get trained. The Entertainment industry has likewise changed its game plan and so has the Hotel & Food industry. Similarly transformed is the way we would shop and buy, from things of daily needs to white goods and automobiles.

A highly noteworthy occurrence, meanwhile, has been the emergence of a multipurpose hub that was once called home and used as a purely personal space to unwind. Decision-makers are living, working, interacting and conducting their affairs in an environment far removed from the scene of action. This has a consequence on their interactions and, most importantly, their decision making.

### Adapting to changing times

Organizations and businesses must retool themselves to cater to people and their needs across platforms and channels with video conferencing virtual reality, depending on the right mix and the segment. The key issue is to work this home platform economy and integrate it into one's business ecosystem effectively.

From a machine tool and manufacturing perspective, key addressable issues continue to be productivity, effectiveness, cost, and customer experience across users, enablers, decision-makers, and their teams. While initiatives to use IT in manufacturing and IoT have made headway in collecting data and building tables or dashboards, not much has happened in the analysis of the data gaining actionable output. These are the areas that need to be acted upon urgently to increase managerial manufacturing effectiveness and sow the seeds of using technologies of machine learning and AI that are available today. Hence, it is important to seriously evaluate the need for change in the organizational structure from an analogous perspective to a digital perspective.

Although the nature and the enormity of the impact, and the pace to get used to those changes will differ from organization to organization, depending upon the kind of their business and segment, re-imagination has to happen across the board.

**T K RAMESH**  
**Managing Director and CEO**  
**Micromatic Machine Tools Pvt Ltd**

The views expressed by the author are personal and he can be contacted at [rameshtkr@gmail.com](mailto:rameshtkr@gmail.com)



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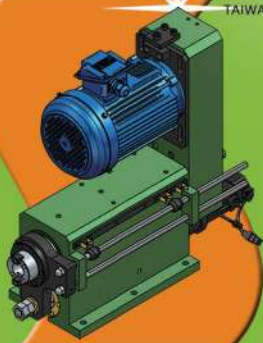
# Drilling Tapping Milling Spindle Units



**XYZ 3 AXIS SERVO TYPE SPINDLE HEAD**



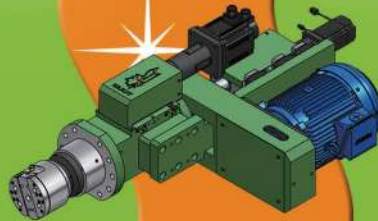
TAIWAN EXCELLENCE 2017



Servo Type Drilling / Tapping Spindle Head Unit



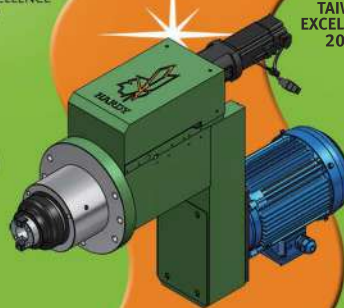
TAIWAN EXCELLENCE 2017



Facing Spindle Head-Servo / Flange Type



TAIWAN EXCELLENCE 2020



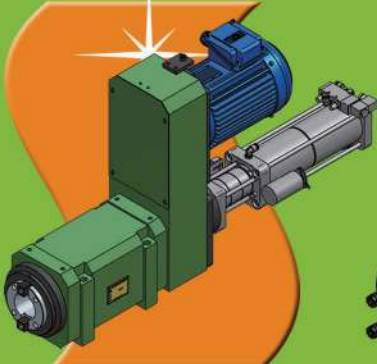
Servo Drilling / Tapping Spindle Head - Flange Type



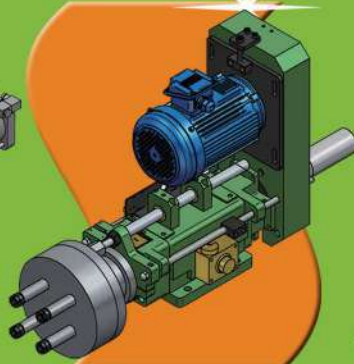
TAIWAN EXCELLENCE 2020



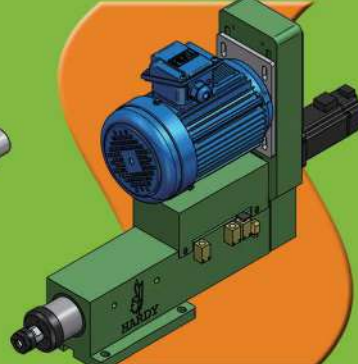
Built-in Motor Spindle Unit



Boring & Milling Head Unit / with Auto Tool Unclamping



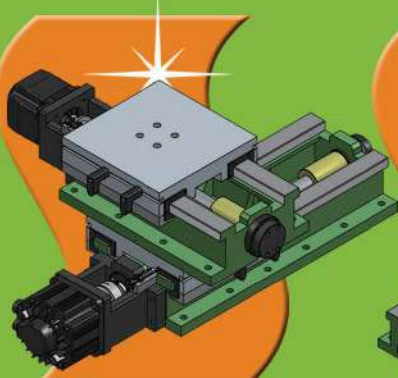
Multi-Spindle Head



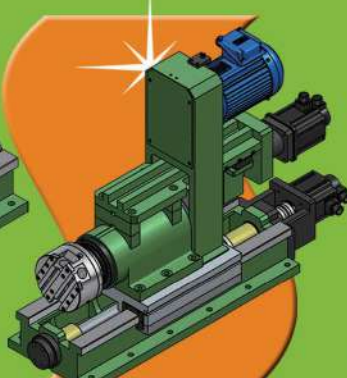
Servo Type Drilling / Tapping Spindle Head



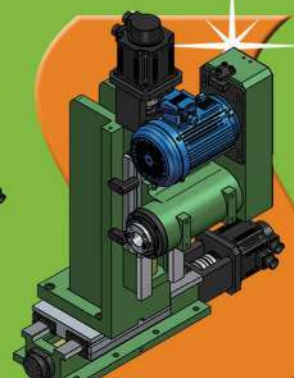
Tapping Spindle Head



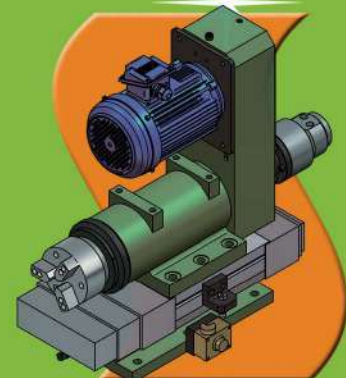
XY Servo Hardness Slide Unit



Servo Facing Head / Servo Ball Screw Slide Unit



XYZ Servo Slide Table + Milling Head



3-Jaw Chuck Spindle + Slide Unit



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# FIVE COMMON MISTAKES IN CNC PROGRAMS

The listed mistakes does not lead to a failure in program, but nevertheless cause confusion, wasted time and scrap parts.



Source: Modern Machine Shop

**T**oday's CNCs allow great flexibility for programming, not just with syntax but with the overall structure of a program. While flexibility is usually a good thing, having too many ways of doing something often leads to reduced consistency, clarity and ease of use. This can result in serious usage mistakes. Here are the five we find most in CNC programs:

## **Insufficient or non-existent program header**

**Mistake 1** Everyone in the CNC environment must know what a given CNC program does. All programs should start with a series of documenting messages, called a program header, that provides pertinent, easily interpreted

information. For instance, a program header can help setup people know who to contact if issues arise, help operators know that they are running the correct version/revision of the program and help production control people determine the program's execution time. Include anything in a program header that could answer all likely questions. Part name and number, revision, operation number and storage location in the DNC system are all critically important. Programmer name, date created, date last revised and program execution time are of lesser importance but should still be considered. Think through your company's own circumstances to determine what should be included in your program headers.



## **Insufficient documentation**

**Mistake 2** In similar fashion, people running CNC programs must know what the program is doing as it runs. Insufficient documentation leads to confused operators, which at the very least results in wasted time as they figure things out. Worse, misinterpretations can result in mistakes that cause scrap workpieces and even damaged machines. Messages should be placed in the program any time a setup person or operator needs to know what is happening. These should be included at every tool change to describe the next cutting tool, at every program stop (M00) to tell the operator what to do, and any time something unusual is happening, such as using multiple

MIKE LYNCH  
Founder & President  
CNC Concepts Inc.



offsets to control the size of two or more machined surfaces. Anything you can do to eliminate confusion is fair game for your documenting efforts.

**Mistake 3**  
**Missing safety commands**

CNC machines have many programmed modes, and the appropriate mode for each condition must be in effect when a program is run. If a program specifies metric coordinates, the machine must be in the metric mode when you run the program. Other mode selection examples include absolute/incremental, spindle speed and feed-rate type, and plane selection. Additionally, the machine must be in canceled states for certain programming features. If the machine is in the wrong mode for any of the possibilities, results will range from confusing to catastrophic. Place safety commands (a series of G codes) at the beginning of your CNC programs to ensure that every possible CNC mode is appropriately set.

**Mistake 4**  
**Missing restart commands**

For machines that allow it, CNC setup people and operators must be able to rerun


cutting tools from time to time. This will save time, keeping them from having to run the entire program just to get to the cutting tool that must be run again. The setup person may be five tools into verifying a program, for example, before they discover something is wrong.

For operators to be able to rerun tools, certain redundant (currently instated) CNC words must be included at the beginning of each tool. They commonly include spindle speed and activation, coolant activation and axis-positioning commands.

