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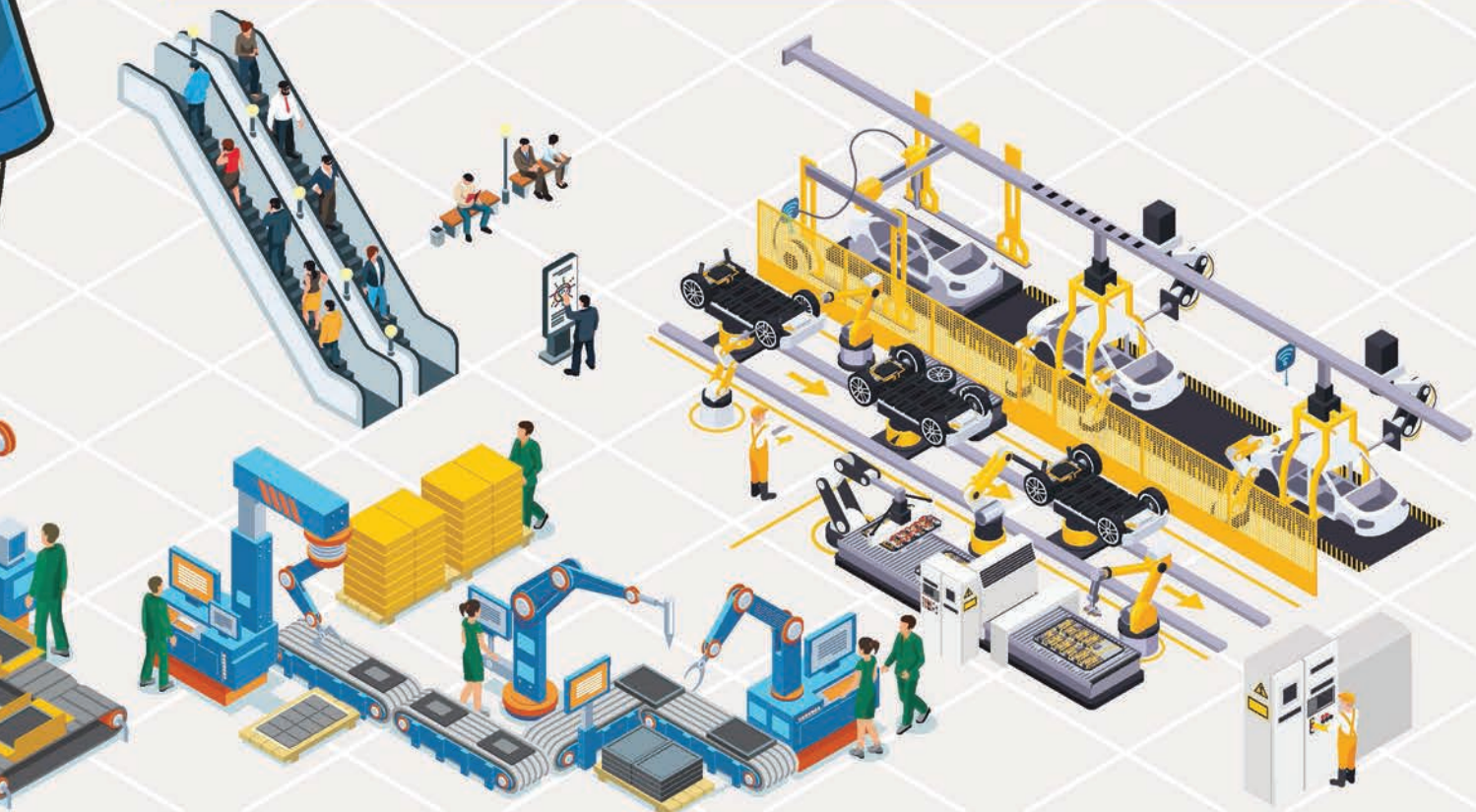


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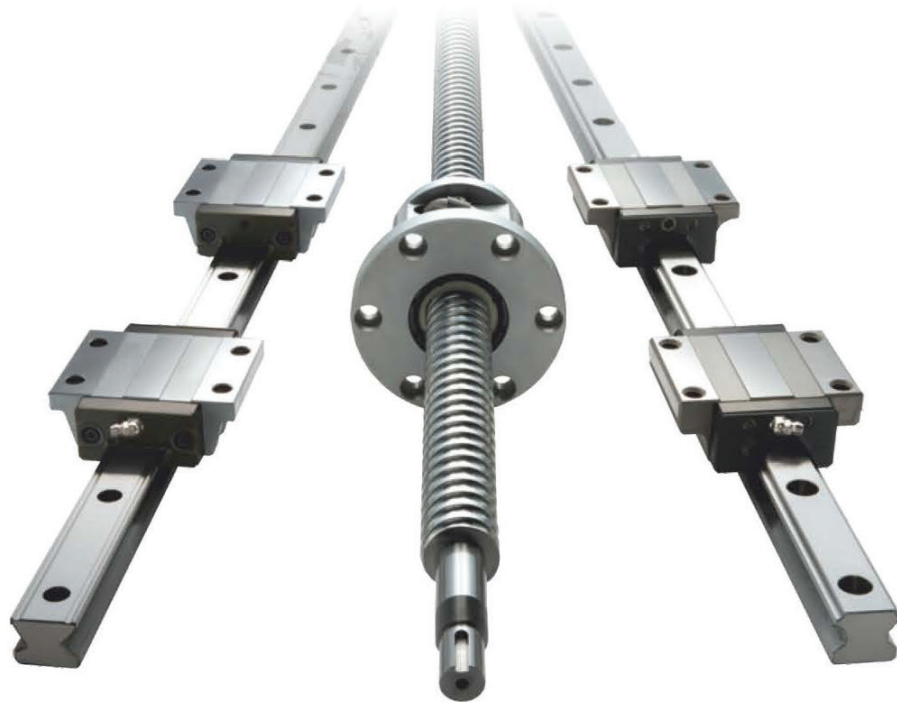
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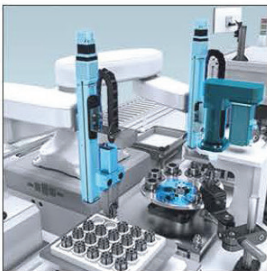
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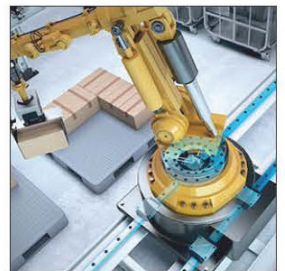
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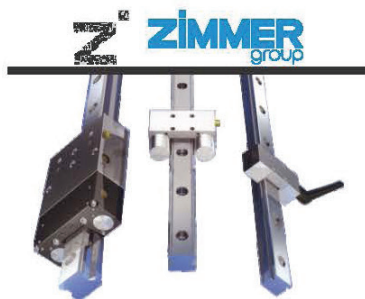
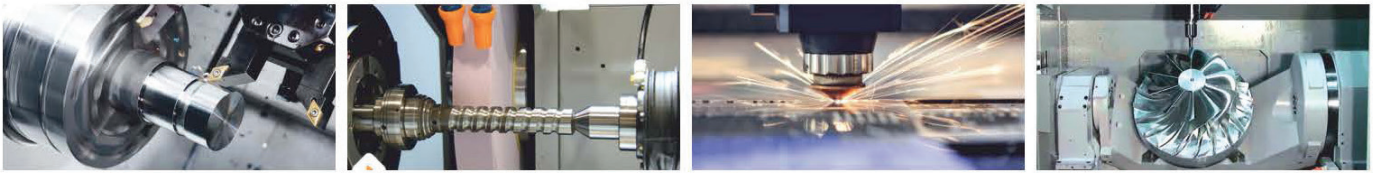
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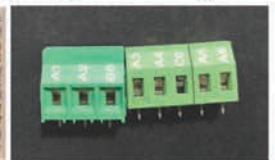
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“With global markets becoming highly challenging, *SME* will continue to be the Indian industry's voice and engage with stakeholders for providing probable solutions.

Still A Long Way To Go

Despite global economic disruptions caused by the pandemic and intensified by recent geopolitical events, India's manufacturing sector has displayed remarkable resilience, outpacing several major economies in growth. The Indian government has been actively pursuing its vision of an Atmanirbhar Bharat (self-reliant India) to establish the country as a major global manufacturing hub, a role China has successfully held for years. China's manufacturing output reached an impressive \$4,659 billion in 2023, whereas India's output stood at a considerably smaller \$456 billion in the same year.

Achieving significant manufacturing growth requires substantial investment. For instance, establishing an integrated steel plant with a capacity of one million tonnes per annum (MTPA) demands around ₹50 billion. To meet the Indian government's ambitious target of expanding steel production capacity from 180 MTPA to 300 MTPA by 2030, India will need to invest approximately ₹1,000 billion (around \$ 11.5 billion) annually over the next six years. Moreover, expanding industrial infrastructure at this scale requires about 400,000 skilled workers each year. However, India currently faces a shortage of adequately trained personnel for large-scale construction projects, presenting a challenge to steel capacity expansion. And this is just for one industry.

Nonetheless, India's manufacturing sector shows promising growth. Market projections indicate expansion from \$310.3 billion in 2024 to \$523.7 billion by 2029, reflecting a compound annual growth rate (CAGR) of 9.11 per cent. Foreign Direct Investment (FDI) inflows have surged by 69 per cent between 2014 and 2024, reaching a total of \$165.1 billion. This trend is expected to continue as global manufacturers diversify their supply chains away from China, positioning India as an attractive alternative.

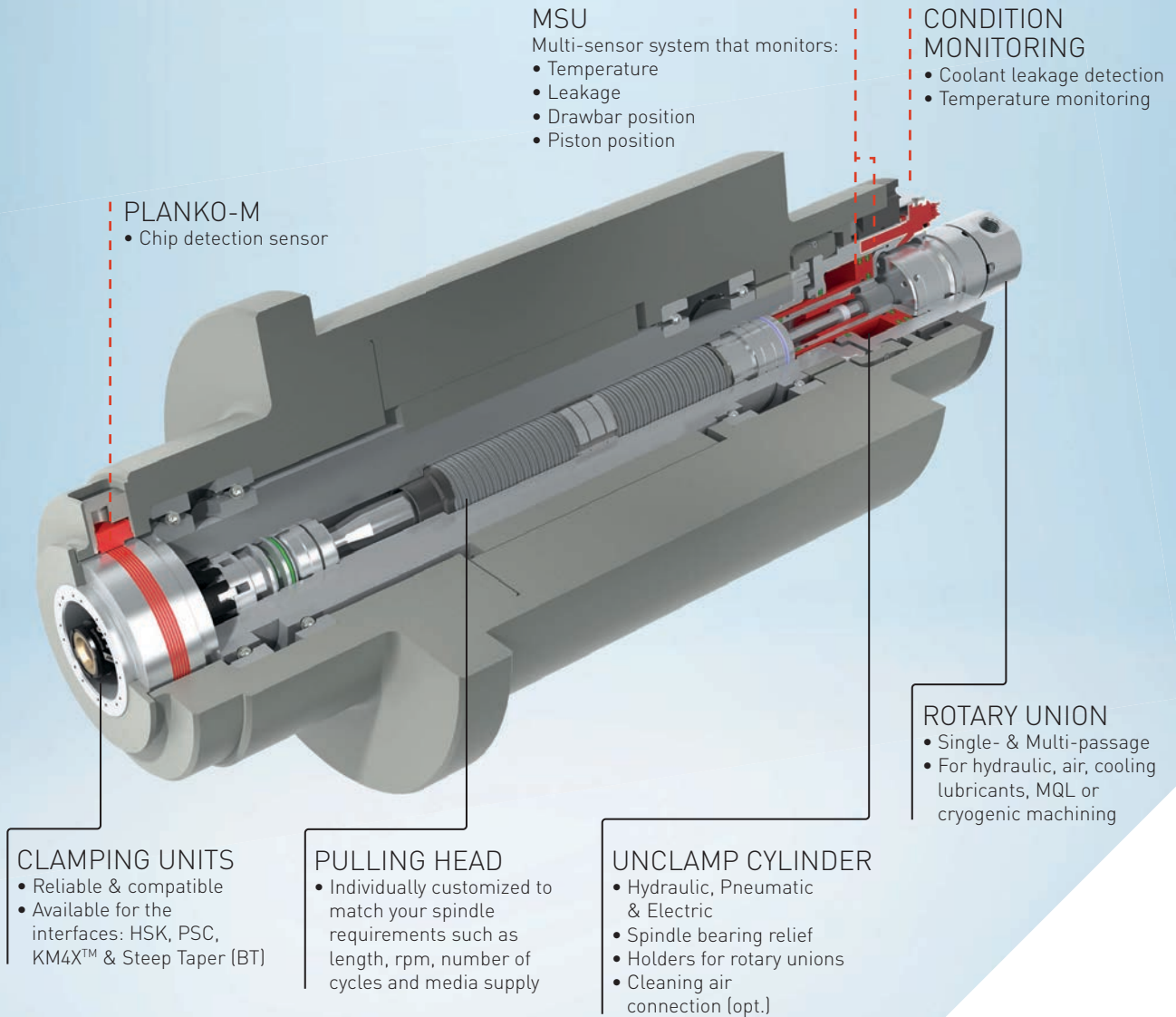
In this 53rd Annual Edition of *Smart Manufacturing & Enterprises (SME)*, more than 30 industry leaders delve into four key areas, government policies, advanced technologies, green manufacturing, and skill development, for developing India into a \$ 1 trillion manufacturing economy. In addition, it also showcases over 280 products, including some newly launched products.

Year 2024 was challenging, yet exciting for the industry and *SME*. During the year, *SME* transitioned from product-centric publication to all-encompassing, solution-centric platform catering to the needs of every stakeholder of the manufacturing sector right from the factory shop floor to the boardroom and policy-influencers by raising industry-relevant issues such as skilled workforce, lack of funding, export challenges, etc.

Year 2025 will be no different. With global markets becoming highly challenging, *SME* will continue to be the Indian industry's voice and engage with stakeholders for providing probable solutions. While we will bring out some special editions like "Hannover Messe 2025", "Women in Manufacturing Sector", "Top 100 Engineering Companies", "EMO 2025", etc, we will also be hosting events relevant to the manufacturing sector such as "MultiLogistix Expo 2025", "SME Summit 2026", etc during the year. Loaded with business-relevant information, *SME* will aid businesses, both small and big, to grow and spur India's economic growth.

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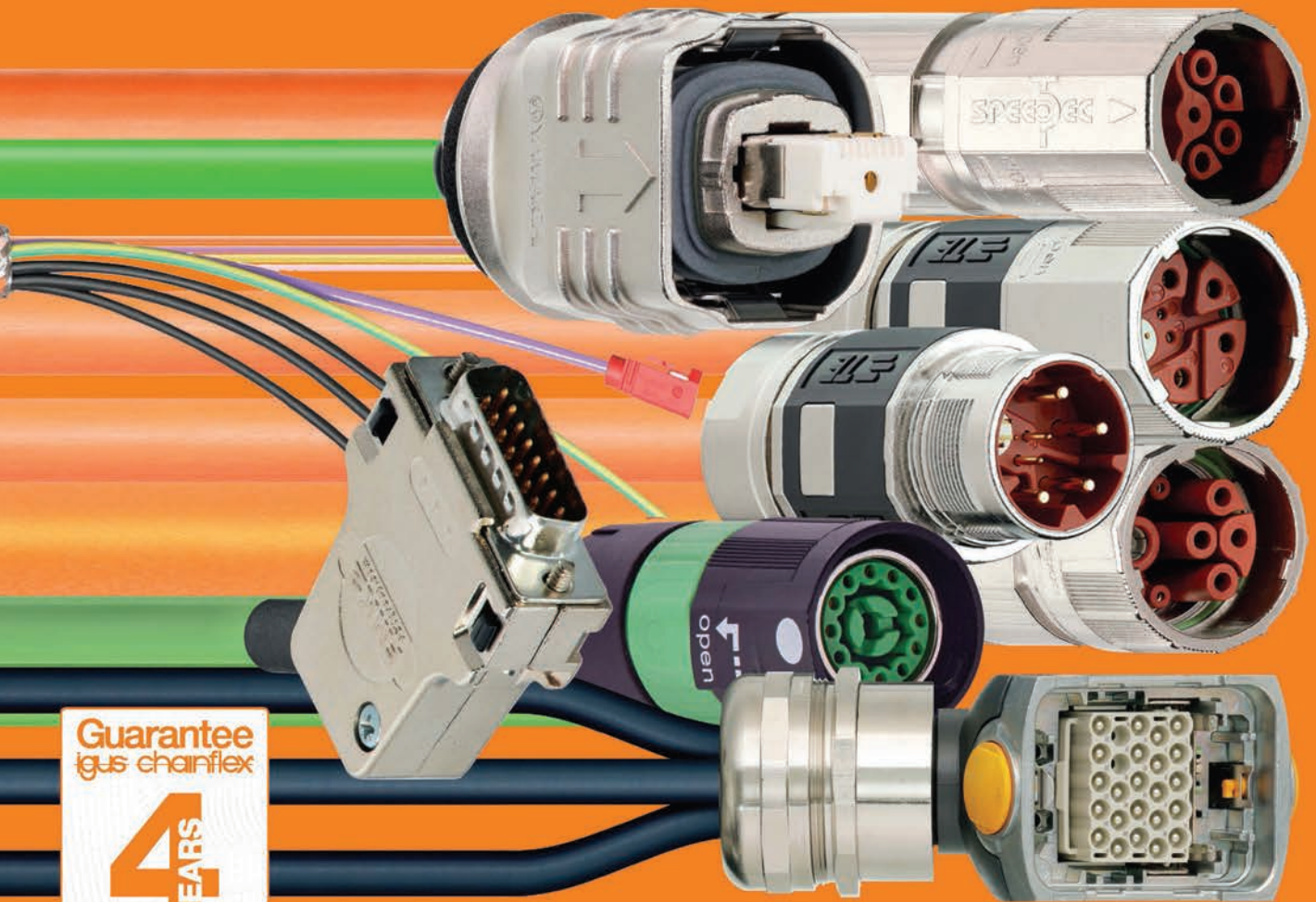
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SWITCHES & POSITION SENSORS

MICROSWITCHES

	SUB-SUBMINIATURE			SUBMINIATURE			MINIATURE & SPECIAL		
SERIES	V5S 8320	83228 83229	V5D 83194 83141	V4/V4D 83170 8327	V4S 8318	83132 83133 83134	V3/V3D 83161/160 8326	V3S/V3DS 83169 8329	PBX 8324
Max Rating @250 V~	4 A	5 A	5 A	12 A	10 A	6 A	25 A	10 A	10 A
Low Level version	I (mA)	I (mA)	I (mA)	I (mA)	I (mA)	I (mA)	I (mA)	I (mA)	I (mA)
Sealing level	IP67 IP69					IP67 IP69		IP67 IP69	IP65 IP67
Double break						Za ⁺			Zb ⁺
Max. temperature (°C)	+90	+140	+150	+150	+125	+150	+200	+105	+85
Min. temperature (°C)	-40	-55	-55	-40	-40	-40	-60	-40	-50
Specific environment									
Approvals	NF/ENEC/CE	CE	CE	CE	NF CE	NF CE	CE	NF CE	CE
	UL	cULus	cULus	cULus	cULus	cULus	cULus	cULus	cULus
	CCC	CCC	CCC	CCC	CCC	CCC	CCC	CCC	CCC
	EAC	EAC	EAC	EAC	EAC	EAC	EAC	EAC	EAC

* Za: NO and NC circuits must be used at same polarity. Zb: NO and NC circuits are electrically separated, and can be used at opposite polarities. ** Consult us.

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RAILWAYS



ELECTRICAL EQUIPMENT



TRANSPORTATION



LIMIT SWITCHES

	STANDARD		HARSH ENVIRONMENT		
					
SERIES	8387 8388	83589	83777 83778	8399Nuc	8399Ex
Max Rating @ 250 V~	10 A	8 A	4A	1 A	1 A
Sealing level	IP66 IP67 IP69	IP66 IP67 IP69	IP66 IP68(4m) IP69	IP66 IP68(18m) IP69	IP66 IP67 IP69
Max. temperature (°C)	+70	+85	+125	+200	+200
Min. temperature (°C)	-40	-40	-55	-55	-40
Specific environment			 **	 	
Approvals	CE				
	UL				
	CCC			** 	
	EAC				

SENSORS AEROSPACE

	LIMIT SWITCH	PROXIMITY SWITCH	PROXIMITY SENSOR
			
Key features	› Hermetically sealed › Customizable › Multi-pole functions	› Contactless detection with integrated electronics › Customizable	› Contactless detection with external electronics › Customizable
Operating force (N)	2.5 → 50	NA	NA
Mechanical life (cycles)	100 000	NA	NA
Water proofness	Watertight or hermetic version - DO 160 sect10		
Weight (g)	15 → 300	< 60	< 50
Operating temperature (°C)	-55 → +250	-55 → +125	-55 → +125

 Irradiated Environment  High pressure up to 6 bar  Explosive atmospheres

CUSTOMIZED SOLUTIONS

- › Dedicated application
- › Customer specific product
- › Innovation & industrialization



MANUALLY OPERATED SWITCHES

- › Pushbuttons, Momentary and/or Maintained, up to 4 poles
- › Toggles, Maintained and/or Momentary, up to 4 poles
- › Multiway, Momentary
- › Rockers, Momentary and Maintained
- › Triggers, Momentary



MOTION

MOTORS

	INDUSTRIAL BRUSH			DCmind BRUSH		DCmind BRUSHLESS		SYNCHRONOUS		STEPPER	
CHARACTERISTICS	SERIES	82940 82880	82800 10 50	82830 82890	89800 10 50	89830 98890	80140 180 280	80350 60 70	82510 20 30 40	82330 82340	82810 20 30 40
Nominal power (W)		0.9 / 3	9 → 33	27 → 95	15 → 35	54 → 104	66 → 150	310 → 600	0.3 → 3	0.2 / 0.4	0.5 → 5
Voltage		12 → 24 V~	12 → 48 V~	12 → 48 V~	12 → 48 V~	12 → 120 V~	9 → 75 V~	9 → 75 V~	24 → 240 V~ 50 → 60 Hz	24 → 240 V~ 50 → 60 Hz	3 → 64 V~
Front side (mm)		Ø 32	Ø 42	Ø 63	Ø 42	Ø 63	50/57	50/75	Ø 35 / 51 Ø 57 / 65	Ø 47	Ø 35 / 51 Ø 57 / 65
Nominal speed (rpm)		3700	3000	3000	3000	3000	3000	3000	250 → 600	600 → 720	0 → 1500
Nominal torque (mN.m)		2.2 / 7.7	41 → 100	170 / 270	50 → 110	180 / 290	125 → 550	830 → 1900	10 → 110	2.5 → 8	15 → 300
Noise level (dBA)		55	55	55	35	35	45	50	30	45	35
Service life (hrs)		2000	3000	5000	4000	5000	20000	20000	20000	10 M on / off	20000
Certification											
Gearboxes											
Connection											
Standard											
Options											
IP		IP20			IP65*		IP54	IP65*, IP67* IP69*	IP40	IP30	IP40

* Except front face & shaft



RAILWAYS



ACCES CONTROL



EQUIPMENT



MEDICAL



CONTROL ELECTRONICS

	INTEGRATED			EXTERNAL	
					
SERIES	TNi21	SMi21	SMi22	BDE 30	BDE 40
CHARACTERISTICS					
Compatible models	SQ57		SQ75	SQ57	
Speed-torque	●	●	●	●	●
Position (P/R)	4096		4096		
Programming		DCmind Soft & DCmind Soft + CANopen	DCmind Soft + CANopen	PWM or 0 → 10 V _{cc}	
Communication bus		Optional CANopen	Standard CANopen		
Voltage	10 → 36 V _{cc}	9 → 75 V _{cc}	9 → 75 V _{cc}	18 → 36 V _{cc}	10 → 36 V _{cc}
Maximum current (A)	17	17	75	10	14
Adaptations	Programs: Custom firmware as per customer specifications				

GEARBOXES

	PARALLEL SHAFTS	PLANETARY	WORM
			
CHARACTERISTICS	11 models	7 models	2 models
Torque (N.m)	0.5 → 6	0.8 → 120	10 → 20
Power (W)	0.2 → 50	8 → 600	25 → 600
Service life (Mr*)	1 → 10	50	50
Ratios	4 → 1036800	4 → 308	5 → 100
Options	Stainless steel shafts, pulleys, pinions, special bearings, etc...		

* Million revolutions

SIMPLIFIED PROGRAMMING*

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- › Two programming modes: application & expert
- › Application programs: dosing, valves, machinery, conveyor belt, access control



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Force & Load Sensors

FORCE SENSORS



- › Load pins
- › Compression load cells
- › Traction/compression load cells
- › Bending sensors
- › Multi-axis sensors
- › Tie Rods

- › Measurement of compression and/or traction forces: from 500N to 20MN
- › Measurement of forces in one or more directions
- › Analog or digital outputs: mv/V, CAN Open, CAN J939, RS232-RS485, 0-10V, 4-20mA)
- › IP Level: IP65/66/67/68
- › Temperature range: -30°C to +70°C

WEIGHING LOAD CELLS



- › Load pins
- › Compression load cells
- › Bending sensors

- › Weight measurement using compression and traction force values
- › Analog or digital output: mv/V, CAN Open, CAN J939, RS232-RS485, 0-10V, 4-20mA
- › IP Level: IP65/66/67/68
- › Temperature Range: -30°C to +70°C

TORQUE SENSORS



- › Static Torque Sensor

- › Torque measurement between two parts: from 5 Nm to 20 000 Nm
- › Analog or digital output: mv/V, CAN Open, CAN J939, RS232-RS485, 0-10V, 4-20mA
- › IP Level: IP65/66/67/68
- › Temperature Range: -30°C to +70°C

EXTENSOMETERS



- › Large displacement (millimeter)
- › Small displacement (micrometer)

- › Measures a displacement from millimeters to micrometers via the deformation of a part ($\pm 1000 \mu\text{m/m}$)
- › Analog or digital output: mv/V, CAN Open, CAN J939, RS232-RS485, 0-10V, 4-20mA
- › IP Level: IP67
- › Temperature range: from -30°C to +80°C

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- > From 1 to 6 poles



Timers

- > Time Delay Relay
- > Solid state timers
- > Flashers
- > Cadencers
- > Retriggerable delay.



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- > Relays panels (wiring system, PCB)
- > Relay cards (PCB)
- > Relays sub-assemblies
- > Integrated architecture to optimize electrical power performance

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Non Latching Relays

Rating & Arrangement	Can Size	Series	Design	Application Reference
1 Amp - 2PDT	T05	T		ESA QPL Specification ESCC 3601 002
2 Amp - 2PDT	1/8 Crystal	310/311		Customer Launcher Specification
2 Amp - 4PDT	Crystal	320		Customer Launcher Specification
10/15 Amp - 2PDT	1/8 Inch ³	E 215		ESA QPL Specification ESCC 3601 007
15 Amp - 2PDT - DB	1 Inch ³	ED 215		Customer Space Specification
15 Amp - 4PDT	1 Inch ³	E 415		Customer Space Specification

Latching Relays

Rating & Arrangement	Can Size	Series	Design	Application Reference
1 Amp - 2PDT	T05	TL		ESA QPL Specification ESCC 3602 002
2 Amp - 2PDT	1/8 Crystal	310B		Customer Launcher Specification
2 Amp - 4PDT	Crystal	320B		Customer Launcher Specification
10/15 Amp - 2PDT	1/8 Inch ³	EL 215		ESA QPL Specification ESCC 3602 003
15 Amp - 2PDT - DB	1 Inch ³	EDL 215		Customer Space Specification
15 Amp - 4PDT	1 Inch ³	EL 415		ESA QPL Specification ESCC 3602 004
25 Amp - 3PDT Open - auxiliary contact	1 Inch ³	EL 325		Customer Launcher Specification
50 Amp - 5PDT-DB + aux.	2.75 Inch ³	PHL		Customer Space Specification ESCC 3602 014

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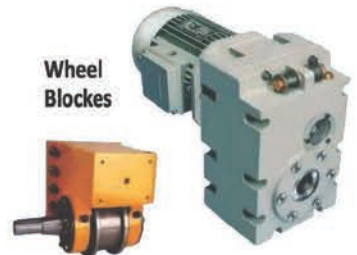
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◆ Patent 2: System and Method for Self-Centering Steady Rest

Our Patents



Bar Feeder



Self Centering Steady Rest

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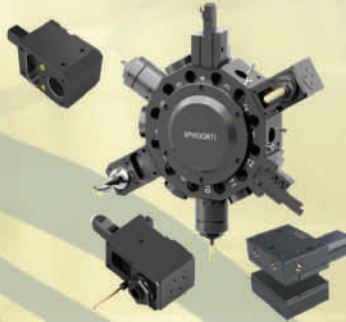
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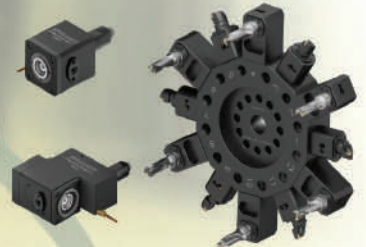
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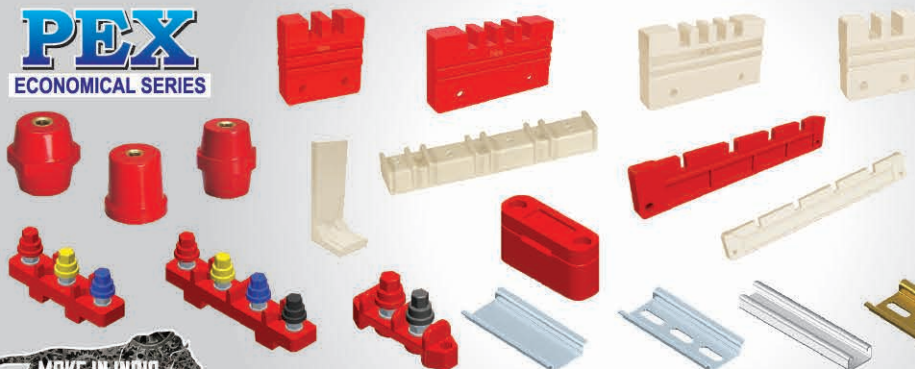
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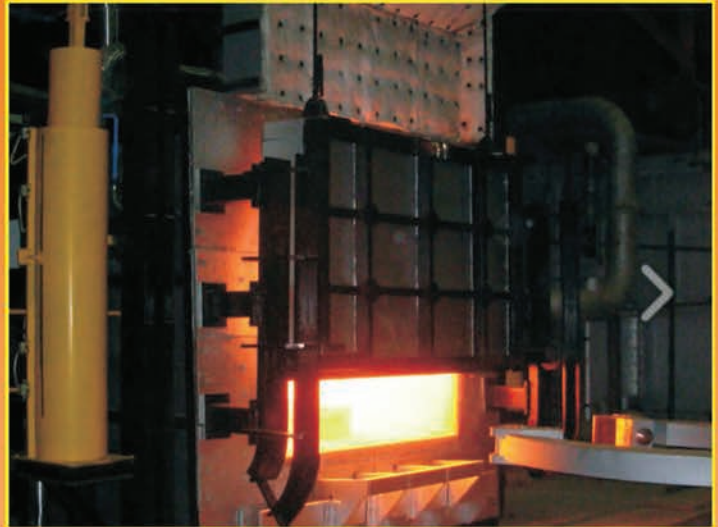
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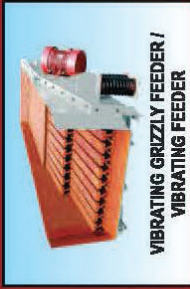
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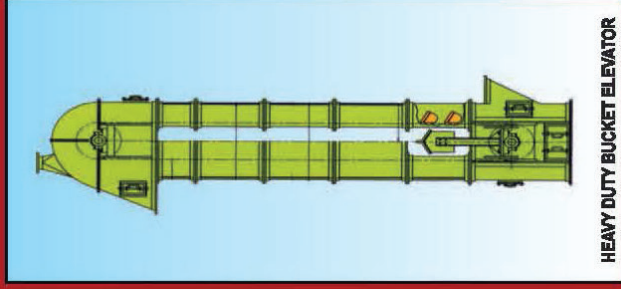
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- Sizes available are M2.5 to M5 with various standard lengths.
- Advantages of standoffs : easy installation, permanent threads with high torque and pull out strengths, variety of design & material to suit the application, panels can be easily replaced from parent panel for maintenance, no loose hardware like washer is required.

About the Company: Established in the 2019 at Kolhapur Delstra India Private Limited are an affluent wholesaler distributor or trader of brass moulding nut, threaded brass inserts, blind rivet etc.

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Contact:

Delstra India Pvt Ltd, Kolhapur

Mobile: 09960080088

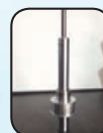
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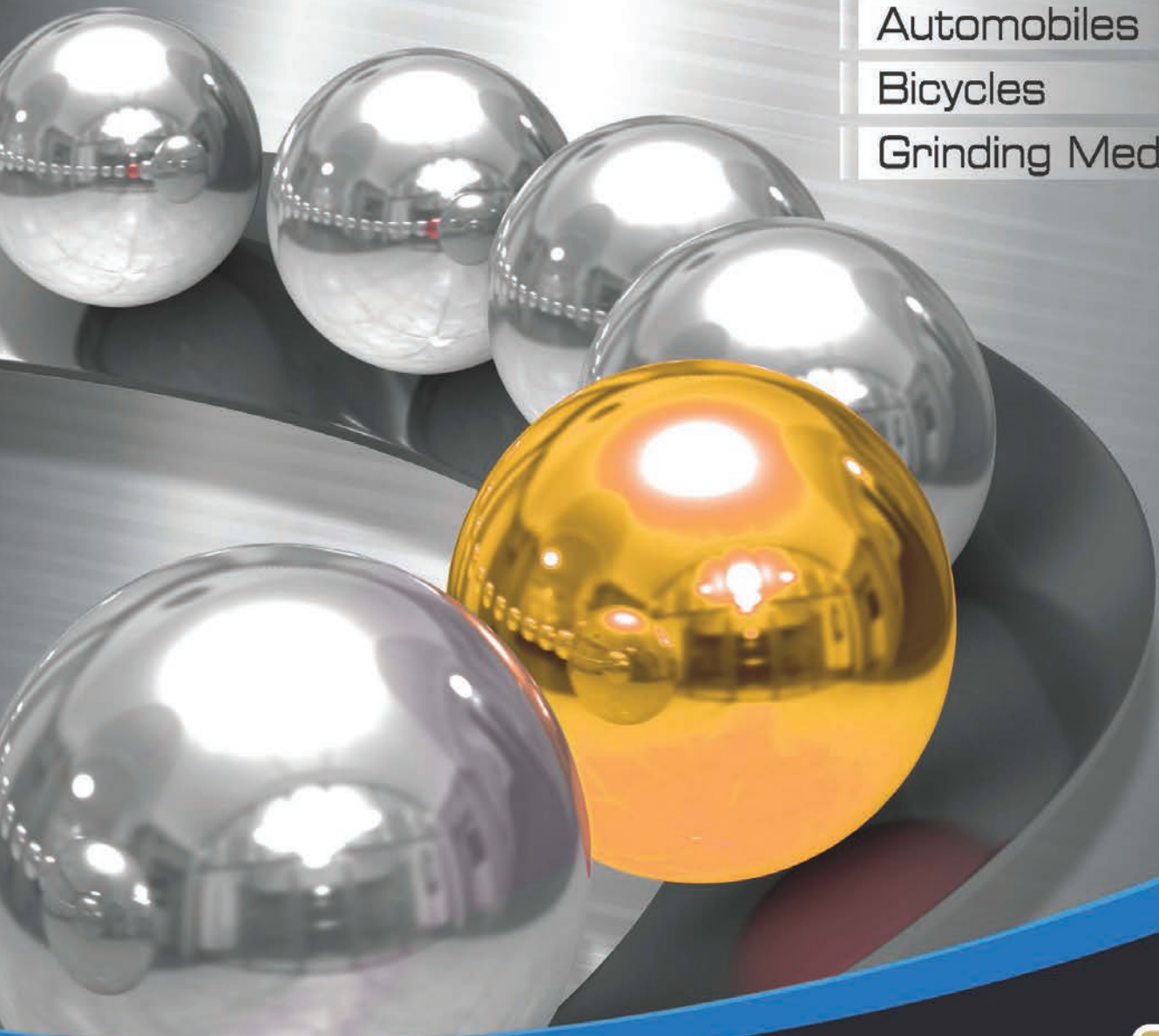
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Delstra India Pvt Ltd offers knurled rivet nuts for sheet metal applications.



Features:

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- Standard finishes available are passivation for stainless steel rivet nuts and zinc blue plating for steel rivet nuts.
- Advantages of rivet nuts: easy installation, permanent threads with high torque and pull out strengths, variety of design & material to suit the application, panels can be easily replaced from parent panel for maintenance, no loose hardware like washer is required, space & weight saving.

About the Company: Established in the 2019 at Kolhapur Delstra India Private Limited are an affluent wholesaler distributor or trader of brass moulding nut, threaded brass inserts, blind rivet nuts, etc.

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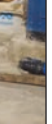
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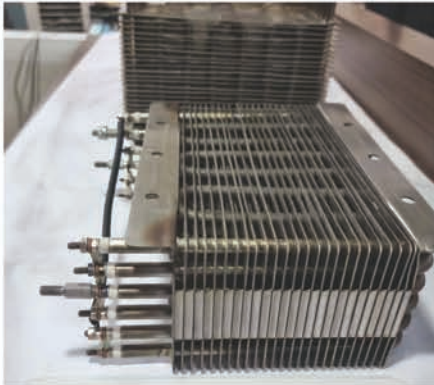




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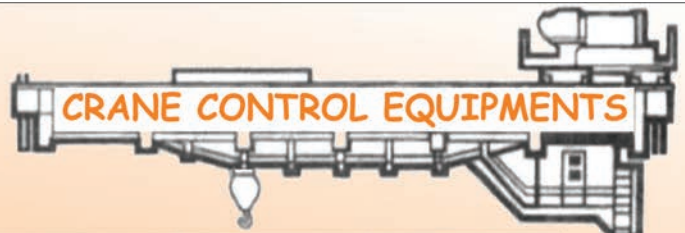
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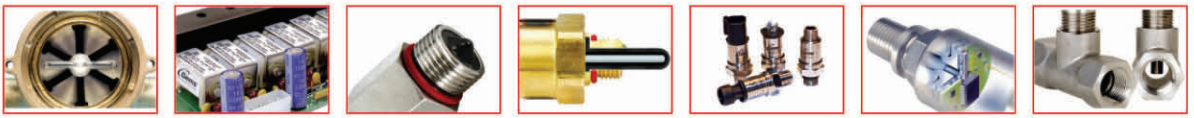
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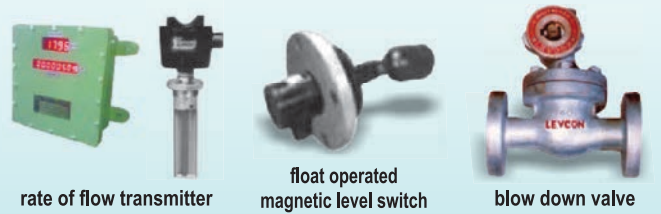
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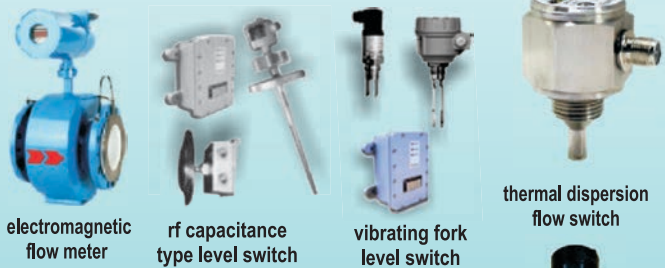
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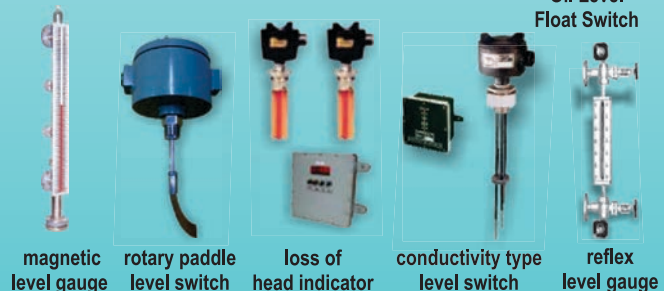


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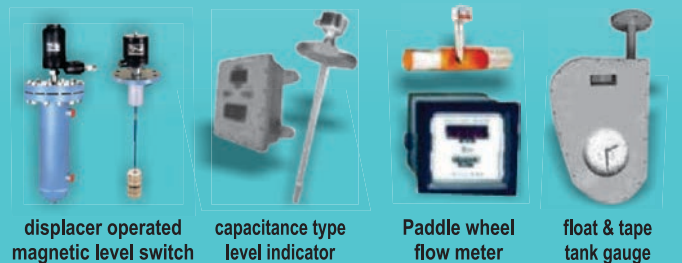
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About the Company: Elmech Engineers, also manufactures EOT Cranes, Goliath Cranes, Grabbing Cranes, Flameproof EOT Cranes & Electric Hoists and JIB Cranes, etc. Elmech Hoist are exported to Bangladesh, Bahrain, Bhutan, Ethiopia, Ghana, Indonesia, Iran, Jordan, Kuwait, Malawi, Nepal, Oman, Qatar, Srilanka, UAE, Uganda, Yemen & Zambia. Elmech has been successfully providing unparalleled nationwide service to numerous customers and organisations. The high-level customer service and honesty has made Elmech Engineers one of the leading provider of independent power generation solutions in the industrial sector of

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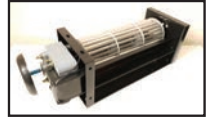
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FEATURED PRODUCTS

LIGHT DUTY CROSS FLOW FAN – CENTRIFUGAL BLOWERS



Delco Fans Pvt Ltd offers Light Duty Cross Flow Fans and Centrifugal Blowers, a new product line particularly well suited to small systems.

Features:

- Where concentrated airflow, space and noise levels are serious considerations; Airflow available from 40 to 2400 CFM at zero static pressure; Available from 18 watts to 1 Hp, in Single and Three Phase.
- Driven by quality performed light weight Shaded Pole / TEFC Motor having 2800 RPM; Products manufactured using most sophisticated technology; Aluminum, MS and SS Impellers available. Low power consumption and long-life expectancy.
- Equipped with precision Ball Bearings having plastic or metallic outer casing.

About the Company: Delco Fans Pvt Ltd established in 1975. Their manufacturing range consists of FHP Electric Motors, Geared Electric Motors, etc.

Contact:

Delco Fans Pvt Ltd, Thane
Mobile: 09769201564
Email: delcofans@gmail.com

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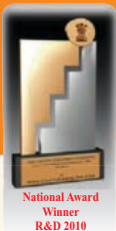
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MTT-F5 with its compact, bearingless, maintenance-free design, brings many appealing advantages to torque measurement applications. High torsional rigidity supports direct mounting on the flange, avoiding the use of couplings on one side. This allows easy integration into a test system, shortens the overall length of the test bench and reduces costs.



Monad Electronics

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SIMPLEX BAG/STRAINER FILTRATION SYSTEMS

S & C Invotek offers a wide range of simplex bag/strainer filtration systems.

Features:

- S & C Invotek manufactures a Simplex Filtration System which is user-friendly, their systems are designed for use with high performance Bags Filters and Strainer Filter. These Filters are used for filtration of coolants, alkaline, paints and varnishes, inks, solvents, etc.
- Bag Filters are available for high viscous liquid filtration. Polishing of wine, herbal extracts, juices are the major applications.

About the Company: S&C Invotek is a pioneering company in the field of manufacturing filtration systems, also known as top auto components manufacturers in India. Based in Bangalore, South India, the company has earned a prominent position as a leading designer and manufacturer of custom-engineered filtration products.

Contact:

S & C Invotek, Bangalore
Tel: 080-26665676/26697112/26797001
Mobile: 09844035677, 09980775677
Email: info@invotekfilters.com,
sales@invotekfilters.com

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“KUSAM-MECO” HOOK TYPE HIGHLY INSULATED FRP TELESCOPIC EARTH/DISCHARGE ROD

‘Kusam-Meco’ has added a full new range of hook type highly insulated FRP Telescopic Earth /Discharge Rod, Model: KM-HKDR-11 KV / KM-HKDR-33 KV /KM-HKDR-66 KV .

Features:

- These Discharge Rods are manufactured in fully automatic Pultrusion Plant thus having strong Electrical & Mechanical Strength.
- The locking is Auto fit during extraction. The 11 KV Discharge Rod has 02 Sections; 33 KV has 03 Section; 66, 132, 220 & 400 KV has 04 Sections. The Earthing Clamp is by means of Crocodile clamp. The Earthing Cable length is as per the length of the Rod.

About the Company: Established in 1983, Kusam-Meco, an ISO 9001:2008 certified company, introduced and pioneered the use of digital multimeters and clamp meters in Indian industry.

Contact:

Kusam Electrical Industries Ltd, Navi Mumbai
Mobile: 09594058456, 09594057456
Email: sales@kusam-meco.co.in

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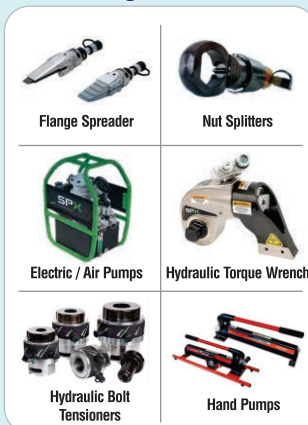
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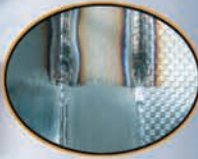


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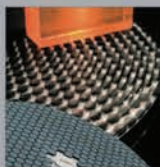
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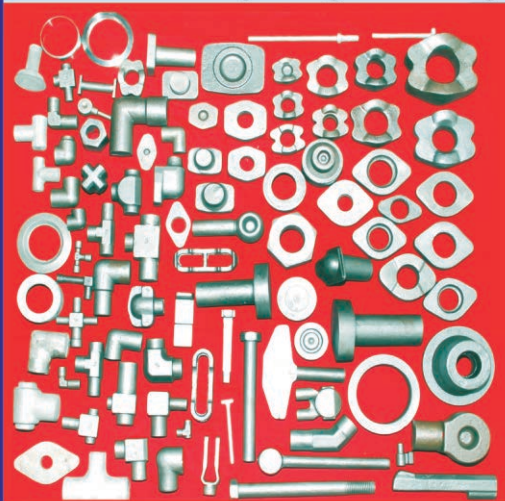
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FEATURED PRODUCTS

SINGLE POLE, NON-DIRECTIONAL, IDMT O/C OR E/F RELAY

JVS Electronics Pvt Ltd offers a wide range of single pole, non-directional, IDMT O/C or E/F relay JRC 051P/JRC 051.



Features:

- The relay measures the line current from each of the phases and if exceeds the set operating current, then relay extends a trip signal after the operating time. The relays operating time is determined by selecting one of the four inverse time current characteristics. The relay has facility to active / inhibit the high set protection feature. The relay output contacts are Self reset/hand reset type. Relay opera on without any fault current is determinated by trip test facility.
- The relay provides time graded phase or earth fault protection of Generators, Transformers, Feeder, etc.

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

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Contact:

JVS Electronics Pvt Ltd, Bangalore

Mobile: 09448288863

Email: bangalore@jvselectronics.in

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Cup filling machine suitable for filling liquids like Dahi/Lassi/Milk/Juice/Yogurt/Shrikhand and Non Carbonated Beverage.

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Functioning-Semi-Automatic, Fully Automatic



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Pasteurization system ranging 300 LPH to 20,000 LPH Suitable for Milk, cream, dahi, paneer, juice & beverage. This system is offered with tubular holding ranging from 20 sec to 10 min depends on application. It is also provided precise output temp. control of the product



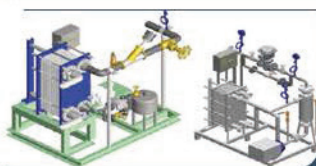
Plate heat exchanger

PHE used for heating/cooling of milk, cream, ice cream mix, sugar syrup, juice mix, beverages, soda water, pharma chemicals & food products



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Hot water generation system

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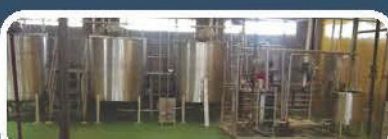
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FEATURED PRODUCTS

HIGH PRECISION RUBBER VACUUM SUCTION CUPS FOR MATERIAL HANDLING APPLICATIONS

Moulik Rubber Industries offers high precision rubber vacuum suction cups for material handling applications.

Features:

- It manufacture precision molded vacuum suction cups and bellows which are used extensively in Automated material handling equipment's along with Food, Packaging and Printing Industries.
- They are manufactured from high quality polymers like Silicone Rubber, Nitrile and Neoprene Rubber.
- These suction cups are available in various sizes, design, colors and folds to fit precisely to its assembly and allow it to pickup and move the loads efficiently.
- They comply with all international standards like EU, US and Asian, making it the perfect replacement for the expensive cups made abroad.

About the Company: Moulik Rubber Industries, established in 1990, are one of the leading manufacturers of high quality moulded and extruded rubber components.

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Contact:

Moulik Rubber Industries, Mumbai

Tel: 022 40037863

Mobile: 09820444582

Email: response@moulikrubberindustries.com

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FILES

PFERD offers a wide range of files.

Features:

- For manual roughing, finishing, chamfering and sharpening tasks, PFERD offers an extensive range of files and rasps, holders, handles and devices ideal for coarse to delicate work on a variety of materials.

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

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PFERD, Bengaluru

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- Flameproof and intrinsically safe.
- Stepless and fingertip control to work near natural frequency.
- Suitable for warm and humid environments.
- Wide range of 8 models.

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Eminently suited to:

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- Dislodge material build-ups on walls of storage vessels, pneumatic conveying lines, cyclone separators, bag filter etc.
- Drive small screens, feeders, vibrating tables and vibratory devices.

Beneficial Features:

- Low cost.
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- Easy to install and operate.
- Maintenance free.
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- Amenable to automation and remote control.
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Tel.: 022-27130270/66302504

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FEATURED PRODUCTS

CONCEPT-HYDRO GRIPPING SYSTEMS

Concept Engineers offers a wide range of concept-hydro gripping systems.

Features:

- The advent of CONCEPT-hydro gripping system opens new ways in mastering the most difficult situation with uncompromising thoroughness. Sophisticated technology, perfect construction and special materials make the clamping devices a generation ahead of the conventional work holding fixtures in clamping force, clamping accuracy and load torque.
- Whereas remarkable technical advance are being made on machines and machine tools, clamping fixtures have scarcely changed.
- CONCEPT-Hydraulic holding devices on the one hand reduce cost and improve quality in almost all areas of machining and inspection while on the other solve the most difficult clamping problems.
- The very high repeatability and reliability factors reduce rejections to a minimum. There is no deformation of work piece or damage to the clamping surface - though the clamping force is a maximum of 5 Kg/mm - as the clamping force is transmitted evenly to the entire clamping surface. This means even very short or thin walled components could be securely clamped with the least danger of canting or deformation.
- CONCEPT-Hydraulic holding devices have no loose components (collects or liners) making pressure coolant applications on chucks direct and efficient.
- Flexibility in design and application of hydraulically controlled holding devices lies in the fact that they can be adopted to perform any machining operation - turning, copy turning, boring, drilling, gear cutting, gear finishing, etc.
- Concept Hydraulic expanding arbors and chucks could be applied successfully in inspection of components accurately.
- A selection of arbors and chucks in standard sizes and average bearing lengths are generally available from stock. An outline of the operations performed with pertinent machining data or inspection techniques should accompany your enquiry.