**No help for setup people and operators**

**Mistake 5** A CNC program must do more than allow the machining of good parts. Whenever a CNC setup person or operator is involved in the process, the CNC program must help in every possible way. While setup people and operators can make even poorly developed programs work, they often take excessive time and sometimes make mistakes while doing so. Consider, for example, the task of trial machining, which is often required when machining critical surfaces. It involves adjusting an offset in such a

way that excess stock is left on the critical surface, machining under the influence of the trial machining offset, stopping the machine, measuring the surface, readjusting the trial machining offset and rerunning the tool. This process is cumbersome and prone to error. You can dramatically simplify the process by using the block delete function (turned off for trial machining, on for not), programming the trial machining operation.

Other examples include programming offset entries for known offset values with G10 commands to keep from having to enter them, creating programs consistently so operators can become familiar with your methods, and using canned cycles to allow easy program verification and optimizing. Any time you see a CNC setup person or operator struggling while running a program, find a way to make the program help them. Some programmers eliminate safety commands for modes that are initialized (automatically instated during power-up) thinking the machine will still be in the initialized state when the program is run. This can be a terrible mistake since modes can be easily changed after power-up, yet before programs are run. 

**People running CNC programs must know what the program is doing as it runs. Insufficient documentation leads to confused operators, which at the very least results in wasted time as they figure things out.**



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# TRANSFORMATION IS A PROCESS

A deliberation on the drivers of digital transformation in manufacturing, and how multi-site enterprises can ensure consistent processes, reporting and analysis that ultimately unlock the true value of their business.

KEITH CHAMBERS  
Director  
Product Line  
Management  
AVEVA



MICHAEL SCHWARZ  
MES/MOM Software  
Senior Product  
Marketing Manager  
AVEVA



**B**ack in the nineties there was an influx in ERP implementations, and companies invested in rolling out SAP or other ERP systems to standardize their business processes. Those companies are now leveraging previous technology investments to redefine how they run their businesses through global transformation initiatives. These initiatives are meant to give businesses the agility they need in their operating processes to be able to adapt to fast changing markets and competitive forces. A recent KPMG survey showed that 93 percent of US-based multinational corporations are either currently initiating transformation or have already implemented it, and these are major investments often running into the \$100M range.

Business transformation is closely connected to the digital transformation happening everywhere which is changing both B2B and B2C relationships and related expectations in user experience and services. But with all that, business transformation, like ERP implementations before, gets stopped at the gates of the plant, which is where the businesses' primary value creation occurs.

### **Manufacturing operations transformation**

All industrial manufacturing companies have started their transformation journey with plant and machine automation and the gains of productivity and process repeatability that brings. Plant equipment automation minimizes the amount of manual operations and maximizes the physical throughput. To further improve the utilization of equipment, plant operations have matured into using information technology (IT) and soft-

ware applications as the basis for improvement strategies such as replacing paper-based work instructions and data collection.

#### **First generation software and IT adoption**

The use of software and IT, such as Manufacturing Execution System (MES) has provided more benefits than increased operational efficiency through core application functionality. Historical data and modern big data analytics offer additional payback opportunities by providing optimization insights and facilitation of continuous improvement. Visibility of operational execution and inventory status based on automatic data exchange with enterprise systems in near real-time enables better decision-making and collaboration between plant and enterprise functions.

The return (ROI) on these plant MES investments has been and continues to be based on improvements to operational efficiency and quality, both directly impacting bottom line results.

**Operational Efficiency**-increased asset performance and plant throughput, faster product change-over, increased productivity.

**Increased Quality** - enforcement of product and process specifications, reduced waste and rework, detailed traceability, indications, and management of nonconformance, effective recalls.

Manufacturing Operations Management (MOM) and supporting Manufacturing Execution System (MES) software have made great strides in bringing order, but unless they are easy to use and model the real-world dynamics of the plant, they may not be used to their fullest potential. Manufacturing Operations Transformation (MOT) is the continuation (or beginning)

of transformation activities that align these manufacturing IT systems across the business to provide both operational and business improvements.

According to McKinsey, digital manufacturing technologies will transform every link in the manufacturing value chain, from research and development, supply chain, and factory operations to marketing, sales, and service. Digital collaboration among designers, managers, workers, consumers, and physical industrial assets will unlock enormous value and change the manufacturing landscape forever.

#### **Drivers of digital transformation in manufacturing**

Technological advances in big data and predictive analytics, business process management, mobile applications, and augmented reality are enabling manufacturers to empower operators and decision-makers to make sense of operational data. Newer platform and integration technologies like cloud, IOT, IIOT, smart and edge devices are driving down the cost of digital transformation in the manufacturing sector.

#### **Plants have fallen behind in digital transformation of business processes**

Plant operations are traditionally set up as multiple functional domains operated by separate teams and with separate systems for inventory, production, quality and maintenance activities (using the ISA 95 segmentation of operational activities in manufacturing). Software to manage operations in these domains exists on the plant and enterprise level but for collaboration across these domains, knowledge and experience are still required for operating and maintaining plant or manual approaches. Such approaches

**Manufacturing Operations Management and supporting Manufacturing Execution System software have made great strides in bringing order, but unless they are easy to use and model the real-world dynamics of the plant, they may not be used to their fullest potential.**

**Finding a provider that offers industry leading technology and domain expertise will improve deployment time and help you get started while minimizing business disruption.**

are too inconsistent and isolated and, when analyzed, prove to be inefficient. Collaboration is also challenging with traditional methods, and when the experts retire or change jobs their expertise goes with them.

#### **Collaboration across people and systems**

A key factor for future manufacturing operations improvements is the effective collaboration of people and systems in a digital, automated and integrated fashion. The element that can bring these together in industrial operations is Business Process Management (BPM) technology integrated with a manufacturing IT platform to connect with plant floor processes, people, data and systems. Digital transformation of operational processes using a business process management system (BPMS) can be used to capture and transform best practices into

electronic workflows, to connect assets and systems, establish systematic people and system collaboration and to empower the mobile and next generation workforce. It can orchestrate process across functional domains (horizontal integration) and can integrate with business functions (vertical integration). Enforcing consistency of operational procedures and the automation of workflows with electronic records of manufacturing execution activities and data preserves the investments in existing plant systems while offering significant operational efficiency improvement potentials.

#### **Multi-site manufacturing operations transformation**

Many manufacturing businesses have grown by mergers and acquisitions, becoming large national, multinational or global organizations. These companies

are now equipped with multiple production plants across regions for producing the same, similar or variations of products. These plants often represent very heterogeneous plant system landscapes and varying practices for similar operational activities and business targets.

These multi-site enterprises are changing to a broader transformative view of manufacturing to make use of new significant ROI opportunities that are unique on a business-wide basis:

- Business-wide scorecards and consistent KPIs for transparency in cost, capacity and inventory across the enterprise;
- Operational excellence, lean and continuous improvement cultures that need to collaborate and share best practices;
- A consistent, documented approach to regulatory compliance to minimize risks;



- A connected enterprise for visualization and accessibility of information anywhere and anytime, to increase business agility and the ability to innovate faster;
- Reduced cost of ownership while reducing the number of applications across the business to facilitate standardization in IT and operations.

**Standardization of processes, KPIs and plant integration across a multi-site business**

The primary enabler of an effective multi-site Manufacturing Operations Transformation is the enterprise-wide standardization of operational processes, enabled through the standardization of information technologies. Such IT harmonization is the foundation to digitally model, integrate, execute, and govern operational processes and

related information flow consistently across multiple plants. Standardization of operational processes is possible with the following components:

- An open engineering and runtime platform, leveraging Business Process Management capabilities, hardened for industrial use and designed for enabling integration of business, manufacturing operations and production processes and data.
- A broad suite of industrial applications scaling from rapid ROI equipment performance optimization to full manufacturing operations management functionality.
- A reusable operations process modeling approach, which standardizes all operations, simplifies deployment of processes to equipment, systems and people.

**Ensuring consistency across varied plants**

The physical attributes and even the level of automation of manufacturing plants in an enterprise may vary, but what standardization strives for is a common way of monitoring and measuring operational efficiency for decision support and interacting with each manufacturing location for process execution.

The role of a manufacturing IT platform is to provide adaptability to local plant nuances and a plant asset model which applications can use to blend human and automated activity in the execution of standardized processes and business rules. The platform adapts to individual local physical equipment and automation, while maintaining the data and information models of the processes and flow of data to other applications and towards the enterprise.

A configurable, model-driven approach to work processes and

related user interfaces enables reusability of captured best practices and enforces operational procedures as corporate standards which can be quickly implemented and sustained for adopting change in a version-controlled fashion for each plant connected through the manufacturing IT platform.

This ultimately enables manufacturing industries to make operational improvements and digitally transform operations consistently across multiple sites, with adaptability to the site-specific nuances abstracted in a digital plant information model.

**Get started**  
**How to get started on your Manufacturing Operations Transformation journey**

Multi-site digital and operational transformation must happen incrementally, in phases that align with your business strategy.

There are several factors to consider when choosing a partner in your MOT journey. First, you need a trusted solution; finding a provider that offers industry leading technology and domain expertise will improve deployment time and help you get started while minimizing business disruption. This is a journey, so you want to find a company that will provide services to support your transformation.