About the Company: Concept Engineers, the pioneer in precision engineering designs and tools was established in 1984 by a team of young, dynamic and professional engineers to manufacture a range of precision Concept

Hydraulic Chuck and Mandrels/Arbors, Taper Collets and Hydraulic Fixtures, etc.

Contact:

Concept Engineers, Bangalore

Tel: 080-25258885 Mobile: 09845017701

Email: design@conceptarbors.net

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DUMP TUBES

IndiTech Valves Pvt Ltd offers a wide range of dump tubes.

Features:

- Dump Tubes play a critical role in Turbine Bypass applications. Due to the low-pressure conditions at the outlet of the Turbine Bypass Valves, the specific volume of steam dramatically increases, which calls for large pipe sizes.
- By deploying Dump Tubes, the size of the Turbine Bypass Valve and pipe sizes between the Bypass Valve and the Condenser can be reduced considerably, thereby reducing the overall cost of the system.
- Its features include: Precise steam temperature control; Customised to Maintain desired upstream conditions; Single-Stage/Multi-Stage Pressure Reduction options available to reduce noise to the required specification.



About the Company: IndiTech Valves Pvt. Ltd., established in 2000 under the leadership of Mr. Chandrashekhar Indi, has evolved to become a leading control valve manufacturer in India.

Contact:

IndiTech Valves Pvt Ltd, Pune

Tel: 020-25420021

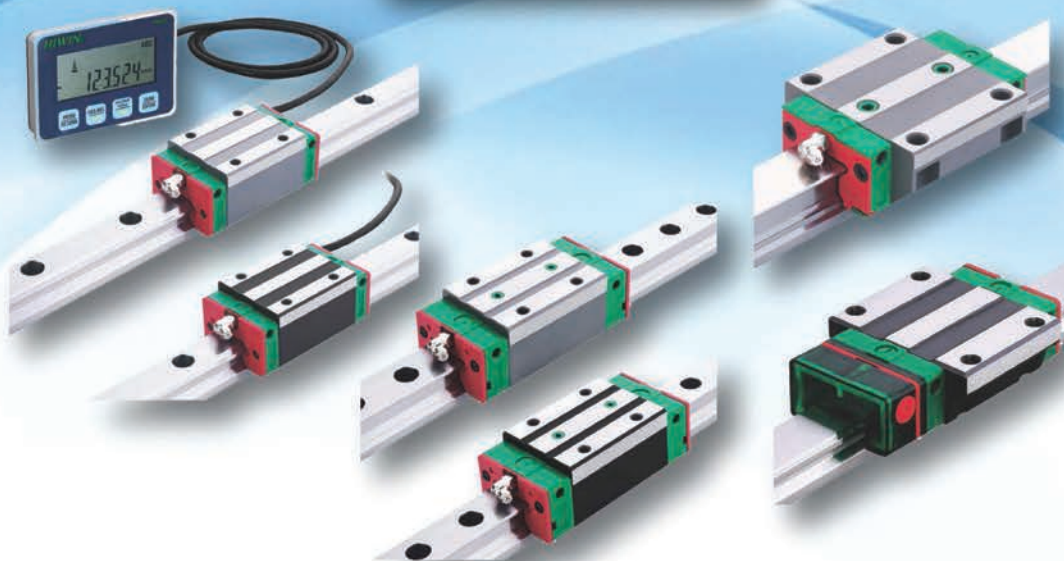
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Bangalore – 560 058 Ph: +91 80 2372 6644, 2372 5544
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Plot No. A/388, Road No. 28, Wagle Estate,
Thane - 400604 M. S. India
Mobile : 9769201564 Email : sales.delcofans@gmail.com
Website : www.delcofans.com

HYDRAULIC EXPANDING MANDRELS REVOLUTION IN WORK HOLDING DEVICES

Concept Engineers offers a wide range of hydraulic expanding mandrels revolution in work holding devices.



Features:

- The advent of CONCEPT- hydraulic clamping work holding devices opens new ways in mastering the most difficult situation with uncompromising thoroughness. Sophisticated technology, perfect construction and special materials make the clamping devices a generation ahead of the conventional work holding fixtures in clamping force, clamping accuracy and load torque.
- Whereas remarkable technical advance has been made on machines and machine tools, clamping fixtures have scarcely changed.
- CONCEPT-Hydraulic holding devices on the one hand reduce cost and improve quality in almost all areas of machining and inspection while on the other solve the most difficult clamping problems.
- The very high repeatability and reliability factors reduce rejections to a minimum. There is no deformation of work piece or damage to the clamping surface — though the clamping force is a maximum of 5 Kg/mm — as the clamping force is transmitted evenly to the entire clamping surface. This means even very short or thin walled components could be securely clamped with the least danger of canting or deformation.
- CONCEPT-Hydraulic holding devices have no loose components (collects or liners) making pressure coolant applications on chucks direct and efficient. Presenting of a hydraulic fixture is also simplified as there is no axial movement while clamping. Flexibility in design and application of hydraulically controlled holding devices lies in the fact that they can be adopted to perform any finishing machining operation - turning, milling, boring, drilling, fixture location, gear cutting, gear shaving, gear grinding, etc.
- CONCEPT—Hydraulic expanding arbors and chucks could be applied successfully in inspection of components accurately.

About the Company: Concept Engineers, the pioneer in precision engineering designs and tools was established in 1984 by a team of young, dynamic and professional engineers to manufacture a range of precision Concept Hydraulic Chuck and Mandrels/Arbors, Taper Collets and Hydraulic Fixtures for the first time in the country.

Contact:

Concept Engineers, Bangalore
Tel: 080-25258885 Mobile: 09845017701
Email: design@conceptarbors.net

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MINI TRAVELLING GRATES

Rushas Engg Co Pvt Ltd offers a wide range of mini travelling grates.

Features:

- Mini Travelling Grate (MTG) is an efficient stoker for fuel combustion in furnaces of small boilers, in the range of 3 TPH to 10 TPH capacity.
- Common Practices of fuel combustion in small boilers are: Stationary Grate, Dumping Grate and Pulsating Grate. However, due to limitations of above systems which includes improper combustion, efficiency, maintenance and their inability to handle multiple fuels, an efficient stoker system was necessary. The result is our Mini Traveling Grate (MTG).

About the Company: Rushas Engineering Co Pvt Ltd is an ISO 9001:2015 certified company and approved under IBR, founded in the year 1980. They are aligned with the boiler Industry and are manufacturing various products for the same like various types of Grates, Valves, Boiler Mountings, Castings etc.

Contact:

Rushas Engg Co Pvt Ltd, Ahmednagar
Tel: 0241-2777380
Mobile: 09145000861
Email: marketing@rushas.com

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Material : Carbon Steel, Stainless Steel, Alu.



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Material : Carbon Steel, Stainless Steel, Alu.
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- Captive Screw
- Low profile

Sizes : Metric, UNC & UNF

Material : Stainless Steel, Alu.



Cage Nuts

- High Quality
- For various sheet thickness
- Special Types Available

Sizes : Metric & UNC

Material : Spring Steel and Spring Stainless Steel



Blind Rivets

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Sizes :
2.4 dia, 3.2 dia, 4 dia, 4.8 dia,
6.4 dia in various lengths

Material : Carbon Steel, Stainless Steel, Alu., Copper



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Sizes : 4.8 dia & 6.4 dia

Material : Carbon Steel, Stainless Steel, Alu.



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Size - M3 thru M6

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Mob. 99 600 800 88
Email : shreefasteners@gmail.com

FEATURED PRODUCTS

PIPE FITTING

Matrix Tube & Fittings Pvt Ltd offers a wide range of pipe fitting.

Features:

- Pipe fittings are widely demanded for any piping and plumbing systems used in industrial and commercial applications. Fittings allow pipes to be joined or installed in the appropriate place and terminated or closed where necessary. Fittings are available in various shapes and sizes. They can be expensive, require time, and different materials and tools to install.
- They are an essential part of piping and plumbing systems. There are thousands of specialized fittings manufactured. Each type of pipe or tube requires its own type of fitting, but usually all pipe fittings share some common features. Pipe fittings are available everywhere where plumbing materials are sold.

About the Company: Matrix Tube and Fitting has been a professionally managed Manufacturer of ferrous and non-ferrous metals.

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Contact:

Matrix Tube & Fittings Pvt Ltd, Mumbai

Tel: 022-66394842, 66109240

Email: sales@matrixfittings.com

matrixfitting@gmail.com

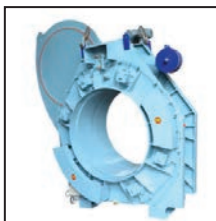


OPEN TYPE ROTARY GOOGLE VALVE

JoshiJampala Engineering Pvt Ltd offers a wide range of open type rotary goggle valve.

Features:

- The Goggle valve is used for the isolation of Blast furnace gas/toxic or inflammable gases in the furnace, and converter gas pipelines.
- The valve mainly consists of the body, disc, compensator bellow, clamping/de-clamping mechanism, disc centering mechanism, and drive mechanism.
- Nitrogen purging arrangement can be provided at the end of either the close or open cycle. Interlocks are provided in the control panel to avoid any misalignment or illogical functioning of the goggle valve.



About the Company: JoshiJampala Engineering Pvt Ltd (JJEPL) is a renowned name in the field of special- purpose industrial valves and dampers.

Contact:

JoshiJampala Engineering Pvt Ltd, Satara

Mobile: 07767809105

Email: sales@joshijampala.com

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TRUNNION MOUNTED 2PC BALL VALVES

Micon Engineers (Hubli) Pvt Ltd offers a wide range of trunnion mounted 2PC ball valve.

Features:

- It is low operating torque; Design Std. EN ISO 17292 /API 6D / BS 5351; Fire safe tested design API 607/API 6FA; Blowout proof stem design & antistatic device.
- Face to Face Dimension as per ANSI B 16.10; Testing as per EN ISO 12266-1/API 598; Flange Drilling as per ANSI B16.5 RF Serrated; Full bore/reduced bore; Double block and blee.

About the Company: Micon introduce as one of the dynamic growth oriented engineering Company. Engaged in manufacturing & exporting of quality industrial Valves . These valves are designed and manufacture to confirm strictly to ASTM, ANSI, API, BS, EN AND IS and other internationally acclaimed standards to meet the most stringent requirements of industrial valves.

Contact:

Micon Engineers (Hubli) Pvt Ltd,
Dharwad

Tel: 0836-2970449, 2970712

Email: info@miconvalveshubli.com

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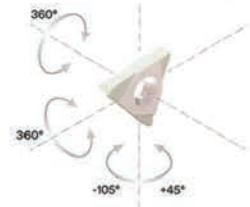
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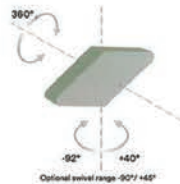
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Output Current : Settable with Coarse & Fine Control
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Line Regulation (CC) : 0.01% 1mA/for 10% variation input voltage
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Protection : Two DPM to monitor the output voltage & current
Protection : Against short circuit & over load

CODE	CES-500	CES-501	CES-502	CES-503	CES-504	CES-505	CES-506	CES-507	CES-508	CES-509	CES-510	CES-511	CES-512	CES-513
Output Voltage	0-32V	0-32V	0-32V	0-32V	0-32V	0-32V	0-64V	0-64V	0-64V	0-64V	0-128V	0-128V	0-128V	0-128V
Output Current (Max)	0-20A	0-10A	0-05A	0-2A	0-1A	0-30/50A	0-1A	0-2A	0-5A	0-10/20/30A	0-1A	0-2A	0-5A	0-10A



CROWN ELECTRONICS SYSTEMS

Plot No A-25, Ground Floor, Keshpur Industrial Area,
Vikasपुरी New Delhi 110018

Contact : Tel 011-45013465, 7838002712

Email: crown_tnm@yahoo.com, tnm.ces@gmail.com

Web: <http://www.crownelectronicssystems.com>, www.crowndcpowersupply.com

SEAMLESS BUTTWELD FITTINGS

EBY Fasteners offers a wide range of seamless butt weld fittings.



Features:

- As one of the leading manufacturers of seamless butt weld fittings, EBY Fasteners is committed to providing customers with high-quality products that meet the required industry standards in terms of durability and quality.
- Seamless Butt Weld Fittings are manufactured from seamless pipe and tube using either a hot or a cold-forming process, depending on the application. Butt weld Seamless fittings continuously formed from a section of seamless pipe material, seamless fittings are formed by applying pressure and heat to change the pipe directly into a different shape.

About the Company: Established in the year 1977, EBY Fasteners have contributed immensely to the industry during its more than four decades of presence in the field of Forged Fittings, Out-lets & Flanges.

Contact:

EBY Fasteners, Navi Mumbai

Mobile: 07304781003 09323464278

Email: inquiry@ebyfasteners.com

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BIOMASS AND COAL FIRED SPREADER STOKER BOILER

Sitson India Ltd offers a wide range of biomass and coal fired spreader stoker boiler.

Features:

- Super heater is provided in convection zone, radiation zone is eliminated so more life of super heater coils. Super heater is completely drainable.
- Small evaporation heating surface is required for boilers having super heater steam pressure more than 87 Kg/Cm² to avoid steaming in economizer.
- More residence time for complete combustion of fuel in suspension. More steam volume in steam drum which ensures better steam quality.
- Two stage top header ensure moisture return back to furnace bottom header so moisture separation load reduced in steam drum so better steam quality.



About the Company: Sitson India Ltd. is an ISO-9001 Company, incorporated in 1978 to provide specialized engineering services in the field of boilers and power generation.

Contact:

Sitson India Ltd, Thane

Tel: 0251-2871283

Email: sitson@sitsonindia.com

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SURFACE PROTECTION FILM

Spark adhesives offers a wide range of surface protection film.



Features:

- Surface protective films are thin, transparent, adhesive layers of plastic material applied to the surface of various objects to protect them from scratches, dust, and other forms of damage.
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Contact:

Spark adhesives, Hyderabad

Mobile: 09912729189

Email: sales@sparkadhesives.com

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MUMBAI : No. 620, Marathon Max, Mulund Goregaon Link Road, Mulund West, Mumbai - 400 080 • Mob.: 90350 32568

CHENNAI : No. 25, Maha Vishnu Nagar, 1st Street, Pooniammaan Medu, Madhavaram, Chennai - 600110 • Mob.: 99456 23888

PUNE : Plot No P 81, D 2 Block, Behind Kabre Hospital, Midc Chinchawad, Pune - 411038 • Mob.: 9036180741

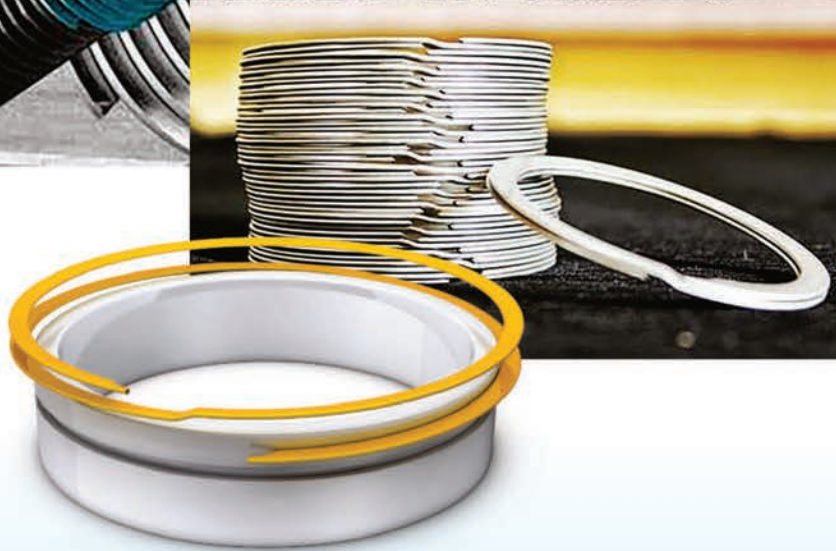
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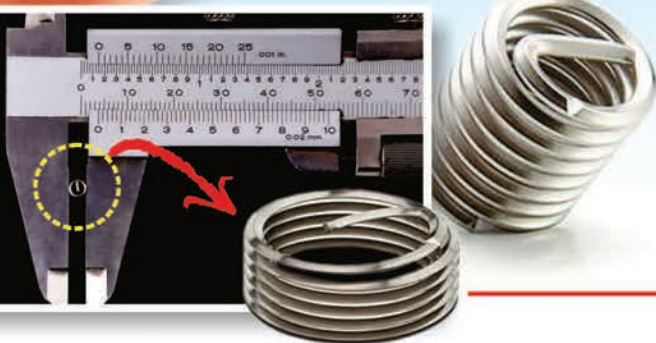


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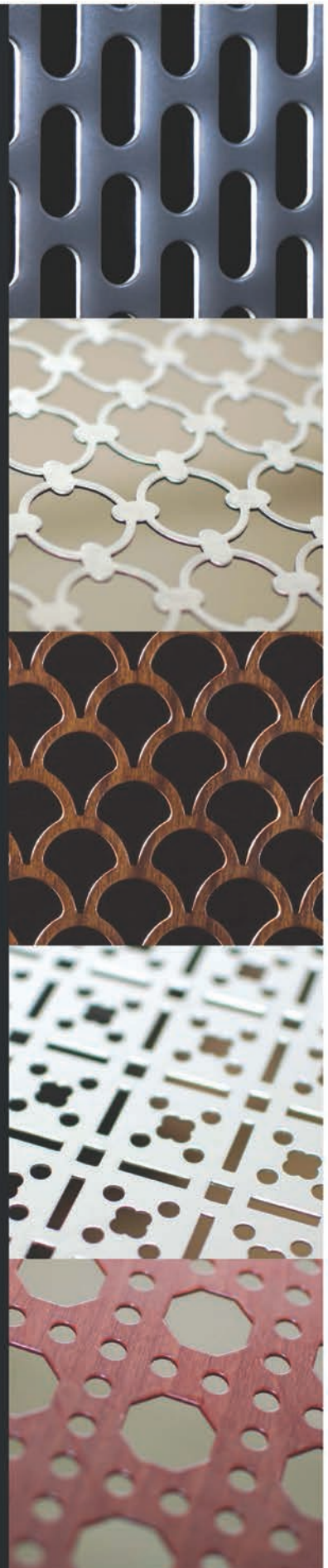
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FEATURED PRODUCTS

WASTE HEAT RECOVERY MODULE

Thermodyne Engineering Systems offers waste heat recovery module.



Features:

- Waste Heat Recovery boilers are designed to recover heat from waste flue gases from DG exhaust, Furnace exhaust, Kiln exhaust, incinerator exhaust etc. to produce steam or hot water based on the application requirements of the plant.
- There are 4 basic requirements or inputs for calculating your waste heat from the source:
- Type of flue gas and its composition; amount of flue gases leaving the exhaust per hour in Kg/hr or Nm³/hr; the temperature of flue gases at the exhaust; the process where you want to utilize this waste heat.

About the Company: Thermodyne has been established as a trusted industry partner in understanding customer-specific energy needs and offering tailored solutions that provide a competitive edge by lowering operating costs.

Contact:

Thermodyne Engineering Systems,
Ghaziabad

Tel: 0120-4562332, 4110482

Mobile: 09990226006

Email: sales@thermodyneboilers.co

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ROOF GUARD BLACK

Royal Industrial Corporation offers a wide range of roof guard black.

Features:

- Roof guard black is cold applied liquid waterproofing membrane, specially formulated from a blend of special resin and rubber, reinforced with special water repelling fillers, minerals stabilizers and gelling agent.
- Ideal waterproofing system for concrete roofs, polyurethane foam slabs, and polyester built up roofs, maintenance of existing roofs, masonry and concrete walls, bathrooms, basements, bridges, decks, metal surfaces etc. Used as a sandwich membrane in new construction and as surface treatment on existing slabs.



About the Company: Royal Industrial Corporation envisioned in the year 2005 has come up as a shining star in the domain of trading, supplying and distributing a wide array of water proofing, industrial tapes and adhesive products.

Contact:

Royal Industrial Corporation,
Secunderabad

Mobile: 097040 87282, 070326 51052

Email: royalindustrial@yahoo.co.in

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WALKING HEARTH FURNACE / WALKING BEAM FURNACE

Therm Process Engineering Pvt Ltd offers a wide range of walking hearth furnace / walking beam furnace.



Features:

- The walking beam furnace allows the product to be heated from all sides, where a walking hearth furnace only allows product to be heated from top.
- The walking hearth furnace allows the charge to be transported through the furnace by lift and shift mechanism.
- There is no major mechanism difference between walking hearth and walking beam furnace.
- Simplicity of Design and Ease of Construction; Very effective heating and soaking of billets.

About the Company: Therm Process Engineering provide range of innovative thermal process systems with computer aided - microprocessor based process controls, energy saving equipment, automatic material handling system, etc.

Contact:

Therm Process Engineering Pvt Ltd,
Mumbai

Tel: 022-25917882, 25917883

Email: sales@thermprocess.com

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Workpiece in Chuck being machined with SycoTec Spindle



Robotic Application of SycoTec Spindle



SycoTec Spindle as a 5th Axis for VMC (Vertical Machining Centre)



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FEATURED PRODUCTS

CARTRIDGE FILTER

Aswathi Industries Limited offers a wide range of cartridge filter.

Features:

- Construction and operation of Cartridge Filter is similar to pulse jet bag filters, except the fact that cartridge filters are used instead of bags resulting in compact design.
- Its advantages is: Surface filtration does not allow the micron particle to penetrate; Surface area of the cartridge is 4 times more; Length is maximum 0.5 to 2 mts.
- Compressed air consumption for cleaning; Low pressure drop due to surface filtration; Washable in PTFE coating; Less number of solenoid valves are required; Low space consumption; Low construction and installation cost.

About the Company: Aswathi Industries Limited offers a turnkey project solution for Industrial Waste Incinerators Plant, Lead-acid battery recycling processes, and Air Pollution Control Equipments, rotary calciner and dryer.

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Contact:

Aswathi Industries Limited, Mumbai
Tel: 022-6179 0900
Email: sales@aswathiindustries.com



DOUBLE SEATED GLOBE VALVE

Dembla Valves Ltd offers a wide range of double seated globe valve.

Features:

- Globe double seated control valves are essentially utilized for a variety of applications where large flow capacities with higher pressure drops condition are must & where shut off is not required.
- These Valves are employed for non-clean fluids with contoured type trims. Series 2000 Double seated Globe control Valve incorporates top and bottom plug guiding to provide adequate support against side thrust of the fluid and high resistance to liberation. The valve plug design inherent features the pressure balancing effect to facilitate the high pressure drop capability with standard actuators.

About the Company: Dembla Valves Ltd has an experienced and highly skilled technical

sales team, alongside dedicated application/offer preparation team to generate sales and ensure the seamless execution of orders.

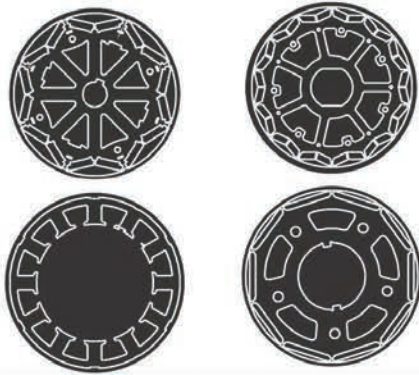
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Contact:

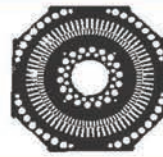
Dembla Valves Ltd, Thane
Email: marketing@dembla.com





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TRACTION MOTORS



HEAVY MOTOR



SEGMENTAL STAMPING



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MIXIE STAMPING



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CLUSTER OF APPLIANCE STAMPINGS



ALTERNATOR STAMPING



WELDED STATOR STACK



ALTERNATOR ROTOR LAMINATION



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Range : IEC 63 to 160 Frame Tailor Made Special Covers

DEEP DRAWN MS COVERS



DIE CASTED ALUMINIUM ROTOR
CORE LENGTH- 900MM,
450MM ALUMINIUM 105KG



STATOR CORE
CORE LENGTH- 900MM, 770MM

RANGE OF PRODUCTS IN STAMPING, LAMINATION & DIE CAST ROTORS

- Electric Vehicle - Special Tailor Made Stampings
- Engineering Application - Industrial, Traction, Textile Motor Etc.,
- Power Generation - Alternators, Wind Generators
- Pumps - Submersible, Sewage, Monoblock Etc.,
- Home Appliance - Mixie, Table Fan, Ceiling Fan, Coolers
- Automotive - Armature, Starter Motor Lamination
- Strip Laminations -E & I, Type 8, 8B, 16, 43....

BABULAL BHANSALI

Managing Director

VIKRAM BHANSALI

Director

111-A, Bommasandra Industrial Area, Bangalore-560099, Karnataka, India

+91-98450 11881 / +91 99000 87584

vikram@magcore.in

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450 Kg.	Cartridge Dust Collector (Optional)
700 Kg.	PLC Programmed Auto Control Loader (Optional)
	Many more features as per customers choice.

Features:

Least Maintenance
Latest Direct Wheel technology
Cartridge Dust Collector (Optional)
PLC Programmed Auto Control Loader (Optional)
Many more features as per customers choice.

Manufacturers:-

SURFACE FINISHING EQUIPMENT COMPANY
E-100, M.I.A, PHASE-II BASNI, JODHPUR-342005(RAJ.) INDIA
Mob:- +91- 9829022624, Tel:- +91-291-2740128,+91-291-2740259
Website:- www.sfecindia.net, E-mail:- info@surfexindia.com

AUTO RECLOSE RELAY WITH FAST RESET- JRV 142

JVS Electronics Pvt Ltd offers auto reclose relay with fast reset- JRV 142.

Features:

- The relay receives the fault initiation from the protection relay and that triggers the auto reclose function.
- Normally, the first reclose (or shot) is so short in time, that the consumer cannot notice anything. However, the fault will cleared and the feeder will continue in normal service. The auto reclose function is normally used in feeder protection relays that are protecting an overhead line.
- Its features include: Software based design; Built- in Auto / Manual selection facility; Fast reset facility; No. of shots selectable; High accuracy and stability; Drawout case.



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

Contact:

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

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SPRING WASHER

Khanwalkar Industries offers a wide range of Carbon' brand spring washer.

Features:

- These are manufactured on automatic machines within close tolerances and under strict quality control that are applicable to production process.
- The company supplies its product 'Carbon' spring washers conforming to various standards like ISS, BSS, DIN, ASA, JIS and also in stainless steel all over India.
- These washers conforming to special sizes and combi sizes are also available. Washers are manufactured in ID size 2.5mm to 50mm in natural black and in electroplated coating with blue, golden green finish and with trivalent coating.



About the company: Khanwalkar industries, an ISO 9001:2015 certified company manufacturing 'Carbon' brand spring washer in carbon steel (EN-42B), domestic market of India.

Contact:

Khanwalkar Industries, Indore
Mobile: 09993555087
Email: Khanwalkaro8@gmail.com

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DRYER

Vincitore Solutions & Equipment LLP's offers a wide range of dryer.

Features:

- Drying is a mass transfer process consisting of the removal of water or another solvent by evaporation from a solid, semi-solid or liquid.
- This process is often used as a final production step before selling or packaging product. Dryers play a crucial role in the production process, as they help to enhance the quality, stability, and shelf life of chemical products.



About the Company: Vincitore Engineers is a team of proactive engineers to provide quality and cost effective solution with innovative ideas to optimize project cost & schedule.

Contact:

Vincitore Solutions & Equipment LLP's,
Dist-Pune
Mobile: 08668745945, 07397858 697
Email: enq@vincitoretechnology.com

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PRODUCTS OF INNOVATIVE ENGINEERS



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Low Profile Hand Pallet Truck



Manual Stacker



Semi Electric Stacker



Drum Lifter



Drum Lifter and Tilter



Semi Electric Drum Lifting and Tilting Stacker



Counterbalance stacker



Full Electric Stacker



Manual Scissor Lift



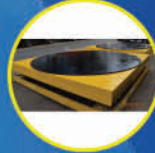
AC operated Scissor lift



Customised Scissor lift



Customised SL



SL with Round Table



Lift Table with Rollers



SS304 SL



Platform Lift



Goods lift



Goods Lift



AC Motorised Floor Crane



Swivel Electric Floor Crane



Electric RTPT



Dock Leveler



Dock Leveler



HOT Crane



EOT Crane



Jib Crane



Wall mounted jib crane



Gantry Crane



Gantry Crane-1



Manual Floor Crane



Monorail



Mobile Dock Ramp



Mezzanine floor



C Hook



Crane Fork



Fork Attachments



Lifting attachment for fork

We manufacture:

- Pallet Truck
- Stacker
- Scissor Lift
- Goods Lift

- Electric Rough Terrain Pallet Truck
- Cranes like Floor Crane
- Swivel Floor Cranes

- Monorails
- EOT Cranes
- Jib Cranes
- Gantry Cranes etc

INNOVATIVE ENGINEERS

111/42, 2nd Main, Rajajinagar Industrial Town, Rajajinagar, Bangalore 560 044

Ph: +91 80 2338 6558/4167 3487 Email: enquiry@innovativeengrs.com Web: www.innovativeengrs.com

COPPER HEAD DSL SYSTEMS

Insutech Corporation offers a wide range of copper head DSL systems.

Features:

- Insutech Corporation introduces copper head DSL systems to handle very high Amps from 750 Amps to 7000 Amps for demanding applications in steel melting shop and other continuous duty cranes.
- Until very recently for high Amps standard MS-rail were in use which proved to be extremely bulky. Copper Head DSL becomes instrumental for high Amps and moreover extremely compact in size as well as weight with the same agility of MS-rail, where customers don't have to setup bulky structure for supporting DSL.
- With multiple options starting from 750 Amps to 7,000 Amps, we at Insutech can design the system which shall suit your exact Amps requirement, hence making it extremely economical for the end user. For instance if the Load requirement is 2,150 Amps thus we shall design the copper conductor for 2150 Amps and not offer a standard catalog rating of 2,500 Amps, thus making it optimum technically as well as commercially.
- Insutech has become One Stop Shop for providing power transmission solutions for material handling industry offering array of products like drag chains, shrouded DSL, festoon systems, rail clamps, rail pads, spring buffers, MS-angle/rail DSL system and many more.
- Ease of operation, minimum maintenance, precision in handling critical components are key features of the product.
- With multiple products entirely made In India Insutech is material handling equipment manufacturing company with more than 4 decades of industry experience serving more than 300 customers.

About the company: Insu Tech offers solutions that are safe, robust and consistent for a Steel Plant operating conditions. These products are synonymous to crane OEMs across the world. It offers innovative solutions for new projects to provide optimal power transmission for material handling equipment. Inception of Insutech Corporation by Mr. Hitendra Shah, to provide customers with economical, efficient and well-engineered material handling solutions.

Contact:

Insu Tech Corporation, Dist. – Palghar
Tel: 0250-2453546, 2457073
Mobile: 08669997733, 08669997833
Email: suchit.shah@insutech.net,
info@insutech.net

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BARREL PUMPS

C Bole & Co offers a wide range of barrel pumps.

Features:

- These are available in various types like, hand operated, motorised, air operated, flameproof, etc.; available in different materials of construction such as Stainless Steel 316, polypropylene, MS and aluminium.
- It requires a smaller footprint and is suitable for installation where the ground surface area is limited. Used for handling a variety of viscous and non-viscous liquids like solvents, alkalies, pesticides, gasoline, fuel oil, inflammable corrosive liquids, varnishes, petroleum products, drugs and pharmaceuticals and degreasing agents, glucose, honey, glycerine, shampoo, paints and other highly viscous liquids.

About the company: C Bole & Co offers wide range of seal-less magnetic drive monoblock, chemical process pumps which ensures 100 per cent leak proof operation. They are ideal for transfer of corrosive chemicals, acids, dyes, solvents, toxic and fuming liquids, petrol, kerosene, water etc.

Contact:

C Bole & Co, Mumbai
Tel: 022-23424350, 23429641
Fax: 022-23424040
Email: cboleco@yahoo.com

Scan the QR Code for instant product enquiry



BURNER SEQUENCE CONTROLLER

Linear Systems offers a wide range of burner sequence controller.

Features:

- The burner sequence controller is an automatic electronic controller used for oil-fired boilers/burners; the sequence controller is designed to ensure safe start up and operation of oil fired burners.
- This controller finds ready application in oil-fired boilers/furnaces and also offered are sequence controllers for gas-fired burners.
- Controller is manufactured with microprocessor-based technology, ensuring quality and reliability.
- It has the capability of supplying sequence controllers to suit the specific requirement of the OEM.

About the company: Established in 1986, Linear Systems is a manufacturer of oil burner controllers, gas burner controllers, burner sequence controllers, LDR flame sensor, LDR flame amplifier, UV flame sensor, UV flame amplifier, etc.

Contact:

Linear Systems, Mumbai
Tel: 022-25512534 Telefax: 022-25576002
Email: info@linearsystems.in

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Lifting Magnets



Cable Reeling Drums



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Our Clients



To know more, contact us today

Electro Zavod (India) Pvt. Ltd.

Regd. office : White House, 119 Park Street, Kolkata 700 016, India

Works : Sankrail Industrial Park, Dhulagarh, Howrah 711 302, India

☎ +91 9051 700070 (WhatsApp only) ✉ info@electrozavod.com 🌐 www.electrozavod.com

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UV SENSOR FOR OIL/GAS FLAMES

Linear Systems provides a range of flame sensors for detecting oil and gas flames.

Features:

- Available with various viewing and mounting arrangements – Models UV-01, UV-71-AJ, UV-71-SC, etc.; designed to detect UV radiations emitted by a naked flame.
- These are immune to visible light and refractory glow from furnace walls; the company's designs include protective quartz glass cover, 3/4" NPT and BSW mounting with optional air cooling.
- Also available a NW model self-checking UV sensor (UV-71-SC).

About the company: Established in 1986, Linear Systems is a manufacturer of oil burner controllers, gas burner controllers, burner sequence controllers, LDR flame sensor, LDR flame amplifier, UV flame sensor, etc.

Contact:

Linear Systems, Mumbai
Tel: 022-25512534
Email: info@linearsystems.in



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ROTARY GEAR PUMPS

C Bole & Co offers a wide range of positive displacement rotary gear pumps for handling oil and other semi viscous liquids.

Features:

- These pumps find applications for furnace oils, fuel oils, molasses, paints and pigments, castor oils, gasoline, inks, gums, sizing liquids, glue, polymers and other industrial applications; can be also used in applications like pressure feeding of fuel in burners, circulation of lube oils in gearboxes, turbines, fluid couplings, etc.
- Pumps can be supplied in SS 316, gun metal, bronze construction with heating/cooling jackets; pumps can be supplied with special mechanical seal, which prevents leakage near shaft end; the pump body is made of 2-piece type i.e., only one joint in the body which reduces the maintenance cost.

About the company: C Bole & Co offers wide range of seal-less magnetic drive monoblock, chemical process pumps which ensures 100% leak proof operation.

Contact:

C Bole & Co, Mumbai
Tel: 022-23424350, 23429641
Email: cboleco@yahoo.com
cboleco@hotmail.com



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DEGREASER CLEANER

Novel Surface Treatments offers a wide range of degreaser industrial cleaner.

Features:

- Offered degreaser is gaining huge acclamation for its fast removal properties that is widely acclaimed in the industry.
- Its features include: aqueous & has water pH; ecofriendly – no ozone depletors; replaces trichloroethylene (TCE) etc Haz. Solvents; removes wide range of cutting, stamping, quenching, lubricating oils, grease, buffing compound; used for steel, aluminium brass, copper, nickel, tin, stainless steel etc many metals and non-metals; prevents corrosion/rust; used in immersion, ultrasonic, spray-in-air or spray-under-immersion and hand wipe application method.

About the company: Established in 2001, Novel Surface Treatments, is a manufacturer of surface technology products. The company developed the VK range of chemicals for fumeless stainless steel pickling passivation and cleaning. IIT Bombay in compliance with industry quality standards.

Contact:

Novel Surface Treatments, Mumbai
Mobile: 09322246307, 09172750225
Email: marketing@novelindia.com



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INDUSTRIAL SOLAR BATTERIES

Inova Battery manufactures and supplier of a wide range of industrial solar batteries.

Features:

- These are portable energy sources which can be transported conveniently anywhere; helps in reducing electricity bills and the pollution footprint.
- Some key benefits of the products are such as precise design; efficient; high functionality.
- The material used in production is acquired from specialised sellers after strict testing for flawlessness and efficiency.

About the company: Established in 2007, Inova Battery is a manufacturer and supplier of a large array of products including inverter batteries, UPS batteries, tubular batteries, solar batteries, automotive batteries and electric car batteries, manufactured using supreme class basic materials and contemporary tools and machinery.

Contact:

Inova Battery, Mumbai
Mobile: 09987076192, 09769688180
Email: ganesh75@gmail.com



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Industrial Valves



Manufacturer & Exporter of industrial valves

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- Wafer Check Valve
- Strainers: Y Type / Basket / Duplex
- Butterfly Valve
- Needle Valve
- Safety Valve
- Steam Trap - Thermo Dynamic / Bucket
- Extend Bonnet Valve: Ball / Gate / Globe Valve
- Flush Bottom Valve: Ball / Disc / Ram Type
- Breather Valve / Vacuum Breaker / Flame Arrester



RANGE OF AUTOMATION VALVES

- Pneumatic / Electric Actuated Ball Valve
- Pneumatic / Electric Actuated Butterfly valve
- 2/3 Way Pneumatic Diaphragm / Cylinder / Electric Actuated Globe Control Valve - ON-OFF / PID
- Pneumatic Cylinder Piston Actuated Gate Valve
- Angle Seat Valve (Y Type)



Caliber Valves Pvt Ltd

M: +91 9884 229 447
P: 044 4350 0192/143
E: mktg@calibervalves.com
calibervalves13@gmail.com
W: www.calibervalves.com



ROTARY UNION

Fluconn Rotary Devices Pvt. Ltd offers a wide range of rotary union.

Features:

- A rotary union is a mechanical seal used to transfer fluid or media from a stationary source, such as a pump, into a rotating device, such as a spindle with cutting tool.
- Rotary joints enable transfer of the fluids used to heat and cool.
- Rotary unions are used for heating or cooling the many processing rolls throughout the wide variety of applications.
- In addition, rotary unions for air and hydraulic service are used in winding and injection molding applications.
- In certain machine tool applications, rotate unions also are used to transfer hydraulic fluid or air for clamping or sensing.
- With the adoption of industrial automation it is a necessity to have efficient and reliable fluid transfer using Rotary Unions.
- With the help of our Rotary union solutions our customers are able to achieve higher processing efficiencies in their manufacturing units. Our products also help lower the maintenance and operation costs.
- We cater to a wide range of industries and their specific applications and also offer a wide range of material choices to meet the demands of varying environmental conditions and limits of operating specifications.
- Contact Fluconn Rotary Devices for your Rotary Union requirements. Apart from standard use cases we also specialize in special applications that require custom built Rotary Unions.

About the company: Fluconn Rotary Devices Pvt Ltd (Formerly Fluconn Co) has been engaged in manufacturing Rotary Unions since 1982. Fluconn Rotary Devices has been the Pioneer in manufacturing Rotary Unions in India, and the only one in the organized sector. The range and design of Fluconn Products covers every existing application for Rotary Unions in a wide spectrum of Industries. The application ranges from a mere swiveling action to spinning at 15,000 rev/min.

Contact:

Fluconn Rotary Devices Pvt Ltd, Vapi
 Tel: 0260-2452068
 Mobile: 09016818012
 Email: sales@fluconn.com,
 fluconn@gmail.com

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AUTOMATIC BACK SPOT FACING TOOL

Shenoy Engg Pvt Ltd offers automatic back spot facing tool.

Features:

- Since fully automatically operated back spot facing tools are generally not available, customers have no choices, other than to use a detachable cutter & a tool holder. For every operation, cutter needs to be physically dismantled, before going over to the next hole. Operators need to wait till the cutter cools down after completing and before commencing another operation, wasting machine hours & operator's energy.
- It offers automatic back spot facing tool to suit to customers' requirement. For hole $\varnothing 9$ mm to $\varnothing 12$ mm, tools are offered with solid HSS wings. Optionally, brazed carbide wings are also offered. For holes $\varnothing 12$ mm & above, tools are offered with wings, accommodating center clamping type, standard carbide inserts, having 4 cutting edges. Tools are tailor-made to suit varying individual requirement.
- Generally, the ratio of maximum back spot facing diameter with respect to the corresponding pilot hole diameter is 2:1. Since a back spot facing tool is normally custom-built, there is no general thumb rule for the back spot facing dia with respect to the corresponding pilot dia. The holding shank can be cylindrical (suitable for side lock holders), Morse taper, ISO, BT, and Metric, depending upon the machine spindle taper. The rear counter boring tool is meant for producing one specific back spot facing diameter through one specified bore. Therefore, these back spot facing tools are ideal for batch or mass production.
- The tool shank is made of case hardening steel for wear-resistance and also for taking care of heavy torsion load. In fact, this is the only known tool, which performs back spot facing operation automatically and without manual interruption. Therefore, for back spot facing operation, this is the most ideal tool in CNC machines, machining centers, SPMs with auto-cycles etc.

About the company: Shenoy Engg Pvt Ltd has developed a number of grinding attachments which enhance the capabilities of existing machines. It has also started specialising in special purpose machine tools, jigs and fixtures, technological upgradation of conventional machine tools, etc.

Contact:

Shenoy Engg Pvt Ltd, Bangalore
 Tel: 080-28361767, 28361725
 Mobile: 09243437487
 Email: info@shenoyengineering.com

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LEVEL ADJUSTING CASTER WHEELS

Jyoti Architectural Products Pvt Ltd offers a wide range of level adjusting caster wheels.

Features:

- These level adjusting caster wheels are now available from ready stock with load capacity 50kg/250/500 /750 & 1000kg/ wheel unique design allows to move the equipment on wheels whenever required.
- After positioning at desired place it will rest on rubber pad. This will eliminate movement & vibrations of equipment.

About the company: Established in the year 1992, "Jyoti Architectural Products Pvt Ltd", are counted amongst the prominent manufacturers, suppliers, importers, traders and exporters of caster wheels & furniture components. Being appreciated for their optimum quality, perfect finish & dimensional accuracy, their products are highly demanded in residential as well as commercial application by interior designers & architects.

Contact:

Jyoti Architectural Products Pvt Ltd,
Mumbai
Tel: 022-42421000 Mobile: 09320892981
Email: sales@jyotiarch.in



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CYLINDRICAL TAPER & GROOVED PINS

R K Engineering Company offers cylindrical, taper and grooved pins.

Features:

- Cylindrical (dowel) pins are used for retaining parts in a fixed position or for preserving their alignment.
- Cylindrical hardened pins are manufactured as per IS: 6689, unhardened pins as per IS: 2393 and taper, pins as per IS: 6698 standards.
- These are suitable for parts that have to be taken apart frequently, in which case cylindrical pins would tend to wear the holes.
- Grooved pins have parallel equidistant longitudinal grooves impressed on their exterior surface and are manufactured to IS: 7368 standards; also manufactured are non-standard pins.

About the company: R K Engineering Co commenced its business operation in the year 1976. It is engaged as a manufacturer, exporter, supplier for grooved pin, dowel pin, taper pin, spring dowel pin, circlip, parallel keys.

Contact:

R K Engineering Company, Mumbai
Tel: 022-66104058 Mobile: 09221047336
Email: rkenggcomp@gmail.com



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VIBRATORY FURNACE CHARGER

Elektromag-Joest Vibration Pvt Ltd offers vibratory furnace charger.

Features:

- This vibratory furnace chargers are a cost effective method of increasing productivity and quality of melt. The furnace charger consists of storage hopper with vibrating feeder mounted on a mobile trolley which moves to and fro between scrap yard and the furnace.
- By using the furnace charger, controlled vibrations the metal is uniformly fed into the furnace whereby the melting cycle is reduced and the furnace life and the bridging forming situation is avoided.
- The entangled pieces of scrap metal form a layer above and if unrecognized by furnace operator, bridging can lead to super heating of bath and failure of furnace lining and run out. Due to controlled feed, the hot metal splashing is avoided and the charger can be operated from a framed plate by the operator without actually being near to the furnace.

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

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Contact:

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



CABLE DRAG CHAINS

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

Features:

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

About the company: Established in the year 1958,

Elektromag is engaged in manufacturing of metallic/plastic cable drag chains and supplying to various steel plant, etc.

Contact:

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

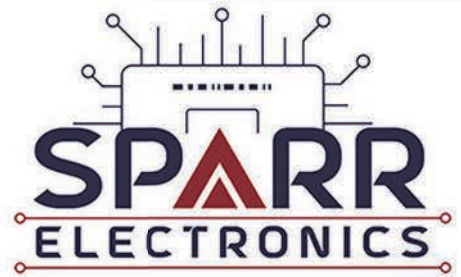


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An ISO 9001:2015
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Multiport Protocol Converter



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- Remote Monitoring Solutions**
Remote data for analysis
- IT Security & Managing Solutions**
Monitoring IT infrastructure for communication and IT security



Customized
Controller Boards



RS485-422
Isolator Repeater



RS232 to
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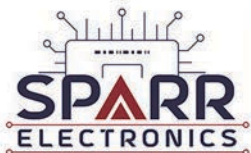


USB to
RS485-422 Converter



USB to
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*All products are developed / manufactured by us and can be customized to your specific needs.



CONTACT US

SPARR ELECTRONICS LTD

#414A, 7th Main Road, 1st Block, HRBR Layout, Banaswadi, Bengaluru – 560043, Karnataka, India.

Web: www.sparrl.com | Email: sales@sparrl.com, info@sparrl.com

Mobile: 9900477055

Phone: +91-80-41278033



DC CHOKE

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

Features:

- A DC choke, also known as a DC reactor or DC inductor, is an electrical component used to limit or control the flow of direct current (DC) in an electrical circuit.
- Filtering and Smoothing: DC chokes are commonly used in power supply circuits to filter out high-frequency noise and ripple voltage.
- By introducing a DC choke into the circuit, it can help to smooth the DC output, resulting in cleaner and more stable power for sensitive electronic equipment.
- Voltage Stabilization: In some cases, DC chokes are used to stabilize the voltage levels in a circuit.
- Current Limitation: DC chokes can be used to limit the amount of current flowing through a circuit.
- Harmonic Mitigation: In AC/DC conversion systems, such as variable frequency drives (VFDs), DC chokes are used to reduce harmonics in the current waveform.
- Inrush Current Limiting: When electrical equipment is turned on, there can be a surge of current called inrush current. DC chokes can be used to limit this inrush current, protecting the equipment and preventing circuit breakers from tripping.
- DC Motor Control: DC chokes are used in DC motor control systems to smooth out the current supplied to the motor, reduce electromagnetic interference (EMI), and improve overall performance.
- Power Factor Correction: DC chokes can be used in power factor correction circuits to improve the power factor of electrical systems.
- Power Electronics: In power electronic applications, DC chokes can be used in inverters, converters, and other devices to control and stabilize the flow of DC power, reducing electrical noise and improving the efficiency of these systems.
- Solar and Wind Power Systems: DC chokes are used in renewable energy systems to filter and stabilize the DC power generated by solar panels or wind turbines before it is fed into the grid or used in battery storage systems.

About the company: Miracle Electronics is a renowned Transformer manufacturer in India, engaged in manufacturing Power transformers, Toroidal

transformers, EI transformers, etc.

Contact:

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



SHEET PACK LIFTERS

Armatic Engineering Private Limited offers sheet pack lifters.

Features:

- Keeping in mind the precise demands of clients, we offer a wide range of Sheet Pack Lifters.
- Their products are acclaimed for their high work capacity and effective performance. These are acclaimed for their optimum strength and top notch performance. They ensure top notch performance.

About the company: Armatic Engineering was Established in 1968. They are ISO Certified Leading designers of custom-built material handling equipment in India having expertise in design and innovation of new products.

Contact:

Armatic Engineering Private Limited,
Bangalore
Tel: 080-6717078/26711733/26713125
Email: mail@armaticengineering.com



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FLOOR CRANE- AVBOFC 1030

Avcon Systems introduces a floor crane AVBOFC -1030 to handle hooking applications for heights up to 4000 mm and capacities up to 1500 kg.

Features:

- Battery Operated floor cranes become instrumental in Injection Molding industries, Rubber industries, Textile and Aerospace industries for various applications where customers don't have overhead cranes or want to reduce engagement time for overhead cranes for medium duty component handlings.
- With multiple options of Semi Electric, Counter Balanced and wide chassis model AVCON has become industry leader providing solutions for shop floor material handling activities in a flexible path system. Ease of operation, Minimum Maintenance, Precision in handling critical components are key features of the product.

About the company: Avcon Systems one of the oldest material handling solutions provider in the country was established in the year 1984. Avcon in a very unpretentious manner of providing material handling solutions. Avcon has developed skills for helping their customers with correct selection of equipment.

Contact:

Avcon Systems, Thane
Helpline: 09833147460
Email: sales@avconforklift.com



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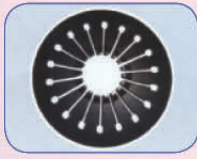
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We Manufacture all Types of Industrial Clutches, Brakes & Spares



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Diaphragm Spring



Electromagnetic Clutch Plates



Clutch Damper Assemblies



Belleville Washer (Disc Springs)



Customised Clutches



Mechanical Clutch



Single Disc Clutch



Friction Plates (Paper)



Friction Gears



Telescopic Brushes



Faster Delivery



Friction Elements is a member of Dee-Kay Group of Companies which was established in the year 1959. This Company is engaged in manufacturing Friction Materials for industrial Applications

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E-mail: eliteindia@yahoo.com, frictionelementsp1@gmail.com www.frictionelements.com

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Hydraulic Dockleveller



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Dock Seal



Elevating Dock



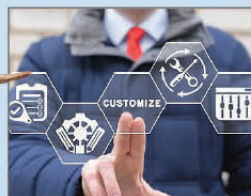
Stacker



Pallet Truck



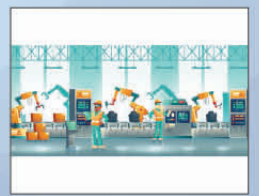
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Email: eliteindia@yahoo.com, elitematerialhandling@gmail.com, Web: www.elitematerialhandling.com

We Service & Manufacture all types of Material Handling Equipment

HYDRAULIC ROTARY ACTUATORS

Rotodyne Fluid Technic offers a wide range of hydraulic rotary actuators.

Features:

- Rotary Actuators are devices for converting the pressure energy in a fluid medium to useful Rotary Power.
- The Rotary Motion is usually limited to one revolution or less and hence they are also known as Partial Rotation Motors or Oscillators. .
- The designs with double vane are also available. External stops will be required to stop and hold loads at desired position and deceleration of high inertia loads shall be achieved through proper meter out circuits.

About the company: Rotodyne Fluid Technic is design and manufactures rotary joints for various sectors like Machine tool, Earth Moving , Construction, Hydro Power and Defence.

Contact:

Rotodyne Fluid Technic, Bangalore
Tel: 080-28396831
Email: info@tornadofluidpower.com,
marketing@tornadofluidpower.com



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END BRUSHES KNOTTED, SHANK-MOUNTED

PFERD offers a wide range of end brushes knotted, shank-mounted.

Features:

- It is aggressive brush. Suitable for medium-duty brushing such as deburring, cleaning, derusting and descaling, as well as removing spatter.
- Steel wire is the most common filament material. Brushes with steel wire as the filament material are especially well-suited to work on surfaces and deburring. PFERD special wire has high tensile strength and bending fatigue strength. This ensures that the wire wears down in the optimal way, as well as a long tool life, even in extreme brushing applications.
- Its advantages: Optimal access to hard-to-reach areas such as recesses and drilled holes.

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

Contact:

PFERD, Bengaluru
Mobile: 09880665415, 09741481117
Email: sales@swit.in



Scan the QR Code for instant product enquiry



MAGNETIC GRIPPER – EMH

Schunk Intec India Pvt Ltd offers a wide range of magnetic gripper – EMH.

Features:

- Electro-permanent magnetic gripper for energy-efficient handling of ferromagnetic workpieces with integrated electronics and feedback function.
- The function of the magnetic gripper bases on the combination of AlNiCo and neodymium magnets. The magnetic flux of the AlNiCo magnets passes the neodymium magnet in the deactivated state, and closes the magnetic circuit over the gripper base body made of steel. To activate the system, an electric current pulse is conducted through the coil, which reverses the polarity.

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

Contact:

Schunk Intec India Pvt Ltd, Bangalore
Tel: 080-40538999
Email: rakhi.singh@in.schunk.com



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SURFACE GRINDING MACHINE (MANUAL)

Universal Machine Tools Corporation offers surface grinding machine (manual).

Features:

- The machine is built of heavy cast iron hand scrapped to fine tolerance, easy movement of table slide by providing V – ways & flat ways.
- The grinding wheel spindle is hardened and round and runs in precision contact angular bearing and driven by flange, vertical grinding wheel slide movement down at right side in the body.
- The vertical wheel dial least count in 0.01mm and micro feed least count in 0.001 mm.
- These machines are available in various sizes: 450 X 225 mm , 600 X 300 mm. And also available in hydraulic version.

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

Contact:

Universal Machine Tools Corporation,
Bangalore
Tel: 080-23356231, 23108370, 23206821
Mobile: 09845006959, 09844199559
Email: universalblr@gmail.com



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"Magal & Ingyu — Powering Innovation in Stamping, Fine Blanking & EV Solutions"

Magal and Ingyu share a long-standing partnership, bringing cutting-edge technology to India in high-speed stamping, fine blanking, and EV motor and battery stamping.

Ingyu, with over 50 years of expertise, offers a diverse range of presses:

- High-Speed Presses for progressive die stamping in automotive and electronics.
- Fine Blanking Presses for intricate part manufacturing.
- EV Stamping Solutions for motors and battery components.
- Double Action Cupping Presses for can manufacturing.



FPB-250

Apex-125



Saga-80

For More Information Contact:

Magal Engineering Co India Pvt Ltd.

No. 264/75, 2nd Floor, 36th cross rd, 8th Block, Jayanagar, Bangalore – 560070, Karnataka, India

Mobile. +91 9916534110 | **Landline:** +91 80 26640443 | **Email:** shashank@magal.co.in

SPRING BALANCER

Vijay Air Control offers a wide range of spring balancer.

Features:

- It is fatigue less works and improved production efficiency.
- Available in capacities ranging from as low as 0.5kg upto maximum 120kg capacity.
- The fall arrest device in provide against tool drop cause by srping breakage. It has secondary support hanger is available on every model.

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

Contact:

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



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TORQUE WRENCHES

Enerpac India Pvt Ltd offers a wide range of custom torque wrenches.

Features:

- The company offers a variety of controlled tightening tools to meet the requirements of the application along with the hydraulic torque tools needed for accurate and simultaneous tightening of the multiple bolts.
- Due to space constraints and the location of reaction points, customised components are often essential for bolting applications. When standard torque wrenches do not meet the application needs, Enerpac engineers and product specialists work with the customers to produce customised components for their bolting application.
- Enerpac's depth of manufacturing resources can support high volume, simple modifications, as well as private labeling.

About the company: Enerpac is pushing the industry forward with a wide range of advanced industrial tools and services that first and foremost ensure its customers operate safely and productively every day.

Contact:

Enerpac India Private Limited, Bangalore
Tel: 080-39289000
Email: nibedita.jyotishi@enerpac.com



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SKATE CARGO TROLLEY FOR HEAVY MACHINES

Jyoti Architectural Products Pvt Ltd offers a wide range of skate cargo trolley for heavy machines.

Features:

- This heavy duty M skate trolley for machinery movement is available in capacity 6T/12T/18T & 20T.
- These heavy machines can be moved / transported with ease with these trolley.

About the company: Established in the year 1992, "Jyoti Architectural Products Pvt Ltd", are counted amongst the prominent manufacturers, suppliers, importers, traders and exporters of caster wheels & furniture components. Being appreciated for their optimum quality, perfect finish & dimensional accuracy, their products are highly demanded in residential as well as commercial application by interior designers & architects. Moreover their products are dynamically balanced and are suitable for several high-speed applications.

Contact:

Jyoti Architectural Products Pvt Ltd,
Mumbai
Tel: 022-42421000
Mobile: 09320892981
Email: sales@jyotiarch.in



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PARALLEL & WOODRUFF KEYS

R K Engineering Company manufactures a wide range of Parallel and Woodruff Keys.

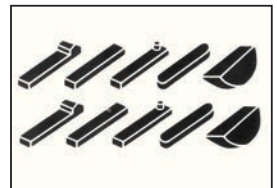
Features:

- Parallel keys are manufactured as per IS: 2048/83 and woodruff keys as per IS: 2294. These are made from EN-8/9 material in soft condition.
- They can also be made from SS-410 and SS-316. The keys are used in automobile industries, textile industries, machine tool industries, motor and pump industries, cement industries, etc. Also offered are non-standard keys to suit customer's requirements.

About the company: R K Engineering Co commenced its business operation in the year 1976. It is engaged as a manufacturer, exporter, supplier for grooved pin, dowel pin, taper pin, spring dowel pin, circlip, parallel keys.

Contact:

R K Engineering Company, Mumbai
Tel: 022-66104058 Mobile: 09221047336
Email: rkenggcomp@gmail.com



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ACCUSPIRALS

www.accuspirals.com

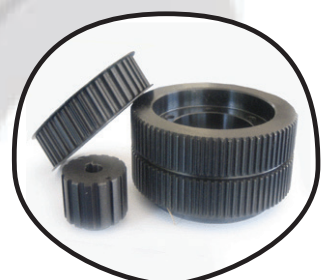
Service providers for all types of Gearing Solutions



We manufacture all types of gears - Spiral Bevel Gears, Straight bevel gears, Ground Spur and Helical Gears, Ground Worm shafts & wheels, Rack & pinions, Sprockets and Timer Pulleys.



We house some of the best machines in the business. We have CNC Spiral bevel gear cutting facility and CNC worm grinding facility to produce gears of DIN 7 and DIN 5 class respectively. Apart from these - we have all facilities like CNC turning, Machining, Grinding, Broaching in-house.



ACCUSPIRALS

D-425 /424, 10th Main, Peenya II Stage,
Bangalore - 566058. INDIA

T: +91-80-28362280 | 28364749

M: +91-9845450333 F: 28360814

E-mail: bharatjain@accuspirals.com / contact@accuspirals.com



EXTRACTOR ARM

Powertech Pollution Controls Pvt Ltd offers a wide range of extractor arm.

Features:

- The Extractor Arm is device which allows the user to position a suction hood to capture fumes or dust close the generation spot with complete ease and flexibility.
- This highly useful accessory may be used with the Fumekiller(R) and DustBag(R) units maintenance and running costs are low as all components are built for continuous, reliable, safe and efficient use. These systems contribute to a safer, healthier work environment where toxic airborne pollutants are removed.
- The Extractor Arm consists of 2 ducts made of aluminium or stainless steel, connected by PVC flexible hoses and mounted on interconnected support rods with friction-loaded pivots. A suction hood is attached to one end. The other end is attached to a rotating hollow cylinder. The suction hood, ducts, hose and rotating cylinder form a passage for the fumes or dust.
- This allows the suction hood to be positioned by hand at any point with a reach of 2 meters (or 4 meters) to & fro an 2 meters (or 4 meters) up & down with complete ease & flexibility with minimum effort. The Extractor Arm can be fitted to most of our Fumekiller(R) models & Dustbag(R) models.
- The arm can also be fitted to overhead ducting to provide suction points close to the flow level for the capture of fumes or dust from pollution generation spots.



About the company: Powertech Pollution Controls Pvt Ltd was established in the year 1996, for the design and manufacture of a wide range of air pollution control equipment, specifically electrostatic filters, for the capture and control of most types of fumes, mist, smoke and fine dust, generated on the shop floor, during the production process. Electrostatic filters are marked under the brand name of Fumekiller(R) and Dustkiller(R) throughout India and Abroad. These Filters may also be used for Clean Room applications of upto Class 1,00,000, and as efficient prefilters for higher class of Clean Rooms (where the life of expensive terminal HEPA filters can be extended by about 3 times).

Contact:

Powertech Pollution Controls Pvt Ltd,
Bangalore
Tel: 080-23452156, 23452256
Email: powertech@airtelmail.in,
philipthomas@powertechindia.co

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MAGNETIC DRUM MACHINES

Magnetics Corporation of India offers a range of magnetic drum machines.

Features:

- These are used for removal of tramp/iron impurities from chemicals, food items, ceramics, silica, quartz, glass chips and glass raw materials, etc where the conveyor beltings are not available. Any material fed to hopper will be moved down through vibratory feeder with controlled feed rate.
- In the process, the material free of iron particles will be collected at the forefront of the machine with natural fall.



About the company: MCI has the distinction of handling design, manufacture, installation and commissioning of user-friendly, oil-cooled, electro magnetic separators for National Thermal Power Corporation Ltd. (NTPC), Singrauli; which is in perfectly working condition and in use for past 12 years.

Contact:

Magnetics Corporation of India,
Bengaluru
Tel: 080-28360556
Email: sales@magcorpindia.com

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PURGE ROTAMETER ALUMINIUM

Placka Instruments India Pvt Ltd offers a wide range of purge rotameter aluminium.

Features:

- Rotameters are the mostly widely used type of variable area (VA) flowmeter. The movement of a float in a tapered tube provides a measure of flow rate.
- In Placka purge rotameter a constant flow differential pressure flow regulator is used to maintain the purge flow rate at the desired level.
- Its applications include: accurate level measurement; purging for corrosive fluids; continuous lubrication (bearings); density measurement; gas analysers.

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

Contact:

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

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Axial Flow Fans
Size : Ø200mm - Ø630mm
Air Flow : 450M³/hr to 11785M³/hr



Inline Duct Fans
Inlet Size : Ø100mm - Ø400mm
Air Flow : 300M³/hr to 4200M³/hr



Single Inlet Blower
Fan Size : Ø120mmx30mm to
Ø280mmx115mm
Air Flow : 140M³/hr to 2750M³/hr



Polypropylene Blowers
Fan Size : Ø200mm - Ø315mm
Air Flow : 500M³/hr to 4260M³/hr



Double Inlet Blower
Fan Size : Ø133mm x 120mm to
Ø240mm x 280mm
Air Flow : 400M³/hr to 4400M³/hr



Cabinet Fan
Fan Size : Ø250mm - Ø800mm
GI Body & Aluminum frame
Air Flow: 690M³/hr to 17100M³/hr

MANUFACTURERS OF WIDE RANGE OF INDUSTRIAL FANS

AXIAL FANS

- ▶ Press Fit Impeller
- ▶ With Aluminium frame
- ▶ For Motor cooling
- ▶ Exhaust Fans

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- ▶ In-Line Duct Fans
- ▶ Tube-Axial Fans
- ▶ Inflatable Ballons

BLOWER / CENTRIFUGAL FANS

- ▶ Single Inlet backward Curved Impeller
- ▶ Single Inlet forward Curved Impeller
- ▶ Double Inlet forward Curved Impeller
- ▶ Conventional Motor Blowers upto 25 HP
- ▶ Heavy duty Centrifugal Blow Inlet

Fan Applications

- ▶ Electronic Equipments
- ▶ Condenser Cooling
- ▶ Power Transformer Cooling
- ▶ Smoke Extraction
- ▶ Refrigeration & Air Conditioning
- ▶ Variable Frequency Drive Motors
- ▶ Roof Extractors
- ▶ Fume Extractor
- ▶ Forced Ventilation
- ▶ Elevator Cabins
- ▶ Deep Freezers
- ▶ Water Coolers

Blower Applications

- ▶ Clean Room Industries
- ▶ Plastic Extrusion
- ▶ Pharma Industries
- ▶ Heat Exchanger
- ▶ Clean Air Equipment
- ▶ Clean Air Cabinets
- ▶ Xenon lamps
- ▶ Forced Cooling
- ▶ Data Processing Machines
- ▶ Air Purifying
- ▶ Ventilating Appliances
- ▶ Inflatable Balloons
- ▶ Reprographic Printing
- ▶ Welding Bench
- ▶ Air Circulation
- ▶ Gas Burners

JAS-ANZ



Our Motors are



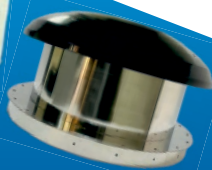
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RM-84210546

Fresh Air Fan with HEPA filter
Fan Size : Ø200mm - Ø400mm
Air Flow : 375M³/hr to 2050M³/hr
(UV-C LAMP AVAILABLE)



Roof Extractor
Fan Size : Ø280mm - Ø 400mm
Air Flow : 500-4200 CMH



Axial Flow Fans Long body
Fan Size : Ø300mm - Ø800mm
Air Flow : 2600M³/hr to 16000M³/hr



Wall Mounted
Fan Size : Ø190mm - 400mm
Air Flow : 500-4000 CMH



Flame Proof / Non Flame Proof Extended Shaft Dual Inlet Blower
Size : Ø108mm - Ø250mm
Air Flow : 900M³/hr to 7000M³/hr
Also available single side type



Regenerative Blower
Power Rating :
90 watts - 750 watts
Air Flow : 16M³/hr to 145M³/hr



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An ISO 9001-2015 Company

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HIWIN INTERNAL RECIRCULATION TYPE BALLSCREW

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

Features:

- Internal recirculation type ballscrew, consists of the screw spindle, the ball nut, the steel balls and the ball return caps.
- The steel balls make only one revolution around the screw spindle. The circuit is closed by a ball return cap in the nut allowing the balls to cross over adjacent ball tracks. Its features include: Adapted to normal leads and Outer diameter of nut is small.

About the company: Established in 2014, IBK Engineers Pvt Ltd, is engaged in the wholesaling, supplying, distributing and trading of deep groove ball bearing, mechanical bearing, roller chain, safety equipment, automotive components, electric equipment, etc.

Contact:

IBK Engineers Pvt Ltd, Bengaluru
Mobile: 09880566644
Email: raju.kn@ibizkart.com



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LASER CONTROL MICRO COMPACT NT

Blum-Novotest Measuring & Testing Technology Pvt Ltd offers laser control micro compact NT.

Features:

- Laser measuring system for CNC machining centres for non-contact tool measurement and tool monitoring under the harshest conditions. Unbeatable precision and reliability due to high-quality laser optic, intelligent NT Electronics and unique BLUM protection system.
- Its applications include: support systems provide highest precision; laser diodes and lenses of the highest quality; Intelligent NT-Technology; maximum absolute accuracy with focused laser beam; programmable by integrated microprocessor; pre-aligned laser for easy mounting; extremely robust and long-lasting fast, shapes and cutting materials.

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

Contact:

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



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PRECISIONS TURBO HYDRO MACHINE VICE

B R Precisions offers a wide range of precisions turbo hydro machine vice.

Features:

- This type of Hydraulic vice achieves a clamping force up to 5000kgs using the simple turn of the handle without any effort.
- This advantage makes them ideal for heavy duty clamping in Machines. Machined and surface flame Hardened and ground to ensure maximum accuracy. Jaw plates are made out of tool steel machined and heat treated Hardened at 52° to 56° HRC and ground with stopper hole in side of the clamping jaws Inbuilt hydraulic cylinder for high clamping force which does not required any external force. Different stations given that is Pin changing for clamping the work pieces at different levels for shortening the time lapse of rotating the handle Tenon slots are grounded Longitudinal and cross squareness and Parallelism accuracy at 0.02 Micron High deflection / Bending resistant constructed for machining center Milling VMC and other machine shop applications.

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

Contact:

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



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PORTABLE ENGINE OPERATED ACTUATORS

Indaai Technologies Pvt Ltd offers portable engine operated actuators.

Features:

- It is compact, light, quick, reliable, the model APS1000N is portable engine-operated actuation system that, coupled to manual operation units, makes it possible to handle medium-size sluice gates quickly and safely.
- With a weight of about 12kg and a modern engine Honda GX25 4T, this model that can be used in either the horizontal or vertical position, guarantees really surprising performances.

About the company: Indaai Technologies Pvt Ltd is in the business of flow management. They offer virtually every solution related to flow, whether it is pumping or flow control or flow measurement.

Contact:

Indaai Technologies Pvt Ltd, Pune
Mobile: 09766336366
Email: response@indaai.com



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Range of Panel Accessories
& Position Limit Switches



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& PLC'S. INVT, A High End
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Instruments, Energy, Times, Batch
Counters, Protection Relays



Access Visualize Gateways
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Access



Industrial PC, Flexipanel® HMIs,
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Panel Series, FlexiLogics PLC Series
Gateway.



making humans efficient.



Single Core & Multi Core Cables



Safety It's on Next
Level. Schmersal the DNA of
Safety



THE DNA OF SAFETY



DC-AC, AC-AC, DC-DC SSR, Phase
Angle & Power Controllers,
Solenoid Switching SSR, Scanner
Cards



Incremental Encoder, Absolute
Encoder,
Omron SMPS, Relay Boards



Automation GmbH & Co. KG

108E, 1st floor Peenya 3rd Phase, SRS Rd, opp Local ESI Dispensary, Bengaluru, Karnataka 560058,

Cell : +91 9141004135/ +91 8317461819

Email: marketing@insyselectrical.in <http://www.insyselectrical.in/>

Follow us on



HEAT RECOVERY UNITS - HRU - SERIES

MA Boilers Private Limited offers a wide range of heat recovery units - HRU - Series.

Features:

- It is low initial & operational cost; beyond purview of IBR; steam at full pressure in two minutes of cold start; no explosion Hazard; high efficiency 5 pass design.
- Space saver - vertical package unit; dependable parts, longer life; easy trouble free operation; smokeless combustion; peak-efficiency at even part loads; wide temp. setting range. Inbuilt HRU & HRU bypass duct.

About the company: IMA Boilers Private Limited is an engineering company offering specialized services in industrial process heating systems, application, utilities, and system engineering. Our product range features Steam Boilers (Small Industrial Boilers), Thermic Fluid (Hot Oil) Heaters, (Direct) Process Oil Heaters, Solar Thermal Heaters, Hot Water Generators, Hot Air Generators, Waste Heat Recovery Units and a full range of ancillary equipment.

Contact:

MA Boilers Private Limited, Mumbai
Tel: 022-25602369, 25683220
Email: info@imaboilers.com



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SMOKE TUBE CUM WATER TUBE BOILER

Steam & Power Engineers offers a wide range of smoke tube cum water tube boiler.

Features:

- This is an automatic and semi automatic control equipment with compact design requiring less space. These have an easy access for cleaning of smoke tubes. They design these boilers in terms of meeting all the demands of the clients.
- Its features include: high efficiency; easy in maintenance; simple installation; low running cost; low cost of civil foundation and installation.

About the company: Established in the year 2007, Steam & Power Engineers are engaged in designing and manufacturing and supplying boilers for the power and energy sector in India. Apart from this, they even provide erection and commissioning.

Contact:

Steam & Power Engineers, Pune
Mobile: 09850908663, 09921096172
Email: spe.pune@gmail.com



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STEAM GENERATOR - MSG SERIES

Maxima Boilers Private Limited offers a wide range of steam generator - MSG Series.

Features:

- The MSG Series is a range of thermal oil steam generators, used along with thermic fluid heaters. This series is beneficial for customers who need additional steam in their plants, by utilizing the existing thermic fluid heaters.
- Thermic fluid based steam generator features: available in a horizontal orientation with shell and tube type construction; low fuel and operational costs, as the same heat transfer oil used in the thermic fluid heater, is used to generate steam; unlike the traditional steam boiler, this series does not require direct flame heating, making it safer and more reliable to use. Lower risk of explosion and safety hazard during operation. Does not require a licensed boiler operator. More affordable alternative to steam boilers.

About the company: Since 1986, Maxima Boilers has been a recognized boiler manufacturer in India, with an established reputation & presence in the industry. They have one of the most extensive range of heating products in the market which includes steam boilers, coil type boilers, etc.

Contact:

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



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CAST STEEL GATE VALVE

Flowjet Valves Pvt Ltd offers a wide range of cast steel gate valve.

Features:

- There are different varieties of gate valves available and the Cast Steel Gate valve is one of them.
- The reason being this name is, that this particular type of gate valve is made with cast steel using a special type of mechanism. When you're dealing with high-pressure installations like gas, oil, oil vapour, etc.

About the company: Flowjet Valves vision is to achieve a leadership position in our industry

vertical, to supply high quality products and solutions in an environmentally sustainable manner so as to fulfill our customer needs.

Contact:

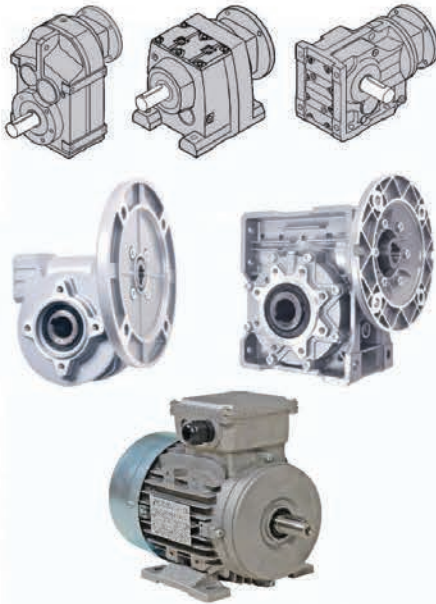
Flowjet Valves Pvt Ltd, Ahmedabad
Mobile: 09978608334
Email: info@flowjetvalve.com



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IBK Engineers Pvt Ltd

B-219, 4th Cross, 1st Stage, Peenya Industrial Estate,
Bangalore - 560 058 Ph: +91 80 2372 6644, 2372 5544
E-mail: raju.kn@ibizkart.com, ibksales@ibizkart.com
Website: www.ibizkart.com



AIR SHOWERS

Sam Products Pvt Ltd offers a wide range of air showers.

Features:

- The new generation air showers besides having all facilities of the existing Sam air showers, now facilitates the user friendly functions.
- These new hybrid air showers A.K.A negex have more built in safe features & incorporate better end user requirements.
- Negex are provided with Industrial grade Electromagnetic Locks having single body no moving parts. Even the Doors have Strong & Robust Stainless Steel Striker operating at static olding force of 1360Kgs. The doors are durable aluminium framed door assemblies with clear glass. As safety measure now Negex have Emergency Buttons along with User Lights on both sides of Shower for all doors to be unlocked instantly.
- Electrical main breaker switch are mounted on inside the work zone for rapid shutdown of the system & all doors are immediately unlocked.
- Electronic ballasted lights ensure reduction of energy costs.
- Permanantly lubricated direct drive centrifugal blowers.
- Interlocking of both exit & entry doors ensures both doors from being opened.
- All doors are unlocked automatically in case of power failure for safety reasons.
- It is duration of air shower is programmable. Continous flow of air is available at lower speeds at stand by mode thereby reducing energy consumed & maintaining the chamber clean.
- This time watch along with thermometer have been provided for instant display. It is stainless steel flooring ensures easy maintenance & cleaning.

About the company: Sam Products Pvt Ltd was incorporated with the aim to serve the customers with honest deals and high quality products such as plastic air curtains, air showers, etc. The company started its business operations in the year 1992 as a manufacturer and supplier of varied line of products for different industrial usage. This entire range of products is manufactured complying to the prevailing norms and standards of the respective industry. Located in Noida, they strictly examine our clean room garments storage, air cooling system etc.

Contact:

Sam Products Pvt Ltd, Noida
Tel: 0120-4357039
Mobile: 09810065139
Email: samproducts1992@gmail.com



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BAND SAW MACHINE MODEL ITL – 300 TCBA-NC

ITL Industries Limited offers a wide range of band saw machine model ITL – 300 TCBA-NC.

Features:

- Different types of material cutting, rear-feed machine.
- Anti friction LMG bearings for smooth up-down movements of cutting head (blade).
- Hydraulic automatic feed regulation to adjust feed without operator involvement depending upon material composition, hardness and cross-section. Much superior and better technology than conventional hydro mechanical blade sensor.
- Carbide face blade guide preciously manufactured and mounted carbide with anti friction bearings which does not required frequent alignment.
- Sturdy Split Main Vice helps in holding the job on both sides of cutting. Hydraulic Blade Tension for precise blade tensioning of blade for cutting. The blade tension is gradually released when power off to avoid falling of blade.
- Heavy Duty Gear Box with taper roller bearings to take the side thrust load of blade tension easily. The drive output is very smooth which helps in getting very high blade life.
- High Pressure Coolant Jets are provided for chip removal at very high cutting rates. Better cooling and chip removal helps in achieving high tool life and exceptional material removal rate (MRR).
- Ergonomic design of Electrical control panel and Hydraulic Power Pack for ease of operation and maintenance. Machine controls shall be through screen, HMI for easy operation. Machine with shuttle indexing 400mm.
- Bar indexing through servo-motor and ball-screw. Additional operator console for easy operation of the machine. Machine is enclosed from all side to keep the working area clean and operator safety. NC control of the machine give additional facility to use it with minimum manual control. High degree of length accuracy and precision achieved.

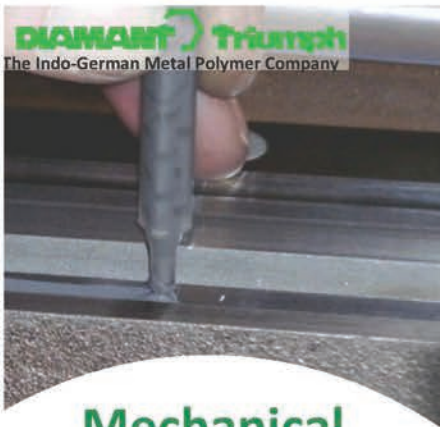
About the company: ITL (a BSE Listed Company since 1993) came into existence 30 years ago with its own indigenious design & developed India's first double Column bandsaw machines. ITL offers a wide range of horizontal & vertical bandsaw machines with 52 different models having capacity from 100 MM to 3000 MM featuring manual, semi automatic, fully automatic, NC & CNC models.

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Contact:

ITL Industries Limited, Indore
Tel: 0731-7104400/409
Sales: 0731-7104412/416
Email: marketing@itl.co.in,
info@itl.co.in



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Karnataka 560102



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Sarjapur Rd, Agara, Bengaluru,
Karnataka 560102

DEGREASER CLEANER

Novel Surface Treatments offers a wide range of degreaser industrial cleaner.

Features:

- Offered degreaser is gaining huge acclamation for its fast removal properties that is widely acclaimed in the industry.
- Its features include: aqueous & has water pH; ecofriendly – no ozone depleters; replaces trichloroethylene (TCE) etc Haz. Solvents; removes wide range of cutting, stamping, quenching, lubricating oils, grease, buffing compound; used for steel, aluminium brass, copper, nickel, tin, stainless steel etc many metals and non-metals; prevents corrosion/rust; used in immersion, ultrasonic, spray-in-air or spray-under-immersion and hand wipe application method.

About the company: Established in 2001, Novel Surface Treatments, is a manufacturer of surface technology products. The company developed the VK range of chemicals for fumeless stainless steel pickling passivation and cleaning. IIT Bombay in compliance with industry quality standards.

Contact:

Novel Surface Treatments, Mumbai
Mobile: 09322246307, 09172750225
Email: marketing@novelindia.com



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INDUSTRIAL SOLAR BATTERIES

Inova Battery manufactures and supplier of a wide range of industrial solar batteries.

Features:

- These are portable energy sources which can be transported conveniently anywhere; helps in reducing electricity bills and the pollution footprint.
- Some key benefits of the products are such as precise design; efficient; high functionality.
- The material used in production is acquired from specialised sellers after strict testing for flawlessness and efficiency.

About the company: Established in 2007, Inova Battery is a manufacturer and supplier of a large array of products including inverter batteries, UPS batteries, tubular batteries, solar batteries, automotive batteries and electric car batteries, manufactured using supreme class basic materials and contemporary tools and machinery.

Contact:

Inova Battery, Mumbai
Mobile: 09987076192, 09769688180
Email: ganesht75@gmail.com



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SURFACE TREATMENT

Rishi Laser offers a wide range of surface treatment.

Features:

- Modern surface-coating techniques are used to make sure that products look aesthetically good and last long in sheet steel fabricated assemblies.
- There are various methods of surface coating like power coating, epoxy painting, or zinc plating; a sheet steel assembly surface needs to be prepared for coating as there are several infirmities and impurities that can act as a hindrance for protective coating.
- In order to ensure a good bonding between the metal and the protective coat, various methods like shot blasting and liquid dipping are used, depending on the type of material.
- Sandblasting is propelling very fine bits of sand at high velocity to clean or etch a surface; sand blasting process helps remove oil and rust layers on the surface of the product, which ensures quality in surface coating; seven-tank cleaning is a chemical process.
- Oils and greases are removed in weak alkali or neutral detergent solutions and the surface is etched to remove heavy oxides.



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About the company: Rishi Laser Ltd is a manufacturer, service provider and supplier of CNC lasercut, shearing, etc.

Contact:

Rishi Laser Ltd, Pune
Mobile: 09881730353
Email: rajendra.m@rishilaser.com

SOLAR PANEL

Focusun Energy Systems offers a wide range of thermal solar panel.

Features:

- For the purpose of maintaining this reputation, they engage in using the finest raw materials and modern machines, in accordance with the industry set norms and guidelines.
- Some key advantages of the products are such as longer service life; impeccable performance; and compact design.

About the company: Established in 2000, Focusun Energy Systems is a manufacturer and supplier of high quality solar products including solar water heaters, solar heaters and solar power plants.

Contact:

Focusun Energy Systems, Coimbatore
Tel: 0422-2628979, 2591069
Mobile: 09842291069, 09842216190
Email: info@focusunsolar.com



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Corporate Office: # 139/4, 1st Floor, 1st Main, 1st Block, Dr. Rajkumar Road, Rajajinagar, Bangalore - 560 010,
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Branches: Chennai | Ahmedabad | Pune

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HEAT RECOVERY BOILER

Akshaya Enterprises offers high quality heat recovery boiler.

Features:

- These products have rugged construction and innovative designs.
- Additionally, these boilers are highly acknowledged for long life and efficiency. Moreover, these boilers have large combustion volume, which assists in improving safety and output ratio.
- These can be availed in different sizes and specifications. The company also offers assortment of boilers having superior radiation heat transfer area.
- These boilers are designed as per requisite norms and standards. Boilers are fabricated under the supervision of skilled professionals utilising cutting edge technology.

About the company: Established in 1989, Akshaya Enterprises is a manufacturer, exporter and supplier of industrial processing machines, equipment, and plants.

Contact:

Akshaya Enterprises, Coimbatore
Mobile: 09629968102
Email: balanakshaya@yahoo.com



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AXIAL FLOW FANS

Vintech Air control Engineers & Consultants offers a wide range of axial flow fans.

Features:

- These fans are provided with high volume and low-pressure application with high efficiency.
- The fan sizes ranges from 300 mm ϕ to 1600 mm ϕ with a capacity up to 100,000 CMH with different materials of construction of blades, like aluminium, GRP, polypropylene and stainless steel, to suit different applications.
- These fans also suit applications like fixed die cast or moulded blade design and variable pitch bladed design, direct drive, V-belt drive, bifurcated type roof extractor type for high rise concrete roofs like power plants, etc, as power ventilators.

About the company: Vintech Air control Engineers & Consultants, an ISO 9001: 2008 certified company, offers a range of Axial Flow Fans.

Contact:

Vintech Air control Engineers & Consultants, Chennai
Tel: 044-23776221, 23776821, 65631221
Mobile: 09840971221, 09444138884
Email: vintechchennai@vsnl.net



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FBC BASE THERMIC FLUID HEATER

Heat Max Engineering offers a wide range of Fbc base thermic fluid heater.

Features:

- There are numerous ways in which thermal fluid systems are superior to other heating systems such as hot water or steam. As market leaders in the field of heat transfer thermal energy is able to offer the Maxxtec range of advanced design heaters in addition to complete, highly efficient systems designed by an experienced staff of qualified engineers.
- Its principal advantages of a thermal fluid system: high thermal efficiency and economical operation; temperatures up to 380 degrees centigrade; no water treatment is required; internal corrosion and scale are eliminated; bellows sealed valves and simple burner components virtually eliminate maintenance.

About the company: Heat Max Engineering is a manufacturer of industrial thermic fluid heater, industrial steam boiler and hot water generators.

Contact:

Heat Max Engineering, Ahmedabad
Mobile: 09824052714
Email: hmevipul@yahoo.com



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FURNACE OIL TANK SUCTION HEATER

Vacunair Engineering Co Pvt Ltd offers a wide range of furnace oil tank suction heater.

Features:

- Furnace oil have viscosity of 1500 Sec Redwood No. 1 at 100 Deg F with a fall in temperature this viscosity goes further up making oil to flow extremely difficult.
- To meet this demand tank suction heaters have been designed. These heaters are installed at little above the tank bottom.
- The beauty of the heater is that it does not heat entire tank filled with oil - it only heats the oil that flows through the heater thus cutting down the kilowatt(KW) rating which otherwise may require to heat entire oil tank. The operation is smooth and safe.

About the company: Vacunair Engineering supplies its product to a broad range of industries, including petroleum, gas, pharmaceutical, chemical, processing and power generation.

Contact:

Vacunair Engineering Co Pvt Ltd, Ahmedabad
Tel: 079-22910771-2-3
Email: info@vacunair.com



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Phone: +91 80 50050163 · E-mail: info@india.emag.com

www.emag.com



VACUUM PRESSURE TURBINE BLOWERS

Promivac Engineers offers a wide range of vacuum pressure turbine blowers.

Features:

- Based on revolutionary innovation, It is comparatively quieter, lighter and practically maintenance & oil free substitute of the noisy, bulky, oily and monstrous type of conventional air blowers, for the applications where large and forceful suction and pressure capabilities are required in agitation of chemicals.
- Since these blowers are compact, maintenance free and need no oiling at all, these are most suited for mounting inside the machines meant for electro plating, dust collecting, printing, paper handling, Vacuum packaging, pneumatic conveying and hence are quite popular with OEM.

About the company: Promivac Engineers is a manufacturer of industrial pumps, established in 1981.

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The company produces various types of vacuum, pressure and chemical process pumps.

Contact:

Promivac Engineers, New Delhi

Tel: 011-23281082, 23273965, 23246398

Email: promivac@vsnl.net



STREET LIGHT BATTERIES

Telex India Industries offers a wide range of solar street light batteries.

Features:

- Telex India as a ruling solar street light battery manufacturer provides total energy storage system. In solar applications batteries have to meet the requirement of unstable grid energy, heavy cycling, and irregular recharging.
- They are providing wide varieties of batteries fitted to meet solar panel requirements.
- Its manufactures lightweight, compact, rugged, and a dependable batter system used for solar panels. They provide batteries for small businesses and heavy businesses and homes that can store the sun's energy in order to deliver clean, reliable electricity when the sun isn't shining.

About the company: Telex India Industries engages in the business of creating, improving, and innovating the advanced batteries and related products to keep pace with the times.

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Contact:

Telex India Industries Pvt Ltd, New Delhi

Mobile: 09810087677, 09721326000

Email: info@telexindia.com



GOLF CART BATTERIES

Shiraz C Lalkaka Enterprises offers a wide range of golf cart batteries.

Features:

- Golf cart batteries manufacturers & golf cart batteries manufacturers suppliers golf-cart-battery.
- The Exide 6C225 is the latest development - a Blen of improved high density paste formulation and unique glass mat separator for better positive active material retention.
- Easy accessibility is ensured through 4 regional offices, 24 branches, 30 Exide Power centers and over 500 industrial dealers spread all over the country. Exide offers total solution including installation, operation and maintenance through experienced engineers.

About the company: Shiraz C Lalkaka Enterprises are providers of reliable service to our clients in Mumbai. In 1986, the company grew as distributors of standard batteries for the auto batteries segment.

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Contact:

Shiraz C Lalkaka Enterprises, Mumbai

Mobile: 09821307551, 09260589838

Email: sclalkaka@vsnl.net



HIGHER CAPACITY OFFLINE UPS

Aatous International Pvt Ltd offers a wide range of higher capacity offline UPS.

Features:

- It is one of the renowned manufacturers, exporters and suppliers of UPS that has gained wide appreciation for its quality standards.
- Constructed using qualitative grades of raw material these UPS provide continuous power supply in case of power cuts and help in controlling power supply of industrial and residential sectors. Their high capacity online and offline UPS have gained wide appreciation for high load capacity.
- They export to many countries like Bangladesh, Srilanka, Afghanistan, Algeria, Angola, Benin, Botswana, Central African Republic, cameroon, Chad, Behrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, etc.

About the company: Aatous International is a prominent name in manufacturing industries, making power back-up systems like tubular batteries, traction batteries, automotive batteries.

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Contact:

Aatous International Pvt Ltd, Navi Mumbai

Mobile: 09324045234, 9819842857

Email: aatousinternational@yahoo.co.in



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5th Floor, Brigade Triumph, Dasarahalli Main Road,
Sector B Hebbal Kempapura, Bengaluru -560092.

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ELECTRIC SERVO PRESS

Delta Electronics India Private Limited offers a wide range of electric servo press.

Features:

- The Electric Servo Press integrates Delta's self-developed key components such as the Human Machine Interface (HMI), Programmable Logic Controllers (PLC), servo drives and motors into the whole system, providing convenient machine maintenance and enhancing efficiency.
- The Delta Electric Servo Press is a high-performance and energy-saving machine with no traditional press parts (e.g. flywheel, pneumatic cylinder, press motor, clutch, or others).
- The press adopts AC servo motors that propel a low-backlash ballscrew and press punch, along with sensor and control parts, to precisely adjust load and achieve high-repeatability processing quality.
- The machine features multiple control modes with flexible combinations to perform real-time press monitoring that not only helps reduce press yield rate and damage, but also saves cost..

About the Company: Delta Electronics India has been at the EPI Center of shift that is needed for today's complex industrial ecosystem of interconnected equipment and smart industrial assets for over two decades.

Contact:

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



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CNC DOUBLE ENDED PIPE BORING MACHINE

Brisk Tech Engineers offers a wide range of CNC double ended pipe boring machine.

Features:

- Brisk CNC double-ended pipe boring machine also known as CNC double-ended horizontal idler pipe boring machine designed for high precision outcome of the components.

About the company: Brisk Tech Engineers, based in Bangalore, is a trusted name in the field of precision engineering. We specialize in delivering innovative CNC machining solutions that cater to diverse industries. With a strong commitment to quality, advanced technology, and customer-centric services, we have built a reputation for excellence in both product performance and client satisfaction.

Contact:

Brisk Tech Engineers, Bangalore
Mobile: 09448479855, 07892743816
Email: info@brisktechengineers.com



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UV LASER PROCESSING SYSTEMS

C And C Laser Engineering Pvt Ltd offers a wide range of UV laser processing systems.

Features:

- With the UV Laser Series, C And C Laser Engineering offers a flexible, cost effective and low maintenance marking system for non-metals and organic materials.
- The Marking Software is easy to operate and allows the user to quickly define parameters for single piece, small scale, medium-scale and large-scale production. UV laser marking machines are available in power ranging from 3W to 12W to achieve top quality marking in industry. The excellent beam quality with the sufficient power enables marking with high precision.

About the Company: C And C Laser also offers compact lasers for all applications – lasers of wavelengths from Far IR – CO₂ lasers, Diode-pumped fiber-coupled IR, Green, UV and DUV lasers.

Contact:

C And C Laser Engineering Pvt Ltd,
Mumbai
Tel: 022-3506 1794 Mobile: 09833105515
Email: info@cnclaserengg.com



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BEARING INDUCTION HEATERS

Inventum Engineering Co Pvt Ltd offers bearing induction heaters.

Features:

- Inventum heaters are rated at par with the imported European bearing induction heaters and are the preferred choice of leading Indian industries, because of the sturdiness and superior after sales service. The company manufactures more than 17 models ranging from power 2 kVA to 120 kVA to suit different applications of heating bearings, gears, couplings etc.
- Special induction heaters are also available for dismantling inner racers of cylindrical roller bearings and couplings etc.

About the Company: Inventum Engineering Co Pvt Ltd is pioneer in developing bearing induction heaters with microprocessor controls in India and have been manufacturing the induction heaters for more than 35 years.

Contact:

Inventum Engineering Co Pvt Ltd,
Mumbai
Mobile: 09819802535
Email: sales@inventumindia.com



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END TO END PLANT AUTOMATION FOR AGILE MANUFACTURING

The manufacturing industry in India is moving up the value curve. The focus is shifting from volume to value, driven by quality and consistency. Investing in modernization and automation has become an imperative. After working with the industry for over 2 decades, we are leading this revolution with guaranteed performance metrics on OEE, throughput, quality and accuracy.

WHY AUTOSYS?

- Fixed price contracts
- Deep domain / process knowledge across many industries
- Strong multi-disciplinary expertise
(Mechanical-Electrical-Instrumentation-PLCs-Software)
- Engineering team has worked together for 20+ years, 400+ projects.



CAPABILITIES

Consulting and Services

- Green field projects – EPC / Turnkey
- OEE improvement, De-bottlenecking, Modernization, Automation.
- Project management • Software Development for MES, M2M and IOT.

Systems

- Automated material handling (raw materials to finished products)
- Batching plants (from silos & feeders to mixers & grinders)
- Automatic weighing & dosing (grams to tons, solids and liquids)
- Instrumentation, Control and Telemetry
- PLCs, SCADA, MES Software
- Power, MCC and Control panels

Domains

- Water, Waste-water • Oil and Gas
- Refractories, Ceramics, Building materials, Friction materials
- Food, Animal feeds, Nutrients, Pharma • Chemicals, Plastics

Products

- Recron / Fibre dosing system
- Preform (fibrous composite) dosing system
- Automatic nailing system (for wooden skids / pallets)
- Batch weighing system
- Bagging machines
- Bag placers, palletizers

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PF SERIES WATER BASES FLUID PUMP

HTM Hydraulics Pvt Ltd offers a wide range of PF series water bases fluid pump.



Features:

- These pumps are compatible with water glycol as well as variety of water-based and other low lubricity fluids.
- They can operate at pressure to 1040 bar on well head control systems both on and offshore around the world.
- Output flow range of 1lpm-30lpm. Dynex single fluid design eliminates the need for a separate lubrication circuit, resulting in less space, labour, piping and lower ongoing maintenance cost.

About the company: HTM Group has been in the field of hydraulics since 1995. Their expertise in the industry makes us one of the leading competitive companies in the field of trading, marketing & servicing and training for customers in India and abroad. HTM group has headquarters in Bangalore, India.

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Contact:

HTM Hydraulics Pvt Ltd, Bangalore
Tel: 080-41572101 Mobile: 09741165877
Email: info@htmhydraulics.co.in

ABSOLUTE OPTICAL SCALE FOR LARGE MACHINES – GVS 908

Givi Misure Pvt Ltd offers a wide range of absolute optical scale for large machines – GVS 908.



Features:

- Absolute optical scale, available in a single piece or in modular version for large machines (up to 30040mm of measuring length).
- Application in various industrial fields such as machine tools, vertical lathes, gantry machines, laser/plasma cutting machines, robotics, automation etc.
- Stainless steel grating, integral with the machine guide, for an excellent accuracy at any temperature.
- Serial interface SSI-BiSS C (unidirectional), with or without 1 Vpp analog signal, Siemens Drive-CLiQ and Fancu a-ai. Direct reading of absolute measure. Resolutions up to 0.1µm. Accuracy grade ±5µm.

About the company: Givi Misure has been established by experts in the field to provide low cost automation solutions to machine tools and other machines.

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Contact:

Givi Misure Pvt Ltd, Bangalore
Tel: 080-41272559, 41171374
Mobile: 09900028662, 09900028663
Email: info@givimisureindia.com, admin@givimisureindia.com

BULK MILK COOLER

Process Engineering Company offers a wide range of bulk milk cooler.



Features:

- High Durability
Manufactured using proven engineering principles, combines with 30 years designing and manufacturing experience, every BMC (DX) tank is constructed from high quality stainless steel (304) resulting in a superior hygienic finish.
- Effective insulation: 50mm polyurethane foam (CFC free) is injected between the inner and outer shells creating high rigidity and good insulation properties thus reducing the running cost and helps in retaining the natural quality of milk.
- Operationally efficient agitation: The gentle motion (25 RPM) of the paddle type agitator enables the milk to be blended at all times, while maintaining the uniform temperature of milk and avoids the ice formation/freezing of milk.
- Easy to Install: The BMC can be installed even on an uneven ground by adjusting ball feet. High Load Capacity : Robust and sturdy saddles underpin the tank and add strength and durability whilst the milk is stored.
- High Load Capacity: Robust and sturdy saddles underpin the tank and add strength and durability whilst the milk is stored. Fabdec's (England) Efficient Cooling Thermal Plates : At the heart of Bulk Milk Cooler is the efficient "Thermal Plate Technology" providing optimum cooling efficiently via direct contact with the plates even at low milk volumes.

About the company: Process Engineering Company is a renowned name in the Indian Industry as it deals in diverse machinery which finds use in packaging, food & beverage, chemical, pharmaceutical and other industries. Our company is good at meeting customers needs related to advanced machinery as it designs and develops Bulk Milk Cooler, Double Head Cup Filling Machine, Plate Heat Exchangers, Tilting Boiling Pan, Automatic Cup Filling Machine and others using cutting edge technology. Having our base at Greater Noida, Uttar Pradesh (India), we feel proud to have been making fast deliveries in the nationwide. To support company, qualified and experienced people have been hired who make sure that company scales to new heights.

Scan the QR Code for instant product enquiry



Contact:

Process Engineering Company, Greater Noida
Mobile: 09971934240
Email: sagarc2403@gmail.com

CUSTOM-BUILT MATERIAL HANDLING EQUIPMENT IN INDIA



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25T coil lifter



18T ingot tong



25t slab tong



55T coil transfer car



40T roll tong



40T coil tong



45T C-Hook



30T coil car



30T coil tilter



10T stack turnover device



Convector Plate Lifter



Coil Lifter



Tripod Grab



Ingot / Billet Tongs



Hot Plate Stack Lifter Trolley



Motorised Sheet Pack Lifter



Electro Hydraulic Cactus Grab



Transfer Car with Scissor Lift



Battery Operated Transfer Car



Pipe and Billet Transfer Car



Spreader Beams

ARMATIC
ENGINEERING PRIVATE LIMITED

8, 27th Cross, Banashankari 2nd Stage,
Bangalore 560 070, India.
Tel: +91-80-2671 7078, 2671 1733, Fax: +91-80-2671 3138
Email: mail@armaticengineering.com
Web: www.armaticengineering.com

**DEALER ENQUIRY /
SALES REP /
NETWORK SOLICITED**

ELECTRO - PNEUMATIC BRAKE SYSTEM FOR EMU

Escorts Kubota Limited offers a wide range of electro - pneumatic brake system for EMU.

Features:

- One of the largest railway network in the world with super dense crush load on their EMU and MEMU stock running on suburban network across various cities of India run on Escorts manufactured systems for their braking, coupling and suspensions requirements.
- Escorts have been manufacturing Electro - Pneumatic Brake systems for more than three decades.
- Its features include: Rapid application and release of brakes; graduated application and release; auto control for fail safe operation in electrical failure.

About the company: From a small agency house in 1944 to one of the largest engineering conglomerates in India, the saga of our ascent is entwined in the evolving dynamics of India's economic progress.

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Contact:

*Escorts Kubota Limited, Faridabad
Tel: 0129-2576000, 2232148
Email: ekl_ex.railheadoffice@escortskubota.com*



RAILWAY PLATE SCREW

Rail Udyog offers a wide range of railway plate screw.

Features:

- They are engaged in manufacturing and supplying a wide range of plate screw and screw spikes.
- Designed with high precision and processed under advanced technologies these screws are manufactured using high graded raw materials satisfying all the quality standards. With reliability, robustness and effective performance these products can ideally be used in railway engineering.
- We are engaged in manufacturing and supplying a wide range of Railway Track Fittings. Fabricated with high quality raw materials, these railway components are very durable, corrosion & abrasion resistant and robust in nature.

About the company: Rail Udyog is proudly associated with the manufacturing and supplying of Railway Products, Wagon Components and Ancillary Items. Located in the city of Kolkata, we have been created a distinct recognition in the domestic as well as international market since 1973.

Scan the QR Code for instant product enquiry



Contact:

*Rail Udyog, Howrah
Mobile: 08037303443
Email: rail_udyog@yahoo.co.in*



RAIL RUBBER PAD

Chamunda Enterprise offers a wide range of rail rubber pad.

Features:

- They are engaged in offering an exclusive assortment of heavy duty railway components like rail rubber pad 1 meter long. These plates are made using superior quality rubber and plastic material, reducing shocks of vibration of a passing train.
- Rail pads are made from a variety of both natural and synthetic elastomers to meet the precise demands of the operating environment from high-speed track to maintenance bays.
- A rail pad, also called rail rubber plate, is designed between the rail tie plate and foot of the rail, made by an elastic polyurethane mat, which is interposed between steel rails and tie sleepers to protect the sleeper top from wearing and impacting.

About the company: Incepted in the year 2015, in Kolkata, "Chamunda Enterprise", are a sole proprietorship firm, engaged in manufacturer, trader and exporter a wide array of railway hand planar lock, etc.

Scan the QR Code for instant product enquiry



Contact:

*Chamunda Enterprise, Howrah
Mobile: 09674437382*



FRP MODULAR TOILETS

Universal Engineers offers a wide range of FRP modular toilets.

Features:

- Universal Engineers manufactures state-of-the-art products, which are of wide range, catering to the future market demands and requirements.
- Doors allow passengers to gain access and leave the passenger train. Universal Engineers has mastered the art of manufacturing doors for passengers to have the safest experience.

About the company: Universal Engineers had successfully delivered Turnkey Projects for Train 18 (Vande Bharat Express) comprising of nose cone structures, continuous windows, PVC Flooring and mini-Pantry equipment.