Connectivity is also key - your solution should have built-in connectivity to existing plant floor systems, devices and equipment automation. It is vital to ensure an easy-to-use, accessible user interface for a process-based approach to manufacturing operations management. If you are a global manufacturing organization, finding a supplier with global program management, support, and a system integrator network is a must.

**A key factor for future manufacturing operations improvements is the effective collaboration of people and systems in a digital, automated and integrated fashion.**



Source: Magic Wand Media

# PUSHING BOUNDARIES

Dr Susanne Bieller, General Secretary, International Federation of Robotics (IFR), in this interview with Soumi Mitra, Editor in Chief, MMI, sheds light on the changes she has been observing in the manufacturing sector's acceptance of robotics over the years, the spurred interest in it due to Covid-19, India's current position in the adoption of the technology and its promising prospects...



Source: IFR

Dr Susanne Bieller, General Secretary, International Federation of Robotics (IFR)

**Mitra: Kindly tell us about the vision and objectives of IFR as well as your contribution to the organization.**

**Dr Bieller:** IFR connects the world of robotics around the globe and acts as the voice of the global robotics industry. We aim at promoting and strengthening the robotics industry worldwide and at increasing public awareness about robotics technologies. Part of our mission is also to foster the collaboration between companies and academia around the globe. In order to do so, IFR is compil-

ing the annual statistics on the global robotics market, which is esteemed and often known as World Robotics. Furthermore, we publish positioning papers on the big megatrends impacting our industry, like cobots, AI and digitization.

As General Secretary, I am responsible for coordinating the work of our different committees and bodies, and, in close collaboration with our President and Executive Board, for representing the IFR both towards international organizations like the OECD (Organisa-

tion for Economic Cooperation and Development) and UNIDO (United Nations Industrial Development Organization) and at events like conferences and trade fairs. Last but not least, I am also in charge of our PR activities. With the attention robotics has gained in the past years, this is an exciting and challenging task, which provides the huge opportunity to influence the public perception of the technology and the acceptance of robots in society. It is a very fascinating sector to work for!

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**Since you have been seeing the industry closely for a long time, what are the prominent changes that you have observed in terms of acceptance and deployment of robotics in the manufacturing sector?**

When I started in robotics, robots always had to be hidden behind fences. They were well established in the Automotive sector. Next, we saw the rise of robotics in the Electronics industry, which requires robots quite different from those used for building cars. Then came the introduction of the so-called cobots, and robots suddenly could leave their cages and work alongside humans. This was accompanied with the public perception that robots are taking jobs away from humans. Thanks to PR work of the IFR and many other associations, a lot has changed since. The understanding rose that it is not either robots or human workers, but rather both or nothing: companies need to deploy robots and automation solutions to stay competitive and maintain jobs. Trade unions are increasingly supportive and welcome the deployment of robots. Nowadays, new sectors are increasingly using the technology, and new technological developments are backing this.

**Covid-19 has changed the way the manufacturing world operated. The pandemic and resulting worker health-and-safety requirements have spurred interest in robotics in the supply chain. How much, according to you, will the adoption rate for robotics and automation increase in the time to come?**

It was indeed amazing to see how the pandemic has spurred the interest in robotics. The motivation to invest in technology is multifaceted: At the beginning of the pandemic, we saw production outages due



Source: IFR

“Since 2009, the number of robot installations in India has been growing rapidly with an impressive growth rate of 39 percent, resulting in a new peak at almost 4,800 units in 2018. India now ranks eleventh regarding annual installations. This strong growth is not a one-hit wonder, but rather continuous for several years now.”

**Dr Susanne Bieller  
General Secretary  
International Federation of Robotics  
(IFR)**

to disruptions in global supply chains. Companies now review this and consider to re-shore the production of critical parts, which often requires automation to keep costs under control. Then companies faced issues to implement social distancing rules, so they investigate how robots can help to uphold production. We can observe now what we have already monitored in crisis situations before: companies using automation are more resilient and recover faster from exogenic shocks.

How fast and to what extent this will translate into business and higher adoption is certainly well linked to the recovery of the industry in general. We see an increased interest in robotics solutions around the globe, not only by the large players, but also by SMEs and by sectors that were hesitant to automate their production processes. At the end, the implementation of projects, and thus the adoption

rate is strongly dependent on the availability of capital for the necessary investments. Equally important are the skills that need to be ready. First of all, for the integration process: combining process knowledge with the insight on robots, but in the long run, also for operation, maintenance and necessary adaptations to the manufacturing setup. We are facing a shortage of skilled workers today so in order not to limit the further adoption, we need to speed up skilling, up-skilling and re-skilling measures.

**How much role does robotics play in Industry 4.0? Which are the other advanced technologies where you see robotics contributing?**

The vision of Industry 4.0 is of a seamless automated process from order through to dispatch and delivery. Machines can communicate with each other as well as report on their own status, producing data that can be aggregated across multiple machines or an entire process. This data can be analyzed and used to anticipate bottlenecks in the production process as well as forecast when machines need servicing, saving costs in machine downtime which can run to millions of dollars per minute. The digitization of parts or the entire manufacturing process brings various advantages to manufacturers which, collectively, lead to significant productivity increases and cost savings. Robotics certainly are a core element of Industry 4.0 since they offer a huge versatility to either connect different machines on the shop floor, be used as a tool to manipulate objects, or simply handle and move parts or finished goods. Connecting smart robots to a Cyber-physical system on the manufacturing

**In combination with AI technologies and improved sensors, robots will be enabled to sense and respond to their environment and positively impact our daily life.**

**We see an increased interest in robotics solutions around the globe, not only by the large players, but also by SMEs and by sectors that were hesitant to automate their production processes.**

floor brings additional benefits like lower cost of quality, traceability, performance optimization through internal knowledge-bases, real-time and remote fault detection / solving as well as condition-based monitoring, maintenance and inspection, decreasing overall downtime and avoiding unexpected shut-downs.

Robotics will also play a major role in the workplace of the future. For instance, robots make work safer and less physically demanding. Robots already carry out a variety of dangerous tasks. New developments in collaborative robots and exoskeletons will reduce chronic health complaints associated with unergonomic tasks, particularly heavy lifting. They will also support manufacturing employees in decision making, through better information from machine performance data that can be analyzed for machine and process optimization.

In combination with AI technologies and improved sensors, robots will be enabled to sense and respond to their environment and positively impact our daily life.

**Where do you think India stands in the adoption of the technology as compared to other developed nations?**

India is one of the strongest growing economies among the Asian emerging markets. But due to low wages and insufficient infrastructure, using automation in the production process is not always the preferred option.

However, since 2009, the number of robot installations has been growing rapidly and - while the global results were quite moderate - India saw an impressive growth rate of 39 percent, resulting in a new peak at almost 4,800 units in 2018. India now ranks eleventh regarding annual

installations. This strong growth is not a one-hit wonder, but rather continuous for several years now, as the annual compound growth rate of 20 percent between 2013 and 2018 shows.

Since the adoption of robots has only kicked off in the recent years, India still needs to make up the leeway. To be able to better compare the adoption rate of robots among countries differing in size and share of manufacturing, IFR calculates the value called robot density, which is the number of industrial robots in operation per 10,000 employees in the manufacturing sector. The global average across all countries monitored by IFR is currently at 99. Frontrunners Singapore and South Korea are at 831 and 774, respectively. India currently has a robot density of 4, which still leaves quite some room for improvements - prospects for India are promising.

**The Automotive industry is the major end-user of the industrial robotics market in India. Could you please provide us with a global perspective?**


The other two major customers of robots in India are the Rubber and Plastics industry and the Metal industry, each with a 9 percent share. The Automotive industry is by far the largest customer industry, with a share of 44 percent of total installations, but growth driver in 2018 was the General industry comprising of the Rubber and Plastics industry (9%), the Metal industry (9%) and the Electrical/Electronics industry (5%), increasing by 28 percent. We thus see that robot use in the non-automotive manufacturing is catching up with the Automotive sector. The two main applications in India, which make up 86 percent of the market are accordingly welding and handling operations.

On a global scale, Automotive (30%) and Electrical/Electronics (25%) are the two major customer industries, followed by the Metal industry (10%). Plastic and chemical products globally only account for 5 percent of installations.

**According to UK-based data analytics firm GlobalData, adoption of robots to treat Covid-19 patients is expected to grow in India. Will the healthcare industry become the major end-user of the Industrial Robotics market in India during and post pandemic?**

Within the robotics market, we distinguish between industrial robots and (professional) service robots. Robots used in healthcare and medical applications belong to the second category. Since the outbreak of the pandemic, we have indeed seen a vast number and different types of service robots used in hospitals and care facilities. To give just a few examples from around the globe: we have seen telepresence robots enabling contactless communication between patients and medical staff, mobile robots used for scanning the body temperature of people strolling the corridors of hospitals and other care facilities, robots used for disinfection and such supporting hospital logistics - bringing food and consumables into isolation wards. Humanoids are naturally not the best solution for this.

Moreover, industrial robots are also used to automate lab tasks to be able to upscale testing against Covid-19 and even to automate the process to take throat swabs.

The Robotics industry has taken the pandemic as an opportunity to showcase its creativity, and the flexibility and adaptability of robots to quickly come up with diverse solutions to the problems we suddenly faced in the pandemic. 