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Contact:

*Universal Engineers, Chennai
Tel: 044-26252158
Email: director@universalengineers.in*



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- AC Worm Reduction Gear Motor Single & Double
- AC Inline Gear Motor
- AC/DC Universal Motor
- AC Motor with Hollow Shaft Gear Box



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- DC Shunt Motor with worm Gear Box 220 Volts DC
- Low Voltage DC shunt Geared Motor
- PMDC Motor 1/8 HP to 3 HP 12/24/48/90/110/180 Volts DC



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- Digital Timers & Counters.
- 24 Hours Program me timers with & without battery backup



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- Centrifugal Blowers
- Cross Flow Fans
- Axial Flow Fans 8", 10", 12"



AC SYNCHRONOUS MOTOR & GEAR MOTORS

- AC Synchronous Motors
- DC Stepper Motors
- AC Synchronous Gear Motors
- AC Servo and DC Brush less Motor



AC SHADED POLE MOTOR & GEAR MOTOR

- AC Shaded Pole Motor 9-45 watts
- AC Shaded Pole Motor with 3" 4" & 6" Al Blade
- AC Shaded Pole Gear Motor 5-140 RPM



MOTOR SPEED CONTROLLER DRIVES

- AC Drive VFD
- Stepper Motor Drive
- DC Drive
- AC / DC Motor Controller



SWITCHES & SENSORS

- Micro Switches & Limit Switches
- Mercury Switches
- Foot Switch
- Proximity Sensors 6-30 mm
- AC & DC Diffusion - Color Mark - Through Scan - Temperature Sensors
- Solid State Relay



DC MICRO MOTOR & DC MICRO GEAR MOTOR

- DC Micro Motor 3, 6, 12 & 24
- DC Micro Gear Motor 12 & 24 V, 1-300 RPM



MOTOR

AC INDUCTION MOTOR,
AC INDUCTION BREAK MOTORS

GEAR BOX
HALLOW SHAFT WORM GEAR BOX,
HELICAL GEAR BOX,
HELI BEVEL GEAR BOX,
PARALLEL SHAFT GEAR BOX



COMPACT AC/DC GEARED MOTOR

COMPACT AC/DC GEARED
MOTOR WITH SPEED CONTROLLER



Encoder



AC & DC Solenoid



SSR



Vacuum Blower



Break



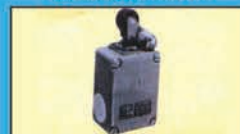
SMPS



Variac



Linear Actuator



Limit Switch



Clutch



100, Annexe to Ambika, Shankara Park, Bangalore - 560004.

Phone : 080-26602160, 26613337, Mobail: +91-9845040662

Email : ambikaramesh@hotmail.com, Info@ambikatrading.com

Website : www.ambikatrading.com

PERFORATED CABLE TRAYS

Rama Enterprises offers a wide range of perforated cable trays.

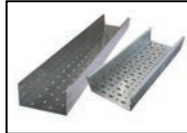
Features:

- Offered perforated cable trays in different widths, heights and lengths. These are easy to install and cost effective. Owing to our in house facilities we offer tested and proven in the harsh environment of the offshore oil and gas industry to meet the customer's requirement.
- These are designed and developed by using sophisticated machinery available with durable finish standards available at cost effective prices.

About the Company: Rama Enterprises an ISO 9001-2000 certified company. Take this opportunity to introduce as a manufacturing organization, that the production based in Ghaziabad, Uttar Pradesh in Year 2000 having manufacturing facilities for cable tray, slotted angle, raceways & earthing material.

Contact:

Rama Enterprises, Ghaziabad
Tel: 0120-6531212 Mobile: 08800566900
Email: info@ramaenterprises.co.in



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SEMI METALLIC AND METALLIC GASKETS

PGE Industries Pvt Ltd offers semi metallic and metallic gaskets.

Features:

- The PGE® SealPro™ is a reusable gasket consisting of a solid metal core with serrations with a specialized flexible face consisting of various options for high temperature, chemical resistance, and exhaust gases etc.
- Once the gasket is installed, the soft non-metallic material is forced into the metal core serrated grooves. As a result, the compressive stress increases, and multiple concentric high-pressure seals are created along the gasket face surface.
- Unlike traditional spiral-wound gasket, all of the compressive force is exerted on the PGE® SealPro™ facing, thus resulting in a very tight seal. Since the PGE® SealPro™ is basically a solid metal, as opposed to alternating plies of metal and filler applied at spiral-wound gaskets; to handle even in large diameters (2000mm).

About the Company: Established in 1981, PGE India (PILOT Gaskets) is the prominent manufacturer of sealing and insulating products. They are dedicated to being customer-oriented and proactively providing solutions to their needs. **Contact:**
PGE Industries Pvt Ltd, Mumbai
Mobile: 08080890022
Email: info@pilotgaskets.com



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FLEXNUTS

Nord-Lock India Pvt Ltd offers a wide range of flexnuts.

Features:

- Flexnuts have been specially developed for through-hole applications. Their reactive design distributes the bolt load along many threads, adds elasticity and prevents stress concentrations in the first few threads.
- This helps relieve stress concentrations and increases the fatigue life of the bolt. Since Flexnuts are reactive nuts to be used opposite our tensioners, they are never torqued directly to achieve preload.

About the Company: The Nord-Lock Group has been providing customers with high-quality, safe and innovative bolting solutions since 1982. The Nord-Lock Group is wholly owned by Investment AB Latour, a company listed on the Stockholm Stock Exchange.

Contact:

Nord-Lock India Pvt Ltd, Mumbai
Tel: 022-49743518
Email: info@nord-lock.in



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IMPACT CRUSHER

Crush Power offers a wide range of impact crusher.

Features:

- This vertical shaft impact crusher is widely used in all kinds of minerals. It provides the high quality sand and crushed stone aggregate to the high-speed railroad, high-rise construction, municipal administration construction, water and electricity dam construction, concretes agitation station.
- It is effective machines at present. It is also applicable to crush various stones with different hardness in medium and fine crushing area. It is more advanced in intermediate hard, extra, extra hard and abrasive material crushing.

About the Company: Crush Power are the manufacturer and supplier of heavy machinery like jaw crusher, horizontal shaft impact crushers, cone crusher, grizzly feeders, vertical shaft impactor and their allied equipments, and also conveyor system, hoppers etc mainly used in stone quarry and mining field.

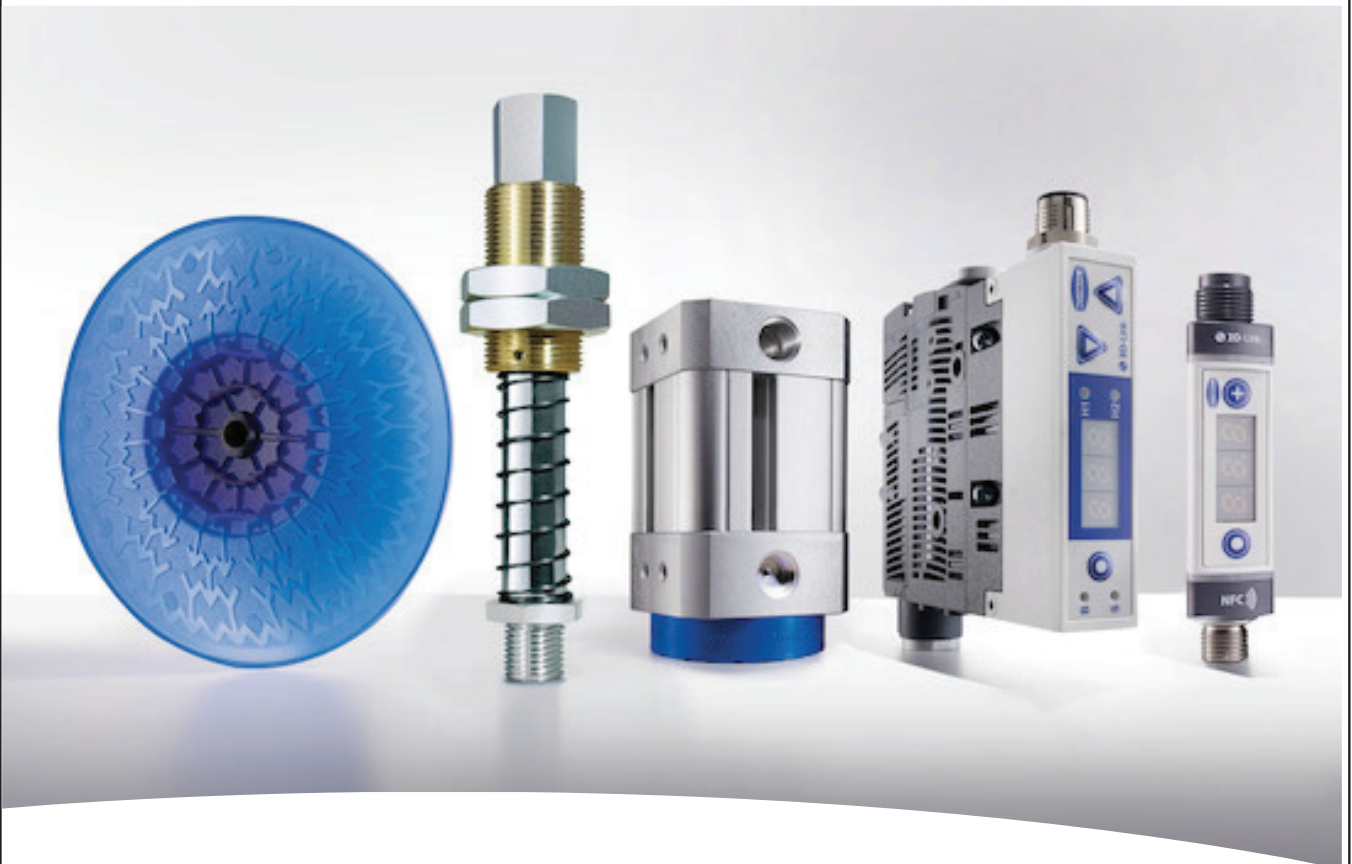
Contact:

Crush Power, Nashik
Mobile: 09657064878, 09922293339
Email: shashi@crushpower.net
sales@crushpower.net



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Schmalz India Pvt Ltd . EL 38, J Block, MIDC, Bhosari, Pune 411026 .

schmalz@schmalz.co.in



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KNOCKOUT CYLINDER

Fluidtec Controls offers a wide range of hydraulic knockout cylinder.

Features:

- These are engaged in manufacturing extensive range of knock out type custom bulid hydraulic cylinders form 1 ton to 100 ton capacity.
- Furthermore these are manufactured in compliance with client requirement and can be delivered within stipulated time frame.
- Offered hydraulic cylinders are one of the hugely popular products of our gamut of products.
- Its specifications include: trunnion mountings-bore diameters vary from 40 to 300 mm; hydraulic power stroke varies from 50 mm to 350 mm; capacity range: from 1 ton to 100 ton.

About the company: Created in 2002, Fluidtec Controls is a manufacturer, supplier, distributor, service provider and trader of hydraulic power packs, cylinders and pumps, etc.

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Contact:

Fluidtec Controls, Chennai
Tel: 044-26250854
Mobile: 09841727799, 09087627799
Email: fluidteccontrols@gmail.com



BAG FILTER HOUSING

Filtereno Engineering Co offers a wide range of bag filter housing.

Features:

- Facilitated by technically advanced process, they are presenting a distinguished collection of bag filter housing.
- They offered range is manufactured by utilizing optimum quality components and advanced technology by our skilled professionals. In order to ensure quality, these filters are rigorously tested on various parameters. In tune with international standard, we provide this filter in various specifications as per the ever-evolving requirement of our clients.

About the company: Incorporated in 2011, Filtereno Engineering Co, is a manufacturer and supplier of vessel and tank. The company provides a diverse equipment including liquid filtration system, liquid manufacturing section and powder section products.

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Contact:

Filtereno Engineering Co, Mumbai
Tel: 022-65618854, 65618800
Mobile: 09819241506, 08452917256
Email: info@filtereno.com



LEAF FILTER

Sharplex Filters (India) Pvt Ltd offers a wide range of level leaf filter.

Features:

- Sharplex level leaf filters are used for polishing filtration in post filtration stage to trap the fine particles from the filtrate of main filter.
- The filter elements have filter surface at both the sides and hence this filter becomes very compact even at higher filtration areas. The filter medium can be cloth or paper. The filters are available from 2m2 upto 15m2.

About the company: In the year 1993 Sharplex Agro Process (India) Pvt Ltd was incorporated to takeover Sharplex Agro Process Engineers, a proprietorship firm established in the same year with Mr.Satish Vasudeo Khadke as the Proprietor. In year 2002 the name was changed to "Sharplex Filters (India) Pvt. Ltd." With a rich experience of 12 years of working with the largest engineering establishment, (i.e. Larsen & Toubro Ltd.)

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Mr. Satish V. Khadke has introduced Process Filtration Equipments.

Contact:

Sharplex Filters (India) Pvt Ltd, Navi Mumbai
Mobile: 09136921232 Email: sales@sharplexfilters.ccoscomharplexfilters.com



FILTRATION UNIT

Smridhi Manufacturing Company Private Limited offers oil filtration unit.

Features:

- The Micron filtration unit is a multi-purpose fluid cleaning and transfer rig, it is available in different models.
- The system can be used to clean most mineral oils such as hydraulic, gear and transmission oils, diesel type fuels and many soluble oils and fluids. In its static form, it can be permanently connected to large fluid reservoirs where the machines and engines are in constant use.
- Its features include: removes contaminant particles down to less than 0.5 microns; prevents corrosion of components; reduces the incidence of sticking & worn value components; used in industries world-wide; can be used with virtually any petroleum/synthetic based oil.

About the company: Established in the year 1997, Smridhi Manufacturing Co Pvt Ltd has made its distinct position in the market in a short span of time.

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Contact:

Smridhi Manufacturing Company Private Limited, Delhi
Mobile: 09868265775 Email: micronfilters@yahoo.com





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- **Filter Ceiling System**
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Hyderabad - 500 055. Telangana. India.

Phone: 040-2309 3933 Telefax: 91 40 2309 2922

E-mail: info@srprefabs.com, srprefabs@rediffmail.com Visit Us At : www.srprefabs.com

SENSOR RELAY AND ACTUATOR TESTER

Ampro Testing Machines offers a wide range of automobile sensor relay and actuator tester.

Features:

- With a firm commitment to quality, they are presenting to their clients a vast range of automobiles sensor relay and actuator tester.
- The given product is designed by making use of best grade material & modernizes technology in compliance with the set norms of industry.
- This product is tested against various parameters of quality to supply the flawless supplies.
- Its features include: sturdy design; high operational fluency; excellent functionality.

About the company: Ampro Testing Machines established our organization in the year, 2003 under the name, Ampro Testing Machines, as a prime manufacturer, supplier, trader and exporter of automobiles and car diagnostic equipment. an array of other products.

Contact:

Ampro Testing Machines, New Delhi
Mobile: 09811890900, 07060631827.
Email: info@amproindia.com



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POWER PACK

Patson Hydrotech offers a wide range of hydraulic power pack.

Features:

- The provided power pack is used in the applications that require automation and pressure controls.
- Offered power pack is precisely designed by our experts using excellent quality material. This entire range of power pack is tested on quality provisions so as to dispatch a flawless range. These are totally leakage free to save hydraulic oil in all manner.
- These professionals give their best possible services to us with immense professional approach and dedication to achieve the specific goal of the firm.
- Its features include: easy to maintain; high functionality; excellent pressure controls; leakage free.

About the company: Patson HydroTech, created in 2011, is a manufacturer and supplier of a range of hydraulic power packs, hydraulic cylinders, car parking lifts, special purpose hydraulic lifts, and manifold blocks.

Contact:

Patson Hydrotech, Ahmedabad
Mobile: 09913960362
Email: info@patsonhydrotech.com



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FULL ELECTRIC STACKER

New National Hydraulics offers a wide range of Fk series full electric stacker.

Features:

- Being a client-centric organization, they are engaged in providing Fk Series, full electric stacker. Their skilled professionals manufacture this stacker from superior class components and sophisticated technology in accordance with predefined industry standards.
- This stacker is used for handling and stacking of pallets. Ahead of its final dispatch, this stacker is duly inspected by our quality controllers on several parameters of quality.

About the company: New National Hydraulics, Noida was established in the year 1986. They are engaged in manufacturing and trading and also in exporting a quality range of material handling equipments & construction equipments.

Contact:

New National Hydraulics, Noida
Mobile: 09811553201, 08506070450.
Fax: 0120-4215072.
Email: nationalhydraulics@gmail.com, info@nationalhydraulics.co.in



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TWO POST LIFT WHEEL BALANCER

Sunrise Instruments Private Limited offers a wide range of wheel balancer-two post lift.

Features:

- This wheel balancer-two post lifts are widely demanded in the market. Engaged in manufacturing of electro mechanical two post lift, which has a high capacity to carry weight.
- They have designed this model as per the industry guidelines, these are developed from high quality material.
- They ensure best performance of all their products as they are engineered under close supervision of their experts, while they are very easy to operate.

About the company: Sunrise Instruments Private Limited is professionally managed organization actively engaged in manufacturing & exporting of a wide range of electronic instruments & systems, digital tyre inflators, GPS tracking systems, solar systems, residential solar water heaters, heaters, etc.

Contact:

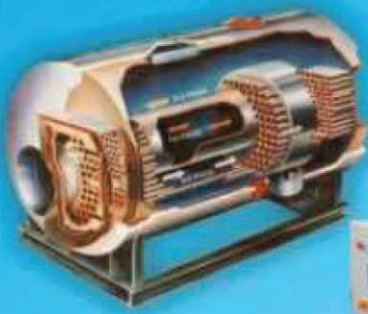
Sunrise Instruments Private Limited, Pune
Mobile: 09890066773, 09822493914
Email: info@futuressi.com



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Office: 365/3, 5 th lane Avantika Nagar, opp Agarbatti Complex
sector A Industrial Area Sanwer Road Indore - 452015 (M.P.) India
Mob.: 9424018370, 9302101122 Email: radtherm@rediffmail.com

TRANSMISSION CHAIN COUPLING

Hasmukhlal & Brothers offers a wide range of chain coupling. These offered products are used to join two pieces of rotating equipment while permitting



the various degree of misalignment or end movement or both.

Contact:

Hasmukhlal & Brothers, Rajkot
Tel: 0281-2360761, 6591097
Mobile: 09825340600, 9879760004
Email: bonnaflex@gmail.com

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PLANT SMSR GEARBOX

Micro Precision Works offers a wide range of coal plant SMSR gearbox. Being a foremost organization in this industry, they are actively engaged in offering the finest quality range of coal plant SMSR



gearbox.

Contact:

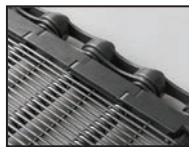
Micro Precision Works, Ahmedabad
Tel: 079-25893824
Mobile: 09924304636, 09824001570
Email: microgearbox@gmail.com, info@microprecisionworks.com

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INDUSTRIAL EYELINK BELTS

A G Belting Pvt Ltd offers a wide range of eyelink belts. Eyelink belts combine a flat, stable surface with the dimensional stability and robustness of metal and are well suited to heavy loads and unstable or fragile



products requiring good support.

Contact:

A G Belting Pvt Ltd, Ghaziabad
Tel: 0120-4159660, 4313588
Mobile: 09810979977, 08800466515
Email: info@agengineers.net

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ELEVATOR CHAIN

Tripcon Engineering Pvt Ltd offers a wide range of conveyor elevator chain. Offered this range in different styles of attachments such as K2, K24, K3, K44, K443, to meet the distinctive requirements of their



clients.

Contact:

Tripcon Engineering Pvt Ltd, Anand
Tel: 02692-236031
Mobile: 09825089070, 08347556104
Email: response@elevatorchains.com

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CHAIN SPROCKET & TRAILING WHEEL

National Engineering Works offers a wide range of link chain sprocket & trailing wheel. These chain wheels with projecting teeth replaceable rim type, with pocket teeth one piece casting, pocket teeth



replaceable rim.

Contact:

National Engineering Works, Kolkata
Mobile: 092318-20839
Email: nationalengg@bsnl.in

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DEEP HOLE GRINDING SPINDLES

Capital Engineering Corporation offers a wide range of motorized deep hole grinding spindles. These motorized deep hole grinding spindles are used in various grinding



spindles.

Contact:

Capital Engineering Corporation, New Delhi
Mobile: 09810056849
Email: yogesh@capitalspindles.com

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PREMIUM ANILOX ROLLER

Anar Rub Tech Pvt Ltd offers a wide range of anilox roller. These are fabricated with premium grade material. These products are abrasion resistant and are long lasting in nature as well. Ceramic anilox rollers provided by us are well known for their quality and durability.



Contact:

Anar Rub Tech Pvt Ltd, Ahmedabad
Mobile: 09825405265, 09825047390
Email: sales@anarrubber.com

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METAL EXPANSION JOINTS

RMS Corporation offers a wide range of metal expansion joints with fixed flanges. This metal expansion joints with fixed flanges are elastic pipe elements designed



to provide compensation for expansion movements and vibrations in the pipelines.

Contact:

RMS Corporation, Mumbai
Mobile: 09323804063, 09167245537
Email: rms_corp@vsnl.net

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JAMSHEDJI SOIL COMPACTOR

Jamshedji Constro Equip Pvt Ltd offers a wide range of jamshedji soil compactor. The comprehensive range of Rammer offered by us is appreciated by our valued clients for light weight and can be available in various



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models. These are mainly used for concrete leveling and vacuum de-watering.

Contact:

Jamshedji Constro Equip Pvt Ltd, Pune
Mobile: 09172222137, 09850153305
Email: info@jamshedji.com

HYDRAULIC HOPPER CONCRETE MIXER

Esquire Machines offers a wide range of concrete mixer – hydraulic hopper. It is built on the same robust design principles as the ever-reliable Esquire hand fed mixer, giving it the same dependable features.



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Contact:

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

QUALITY CUTTER-CRUSHERS

Rajat Equipments is a manufacturer, supplier and distributor of an extensive range of superior quality cutter crushers. These are available in various models and can be customised as per specifications; they are stringently tested on several parameters to eliminate defects.



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Contact:

Rajat Equipments Pvt Ltd, Raipur
Mobile: 09826421900, 09926936300
Email: info@rajat-group.com

DOUBLE TOGGLE JAW CRUSHER

Precious Mineral Processing Systems offers double toggle jaw crusher. The range of double toggle jaw crushers is manufactured with innovative techniques, high-grade raw material and strictly complies.



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Contact:

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



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DURABLE & TOUGH CASTOR WHEELS
TO WITHSTAND RIGOURS OF
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maneuver
with confidence

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enquiry@kalpar.in | kalpar.in

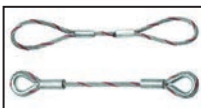
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SS WIRE ROPE SLING

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



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Contact:

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

SPEED REDUCER

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



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Contact:

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

SHOCK ABSORBER

Stellent Technologies is offering hydraulic shock absorber for moving loads with deceleration over the full stroke. The product has the lowest braking force and shortest braking time. The Magnum series from ACE is viewed as the reference.



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Contact:

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

CRANKSHAFTS

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



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Contact:

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

AUTOMOTIVE SHOCK ABSORBERS - AUTO PARTS

TMA International Private Ltd. has export comprehensive range of shock absorbers. The different departments share their strategic technical synergies.



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Contact:

TMA International Private Limited, New Delhi
Mobile: 09873938066
Email: tma@airtelmail.in

FLEXIBLE SHAFT

A M Associates is offering flexible shaft grinding machines. These products are widely used in fabrication workshops, foundries and heavy industries. They are suitable for heavy jobs and/or jobs where it is not possible to lift the work piece or get the same close to the grinding machine.



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Contact:

A M Associates, Chennai
Mobile: 09789881464, 09789881872
Email: aic.loyal@gmail.com

QUALITY TORQUE LIMITERS

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



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Contact:

Pethe Industrial Marketing Company Pvt Ltd, Mumbai 400 028
Mobile: 09821936459
Email: response@petheind.com

TIMING BELTS

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



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Contact:

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

GENERAL PRODUCTS

AUTOMATIC PAVER BLOCK MAKING MACHINE

Mortek Machinery Pvt Ltd offers a wide range of automatic paver block making machine. These automatic paver block making machine offered is based on



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advanced Hydro+Vibro technology as well as features fully PLC automatic controlled operations.

Contact:

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

CONSTRUCTION CONE CRUSHER

Creative Enterprises offers a wide range of construction cone crushers. These crushers have reliable construction, high



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productivity, easy adjustment and lower operational costs. Uniquely designed cone crushers used in a crushing circuit.

Contact:

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

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Hardware & Pneumatics offers a wide range of pneumatic riveting hammers. A rivet gun, also known as a pneumatic hammer, is a type of tool used to drive rivets; nearly all rivet guns are pneumatically powered.



Contact:

Hardware & Pneumatics, Kolkata
Tel: 033-22484842, 22432996
Mobile: 09831063719, 09874044351
Email: sales@hardwarepneumatics.in

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SCAFFOLDING PLANKS

Aegis Scaffolding Services is a service provider and manufacturer of a range of scaffolding planks. These scaffolding board are made using superior quality raw material and latest methods of production.



Contact:

Aegis Scaffolding Services Pvt Ltd, Mumbai
Mobile: 09930450958, 08600376735
Email: aegisscaffolding@gmail.com

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BATCHING PLANT

Nilkanth Engineering Works offers stationary concrete batching plants. The plant comprises of adequate capacity gravel and sand hoppers, weighing conveyor suspended on electronic load cells, pan type mixer unit, and additive tank.



Contact:

Nilkanth Engineering Works, Ahmedabad
Tel: 079-25835553, 40085485
Mobile: 09825073105, 09904242413
Email: info@nilkanthengg.com

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AUTOMOTIVE SHAFTS

Kalsi Engineering Company is offering a quality range of automotive shafts. They used in automobile industries and other related industries, offered shaft is manufactured using high grade raw material and advanced technology in line with industry standards.



Contact:

Kalsi Engineering Company, New Delhi
Tel: 011-28116427, 28116704
Mobile: 09810277090
Email: info@jimigears.com

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JAW CRUSHERS

Buildmate Projects offers a wide range of jaw crushers. These jaw crushers are single toggle type and have been designed after studying the day-to-day problems of crusher owners. They are made for more production, tough and large feed conditions, easy operation.



Contact:

Buildmate Projects Pvt Ltd, Hyderabad
Mobile: 07675989911, 09849019012
Email: mvr@buildmate.in, marketing@buildmate.in

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SINGLE DRUM ROLLER

Topall Impex offers a wide range of walk behind single drum rollers - CYLO6. These hi-tech rollers are known for their smooth performance, durability, sturdiness and easy handling, and are widely used for construction and repairing of roads and also to maintain edges of highways.



Contact:

Topall Impex, New Delhi
Mobile: 09716467843, 09350288831
Email: sales.topallimpex@gmail.com

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BULKER CEMENT UNLOADING SYSTEMS

Shreeji Technology offers a wide range of bulker cement unloading systems. Through this system, you can arrange to unload the bulkier into cement silo. It offers pneumatic conveying systems for cement bulker unloading.



Contact:

Shreeji Technology, Ahmedabad
Tel: 079-25840511
Mobile: 09725310611, 09825012858
Email: info@factory.com

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BAR CUTTER MACHINE

Sona Construction Technologies Pvt Ltd offers a wide range of bar cutter machine. Reckoned as leaders in this industry, they are providing their esteemed clients with excellent quality bar cutter machine.



Contact:

Sona Construction Technologies Pvt Ltd, New Delhi
Tel: 011-42430909, 27105123
Mobile: 09810034741, 09312908830
Email: sales@sonavibrators.com

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GENERAL PRODUCTS

ROCK DRILL

Suretech Infrastructure offers hydraulic craw rock drill. These rock drills are developed with the finest components and modern techniques in accordance with industry norms. The products are inspected on numerous parameters before delivery.



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Contact:

Suretech Infrastructure Pvt Ltd, Panvel
Tel: 022-27431868
Mobile: 07021139961, 09967987913
Email: sunil@suretech.co.in

HEAVY DUTY LAND LEVELLERS

Punjab Agro Sales (India) manufactures and supplies heavy duty land levellers. Offered is a wide range of soil levellers that find application for land levelling and for facilitating uniform irrigation. These rugged implements can be directly fitted to the tractors



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Contact:

Punjab Agro Sales (India), Karnal
Mobile: 09255411474, 09034083063
Email: punjab_agro_india@yahoo.co.in

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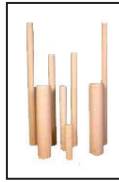


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DEEP FILTER CARTRIDGE

Pure Aqua Engineers offers a wide range of filter cartridge. These cartridge is a kind of deep filter cartridge, which is made of the textile fabric string (polypropylene, absorbent cotton and so on) preciously winding onto the multi hole axles according to the specific technology.



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Contact:

Pure Aqua Engineers, Ahmedabad
Tel: 079-22971320
Mobile: 09586023661
Email: viral@pureaquaengineers.com

INDUSTRIAL ROBOAGGREGATES

Robo Silicon Pvt Ltd offers a wide range of industrial Roboaggregates. These roboaggregates are obtained by crushing of parent rock and exhibit better bonding at the interface of aggregates with cement paste. Its crushed by a three-stage configuration consisting of a jaw crusher followed by a cone crusher. **Contact:** Robo Silicon Private Limited, Hyderabad
Tel: 040-45467210
Email: robosand@robo.co.in



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DISPLACEMENT VANE PUMPS

Shuban Hydrotech offers a wide range of displacement vane pumps produced by Berarma. Berarma has launched a new family of variable displacement vane pumps with high working pressure [250 bar], known as O1 PHP.



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Contact:

Shuban Hydrotech, Bangalore
Mobile: 09964315671, 09844031093
Email: sales@shubanhidrotech.com

TURNING TOOLS

Duracarb Cutting Tools offers a wide range of Turning Tools. As a full-line supplier of metalworking tools, Duracarb naturally provides the full ISO range of quality tools. All standard geometries are supplied. Its offers a variety of unique chipformer.



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Contact:

Duracarb Cutting Tools, Chennai
Tel: 044-24313371, 24313381
Email: sales@duracarb-india.com

INDUSTRIAL QUALITY ALLOYS

Shalco Industries Pvt Ltd offers a wide range of quality alloys. It has maintained its goodwill with unmatched quality and unsurpassed commitment towards the needs and requirements of its clients and Shalco is looking to maintain the same.



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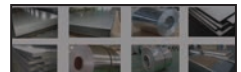


Contact:

Shalco Industries Private Limited, Mumbai
Tel: 022-62498200, 62498214
Email: info@shalco.in

NICKEL ALLOYS & DUPLEX STAINLESS STEEL

Suraj Metal Corporation offers nickel alloys & duplex stainless steel. This duplex stainless steel was developed as a product which could improve upon some of the technical weaknesses of the standard austenitic and ferritic stainless steels that are available in the market.



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Contact:

Suraj Metal Corporation, Mumbai
Mobile: 09619624188, 08369410192
Email: mishal@surajmetal.com

AUTOMOTIVE MILD STEEL U BOLT

Auto Pin India Limited are involved in manufacturing and supplying premium quality of automotive mild steel U bolts. Using ultra-modern machines & technology, the company manufactures products with the excellent grade.



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Contact:

Auto Pin India Limited, Faridabad
Mobile: 09015888890, 09899470570
Email: contactus@autopinsindia.com

THREAD TURNING

Vardex Tooling Private Limited offers a wide range of high quality thread turning. The Vardex indexable laydown thread turning insert technology was developed long years ago. Its patented designs continue to be the industry standard to this day.



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Contact:

Vardex Tooling Private Limited, Pune
Mobile: 09011553000
Email: info@vargusindia.com

GENERAL PRODUCTS

HELICAL GEAR

J S Engineering Works is offering an assortment of spur helical gear in which tooth contact is primarily rolling. Designed and manufactured in compliance with international quality standards using high-grade raw materials, this gear assures a high level of accuracy.



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Contact:

J S Engineering Works, Ahmedabad
Tel: 079-65404065 Mobile: 09427028033
Email: jsgears@jsgears.in

HEAVY-DUTY VANE TYPE AIR MOTORS

AMRO Airtech manufactures heavy-duty vane type air motors; model DAM-6AM-1. These motors are available in 4 HP rating and free speed of 3000 rpm, with 10 nm torque. All steel construction makes these motors rugged for use.



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Contact:

AMRO Airtech, Pune
Mobile: 09890135193, 09545735193
Email: amroairtech@gmail.com

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COOLING MOTORS

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Contact:

Amit Electricals, Ahmedabad
Tel: 079-25831031 Mobile: 09824003939
Email: info@amitelectricals.com

INDUSTRIAL BRAKE MOTOR

Pethe Industrial Marketing Company Pvt Ltd is manufacturing industrial brake motor. These brakes are precisely manufactured to comply with set industry parameters, using quality metal, obtained from trustworthy vendors.



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Contact:

Pethe Industrial Marketing Company Pvt Ltd, Mumbai
Mobile: 08355912764
Email: response@petheind.com
petheind@yahoo.com

VARIABLE SPEED MOTOR DRIVES

Concept Automation Private Limited offers a wide range of variable speed motor drives. It is compact design; low noise operation; and corrosion resistant. These are engineered under the firm direction of experienced quality controllers.



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Contact:

Concept Automation Private Limited, Kolkata
Mobile: 09432437981, 08017985832
Email: conceptautomationpvtltd@gmail.com

SERVO DRIVES, FULLY DIGITAL

Bristol Industrial Electronics offers optimum quality, fully digital servo drives. These servo drives can be operated at ease and give excellent level of performance.



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These drives are equipped with a variety of control modes, high speed, current and position loop and sinusoidal outputs.

Contact:

Bristol Industrial Electronics, Delhi
Mobile: 09312223289
Email: bristolelectronics@rediffmail.com

MICROSTEPPING MOTOR DRIVER

Yugandhar Systems offers a silent microstepping motor driver – YSSPD 4. This is compact, silent, yet a powerful driver, which eliminates all the problems related to vibration, resonance and sound in the stepper motor.



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Contact:

Yugandhar Systems, Pune
Tel: 020-24228445 Mobile: 09823037997
Email: yugandharsystems@gmail.com

COMPACT SPEED VECTOR DRIVES

Confident Automation offers compact speed vector drives. These are manufactured under rigid quality norms in agreement with global quality standards and can be availed for AC drive series for sensor less vector and closed-loop vector.



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Contact:

Confident Automation, Coimbatore
Mobile: 09362264242, 09843264242.
Email: confidentautomation@gmail.com

BRAKE MOTORS

Engineering Hindustan offers a range of brake motors. A wide range from fractional HP to 40 HP; TEFC (totally enclosed fan cooled) motors; and factory fitted and aligned brake motors. The brake mounting provision is in-built.



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Contact:

Engineering Hindustan, Navi Mumbai
Tel: 022-65208640, 27683513
Mobile: 09821334017, 09820740067
Email: enghind@bom3.vsnl.net.in

CLUSTER GEARS

Trishla Gear Industries is engaged in manufacture and supply of a wide range of cluster gears. The robustly designed cluster gears offer hassle free performance.



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Contact:

Trishla Gear Industries, Chennai
Tel: 044-26880578, 26880520
Mobile: 09841025097, 09841874997
Email: trishla@eth.net

GENERAL PRODUCTS

REFRIGERATION DRIVE

RudraImpex Corporation offers VLT refrigeration drive. The VLT refrigeration drive FC 103 covers a power range between 1.1-315 kW. Available in a variety of protection classes, the drive suits the needs of pump, fan and compressor applications.



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Contact:

RudraImpex Corporation Company,
Mumbai
Tel: 022-22002450, 39657380
Email: rudraimpex@aol.in

AC BRUSHLESS SERVO MOTORS

Rotolinear Systems offers AC brushless servo motors. These are available in range of 0.1- 115 Nm. The standard frame sizes (square) available are 25, 37, 55, 74, 86, 98, and 142, 190, 240. There are mainly 2



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models or series (i.e. TGT series and TGH series).

Contact:

Rotolinear Systems, Bengaluru
Tel: 080-23572855. Mobile: 09845196751
Email: rotolinearindia@vsnl.net




HI-TECH CASTER WHEELS



WHEEL Ø: 25mm to 300mm
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MECHEM PRIVATE LIMITED

CORPORATE OFFICE: S-3/72 (Annexe), 1st Floor, Mancheswar Industrial Estate, Bhubaneswar 751010, Odisha, India
Ph.: 91-674-2585886, E-mail: mechempl@gmail.com
Website: www.mechem.in



METRIC HEX NUTS

Austenite Fasteners Pvt Ltd engages to manufacture metric hex nuts. A six-sided internally threaded fastener with metric thread pitch. 16 millimeter nuts and smaller are chamfered on the top and the bearing surface.



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Contact:

Austenite Fasteners Pvt Ltd, Vadodara
Tel: 0265-2635396, 2635397
Mobile: 09099094481
Email: info@austenitefasteners.com

CONICAL SPRINGS

Micro Spring Products offering conical springs. The different types of conical springs are conical compression and extension Springs. Conical Springs are used in push buttons, battery conductors, electrical and electronics products.



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Contact:

Micro Spring Products, Chennai
Tel: 044-24765567 Mobile: 09003062996
Email: info@microsprings.com

HOSE COUPLINGS

Patel Brass Turnomatics Pvt Ltd is manufacturing hose couplings. A hose coupling is a connector on the end of a hose to connect (or couple) it with another hose or with a tap or a hose appliance, such as an irrigation sprinkler.



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Contact:

Patel Brass Turnomatics Pvt Ltd, Jamnagar
Tel: 0288-2730877/78
Email: info@patelbrass.com

CARBON STEEL FASTENERS

Katariya Steel Distributors engages as a manufacturer and supplier of a wide range of carbon steel fasteners. The use of optimum quality raw materials in the manufacturing of the carbon steel fastener ensures high durability, tensile strength and resistivity to adverse conditions.



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Contact:

Katariya Steel Distributors, Mumbai
Mobile: 09833405433, 09823458877
Email: sales@katariyasteel.com

INDUSTRIAL BOLTS

Micro Metals is a provider a wide range of industrial bolts. These are widely used in fence fittings and hydraulic fittings. These are produced using high-quality material and are highly appreciated by their clients.



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Contact:

Micro Metals, Mumbai
Tel: 022-66595495, 66159036
Mobile: 09930772998, 09773102209
Email: info@micrometals.co.in

IMPACT WRENCH

Hardware & Pneumatics offers a wide range of impact wrench. An impact wrench (also known as an impactor, impact gun, air wrench, air gun, rattle gun, torque gun, windy gun) is a socket wrench power tool designed to deliver high torque output with minimal exertion by the user.



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Contact:

Hardware & Pneumatics, Kolkata
Mobile: 09831063719, 09874044351
Email: sales@hardwarepneumatics.in

SLEDGE BRASS HAMMER

Manomay & Co offers a wide range of sledge brass hammer. It devoted towards manufacturing an optimum quality range of sledge brass hammer. Offered range is highly acknowledged for compact design, corrosion resistance, easy handling and long life.



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Contact:

Manomay and Co, Jamnagar
Mobile: 09898015043
Email: amncojam@gmail.com, manomayjam@gmail.com

AUTOMATIC SELF ADJUSTING PIPE WRENCH, 9"

Solsons Exim develops automatic self-adjusting pipe wrench, 9". It automatically sizes any pipe or round bar. Slip-free grip - the harder you turn, the tighter it grips. Grips securely without adjusting any nut.



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Contact:

Solsons Exim, Ahmedabad
Mobile: 09925152422
Email: solsons@solsons.com

GENERAL PRODUCTS

ELECTRIC MOTORS -BELCO

Indian Electrical Industries offers an electric motor, Belco. Three phase electric motors range from 0.125 to 50 HP. Single phase motors range from 0.125 to 2 HP. It



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has dynamically balanced rotors and fans, which ensure quiet and vibration free operation.

Contact:

Indian Electrical Industries, Mumbai
Tel: 022-25947605 Mobile: 09821806646
Email: info@belko.in

BALL BEARINGS

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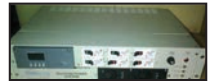


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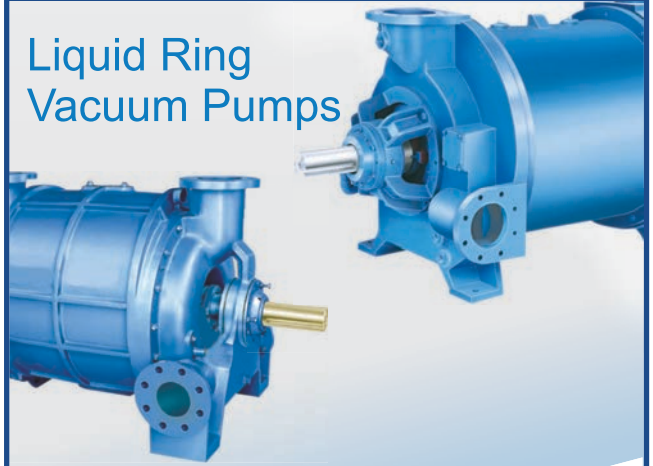


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The Four-Pronged Manufacturing Strategy

With India all set to become the third largest economy of the world by 2027, the manufacturing sector is expected to play a crucial role in sustaining the country's growth momentum. The 'Make in India' initiative has driven industrial growth by improving infrastructure, labour regulations, and public sector efficiency. Adoption of advanced technologies like AI, ML, and IoT is transforming manufacturing, enhancing productivity, and ensuring global competitiveness.

Skill development remains vital, with institutions like the National Skill Development Corporation (NSDC) providing training to equip workers with modern industry skills. Policy reforms such as the Production Linked Incentive (PLI) scheme and 'Atmanirbhar Bharat' have further bolstered manufacturing investments. Sustainability is another key focus, as manufacturing

contributes 20 per cent of India's greenhouse gas emissions. Implementing green practices, renewable energy use, and waste reduction strategies are crucial for eco-friendly growth. With strategic investments, technological advancements, and sustainability efforts, India's manufacturing sector is poised to become a global leader, reinforcing its path towards becoming a developed economy by 2047.

In the "Cover Story" section, industry leaders delve into four key pillars (government initiatives, skill development, modern technologies and sustainability) that are crucial for India's manufacturing sector to scale new heights. Read on...





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India: A Global Manufacturing Hub?

Manufacturing thrives on scale — the bigger, the better. Even for major economies like the USA and China, this requires strong infrastructure: land, water, power, steel production, manpower, roads, railways, and ports, opines **R Jayaraman, Head-Capstone Projects, Bhavan's SPJIMR.**



Source: Freepik

India's potential to become a global manufacturing hub is a critical question under the government's vision of an Atmanirbhar Bharat. The government is committed to positioning India as a major manufacturing destination, a role that China has dominated for years.

China's rise as a manufacturing powerhouse was driven by Western companies seeking lower labour costs, along with China's proven competence and capability in delivering high-quality goods and services. Today, China leads in global manufacturing, producing over a billion tonnes of crude steel annually and accounting for nearly 33 per cent of global passenger car production.

India aims to replicate this success by leveraging its workforce, policy support, and infrastructure

development to attract global investments and strengthen its manufacturing sector (table 1).

Compared with these numbers, India is currently achieving about 125 million tonne per annum of crude

Table 1: Comparison of production of automobiles

Year	Passenger cars production worldwide (mvpa)	China (mvpa)
2008	71	9.3
2015	91	24.6
2020	78	25.3
2023	94	26.1

steel and about 5 million vehicles per annum of passenger cars. India has a long way to go. Not just that, the global hub numbers are truly mind boggling. What characterises as a 'global manufacturing hub (GMH)'? For comparisons, the total output of China's manufacturing sector was about \$4.9 trillion in 2022, whereas India was a comparatively low less than \$1 trillion. (see Figure 1)

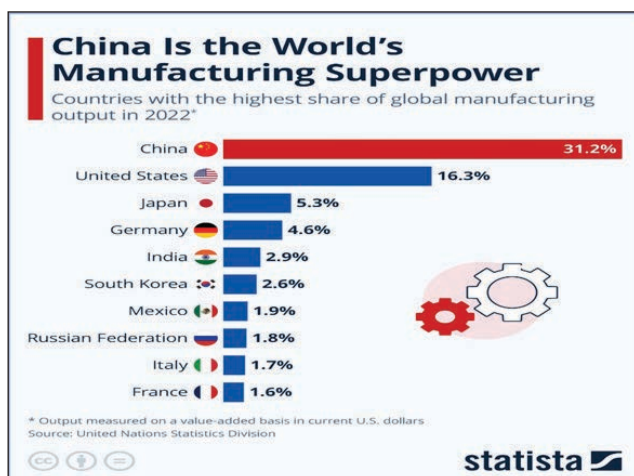


Figure 1: Comparison of world manufacturing outputs

China's numbers are double that of US that have been achieved in the last twenty years or so. It is incredible and serves as a beacon of hope for those who want to emulate.

Dimensions of a GMH

There are at least five dimensions which a country should be aware of, to become a GMH.

Quantity of goods: A billion tonnes of crude steel, at least 10 to 20 mvpa of passenger cars, about 5 to 10 mvpa of commercial vehicles, about 30 to 35 mtpa of aluminium, between 1,000 to 2,000 GW of installed electric power generation capacity — and the list goes on. The point is that the numbers are big, the investments needed to create such capacities are also big, and the capital required is neither easy to imagine nor easy to secure.

For example, setting up a one mtpa integrated steel plant takes about ₹50 billion. It could be less if done on a brownfield site. If this is accepted, then we will need about ₹500 billion per annum to create a capacity of 10 mtpa, which has been achieved in India in the past. To create the capacity of 300 mtpa targeted by GOI by 2030, from the current level of 180 mtpa, an additional capital investment of about ₹1000 billion per year will be needed for the next six years. That's a lot — and only for one industry.

Similar amounts are needed in other basic industries

like mining, aluminium, electric power, railways, and other infrastructure. This scale of effort requires recognising the importance of project management and construction management. Just imagine — to build this quantum of industrial structures, we will need at least 400,000 personnel per annum. And this is for just one industry. As of now, there is an acute shortage of skilled manpower for construction projects in India.

To get an idea of the magnitude of the task in becoming a GMH in terms of quantum of output, we list five key industries outputs in India and China. (Table 2).

Table 2: Comparison of some key metrics related to manufacturing in China and India

Good	India	China	Remarks
Crude steel	124.45 million tonnes	1,013 billion metric tonnes	China's output is 9 times that of India
Electricity	1,624 billion units	8,389,000 billion units	China's output is about 5,000 times that of India
Roads	6,331 million kms	5.44 million kms	More than China
Civil airports	44	254	China has 6 times as many airports as India
Iron Ore production	254 million tonnes	968 million tonnes	China produces about 4 times as much as India
Length of Railway lines	68,000 kms	155,000 kms	China has about 2.2 times that of India

One can easily guess the enormity of the task of becoming a GMH.

Availability of basic infrastructure factors

Manufacturing thrives on scale — the bigger, the better. Even for major economies like the USA and China, this requires strong infrastructure: land, water,

Table 3: Comparison of infrastructure in India and the USA (all figures are for 2022)

Sectors	India	USA
Crude steel (million tonnes per annum)	125	81
Electricity (billion units per annum)	1,624	4,230,723
Roads (million kms)	6.331	6.64
Civil airports (numbers)	44	5,193
Iron Ore production (million tonnes per annum)	254	48
Length of Railway lines (kms)	68,000	149,000

power, steel production, manpower, roads, railways, and ports. As shown in Figure 1, the gap between India and the USA is smaller than between India and China. Therefore, comparing India with the USA offers a more realistic benchmark and greater hope for progress (Table 3).

The USA numbers are not too far way from those of India. However, to get the correct perspective, let's look at the per capita picture. The total output value of the manufacturing GDP in India and USA for 2022 were: \$470 million and \$2,730 million (with China at \$4,648 million) as summarised in Table 4.

Table 4: GDP data of 3 countries

GDP data for 2022	\$ Million	per cent Manufacturing	Mfg GDP million \$
India	3,385	13.9	470
USA	26,000	10.5	2,730
China	17,880	26.0	4,648

The productivity of the key infrastructure variables per capita are shown in table 5:

Table 5: Comparison of productivity of infrastructure for manufacturing – India and the USA (productivity = Manufacturing GDP in \$ million / units of goods)

Good	India	USA	USA/India
Electricity productivity (\$ million per B Units)	0.29	0.001	0.002
Roads productivity (\$ million per M KM)	74.85	411.14	5.493
Cargo airports productivity (\$ million per airport)	47.39	91.00	1.920
Railway productivity (\$ million per km)	0.01	0.02	2.629

Barring electricity, the USA uses its infra far more effectively than India. The effectiveness is reflected in the amount of each infra 'consumed' to produce a unit of manufacturing output. This analysis has the flaws of aggregate analysis, but, directionally, it indicates that India can improve its infrastructure usage to catch up with the USA in the manufacturing sector. Hence, the GOI could look more closely at these figures and find out if this route can be applied to some extent to reach the GMH goal of India.

Land availability

Manufacturing requires substantial land — for factories, inventory storage, housing supply chain participants, mining, mineral production, and in India's case, agricultural farming. While agriculture isn't

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classified as manufacturing, it plays a significant role in India's land-use analysis compared to China and the USA.

India's land area is 1.597 million square km, far smaller than China's 9.6 million square km and the USA's 9.53 million square km. This puts India at a clear disadvantage. In terms of agricultural land use, India dedicates 60 per cent, compared to 44 per cent in the USA and just 10 per cent in China. As a result, the land available for industry and other purposes is approximately 8.6 million square km for China, 5.33 million square km for the USA, and only 0.64 million square km for India.

The GDP productivity per square km of land area for these three countries is shown in Table 6:

India's land usage for manufacturing is more
Table 6: Land productivity and future prospects for using it for GMH in India

Item	China	USA	India
Manufacturing GDP in 2022 (\$ million)	4,648	2,730	470
Total Land Area (Million skm)	9.60	9.53	1.60
per cent Used for agriculture	10	44	60
per cent available for other uses	90	56	40
Land area available for other uses, Million skm	8.64	5.34	0.64
Land productivity (GDP \$ million per M skm)	538	512	736

productive than in China or the USA, but its limited available land leaves few options: either boost current productivity or convert farming land into industrial use.

Logistics

Manufacturing heavily depends on transportation, involving the movement of raw materials, components, and finished products. Globally, logistics costs range from 8 per cent to 10 per cent of production costs, but in India, it exceeds 10 per cent. Initiatives like PMGSS aim to reduce this. Logistics relies on land, roads, railways, and ports, though India still mainly uses road, rail, and sea routes, with limited pipeline infrastructure.

For manufacturing, logistics splits into domestic and export channels. Domestic logistics depends on roads and railways, while exports face additional complexities like customs and international practices. In the last decade, India's transport infrastructure has improved significantly, though productivity data tells a more detailed story, as shown in Table 7.