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# BROADENING HORIZONS

MAG India Industrial Automation Systems Pvt Ltd has had remarkable growth in a wide range of industries including automotive, aerospace, defense, power, die & mould, medical equipment, and railways. A snapshot of its accomplished goals that have made it win a coveted position in the machine tools industry...



Source: FFG MAG India

**F**FG MAG India's journey has been very exciting since its inception in 2006. This was the time when many of its global automotive OEM customers had moved to India to set up their plants. "This gave us the opportunity to deliver high technology manufacturing systems for powertrain and axle components (cylinder blocks, cylinder heads, transmissions, crankshafts, knuckles, etc.). Some of these systems were agile (with full flexibility) and some were hybrid (a combination of special and flexible machines) with either automation (gantry loaded systems) or manual direct loading of components," shares Shashank MP, President, FFG MAG India.

The company then forayed in the areas of aerospace, defense, power and railways, executing several key projects with its turning machines, double column machines, grinding machines, and heavy-duty horizontal machining centers. FFG MAG India has also made a remarkable footprint in the Automotive tier segment over the last five years. "As our customer base started increasing in India, we also grew at every stage. In the year 2011, we set up a technology center in Bangalore as the first step before manufacturing. This facility was equipped with demonstration capabilities, in-house fixture design, and manufacturing along with a quality assurance facility," he adds.

In the year 2016, the company took its first steps towards local machine building and local service of its MAG motor spindles. "We have been highly successful in establishing a full-fledged and state-of-the-art manufacturing facility in Bengaluru spanning 80,000 sq ft. We also have established our strong presence in nine locations across India – Bengaluru, Chennai, Coimbatore, Kolhapur, Pune, Baroda, Ahmedabad, Delhi, and Jamshedpur – to support all our customers in terms of service, application, and sales," he shares further.

**Growing strong**  
The new facility of FFG MAG India in Bangalore has been built with a

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strategic long-term plan for the group in India and a strong commitment from the company to its customers, explains Shashank.

The facility is capable of handling vertical and horizontal machining centers up to very large double column machines and heavy-duty turning machines. As the company's main focus is on delivering technology solutions, which often involve automation like gantry systems, the new facility also facilitates the demonstration of complete systems including such automation equipment to customers.



"Currently, we are focused on a couple of products from our portfolio in this facility which are MAG SPECHT horizontal machining centers and FEELER VMP and VMX vertical machining centers. Both these series of machines cater to the requirements of high-precision and high-speed machining applications. With these machines, we supply products and technologies to the Automotive (Passenger car and commercial vehicles), Farm equipment, Die & Mould, Aerospace, Defense, Medical equipment, and General Machining applications. We also execute projects for crankshaft manufacturing systems with our VDF BOEHRINGER crankshaft machines in combination with SPECHT machines," he informs.



Source: FFG MAG India

"Our group companies have substantially contributed to the progress in industrial manufacturing and are well known as reliable and innovative equipment and systems solutions suppliers for the automotive and truck, aerospace, general machining, railway industry, energy, defense, medical equipment and heavy engineering industries."

**Shashank MP**  
President  
FFG MAG India

The company has also expanded the fixture manufacturing in the facility which supports its global fixture requirements in addition to that of the local market. "We export about 200 fixtures every year to MAG Germany and MAG North America. The quality assurance setup has been enhanced and augmented to cater to the increased production requirements," he adds.

The new facility also has a state-of-the-art spindle repair and reconditioning facility with experienced spindle specialists. "In this facility, we are able to service both our motorized and gear-driven spindles," he shares.

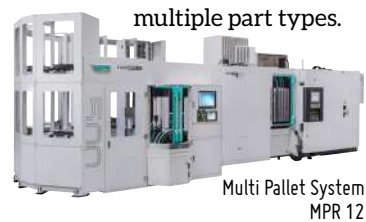
FFG MAG India also has a highly skilled and qualified engineering team that takes care of machine design, fixture design, tooling design and turnkey solution design.

### Comprehensive automation offerings

MAG has gained quite a reputation in the

industry owing to its automation systems. Elaborating on its automation offerings in India, Shashank speaks about the MAG SPECHT series machines that can be integrated easily in any manufacturing process. "This means the automation concept and the type of installation can be freely configured. Loading from above with the integrated protective tray of the gantry as well as manual or automatic loading from the front are alternatively executable. The most common forms of automation being executed in our projects are gantries (overhead loading), stationary or rail-guided robotic loading (front loading). In some cases where cost is a key factor, simpler conveyORIZED automation for part loading from the front and the side of machines is implemented," he explains.

Another important product that the company offers to support unmanned batch production is the Multi Pallet system MPR12. The system has the capability of storing multiple fixtures with components loaded in parallel to machining time and can be programmed to automatically run in multiple shifts and handle multiple part types.



Source: FFG MAG India

### Receptive Indian market

According to Shashank, the reason the Indian market has been highly receptive to the company's products is mainly because it leads in technology. "Our legacy traces back to 1798, when our first plant was founded in Germany. Since

then, our group companies have substantially



Source: FFG MAG India

Currently, FFG MAG India is focused on MAG SPECHT horizontal machining centers and FEELER VMP and VMX vertical machining centers that cater to the requirements of high-precision and high-speed machining applications.

**“From the machine tool fraternity perspective, there should be no impact on India’s machine tool manufacturing due to Chinese imports. India has a very robust local supply chain for all components required in the machine tool industry.”**

contributed to the progress in industrial manufacturing and are well known as reliable and innovative equipment and systems solutions suppliers for the automotive and truck, aerospace, machine building, general machining, railway industry, energy, and heavy engineering industries. Our VDF BOEHRINGER turning machines, for example, are preferred for heavy-duty turning applications especially in the Indian defense industry for the last several decades,” he stresses.

One of the unique advantages MAG India offers is its capability of delivering a range of technologies for a wide spectrum of applications:

- **Milling:** Single spindle and dual spindle machining centers, double column machines with 5-axis machining capability, horizontal boring machines, large general purpose milling machines etc.;
- **Turning:** Horizontal and Vertical single and dual spindle turning centers, turn mills, etc.
- Gear hobbing, power skiving, chamfering and deburring machines;
- Integrated grinding solutions;
- Rotary transfer machines.

“Our business strategy is to be known as a full technology and service provider which makes our process begin with customer application and part analysis to determine the process layout. The next step is to identify suitable machines, fixtures, and tools. Following this is the analysis of automation, cell management and networks, data management and diagnostic systems. We are also able to scale this technology integration based on the customer demand,” explains Shashank.

MAG has also pioneered many innovative solutions in India like manufacturing systems with adapter plate technology (to avoid changeovers between part types

and enable flexible lines), minimum quantity lubrication to reduce part piece cost and increase productivity and linear motor technology to reduce idle times on machines. “We have also pioneered the development of honing on SPECHT machining centers with patented spindle technology. This rich technology background and experience with our group has allowed us to serve customers in all leading sectors across India for several decades now,” he adds. He goes on to add that safety is MAG’s first priority, and hence all its manufacturing systems are fully equipped with the safety integration protocols in the control systems and software.

“The major benefit our customers get when we deliver our complete system with automation is that they have one face for all deliverables, lower lead times, best overall equipment efficiency with the best fit of components, high flexibility, integration of turnkey equipment, integration of Industry 4.0 and the ease of retooling our systems in the future,” informs Shashank.

### **Controlling high quality of offerings**

On the practices in place at FFG MAG India for ensuring the quality of its products and processes, Shashank shares that they have adopted similar quality processes as implemented by the company’s global plants with their long-term experience.

“We follow a very stringent Quality Assurance system during the building and testing of equipment. All our assembly and quality engineers are trained by

experts in Germany, North America, and Taiwan on implementing best quality practices in the process,” he adds.

“A significant contribution to the product quality comes from the product design itself. Our equipment is implemented by customers for applications that require high-precision manufacturing. Hence, the machines are designed with intelligent technology to achieve the highest continuous accuracy,” he shares further.

Digitization has been a remarkable step towards creating a positive impact on the cost, time, and quality of production. MAG is one of the first suppliers to take advantage of the benefits of Digital Twins for the process, product, and manufacturing system for the projects. Thus, only NC programs that are tested and optimized on the virtual model and are guaranteed collision-free from the very first start-up are delivered to the fully assembled machine.

“An important step was the introduction of the virtual commissioning, which starts on the model already during the design phase. This allows many optimizations to be implemented even before the real products are built. By far the greatest effect is the spatially separated commissioning of machine and automation, which eliminates the need for joint assembly for preliminary acceptance and reduces project completion by approx. 10 weeks,” he adds.

### **Pandemic hurdles**

The pandemic lockdown has certainly posed severe challenges to the entire economy and most companies across India. On the hurdles the company faced in the months of lockdown, Shashank says, “Safety and health of all our employees and other associated partners is of utmost importance and we have respected and followed all the guidelines that were mandated.

Source: FFG MAG India



Implementation and maintaining adequate PPE for all team members was the first challenge that we had to overcome. As borders were sealed and transport services suspended for a while, some of our suppliers in other states that were severely affected could not supply material on time for our projects.”


However, thanks to a strong order backlog of projects, it was able to recover quickly from the situation. Post the lockdown, the entire team at FFG MAG India demonstrated a high level of commitment in being able to complete the projects and start the installation and commissioning activities at its customer plants.