As seen in Table 7, India's logistics productivity

Table 7: Railway and Roads productivity

Item	China	USA	India
GDP in 2022 (\$ million)	4,648	2,730	470
Length of Railway Lines (km)	1,55,000	1,49,000	68,000
Length of Roads (Million km)	5.44	6.64	6.33
Railway productivity (\$ million per km)	0.03	0.02	0.01
Roads productivity (\$ million per km)	854	411	74

parameters are significantly lower than those of the USA, posing a major bottleneck for the country's manufacturing ambitions. Poor transport infrastructure and weak last-mile connectivity to ports and commercial centers hinder efficiency. The Pradhan Mantri Gati Shakti Scheme (PMGSS) addresses these issues through a coordinated, multi-level approach, but this remains a key area for improvement.

Ports

Ports are essential for any nation aiming to become a global manufacturing hub (GMH). Efficient inland connectivity to ports directly impacts overall logistics performance, but sea transport remains slow due to global chokepoints like the Suez Canal, Panama Canal, and South China Sea. In India, domestic factories rely on ports for both exports and internal movement — for instance, Gujarat's cement plants use sea routes for distribution.

However, the lack of point-to-point connectivity at ports results in multiple loadings, inspections, and delays. Despite these inefficiencies, sea and rail transport remain the most cost-effective options for bulk goods, typically moving products into warehouses before final distribution. Table 8 highlights the productivity comparison of ports in India, China, and the USA.

Table 8: Productivity of ports

Item	China	USA	India
GDP in 2022 (\$ million)	4,648	2,730	470
Number of ports (Major, except India)	34	25	229
Traffic handled (million tonnes)	15,680	1,325	16,700
Traffic productivity (\$ million per million tonnes handled at the ports)	0.30	2.06	0.03
Ports productivity (\$ million per port)	136.71	109.20	2.05

Summing Up

India has 229 ports, with 12 classified as major, handling only 54 per cent of the country's cargo. Unlike the USA and China, where only major ports manage most of the cargo, India's overall port productivity remains low, even when considering only its major ports.



India's logistics productivity parameters are significantly lower than those of the USA, posing a major bottleneck for the country's manufacturing ambitions.

Port productivity reflects cargo-handling capacity, processing speed, and ease of booking and release procedures, all critical for efficient trade. Two key productivity measures stand out: traffic productivity, indicating the volume of goods moved, and revenue generated per port, with higher figures signaling better

infrastructure.

India falls short on both measures, highlighting the urgent need for more efficient and world-class port facilities. A recent Government of India report revealed a 47 per cent increase in India's coastline length, offering greater potential for developing new, high-capacity ports.

India still has a long way to go to become a global manufacturing hub, requiring significant improvement across key areas. While the financial investment needed is massive, the country has ample manpower and ingenuity. Success will depend on determined leadership at the national and state levels, along with skilled project managers, engineers, and workers. The past decade has proven that India has the potential to achieve this goal.

SME



About the author:

R Jayaraman is the Head-Capstone Projects, Bhavan's S P Jain Institute of Management & Research (SPJIMR). He has worked in several capacities, including Tata Steel, for over 30 years. He has authored over 60 papers in academic and techno economic journals in India and abroad. Jayaraman is a qualified and trained Malcolm Baldrige and EFQM Business Model Lead Assessor.



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Riding the Sustainable Manufacturing Wave

Advancing energy storage solutions will enable use of clean energy sources within industrial settings. This will make it easier for manufacturers to transition from conventional fossil fuels to cleaner, energy alternatives, says **Saurabh Patawari, Managing Partner, National Electrical Equipments Corporation (NEEC)**.

In an era marked by climate change, resource depletion, and rising global temperatures, industries face mounting pressure to adopt sustainable practices. Green manufacturing represents a vital shift from conventional production methods to environmentally conscious alternatives. It is not merely a trend but a necessity for achieving long-term economic and environmental sustainability.

Urgency of green manufacturing

The manufacturing sector is responsible for a significant share of global greenhouse gas emissions, contributing approximately 20 per cent to 30 per cent of the world's carbon footprint. Without swift action, industries risk exacerbating climate impacts, facing resource shortages, and encountering rising production costs. Green manufacturing offers solutions by integrating sustainable practices into every facet of production, from sourcing raw materials to waste management.

Core pillars of green manufacturing

Green manufacturing cannot sustain without these foundational steps:

- **Reducing carbon footprint:** A primary goal of green manufacturing is to minimise carbon emissions. Industries achieve this by optimising energy usage, transitioning to renewable energy sources, and employing energy-efficient machinery. For example, installing solar panels, investing in wind energy, or harnessing geothermal power can significantly reduce emissions and dependency on fossil fuels.
- **Adopting circular economy principles:** A circular economy replaces the linear 'take-make-dispose' model, emphasising resource recovery and waste minimisation. Green manufacturing encourages designing products for durability, reuse, and recyclability. This reduces raw material consumption and ensures that materials at the end of their lifecycle are reintegrated into production processes. Additionally, circular economy practices create



Source: Freepik

economic opportunities in recycling and remanufacturing industries.

- **Sustainable material sourcing:** The choice of raw materials significantly impacts green manufacturing. Companies are increasingly turning to eco-friendly and biodegradable materials such as bamboo, recycled metals, and plant-based plastics. These alternatives have a lower environmental impact compared to traditional materials like virgin plastic or mined metals.
- **Waste minimisation and management:** Efforts to minimise waste involve adopting lean manufacturing techniques, better process control, and advanced recycling systems. Some companies are adopting zero-waste policies by finding innovative uses for by-products, such as converting scrap materials into secondary products or fuel.
- **Benefits of green manufacturing:** Adopting green manufacturing practices offer numerous benefits, both tangible and intangible. These extend beyond environmental preservation to economic, social, and operational improvements.
- **Cost savings:** Energy-efficient technologies and waste reduction strategies lead to substantial cost savings over time. While the initial investment in green infrastructure may be high, operational costs, including energy bills and waste disposal expenses, decrease significantly.
- **Enhanced brand image:** Companies that practice green manufacturing enjoy a favourable reputation

among consumers and investors increasingly prioritising sustainability. A strong brand image can boost customer loyalty, open new markets, and attract eco-conscious customers.

- **Regulatory compliance:** Governments worldwide are tightening environmental regulations, enforcing stricter limits on emissions, and encouraging sustainable practices through incentives and penalties. Green manufacturing ensures compliance, helping companies avoid fines and legal hurdles.
- **Employee and community well-being:** Cleaner production environments reduce health risks for workers and surrounding communities. Lower pollutant levels lead to improved air and water quality, contributing to a healthier ecosystem and workforce.

Challenges in implementing green manufacturing

Transitioning to green manufacturing is not without its challenges. The high upfront cost of adopting sustainable technologies and infrastructure is a major barrier, particularly for small and medium-sized enterprises (SMEs). Additionally, the lack of standardised industry regulations creates uncertainty about what constitutes green manufacturing. This has led to instances of greenwashing, where companies falsely claim eco-friendly practices without making substantial changes. Retraining the workforce to operate advanced, energy-efficient machinery and implement sustainable processes is another challenge. This requires significant time and investment to ensure employees are equipped with the necessary skills.

Global examples of green manufacturing success

Despite these challenges, several countries and companies have successfully adopted green manufacturing practices, setting benchmarks for the industry.

- **Japan:** Renowned for its technological prowess, Japan has been a pioneer in sustainable manufacturing. Its industries have implemented energy-efficient machinery and strict waste management practices.
- **Germany:** The automotive industry in Germany has embraced green manufacturing by developing electric vehicles and reducing production waste.
- **Sweden:** Known for its closed-loop systems, Sweden uses industrial waste from one sector as raw material for another, demonstrating effective resource recovery.
- **Corporate success:** Major electronics manufacturers have committed to carbon

neutrality by integrating renewable energy and recycled materials into their operations.

Role of technology in green manufacturing

Technological innovation is the backbone of green manufacturing. Advanced technologies like the Internet of Things (IoT), artificial intelligence (AI), and machine learning enable real-time monitoring of energy consumption and waste generation. These insights allow manufacturers to optimise processes, reduce inefficiencies, and predict maintenance needs. Additive manufacturing, or 3D printing, is another transformative technology. By enabling precise production, 3D printing minimises material waste and allows for the use of recycled inputs. Innovations in carbon capture and storage (CCS) also offer promising solutions for reducing emissions from heavy industries such as cement and steel production.

India's path to green manufacturing leadership

India, with its rapidly expanding industrial base, stands at a crucial juncture where sustainability and economic growth must align. The government's proactive policies, such as the National Manufacturing Policy, Make in India, and the Production-Linked Incentive (PLI) scheme, provide a solid foundation for promoting green manufacturing practices. India's ambitious renewable energy targets, including achieving 500 GW of non-fossil fuel capacity by 2030, further support its green manufacturing goals. However, India faces unique challenges. SMEs often struggle with the financial burden of adopting green technologies. Inadequate infrastructure, limited access to green finance, and insufficient public-private partnerships also hinder progress. Addressing these issues requires fostering innovation, developing supportive regulatory frameworks, and investing in capacity building through skill development programs.

Future trends and challenges in green manufacturing

The future of green manufacturing will be shaped by several transformative trends that promise to revolutionise production processes across industries. One of the most crucial trends is the advancements in renewable energy integration. As energy storage solutions and smart grid technologies continue to evolve, they will enable more efficient and widespread use of renewable energy sources within industrial settings. This will make it easier for manufacturers to transition from conventional fossil fuels to cleaner, sustainable energy alternatives, reducing their carbon footprints.

Furthermore, the rise of smart manufacturing is set

to play a pivotal role in optimising industrial processes. Through real-time monitoring and data-driven insights, these technologies will enable manufacturers to reduce resource consumption, minimise waste, and improve overall efficiency, contributing to a more sustainable production model.

Another key trend is the development of carbon-negative technologies, which will be crucial in achieving net-zero emissions goals. Innovations such as bio-based materials, which offer sustainable alternatives to traditional plastics and metals, and advanced carbon capture and storage systems will help industries mitigate their environmental impact.

Despite these promising advancements, several challenges remain. The high upfront capital costs associated with implementing green manufacturing technologies could prove to be a significant barrier, especially for small and medium-sized enterprises (SMEs). Additionally, the lack of consistent regulations may create confusion and hinder the widespread adoption of green practices. Furthermore, geopolitical uncertainties and the complexity of sourcing sustainable materials could disrupt supply chains, adding another layer of difficulty to the transition toward greener

manufacturing. To address these challenges, it will be essential for governments, industries, and other stakeholders to collaborate on developing clear standards, providing financial incentives, and fostering global partnerships.

Closing thoughts

Through collaboration, technological advancements, and supportive policy frameworks, industries can lead global green manufacturing, ensuring a sustainable future for generations to come.

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About the author:

Saurabh Patawari serves as the Managing Partner of National Electrical Equipments Corporation (NEEC), bringing over one decade of industry expertise to the helm of one of India's leading transformer manufacturers. A visionary leader with a hands-on approach, Saurabh has been instrumental in driving the company's operational excellence, product innovation, and global expansion under guidance of family tradition of giving high value to customers. Under him, NEEC has solidified its reputation as a trusted partner in power distribution, catering to diverse clients across India and 20+ international markets, including Sri Lanka, Saudi Arabia, Zambia, Uganda, Yemen, Liberia, Burundi and more countries.



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Make in India Incentivising Entrepreneurs

Sustainability also extends to the way India handles its raw materials. For instance, India's mining industry plays a vital role in supplying essential resources to manufacturing, but it is also under pressure to adopt sustainable practices, remarks **Agnishwar Jayaprakash, Founder and CEO, Garuda Aerospace.**



Source: Freepik

The 'Make in India' initiative launched by Prime Minister Narendra Modi has emerged as one of the most significant endeavours in the country's history, aimed at transforming India into a global manufacturing powerhouse. Launched in 2014, it has brought together government, businesses, and other stakeholders to align their strategies and efforts towards making India a hub for global production for over 10 years now. This transformation hinges on several interconnected elements: strategic alignment between businesses and government, a commitment to sustainable practices, the embrace of cutting-edge technologies, and the cultivation of a skilled workforce. These elements are not merely components of 'Make in India' but are fundamental to securing India's leadership in the global manufacturing arena.

In today's interconnected world, businesses operate within a fluctuating global landscape. Aligning company

strategies with supportive government policies is crucial for navigating these complexities. Effective strategies and policies provide the necessary framework for businesses to thrive amidst global challenges like shifting demand, supply chain vulnerabilities, and escalating production costs.

In the world of global manufacturing, companies must navigate an increasingly volatile, uncertain, complex, and ambiguous (VUCA) environment. This makes the alignment between a company's strategies and government policies vital for success. The right strategies and policies provide businesses with the framework and support needed to flourish, especially in the face of challenges such as fluctuating global demand, supply chain disruptions, and rising production costs.

The Major goal of this initiative is to boost the manufacturing sector's contribution to GDP, create millions of jobs, and attract foreign investments through

relaxed FDI norms and improved infrastructure. The initiative also focuses on enhancing the ease of doing business, promoting innovation, and improving skills through vocational training. While it has had some success, challenges like labour laws and infrastructure gaps remain. Ultimately, 'Make in India' aims to position India as a competitive player in the global market, driving economic growth and export expansion.

Additionally, diversity and inclusion must be prioritised. Women, in particular, have been underrepresented in manufacturing industries globally, and India is no exception. Promoting gender equality in the manufacturing sector can help unlock the full potential of the workforce and foster a more inclusive, innovative, and collaborative work environment. Diverse teams bring a range of perspectives, which is essential for solving complex problems and driving innovation. By empowering women and other underrepresented groups in manufacturing, India can ensure that its workforce is not only skilled but also diverse and adaptable.

Cultivating a skilled workforce is paramount. India's young population represents a significant advantage, but realising its full potential requires strategic investment in skill development, up skilling, and industry-academia partnerships. Training programs focused on advanced manufacturing technologies are essential. Collaborations between industry and educational institutions will ensure curricula align with industry needs. Promoting diversity and inclusion, particularly the participation of women in manufacturing, will unlock greater innovation and create a more robust workforce.

At the heart of India's growth potential lies the 'China Plus One' strategy, which calls for businesses to diversify their supply chains beyond China. As businesses around the world look to reduce their dependence on China, India is well-positioned to capitalise on this shift. To attract investment and foster growth, India must offer the right incentives, improve ease of doing business, and provide a clear and consistent regulatory framework.

For companies, aligning their strategies with the changing global business landscape is equally important. In addition to pursuing cost-effectiveness, companies must focus on areas such as research and development (R&D), innovation, quality control, and sustainability. India's manufacturing sector must prioritise R&D to drive product and process innovation, allowing it to stay competitive and meet the evolving needs of global consumers. The government can play a significant role by providing incentives for R&D, supporting collaborations between businesses and research institutions, and encouraging the development of new technologies.

Moreover, India must ensure that its policies are

agile, responding to global shifts and emerging opportunities. Policymakers must focus on creating a regulatory environment that encourages investment in infrastructure, simplifies trade processes, and minimises bureaucracy. By strengthening these frameworks, India can establish itself as a reliable and competitive manufacturing destination for global companies.

Sustainability is one of the most pressing issues facing the global manufacturing sector today. As countries and businesses increasingly focus on reducing their environmental impact, India's manufacturing sector must prioritise green manufacturing practices. Green manufacturing involves the adoption of environmentally friendly processes, reduction of energy consumption, lowering carbon footprints, and implementing a circular economy approach, where resources are reused and waste is minimised.

For India to be recognised as a global manufacturing leader, it must lead by example in reducing its carbon emissions. Manufacturing processes that rely on fossil fuels, excessive energy consumption, and wasteful practices contribute significantly to environmental degradation. In contrast, green manufacturing not only minimises these environmental impacts but also presents significant economic opportunities. By reducing energy consumption, Indian manufacturers can lower operational costs, while adopting circular economy practices—such as recycling, reusing, and repurposing materials—can open new markets for eco-friendly products and services.

Additionally, sustainability is increasingly becoming a key consideration for international buyers. Consumers and businesses are demanding that products be produced with minimal environmental impact. Meeting global environmental standards will not only help Indian manufacturers gain access to new markets but will also enhance the country's reputation as a responsible player in the global economy. International trade agreements and consumer preferences are increasingly favouring companies that prioritise sustainability, and India's manufacturing sector must respond to this demand. By incorporating green manufacturing practices into their operations, Indian manufacturers can differentiate themselves and add value to their products while addressing the global need for environmentally responsible practices.

Sustainability also extends to the way India handles its raw materials. For instance, India's mining industry plays a vital role in supplying essential resources to manufacturing, but it is also under pressure to adopt sustainable practices. Promoting sustainable mining techniques and efficient resource use across industries is key to ensuring that India's raw material sector can support manufacturing in a way that does not deplete

natural resources or damage the environment.

The government can further support green manufacturing through policies that provide incentives for sustainable practices, including renewable energy adoption, energy-efficient technologies, and waste-reduction strategies. By linking sustainability goals to financial and regulatory incentives, the government can create a robust framework for Indian manufacturers to transition to greener production methods.

The future of manufacturing hinges on the integration of advanced technologies like automation, robotics, AI, machine learning, 3D printing, and the Industrial Internet of Things (IIoT), which are transforming how products are designed, produced, and delivered. These technologies help reduce manual labour, increase precision, enhance production speeds, and improve safety, particularly in hazardous environments. Automation and robotics also lower operational costs and boost product quality and consistency. Additionally, digitalisation through real-time data collection, predictive analytics, and sensors allows for improved supply chain management and production efficiency, enabling manufacturers to quickly adapt to changing demands. For India to remain competitive in the global manufacturing sector, embracing these advancements is crucial to driving growth, improving productivity, and optimising processes.

To harness the potential of these technologies, India needs to invest in digital infrastructure, build a skilled workforce that can operate and maintain these systems, and foster a culture of continuous innovation. Integrating advanced manufacturing technologies into Indian factories will require big investments, but the long-term benefits, like increased competitiveness, higher quality products, and reduced costs, will make it worthwhile.

No manufacturing transformation can succeed without the right people driving it. India's young and diverse population offers an advantage in building a capable workforce for the manufacturing sector. The 'Make in India' initiative gives a holistic opportunity to India for driving exponential growth.

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About the author:



Agnishwar Jayaprakash is the Founder and CEO, Garuda Aerospace, India's largest drone start-up and an entrepreneur who has been making rapid strides in the Global Changemakers Community. Agnishwar Jayaprakash founded Ignite-India, an innovation ecosystem established in over 70,000 schools and colleges across India. The United Nations recognised

the ecosystem as one of the Top 10 socio-economic initiatives in 2016. He is also an alumnus of the Harvard Business School and has served in the UN under Assistant Secretary General Madam Lakshmi Puri. Founded in 2015 with a team of 5, he has scaled Garuda Aerospace to a 200+ member team having the largest drone fleet in India with over 400 drones and 500 pilots operating in 84 cities.

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3D Printing in Drone Manufacturing

Using 3D printing, companies can produce complex geometries for drone components that optimise performance and reduce weight. For instance, nano drones leverage 3D-printed frames made from advanced composites, ensuring durability without compromising agility, says **Rama Krishna, Co-Founder & CEO, EndureAir**.



Source: Freepik

As industries shift toward the development and adoption of advanced drone or UAV technologies, drones have emerged as a crucial solution in reshaping various sectors like defence to civilians. Companies in unmanned aerial vehicle (UAV) systems, harness cutting-edge technologies to design and manufacture lightweight, efficient, and highly adaptable nano and logistics drones.

Advanced drone manufacturing technologies have revolutionised the industry by offering unparalleled long-range operation, payload capacity, and customisation.

One of the most difficult problems in drone design and manufacturing is achieving an aerodynamic, minimal

operating weight. Weight and power must be carefully balanced while using drones. Many drones are currently dealing with a troublesome loop. Specifically, they run on batteries and need larger power reserves for transporting cargo. They need larger batteries to produce more power. However, larger batteries increase weight, which necessitates more power to offset, which calls for larger batteries, which in turn calls for more power, and so on. Currently, the startup integrates technology advancements to achieve excellence in drone design and production. Advanced aerodynamics and lightweight materials can

enable payloads of up to 100 kg, with the potential for increased capacity.

Although carbon fibre is a strong material option for general use, manufacturers must take into account a wide range of criteria when choosing drone material. Near all manufacturers of UAVs use carbon fibre composite material. Over time, lightweight elements of carbon fibre gradually replaced heavy metal components, enabling greater acceleration and higher speeds.

Stiffness plays an important role in aircraft applications. To preserve its aerodynamic shape, the hardware structure must, first and foremost, have a high level of structural stiffness. Second, high rigidity is necessary for rotating blades like rotors, propellers,

engine fan blades, and structures going through pressurisation cycles. Otherwise, the thrust would deform the blade profile and lower propulsion efficiency.

Composites are hard to beat when it comes to dependable drone materials. Drones must be able to connect to ground stations via satellite or wireless communications as they are unmanned aircraft. Composites can be made to pass some electromagnetic frequencies while absorbing others. They are therefore frequently employed to build weather-proof, structural enclosures that shield the broadcast and receive antennas.

New dimension to manufacturing

Additive manufacturing (3D printing) has also transformed how drones are built by enabling lightweight and robust structures. Using 3D printing, companies can produce complex geometries for drone components that optimise performance and reduce weight. For instance, nano drones leverage 3D-printed frames made from advanced composites, ensuring durability without compromising agility.

However, additive manufacturing also enables part consolidation and the creation of tight packaging of

subcomponents, which are two further ways that 3D printing might reduce drone weight. For instance, there are heavy and time-consuming components that make up a fan in a ducted cooling system. This fan can be reduced to a single component using design for additive manufacturing. Nevertheless, the advantages extend beyond design. Manufacturers can now maximise the mass of UAVs thanks to this capability.

Additionally, additive printing speeds up prototyping, enabling quick design testing and improvement. This flexibility is essential for meeting the ever-changing needs of surveillance and logistics applications.

Production procedures have been reduced by automation and robotics, guaranteeing efficiency and uniformity. Robotic systems in assembly lines allow for exact component integration, which lowers human error and improves quality control. For logistics drones produced in bulk, where precise construction is essential for payload stability and flying efficiency, this is especially crucial.

A key component of contemporary operations is digital transformation. Digital twins save time and money by simulating and optimising drone performance

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BQLM2100-QR	3/8"	10-100	0.5	435	32	1.04
BQLM3150-QR	1/2"	10-150	1	478	42	1.05
BQLM3220-QR	1/2"	20-220	1	507	42	1.16
BQLM3350-QR	1/2"	50-350	2	567	42	1.34
BQLM3400-QR	1/2"	40-400	2	690	42	1.36

Mini Size for BQLM-QR

Item no.	Square Drive	Torque Range N.m	Increment N.m	Length mm	Width mm	Weight kg
BQLSM15-QR	1/4"	0.5-5	0.05	217	28	0.3
BQLSM110-QR	1/4"	2.0-10	0.1	227	28	0.32
BQLSM125-QR	1/4"	3.0-25	0.2	265	28	1.33
BQLSM225-QR	3/8"	3.0-25	0.2	265	28	1.35



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BMH9100-QR	9 X 12	10-100	0.5	445.5	22	1.04
BMH14150-QR	14 X 18	10-150	1	460	32	1.05
BMH14220-QR	14 X 18	20-220	1	481	32	1.16
BMH14350-QR	14 X 18	50-350	2	544	32	1.34
BMH14400-QR	14 X 18	40-400	2	665	32	1.36

Mini Size for BMH-QR

Item no.	Shank size mm	Torque Range N.m	Increment N.m	Length mm	Width mm	Weight kg
BMH955-QR	9 X 12	0.5-5	0.5	200	22	0.32
BMH9105-QR	9 X 12	2.0-10	0.1	210	22	0.33
BMH9255-QR	9 X 12	3.0-25	0.2	248	32	0.35

Note: Due to the product improvement, the technical parameters are subject to variation, please refer to the actual production from the factory.



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in a variety of circumstances, spotting possible problems before they are physically manufactured.

Using IoT-enabled sensors, Industry 4.0 concepts also make it possible to monitor manufacturing processes in real-time, guaranteeing that strict quality standards are met. Given that logistics drones frequently operate in harsh settings, this functionality is essential for ensuring reliability.

Drones are used in the military for a variety of purposes, such as reconnaissance, target acquisition, surveillance, and intelligence gathering. Additive manufacturing could be very helpful in these endeavours.

As the military increasingly depends on UAVs to complete missions, on-demand manufacturing and repair could become essential. In a location where distribution is challenging or in a scenario where speed is crucial, they could need a drone or spare parts like the propeller soon. Local manufacture made possible by additive manufacturing, maybe the most dependable and expedient buying strategy in this instance.



In the production of drones, sustainability is becoming more and more important. Energy-efficient procedures and material recycling are examples of eco-friendly activities that are increasingly commonplace.

Making efficient drones

Artificial intelligence (AI) and machine learning are essential to the production and use of drones. Machine learning algorithms evaluate sensor data throughout production to forecast maintenance requirements and boost workflow effectiveness. Through autonomous navigation and real-time decision-making and AI improves drone performance after manufacture, allowing for smooth operation in challenging logistics situations.

In the production of drones, sustainability is becoming more and more important. Energy-efficient procedures and material recycling are examples of eco-friendly activities that are increasingly commonplace. To lengthen their lifespan and lessen their environmental impact, logistics drones are frequently built with modular components that are simple to repair or replace.

Nano drones are designed for accuracy and

maneuverability, which make them perfect for uses like environmental monitoring and spying.

These little UAVs have advantages. Cutting weight without sacrificing structural integrity is possible with advanced materials. Electronics that are smaller in size are high-performance features in a small form factor made possible by precision engineering. Modular design increases versatility by being easily modified or swapped out.

Drones for logistics meet the increasing need for dependable and effective delivery methods. Lifting payloads is made possible by advanced aerodynamics and lightweight materials, with the possibility of an enhanced capacity. Possessing long-range capabilities, the extended operations are made possible by high-efficiency propulsion systems, which make them perfect for inter-city logistics and deliveries. Even in difficult terrain, autonomous navigation with AI-driven technologies guarantees safe and effective operations.

The drone business is dedicated to expanding the capabilities of unmanned aerial vehicles. The goal is to establish new standards for UAV performance and dependability by consistently investing in cutting-edge manufacturing technologies. The goal is to develop drones that not only satisfy present demands but also foresee those of the future.

Drones are at the vanguard of innovation as the world transitions to a more automated and connected future, enabling companies to take advantage of possibilities and overcome obstacles. Advanced manufacturing demonstrates its potential to revolutionise businesses and provide significant solutions in a variety of fields through nanotechnology and logistics drones.

Drones must fulfil the requirements. Many businesses that provide goods and services in the aerospace sector strive to obtain certifications since the industry has a set of design and production standards that promote strong confidence in the UAVs dependability.

SME



About the author:

Rama Krishna, with a strong foundation in aeronautics, specialises in structural and experimental aerodynamics. Over time, he has broadened his expertise to include operations, legal, and finance, playing a pivotal role in the inception and growth of EndureAir. An alumnus of IIT Kanpur with a Bachelor's and Master's in Aerospace

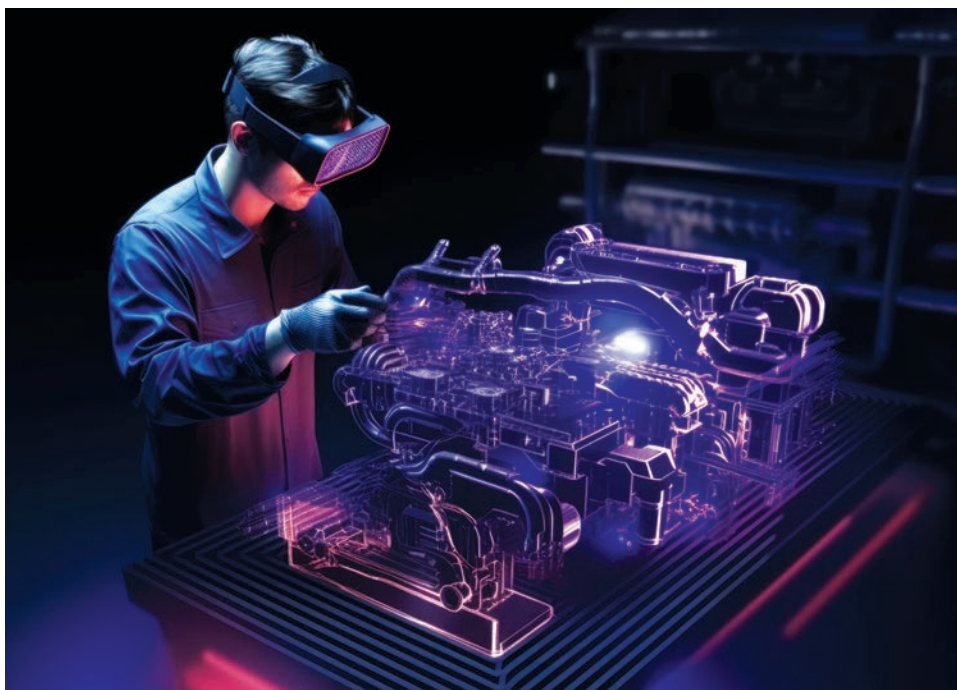
Engineering. Before its establishment, Rama worked in a research group led by Dr Abhishek, Director, EndureAir, focusing on wind tunnel research and drone performance enhancement. This collaboration included consulting for defence organisations, private companies, and DRDO labs. Since joining the group in 2016, Rama gained entrepreneurial experience by addressing R&D gaps for partner organisations. This laid the foundation for EndureAir's business model, which provides customised solutions for aerospace and defence.



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Skilling for Bharat, Scaling for the World

India's youth population is one of its greatest strengths. Yet, a gap in skill levels, access to training, and awareness of opportunities has kept this demographic from fulfilling its potential, comments, **Sabarinath C Nair, CEO, Skillveri.**



Source: Freepik

Building for Bharat has become a subject of frequent discussion in recent times, with the country's manufacturing sector poised for a huge leap. It is not just a strategy anymore, but it has become a necessity. It means creating solutions that solve real problems, even when the process is difficult. India has long been labelled a challenging market for technology adoption, but in the last 15 years, we have proven otherwise. From tier 2 and tier 3 towns to rural villages, users have shown an incredible ability to adapt to technology—provided it meets their needs and is designed with them in mind. This is a testament to one undeniable truth: if you build for the user, they will adopt it.

However, scaling these innovations remains a challenge in India, particularly for B2B products. Even when the need is clear and the solution is recognised as transformative, decision-makers often prioritise short-term savings over long-term value. And in our country,

predominantly training—a cornerstone for an efficient workforce, is frequently considered as a non-essential expense. This systemic mindset has far-reaching implications, especially in manufacturing and automotive sectors, where emerging technologies such as machine learning, automation, and smart manufacturing demand a skilled workforce to remain globally competitive.

The skill gap

India's youth population is one of its greatest strengths. Yet, a gap in skill levels, access to training, and awareness of opportunities has kept this demographic from fulfilling its potential.

Ironically, while demand for skilled labour surges, industries have often outsourced workers from countries like Peru and China to meet critical needs in infrastructure projects. This mismatch underscores a need to prepare India's youth for the evolving demands of modern industry.

The challenges extend beyond just technical skills. Conventional training methods often fail to keep pace with the needs of modern technology-driven workplaces. The amount of hands-on training given is also constrained by costs and availability of resources. There is a pressing need for innovative, scalable, and practical approaches to skill development that cater to industry requirements and are accessible to India's diverse population.

Extended Reality (XR)

Technology offers a transformative solution to

India's skilling challenges. Extended Reality (XR) and Virtual Reality (VR), commonly associated with entertainment, are now revolutionising technical and vocational education and training (TVET). By creating immersive and interactive simulations, XR facilitates experiential learning, making training more effective, engaging, and cost-efficient.

Benefits of XR:

Eco-friendly and cost-effective: XR training eliminates the need for consumables, reduces wastage, and optimises work efficiency.

Enhanced safety: Trainees practice in virtual environments, avoiding exposure to health hazards like fumes and pollutants.

Accelerated learning: XR shortens the transition from training to workforce readiness, equipping professionals with precision and confidence.

Detailed feedback: Real-time analytics and hand movement tracking enable comprehensive skill assessments, providing insights that traditional methods cannot match.



In industries like welding, spray painting, and HVAC repair, where precision is critical, XR delivers structured training that minimises risks, reduces rework, and ensures consistent quality.

In industries like welding, spray painting, and HVAC repair, where precision is critical, XR delivers structured training that minimises risks, reduces rework, and ensures consistent quality. It represents the most advanced method for workforce development, bridging gaps in skill and efficiency.

Multi skill XR labs can accelerate skilling capacity

Setting up skill development centres in tier 2 and tier 3 cities come with challenges like connectivity, power issues, and high costs of equipment. Multi-skill XR labs with portable and offline-capable XR devices have emerged as game-changers in addressing these issues. Multi-skill XR labs, shared by multiple users, provide scalable and cost-effective training platforms. With latest VR devices becoming available for almost the cost of mobile phones, and recent technical advancements in

immersive software, XR training has become accessible even in resource-constrained settings.

These labs enable industries to train workers across multiple or diverse skill sets without extensive infrastructure investment for each different skill module. By creating centralised hubs equipped with XR systems, industries and institutions can share resources, making training both economically viable and operationally efficient. These customisable XR labs ensure that training remains relevant to industry-specific needs, maximising impact and scalability.

Real-world success stories

A leading paint company in India successfully trained thousands of painters across Tamil Nadu and Karnataka using VR-based multi-skill simulation platforms. Compact VR headsets were transported directly to tier 2, tier 3, and rural locations, popularising mechanised painting and proving that technology can drive quick user adoption. This program, running successfully for over three years, demonstrates XR's potential to revolutionise skill development.

Similarly, XR has proven instrumental in industries where precision and safety are the most important. For instance, the automotive sector has adopted VR training to simulate assembly line tasks, enabling workers to practice complex operations without disrupting production. This approach not only enhances skills but also boosts productivity and reduces downtime.

While XR is still an emerging technology, its adoption for training and development is growing rapidly. From cost-effective simulations to enhanced safety and personalised learning opportunities, XR is poised to transform workforce development in India. However, to truly succeed, companies must go beyond rebranding imported products. India has the talent to create original solutions tailored to its unique market needs.

The journey of building for Bharat is not without its hurdles. This can be achieved when companies prioritise high-quality standards and robust products to succeed globally.

Solutions for Bharat can come only when founders set out to build with a true understanding of challenges and problems that are unique to the Indian scenario. Entrepreneurs will see their solutions adopted faster if it delivers meaningful value to the end user. Building products based merely on current trends or hypes will not be sustainable in the long run.

A solution built and tested against the demands of a diverse Indian market will no doubt be ready to be scaled globally, but it should also be ensured that they comply with rigorous international standards. Solutions based on technology like XR must be interoperable, user-friendly, and adaptable to diverse cultural contexts. By

embedding these principles into product development, Indian companies can position themselves as leaders in the global skill development ecosystem.

Future of XR in skill development

The potential of XR extends beyond current applications. Emerging technologies like Artificial Intelligence (AI) and the Internet of Things (IoT), when used in conjunction with XR, can create more intelligent and responsive training systems. AI-powered analytics can provide deeper insights into trainee performance, while IoT-enabled devices can simulate real-world scenarios with unparalleled accuracy.

Additionally, integrating XR into formal education systems can further expand its impact. Introducing XR-based learning modules in schools and colleges can nurture a generation of tech-savvy professionals ready to meet modern industry demands. This aligns with the government's vision of 'Digital India' and 'Skill India,' creating a cohesive strategy for national development.

Conclusion

India has the potential to become a global leader in skill development by harnessing technologies like XR to bridge skill gaps, modernise training, and empower its youth. By focusing on creating solutions tailored to local needs while maintaining global quality standards, India can transform its workforce and strengthen its position on the world stage.

As we continue to innovate, the developers should build for Bharat with the intent to scale for the world, keeping in mind the diverse and dynamic needs of our market. With XR and other emerging technologies at the forefront, India has the potential to lead the way in redefining skill development for a sustainable and inclusive future.

SME



About the author:

Sabarinath is a technology marketing specialist and a Virtual Reality enthusiast. After his education he moved to product management at Vortex, the world's pioneer in energy efficient Automated Teller Machines. Together with Kannan Lakshminarayan (Founder of Vortex and serial inventor in the mechatronics space), he founded Skillveri to solve

problems related to skilling, lack of a trustable score for hands-on skills, and scalable methods to train, and to use Metaverse XR and analytics to provide error-free dexterity to manufacturing industry. After starting up at IIT Madras, Skillveri has become the world's leading player in the Metaverse XR multi-skill simulation space and has won many awards including the National Innovations for Skills Challenge of NSDC, Ministry of Skill Development, Govt of India. Sabari is on the Prime Minister's Champions of Change panel on edtech & skills. He was also one of the panelists at the Manila Skill Experts Meetings hosted by International Training Center of ILO (United Nations).



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Industry–Academia–Govt Transforms MSMEs

Geographically, MSMEs are instrumental in promoting industrialisation in rural and semi-urban areas, thereby reducing regional disparities. These enterprises are fostering entrepreneurship, driving innovation, and contributing to the socio-economic development of communities, opines **Saravanam J, Chief Marketing and Communications Officer, Elfonze Technologies**.



Source: Freepik

The Micro, Small, and Medium Enterprises (MSMEs) sector forms the backbone of India's economic framework. With over 63 million enterprises, this sector not only drives growth but also addresses critical challenges such as employment generation, gender equality, workforce up-skilling, and the adoption of advanced technologies. The transformation of India's MSMEs highlights the importance of collaboration among industry, academia, and government, creating a robust ecosystem that fuels innovation, inclusivity, and global competitiveness.

A strategic triad industry, academia, and government

The growth trajectory of MSMEs has been profoundly shaped by structured initiatives that bridge the gap between education and industry demands. In earlier

years, diploma and ITI graduates would often walk from factory to factory with their resumes, searching for opportunities. This scenario has drastically changed with programs like the Skill Development Corporation and the National Apprenticeship Promotion Scheme (NAPS). These initiatives have laid the foundation for systematic skilling, enabling young talent to acquire job-specific competencies.

Academic institutions are partnering with MSMEs to provide hands-on training in emerging domains such as automotive, EV charging infrastructure, solar energy, electronics manufacturing, and smart factories powered by Industry 4.0 technologies. This collaboration is not limited to students—it extends to the existing workforce, equipping employees with the skills needed to thrive in a rapidly evolving industrial environment.

Empowering workforce and enhancing work environments

The MSME sector has undergone a paradigm shift in people management, focusing on employees as key contributors to organisational success. Progressive MSMEs now prioritise creating better work environments that include:

- Safety and security: Ensuring workplace safety and implementing policies to safeguard employee well-being.
- Comprehensive benefits: Offering competitive emoluments, health insurance, and retirement benefits to enhance financial security.
- Employee-centric facilities: Providing access to healthcare, housing assistance, and children's education facilities.

These measures enable employees to lead a dignified and decent life, fostering motivation and loyalty within the workforce.

Moreover, many MSMEs are embracing gender inclusivity by employing more women, especially on shop floors, and ensuring equitable opportunities for all. The inclusion of persons with disabilities and the adoption of diverse hiring practices further enrich

organisational culture. With a focus on continuous learning, reskilling, and upskilling opportunities, MSMEs empower employees to stay relevant in an era of rapid technological advancements, particularly in artificial intelligence (AI), machine learning (ML), and automation.



Many MSMEs are embracing gender inclusivity by employing more women, especially on shop floors, and ensuring equitable opportunities for all.

Sectoral diversification and emerging opportunities

India's MSMEs are thriving across a wide spectrum of industries, from traditional manufacturing to innovative technology. The aerospace and defence sectors have





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opened new avenues for MSMEs to innovate with specialised components and prototypes. Similarly, the rapid growth in EV battery technologies, solar energy, and advanced electronics is creating opportunities for MSMEs to contribute to the global supply chain.

The space technology sector is another promising frontier. Engineering students and MSMEs are collaborating to develop novel solutions, supported by government incentives for research and development. Meanwhile, advancements in testing and manufacturing capabilities, such as state-of-the-art test benches and labs, enable MSMEs to compete globally. These innovations are not only attracting investments but also generating thousands of jobs for India's youth.

Economic contributions and workforce empowerment

The MSME sector's contribution to India's economy is undeniable. It accounts for approximately 30 per cent of GDP, 45 per cent of industrial output, and nearly 45 per cent of total exports. With over 113 million individuals employed, MSMEs are the second-largest job creators after agriculture, playing a crucial role in reducing unemployment and alleviating poverty.



The MSME sector's contribution to India's economy is undeniable. It accounts for approximately 30 per cent of the nation's GDP.

Geographically, MSMEs are instrumental in promoting industrialisation in rural and semi-urban areas, thereby reducing regional disparities. These enterprises are fostering entrepreneurship, driving innovation, and contributing to the socio-economic development of communities. By addressing critical aspects such as workplace safety, fair wages, housing, and healthcare facilities, MSMEs ensure a motivated workforce that drives productivity and innovation. When employees feel secure and valued, their contributions to organisational success and development multiply.

Building a future-ready ecosystem

The future of India's MSMEs lies in their ability to adapt and innovate. Industry, academia, and government must continue to work in tandem to build an ecosystem that supports resilience and sustainability. Emerging technologies like AI, ML, and automation should be

embraced not as challenges but as opportunities to innovate and upskill. Students entering the workforce must prioritise acquiring relevant skills and exploring industries poised for sustained growth. Lifelong learning will be crucial, as the industrial landscape evolves with new technologies and market demands.



The future of India's MSMEs lies in their ability to adapt and innovate. Industry, academia, and government must continue to work in tandem to build an ecosystem that supports resilience and sustainability.

Gender inclusivity, workforce diversity, and a culture of continuous learning will remain central to MSMEs' success. By nurturing safe, equitable, and growth-oriented workplaces, the sector can unlock its full potential, driving productivity and innovation. India's MSME sector is at the forefront of the nation's economic and social transformation. Through strategic collaboration between industry, academia, and government, MSMEs are addressing critical challenges, creating opportunities, and driving innovation. These enterprises are not just contributing to GDP and exports but are also shaping a future marked by inclusivity, resilience, and global competitiveness.

With the right policies, investments, and partnerships, the MSME sector is poised to propel India into a new era of sustainable growth and technological leadership. This collective vision and effort ensure India's MSMEs remain the backbone of its economy and a beacon of opportunity in the global marketplace, offering millions of Indians the chance to lead decent, dignified, and fulfilled lives.

SME



About the author:

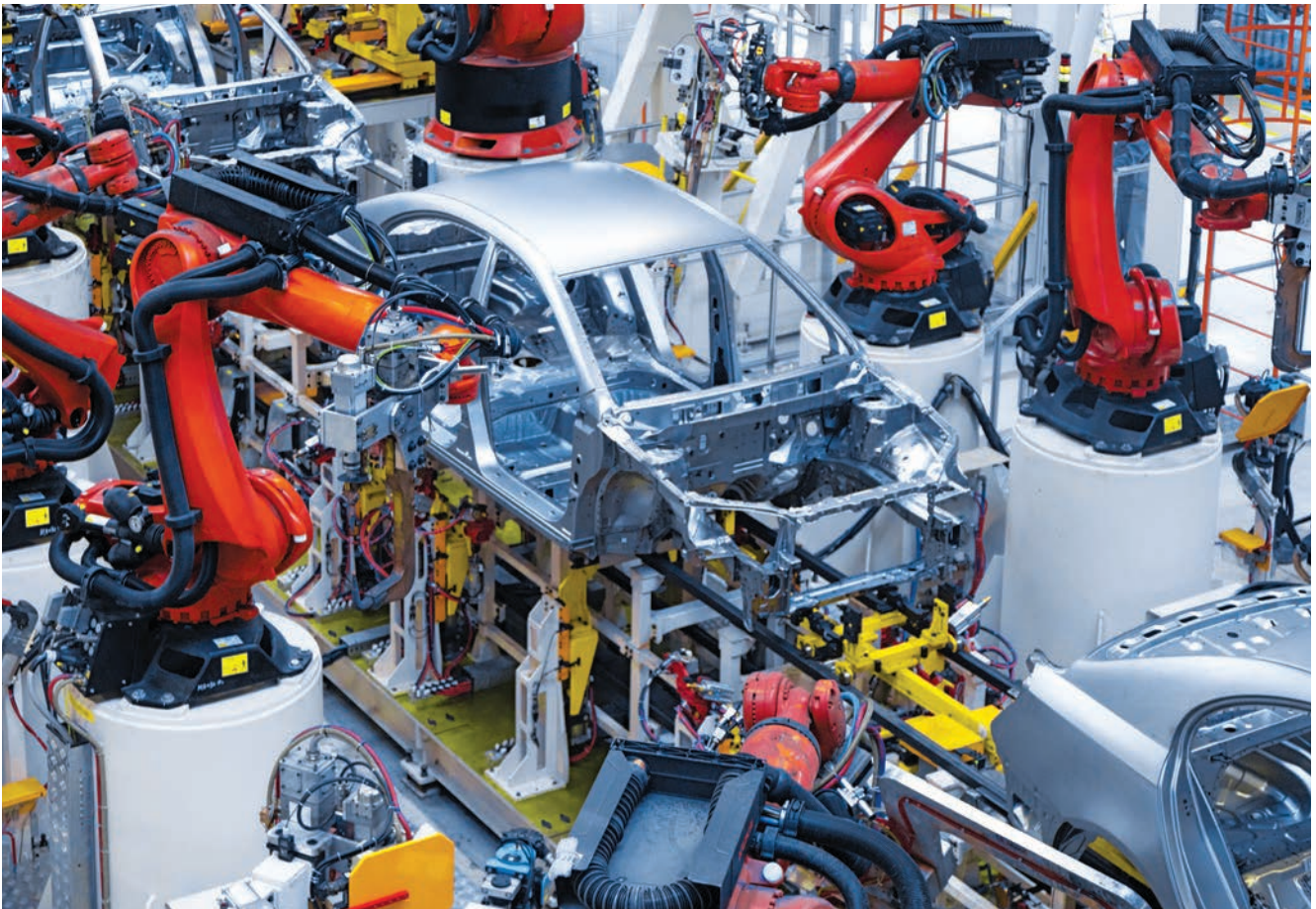
Saravanam J is a seasoned B2B media professional with over 30 years of experience across various industries, including electronics, IT, automotive, textile, and engineering. Currently serving as the Chief Marketing and Communication Officer at Elfonce Technologies in Bengaluru, he has developed a strong expertise in brand development, corporate communication, and strategic marketing. Throughout his career, he has successfully led initiatives that bridge the gap between technology and business.



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Transforming Industrial Production Landscape

The industry is seeing a significant shift toward circular economy principles, with manufacturers developing technologies that support the processing of recycled materials and the production of sustainable packaging solutions, remarks **Khushboo Doshi, Managing Director, Rajoo Engineers Limited.**



Source: Freepik

The manufacturing landscape is undergoing a profound transformation, driven by technological innovations that are reshaping how we conceptualise, implement, and optimise production processes. This shift is no longer a matter of choice but a necessity for staying competitive in a dynamic global landscape. As we navigate this evolution, understanding the intersection of automation, sustainability, and digital integration becomes crucial for staying competitive in the global market.

Evolution of manufacturing processes

Traditionally, manufacturing relied on conventional setups with multiple stages and extensive human involvement, leading to longer lead times and increased chances of inaccuracies.

However, modern manufacturing has undergone a seismic shift, embracing automation across the entire production chain, from metallurgy and component design to machining and final assembly. This transition has significantly reduced manual

intervention, enhancing both accuracy and consistency. Modern manufacturing setups are advancing toward paperless shop floors, which not only reduce production lead times but also improve efficiency and reliability. This evolution enables manufacturers to meet stringent global standards and exceed customer expectations.

Dawn of Industry 4.0 and smart factories

The rise of Industry 4.0 is driving the transformation of manufacturing into a digital ecosystem characterised by interconnected systems and real-time data analytics. Smart factories go beyond automation, integrating technologies that enable seamless communication between machines, predictive maintenance, and automatic optimisation of production parameters.

Paperless operations, where digital systems handle everything from design specifications to quality control, have become the norm. These advancements have achieved remarkable improvements in precision, up to 100 times better than conventional methods, while significantly reducing human errors and lead times.

Role of automation and robotics in manufacturing

Automation is redefining manufacturing processes by enhancing efficiency, reducing costs, and ensuring precision. Automated machinery integrated with advanced control systems ensures consistent quality and performance. Real-time monitoring features allow for immediate adjustments, optimising output and ensuring products meet industry demands for accuracy and reliability.

For instance, the use of precision-driven metrology tools like Coordinate Measuring Machines (CMM) enables manufacturers to verify geometric relationships and dimensions with exceptional accuracy. These innovations ensure seamless assembly of components while maintaining the highest quality standards.

Looking ahead, integrating robotics into manufacturing processes will further enhance efficiency, reduce human intervention in repetitive tasks, and improve workplace safety.

Sustainable manufacturing and cybersecurity concerns

Sustainability has become a central focus in advanced manufacturing, with innovations directed toward reducing environmental impact while maintaining high performance.

Modern production systems are being designed with energy efficiency in mind, incorporating features that optimise resource utilisation and minimise waste generation.

The industry is seeing a significant shift toward circular economy principles, with manufacturers developing technologies that support the processing of recycled materials and the production of sustainable packaging solutions. This evolution isn't just about environmental responsibility, it's becoming a crucial factor in maintaining competitiveness in a market increasingly driven by sustainability concerns.

The integration of connected devices in manufacturing has brought cybersecurity to the forefront. Cyberattacks and data breaches can disrupt operations and compromise sensitive information. To mitigate these risks, manufacturers must establish robust IT infrastructure and proactive cybersecurity protocols.

Maintaining trust with stakeholders and ensuring uninterrupted operations in a digitalised manufacturing environment requires a dedicated IT team and secure data management practices. Protecting intellectual property and operational data is vital for maintaining a competitive edge.

Trends and challenges

As manufacturing adopts advanced technologies, the workforce must evolve in tandem. Training programs in robotics, AI, and machine learning are essential to equip employees with the skills needed to operate sophisticated systems.

Globalisation presents opportunities and challenges. Manufacturers must balance the demand for higher production volumes with the need for quality assurance and cost competitiveness.

The 'China Plus One' strategy exemplifies the shifting dynamics of global supply chains. The successful integration of advanced technologies requires careful planning and investment. Manufacturers must align their technological upgrades with long-term strategic objectives while balancing costs and benefits.

The successful adoption of advanced manufacturing technologies requires a structured approach centred on four pillars:

1. **Assessment and planning:** Evaluate existing capabilities, identify areas for enhancement, and develop a roadmap with measurable goals.
2. **Infrastructure development:** Upgrade network capabilities, establish robust data collection mechanisms, and implement comprehensive security protocols.
3. **Workforce development:** Train employees, recruit skilled talent, and foster a culture of continuous learning and innovation.
4. **Phased implementation:** Test technologies with pilot projects before scaling successful implementations across the organisation.

India's path to manufacturing excellence

India's manufacturing sector is at a crossroads where embracing automation, robotics, and AI is essential to scaling operations and meeting global expectations. The shift in global supply chains, driven by multinational corporations, presents a unique opportunity for India to position itself as a key player onto the global stage.

However, achieving this requires addressing productivity gaps, quality assurance, and cost competitiveness.