As far as FFG MAG India is concerned, its imports are mainly from Germany, Japan, and Taiwan. Due to these origins of import, it did not face any major issues with its supply chain. “From machine tool fraternity perspective, there should be no impact on India’s machine tool manufacturing due to Chinese imports. India has a very robust local supply chain for all components required in the machine tool industry,” he notes.

#### Plans ahead

FFG group has a vast expanse of technology and plans to bring most of it to India in phases, shares Shashank. “We are in a

phase of consolidating and increasing our market share in India with great emphasis to products that are built at FFG MAG India along with the machines being imported directly from our parent units in various countries like Germany, Italy, Switzerland, the US, Taiwan, Korea, and Japan,” he adds.

In the next phase, it intends to increase its local footprint by building additional high technology machines in the areas of turning, grinding and large capacity machines to cater to sectors like aerospace, railways and energy-related segments in addition to existing customer sectors. 

**Safety is MAG’s first priority and, hence, all its manufacturing systems are fully equipped with the safety integration protocols in the control systems and software.**



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# UP IN THE AIR

The ever-changing technological requirements and standards for aerospace manufacturing indicate a rapid pace of innovation unlike ever before, but many can get stuck using outdated tools and application methods at the expense of tool life, security and of course – cost.



Source: Sandvik Coromant

**N**ew demands lead to new development in technologies and materials. To be at the industry forefront and deliver the next generation of products, it is necessary to drive innovation towards new cutting solutions, including cutting tools and processes. Sandvik Coromant provides optimized solutions based on its long-term commitment to the Aero industry, R&D and collaboration with leading OEMs and knowledge partners. Our focus is always to deliver innovative tools and proven solutions that meet the high demands from the industry.

## Challenges to be tackled

Following are some of the biggest and latest challenges in Aerospace:

### Challenge #1: The unpredictable nature of alloys and composites

Heat resistant super alloys (HRSAs) – as their name indicates – do not easily conduct heat. As

a result, the heat is transferred onto the cutting tool, reducing tool life, which, in turn, can lead to strain and work hardening in the component being machined. Hardness is a major factor in tool choice as more force is required to cut the material and form a chip, so it will significantly influence the cutting data and speed. Different combinations of layered materials are very difficult to machine. Entrance and exit layers may differ from supplier to supplier, making it difficult to achieve the same results when the recipes for the material are inconsistent. Newer thermoplastic applications are coming up for composites with lower melting points, rendering traditional high speed, light feed strategy for commodity thermoplastics ineffective with composites that have tougher and more abrasive fillers, or both. Composites also absorb impact energy by damage modes rather than plastic deformation, so failures in composite materials tend to be sudden and disastrous.

### Challenge #2: Part complexity and regulations

The Aerospace industry is one of the most highly regulated, which can occasionally choke productivity and process expectations. Many engine parts experience a shape constraint due to mass flow requirements – for example blisks – which can be quite the challenge for standard tooling. Thin walls and tight features are the norm for a blisk – the traditional design trade-offs between part shape and manufacturability simply don't apply. Every part has to be machined exactly as designed; there is no wiggle room for mistakes or imperfections. It's a locked process. When it comes to finishing operations, if a tool is changed, it might trigger a long process of paperwork and approval, maybe even a destructive inspection of the part after it was created for quality control.

### Tips to overcome hurdles

One of the best ways to handle challenging components is with solid carbide tooling with a tro-

choidal technique, especially if you're looking to achieve light engagement with a high feed.

As for HRSAs, proprietary Sandvik Coromant coatings such as Inveio and Zertivo create a thermal barrier which helps protect the substrate from failure. They're also equipped with adhesion reducing properties that help reduce the formation of build-up edge (BUE). It all comes down to cycle and accuracy.

Additionally, rather than looking at cost per tool, it is best to consider cost per component. How many changes and adjustments do you make during the operation? Are the accuracy and surface quality satisfactory? Is this tool path giving you optimal performance and results? Are you actively trying to reduce the amount of scrap?

Sandvik Coromant puts more resources into research and development than any other company in the metal cutting industry. This has resulted in numerous tooling innovations. By pursuing long-term research projects within the framework of various national and international research programs, it constantly develops its knowledge as a foundation for future innovations.

### **Flexibility, while saving time and money**

The Coromant Capto® modular tool holding system gives flexibility to optimize the required length, while keeping maximum stability and minimum radial run-out for high metal removal rates. Stability and modularity combined with the shank clearance are essential for machining long overhangs and reaches.

The modularity also reduces the required tool inventory, and the quick-change system saves a lot of set-up time, compared to conventional holders.

### **Strong and reliable grade chain for titanium milling**

Grade S30T focuses on productivity and cutting speed, while S40T improves security in unstable and difficult machining conditions, for example when the cutter path is not optimized.

### **For optimum stability**

For process security and minimum run-out in applications requiring high metal removal rates, use a CoroChuck™ 930 hydraulic chuck with sealed cylindrical collet. Easy handling combined with the best pull-out security on the market, for high-precision repetition. You can choose from HD, slender, and pencil versions, with a large number of machine interfaces.

### **Maximum versatility using Coromant EH modular systems**

The Coromant EH exchangeable-head system makes it possible to choose from an extensive variety of



Source: Sandvik Coromant

heads, adaptors and shanks, to build exactly the tool you need. Combine the head required for the operation with round shanks, Coromant Capto®, or HSK clamping standards. Use long or short adaptors, with optional coolant or Silent Tools™.

### **Vibration-free machining with long overhangs**

Silent Tools™ damped solutions for milling enables machining of long overhangs that otherwise would be difficult to reach.



Source: Sandvik Coromant

Chatter and vibration are effectively eliminated, the machining parameters can be increased, and process security improved.

CoroMill® 390 with integrated Silent Tools™ technology is a merge of the most versatile milling cutter concept and Silent Tools™ for unrivalled productivity with small diameter milling cutters on slender undersized shanks. The concept is available for insert sizes 07 and 11 for minimized vibration and increased productivity.

Whether you increase your metal removal, improve your surface finish, secure your process, or reduce your production costs, you will certainly enjoy the silence.

### **Titanium drilling**

CoroDrill® 880 brings the best combination of process stability and productivity. The reinforced drill body is now stiffer for applications of 4-5xD. This gives a reliable drilling experience and superior hole quality. CoroDrill® 880 provides efficient chip evacuation in all materials and a smooth entrance into the workpiece featuring Step Technology™. It is also available for larger holes, equipped with replaceable rigid cartridges for high reliability, flexibility and process security. CoroDrill® 870 is the exchangeable tip drill with an accurate and secure interface between



Source: Sandvik Coromant

the tip and tool body. The tool features high productivity, a close H9-H10 hole tolerance and grades that offer excellent tool life.

CoroDrill® R846 delivers great hole tolerance and quality with high process security, this using a

**For process security and minimum run-out in applications requiring high metal removal rates, use a CoroChuck™ 930 hydraulic chuck with sealed cylindrical collet.**

Source: Sandvik Coromant



unique geometry, a high-quality edge line and a wear-resistant top coating.

### Reduce inventory and cut costs

The CoroMill® 316 exchangeable milling heads allow quick, easy, and accurate switches between various operations. With a quick tool change, you can get the perfectly suited end mill type, radius variation, tooth frequency, geometry, and grade.

A strong cutting head and shank interface provides high strength for roughing and high rigidity for finishing.

High stiffness and low deflection make it possible to machine deep pockets with long overhangs, as well as allowing high accuracy in finishing operations. Internal coolant on selected assortment delivers superior chip evacuation and a secure cutting process.

Productivity, versatility, reduced inventory, quality and tool costs are main advantages with CoroMill® 316.

The CoroDrill® 863 family is developed for titanium material stacks or in combination with other materials such as aluminum, stainless steel, CFRP or HRSA.

These drills are the perfect solutions for ADU and CNC machining applications. Advanced engineered solutions are available for more challenging applications.

### High feed milling

Sandvik Coromant provides a wide range of milling cutters for high feed milling in titanium, such as CoroMill® 415, CoroMill® 210, CoroMill® 316 and solid carbide end mill CoroMill® Plura.

CoroMill® 415 is a small-diameter high feed face milling concept. The high metal removal rate and the four-edged inserts provide reduced cost per component and increased productivity.

The cutter also provides a reliable, secure performance thanks to the unique iLock™ insert clamping interface.

CoroMill® 415 can be combined with the Coromant EH exchangeable head coupling and Silent Tools™ damped adaptors for vibration-free machining.

### Long-edge cutter for highest metal removal

The CoroMill® 690 long-edge cutter has been developed exclusively for 2D profiling, pocketing, and edging of titanium. The iLock™ interface prevents insert movement and enables high metal removal rates with security. Its design makes it cut light and require minimum power. Each coolant

hole is threaded to allow small-diameter nozzles for high pressure coolant applications.

### Solid carbide end mills for quality-demanding components

For quality-demanding



components and difficult applications, CoroMill® Plura is the answer. CoroMill® Plura guarantees close tolerances and efficient machining.

The offer includes optimized tools with geometries and grades specific for titanium, maximizing your production levels. Complementary to the standard assortment are our customized solutions. There you can choose between tailor-made or advanced engineered solutions, depending on your application complexity.

### Effective and secure profile and face milling

CoroMill® 600 is a modern innovative milling cutter with ramping capability, based on Sandvik Coromant's unique iLock™ insert clamping solution. This means easy and accurate indexing, with no need to remove the holding screw.

The innovative insert geometry generates light cutting action. The cutter is designed for roughing and semi-finishing, and has through coolant with pre-threaded coolant holes for applications with high-pressure coolant.

### Global support for the aerospace industry

In situations where the standard product assortment is not enough, many products have an extended tailor-made programme, where one can choose from a wide range of parameters to fit the application.

Using engineered solutions, an even higher degree of customization is possible. By designing the tools according to the specific component requirements, maximum process quality can be obtained.

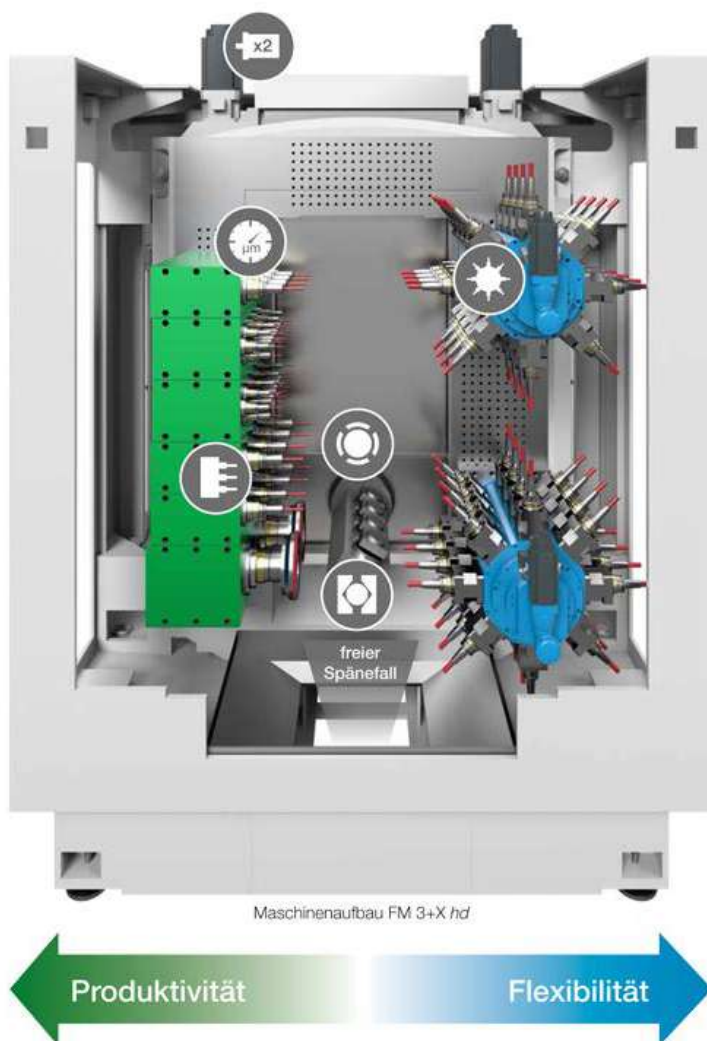
In order to help our customers quickly and accurately, we have a large number of centers around the world, for training, engineered solutions and customer support.

Source: Sandvik Coromant



# TOGETHER WE GROW

A development partnership between special machine manufacturer ELHA and tool manufacturer MAPAL that made accomplishing the desired results possible...



Schematic representation of a production module

cess development and the construction of fixtures all the way through to complete, ready to operate solutions with automation and production support.”

### Special tools for low total costs

“The machining tasks are often as unique as the parts themselves - including in terms of the workpiece materials,” adds Alexander Wiesner, Technical Advisor, MAPAL. “Of course, a lot of machining work on complex parts can be achieved with standard tools. But that often comes with significant drawbacks in terms of cycle times, quality, and cost-effectiveness, particularly when large quantities are being produced.” In these cases, special tools that are precisely calibrated by MAPAL for the machining task in question are preferred.

“During the tool design phase, it’s essential to determine the necessary parameters for the machining process,” says Wiesner, “particularly in the case of challenging geometries.” In order to design the process in the best possible way, MAPAL often makes prototype tools. These are then used to carry out extensive tests with the part to be machined. “That, in turn, helps the equipment manufacturers design the machine with the values identified during testing,” continues Wiesner. He says that MAPAL has had a long standing partnership with ELHA in this area. The following three examples demonstrate the resulting benefits to customers:

“We have a unique approach when we receive customer inquiries,” says Meinolf Wolke, Sales Team Leader, ELHA MASCHINENBAU Liemke KG (ELHA) in Hövelhof. The medium sized, owner-managed special machine construction company places the workpiece and its machining at the center of development and devises an optimal solution perfectly designed for the process

sequence. “In doing so, we take all the technical and economic requirements into account,” clarifies Wolke further. Only then do those responsible decide whether an existing machining concept can be used for the process or whether an individual, application specific construction is required. He explains: “Along with providing the machine, we offer services that stretch from pro-

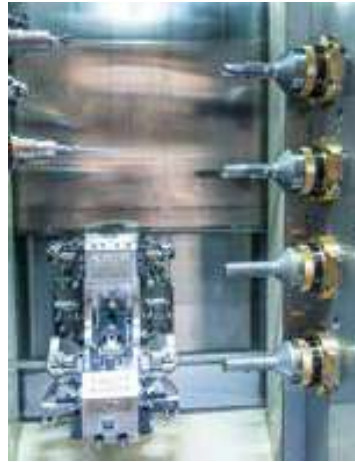
Source: ELHA

Source: MAPAL  
Präzisionswerkzeuge  
Dr. Kress KG

**“A lot of machining work on complex parts can be achieved with standard tools. But that often comes with significant drawbacks in terms of cycle times, quality, and cost-effectiveness, particularly when large quantities are being produced.”**

### **Solid drills for the machining of suspension arms**

“We were dissatisfied with the solution that we had been using for drilling from solid in aluminum when machining a suspension arm, which included creating a fitting,” remembers Friedhelm Dresmann, Project Leader, ELHA. At the time, the company was using tools with brazed PCD cutting edges. In order to keep the machining time as low as possible, these drills were being used with very high feed rates. The disadvantages of this solution were the high drive power required and the insufficient durability of the PCD cutting edges on the solid drill step. In search of a solution, those responsible at ELHA turned to MAPAL. Together, the employees of the machine manufacturer and the tool manufacturer worked to find a solution. What they came up with was a hybrid tool. The tip of the tool is equipped with three bladed, CVD diamond coated, ISO indexable inserts for drilling from solid. The fitting is created using brazed PCD cutting edges on the second step of the tool. MAPAL’s research engineers tested the new tool in their own R&D



Arrangement of four step drills on the right hand side of the working area of a production module.

Source: ELHA

center. The results were impressive. In addition to the lower costs of the indexable inserts overall, the positive blade geometry meant that less drive power was required. What’s more, the previous solution had often produced long metal chips – with the new tool, this was no longer an issue. The indexable inserts at the tip of the drill, which are under significant stress, can be quickly and easily flipped or replaced. As a result, the maintenance costs were also noticeably reduced. Altogether, the suspension arm manufacturers’ production costs for each drilled bore were reduced by over 50 percent.



Quadruple application of disc milling cutters on control arms. The solid cutting surfaces provide an indication of the high drive power required.

Source: ELHA

### **Disc milling cutters for the machining of suspension arms**

“We also worked with MAPAL to find an efficient solution for machining forged suspension arms,” explains Marcel Thieschneider, Project Leader, ELHA. “Our goal was to develop process reliable tools while maintaining the required cycle times.” For the suspension arm, a yoke needed to be created from the solid material at the end of the arm. During the required four spindle machining process, the long chipping workpiece material demands very high drive power to the machine. In addition to this, the internal contour of the part features a number of angles and radii, making the expulsion of chips during milling difficult. In order to ensure short process times, we developed a disc milling cutter with ISO indexable inserts that enables roughing and finishing with minimum quantity lubrication in just one step,” recalls Wiesner. The indexable inserts are coated with CVD diamond. The precisely defined arrangement of the individual inserts limits the drive power required. After considering the comprehensive tests at MAPAL and the data that resulted from them, ELHA set its machine to operate at this drive power. A positive side effect of using the disc milling cutter was the reduction in cycle time, as only one cut is needed. On top of that, the tool only occupies one row of spindles, reducing the resulting tool costs for the end customer.

### **Deep hole drill for the machining of stainless steel forged components**

“Our customer is a manufacturer of high pressure fuel-supply distributors for petrol engines. This requires drilling

deep bores in narrow, forged, stainless steel blanks,” says Jörg Rodehuts Kors, Project Leader, ELHA. The material is difficult to machine, and the bore is 300 mm deep. The drill needs to experience as little axial deviation as possible, otherwise wall of the part (which experiences high pressure) will fall below the required minimum thickness. Previously, the manufacturer machined these bores in a separate, single spindle machine tool with a single flute deep hole drill.

In order to optimize their processes, the customer asked ELHA to provide a solution in which the process described above, along with all other machining tasks, could be performed on a single production module using multiple spindles. The parts should leave the production module in ready-to-install condition.