Advanced technologies play a pivotal role in addressing these challenges:

- **Productivity enhancement:** Automation and robotics streamline processes, reducing production times and increasing output.
- **Consistency and quality assurance:** Precision-driven systems ensure uniformity in production, minimising variations and defects.
- **Error minimisation and cost reduction:** Real-time monitoring and automated adjustments lower operational errors, leading to significant cost savings.
- **Workplace safety:** Robotics can perform hazardous tasks, ensuring a safer environment for workers.

This methodical approach ensures that technological investments deliver tangible business value while minimising risks.

Conclusion

Advanced manufacturing technologies signify a fundamental shift in industrial production. The integration of automation, robotics, AI, and digital tools has created robust systems that are more efficient, flexible, and sustainable than ever before.

For India and the global manufacturing sector, adopting these technologies is no longer optional, it is imperative for achieving growth, maintaining competitiveness, and meeting the burgeoning challenges of the evolving Indian market.

SME



About the author:

Khushboo Doshi, the Managing Director at Rajoo Engineers Limited, joined the company in 2007, infusing her expertise as a second-generation entrepreneur. Initially appointed as the Head of Marketing and Communications, Doshi showcased cross-functional proficiency in marketing, corporate branding, PR, and communications strategy. Notably,

her role as the Product Manager for Rajoo's foam machinery business saw her introducing innovative concepts and fostering key stakeholder collaborations. Khushboo's contributions were recognised with the esteemed award of Best Performing Female Entrepreneur at PLASTINDIA 2018, marking her significant impact and leadership within the Indian Plastics Industry.

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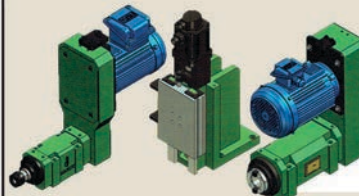
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Strategies to Achieve Manufacturing Success

The Indian manufacturing sector's success depends on effective company strategies and supportive government policies. With the China Plus One trend, many global companies are exploring alternative manufacturing destinations, opines **Prashant Sinha, Head- Marketing, WIKA India.**

India's manufacturing sector holds huge potential to strengthen its domestic economy and establish itself as a leading player in global supply chains. The country is uniquely positioned to capitalise on these changes as the world undergoes significant economic and geopolitical shifts, particularly with the rise of the China Plus One strategy.

In India, 'Make in India' was launched in 2014 with an aim to transform the manufacturing landscape of the country. Achieving this goal requires the support of four key pillars that drive success: company strategies & government policies, green manufacturing, emerging manufacturing technology, and effective people management.

Policies for a resilient nation

The Indian manufacturing sector's success depends on effective company strategies and supportive government policies. As global dynamics shift, India faces challenges and opportunities in a volatile, uncertain, complex, and ambiguous (VUCA) world. With the China Plus One trend, many global companies are exploring alternative manufacturing destinations. India can capitalise on this shift by establishing a robust manufacturing environment.

To compete globally, companies must prioritise research and development (R&D) investments to foster innovation and build technological capabilities. The Indian government's initiatives, such as the Production-Linked Incentive (PLI) Scheme, encourage investments in high-tech industries, directly supporting R&D and



Source: Freepik

innovation. Industries like electronics, pharmaceuticals, and solar energy are seeing increased investment due to these initiatives.

It is also important that India's manufacturers must meet global quality standards to ensure competitiveness in foreign markets. Ensuring product consistency, reliability, and safety through rigorous quality management systems is essential for export readiness. Companies in sectors like instrumentation, automotive, textiles, and consumer goods are increasingly required to adhere to international certifications (ISO, CE, UL) to gain credibility in global markets.

The Indian government has streamlined export procedures, reduced regulatory hurdles, and enhanced trade relations with key markets. Government policies like the Atmanirbhar Bharat (Self-Reliant India) initiative encourage local production and reduce import reliance, complemented by tax incentives, subsidies, and

industrial corridors to improve infrastructure. Regulatory reforms, such as simplifying the Goods and Services Tax (GST) and labour law reforms, create a more business-friendly environment, helping businesses to reduce their operational costs and increase competitiveness.

Green energy integration

As global environmental concerns grow, sustainable manufacturing practices are crucial for India to stay competitive in the global market, where consumers and regulators demand sustainably produced products. Global buyers are increasingly scrutinising the environmental impact of their purchases. Therefore, to stay competitive, Indian manufacturers must invest in energy-efficient technologies and practices that reduce resource consumption.

Renewable energy sources like solar and wind are central to India's industrial strategy. Manufacturing units that utilise renewable energy sources reduce their carbon footprint and benefit from government initiatives promoting green energy. Energy-efficient technologies lower production costs and increase the appeal of Indian-made products in markets where sustainability is

a key purchasing criterion. India's abundant renewable energy resources offer significant opportunities for manufacturers to reduce dependency on traditional energy sources while contributing to the country's climate goals.

The government encourages manufacturers to design recyclable and refurbishable products, reducing raw material consumption and promoting waste reduction, creating new business opportunities and driving innovation in material sourcing and waste management. Similarly, companies involved in the manufacturing of measuring instruments are focused more on sustainability and ensure that their products like pressure gauges, transmitters and more, do not harm the environment.

Industry 4.0 in focus

The fourth industrial revolution, or Industry 4.0, is rapidly transforming manufacturing globally. Embracing automation, digital technologies, and data analytics is central to improving efficiency, quality, and productivity in manufacturing processes. Indian manufacturers are increasingly adopting robotic process automation (RPA) and collaborative robots (cobots) to streamline



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production and reduce labour costs while enhancing precision and throughput.

The Indian government is also playing a critical role by incentivising automation adoption in key industries such as measurement instrumentation, textiles, and electronics to boost manufacturing output. Moreover, the rise of digital technologies, such as the Internet of Things (IoT), big data analytics, artificial intelligence (AI), and machine learning (ML), is reshaping manufacturing operations. Digitalisation allows manufacturers to optimise processes, reduce downtime, and improve product quality by integrating smart systems and real-time data monitoring.



It is also important that India's manufacturers must meet global quality standards to ensure competitiveness in foreign markets. Ensuring product consistency, reliability, and safety through rigorous quality management systems is essential for export readiness

Workforce excellence

A highly skilled and capable workforce is essential for the successful future of India's manufacturing sector. To thrive in an Industry 4.0-driven environment, workers must be equipped with the necessary skills. Addressing the significant skill gap, especially in sectors undergoing digital transformation, is crucial. The government has launched initiatives like Skill India to train millions of youths, focusing on industry-relevant skills such as robotics, automation, AI, and 3D printing. These efforts are vital for improving youth employability, reducing the skill gap, and driving innovation. Companies are also encouraged to establish in-house training programs to continually upgrade employee skills, ensuring competitiveness in an evolving industrial landscape.

Collaboration between industry and academia helps bridge the skill gap and foster innovation. Aligning educational curricula with industry requirements ensures that graduates across the country have the knowledge and skills needed to excel in advanced manufacturing environments. Industry partnerships with universities and technical institutions are critical

for driving research, innovation, and the development of new technologies. Many Indian universities have begun partnering with manufacturing companies to offer specialised courses focusing on emerging technologies such as Industry 4.0, AI, and IoT, preparing students for real-world manufacturing challenges.

Promoting diversity, particularly the inclusion of women in the workforce, is also key to the success of the Make in India initiative. A diverse workforce fosters innovation and creativity, leading to better decision-making and higher levels of creativity. Programs encouraging women in STEM are essential for creating a dynamic workforce. Companies promoting gender equality and inclusivity can attract a wider talent pool, improve employee morale, and enhance organisational performance, ensuring that the manufacturing sector remains adaptable and competitive in the global market.

Conclusion

India's potential to become a global manufacturing hub depends on its ability to capitalise on the strategic pillars of the Make in India initiative. By focusing on sound company strategies, government policies, and innovation, India can strengthen its manufacturing base and expand its role in global supply chains. The integration of green manufacturing practices will not only enhance sustainability but also the competitiveness, helping Indian manufacturers meet global standards.

Additionally, adopting advanced manufacturing technologies, such as automation, AI, and 3D printing, will drive operational efficiency and product quality. A skilled and adaptable workforce equipped through continuous training and industry-academia collaboration will support this transformation. By focusing on these critical areas, India can build a robust, sustainable, and competitive manufacturing ecosystem that will secure its place as a global leader in manufacturing for the future.

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About the author:

Prashant Sinha is a marketing communications professional with a career spanning over 17 years of cross-functional and cross-industry experience. With his career progression from Happersberger otopront GmbH to Socomec Innovative power solutions, he has garnered an in-dept expertise in the sectors of Process Instrumentation and Power Electronics

Industry for products such as Uninterruptible Power Supply, Transfer switches, Solar Switches, Energy Efficiency products and Medical Equipment. In his current role at WIKA India, he is heading the marketing division of the company for EMEA & INDIA Region, exhibiting multi-faceted operational capabilities that include designing and executing strategic marketing and communication plans for the company. He plays a pivotal role in the company's new Product Development, Trade Marketing, Pricing, Market Research & Integrated Marketing Communications, Event Management, Brand Management & Public Relations.



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Empowering the Solar Industry

The adoption of advance technologies such as automation, robotics, digitalisation, Industry 4.0, 3D printing, and artificial intelligence is revolutionising solar panel manufacturing and installation processes, **opines Tanmoy Duari, CEO, Axitec Energy India Pvt Ltd.**



Source: Freepik

India's solar energy sector has emerged as a vital component of the country's energy future, contributing significantly to the global transition towards clean energy. As the world continues to grapple with the dual challenges of climate change and energy security, India is positioning itself as a leader in the solar industry. With the Indian government's ambitious renewable energy targets and the rising global demand for clean power, the solar energy sector has entered a new phase of opportunity.

The theme of 'Making in India for the World' resonates deeply in this context, as it reflects India's potential to not only cater to domestic needs but also lead global efforts towards sustainable energy solutions. This article delves into the right strategies, government policies, green manufacturing, advanced technologies, and people management that are driving the growth of India's solar energy sector, and why these factors are essential for creating a robust, globally competitive industry.

VUCA challenge and China Plus One

In a volatile, uncertain, complex, and ambiguous (VUCA) world, industries across the globe face unprecedented challenges. For the solar energy sector, this means dealing with fluctuating raw material prices, geopolitical tensions, technological disruptions, and shifting regulatory environments. However, in the midst of this turbulence, India finds itself in a unique position, thanks to the 'China Plus One' strategy adopted by many global companies seeking to diversify their supply chains.

The 'China Plus One' strategy refers to companies looking beyond China as the sole manufacturing hub, in search of alternative manufacturing locations. India, with its robust industrial base, skilled workforce, and government-backed initiatives, has emerged as an ideal alternative. To capitalise on this opportunity, Indian solar companies must adopt the right strategies in several key areas:

1. **Research & development (R&D) and innovation:** In the fast-evolving solar energy market, innovation is

the key to staying competitive. Indian solar companies must prioritise R&D to develop cutting-edge technologies, improve solar panel efficiency, and create new materials that enhance energy generation. Innovations in solar storage systems, bifacial modules, and thin-film technologies can significantly enhance the value proposition of Indian solar products in the global market.

2. **Quality assurance:** As the global market for solar energy expands, maintaining high-quality standards is crucial. Indian companies need to adopt international quality certifications and best practices to ensure their products meet the stringent demands of global markets. This not only helps in building a strong brand reputation but also ensures long-term sustainability.
3. **Exports:** To strengthen India's position as a solar manufacturing hub, it is essential to focus on export strategies. The government's push for 'Atmanirbhar Bharat' (self-reliant India) provides an impetus for solar companies to scale up production and explore global markets. Additionally, forging strategic partnerships with countries and participating in international forums can facilitate the export of Indian-made solar technology.
4. **Safety, government incentives, and regulations:** Government policies play a critical role in the success of the solar energy sector. India has introduced several incentives to promote solar power generation, including subsidies, tax breaks, and support for setting up manufacturing units. For instance, the Production-Linked Incentive (PLI) Scheme has been designed to make India a global hub for solar panel manufacturing. Additionally, ensuring the safety of manufacturing processes, installation, and operations is paramount. Stringent safety regulations, along with ongoing training and skill development, will enhance industry standards.

Paving the way for sustainability

Sustainability is at the core of India's vision for a cleaner, greener future. In the manufacturing sector, this translates to adopting green manufacturing practices that minimise environmental impact and foster a circular economy. The solar energy industry is uniquely positioned to embrace sustainability as it directly contributes to the reduction of carbon emissions by harnessing solar power, a clean and renewable energy source.

Key elements of green manufacturing include:

1. **Reducing carbon footprint:** Solar manufacturing processes need to reduce their carbon emissions by adopting cleaner energy sources and implementing energy-efficient practices. This includes optimising

production techniques, improving the energy efficiency of factories, and transitioning to renewable energy sources for manufacturing.

2. **Circular economy:** The concept of a circular economy focuses on recycling, reusing, and reducing waste. In solar manufacturing, this could involve designing solar panels with longer lifecycles, facilitating the recycling of old panels, and using sustainable materials in production. By doing so, companies can minimise waste, reduce environmental impact, and create a more sustainable supply chain.
3. **Waste management and resource efficiency:** Efficient use of raw materials and waste reduction techniques in the manufacturing process can lower costs and reduce the strain on natural resources. Innovations in product design and manufacturing methods can lead to less waste and more efficient resource use, ensuring that solar energy remains a sustainable solution for generations to come.

Driving the future of solar energy

The integration of advanced manufacturing technologies is transforming the solar energy sector, enabling companies to streamline operations, improve efficiency, and maintain competitiveness on the global stage. The adoption of cutting-edge technologies such as automation, robotics, digitalisation, Industry 4.0, 3D printing, and artificial intelligence (AI) is revolutionising solar panel manufacturing and installation processes.

1. **Advanced automation and robotics:** Automation and robotics are critical in enhancing production efficiency and minimising human error in solar manufacturing. Automated assembly lines, precision robotics, and automated testing systems can improve throughput, reduce labour costs, and maintain consistent product quality.
2. **Digitalisation and industry 4.0:** Industry 4.0 refers to the integration of digital technologies into the manufacturing process, enabling real-time data monitoring, predictive maintenance, and optimisation. By leveraging Internet of Things (IoT) devices, data analytics, and cloud computing, solar companies can create a smart, connected manufacturing ecosystem that enhances productivity, reduces downtime, and ensures quality control.
3. **3D printing/additive manufacturing:** 3D printing has the potential to revolutionise solar panel design and manufacturing. This technology allows for rapid prototyping, custom designs, and the production of complex, lightweight structures that traditional manufacturing methods cannot achieve. This can lead to significant advancements in solar panel efficiency and cost reduction.

4. **Artificial intelligence and machine learning:** AI and machine learning algorithms can optimise solar panel manufacturing by analysing vast amounts of data in real-time. From predicting defects to streamlining supply chain logistics, AI can make solar manufacturing more intelligent, efficient, and cost-effective.

Empowering the workforce

The success of India's solar energy sector depends not only on advanced technologies and strategic policies but also on a skilled and empowered workforce.

1. **Skill development and upskilling:** The solar energy industry requires a highly skilled workforce capable of handling sophisticated manufacturing processes, advanced technologies, and large-scale installations. It is essential for both the government and private sector to invest in training and upskilling programs to equip the workforce with the necessary skills to meet the sector's growing demands.
2. **Industry-academia collaboration:** Collaboration between industry players and academic institutions is essential for fostering innovation and research. Universities can play a key role in developing new

materials, improving solar technologies, and supporting the next generation of engineers and scientists.

3. **Diversity and women in manufacturing:** Encouraging diversity in the workforce, particularly by increasing the participation of women in manufacturing roles, is a crucial step towards creating a more inclusive and innovative solar energy sector. Gender-balanced teams have been shown to foster collaboration, and better decision-making.

Making India a global solar hub

By continuously evolving and adapting to the challenges and opportunities presented by the VUCA world, India's solar sector can light the way to a cleaner, more sustainable future.

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About the author:

Tanmoy Duari is an accomplished leader with over two decades of expertise in the power generation and renewable energy industry. He has spearheaded the company's remarkable growth and success in India's renewable energy sector. Duari also brings a wealth of international experience, having worked at Axitec Energy GmbH & Co. KG in Germany.


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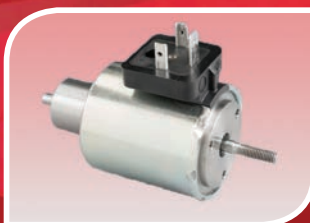
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Revitalising Core Engineering to Boost Manufacturing

To truly emerge as a global manufacturing hub, India must address these issues strategically. Core engineering disciplines—mechanical, civil, electrical, and chemical—are central to unlocking this potential, remarks **Neeti Sharma, CEO, TeamLease Digital**.



Source: Freepik

India is at a pivotal moment in its economic journey. As the world's most populous nation and a rapidly growing economy, our aspirations are bold—targeting a \$7 trillion economy by 2030. This goal is not just an economic benchmark; it reflects a broader vision of enhanced living standards, technological innovation, and global leadership. Achieving this vision hinges on manufacturing, a sector that has historically been a cornerstone of economic progress. From creating jobs to driving innovation, manufacturing remains critical to India's growth story. The question, however, is whether our current trajectory is sufficient to realise these ambitions.

resilience to meet dynamic global demands.

Currently, manufacturing contributes approximately 17 per cent to the GDP, with an ambitious goal to raise it to 21 per cent within the next 6-7 years. To achieve this, several measures and policies are being implemented, including the 'Make in India' initiative to attract foreign investment, Production-Linked Incentive (PLI) schemes to boost domestic manufacturing, and a focus on improving infrastructure, skilling programs, and research and development (R&D) capabilities. Initiatives like 'Make in India' and PLI schemes have laid a strong foundation. However, challenges such as skill gaps, outdated infrastructure, and underinvestment in R&D

India's demographic advantage, as one of the youngest nations globally, further amplifies its potential. With over 65 per cent of the population under the age of 35, India has a unique opportunity to prepare a future-ready workforce not only for domestic requirements but also for global manufacturing needs. This entails equipping talent with cutting-edge skills, fostering innovation, and building

persist. To truly emerge as a global manufacturing hub, India must address these issues strategically. Core engineering disciplines—mechanical, civil, electrical, and chemical—are central to unlocking this potential.

Core engineering

Core engineering fields form the backbone of India's industrial landscape. While emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and blockchain are driving modernisation, they rely on the foundational expertise provided by traditional engineering disciplines.

- **Mechanical engineering:** Central to the transition toward electric and autonomous vehicles, robotics, automation, and renewable energy systems.
- **Civil engineering:** Integral to designing sustainable urban spaces and infrastructure aligned with India's Smart Cities Mission.
- **Electrical engineering:** Enabling advancements in smart grids and renewable energy, contributing to clean energy goals.
- **Chemical engineering:** Essential for innovations in pharmaceuticals, petrochemicals, and sustainable manufacturing processes.

Despite growing demand, employability rates in core engineering fields remain concerning. For instance, mechanical engineering graduates show an employability rate of only 54.86 per cent, compared to 68.44 per cent in information technology (IT). This gap stems from several underlying factors, including a lack of exposure to industry-relevant technologies, insufficient practical training, and outdated curricula in many engineering programs. Addressing these challenges through targeted interventions is crucial to unlocking the full potential of core engineering talent. Bridging this gap requires urgent attention.

Bridging the skill gap

The skill gap in India's core engineering sector poses a significant challenge, threatening to limit the manufacturing sector's potential. Reports indicate that only about half of mechanical and civil engineering graduates are employable. This contrasts starkly with higher employability rates in IT and computer science, highlighting a disconnect between academic training and industry requirements.

Root causes include:

- **Outdated curricula:** Many engineering institutions fail to incorporate advancements like robotics, 3D printing, and green construction, leaving graduates unprepared for modern roles.
- **Limited academia-industry collaboration:** A lack of partnerships restricts access to hands-on

exposure, internships, and industry-driven projects.

- **Gender disparity:** Although women constitute over 50 per cent of STEM graduates, only 29 per cent join the workforce, limiting the talent pool further.

Solutions to bridge the gap:

1. **Revamp curricula:** Integrate Industry 4.0 technologies such as IoT, AI, and automation into engineering programs.
2. **Foster academia-industry partnerships:** Establish stronger collaborations to provide internships, apprenticeships, and exposure to real-world challenges.
3. **Promote gender diversity:** Implement mentorship programs, scholarships, and workplace policies that encourage greater participation of women.

India has the talent; it needs the frameworks to nurture and align it with industry demands. Addressing these gaps can position core engineering as a driving force for India's manufacturing resurgence.

Driving job creation

India's manufacturing sector is poised to create substantial employment opportunities, particularly in core engineering fields. According to estimates by the National Skill Development Corporation (NSDC), the sector is expected to generate 100 million jobs by 2030.

Key growth drivers include:

1. **Infrastructure development:** Large-scale projects like the Smart Cities Mission and mass housing schemes demand skilled civil, mechanical, and electrical engineers. For instance, the Smart Cities Mission alone involves an estimated project outlay of ₹2.05 trillion, with significant potential to generate thousands of engineering jobs. Additionally, mass housing initiatives aim to construct millions of affordable housing units, further boosting demand for expertise in core engineering disciplines. For instance, the Smart Cities Mission has an estimated project outlay of ₹2.05 lakh crore.
2. **Renewable energy:** India's target of 500 GW of renewable energy capacity by 2030 is driving demand for electrical engineers specialising in solar, wind, and smart grid technologies.
3. **Industry 4.0:** Emerging technologies are redefining roles, creating opportunities in automation engineering, digital manufacturing, and predictive maintenance. By 2025, 75 per cent of manufacturing jobs will require digital skills alongside traditional expertise.
4. **MSMEs as job creators:** Micro, Small, and

Medium Enterprises (MSMEs) account for 45 per cent of industrial output and employ 110 million people. These enterprises are fostering innovation and providing opportunities for engineers to work on technologies.

Competitive salaries, future-ready roles, and transformative projects are gradually shifting talent preferences back to core engineering, solidifying its importance in India's economic growth.

Preparing India for global needs

India, as one of the youngest nations globally, has a unique advantage in meeting global manufacturing talent requirements. With a median age of just 28 years, the country's demographic dividend is unmatched. However, leveraging this youthful workforce for global manufacturing demands requires focused strategies.

Steps to be taken to align Indian talent with global manufacturing:

- **Skill mapping for global standards:** Indian engineering programs must align their curricula with international benchmarks such as ISO, ANSI, and EU regulations. This ensures that graduates are equipped to work on global projects seamlessly.
- **Expanding apprenticeships:** Structured apprenticeships in collaboration with multinational corporations can bridge the gap between academic knowledge and practical skills. Germany's dual education system serves as a model for integrating classroom learning with hands-on training.
- **Focus on emerging sectors:** Global manufacturing is increasingly driven by clean energy, electric vehicles, and advanced robotics. Training initiatives should emphasise these areas to prepare Indian talent for high-demand roles internationally.
- **Government support for exportable talent:** Programs like 'Skill India' should include a focus on making Indian engineers competitive for overseas opportunities, addressing language skills, cultural adaptability, and advanced technical training.

Making India ready for global demand:

- **Global manufacturing demand:** The International Federation of Robotics projects a need for over 4 million industrial robots globally by 2030, requiring engineers skilled in robotics and automation.
- **India's exportable talent:** A 2023 report by NASSCOM highlights that India produces 2.5 times more STEM graduates annually than the US, indicating its potential to fill global skill

shortages.

- **Collaborative efforts:** Partnerships with countries like Japan and Germany under bilateral agreements have already opened pathways for Indian engineers to contribute to global manufacturing ecosystems.

By aligning its talent pool with global manufacturing requirements, India not only strengthens its position as a domestic manufacturing hub but also becomes a key player in addressing international skill shortages.

The path forward

India produces 1.5 million engineering graduates annually, yet only a fraction secures meaningful employment. The missing link is often the lack of upskilling and reskilling, which have become imperative in today's fast-evolving industries.

- **Upskilling:** Equips professionals with advanced expertise to excel in their current roles.
- **Reskilling:** Enables workers to transition to entirely new roles aligned with emerging technologies.

Some of the successful initiatives include:

1. **National Apprenticeship Promotion Scheme (NAPS):** Encourages industries to offer apprenticeships, bridging theoretical knowledge with practical experience.
2. **Short-term training programs:** Pradhan Mantri Kaushal Kendra (PMKK) centres offer industry-aligned courses in advanced manufacturing and green construction.
3. **Industry-led programs:** Companies have launched initiatives combining classroom learning with on-the-job training in areas like digital manufacturing and smart infrastructure.

Future trends:

- Engineers must acquire skills in robotics, IoT, and AI to remain competitive.
- Continuous learning programs ensure workforce agility and retention. Surveys reveal that 61 per cent of employees value upskilling for long-term career growth.

By prioritising these efforts, India can future-proof its workforce, ensuring sustainable growth and innovation in manufacturing.

Importance of gender diversity in engineering

Encouraging women to pursue careers in engineering can significantly enhance innovation and problem-solving capabilities in the sector. Despite comprising over 50 per cent of STEM graduates, women's workforce participation remains low.

Benefits of gender diversity:

1. **Diverse perspectives:** Gender-diverse teams are better at innovation and addressing challenges through a broader range of ideas.
2. **Enhanced product design:** Industries like automotive and healthcare benefit from inclusive engineering teams that cater to diverse consumer needs.

Initiatives to promote gender diversity:

- **Mentorship and scholarships:** Programs tailored to support women in engineering.
- **Workplace policies:** Flexible work arrangements and equal opportunities foster inclusion.
- **Role models:** Women in leadership positions inspire younger generations to pursue engineering careers.

By fostering diversity, the engineering workforce can unlock its full potential, contributing to equitable growth and innovation.

Conclusion

India's manufacturing sector is not just an economic imperative but a pathway to a more prosperous, equitable, and innovative society. The stakes are high, and the opportunities immense. With its young demographic, growing manufacturing sector, and a strategic focus on core engineering, the country has the potential to become a global manufacturing powerhouse. Through updated curricula, robust academia-industry partnerships, and targeted upskilling initiatives, India can bridge the skill gap and align its workforce with industry needs. Addressing gender disparities and fostering diversity will further strengthen our talent pool, creating a more inclusive and dynamic ecosystem.

Looking ahead, the synergy between traditional engineering expertise and emerging technologies holds the key to transforming India into a global manufacturing leader. As we navigate this crucial decade, the steps we take today will define our place in the global economic order. By embracing these challenges and opportunities, India can fulfil its vision of becoming not only a \$7 trillion economy but also a beacon of innovation, resilience, and sustainable growth for the world.

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About the author:

Neeti Sharma is a seasoned leader in the learning and staffing industry. Currently serving as the CEO of TeamLease Digital, Neeti has been a compelling leader in the TeamLease Services Group over the past 20 years, and has led multiple businesses including TeamLease EdTech and TeamLease Skills University - India's first Skills University. With over three

decades of experience, she guides the group companies with a clear focus on strategic growth and operational excellence. Recognised by HolonIQ as one of the 'Top 200 Women Founders in EdTech,' Neeti has played a significant role in shaping TeamLease's trajectory through various leadership roles.

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Logistics Drives the Manufacturing Dream

In the logistics world, safety isn't just about transporting goods carefully; it's about trust. Customers expect quality service, whether it's on-time deliveries, proper packaging, or safe handling of delicate items, states **Lancy Barboza, MD, Flomic Global Logistics**.



Source: Freepik

India's Make in India initiative is an ambitious goal to transform the country into a global manufacturing hub. But behind every successful manufacturing operation is a strong logistics industry that ensures goods are moved efficiently, safely, and cost-effectively. Logistics isn't just the backbone of manufacturing—it's the lifeline that keeps businesses running smoothly.

For India to achieve its manufacturing dreams, the logistics industry needs to grow stronger, smarter, and greener. This can be done by focusing on four key pillars: right company strategies & government policies, green logistics, advanced technologies, and people management.

1. Right company strategies & policies

In today's fast-changing world, where uncertainties (also called VUCA: Volatility, Uncertainty, Complexity, Ambiguity) are the norm, having the right strategies is crucial for any industry. Add to this the global shift towards the 'China Plus One' strategy, where businesses are looking for alternatives to China for manufacturing and logistics. India has a golden chance to step up, but it won't happen automatically. Both companies and the government need to work together and plan wisely.

Why strategy matters?

- R&D and innovation: Logistics companies need to

think ahead. How can routes be optimised? What new technologies can be adopted? Investing in research and finding innovative ways to move goods faster and safer will give businesses a competitive edge.

- **Quality and safety standards:** In the logistics world, safety isn't just about transporting goods carefully; it's about trust. Customers expect quality service, whether it's on-time deliveries, proper packaging, or safe handling of delicate items.
- **Export readiness:** With more Indian products going global, logistics companies need to be export-ready. This means understanding international trade rules, customs procedures, and handling global supply chain complexities.
- **Government incentives:** The government plays a big role in encouraging businesses to grow. Policies like the Production Linked Incentive (PLI) scheme and the National Logistics Policy are great examples. Companies need to understand and make the most of these incentives to expand their operations.
- **Infrastructure support:** From better highways to modern ports and dedicated freight corridors, the government's investments in infrastructure can make logistics faster and more efficient. But companies must align their strategies with these developments to fully benefit.

VUCA and China Plus One

In a VUCA world, businesses must be flexible and ready to adapt. For example, during the pandemic, companies that quickly adjusted to new ways of transporting goods survived better. Similarly, the China Plus One strategy offers India a chance to grab a bigger slice of global manufacturing. But without strong logistics, businesses won't be able to deliver on time, and opportunities might slip away.

Right strategies and policies aren't just about ticking boxes—they're about building a solid foundation for the future, where India becomes the first choice for global companies.

2. Green logistics

Sustainability is no longer a buzzword; it's a necessity. The logistics industry plays a big role in carbon emissions, especially with trucks and warehouses consuming large amounts of fuel and energy. Green logistics isn't just good for the planet—it's good for business too.

How logistics can go green

- **Cleaner transportation:** Switching to electric vehicles (EVs), hybrid trucks, or even exploring hydrogen fuel can make a huge difference in cutting



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- Eco-friendly warehouses: Using solar panels for energy, installing LED lights, and creating efficient storage systems can lower costs and reduce the environmental impact.
- Smart supply chains: Optimising delivery routes and using data to reduce empty runs can save time.
- Circular economy: Logistics can play a huge role in recycling and reusing materials. For example, companies can set up systems to bring back used packaging or repair goods instead of discarding them.

Going green isn't just about saving the environment, it's about future-proofing the logistics industry.

Customers are increasingly choosing companies that care about sustainability, and regulations are becoming stricter. By adopting green practices now, the logistics industry can stay ahead of the curve.

3. Advanced technologies

Technology is changing logistics faster than ever. From drones delivering packages to AI predicting supply chain disruptions, advanced technologies are making logistics smarter and more efficient.

Key technologies transforming logistics

- Automation and robotics: Automated sorting systems in warehouses, robotic arms for loading, and drones for delivery are speeding up processes while reducing human errors.
- IoT (Internet of Things): Devices like GPS trackers help logistics companies monitor shipments in real time. If a shipment gets delayed, companies can act immediately.
- AI and machine learning: These tools can analyse data to predict future trends, optimise inventory, and find the best delivery routes.
- 3D printing: Imagine needing a spare part urgently. Instead of waiting for it to ship, it can be printed at a nearby hub. This is the power of 3D printing in logistics.
- Blockchain: Blockchain ensures secure and tamper-proof documentation of shipments, making international trade smoother and more reliable.

Adopting these technologies isn't just about keeping up, it's about staying competitive in a fast-moving world.

4. People management

Behind every truck, warehouse, or technology system is a person making it all work. People are the heart of logistics. For India to truly excel in logistics, we need a skilled, motivated, and diverse workforce.

Key focus areas

- Skill development: Training programs under Skill

India can prepare workers for modern logistics roles. For example, a warehouse worker needs to learn how to use automated systems, and truck drivers need to understand fuel-efficient driving techniques.

- Upskilling: As technologies like AI and IoT become common, existing workers need training to adapt to these changes.
- Diversity and inclusion: Encouraging women to join the logistics workforce can bring fresh perspectives and bridge talent gaps. Creating safe and inclusive workplaces is crucial for this.
- Worker well-being: From safety protocols to mental health support, taking care of workers boosts productivity and loyalty.

Collaboration between logistics companies, educational institutions, and the government can create a workforce that's ready for the future.

Challenges and opportunities in logistics

Challenges

1. High costs: Logistics costs in India are among the highest globally, making goods more expensive.
2. Infrastructure gaps: While roads, ports, and railways are improving, there's still a long way to go.
3. Regulatory complexity: Different rules across states and long customs clearance times can slow things down.

Opportunities

1. Global realignment: With companies looking to move away from China, India has the chance to attract big investments.
2. E-commerce boom: Online shopping is growing rapidly, creating huge demand for fast and efficient logistics services.
3. Sustainability leadership: By going green, logistics companies can become leaders in eco-friendly supply chains.

Conclusion

By focusing on the four key pillars: right company strategies & government policies, green logistics, advanced technologies, and people management, the logistics sector can overcome its challenges and unlock its full potential.

SME



About the author:

Lancy Barboza is the Managing Director and Chief Executive Officer of Flomic Global Logistics Ltd, a position he has held since February 2020. Flomic has evolved from a simple freight forwarding venture in 1988 into one of India's preferred full-service, integrated logistics service providers. It is a successful global player of international repute in the multi-cargo, multi-surface logistics business.



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India Emerges as a Global Manufacturing Hub

As India's manufacturing sector focuses on export oriented manufacturing, integration of advanced technologies has become inevitable. The sector must explore the possibilities of employing solutions to improve efficiency, scalability, and quality, says **K L Bansal, CMD, DEE Development Engineers**.



Source: Freepik

India, which strives to achieve its ambitious goal of becoming a developed nation by 2047, is on a transformative journey to position itself as a global manufacturing powerhouse. The manufacturing sector, which contributes around 17 per cent to the GDP and provides employment to over 27 million workers, has emerged as a vital component of India's economic growth. To realise its vision for development and growth, India is leveraging advanced manufacturing technologies, fostering people-centric strategies, and creating a robust ecosystem for growth.

Major industries like automotive, engineering, chemicals, pharmaceuticals, and consumer durables are driving this momentum. Supported by robust government initiatives, increased investments, and a burgeoning domestic market, India's manufacturing industry has shown remarkable growth potential. As one

of the fastest-growing sectors, it is poised to accelerate India's journey towards economic transformation and self-reliance.

Drawing global attention

The unprecedented growth and performance of the Indian manufacturing sector resulted in increased interest of domestic as well as global investors. Moreover, the government's push and futuristic measures and schemes have further stimulated investors' sentiment; they are actively exploring the investment opportunities in the sector. As a result, the FDI inflows in the sector have reached \$165.1 billion, a rise of 69 per cent as compared to the previous decade. This momentum is expected to gain further strength in 2025 and beyond as the local manufacturing is on the priority of the government.

Driving efficiency and innovation

The advent of advanced manufacturing technologies is revolutionising India's industrial landscape. These technologies are not only enhancing productivity and efficiency but also ensuring global competitiveness. Below are some key areas where technological advancements are shaping India's manufacturing sector:

- **Advanced automation and robotics:** Automation and robotics are at the heart of modern manufacturing. Indian industries are increasingly adopting robotics for tasks such as assembly, quality control, and packaging. This reduces human error, enhances precision, and increases output. For instance, the automotive sector heavily relies on robotic arms for welding and painting, ensuring consistency and speed.
- **Digitalisation and Industry 4.0:** Industry 4.0 integrates digital technologies such as the Internet of Things (IoT), big data, and cloud computing into manufacturing processes. Smart factories equipped with IoT devices can monitor operations in real-time, predict maintenance needs, and optimise resource utilisation. Indian companies are adopting Industry 4.0 practices to enhance operational efficiency and reduce costs.
- **3D printing/additive manufacturing:** Additive manufacturing is revolutionising product design and prototyping. Industries such as aerospace, healthcare, and automotive are leveraging 3D printing to produce lightweight and complex components with minimal waste. Indian startups and established firms are investing in 3D printing to cater to niche global markets.
- **AI and machine learning:** AI and ML are enabling predictive analytics, process optimisation, and quality assurance. For example, AI-powered systems can analyse production data to predict machine failures, reducing downtime and ensuring seamless operations. The pharmaceutical industry is using AI to optimise drug production processes, ensuring precision and compliance.
- **Sustainable manufacturing:** Advanced technologies are also supporting India's sustainability goals. Energy-efficient machines, renewable energy integration, and waste reduction techniques are helping industries minimise their carbon footprint. For instance, green manufacturing practices in sectors like textiles and electronics are creating eco-friendly products for global markets.

The adoption of these technologies not only boosts productivity but also ensures India's readiness to cater to global markets with high-quality products. By investing in advanced manufacturing, India is signalling

its commitment to innovation, efficiency, and sustainability, solidifying its position as a preferred manufacturing destination. Most importantly, this will enable India to export goods worth \$1 trillion by 2030, positively impacting its foreign reserve.

Necessity of inspiring future workers

As advanced technologies redefine manufacturing, managing and empowering the human workforce remains crucial. India's demographic dividend presents a unique opportunity to develop a skilled and diverse workforce that can drive the sector's growth. Key focus areas include:

- **Skill development and upskilling:** With the rapid integration of advanced technologies, there is a growing need for a workforce skilled in robotics, data analytics, AI, and other emerging domains. Government initiatives such as Skill India and programs by organisations like the National Skill Development Corporation (NSDC) are bridging the skills gap. Industry-specific training programs are equipping workers with the knowledge and expertise required to operate advanced machinery and systems.
- **Industry-academia collaboration:** Collaboration between academia and industry is essential for aligning educational curricula with industry requirements. Institutions like the Indian Institutes of Technology (IITs) and National Institutes of Technology (NITs) are partnering with corporations to design courses, offer internships, and foster research. Such collaborations ensure that graduates are industry-ready and equipped to tackle real-world challenges.
- **Diversity and inclusion:** Diversity in the workforce brings varied perspectives and fosters innovation. Indian manufacturing companies are increasingly focusing on creating inclusive workplaces that welcome individuals from diverse backgrounds. Women, in particular, are being encouraged to join the manufacturing sector, breaking stereotypes and contributing to its growth.
- **Women in manufacturing:** Women's participation in manufacturing is gradually increasing, supported by initiatives like the government's 'Make in India' campaign and corporate diversity programs. Companies are offering flexible work environments, safety measures, and leadership training to encourage women to pursue careers in manufacturing. This not only promotes gender equality but also taps into a vast talent pool.

- **Continuous learning and adaptability:** As technology evolves, the need for continuous learning becomes imperative. Companies are investing in employee training programs, workshops, and online learning platforms to ensure their workforce remains updated with the latest trends and practices. This culture of lifelong learning fosters adaptability and resilience among workers.

By focusing on people management, India is building a workforce that is not only skilled but also diverse and inclusive. This human capital will be instrumental in driving innovation, ensuring quality, and maintaining India's competitiveness in the global market.

Confluence of technology and talent

India's journey to becoming a global manufacturing hub is characterised by the seamless integration of advanced technologies and a skilled workforce. The combination of these elements ensures that Indian manufacturers can cater to the evolving demands of international markets while adhering to the highest standards of quality and sustainability.

Government initiatives like 'Make in India' and Production-Linked Incentive (PLI) schemes are further bolstering the sector by attracting foreign investments and promoting domestic production. These policies, coupled with a focus on technology and people management, are creating an ecosystem that fosters growth, innovation, and global competitiveness.

Challenges affecting growth

While India's manufacturing sector holds immense potential, it faces myriad challenges that need to be addressed to boost the growth of the sector. The following challenges create hurdles:

- **Infrastructure deficiencies:** The lack of robust infrastructure is a critical barrier for India's manufacturing sector. Essential services such as transportation, power supply, and telecommunications are often inadequate, leading to inefficiencies and increased operational costs for manufacturers. This infrastructural gap not only affects domestic production but also deters foreign investment.
- **Skilled labour shortage:** Despite having a large workforce, India struggles with a significant skills gap in the manufacturing sector. The education and vocational training systems have not kept pace with the evolving needs of modern manufacturing processes, resulting in a shortage of skilled workers. This mismatch between available skills and industry requirements is a major impediment to growth.
- **Access to finance:** Small and medium-sized enterprises (SMEs), which are vital to the manufacturing landscape, often face challenges in securing financing. High-interest rates, stringent collateral requirements, and lengthy approval processes create barriers that limit their ability to expand and modernise operations. This financial strain is particularly detrimental to the MSME sector.
- **Global competition:** Indian manufacturers are under pressure from international competitors, particularly from countries like China that benefit from lower production costs and more developed manufacturing ecosystems. This competition necessitates innovation and cost-reduction strategies among Indian firms to maintain market share.

What needs to be done?

It is imperative to address these issues as early as possible to promote growth. This requires a collaborative approach involving the government, industry, and academia. The road ahead for India's manufacturing sector involves:

- **Investing in research and development (R&D):** It's the most critical aspect for the growth of any sector. The sector must increase investment in research and development to ensure that their processes are aligned to global standards. Emphasis on R&D will drive innovation and enable manufacturers to develop cutting-edge products for global markets. This will help meet demands, build trust, and increase revenue, which are crucial for the sustainability of business.

Conclusion

The sector must explore the possibilities of employing technology solutions to improve efficiency, scalability, and quality. At the same time, it's also crucial to prepare a workforce who can utilise these technologies effectively and reap the maximum benefits.

By leveraging these pillars, India can enhance its domestic capabilities and establish itself as a hub.

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About the author:

Krishan Lalit Bansal serves as the Chairman and Managing Director of DEE Development Engineers, since its inception in 1988. Prior to establishing the company, he founded Development Engineers, a partnership concern, in 1986, which was dissolved in 1988. His spirit extends to other ventures, including DEE Group Trust and DDE Piping Components

Private Limited. Bansal has received numerous accolades, such as the 'Business Leader of the Year' in 2011 and the 'Lifetime Achievement Award' in 2016 from the Faridabad Industrial Association.



Make in India Transformed Manufacturing

The Indian security industry continues to face regulatory challenges. Complex regulations and bureaucratic processes can hinder the ease of doing business, affecting both domestic and foreign investments, comments **Ashish P Dhakan, MD & CEO, Prama Hikvision India Private Limited.**



Source: Freepik

India's manufacturing sector is showing clear signs of positive change due to consistent efforts by the government and a policy framework. It's a challenging task to develop the manufacturing sector despite the ongoing challenges related to resources, skilled manpower and infrastructure. Considering the governance, taxation and policy related issues of the past decades, there is a big transformation happening in the manufacturing sector.

Now a big change is visible, the mood is upbeat and the government is taking proactive steps to bolster the manufacturing ecosystem. The Make in India program is already making steady progress based on the roadmap drawn by the government for promoting the manufacturing sector.

The Make in India initiative was started with the

vision of transforming India into a global manufacturing hub, including security and other sectors. There are some key 'challenges and opportunities' associated with this mission.

The Indian security industry was largely dependent on imports over the years, but the scenario is changing now for the better due to various government initiatives. With the help of the 'Make in India' program, the manufacturing sector has significantly reduced dependency by bolstering indigenous manufacturing capabilities. To overcome the dependence on imports, the security industry requires

significant investment in domestic manufacturing capabilities. The new era of AIoT security is highly technology-intensive. Bridging the technological gap between domestic products and those of advanced countries is crucial.

The Indian security industry continues to face regulatory challenges. Complex regulations and bureaucratic processes can hinder the ease of doing business, affecting both domestic and foreign investments.

The Indian security industry needs to develop infrastructure to enable the smart manufacturing process. Developing the necessary infrastructure for advanced manufacturing and R&D is a significant challenge.

There is a huge demand gap for a skilled workforce in

the security products manufacturing sector. While India has a large labour force, there is a need for more specialised training and skill development to meet the demands of high-tech manufacturing.

There are abundant opportunities available in the Indian security market for value-added security solutions.

Economic growth: Boosting domestic manufacturing can significantly contribute to economic growth and job creation.

Self-reliance: Enhancing self-reliance in defence production can improve national security and reduce dependency on foreign suppliers.

Innovation and R&D: Encouraging private sector participation and fostering innovation can lead to the development of cutting-edge technologies.

Global market: By improving manufacturing capabilities, India can become a major exporter of security equipment, tapping into the global security market.

Public-private partnerships: Collaboration between public sector units and private companies can create synergies and drive growth in the defence sector.

The Make in India program presents a unique opportunity to strengthen India's security industry, but it requires addressing these challenges through strategic planning and policy support.

The Make in India initiative has led to several positive outcomes across various sectors, including the security industry. The economic growth and development led by the Make in India program was a game-changer in many ways. The initiative has generated millions of jobs, contributing to a reduction in unemployment and boosting the economy. Both domestic and foreign investments have surged, leading to the establishment of new manufacturing units and infrastructure development.

The Make in India program led technological advancement initiatives through innovation and skill development. The focus on R&D has spurred innovation, leading to the development of new technologies and products. Training programs and skill development initiatives have enhanced the capabilities of the workforce, making them more adept at handling advanced manufacturing processes. This program resulted in self-reliance among the ecosystem partners and developed ancillary industries to foster growth.

By boosting domestic production, India has reduced its dependency on imports, particularly in critical sectors like defence and security. Increased self-reliance on security product manufacturing has strengthened national security by ensuring a steady supply of essential equipment.

The Make in India program resulted in developing

global competitiveness in the manufacturing sector.

Export growth: Indian manufacturers have become more competitive globally, leading to an increase in exports of high-quality products.

Brand India: The initiative has improved India's image as a manufacturing hub, attracting more global companies to set up operations in the country.

It has also led to significant infrastructure development in the industrial clusters across India.

Modern facilities: Significant investments in infrastructure have led to the development of manufacturing facilities and industrial corridors.

Smart cities: The initiative has also contributed to the development of smart cities, enhancing the overall quality of life. These emerging smart cities are the future roadmap for the new Indian cities.

The 'Make-in-India' mission has thus played a crucial role in transforming India's economic landscape, fostering innovation, and enhancing self-reliance and global competitiveness. It has achieved the core objective of reviving India's manufacturing sector.

Recognising the security industry as an MSME sector can help to promote the cause of developing it. Micro, Small and Medium Enterprise (MSME) is the second-largest employment provider in India. Recognising the security industry as an MSME sector will definitely help to upscale and grow it further. Currently, there are around 56 million such enterprises across several industries, employing about 124 million people approximately. Owing to this reason, the MSME sector is known as the growth engine of the nation. Making MSMEs robust and sustainable would require several initiatives that will boost the economy, ecosystem and employment.

To strengthen MSMEs, there are three critical aspects that need to be taken care of: availability of skilled labour in and around MSME clusters, ensuring financial stability through adequate funding and enhancing the market competitiveness of their products to achieve both import substitution and exports.

Following global security technology trends

The security product-manufacturing sector has a much bigger role to play. These segments can expand and grow through innovation. The key trends are showing a positive impact and improvement to help and support the cause of public safety and evolving security requirements.

Intelligent video technologies: Powered by AI, security cameras, monitor densely populated locations to ensure employees follow vital safety precautions – including social distancing, mask wearing and flow control – and provides Touch-Free Access Control.

Multidimensional perception: Multi-dimensional

perception capabilities will play a fundamental role in taking the video security industry to the next level, and we constantly see growing numbers of integrated security devices and systems with multiple sensors.

Visibility – any time, any condition: It's vital to have cameras that can respond effectively to capture clear images, no matter what time of day or night or how bad the weather is. With thermal imaging, the rendered image is far less affected by even the most light-obscuring of these conditions.

5G technology for UHD and wireless video security: 5G technology may bring great changes to the security industry. 5G's greater bandwidth and lower latency make the regular transmission of high quality images possible, and, with the widespread adoption of ultra-high-definition (UHD) cameras, could bring new opportunities for video security.

Convergence of multiple security systems: We operate in an industry where users expect comprehensive solutions. The concept of systems working seamlessly together has long been desired by the vast majority of security professionals. The benefits of converging multiple security systems – including video, access control, alarm, fire prevent and emergency management – into a unified platform are manifold, with efficiency and cost-effectiveness the most obvious.

Imparting training to youth

With an aim to provide impetus for the Skill India Mission, the National Skill Development Corporation (NSDC) is offering security technology training for India's youth. This initiative is helping in promoting security sector specific skills and ecosystem development, which will further prepare India's technical workforce for getting jobs or setting up their own business enterprises. These training initiatives are driving electronic security product manufacturing to a new phase of growth.

Adopting transformative technologies and Industry 4.0

The adoption of new technology-based solutions is expected to bring the much-needed transformation in the manufacturing sector, thus making the sector a bigger participant in the development of Indian economy. The priority should be given to becoming self-reliant by emphasising on local manufacturing, which will be the key to India's survival, thus giving a major boost to the Indian manufacturing sector. The key transformative technologies, including AI (Artificial Intelligence), Machine Learning (ML), IoT (Internet of things), Machine Vision, Block Chain, Robotics, Cloud computing and Digital Twins, are going to be a game changer. The manufacturing industry needs to follow the

industry 4.0 roadmap to stay relevant to the times and trends of the future.

The key priority is to keep on innovating and empowering the security product manufacturing ecosystem while navigating through the challenges and opportunities. The best way is to follow the Make in India vision. It is a perfect manufacturing roadmap for empowering the security product manufacturing sector. The market expectations are very high; there is intense pressure to deliver results despite increasing competition, economic uncertainty and upheaval. In other words, the security industry needs to take manufacturing to the next level.



The key priority is to keep on innovating and empowering the security product manufacturing ecosystem while navigating through the challenges and opportunities.

Advantages of Make in India

Implementation of Make in India in security product manufacturing can help the industry grow further to be at par with global standards. To fulfil the growing demand for a skilled workforce in security product manufacturing, various initiatives are needed to train the young workforce. Such steps taken in true spirit can massively benefit the MSMEs and their progress would translate into the progress of the whole economy. A successful and robust manufacturing industry ecosystem can spell economic success and development in the coming times, thus fulfilling the larger goal envisioned by Make in India should be the way forward.

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About the author:

Ashish P Dhakan is the MD & CEO of Prama Hikvision India Pvt Ltd. He has supported the cause of Indian security industry through various industry bodies and forums. His consistent efforts and initiatives led to security awareness among government and private sector companies in India.

His vision about Indian security industry's growth has led to the formation of Prama Hikvision India, the very first joint venture company formed by Hikvision across the world. He has also led Prama Hikvision into a leading security business entity by successfully creating a pan India network of dealers, distributors and system integrators. Dhakan is the driving force behind Hikvision's 'Make-in-India' plan and implementation strategy. He has been instrumental in Hikvision's Make in India program.



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India to Lead Global Manufacturing

In any business ecosystem, people are the most valuable asset; the same is the case in manufacturing as well. India, with its young and educated workforce, has a visible demographic advantage and offers immense potential for the growth of the manufacturing sector, opines **Sanjay Kulkarni, President, Fleetguard Filters Ltd.**



Source: Freepik

The Make in India initiative launched in 2014 has set the stage for India to become a manufacturing hub. With the largest population in the world, the availability of all skilled, semi-skilled, and unskilled labour along with the availability of raw materials can be pivotal to support competitive costs and rapidly grow the economy. India truly stands at the crossroads of transformation!

Since its inception and over the decade the vision for India is clear – to increase the manufacturing sector's overall contribution to the national GDP from 17 per cent to 25 per cent this fiscal and create almost a million more jobs for its people. If this ambition is met it would lead India to be a major player in the global supply chain.

India's immense manufacturing potential relies on integrating business strategies aligned with

governmental support. The Make in India initiative has already created a positive sentiment, it reflects in the improvement in ranking of ease of doing business from 142 in 2014 to 63 in 2020. The progress will further be supported by the National Manufacturing Policy; aiming to increase sector contribution to 25 per cent of GDP by this year. Additionally, programs such as the Production Linked Incentive (PLI) Scheme, which offers varied incentives for increasing sales, are motivating all businesses to scale their operations, innovate, and focus on quality output.

With improved industrial corridors, logistics, and growing SEZs, this sector is poised to reach newer heights with FDI inflows growing steadily. According to the Department for Promotion of Industry and Internal

Trade (DPIIT), in FY 2021-2022 alone, India saw substantial FDI inflows of around \$50+ billion, with important sectors like automobiles, chemicals, and pharmaceuticals attracting significant foreign capital. As we move ahead, aligning with government policies will be important in building a successful future for Indian manufacturing.



As we move ahead, aligning with government policies will be important in building a successful future for Indian manufacturing.

Sustainability is a significant requirement for any manufacturing setup aiming to compete on a global level. Globally India is expected to adopt stringent environmental standards. This should involve reducing carbon footprint, investing in energy-efficient technology, and moving towards a circular economy - which reduces waste and promotes recycling and reusing.

Like in the filtration industry, focus on designing energy-efficient filtration systems, reducing wastage during production cycles, and recycling materials not only supports sustainability but also aligns with global environmental norms. Government initiatives, such as the National Action Plan on Climate Change (NAPCC), and various other green-focused initiatives are also laying down the foundation for greener manufacturing practices. However, much more can be done in collaboration with all industry stakeholders. India's current manufacturing growth story can be transformed with sustainable practices, which can catapult the economy, and at the same time protect our environment.

The adoption of advanced technologies in manufacturing such as IoT, automation, robotics, AI, & 3D printing - smart manufacturing is essential to improve overall efficiency, increase productivity, and reduce operational costs. These technologies will enable Indian manufacturers to produce high-quality products at scale, ensuring they can compete with established global giants.

Our industry is benefiting from advanced automation to enhance precision, minimise human error, and increase overall production efficiency. Thus, further reducing lead times, improving product quality, and offering more customised solutions to meet the various needs of customers, and stay agile. We need to build a

system where man and machine together create marvels.

In any business ecosystem, people are the most valuable asset; the same is the case in manufacturing as well. India, with its young and educated workforce, has a visible demographic advantage and offers immense potential for the growth of the manufacturing sector, or any sector for that matter. With that said, for us to truly become a 'global' manufacturing leader, we must address the gap in skill development.

The government's focus on skill development through programs like Skill India Mission will certainly help bridge this gap, but industry collaboration with educational institutions (Industry-Academia Collaboration) is a need of the hour - to guide the youth and help create educational institutions create curriculums that meet the demands of modern manufacturing, or the modern work-place in a broader sense.

Outlook on India

With all that we see going around us, India's manufacturing sector is certainly poised for exponential growth, so much so that by 2030, the sector is expected to boost the global economy by \$500 billion+ annually and has the potential to export goods worth \$1 trillion.

The rising purchasing power of the Indian people, domestic companies/startups will become attractive to global investors. India's export potential is also impressive. Between Jan-Jun 2022, India's exports of commodities like engineering goods, petroleum products, gems & jewellery, and pharmaceuticals stood at \$190.4 billion.

In conclusion, I would say India is at the cusp of a manufacturing and even an overall industrial revolution. Considering all our strengths, the global shift away from China and our government's international relations the world over. It is time India makes good on more and more global trade agreements, and heavily promotes 'Brand India' for us to truly make its mark on the world stage that it has indeed arrived and is here to stay. It is up to us, as manufacturers, policymakers, industry leaders, and citizens at large, to capitalise on the Make in India initiative, by focusing on the key pillars mentioned above, or more, to lead the charge and become a major manufacturing hub for the world!

SME



About the author:

Sanjay Kulkarni, is the President of Fleetguard Filters Ltd, a distinguished and accomplished leader with a career spanning over 25 years in the filtration industry. He brings a thorough understanding of legal and corporate matters to his role as a Law Graduate and member of the Institute of Company Secretaries of India. Further, he has a Master's Degree in Human

Resource Management from XLRI, Jamshedpur.



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A Sustainable Make in India

By adopting sustainable practices such as a circular economy, renewable energy utilisation and green supply chains, India can strengthen its global competitiveness, attract investments and advance its environmental goals. **Ashish Aggarwal, Chief Administrative Officer, Cummins India**, explores the importance of sustainability in the 'Make in India' initiative to drive long-term economic growth.



Source: Freepik

India is poised to become a global manufacturing powerhouse, driven by the transformative 'Make in India' initiative launched in 2014. This program has spurred industrial growth at both regional and national levels, fostering a robust ecosystem for domestic and international manufacturing investments. Despite global economic disruptions triggered by the pandemic and exacerbated by the recent geopolitical events, the manufacturing sector has demonstrated resilience, growing at around 11 per cent p.a. As a key indicator of

development, the sector plays a significant role in addressing challenges like carbon emissions, resource depletion and waste generation, paving the way for a more sustainable future. Integrating sustainability into the 'Make in India' framework is essential for long-term economic growth and holistic development.

The sustainability imperative

While India's manufacturing sector contributes 17 per cent to the GDP and employs over 27 million people, it also accounts for 20 per cent of the country's greenhouse gas emissions. Implementing a green lens in manufacturing can help India improve these statistics and gain a multitude of benefits. By using resources optimally and transforming traditional manufacturing operations, the 'Make in India' initiative can advance the emergence of a more sustainable manufacturing landscape.

The global economy has been veering toward sustainable business practices for years. Today, sustainability is a primary consideration for investments at an individual and larger scale. A recent nationwide survey stated that 60 per cent of consumers prioritise sustainable and environmentally friendly products and services. This aligns with the global trend of green investments and sustainable practices, where businesses are implementing green policies to show tangible progress to their employees and investors.

Positioning the 'Make in India' initiative as an environmentally responsible endeavour with tangible on-ground implementation can attract global market interest and broaden access. Additionally, this can boost competition in the innovation space, where India is rapidly advancing in the development of cutting-edge green technologies, such as carbon capture and storage, electric vehicles (EVs), ethanol blending, biomass energy, railway electrification, advanced battery storage technologies and green hydrogen.

The most significant advantage of developing a sustainable manufacturing industry is its transformative impact on India and its people, protecting and preserving our natural resources. By embracing greener practices, we can address water and land shortages, pollution and

displacement, leading to a healthier and more harmonious environment. Sustainable manufacturing promises to revitalise our rivers, lakes and lands while enhancing the well-being of our communities.

Embracing a circular economy for sustainable manufacturing

Starting a green manufacturing revolution doesn't require reinventing the wheel; it's about upgrading existing approaches. The key step is to retrofit current systems with a circular economy mindset, emphasising 'repair, reuse and recycle' to reduce pressure on resources and minimise waste. This approach would entail initiatives such as product design for disassembly, extended producer responsibility, and robust recycling infrastructure. It will also lower production costs and boost infrastructure growth by supporting recycling.

While countries such as Japan and Finland have heavily adopted the circular economy approach, India is progressively advancing in this direction. This approach benefits regional manufacturing industries, enabling them to adopt sustainable practices on a medium to small scale. Moreover, a return to renewable resources is indispensable for a sustainable manufacturing industry. Processes powered by solar, wind and other renewable energy sources can drastically cut carbon emissions. Investing in these will make them more accessible for industrial use, creating more employment and business opportunities. India's renewable energy capacity reached 173 GW in 2023, with the government targeting 500 GW by 2030. Creating and encouraging alternative supply chains that minimise environmental impact, from raw material sourcing to distribution, is essential for a sustainable industry. Given India's vast and varied population and land cover, sustainable supply chains can give the industry the right impetus it needs to become environmentally conscious.

Unequivocally, transitioning to sustainability comes with barriers like high initial costs, lack of awareness and inadequate infrastructure. However, it offers several advantages. For instance, switching to solar energy can drastically cut electricity costs. Renewable energy sources can help manufacturers reduce dependency on grid power and limit service disruptions. At COP29, India and other countries underlined the need for increased global investment in developing economies to help them reach their sustainability goals.

There is a critical need for improved infrastructure for recycling, renewable energy and building low-waste industrial areas. Government and industry can collaborate through subsidies, green technology investments, tax exemptions and sustainability studies. Initiatives like the National Solar Mission and 100 per cent Foreign Direct Investment (FDI) for renewable

energy projects will aid in scaling adoption. The Government has also waived Inter State Transmission System (ISTS) charges for inter-state sale of solar and wind power projects expected to be commissioned by June 30, 2025. Government policies and incentives, along with a skilled workforce and favourable infrastructure, are contributing to the emergence of sustainable regional manufacturing hubs in India. India has an opportunity to claim its spot as a green manufacturing destination. However, strict environmental regulations and standards will be integral to their success.



Initiatives like the National Solar Mission and 100 per cent Foreign Direct Investment (FDI) for renewable energy projects will aid in scaling adoption.

A greener future

By integrating sustainability into the core of 'Make in India', we can ensure that India's industrial resurgence is both economically prosperous and environmentally responsible. It can improve its global competitiveness, attract investments and contribute to national and global environmental goals. COP29 highlighted the importance of increased investment to support economies in their journey toward achieving net-zero goals. The journey will require concerted efforts from the government, industry leaders and the public. As leaders in the manufacturing sector, it is our responsibility to champion this transformation, ensuring that 'Make in India' evolves into 'Make in India Sustainably'.

SME



About the author:

Ashish Aggarwal has been serving as the Chief Administrative Officer at Cummins India since December 2022. In this role, he oversees Government Relations, Communications, Facilities, Security and Corporate Responsibility. Ashish provides strategic leadership and guidance to these functions, ensuring they align with Cummins India's organisational

objectives in the region. Ashish brings over 25 years of extensive experience across various functions, including Corporate and Government Relations, Project Management, Business Development and Corporate Social Responsibility. Before joining Cummins, he served as the Country Director for Koch Industries, where he led policy and strategy for all Koch companies in India, and government policy for Koch companies in the ASEAN region, including Malaysia, Vietnam and the Philippines. He previously worked with Cummins India from 2011 to 2018, serving as the Vice President for Government and Public Policy.



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What's Driving India's Industrial Boom?

Embracing sustainability, adopting advanced manufacturing technologies, enabling workforce diversity, and ensuring strategic alignment with global standards will be key drivers of success, states **Dhruv Taneja, CEO and Founder, MatchLog Solutions.**



Source: Freepik

India's manufacturing sector is growing with the ambitious 'Make in India' initiative. As the country strives to solidify its position as a global manufacturing hub, challenges and opportunities intertwine to shape the sector's trajectory. With global disruptions, heightened sustainability demands, and rapid technological advancements, the need for strategic alignment has never been more critical.

Strategies and initiatives

The global manufacturing landscape is increasingly shaped by volatility, uncertainty, complexity, and ambiguity (VUCA). Companies in India must adopt robust strategies to thrive amid these challenges, particularly with the 'China Plus One' movement opening new doors.

Investment in R&D and innovation is critical for product differentiation, cost optimisation, and global competitiveness. India's R&D expenditure remains at 0.7 per cent of GDP—significantly lower than global leaders

like South Korea (4.81 per cent). A focused push toward innovation can enhance manufacturing efficiency and exports. Equally important is adherence to international quality standards, such as ISO certifications, to build trust and ensure consistency. Embracing total quality management (TQM) systems can significantly enhance product credibility.

Government schemes like the production-linked incentive (PLI) are designed to bolster exports, but manufacturers need tailored strategies to capitalise on these incentives. Moreover, compliance with safety norms and regulations ensures workforce well-being and boosts

global credibility. The updated Occupational Safety, Health, and Working Conditions Code is a step in the right direction, but effective implementation is key to success.

Additionally, export diversification plays a crucial role. India's manufacturing exports have grown steadily, but there is room for expansion into non-traditional markets in Africa and Latin America. Proactive trade policies and incentives can help Indian manufacturers gain a stronger foothold globally.

Sustainable manufacturing

Sustainability is no longer optional; it has become a business imperative. Green manufacturing emphasises reducing carbon footprints, enhancing resource efficiency, and promoting circular economy practices. The manufacturing sector accounts for 22 per cent of India's carbon emissions. Transitioning to renewable energy sources like solar and wind is crucial. For instance, factories in sectors like textiles increasingly

leverage green energy to minimise their environmental impact. Adoption of circular manufacturing models reduces waste by reusing resources, extending product lifecycles, and minimising environmental impact.

Government initiatives, such as the Perform, Achieve, and Trade (PAT) scheme, encourage energy efficiency while offering financial benefits. These efforts align with India's goal of achieving net-zero emissions by 2070. Moreover, implementing energy-efficient machinery and encouraging sustainable supply chain practices can further strengthen India's commitment to green manufacturing. Corporate leaders must also focus on green financing to fund sustainability initiatives. Collaborating with financial institutions to access green bonds and sustainability-linked loans can accelerate the adoption of eco-friendly practices across the industry.

Advanced technologies

The advent of cutting-edge technologies like automation, robotics, and Industry 4.0 is revolutionising India's manufacturing landscape. These tools are essential for building agile, efficient, and competitive systems. Automation and robotics enhance precision, reduce human error, and boost operational efficiency. Maruti Suzuki's smart factories, employing advanced robotics, exemplify the benefits of automation. Similarly, Industry 4.0 technologies, including IoT (Internet of Things), AI, and data analytics, allow real-time monitoring and predictive maintenance, reducing downtime and increasing productivity.

3D printing or additive manufacturing minimises material waste and shortens prototyping cycles, proving invaluable in sectors like aerospace and healthcare. Meanwhile, digital twins enable manufacturers to simulate operations, predict outcomes, and optimise processes, reducing costs and time-to-market. These advancements are crucial for enhancing India's competitiveness in global markets.

Another game-changer is blockchain technology, which enhances transparency and traceability in supply chains. By ensuring secure data exchanges, blockchain reduces inefficiencies and strengthens supplier relationships. Combining this with edge computing enables faster decision-making and better control over manufacturing processes.

Workforce management

A skilled and adaptive workforce is the backbone of a thriving manufacturing sector. The transition toward advanced systems necessitates extensive reskilling and upskilling efforts. According to the World Economic Forum, over 50 per cent of employees will need reskilling or upskilling by 2025. While government initiatives like Skill India aim to address this gap, active industry-

academia collaboration is essential to ensure a steady pipeline of talent. Partnerships between educational institutions and industries can bridge skill gaps through apprenticeships, and tailored training programs.

Diversity in manufacturing also plays a critical role in fostering innovation and inclusivity. Women constitute just 12 per cent of India's manufacturing workforce. Encouraging gender diversity can lead to more robust organisational cultures and improved performance. Additionally, promoting continuous learning and innovation within workplace cultures can prepare employees for supervisory and technical roles, aligning with the demands of advanced manufacturing.

Leadership development is another crucial aspect. Nurturing future leaders with expertise in digital tools, sustainability, and cross-functional collaboration ensures long-term organisational success. Emphasis on employee well-being, such as mental health programs and ergonomic workplace designs, can enhance productivity.

Challenges and prospects

Despite its potential, India's manufacturing sector faces significant hurdles. Infrastructure gaps, such as inconsistent power supply and inefficiencies in logistics, hinder operations. Regulatory compliance remains burdensome, especially for MSMEs. Moreover, India faces stiff competition from countries like Vietnam and Indonesia, which offer lower labour costs and streamlined manufacturing processes.

Conclusion

'Make in India' is more than a policy; it represents a vision for an economically self-reliant nation. By addressing existing challenges and leveraging opportunities, India can transform its manufacturing sector into a global powerhouse. Embracing sustainability, adopting advanced manufacturing technologies, enabling workforce diversity, and ensuring strategic alignment with global standards will be key drivers of success. The journey ahead requires a unified effort from policymakers, industries, and the workforce. With the right strategies in place, India's manufacturing can set new benchmarks for the world.

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About the author:

Dhruv Taneja, the Founder of MatchLog Solutions Pvt Ltd, is a pioneer with over 16 years of experience in container logistics and supply chain optimisation. As a founder at MatchLog, he oversees direction and operational management, alongside client relationship management for the company. Taneja has been on the Board of Directors of various companies in shipping and logistics, such as Empezar Global Marine Services Pvt Ltd, Bellagio Logistics Pvt Ltd, to name a few. He also honed his expertise as a Relationship Manager at BNP Paribas Wealth Management, Singapore.



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India's Manufacturing Renaissance

Creating a pipeline of skilled labour is needed for the success of Make in India. This affects traditional and emerging sectors like electronics or advanced engineering. With demand for technical expertise, schemes like 'Skill India' and 'One Nation', 'One Subscription' play key roles in bridging the gap, says **Rishi Aggarwal, MD, JCBL Group.**



Source: Freepik

Make in India is an initiative designed to encourage indigenous production, generate employment, and implement a robust plan for local development. This shift fosters local initiatives that enhance India's position as a key manufacturing and trade hub while attracting global customers and investors. The Make in India initiative is accelerating the nation's economic growth and aligns perfectly with the need for industrial ambitions that drive national progress.

When industries integrate their ambitions with the larger goal of economic self-reliance, they not only create value for themselves but also strengthen the country's economic resilience. This initiative enables the closure of supply chain gaps, the development of local talent, competition in more sectors, and the achievement of

international recognition. India's pride in its position on the global manufacturing map reflects the transformative potential of collective progress.

'Make in India' and its alignment with the industry

The manufacturing sector is a significant contributor to the national GDP. Increased local production fosters India's economic growth. Government initiatives such as the Production Linked Incentive (PLI) scheme attract domestic and foreign investments while promoting robust infrastructure. These initiatives incentivise high-value manufacturing in sectors like electronics and pharmaceuticals, while industrial and logistical corridors enhance transport and distribution. This not only creates

employment opportunities and promotes ancillary industries but also encourages skill development. Industries have leveraged these initiatives to develop cutting-edge, globally standardized solutions using AI, IoT, and robotics, streamlining operations and enhancing productivity.

Challenges

Often, growth opportunities are disguised as challenges, a perspective that applies to India's manufacturing sector, which has demonstrated remarkable adaptability over the decades. Challenges impacting efficiency, scalability, and cost-effectiveness remain significant. For example, reliance on imported high-quality raw materials increases production costs. Global disruptions further destabilise supply chains, driving costs even higher.

However, promoting research and innovation to ensure the local availability of high-quality raw materials can address these issues. The Make in India initiative actively supports manufacturers and local suppliers in building a self-sustainable ecosystem for the industry.

The logistics and transportation sector faces challenges such as high costs and limited connectivity in underdeveloped regions, which hinder timely delivery and impact production cycles and competitiveness. Make in India addresses these issues by developing logistics corridors and parks to integrate underdeveloped regions into the national network, boost regional economies, and improve transport efficiency. Optimised transport systems also reduce the carbon footprint, aided by e-multimodal logistics parks that integrate rail, road, and other channels for seamless connectivity.

Another critical challenge is the availability of skilled manpower. Creating a sustained pipeline of skilled labour is essential for the success of Make in India. This issue affects traditional manufacturing and emerging sectors like electronics and advanced engineering. With the rising demand for technical expertise, government initiatives like 'Skill India' and 'One Nation', 'One Subscription' play a pivotal role in bridging this gap. These programs empower Indian youth, making them more skilled and industry-ready.

Opportunities

The Make in India initiative offers immense opportunities for the manufacturing industry, the nation, and individuals. It creates career growth and entrepreneurial opportunities across society while influencing every economic sector.

The growing demand for diverse products and solutions, driven by a large consumer base and increased purchasing power, is central to Make in India's success. Businesses are incentivised to innovate, leading to high

returns and further innovation.

With a significantly large and dynamic youthful workforce, India is primed to become a global economic powerhouse. The initiative also fosters an entrepreneurial mindset, equipping the youth with essential skills and driving transformation across production sectors. A self-sustained domestic market, supported by local availability of quality raw materials, skilled labour, and improved logistics, is reducing reliance on imports and strengthening India's economy.

A self-reliant domestic industry serves as the backbone of national growth, making India less vulnerable to geopolitical upheavals. Reduced manufacturing costs, a skilled labour force, a large consumer base, and high-end infrastructure position India's manufacturing sector to leverage global opportunities and tap into the vast potential of international markets.

Conclusion

With the Make in India campaign, India is set to emerge as a global manufacturing leader, enhancing its reputation for operational efficiency, product quality, and innovation. While the benefits may not be immediate, the long-term outcomes will boost employment, production, consumption, and overall economic development.

Complementary initiatives like 'Skill India,' 'Digital India,' 'Start-Up India,' and 'Atmanirbhar Bharat' further enhance self-reliance, skill development, and digital connectivity. Projects such as the Delhi-Mumbai Industrial Corridor (DMIC) aim to create state-of-the-art industrial zones that provide a productive environment for manufacturing growth.

Thoughtful planning and collaboration between industries and policymakers will enable India's manufacturing sector to lead the nation's economic transformation. With sustained efforts and innovative strategies, Make in India has the potential to become the cornerstone of India's long-term global economic success.

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About the author:

Rishi Aggarwal is the Managing Director of the JCBL Group, a diversified business conglomerate that has grown into a symbol of innovation and excellence under his visionary leadership. With 27 years of industry experience, he has driven the group's remarkable expansion across key sectors, including mobility applications, defence and aerospace, railway

and bus components, agriculture, and international business. Collaborating with renowned global and Indian brands such as Tata, Mahindra, Ashok Leyland, and Daimler, Aggarwal has transformed JCBL into a trusted partner in the industry. His strategic vision and ability to build dynamic teams have been instrumental in establishing JCBL as a powerhouse that continues to touch lives across continents while driving sustained growth and success.



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Automation to Catalyse India's Growth

The industry will move towards adopting Industry 5.0 conceptualised as 'Society 5.0'. Coined by the Japanese government, Society 5.0 envisions a technology-driven human-centred 'Super Smart Society', addressing social challenges by integrating IoT, AI, ML, and big data into every aspect of life and industry, says **Narayan Kumar, Divisional Director, Industrial Devices Division (INDD), Panasonic Life Solutions India.**



Source: Freepik

In the past decade, India's manufacturing landscape has undergone a significant evolution, driven by the Aatmanirbhar Bharat (Self-Reliant India) initiative and strategic government policies like the Production Linked Incentive (PLI) scheme. These efforts not just encouraged local production but also attracted global manufacturers, solidifying India's position as a global manufacturing hub. With the ambitious goal of increasing the manufacturing sector's contribution to GDP from 16 per cent to 25 per cent, the National Manufacturing Policy and PLI schemes further aim to propel India towards self-sufficiency, reducing import dependence and creating employment opportunities.

India has emerged as the third most sought-after manufacturing destination globally and is on track to achieve export potential worth \$1 trillion by 2030. The rapid adoption of advanced manufacturing technologies (AMTs) such as the Internet of Things (IoT), artificial intelligence (AI), and automation is propelling this growth. Industries like automotive, electronics, pharmaceuticals, and e-commerce amongst others are increasingly leveraging smart factory solutions to enhance efficiency and competitiveness. Additionally, the rollout of 5G is enabling seamless communication within these factories, fostering operational excellence.

As India continues its journey toward advanced

manufacturing, technologies such as automation, digitalisation, and additive manufacturing are redefining supply chain paradigms. The following are the key technologies shaping the manufacturing in 2025.

Proliferation of industrial automation and AI

As per industry estimates, India's industrial automation market, valued at \$15 billion in 2024, is likely to grow to \$29 billion by 2029, with transformative trends expected to pick up steam in 2025. Automation integrates sophisticated systems like smart sensor solutions to enhance precision and efficiency in manufacturing. It reduces operational costs, improves quality, and ensures worker safety by automating routine and hazardous tasks.

The industry will move towards adopting Industry 5.0 conceptualised as 'Society 5.0' and Panasonic is deeply aligned with this transformative vision. Coined by the Japanese government, Society 5.0 envisions a technology-driven human-centred 'Super Smart Society', addressing social challenges by integrating IoT, AI, ML, and big data into every aspect of life and industry.

Generative Artificial Intelligence (Gen-AI) will assist OEMs by optimising design, processes, and resource efficiency. Gen-AI will support innovative product designs, simulating manufacturing scenarios, predicting maintenance needs, and enhancing quality control, thereby improving go-to-market time. For example, Servo motors with AI capabilities exemplify how machines can self-tune to enhance efficiency, reducing downtime and ensuring high-quality output. As the adoption of AI-driven tools picks up steam, it will streamline supply chains, enable mass customisation, and reduce energy and material waste, fostering sustainability.

The AI can assist in training workers by making immersive simulations or virtual environments to demonstrate complex manufacturing processes. It can also provide real-time guidance during production, improving worker efficiency and safety. For instance, AI-generated simulations can train workers on how to operate advanced machinery or handle emergency scenarios.

OEMs are integrating automation to not only enhance efficiency and reduce waste but also align with their broader sustainability goals. This strategic shift is essential for maintaining competitiveness in a market increasingly focused on environmental stewardship. Automation streamlines production processes, minimises human error, and optimises resource use, leading to cost optimisation and improved operational performance. It also supports circular economy practices by enabling modular manufacturing that facilitates

product repair and recycling. Additionally, it helps them meet compliance obligations with environmental regulations through accurate tracking and reporting.

The emphasis on innovation and technology adoption will catalyse a cultural shift within the manufacturing sector. OEMs will need to transition from traditional practices to more advanced, technology-driven models that prioritise sustainability and efficiency. This shift will require not only investment in new technologies but also a commitment to continuous learning and adaptation among the workforce.



The AI can assist in training workers by making immersive simulations or virtual environments to demonstrate complex manufacturing processes.

As India seeks to establish itself as a preferred manufacturing destination, the development of robust local supply chains will be critical. Strengthening these supply chains will reduce dependency on imports and enhance the speed of production cycles, ultimately leading to greater economic resilience. The focus on indigenous innovation will empower local manufacturers to respond swiftly to market demands while fostering a competitive edge.

In the evolving landscape, collaboration between academia, industry, and government will play a pivotal role in driving advancements. By aligning educational initiatives with industry needs, India can cultivate a skilled workforce equipped to navigate the complexities of modern manufacturing. This collaborative approach will not only enhance productivity but also ensure that India remains at the forefront of global manufacturing trends.

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About the author:

Narayan Kumar, Divisional Director, Industrial Devices Division (INDD), Panasonic Life Solutions India, is responsible for devising Business Transformation strategies as well as Product Management for new and existing products/services and driving sustainable growth for the company.

With over two decades of experience in the industry, he leads Panasonic's Industrial Devices Division (INDD business), driving innovation through consulting, designing, and supplying a wide range of technologies and systems. Narayan, a qualified engineer with an MBA from the Indian Institute of Foreign Trade in Delhi, has led key business sectors of various organisations, including Schreder, Grainger India, Schneider Electric, and Crompton Greaves.



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Electric 3-Wheelers Driving Change

The private sector is also playing a crucial role in driving the adoption of electric three-wheelers. Startups are developing customised solutions tailored to India's unique market requirements, from compact designs to affordable battery technologies, comments **Naveeth Menon, Vice President Sales & Marketing Operations, BAXY Mobility**.



Source: Freepik

The streets of India are undergoing a transformation. From the bustling lanes of Delhi to the quieter roads of Tier-2 and Tier-3 cities, electric three-wheelers have become a ubiquitous sight, signalling a shift toward a more sustainable and affordable transportation system. As India grapples with the dual challenges of rapid urbanisation and rising environmental concerns, these vehicles are proving to be a game-changer for last-mile connectivity. Their rise is more than a trend, it is a movement toward a greener and more inclusive future.

Electric three-wheelers are uniquely positioned to address India's last-mile connectivity challenges, where traditional options have struggled. The logistics and

e-commerce industries, crucial drivers of the Indian economy, often face hurdles in ensuring seamless delivery to the end user. With the e-commerce market projected to grow to \$200 billion by 2027, according to a report by NASSCOM, the demand for efficient last-mile solutions is at an all-time high. These lightweight, cost-effective vehicles are filling this gap, providing a lifeline to businesses and consumers alike.

In the urban sprawl of Mumbai, an electric three-wheeler weaves through narrow lanes, its driver effortlessly delivering packages for a popular e-commerce platform. The vehicle's compact design allows it to navigate congested areas that larger vehicles cannot access. Meanwhile, in the rural outskirts of Varanasi, another electric three-wheeler ferries passengers to their destinations, bridging the gap between underserved regions and the nearest transport hubs. These stories illustrate the versatility of electric three-wheelers in addressing India's diverse mobility needs.

India is already the world's largest market for electric

three-wheelers, with over 1.75 million units sold annually, according to the International Energy Agency. This segment has witnessed a compound annual growth rate of 15 percent over the last five years, driven by a combination of government incentives, rising fuel prices, and increasing consumer awareness about sustainable mobility. The government's Faster Adoption and Manufacturing of Electric Vehicles initiative has been instrumental in this growth, offering subsidies of up to ₹30,000 per vehicle. These incentives have made electric vehicles more affordable for drivers and fleet operators, fostering a shift away from internal combustion engine-powered three-wheelers.

But it is not just economics driving this shift, it is also a necessity. India accounts for 21 of the world's 30 most polluted cities, according to IQAir's 2023 World Air Quality Report. Transportation is a significant contributor to this pollution. Electric three-wheelers, with their zero tailpipe emissions, provide an effective solution to mitigate the environmental impact. For cities like Delhi, where air quality often dips to hazardous levels, these vehicles are not just an option, they are a lifeline.

Beyond environmental benefits, the vehicles also present significant economic advantages. Their operating costs are substantially lower than those of petrol or diesel vehicles. A study by TERI found that electric three-wheelers could save operators up to ₹25,000 annually on fuel expenses alone. These savings are critical for small business owners and self-employed drivers who depend on these vehicles for their livelihoods.

Despite the promising growth, challenges persist. Charging infrastructure remains limited, with only 20,000 public chargers available across the country as of 2024, according to the India Energy Storage Alliance. This scarcity often forces drivers to rely on home charging, which can be inefficient and time-consuming. Moreover, the initial cost of electric three-wheelers, even after subsidies, remains higher than their internal combustion engine counterparts, deterring many potential buyers. Battery range and durability also continue to be significant concerns for operators who depend on reliability for their livelihoods.

However, innovative solutions are beginning to emerge. Battery swapping stations, for instance, are gaining traction in cities like Bengaluru, offering drivers a quick and convenient way to recharge without long wait times. Various companies are investing heavily in ecosystem development, from manufacturing to charging infrastructure. Meanwhile, state governments are introducing localised incentives. Delhi's electric vehicle policy, for example, provides additional subsidies and waivers on registration fees for electric vehicles, further encouraging adoption.

The private sector is also playing a crucial role in driving the adoption of electric three-wheelers. Startups are developing customised solutions tailored to India's unique market requirements, from compact designs to affordable battery technologies. Mobility players are increasingly adopting electric three-wheelers in their supply chains, promoting sustainability while optimising operational efficiency. These collaborations between stakeholders are shaping a robust ecosystem for electric mobility.



Battery swapping stations, for instance, are gaining traction in cities like Bengaluru, offering drivers a quick and convenient way to recharge without long wait times.

The story of electric three-wheelers in India is still being written, but its trajectory is clear. As the country aims for 30 percent electric vehicle penetration by 2030, according to NITI Aayog, these vehicles will play a pivotal role in reshaping India's transportation landscape. They are not merely tools for connectivity, they are catalysts for change, driving India toward a cleaner, more equitable future.

As the sun sets over the crowded streets of an Indian city, the hum of electric three-wheelers paints a picture of hope and progress. They carry with them not just passengers or parcels but the promise of a better tomorrow, one where mobility is affordable, accessible, and environmentally sustainable.

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About the author:

Naveeth Menon, Vice President - Sales & Marketing Operations, BAXY Mobility, is a seasoned professional with over two decades of experience as a Strategic Sales and Business Leader. His comprehensive expertise extends across diverse markets, including India, Nepal, Africa and Bangladesh, overseeing product portfolios ranging from commercial vehicles to passenger vehicles. Menon has a track record of driving significant growth and scaling operations across various automotive segments. Menon excels in roles that require innovation and driving change. His highly collaborative leadership style fosters continuous improvement and long-term success. His competencies include strategic sales and planning, business development, revenue and profit maximisation, P&L ownership, go-to-market strategies, client relationship management, tactical business planning, and new market identification.



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Journey Towards Sustainable Plastic Manufacturing

The plastics industry is undergoing a paradigm shift as sustainability becomes central to its operations. Traditionally reliant on pure plastic materials, the industry now faces increasing pressure to minimise its environmental footprint, opines **Pallav Doshi, Managing Director, Essen Speciality Films Limited.**

India's ambitious Make in India initiative has emerged as a powerful catalyst for the nation's industrial and economic growth. Among the key sectors benefiting from this drive is the plastic manufacturing industry, particularly the subset focusing on sustainable practices. With increasing global emphasis on environmental consciousness and resource efficiency, India has the potential to become a global hub for plastic manufacturing. As global markets emphasise environmentally compliant practices, India stands at the cusp of becoming a global leader in sustainable plastic manufacturing. However, this journey is fraught with challenges and opportunities that require a proactive, innovative, and resilient approach.



Source: Freepik

Sustainability: The new imperative

The plastics industry is undergoing a paradigm shift as sustainability becomes central to its operations. Traditionally reliant on pure plastic materials, the industry now faces increasing pressure to minimise its environmental footprint. This shift is driven by multiple factors:

- **Consumer awareness:** Modern consumers are making informed choices, with growing preference for sustainable, high-quality products.
- **Stringent regulatory norms:** Governments worldwide are enacting laws to reduce plastic waste and encourage recycling, such as the European Union's Single-Use Plastics Directive.
- **Corporate responsibility:** Businesses are adopting Environmental, Social, and Governance

(ESG) frameworks, making sustainability a core component of their strategies.

India's robust infrastructure, skilled workforce, and advanced technologies position it to lead sustainable plastics manufacturing, provided it overcomes key challenges and seizes emerging opportunities.

Addressing core challenges

Despite its potential, the path to sustainable plastic manufacturing is fraught with several hurdles during the transition:

- **Limited availability of recycled materials:** The supply chain for recycled materials in India remains fragmented. Ensuring a consistent and high-quality supply of post-consumer recycled (PCR) materials is a significant hurdle, requiring investment in collection, segregation, and recycling infrastructure.
- **Customisation complexity:** Catering to specific customer demands increases operational

challenges, requiring significant innovation and agility.

- **High transition costs:** Adopting sustainable practices often involves significant capital expenditure. Investments in advanced machinery, renewable energy sources, and research and development (R&D) for eco-friendly materials can be prohibitive, particularly for small and medium enterprises (SMEs) that dominate the sector.
- **Global compliance requirements:** Indian manufacturers must meet stringent sustainability standards, such as the Global Recycled Standard (GRS) and the ISO certifications for environmental management. Achieving these certifications requires substantial financial and operational strategies.
- **Limited market awareness in India:** Limited domestic awareness and price sensitivity hinder the demand for sustainability-focused products in India.

According to government data, India's export levels were stagnant at approximately \$500 million until 2020. However, significant progress has been made in the past two years, with exports now reaching the \$776 million mark. By leveraging Free Trade Agreements, adhering to high standards, and fostering government-industry collaboration, the plastic industry can unlock new markets, create jobs, and strengthen India's global position.

Opportunities to revolutionise the industry

The industry can go green while adopting the following practices:

- **Embracing the circular economy:** Adopting a circular economy minimises waste and reuses resources. Closed-loop systems allow manufacturers to recycle plastic waste into new products, reducing dependency on virgin materials. They showcase this by using post-consumer recycled (PCR) materials to balance sustainability and performance.
- **Investing in renewable energy:** The use of renewable energy in manufacturing processes is a critical step toward sustainability. Solar, wind, and biomass energy sources can reduce the industry's carbon footprint while lowering long-term operational costs. Government subsidies and incentives under the Make in India initiative further support this transition.
- **Developing innovative products:** Sustainable innovations create globally appealing products. Few Indian companies focus on items such as artificial plants, yoga mats, and home décor that

meet environmental and aesthetic standards.

- **Expanding into global markets:** Sustainability enhances a brand's appeal in international markets where eco-friendly products command premium pricing. Aligning with global certifications unlocks lucrative export opportunities for manufacturers.
- **Collaborating with government initiatives:** Programs such as the Production Linked Incentive (PLI) scheme provides financial incentives to manufacturers adopting sustainable practices. Additionally, policies promoting waste management and recycling create a supportive ecosystem for growth.

Strategic focus area

Some green steps that manufactures can take:

- **Strengthening recycling infrastructure:** Investments in modern recycling facilities, coupled with public-private partnerships, can improve the availability and quality of recycled materials. Integrating technology for waste segregation and collection can streamline operations.
- **Fostering industry collaboration:** Collaboration between manufacturers, raw material suppliers, and industry bodies can scale sustainable practices. Platforms for knowledge sharing and joint R&D initiatives are essential.
- **Enhancing consumer awareness:** Educating consumers about the environmental benefits of sustainable plastic products can create demand in domestic markets. Awareness campaigns, labeling initiatives, and partnerships with retailers can accelerate this shift.

Conclusion

India's Make in India initiative presents an unparalleled opportunity for the plastic manufacturing industry to embrace sustainability and lead globally. By addressing challenges through innovation, collaboration, and government support, the sector can turn obstacles into stepping stones. Through innovation, the company embodies India's potential to become a global hub for responsible plastic manufacturing.

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About the author:

Pallav Doshi serves as the Managing Director of Essen Speciality Films Limited, with cross-functional expertise in New Product Development and Manufacturing Operations. Doshi oversees diverse areas within Essen, including financial operations and innovation initiatives. Recently awarded the Entrepreneurs Award, Doshi is celebrated for his achievements as an icon for New Generation Entrepreneurs.



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The Green Manufacturing Revolution

Making the switch to green production is not without its difficulties. High upfront costs for cutting-edge infrastructure and technologies can put off sectors, particularly small and medium-sized businesses, says **Anmol Khandelwal, Executive Director, Chakr Innovation.**

The manufacturing sector is a very significant component of the growth of the economy in India, driving industrialisation, creating millions of jobs, and contributing significantly to the country's gross domestic product (GDP). But lo and behold, this progress has come at an environmental cost. The manufacturing sector accounts for nearly 25 per cent of India's total greenhouse gas emissions, placing immense pressure on the nation's air, water, and land resources. The time is ripe for a green manufacturing revolution, one that aligns economic development with developmental sustainability.

A green manufacturing revolution is way overdue. This shift requires integrating environmentally friendly methods at all levels of manufacturing—from obtaining raw materials to the handling of waste at the end of a product's life cycle. Green manufacturing can significantly support sustainable development in terms of resource efficiency, minimal environmental damage, and coordination with global climate goals. The industry can become a leader in environmental stewardship by implementing strategies such as supply chain optimisation, emission control technologies, renewable energy adoption, and energy-efficient production.

Air pollution in India: A growing crisis

With multiple cities often ranked among the most polluted in the world, India's air quality crisis has reached a critical stage. India is home to 22 of the world's 30 most polluted cities, according to the World Health Organization (WHO). Millions of people's lives are impacted by the widespread pollution and particulate matter in cities, which lower life expectancy and cause serious health problems.

The extensive use of diesel generators (DGs) is one of the major causes of this dilemma. These generators, which are necessary for commercial buildings, residential



Source: Freepik

complexes, and even industrial activities, release greenhouse gases, nitrogen oxides, and hazardous particulate matter. According to studies, DG sets exacerbate the issue by contributing 17–18 per cent of PM_{2.5} emissions during urban peak hours.

The government has taken action under the National Clean Air Programme (NCAP) in recognition of the problem's urgency. This initiative was started in 2019 with the goal of lowering PM_{2.5} and PM₁₀ levels by 20–30 per cent by 2024 (in comparison to 2017 levels). In order to battle air pollution, the State Pollution Control Boards (SPCBs) and the Central Pollution Control Board (CPCB) are vigorously implementing these targets through stringent rules and encouraging sustainable practices.

The role of green manufacturing in combating air pollution

An innovative way to solve India's air quality issues is through green manufacturing. The industry can lower emissions and improve operational efficiency by implementing sustainable production practices. Important tactics consist of:

- **Diesel generator retrofits:** By installing cutting-edge pollution control systems in diesel generators, particulate matter emissions are greatly reduced, guaranteeing adherence to regulations and promoting cleaner air.
- **Practices of the circular economy:** The circular economy is the foundation of green production. Industries can minimise waste generation and lessen their reliance on virgin resources by adopting waste recovery technologies, creating products for prolonged lifecycles, and using recycled materials.
- **Utilising cutting-edge technologies:** Manufacturers may track emissions, optimise energy use, and improve waste management by utilising cutting-edge technology like IoT, AI, and real-time monitoring systems. This increases total production while guaranteeing adherence to environmental rules.
- **Renewable energy adoption:** By switching to renewable energy sources like solar, wind, or biomass from fossil fuels, enterprises can lower greenhouse gas emissions and better meet global sustainability targets. This change lowers long-term energy expenses while simultaneously lessening the impact on the environment.

Government Initiatives and Policy Support

With programs like ‘Make in India’ and ‘Atmanirbhar Bharat,’ the Indian government has established a solid basis for long-term economic expansion. These initiatives prioritise self-reliance, creativity, and eco-friendly production methods.

Energy efficiency improvements in energy-intensive businesses are encouraged by a number of sub-programs under the National Action Plan on Climate Change (NAPCC), such as the Perform, Achieve, and Trade (PAT) scheme. Policies that promote the use of renewable energy sources and clean technology adoption are becoming more popular.

Significant expenditures in sustainable infrastructure, renewable energy, and green technologies are also anticipated in the next Union Budget. These steps not only help the manufacturing industry but also guarantee that environmental preservation and economic growth coexist.

Making the switch to green production is not without its difficulties. High upfront costs for cutting-edge infrastructure and technologies can put off sectors, particularly small and medium-sized businesses. Additionally, widespread adoption is hampered by a lack of technological know-how and awareness but these challenges are greatly outweighed by the opportunities. Green manufacturing encourages creativity and provides access to global markets that place a high value on sustainability. By adhering to international sustainability

standards, Indian producers can stand out from the competition, obtain a competitive advantage, and pursue export prospects.

Moreover, consumer preferences are changing, with a rise in the desire for environmentally friendly goods. Businesses that use green manufacturing can develop enduring brand loyalty by strengthening their bonds with eco-aware consumers.

India’s manufacturing industry is at a turning point. To safeguard the future of the country, moving toward green manufacturing is not merely an option; it is a need. To propel this change, cooperation between businesses, legislators, academic institutions, and environmental groups is essential.

Stakeholders must invest in research and development to provide scalable, reasonably priced solutions that are suited to the Indian environment in order for this transition to be successful:

- Encourage skill development by teaching employees how to adjust to green practices and technologies.
- Tighten Regulations: Implement strict environmental guidelines and offer rewards for adherence.
- Promote Public-Private partnerships: Use pooled resources and knowledge to expand environmentally friendly operations.

India can solve its air pollution problem, meet its climate targets, and establish itself as a world leader in sustainable industrial practices by adopting green manufacturing. This change aims to create a healthier, more just future for future generations, not only to cut emissions or save resources.

‘Making in India for the World’ now encompasses more than just promoting economic expansion. It involves developing an inclusive, accountable, and sustainable vision. India can change the narrative of industrial success to one that puts people and the environment first by inventing, working together, and taking the lead with a green viewpoint. The revolution in green manufacturing is a reality. The moment to take action is now, and it is a real, attainable reality. By working together, we can create an India that is a leader in sustainable innovation and leaves a legacy of clean air and a healthy environment for future generations.

SME



About the author:

Anmol Khandelwal is the Executive Director of Chakr Innovation, a leading clean energy company committed to reducing emissions and driving sustainable solutions. With over 8 years of experience spanning automotive engineering, strategy consulting, and business development, he has played a key role in securing funding, building partnerships, and expanding the company’s market presence.



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India: A Manufacturing Perspective

Sustainability is no longer optional; it is a necessity for modern manufacturing. Companies must integrate eco-friendly practices that align with the company's science-based targets and low-carbon economy goals, opines **Kamlesh Panchal, General Manager, Product Company (Dapodi), Compressor Technique, Atlas Copco (India) Pvt. Ltd.**

The 'Make in India' initiative has positioned India as a global manufacturing hub, fostering innovation, sustainable practices, and advanced manufacturing technologies. As part of this transformative journey, many companies have contributed significantly by investing in state-of-the-art facilities and adopting strategies to meet the growing demands of both domestic and international markets. The dynamics of 'Make in India,' including strategic investments, green manufacturing, advanced technologies, and people management—basic pillars for propelling India's manufacturing growth.

Strategic investments and government policies

India's manufacturing landscape is rapidly evolving, thanks to strategic initiatives and supportive government policies. Government policies, such as the Production Linked Incentive (PLI) schemes and Make in India initiative, are designed to encourage domestic manufacturing, attract foreign investments, and foster innovation. Companies are leveraging these opportunities by making substantial investments, such as establishing state-of-the-art factories and production facilities. These facilities not only aim to cater to the growing Indian and export markets, but also underscore sustainability through environment care initiatives. Companies who align their plans with these government-backed initiatives are paving the way for India to become a leader in both industrial innovation and sustainable manufacturing. Realising India's potential as a global manufacturing powerhouse will require cooperation between the public and private sectors. We need to accelerate digitisation to increase export and production mechanisms' scalability, efficiency, and transparency.

Low carbon manufacturing: Towards a sustainable future

Sustainability is no longer optional; it is a necessity for modern manufacturing. Companies must integrate



Source: Freepik

eco-friendly practices that align with the company's science-based targets and low-carbon economy goals, focusing on waste reduction and the use of renewable energy sources such as solar power, green energy, and rainwater harvesting to minimise their environmental impact. By prioritising sustainability, manufacturers not only reduce the amount of carbon footprint but also promote energy efficiency, and circular economy principles.

Emerging markets for Compressed Natural Gas (CNG mobility) biogas, hydrogen, and carbon capture usage and storage via CO₂ compressor technologies highlight the shift towards alternative energy sources. Companies are increasingly developing energy-efficient products, such as variable speed drive compressors that reduce energy consumption by up to at least 20 per cent. These innovations not only benefit customers by lowering operational costs but also contribute to a cleaner environment.

India's potential in green manufacturing is vast. With global investment flowing into renewable energy and sustainable technologies, Indian companies have the opportunity to establish themselves as leaders in this domain. By prioritising eco-friendly practices and

adopting international sustainability standards, Indian manufacturers can enhance their competitiveness on the global stage.

Advanced manufacturing technologies

The adoption of advanced manufacturing technologies is revolutionising India's industrial ecosystem. Industry 4.0 initiatives, including automation, robotics, digitalisation, and AI/ML applications, are becoming integral to manufacturing processes. We as manufacturers exemplify this trend by incorporating cutting-edge technologies in the manufacturing factory to boost productivity and meet global standards.

The company's focus on emerging technologies such as additive manufacturing, energy conversion solutions, and waste heat recovery systems reflects the growing importance of innovation. Establishing dedicated heat labs and high-tech testing facilities further enhances product development and validation, ensuring superior quality and performance.

India's push for advanced manufacturing technologies is supported by government schemes promoting digitalisation and innovation. The integration of smart technologies not only improves efficiency but also enables manufacturers to respond more effectively to market demands. Moreover, by leveraging data analytics and IoT, companies can optimise their supply chains and reduce operational costs.

People handling

A robust manufacturing ecosystem requires a skilled and diverse workforce. To build a skilled workforce a comprehensive people management strategy is required. This involves implementing on-the-job training, upskilling initiatives, fostering a culture of continuous learning, career development pathways, digital literacy training to engage employees with the evolving manufacturing landscape. These programs empower them with the latest technological know-how, fostering innovation and operational excellence. This collaborative approach between industry and academia ensures a continuous supply of skilled talent.

India's demographic advantage offers a significant opportunity for workforce development. By investing in upskilling and reskilling initiatives, companies can bridge the skill gap and ensure a steady flow of talent. Collaborative efforts between industry, academia, and government are essential to create a future-ready workforce equipped to handle the demands of advanced manufacturing.

Challenges and opportunities

Despite significant progress, India faces challenges in

becoming a global manufacturing leader. Infrastructure gaps, energy reliability, and regulatory complexities are areas that require continued focus. However, initiatives like the Goods and Services Tax (GST) and increased FDI inflows are paving the way for a more conducive business environment.

The growing emphasis on sustainability and advanced technologies presents enormous opportunities. India's knowledge-based sectors, such as IT and pharmaceuticals, combined with its burgeoning manufacturing capabilities, position the country as a strong contender in the global market. With continued investments and policy support, India can achieve its goal of contributing 25 per cent to GDP through manufacturing.

Contribution to the GDP

Among fast growing countries, the contribution by the manufacturing sector to the GDP, stands at over 30 per cent; this remains a benchmark for global manufacturing. However, India is making significant strides, with manufacturing contributing approximately 20 per cent to its GDP. India's infrastructure investment shows a good pace and growth due to recent reforms and several initiatives are closing the gap.

India's strengths lie in its knowledge-based industries, robust financial markets, and a thriving private sector. The 'Make in India' initiative is bridging the manufacturing gap, with a focus on export-led growth and technological innovation. By leveraging its demographic dividend and emphasising skill development, India can further enhance its manufacturing capabilities.

Future outlook and recommendations

As global manufacturing undergoes a shift, India is positioned to capitalise on emerging opportunities. By aligning with global trends and focusing on quality, manufacturers can establish themselves as reliable partners. Policy reforms must continue to support this growth trajectory.

SME



About the author:

Kamlesh Panchal is a leader with three decades of experience in air and gas compressor technology. He has expertise in high-specification, short delivery, complex projects around turnkey solutions with standard high volume compressors production. He has played a key role in driving growth for Atlas Copco Gas and Process Operations in India,

overseeing large machinery deliveries to process industries and international clients, as well as establishing a new packaging facility. Currently, Panchal serves as General Manager at Atlas Copco India Pvt Ltd, Dapodi, Pune leading a diverse product portfolio for both local and global customers. He is also leading a landmark greenfield project to establish a compressor manufacturing facility in Talegaon.



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Strategies for Global Manufacturing Dominance

The role of government policies in this ecosystem cannot be overstated. Effective and supportive government interventions are vital for creating an enabling environment for manufacturing, comments **Vishal Agarwal, President, Yudo Hot Runners India Pvt Ltd.**



Source: Freepik

India is actively striving to become a major player in the global manufacturing sector, with the 'Make in India' initiative serving as a cornerstone of its ambitions. This initiative is supported by four critical pillars for optimising its effectiveness and ensuring sustainable growth.

First, effective corporate strategies and supportive government policies play a vital role in creating an environment conducive to manufacturing. This includes streamlining bureaucratic processes, reducing regulatory hurdles, and implementing incentives to attract domestic and foreign investment. By fostering a business-friendly ecosystem, India can enhance its competitiveness on the global stage.

Second, sustainable manufacturing practices are increasingly essential in today's environmentally conscious market. Emphasising green technologies and resource efficiency aligns with global sustainability goals

and attracts eco-conscious consumers and businesses. Integrating sustainable practices can lead to cost savings and improved brand reputation, further enhancing India's manufacturing appeal.