ELHA enlisted MAPAL to assist with the bore process previously discussed. The tool manufacturer was asked to provide a drill that was able to carry out the machining more quickly – and with less deviation and less wear and tear. The MAPAL engineers developed a double edged solid carbide drill designed to meet the requirements perfectly. With application parameters of  $V_c = 90$  m/min and  $f = 0.5$  mm, the new tool achieves a tool life



A peek inside the interior of a production module reveals that it features two spindle row revolvers (left) as well as two quadruple spindle rows overhead.

of 80 metres – almost three times as long as the solution previously in use. Another special feature of the solution developed jointly by ELHA and MAPAL is that the workpieces in the clamping fixture rotate in the opposite direction to the drill during machining, which reduces the deviation of the bore even further. This leads to significant cycle time benefits for the customer, who manufactures up to five million of these parts every year. And on top of that, they now only need one machine to carry out all machining tasks.

### Development partnership synergies

“These three examples demonstrate the benefits of our close



Quadruple machining of fuel supply distributor parts with deep hole drills. The clamping fixtures that rotate in opposite directions to minimize the deviation of the drill are what makes the solution exceptional.

collaboration with MAPAL,” concludes Carina Becker, Technical Sales, ELHA. “And on top of that, the cooperation gives our design engineers additional freedom.” MAPAL’s specialists for the development of high-performance tools, as well as their exceptionally well-equipped R&D department in Aalen, make it possible to develop and intensively test new tool solutions even during the planning phase. That means ELHA is able to offer its customers even more well-engineered and economically advantageous solutions.

The production module (FM) Philosophy ELHA primarily developed the production module series for the cutting manufacturing of mass produced parts (>100,000 identical or similar parts). In this manufacturing concept, the tools themselves are not moved, but instead the parts are passed along tools arranged in rows. Every row of tools has a clamp and drive system that is optimized for the machining task.

The workpieces are moved from each tool row to the next using the clamping fixture, which achieves the shortest possible chip to chip times. The modular system can be equipped with various multi spindle modules. Multi spindle revolvers providing space for up to 128 directly driven tools can be used for even more flexibility.

**ELHA's close collaboration with MAPAL gives the former's design engineers additional freedom, and making it possible for the company to offer its customers even more well-engineered and economically advantageous solutions.**

**MAPAL's long-standing partnership with ELHA have brought forth the resulting benefits to customers:**

- **Solid drills for the machining of suspension arms have reduced the suspension arm manufacturers' production costs for each drilled bore by over 50 percent.**
- **Disc milling cutters for the machining of suspension arms have brought about reduction in cycle time since only one cut is needed. Also, the tool only occupies one row of spindles, reducing the resulting tool costs for the end customer.**
- **Deep hole drill for the machining of stainless steel forged components can carry out the machining more quickly, with less deviation and less wear and tear. Secondly, the workpieces in the clamping fixture rotate in the opposite direction to the drill during machining, which reduces the deviation of the bore even further. This leads to significant cycle time benefits for the customer.**

## SUSTAINING THE COMMITMENT

Givi Misure has been growing consistently while holding on to its unique core values of focusing on high quality of its offerings, bolstering innovation, and striving relentlessly for customer satisfaction. Here's sharing a snapshot of its success story...



**I**t's been over 17 years since the establishment of Givi Misure Pvt Ltd in India, it having made a significant progress in raising awareness of the company in the industry. "The journey of Givi Misure in India has been one of sustained commitment to its customers. We have been a major contributor to the much-needed development of Agro and Auto industries in India," says Lokesh BM, Director - Technical, Givi Misure Pvt Ltd.

The company's journey has been marked by consistent high performance which reflects in the expansion of its automotive and non-automotive businesses. With customers as its core focus, it has been relentlessly striving towards catering to their diverse needs by introducing ground-

breaking technology products and setting a benchmark in the industry. "We have set industry standards by never compromising on our quality and customer support," he adds. With a facility spanning a total area of 10,000 sq ft, the company has bagged top players of the domestic and international industries including the TATA Group, Hitachi, BHEL, BEML, HMT, Bajaj, Hyundai, Ford, and Kia.

### Focus on R&D

With its sharp focus on the ever-changing market demands, Givi Misure has always ensured timely introduction of customer desired indigenous and cost-effective innovative products and solutions, as well as cutting-edge technologies to meet

specific needs of the industry.

Its product range comprises self-aligned optical scales, magnetic scales, rotary encoders, digital readouts, position controllers, and its export destinations are Italy and China. "In this competitive business, we are here to introduce plug and play solutions for specific consumer needs. We have come up with innovative technologies after years spent on quality R&D," shares Lokesh.

Givi Misure is placed globally with the main R&D unit based out of Italy. "The R&D unit in India is a much smaller setup which contributes to the ongoing research and development. It mainly focuses on providing suitable technological solutions and improved efficiency for

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different applications. The outcome of these programs is shared with the main unit on an ongoing basis," he adds.

### For a range of industry sectors

Givi Misure caters to all kinds of industries, tells Lokesh. "We are both in conventional and non-conventional business sectors. Conventional business sectors are those where all the applications with automation solutions and machine tools are involved. We are the most accurate in the business wherever online position measurement is required. Non-conventional business sectors, which we have forayed into recently, involves controlling quality of various safety applications," he explains.

### Coping with competition

When asked regarding the ways the company resorts to in order to compete with domestic players in terms of product efficiency and cost effectiveness, Lokesh explains, "It is indeed difficult to compete with the local manufacturers who hold dominant positions in protected markets. Having said that, we have devised strategies to carefully handle the ever-evolving customer preferences. The survival and competitiveness of



Source: Givi Misure Pvt Ltd

"In this competitive business, we are here to introduce plug and play solutions for specific consumer needs. We have come up with innovative technologies after years spent on quality R&D."


**Lokesh BM**  
Director - Technical  
Givi Misure Pvt Ltd

manufacturing firms depend on their practices and capabilities to adapt to change, which largely depend on the changes in customer preferences." "We have reached this far through hard work and our focus on innovation, operational excellence and building a performance-driven culture. We have come up with innovative features in our products which have proven to be superior in all aspects and, thus, have continued to gain traction in the marketplace," he notes with evident pride.

### Mapping the future

Givi Misure has chalked out clear plans for its future course. "To support our growth and goals in the times to come, we will need to shift our focus from building and positioning our global brand to improving our go-to-market execution and the productivity of our marketing investments," states Lokesh.

He shares the company's vision which is to create solutions that can fulfill all precision measurement needs of its customers. "We have integrated our enormously talented teams across the globe and brought our innovations closer to our clients. We have set new goals this year and identified new opportunities to further integrate our capabilities, technologies and expertise," he adds.

He commends the Government of India's offering INR 3-lakh crore collateral-free automatic loans for MSMEs to combat the impact of the ongoing pandemic on their businesses. "This is a good initiative by the Government to provide relief to millions of small businesses reeling under the impact of the Covid-19 lockdown. It has been considerate to the concerns of the MSMEs and acknowledge the fact that MSMEs are the pillars of the Indian economy, contributing significantly to the country's growth," he concludes. 

**To support our growth and goals in the times to come, we will need to shift our focus from building and positioning our global brand to improving our go-to-market execution and the productivity of our marketing investments.**



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# FOR A SUSTAINABLE FUTURE

Cleantech startup Skilancer Solar specializes in a centrally controlled, self-powered, intelligent robots for automatic cleaning of solar panels. The unique idea has caught up with fellow environmental enthusiasts seeking a secure tomorrow...



India's emerging cleantech startups are playing a crucial role in strengthening the country's energy security and lowering pollution levels. Their efforts are coming to fruition with India becoming one of the most sought-after destinations in the world for investments in environment-friendly ventures.

Making its contribution to the endeavor is Skilancer Solar, a cleantech startup, that is in the business of maximizing energy production from solar panels. "We design and manufacture automatic, self-powered, water-less Solar Module cleaners for decentralized rooftop, and utility-scale solar power plants," explains Neeraj Kumar, Co-Founder & Director - Tech-

nology, Skilancer Solar Pvt Ltd. Photovoltaic modules need regular cleaning to get rid of the accumulated dust for them to generate optimal electricity and also increase their efficiency and lifecycle. This need sparked Kumar's desire to delve deeper into the subject and develop a robot for cleaning solar panels as a project in his final year at IIT-Jodhpur. It was this stint in the Cleantech industry that made him realize that his project held a massive business opportunity.

Soon after, he met Manish Das, Co-founder, Skilancer Solar, who already had 10 years of experience in Business Development. The partners recognized a major gap in the Solar industry where

a considerable amount of water was getting wasted in cleaning solar panels. The solar cleaning robot designed by Kumar had the potential to address the issue. It uses artificial intelligence and moves seamlessly over the arrays of solar panels, cleaning them, and improving their generating capacity. Additionally, the robot also takes care of the need to hire and train the workforce to carry out the job.

### Overcoming teething issues

It took the partners one year to develop their prototype. With product development being an expensive affair, it was the first major challenge Skilancer Solar faced, followed by the lack of opportunity to test its

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product; companies were skeptical about the new technology and the effect of the new cleaning machine on the panels.

However, the startup has come a long way. To date, the company, with the current team size of 35, has manufactured more than 350 robots, of which 280 are installed at sites across India, including Gujarat, Maharashtra, Madhya Pradesh, Karnataka, Kerala, and Rajasthan.

"At present, our portfolio includes solar panel cleaning robots for utility- and large-scale solar plants with different customizations available like the length of the robot, brush type, and connectivity features," says Kumar.

For the financial backup, the startup has secured VC funding, which it is using to develop and enhance its technology to compete with large, cash surplus companies. "We are aggressively working towards making our robots smart and efficient using AI and ML," he adds.

Since water is scarce in most regions where solar projects have been developed in India, Skilancer Solar's water-free robotic cleaning systems are slated to be high in demand. The company has plans in place for that. "We are working on expanding our manufacturing



Source: Skilancer Solar Pvt Ltd

"We are working on expanding our manufacturing facility and collaborating with manufacturing companies to make ourselves capable to cater to the high demand when it arises."

**Neeraj Kumar**  
Co-Founder & Director - Technology  
Skilancer Solar Pvt Ltd


facility and collaborating with manufacturing companies to make ourselves capable to cater to the high demand when it arises," he says.

#### **AI-powered waterless robots**

Startups thrive on innovative ideas, relentlessly seeking breakthroughs. The newly launched AI-powered waterless robot is another offering from Skilancer. Kumar explains its functioning, "We have a

small solar panel which is placed on the outer surface of the robot. Inside the robot are two junction boxes that contain motors, an electronic kit, a battery, and much more. The battery is connected with the solar panel, and the power is stored in the battery. The motors help in the to and fro movement of the robot, and the roller helps in wiping off the dust. With the help of sensors, the robot is capable to decide the number of times it needs to run in a day. It also senses rain and avoids cleaning at the time of rain. The robot also analyzes the battery level and never stops during the cleaning.

#### **Pandemic lessons**

Covid-19 has opened up opportunities for the company. "The pandemic has made people realize the flipside of dependence on the manpower. Now companies are looking for automation and wanting to install our robotic systems in their plants. We are aggressively looking to expand our business and launch new products. In line with our plans, we have recently launched a cleaning system for small-scale residential rooftop solar setup," shares Kumar signing off. 

The startup's current portfolio includes solar panel cleaning robots for utility- and large-scale solar plants with different customizations like the length of the robot, brush type, and connectivity features.



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Motor Controllers

# IP67 Compact Motor Controller for Roller Conveyor Systems

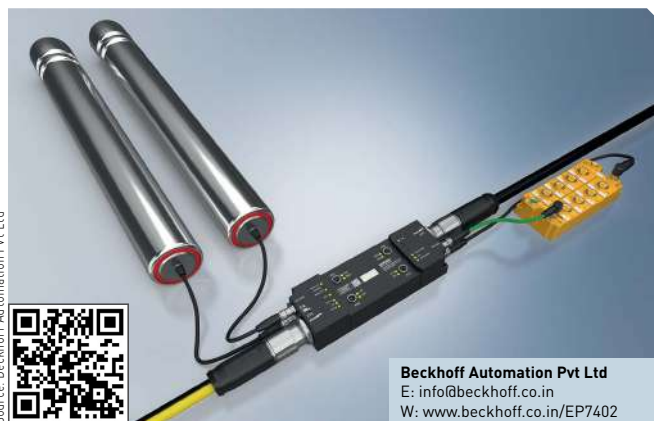
Integrated compact motor controller reduces cabling effort and increases diagnostic capabilities for roller conveyor systems...

With the new EP7402 EtherCAT Box from Beckhoff, the control architecture and cabling of roller conveyor systems become significantly more efficient. With the high IP67 protection rating, this compact motor controller for BLDC motors is ideally suited for conveyor tasks in intralogistics and assembly technology as well as in the packaging, food and beverage industries.

The EP7402 EtherCAT Box offers two outputs with integrated motion controller for the direct connection of 24 V DC

conveyor roller motors or other BLDC motors (up to 3.5 A). Eight additional digital inputs/outputs enable connection of e.g. photoelectric switches and communication between the different box modules in operation without a PLC. The EP7402 takes over the complete control of a roller motor independently of the conveyor or motor manufacturer. The control of the motors is sensorless. Maximum rated current, acceleration or deceleration ramps and various other parameters can be configured, allowing optimal adaptation to different applications.

In conveyor operation, the EP7402 can also be operated without a PLC and provides functions such as Zero Pressure Accumulation (ZPA), single or block discharge. Further EtherCAT devices such as digital and analog I/Os, barcode readers or safety devices can be connected to the additional EtherCAT junction. The EtherCAT Box with IP67 protection rating measures only 174 mm x 60 mm x 36.5 mm and can be easily mounted in standard C-channel or L-brackets on the conveyor frame. It requires no additional protective covering, which saves additional installation space. Power supply and EtherCAT communication take place via a single cable with a B23 ENP hybrid connector (28 A/45°C current carrying capacity).



Source: Beckhoff Automation Pvt Ltd

Beckhoff Automation Pvt Ltd  
E: info@beckhoff.co.in  
W: www.beckhoff.co.in/EP7402

Fine Boring Tools

# Kennametal's eBore Fine Boring System

The system has earned tremendous operator acceptance due to its simplicity and ease-of-use.

Kennametal has introduced a new line of digital-ready fine boring tools that make precision adjustment easy, enabling more productive, predictable, and accurate boring. The eBore Fine Boring System consists of cutting units to cover a diameter range from 6 to 1020mm and an optional digital display that makes precision adjustments as simple as turning a screw—and costly mistakes a thing of the past.

“For many workpieces, the boring operation is often the final step, and a simple mistake can lead to scrapped parts. The Kennametal eBore fine boring system does away with the traditional ‘count the graduations’ approach to boring and reduces costly mistakes,” said Marcus Paul, Global Product Manager, Kennametal.

“We’ve found there’s tremendous operator acceptance due to its simplicity and ease-of-use. And because the same eBore digital device can be used across multiple types of tools and on various

machines, it’s easy on the tooling budget as well.”

**Ease-of-use**

With Kennametal’s digital eBore digital device, dialing in a tight bore and losing count of how far the adjustment screw was turned is a thing of the past. With an adjustment accuracy of 0.002mm, the chip and coolant-resistant device contains a glass-scale that keeps track of boring bar movement. Simply snap it in place, turn the boring head’s adjustment screw by the desired amount, and the tool is ready for the next boring operation.

With eBore, there is no need to remove the boring head from the spindle for adjustment nor to count graduations or take notes. Concerns over backlash and movement due to overtightening of the boring head’s locking screw are a thing of the past, as are endless test cuts and ‘sneaking up on the bore’. The result is less scrap, less downtime, and faster setups. The device shuts off automatically after 30 seconds and provides more than 5,000 adjustments between battery changes. And if you forget to remove the boring head before turning on the spindle, a ball and spring clamping mechanism releases the display automatically at 500 RPM, preventing potential injuries.



Source: Kennametal India Ltd

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# Intelligent, Communicative Frequency Inverters

The NORDAC PRO SK 500P frequency inverters from NORD DRIVESYSTEMS are equipped with an integrated multi-protocol Ethernet interface, a multi-encoder interface for multiple axis operation and a USB interface for voltage-free parameterization.

The new control cabinet inverters cover rated motor powers from 0.25 to 5.5 kW and feature ultimate levels of connectivity, functionality and versatility. Various device versions can be optimally allocated to various application requirements. Plug-in control, safety and option modules ensure maximum flexibility and the compact book-size design format enables space-saving installation in control cabinets.

## Integrated multi-protocol Ethernet interface

NORDAC PRO SK 500P is the new generation of control cabinet inverters. The series is equipped with an integrated universal Ethernet interface that enables the use of the major real-time Ethernet standards via one single interface. Whether for Profinet, EtherNet/IP, Powerlink or EtherCAT, the required protocol can be easily set by means of parameters.

## Voltage-free parameterization via USB port

The future-proof nature of the modular series is shown by its modern connectivity such as the use of an SD memory card as a storage medium for parameters, as well as a USB interface which enables 'in the box' parameterization of the inverter when the power is switched off. It also provides a CANopen interface, five or six digital and two analogue inputs, two digital and one analogue output, two potential-free multi-function relays, an HTL / TTL incremental encoder interface as well as a universal encoder interface which enables connection of SIN/COS, BiSS SSI, Hiperface and EnDat encoders.

## Multi-encoder interface for multiple axis operation

The NORDAC PRO SK 500P can read out up to four encoder systems simultaneously and can therefore control several motors in positioning mode. Together with features such as the integrated PLC for motor related motion and logic control, a 200 percent overload reserve for perfect torque and speed performance as well as sensorless current vector control for asynchronous and synchronous motors (open loop and closed loop), it is a genuine all-rounder. The integrated brake chopper for 4-quadrant operation is a part of the basic equipment for the entire series, as is motor brake management, which is important, e.g. for lifting gear applications. NORD supplies the inverters with integrated STO and SS1.

## Industry 4.0 ready!

The integrated PLC processes the data from sensors and actuators and can autonomously initiate control sequences, as well as communicating drive and application data to a control center, networked components or to cloud storage. This allows continuous condition monitoring and therefore forms the basis for predictive maintenance concepts as well as optimum plant dimensioning.

With the NORDAC PRO SK 500P, the NORD DRIVESYSTEMS range includes future-proof and user-friendly frequency inverters for control cabinets. The overall concept has been revised, so that the inverter series provides a new future-proof platform which promises many years of power and performance from NORD. The new series is of course downwardly compatible with the current SK 500E series.

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Source: NORD DRIVESYSTEMS Pvt Ltd

The new NORDAC PRO family control cabinet inverters provide high levels of connectivity, functionality and modularity.

One NORDAC PRO SK 500P highlight is the integrated multi-chip for Industrial Ethernet that enables the use of the most important real-time Ethernet standards via a single interface.

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