The third pillar, advanced manufacturing technologies, is crucial for innovation and productivity. By investing in Industry 4.0 technologies such as automation, artificial intelligence, and the Internet of Things (IoT), Indian manufacturers can improve efficiency and reduce production costs. Staying ahead in technological advancements will enable Indian companies to compete more effectively in the global marketplace.

Finally, proficient workforce management ensures that India has a skilled labour force that meets the demands of modern manufacturing. This involves investing in education and training programs that equip workers with the necessary skills for advanced

manufacturing processes. By nurturing a skilled workforce, India can drive innovation and maintain a competitive edge.

When effectively leveraging these four pillars in concert, they can significantly elevate India's status in international manufacturing. This article aims to delve deeper into each of these pillars, discussing their importance while outlining practical strategies that can be employed to optimise their effectiveness and contribute to India's manufacturing success.

Right company strategies & government policies

Companies must implement strong strategies to navigate the current era of volatility, uncertainty, complexity, and ambiguity (VUCA), especially considering the strategic shift towards the 'China Plus One' model. These strategies should prioritise research and development (R&D) and innovation to ensure that Indian products meet global quality standards and remain competitive in international markets.

Government policies are crucial in this ecosystem. Providing incentives for exports, streamlining regulations, and supporting safety standards are essential for creating a favour in today's dynamic business landscape characterised by volatility, uncertainty, complexity, and ambiguity (often referred to as VUCA); companies must adopt comprehensive and robust strategies to thrive. This is particularly important considering the strategic shift towards the 'China Plus One' model, where businesses seek to diversify their supply chains beyond China. To succeed in this evolving environment, companies must focus on enhancing their research and development (R&D) capabilities and fostering innovation. By doing so, Indian products can meet and exceed global quality standards, increasing their competitiveness in international markets.

The role of government policies in this ecosystem cannot be overstated. Effective and supportive government interventions are vital for creating an enabling environment for manufacturing. This includes offering incentives for exports to encourage companies to expand their reach and streamline regulations to reduce bureaucratic hurdles that can impede growth. Additionally, robust support for safety and quality standards is necessary to ensure that products meet international safety requirements.

To build a manufacturing sector that is resilient and prepared for the future, companies must align their strategic goals with government policies. This collaboration can lead to developing a more sustainable, innovative, and competitive manufacturing landscape in India, positioning it as a strong player in the global economy. By leveraging both company initiatives and

supportive government frameworks, India can effectively navigate the challenges the current VUCA environment poses—an environment for manufacturing. India can establish a resilient and future-ready manufacturing sector by aligning company strategies with government policies.

Green manufacturing

In today's business landscape, sustainability has shifted from an optional strategy to an essential requirement for success. Companies are recognising that integrating environmentally friendly practices into their operations is no longer just a trend but a necessity for resilience in the market. Green manufacturing practices play a pivotal role in mitigating carbon emissions, waste, and resource depletion, ultimately promoting a circular economy. This approach is crucial for the long-term viability of the manufacturing sector, which is a significant player in the global economy.

Businesses must strategically invest in sustainable technologies and innovative processes to thrive in this evolving landscape. This can involve adopting energy-efficient machinery, utilising renewable energy sources, implementing waste reduction techniques, and embracing sustainable sourcing of raw materials. By doing so, companies can significantly lower their environmental footprint while enhancing operational efficiency. The result is a dual benefit: these practices help preserve the planet and lead to cost savings and improved productivity within the organisation.

Moreover, by committing to green manufacturing practices, businesses position themselves to meet stringent global environmental standards. This proactive approach can enhance the international market value of Indian products, making them more competitive worldwide. Ultimately, these efforts contribute to economic growth and the planet's well-being, ensuring that future generations inherit a healthier environment. Embracing sustainability is not just a moral obligation but a strategic imperative that can drive innovation, attract customers, and foster loyalty in an increasingly eco-conscious marketplace.

Advanced manufacturing technologies

The emergence of advanced manufacturing technologies, including automation, robotics, digitalisation, Industry 4.0, 3D printing, artificial intelligence (AI), and machine learning (ML), fundamentally transforms the manufacturing sector. These innovations allow for unprecedented precision, efficiency, and customisation within production processes, paving the way for manufacturers to optimise their operations and respond more effectively to market demands.

It is crucial to incorporate these technologies into the existing manufacturing ecosystem to position India as a leading global manufacturing hub. This integration will not only enhance production capabilities but also foster competitiveness on the international stage. Achieving this goal involves substantial investments in infrastructure to support advanced technologies and the establishment of modern facilities equipped to handle these innovations.

Moreover, training and development initiatives are essential to ensure the workforce possesses the skills to utilise new technologies effectively. This necessitates the creation of comprehensive education programs and partnerships between industry and educational institutions aimed at upskilling employees and preparing them for the demands of a rapidly evolving manufacturing environment. By investing in technology and human capital, India can create a robust manufacturing sector that can thrive in the global market while driving economic growth and job creation.

People management

The individuals who drive the manufacturing sector are undeniably at the foundation of any successful initiative. A holistic approach to effective people management is essential, encompassing various elements such as skill development, ongoing upskilling, fostering collaboration between industry and academia, and actively promoting diversity and inclusion. These factors are pivotal for the success of the 'Make in India' initiative.

Investing in comprehensive skill development programs ensures the workforce remains competitive in an ever-evolving industrial landscape. This involves initial training and continuous upskilling to help employees adapt to new technologies and methodologies. This commitment to lifelong learning equips the workforce with the necessary competencies to tackle modern manufacturing challenges and seize opportunities presented by technological advancements.

Moreover, fostering collaboration between industry and academia is crucial in bridging the gap between theoretical knowledge and practical application. By partnering with educational institutions, manufacturing firms can ensure that curricula are aligned with industry needs and that students are equipped with relevant skills. This synergy encourages innovation, allowing for exchanging ideas and findings from both sectors, creating a fertile ground for research and development that can drive growth.

In addition to these initiatives, promoting diversity and inclusion within the manufacturing sector, particularly encouraging the participation of women, is

essential. Increasing the representation of women in this field not only enhances equity but also enriches the workforce with diverse perspectives. Research has shown that teams comprising individuals from varied backgrounds are more innovative and effective, as they can approach problems from multiple angles and contribute unique insights. Recognising and valuing every individual's skill and experience fosters a more dynamic and innovative work environment, ultimately enhancing productivity and success within the manufacturing landscape.

In summary, the people driving the manufacturing sector are integral to achieving success in initiatives like 'Make in India'. By prioritising effective people management through skill development, collaboration with academic institutions, and a commitment to diversity and inclusion, the manufacturing industry can cultivate a skilled and adaptable workforce that is innovative and resilient in the face of future challenges.

Conclusion

The 'Make in India' initiative represents a strategic effort to position India as a prominent global manufacturing hub. India focuses on addressing various challenges to enhance its manufacturing environment while seizing emerging opportunities. Achievements in this area will involve developing robust corporate strategies, implementing effective governmental policies, promoting green manufacturing practices, adopting advanced technologies, and prioritising the management and development of the workforce.

Collaboration among all stakeholders—government officials, industry leaders, and employees—is essential as the initiative progresses. The 'Make in India' initiative is more than just a slogan; it is a concerted movement emphasising the importance of collective efforts in steering India toward becoming a leader in global manufacturing. By working together, there is an opportunity to create a success story that benefits all participants, ultimately contributing to a prosperous future for the country and its citizens. The unifying goal is to realise the potential of 'Make in India fully.'

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About the author:

Vishal Agarwal serves as the President of Yudo Hot Runner India Pvt Ltd, a subsidiary of Yudo, a leading manufacturer of hot runner systems and auxiliary equipment for the plastics industry. Under his leadership, Yudo India has been instrumental in introducing advanced hot runner technologies to the Indian market, enabling significant cost savings and efficiency improvements for plastic moulders. He has been featured in various industry publications and interviews, sharing insights on the benefits of hot runner systems and the future of the plastics industry in India.



Building a Competitive Global Manufacturing Ecosystem

Strong partnerships between manufacturers and educational institutions are fostering a culture of innovation and ensuring the next generation of professionals is equipped with industry-relevant expertise, remarks **Varun Poddar, Founder, VOX India**.



Source: Freepik

The 'Make in India' initiative is reshaping India's manufacturing landscape by fostering innovation, sustainability, and cutting-edge technologies while prioritising workforce development. As the country positions itself as a global manufacturing hub, the focus must be on strategic foresight, green manufacturing, technological advancements, and talent management to ensure long-term success.

1. Right company strategies & government policies

Amid the complexities of a VUCA (Volatility,

Uncertainty, Complexity, and Ambiguity) world and the opportunities presented by the China Plus One strategy, it is crucial for companies to adopt well-structured strategies to balance innovation, quality, and compliance. Several key aspects are shaping the industry:

- **R&D and innovation:** To remain competitive on a global scale, manufacturers in India are increasingly investing in research and development to enhance product quality, durability, and performance. Companies that prioritise innovation are not only introducing advanced solutions but also ensuring alignment with evolving global standards. Industry-

wide efforts to enhance product longevity and safety through rigorous testing and eco-conscious material choices are setting new benchmarks for quality.

- **Exports and localisation:** With the push towards self-reliance, India is rapidly expanding its manufacturing capabilities, supplying both domestic and international markets. Key exports to the Middle East, Africa, and Southeast Asia highlight India's growing role in global supply chains. This shift is further supported by localisation strategies that drive efficiency, cost-effectiveness, and customisation for regional markets.
- **Government incentives:** The government's focus on providing tax incentives, production-linked incentives (PLI), and ease of doing business has played a pivotal role in encouraging domestic manufacturing. These incentives are facilitating capital investment, promoting the adoption of high-tech manufacturing, and reducing dependency on imports.
- **Safety and compliance:** Adherence to global safety standards is non-negotiable. Industry players are implementing stringent quality controls and ensuring compliance with international certifications, which not only enhance consumer trust but also make Indian-manufactured products more viable for global exports.

2. Green manufacturing

Sustainability has become a cornerstone of modern manufacturing. Companies across industries are making concerted efforts to reduce their carbon footprint, adopt circular economy principles, and integrate eco-friendly production practices.

- **Reducing carbon footprint:** Manufacturers are increasingly leveraging energy-efficient processes and renewable energy sources to minimise emissions and optimise resource consumption.
- **Circular economy:** Material recycling, waste reduction, and sustainable sourcing are becoming standard practices, aligning with global sustainability goals and green building certifications.
- **Eco-friendly products:** The shift towards sustainable product design, including the use of recyclable materials and non-toxic finishes, is accelerating, further reinforcing India's commitment to green manufacturing.

3. Advanced manufacturing technologies

Technological advancements such as automation, robotics, and digitalisation are transforming India's manufacturing landscape. The adoption of Industry 4.0, AI-driven quality control, and 3D printing is enhancing

precision, efficiency, and scalability in production processes.

- **Smart manufacturing & digitalisation:** Industry 4.0 integration is driving operational excellence by enabling real-time monitoring, predictive maintenance, and data-driven decision-making.
- **AI & machine learning:** Advanced AI models are helping manufacturers optimise inventory, predict demand, and enhance supply chain resilience.
- **Innovative printing technologies:** New-age printing techniques, including thermal printing for durable textures and finishes, are ensuring high-quality aesthetics with long-lasting performance across various applications.

4. People management

A robust manufacturing sector is driven by a skilled workforce. As automation and smart technologies become more prevalent, companies must prioritise continuous learning, industry-academia collaboration, and inclusivity in manufacturing.

- **Skill development & upskilling:** With emerging technologies reshaping job roles, there is a growing emphasis on technical training, digital literacy, and reskilling initiatives to keep India's workforce future-ready.
- **Industry-academia collaboration:** Strong partnerships between manufacturers and educational institutions are fostering a culture of innovation and ensuring the next generation of professionals is equipped with industry-relevant expertise.
- **Diversity & inclusion:** The push for gender diversity, particularly in manufacturing roles, is gaining traction, leading to more inclusive work environments and improved productivity.

Conclusion

India's manufacturing sector is at a turning point, poised to emerge as a global leader through strategic policies, sustainable practices, technological evolution, and a highly skilled workforce. The success of 'Make in India' hinges on the collective efforts of industry stakeholders, government support, and an ecosystem of collaboration that ensures Indian manufacturing remains competitive, resilient, and future-ready for global markets.

SME



About the author:

Varun Poddar is the founder of VOX India, a leading innovative brand involved in designing, manufacturing and distributing furniture, home furnishings and building materials in Europe. Having a legacy of over 30 years, VOX has now established a presence in India through its association with the former promoters of Ashirvad pipes.



"Indian manufacturing sector has a promising outlook."

A seasoned bureaucrat having more than 40 years of working experience in various government organisations and ministries, **Amitabh Kant, India's G20 Sherpa**, doesn't need any introduction. He is seen by many as the key governance reformer and policy change agent. Prior to his existing responsibility, Kant was CEO of NITI Aayog (2016–2022) and Secretary of Department of Industrial Policy and Promotion (2014–2016). He has also authored many books such as *"The Elephant Moves: India's New Place in the World"*, *"Made in India: 75 Years of Business and Enterprise"*, and *"Incredible India 2.0"* among others. In this interview with Rakesh Rao, Amitabh Kant, who has been instrumental in launching several initiatives including Make in India, elaborates on the country's transformative journey in the last few years and the potential of the Indian manufacturing sector.

How has the world transformed in the last decade? And how has India progressed during this period?

The last decade has witnessed significant transformations globally and in India, driven by technological advancements, economic shifts, and social dynamics. Some of the changes witnessed around the world are:

- **Technological advancements:** The integration of technology has accelerated, with innovations such as artificial intelligence (AI), blockchain, and cloud computing becoming mainstream. Organisations that embraced these technologies gained competitive advantages, streamlining operations and enhancing transparency.
- **Sustainability focus:** Sustainability has evolved from a compliance issue to a strategic imperative. Regulatory



Amitabh Kant,
India's G20 Sherpa

- pressures and stakeholder expectations have compelled businesses to adopt robust Environmental, Social, and Governance (ESG) frameworks, positioning sustainability as a competitive advantage.
- **Economic volatility:** The global economy faces challenges such as inflation, rising interest rates, and supply chain disruptions. Financial resilience became crucial as businesses sought to optimise operations and mitigate risks amid these uncertainties.
- **Geopolitical tensions:** Geopolitical issues have influenced global trade and supply chains. Businesses

have had to adapt quickly to shifting trade policies and regional instabilities, with consulting firms providing strategies to navigate these complexities.

- **Diversity and inclusion:** There has been a marked shift towards prioritising diversity and inclusion within organisations, recognised as drivers of innovation and profitability. Companies that effectively implemented diversity and inclusion strategies reported better performance metrics.

At the same time, India has also progressed on multiple fronts.

Economic growth: Over the past decade, India has emerged as one of the largest economies globally, currently ranked 5th in GDP terms and expected to become 3rd by 2027. The country's GDP growth is projected at approximately 7 per cent for FY 2024-25, underscoring its position as the fastest-growing major economy.

Technological adoption: India has embraced digital technology extensively, leading to the rise of start-ups and significant advancements in sectors like information technology and telecommunications. This digital transformation is pivotal for future economic growth. India is ranked 3rd among the fastest-growing startup hubs in the world after the USA and China.

Poverty reduction: Between 2011 and 2019, India halved the share of its population living in extreme poverty. However, the COVID-19 pandemic temporarily slowed this progress before recovery efforts resumed in 2021-22.

Global integration: India's integration into the global economy has strengthened its diplomatic clout and made it a key player on the international stage. The country is expected to continue this trajectory towards becoming a developed economy by 2047.

Reforms and policies: Significant reforms in various sectors have laid a strong foundation for sustained economic growth. These include improvements in infrastructure, labour regulations, and public sector efficiency, which are essential for attracting investment and fostering development.

The Make in India initiative has completed 10 years. What are the key achievements of the Indian manufacturing sector since 2014-15?

The Make in India initiative, launched on September 25, 2014, has significantly impacted the Indian manufacturing sector over the past decade.

Increased FDI: Foreign Direct Investment (FDI) inflows surged from approximately \$ 45.14 billion in 2014-15 to \$ 84.83 billion in 2021-22, totalling about \$ 667.41 billion from April 2014 to March 2024. This reflects growing investor confidence in India's manufacturing potential.

Growth in manufacturing output: The manufacturing sector's contribution to India's GDP has seen fluctuations, with a target to increase it to 25% by 2025 (originally set for 2022) and achieving notable growth in sectors like automobiles, electronics, and pharmaceuticals.

Improvement in ease of doing business: India's ranking improved dramatically from 142nd in 2014 to 63rd in the World Bank's Ease of Doing Business Index by 2020, indicating successful reforms aimed at simplifying regulatory processes and enhancing the business environment.

Infrastructure development: The initiative facilitated the establishment of industrial corridors, special economic zones (SEZs), and smart cities, creating a conducive environment for manufacturing activities and attracting both domestic and international investments.



India's integration into the global economy has strengthened its diplomatic clout and made it a key player on the international stage.

Indigenous manufacturing projects: Notable projects like the Vande Bharat trains and the indigenous aircraft carrier INS Vikrant exemplify India's growing capabilities in advanced manufacturing sectors.

Focus on sustainable manufacturing: India has emerged as the world's fourth-largest producer of renewable energy, reflecting a commitment to sustainable practices within the manufacturing sector as part of the broader goals of Make in India.

Technological advancements and innovation: There has been a strong emphasis on fostering innovation and research & development (R&D) within the manufacturing sector. The adoption of digital technologies such as Industry 4.0 and IoT has improved efficiency and productivity.

What are some of the missed opportunities by India during this period?

India has faced several missed opportunities over the past decade, particularly in the context of economic development, job creation, and social progress.

Job creation: Despite promises to generate millions of jobs, India has experienced a significant rise in unemployment, with rates reaching the highest levels in 45 years. The unemployment rate for graduates is alarmingly high at around 42 per cent. This failure to create adequate employment opportunities has been

attributed to various factors, including the impact of demonetisation & poorly implemented GST reforms that adversely affected SMEs.

Investment in education and skill development:

India's education system has not kept pace with the needs of a modern economy. The National Skill Development Mission, launched in 2015, came too late to address the skills gap among the youth entering the labour market. As a result, many young people lack the necessary skills for gainful employment.

Manufacturing sector growth: While initiatives like Make in India aimed to boost manufacturing, India missed opportunities to build large-scale capacities in labour-intensive sectors like textiles and garments. Countries like Bangladesh and Vietnam capitalised on global market shifts, while India lagged behind due to high tariffs and a lack of strategic investment.



This failure to create adequate employment opportunities has been attributed to various factors, including the impact of demonetisation & poorly implemented GST reforms that adversely affected SMEs.

Public goods investment: There has been a chronic underinvestment in public goods such as healthcare and infrastructure. This neglect hampers overall economic growth and quality of life for citizens.

Technological advancement and R&D: India has not sufficiently increased public investment in R&D. This lack of focus on innovation limits the country's ability to compete globally in high-tech industries.

In spite of many efforts, India is still very much dependent on imported components/parts and raw materials for key sectors. What are the reasons for it? How can we ensure ecosystem-led development of the manufacturing sector?

India's ongoing dependence on imported components, parts, and raw materials for key sectors stems from several interrelated factors.

Historical trade liberalisation: India's trade liberalisation policies, which began in the early 1990s, significantly reduced import duties and removed quantitative restrictions. This opened the market to

imports without preparing domestic industries to compete, leading to a surge in imports from countries like China in critical sectors such as electronics, pharmaceuticals, and textiles.

Limited domestic manufacturing capacity: Many sectors, particularly electronics and medical devices, have limited domestic production capabilities. For instance, around 88 per cent of mobile handset components were imported till 2015, while over 60 per cent of medical devices are sourced from abroad. The focus has often been on assembly rather than manufacturing critical components.

High production costs: Indian manufacturers face higher costs related to logistics and infrastructure compared to their foreign counterparts. For example, transportation costs within India were higher than those in countries like China, making local production less competitive.

Lack of R&D investment: Insufficient investment in R&D has hindered innovation in manufacturing processes and product development. Without a strong R&D base, Indian industries struggle to produce advanced materials and technologies domestically.

Policy inconsistencies: Frequent changes in government policies and regulations can create uncertainty for manufacturers, discouraging long-term investments in domestic production.

Addressing the problem of import-dependency is crucial for India's manufacturing to progress. India needs to adopt several potential strategies for ecosystem-led development.

Strengthening local supply chains: Developing robust local supply chains is essential for reducing reliance on imports. This can be achieved by incentivizing domestic production of critical components through subsidies/PLI or tax breaks.

Enhancing R&D and innovation: Increasing investment in R&D can drive innovation in manufacturing processes and products. Collaborations between industry and academic institutions can facilitate technology transfer and skill development.

Improving infrastructure: Investing in infrastructure improvements—such as transportation networks, power supply stability, and logistics—will help reduce operational costs for manufacturers and make local production more viable.

Targeted policy frameworks: Implementing clear and consistent policies that support domestic industries can encourage investment in manufacturing capabilities. This includes creating favorable conditions for startups and SMEs that contribute significantly to job creation.

Encouraging sustainable manufacturing practices: This will enhance competitiveness while addressing environmental concerns. This includes investing in clean energy technologies.

Are we doing enough to adopt modern manufacturing technologies to improve our global competitiveness?

India is making strides in adopting modern manufacturing technologies to enhance global competitiveness, but there are still challenges and opportunities for improvement. The Indian manufacturing sector is increasingly embracing Industry 4.0, which includes the use of AI, Machine Learning (ML), Internet of Things (IoT), and robotics. These technologies are transforming traditional manufacturing processes into smart factories, enhancing operational efficiency. Technologies like 3D printing are gaining traction, allowing manufacturers to reduce lead times and waste while enabling customization. Despite this, the overall adoption of advanced manufacturing technologies is still in its early stages and India needs to overcome several challenges.



India is making strides in adopting modern manufacturing technologies to enhance global competitiveness, but there are still challenges and opportunities for improvement.

Skills gap: A significant barrier to the widespread adoption of modern technologies is the skills gap in the workforce. There is a need for training programs that equip workers with the necessary skills to operate advanced manufacturing technologies effectively.

Investment requirements: Implementing modern manufacturing technologies often requires substantial upfront investment. Many small and medium enterprises (SMEs) may struggle to allocate resources for such technological upgrades.

Infrastructure limitations: While progress is being made, India still faces infrastructural challenges that can hinder efficient manufacturing operations, such as inadequate logistics and power supply.

What challenges do you foresee for the Indian manufacturing sector in the next few years?

The Indian manufacturing sector faces several challenges in the coming years, which could hinder its growth and global competitiveness. Addressing following challenges will require coordinated efforts from both the industry and the government.

Regulatory hurdles: Complex regulations related to

land acquisition, labour laws, and environmental compliance can deter investment and slow down project implementation.

Skilled labour shortages: Despite a large workforce, there is a significant gap in the skills required for modern manufacturing processes. This is partly due to inadequate vocational training.

Inadequate infrastructure: The manufacturing sector suffers from poor infrastructure, including transportation, power supply, logistics, etc. This increases operational cost & reduce competitiveness.

Access to finance: MSMEs which are crucial for the manufacturing sector, often face difficulties in accessing finance due to high-interest rates and stringent collateral requirements.

Global competition: Indian manufacturers face stiff competition from countries like China, which have more developed manufacturing ecosystems and lower production costs.

Limited investment in R&D: India's investment in research and development remains low compared to other countries, limiting technological advancement and innovation.

What is your outlook for India's manufacturing sector for the next 5 years?

The outlook for India's manufacturing sector over the next five years is promising, driven by government initiatives, increased foreign investment, and a growing domestic market. However, several challenges need to be addressed to maximise this potential.

The Indian manufacturing market is projected to grow from \$ 310.30 billion in 2024 to \$ 523.70 billion by 2029, reflecting a compound annual growth rate (CAGR) of 9.11 per cent. India has seen a significant rise in FDI inflows, with a reported increase of 69 per cent from 2014 to 2024, totalling \$ 165.1 billion. This trend is expected to continue as global manufacturers seek to diversify their supply chains away from China, positioning India as a favourable alternative.

Sectors such as electronics, automotive, and pharmaceuticals are expected to drive growth. For instance, the electronics manufacturing sector is projected to quadruple to \$ 450 billion by FY 2029-30, with a CAGR of 25 per cent. The government's PLI schemes are designed to bolster these sectors further. Ongoing investments in infrastructure, including industrial corridors and smart cities, will enhance the manufacturing ecosystem, making it easier for businesses to operate efficiently and competitively.

India's manufacturing sector aims to achieve exports worth \$ 1 trillion by 2030, bolstered by strong growth in manufactured good. This ambition aligns with the government's goal of increasing the manufacturing sector's contribution to GDP.



“The energy sector is shifting towards renewables.”

With over 63 years of experience, Tata Consulting Engineers Ltd is one of India's largest engineering consultancies specialising in strategic and sustainable solutions across the infrastructure, power, and resources sectors. The company has been supporting the Make in India initiative through its expertise in designing and delivering engineering solutions tailored to the country's needs. In this exclusive interview with Rakesh Rao, **Amit Sharma, Managing Director & CEO, Tata Consulting Engineers Ltd**, highlights the transformation taking place in India's engineering sector and the company's future growth plans.



Amit Sharma,

Managing Director & CEO, Tata Consulting Engineers Ltd

How do you see the evolution of India's engineering sector in the last 10 years?

India's engineering sector has undergone a significant transformation over the last decade, driven by rapid urbanisation, technological advancements, and increased government focus on infrastructure development. Initiatives like *Make in India* have boosted domestic manufacturing capabilities, while global collaborations have introduced cutting-edge technologies. The sector has grown into a dynamic ecosystem, contributing to both economic growth and technological progress.

How is Tata Consulting Engineers Ltd (TCE) contributing to the Make in India initiative?

At Tata Consulting Engineers, we are proud to support the *Make in India* initiative through our expertise in designing and delivering engineering solutions tailored to India's needs. By collaborating on projects that enhance manufacturing, infrastructure, and sustainability, we contribute to building indigenous capabilities and fostering innovation. Our focus on technology integration and knowledge-sharing strengthens local industries and creates long-term value. With a focus on Industrial Internet of Things, Digital Twins, and Manufacturing Execution Systems, we design next-generation manufacturing and process plants with these aspects in mind.

What changes are you witnessing in the energy space? Is India ready to take advantage of these shifts?

The energy sector is witnessing a shift towards renewable energy sources, energy storage, decarbonisation, and a renewed interest in nuclear energy — both fission and fusion. India has taken bold steps in

this transition, with a strong focus on nuclear, solar, and wind energy, hydrogen technologies, and energy efficiency. While challenges like grid modernisation and infrastructure remain, India is well-positioned to leverage its strengths in innovation and policy support to lead the global energy transition.



While challenges like grid modernisation and infrastructure remain, India is well-positioned to leverage its strengths in innovation and policy support to lead the global energy transition.

With sustainability gaining prominence across industries, how is TCE tapping this trend?

Sustainability is central to our approach at TCE. We integrate sustainable practices into project design, from renewable energy solutions to resource-efficient infrastructure. Our focus on green technologies, circular economy principles, and climate resilience enables clients to meet their sustainability goals while creating a positive impact on the environment. We have invested in new offerings, thought leadership and partnerships covering green chemicals, green energy, circularity and green steel and related process technologies.

As a firm having a big global exposure, how are you planning to expand your overseas business?

TCE's global growth strategy is built on leveraging our expertise in diverse sectors to address the specific needs of domestic and international clients. We aim to deepen our presence in key markets by partnering with global leaders, offering innovative solutions, and delivering high-quality, sustainable engineering services. Our emphasis on digital technologies and project excellence ensures we remain competitive and relevant on the global stage. Our expansion in international markets is selective and based on a well-crafted strategy, focusing on niche and emerging areas such as semiconductors, specialty chemicals, modular design and construction technologies, Digital Twins, IIOT, and sustainability.

What are the key challenges facing the Indian engineering sector? What would be

your suggestions to the industry as well as the government to overcome these challenges?

The Indian engineering sector faces challenges such as skill gaps, supply chain disruptions, and the need for modernised infrastructure. To address these, the industry should prioritise investments in R&D and skill development, while the government could support by fostering public-private partnerships, simplifying regulatory frameworks, strengthening the industry-academia partnerships, and ensuring a steady pipeline of infrastructure projects. Collaborative efforts will help overcome these hurdles and unlock the sector's potential.

Are Indian industries investing enough in modern technologies to improve their global competitiveness?

While there is a growing adoption of modern technologies, further investment in areas like digitalisation, automation, AI, ML and IIOT is needed to enhance global competitiveness. Emphasising innovation, reskilling, and technology integration will help industries stay ahead in an increasingly competitive global market.



Initiatives like Make in India have boosted domestic manufacturing capabilities, while global collaborations have introduced cutting-edge technologies.

What are your plans to take TCE's growth story forward?

TCE's growth strategy is focused on innovation, sustainability, and digital transformation. As a knowledge sector player, people are our most important asset and we nurture that with our Industry-Academia partnerships, investment in our graduate and diploma programs, as well as investing in tools and technology to continuously upgrade and ensure our talent is aligned to the evolving demands of the markets and our customers. We aim to expand our service offerings, deepen client relationships, and explore new markets. By fostering a culture of excellence and collaboration, we aspire to create engineering solutions that not only meet current needs but also anticipate future challenges, driving value for our stakeholders and contributing to a better tomorrow.



"Syrma SGS is positioned to leverage industrial shifts."

Syrma SGS is an Indian Electronic System, Design and Manufacturing (ESDM) companies. The R&D centres across India and Germany are the backbone of innovation, supporting the development of globally competitive products, says **J S Gujral, Managing Director, Syрма SGS Technology** in an interview with Rakesh Rao.



J S Gujral,

Managing Director, Syрма SGS Technology

Syrma SGS has been operating for over 30 years. How do you describe the journey of the company over these years?

Backed with a legacy of over four decades, Syрма SGS Technology Ltd has grown into a trusted name in electronics manufacturing with a robust pan-India presence. Over the years, Syрма SGS has consolidated its position as one of the leading India-based Electronic

System, Design and Manufacturing (ESDM) companies, offering services to global and Indian Original Equipment Manufacturers (OEMs).

With facilities in Chennai, Bangalore, Manesar, Gurgaon, Pune, Noida, Jodhpur, and Baddi, the company specialises in PCB assembly, surface mount technology (SMT), and IT hardware manufacturing. These facilities showcase Syрма SGS' capability to deliver scalable, high-quality solutions that align with India's 'Make in India' initiative.

Leveraging technology like automation and robotics, Syрма SGS ensures precision and consistency in production. Our R&D centers across India and Germany are the backbone of innovation, supporting the development of globally competitive products. Our portfolio spans RFID tags, automotive electronics, renewable energy components, electric vehicle systems, railway electronics, defence electronics and IT hardware such as laptops, SSDs and memory products. This breadth highlights our adaptability to market needs and our focus on future-ready sectors.

With exports contributing to 26 per cent of its revenue, Syрма caters to 270+ customers across 20 countries. The company's revenue growth at a CAGR of 53 per cent over the last three years is a testament to its global demand and operational excellence.

How has Syрма emerged as a reliable partner for global companies?

Syrma SGS has established itself as a trusted partner for global and domestic brands, thanks to its commitment to quality, innovation, and scalability.

Our inclusion as a telecom and IT hardware PLI-approved manufacturer further strengthens our position as a preferred choice for technology leaders. A prime example of this is our most recent collaboration with MSI for local laptop manufacturing, which highlights our capability to manage large-scale, high-precision projects. These initiatives also align seamlessly with India's vision for self-reliance in electronics manufacturing, making Syрма SGS a key contributor to the nation's growth story.

How do you see the progress made by the Indian Electronics Manufacturing Services (EMS) industry in the last 4-5 years?

The electronics manufacturing services (EMS) sector in India has witnessed unprecedented growth over the past five years. Initiatives such as the Production Linked Incentive (PLI) scheme have attracted substantial investments, accelerating the country's journey toward becoming a global electronics manufacturing hub. Furthermore, the rising demand for consumer electronics and smart devices has bolstered local production capabilities, gradually reducing India's reliance on imports.

Geopolitics has also contributed to India's emergence as a preferred manufacturing destination. The focus on supply chain diversification by global players has opened new opportunities for manufacturers like Syrma SGS to expand their capabilities and extensively cater to international markets.

What are the key challenges India faces in becoming a global manufacturing hub?

While the Indian EMS industry is on a robust growth trajectory, there are areas that present opportunities for improvement. Enhancing advanced infrastructure will enable more efficient supply chain operations, ensuring faster and more reliable delivery systems. Additionally, building a skilled workforce equipped to handle cutting-edge manufacturing technologies remains an exciting prospect.

India's regulatory environment is evolving, and ongoing efforts to simplify processes are paving the way for greater ease of doing business. With continued collaboration between industry stakeholders and policymakers, these developments can serve as catalysts to unlock the full potential of India's EMS sector and solidify its position as a global manufacturing hub.

How can India take advantage of the current tension between China and developed countries to develop its electronics manufacturing sector?

The ongoing geopolitical dynamics present India with a unique opportunity to solidify its position as a global design and manufacturing hub. With multinational companies seeking to diversify their supply chains, India stands out for its cost advantages and skilled workforce. Strategic trade partnerships with countries like the US and EU will further enhance India's appeal as a preferred destination.

Syrma SGS is well-positioned to leverage these shifts. By catering to the growing demand for India designed and manufactured high-tech products for global markets, we can effectively contribute to strengthening India's footprint in global value chains.

How can we develop a robust manufacturing ecosystem?

To strengthen India's electronics manufacturing ecosystem, significant investments in infrastructure development are imperative. Establishing manufacturing parks and logistics hubs through public-private partnerships will enhance supply chain efficiency. Simplifying labour laws, application and reimbursement procedures for schemes like PLI and providing faster clearances will encourage more investments in the sector.

Industry-academia collaboration is the need of the hour to address the talent gap in advanced manufacturing technologies will ensure the availability of a skilled workforce. Such measures, combined with strategic policy interventions, can position India as a global electronics manufacturing leader.

How is your company gearing up to tap into emerging trends?

The future of the electronics manufacturing industry is closely tied to emerging trends such as IoT, data centers, AI, robotics, sustainability, and e-mobility. Syrma SGS' is well positioned to address each of these sectors, while its adoption of eco-friendly manufacturing practices underscores its commitment to sustainability.

The rising emphasis on electric vehicles presents another avenue for growth, with Syrma already supplying key components for the EV ecosystem. Additionally, the IT hardware sector continues to expand, and collaborations such as the MSI partnership showcase India's potential to lead in high-value electronics manufacturing.

What are your growth plans for the next 2 years?

Syrma SGS's growth strategy is centred around expanding its manufacturing capacity and diversifying its product offerings across sectors. By investing in state-of-the-art facilities and focusing on emerging sectors like renewable energy and electric vehicles, we are positioning ourselves for sustained success. We are aiming to grow at a rate above industry average for FY2026, supported by strategic investments in new facilities and technology upgrades. This expansion will not only optimise our operational scale but also put us in a competitive position to meet increasing demand in the Electronics Manufacturing Services (EMS) sector effectively.

We are actively pursuing global partnerships to enhance our product portfolio and enter new markets. With a focus on innovation, quality, and scalability, we aim to drive growth while contributing significantly to India's electronics manufacturing landscape.



"Henkel aims to achieve a paperless factory."

The adhesive business of Henkel India is experiencing demand, driven by the growth of key sectors such as construction, electronics, data & telecom, automotive and packaging, states **S Sunil Kumar, Country President, Henkel India** in conversation with **Rakesh Rao**.

How do you describe the journey of Henkel in India in the last 10 years?

Over the past decade, journey of Henkel's Adhesive Technologies business in India (the business) has been nothing short of remarkable. From expanding its manufacturing footprint to diversifying product offerings and embracing cutting-edge technologies, we have demonstrated significant growth and a strategic commitment to the Indian market.



S Sunil Kumar,
Country President, Henkel India

The business has also broadened its product range and extended its reach to various sectors, including electronics and construction. The business has been expanding its presence in the country through consistent strategic investments to meet the rapid market growth. A key milestone in the journey of Henkel Adhesive Technologies in India is the expansion of its manufacturing capabilities, led by its Kurkumbh facility near Pune—India's largest adhesive manufacturing site. This multi-technology manufacturing facility is being built in phases. The first and second phases of this site were launched in 2020 while the third phase of this site comprising the Loctite plant was inaugurated in 2024. This facility has significantly boosted local production, reduced import dependence, and increased capacity to meet growing demand. Henkel network also includes plants in Thane, Rudrapur, and Chennai, catering to diverse industries.

To cater to the unique needs of the Indian market, the business has set up two innovation centers to adapt global technologies for local use and established a Flexible Packaging Academy to drive advancements in packaging solutions. It has also established an application center for the footwear industry aimed at scaling competence for innovation and digitalisation, allowing more agility to speed up time-to-market.

By focusing on exports from India, Henkel has strengthened its global supply chain, taking advantage of the country's location and manufacturing infrastructure. Aligning with national initiatives like 'Make in India' and 'Digital India,' Henkel has tailored its growth strategy to harness the country's economic progress.

The business has focused on creating more value for our customers and consumers by constantly innovating to offer better performance with a reduced ecological footprint. From bio-based raw materials to energy-saving solutions like low-temperature adhesives, our adhesive technologies business integrates sustainability into innovation and business strategy.

We are focused on advancing renewable energy adoption and optimising energy and water usage. Henkel

aims to transform all its production sites in India into carbon neutral sites by 2030, sourcing 100 per cent of its electricity from renewable sources and reducing the use of fossil carbon sources through state-of-the-art technologies. Our Chennai and Rudrapur manufacturing site operate on 100 per cent renewable energy (scope 2). In 2023, the Chennai adhesive manufacturing site achieved carbon neutrality covering scope 1 and 2 of the Greenhouse Gas (GhG) protocol. The site achieved this milestone by drawing electricity from both on- and offsite renewable energy sources and upgrading the fossil fuel heater to an electrical temperature control unit besides replacing the conventional boiler with an upgraded electrical version.

The business has leveraged IoT, AI, and advanced robotics to optimise manufacturing efficiency and quality control. By deploying predictive maintenance and real-time data analytics, we have reduced energy consumption, minimised waste, and improved resource utilisation.

How is Henkel supporting the growth of the Indian manufacturing sector?

Henkel is fully aligned with the 'Make in India' vision and is supporting the growth of the Indian manufacturing sector. The adhesive business of Henkel has been expanding its local manufacturing capacity and continuously innovating to meet the growing demand for high-performance solutions in adhesives, sealants, and functional coatings. We aim to contribute to solving challenges faced by manufacturers through material science and know-how in bonding, sealing, and coating.

We have been investing in adhesive production facilities, such as Kurkumbh, near Pune, to cater to domestic and export markets. Henkel operates innovation and application centers in India to develop tailored solutions for the local market. These investments align with the 'Make in India' initiative by strengthening local supply chains.



Dependence on global supply chains has exposed vulnerabilities. Indian manufacturers should focus on increasing localisation to mitigate risks.

Currently, there is a lot of focus on cost reduction in the manufacturing processes, which is a global trend. We work with our customers to provide solutions that help

them in achieving this goal. This comes from the use of different materials, simplifying the processes and making sure that the designs are integrated. Lightweight technology which involves reducing the weight of machines is another important trend as it adds to cost reduction, performance enhancement while making the machines lighter.



By deploying predictive maintenance and real-time data analytics, we have reduced energy consumption, minimised waste, and improved resource utilisation.

Additionally, sustainability is another trend, which has been gaining increasing importance in India. With new and stricter regulations and the desire of our customers to be globally competitive, manufacturers want to make sure that they have the right value proposition so as to meet the global standards of sustainable products. Our adhesives, sealants, and functional coatings are used in a wide range of industries. All of which face enormous challenges when it comes to sustainability. To create value for our partners and the planet, we strive to optimise our own footprint and at the same time enable our customers to drive sustainability through cutting-edge technologies. To foster sustainability across industries, we are holistically transforming our portfolio and co-innovating more sustainable solutions together with our customers and partners. Putting collaboration at the core and center, we are engaging with key players along the whole value chain to promote sustainable practices, share know-how, and drive systemic solutions forward together. Based on our holistic understanding of trends and challenges across the industries we serve, we have identified three focus topics where we can make the biggest impact with our solutions: climate, circularity and safety.

Which factors and sectors are driving demand for Henkel?

The adhesive business of Henkel India is experiencing demand, driven by the growth of key sectors such as construction, electronics, data & telecom, automotive and packaging. The automotive sector, particularly EVs, is fueling demand for high-performance adhesives and sealants that enable lightweight construction, thermal management, safety and passenger comfort. Similarly, the consumer electronics industry is seeing rapid growth due

to increasing demand for smart devices and wearables, driving the need for adhesives that support miniaturisation, thermal management, and durability. The packaging industry, propelled by e-commerce growth and sustainability mandates, seeks eco-friendly, high-performance adhesive solutions that facilitate recyclable and lightweight packaging designs. Additionally, urbanisation and infrastructure development are boosting the demand for durable and sustainable adhesive solutions in construction.

Several factors are contributing to this demand surge. Digitalisation and Industry 4.0 are transforming manufacturing processes. Some of Henkel's digitally enabled adhesive solutions are designed to meet the evolving needs of automated production lines. Sustainability is another critical driver, as industries prioritise eco-friendly adhesives that reduce environmental impact, aligning with Henkel's portfolio of low-emission, bio-based, and recyclable products. Innovation and R&D are also pivotal, with Henkel leading advancements in hybrid adhesives, structural bonding, and high-temperature-resistant materials. Furthermore, Henkel India's focus on localisation and customisation ensures tailored solutions for the needs of the regional market.



Lightweight technology which involves reducing the weight of machines is another important trend as it adds to cost reduction, performance enhancement while making the machines lighter.

What would be your suggestions to the industry and the government?

The Indian manufacturing sector stands at a pivotal juncture, with immense potential to grow despite global uncertainties and trade tensions. To capitalise on this opportunity, a synchronised effort between the government and the industry is essential.

For example, Henkel has already integrated AI into demand forecasting and is extending Industry 4.0 to warehouses. This enables agility and responsiveness, ensuring timely delivery despite disruptions.

Dependence on global supply chains has exposed vulnerabilities. Indian manufacturers should focus on increasing localisation to mitigate risks, as Henkel is doing by sourcing raw materials locally and transitioning from imported finished products to domestic

manufacturing. This also supports the "Make in India" initiative and creates jobs. Henkel, for instance, is deeply committed to advancing sustainability in adhesives, sealants, and coatings.

How is Henkel in India gearing up for robust growth with minimum carbon footprint?

Henkel India's adhesive business is leading the digitalisation transformation in the manufacturing sector through its Smart Factory System and a strong focus on sustainability. By integrating advanced technologies such as the Industrial Internet of Things (IIoT), SCADA systems, and AI, Henkel enhances operational efficiency and product quality while minimising downtime. The integration of digital tools enables the design and testing of eco-friendly materials with reduced environmental impact. Digital simulations are allowing Henkel to design sustainable alternatives such as bio-based resins and water-based adhesives, reducing the environmental impact of production.

The company's commitment to sustainability is evident in its initiatives to monitor energy and water consumption using real-time data analytics, enabling proactive resource management. Additionally, Henkel aims to achieve a paperless factory by digitising workflows.

Henkel aims to transform all its production sites in India into carbon neutral sites by 2030, sourcing 100 per cent of its electricity from renewable sources and reducing the use of fossil carbon sources through state-of-the-art technologies. Our Chennai and Rudrapur manufacturing site operate on 100 per cent renewable energy (scope 2). In 2023, the Chennai adhesive manufacturing site achieved carbon neutrality covering scope 1 and 2 of the Greenhouse Gas (GhG) protocol. The site achieved this milestone by drawing electricity from both on- and offsite renewable energy sources and upgrading the fossil fuel heater to an electrical temperature control unit besides replacing the conventional boiler with an upgraded electrical version.

What are your plans to take Henkel forward in India?

To drive Henkel's growth story forward in India, our focus will be on expanding manufacturing capacity to meet rising demand, introducing innovative and sustainable products tailored to local needs, and tapping into emerging sectors such as electric vehicles and smart infrastructure. We aim to leverage India as a strategic hub for exports, strengthening our role in the global supply chain. With enhanced profitability aligned to India's economic growth, we are committed to advancing R&D, sustainability, and innovation, ensuring Henkel's continued leadership in the Indian market.



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VIEW POINT
Mukesh Jain

Havells Makes a Strong Comeback at Elecrama 2025

During the exhibition, Havells introduced an impressive array of 17 new products across categories.

Havells India Limited, a leading fast-moving electrical goods (FMEG) company, made a remarkable comeback at Elecrama 2025 after a six-year hiatus. The company showcased its cutting-edge solutions for various sectors, including infrastructure, commercial and residential buildings, and industrial applications.



Mukesh Jain, VP - Marketing,
Havells India Ltd

During the exhibition, Havells launched an impressive array of 17 new products across categories such as industrial switchgear, domestic switchgear, solar, motors, EWA, professional lighting and cables. This move demonstrates the

company's commitment to innovation, technology, digitalization and expanding its product portfolio.

Elecrama 2025 provided Havells with an ideal

platform to connect with B2B customers and industry leaders. The company's participation in the exhibition underscored its emphasis on the B2B segment and its desire to showcase its strengths in this area. Havells' exhibit at Elecrama 2025 featured a blend of innovation and digitalization, with solutions for modern infrastructure, industrial automation, and renewable energy on display. These solutions are designed to drive sustainability and support the company's mission to provide efficient and eco-friendly products.

According to **Mukesh Jain, VP - Marketing, Havells India Ltd**, the company is witnessing significant growth in the infrastructure space, with a presence in various verticals, including underground cables, wiring, and industrial applications. Havells also plays a crucial role in industrial automation, supporting industries in process-driven sequences. "We are excited to be back at Elecrama after a six-year gap. Our participation in the exhibition is a testament to our commitment to innovation and our desire to showcase our strengths in the B2B segment. We are confident that our new product launches and solutions will resonate with our customers and help us drive growth in the industry," he added.

SME

News Snippet

SAMIL transacts ₹1.7 billion worth of vehicles in a phygital auction

Shriram Automall India Limited (SAMIL), India's largest phygital marketplace for pre-owned vehicles and equipment, transacted about ₹1.7 billion worth of vehicles, equipment and other assets in India's biggest Phygital auction — Samil Utsav celebrated on its 14th business anniversary recently.

The event, embodying the spirit of 'Wheels Turning Dreams,' provided customers with exceptional opportunities to fulfil their aspirations. This annual celebration marked another milestone in the pre-owned automobile industry.

Over 135 auctions held across more than 135 Automalls nationwide, the event showcased the

unparalleled strength of SAMIL's phygital auction ecosystem. With a participation of over 20,000 customer footfalls, the event achieved a record-breaking number of pre-owned vehicles, equipment and other assets being transacted in a single day. This year's edition featured an extensive inventory of over 18,500 vehicles and equipment, including cars, trucks, two-wheelers, three-wheelers, construction, and farm equipment and other assets. These assets were sourced from a diverse pool of 3,400+ sellers, including banks, NBFCs, insurance companies, OEMs, dealers, leasing and rental companies, aggregators, transporters, and individual sellers.

SME



"Parson provides solutions for renewable applications."

The growing emphasis on environmental preservation, stricter chemical regulations, and economic competitiveness, Parson Adhesives innovates with solutions that promote pollution prevention, waste reduction, and efficiency, says **Biplav Nayak, Associate Director, Parson Adhesives India Pvt Ltd, Vadodra** in this interview.

Kindly brief us about your company.

Parson Adhesives India Pvt Ltd, established in 2013, operates as a key business unit of Parson Adhesives, Inc., USA, one of the world's leading manufacturers of high performance engineering and structural adhesives and sealants. With a presence in 56 countries over three decades, Parson Adhesives has gained trust across industries such as industrial, automotive, electronics, and renewable energy.

Our product portfolio includes advanced adhesive technologies such as anaerobic, cyanoacrylate, acrylic, methacrylate, epoxy, polyurethane, UV-curable adhesives, silicone, and polymer-based sealants. These are designed to meet the diverse needs of industries, enhancing productivity, quality, and sustainability. In 2024, we introduced innovative solvent-free and UV-cured adhesives to cater to eco-friendly and VOC-compliant applications in the electronics, automotive, and medical sectors.

The Vadodra facility in India has been instrumental in serving neighbouring countries like Nepal, Bangladesh, and Sri Lanka. Our relocation to a larger space in Vadodra's industrial estate is a major step toward scaling operations.

End-user industries we serve include automotive, renewable energy, engineering, oil & gas, medical devices, aerospace, defence, railways, general assembly lines, and more.

How has been the performance of your company in the last two years? What factors/end-user industries are driving the growth?



Biplav Nayak,
Associate Director, Parson Adhesives
India Pvt Ltd

The past two years have been pivotal for Parson Adhesives India. Despite global uncertainties, we achieved consistent growth, supported by increased demand from the automotive, renewable energy, and construction sectors. The shift towards renewable energy sector especially wind and solar and rise in upcoming Railway projects has significantly boosted the adoption of our structural adhesives.

Our expansion into emerging markets and robust R&D initiatives further enhanced our ability to meet customer needs across diverse geographies.

What is your analysis of the Indian manufacturing sector, in general, and the adhesives industry, in particular, in

recent years?

The Indian manufacturing sector is evolving rapidly, driven by initiatives like Make in India and Atmanirbhar Bharat, along with investments in automation and digitalisation. However, challenges such as supply chain disruptions, regulatory complexities, and rising transportation costs due to fluctuating fuel prices persist.

In the adhesives industry, sustainability efforts have increased transportation costs and regulatory pressures, but opportunities abound in renewable energy like wind, EVs, and the growing defence sector. Localised manufacturing and innovation in high-performance adhesives can help mitigate costs and cater to these high-growth sectors. By adopting advanced technologies and customer-focused strategies, the sector is poised for substantial expansion.

How is your company leveraging (1) Advanced technologies for manufacturing

and (2) Enterprise-level digitalisation to improve efficiency and profitability?

While advanced technologies like automation and Industry 4.0 may not be directly applicable to our current operations, we focus on targeted innovations tailored to our industry's needs. Our efforts are centered around optimising processes, enhancing product quality, and reducing operational costs.

We have adopted digital tools such as ERP systems for streamlined inventory management and order tracking, ensuring timely delivery to customers. Additionally, CRM platforms are used to strengthen customer relationships and provide personalised solutions. These targeted implementations enable us to maintain efficiency and profitability while meeting evolving market demands.

What steps are being taken by your company towards sustainability?

With growing emphasis on environmental preservation, stricter chemical regulations, and economic competitiveness, Parson Adhesives drives innovation with solutions that promote pollution prevention, waste reduction, and efficiency.

As renewable energy becomes essential amid fossil fuel depletion and global warming, Parson plays a key role by providing high-performance bonding and sealing solutions for wind, solar, and other renewable applications, ensuring both reliability and sustainability.

Our UV-cured adhesives use natural UV light for bonding, eliminating harmful solvents and VOCs. These rapid-curing adhesives are compatible with materials like glass, metal, and plastic, serving industries such as electronics, automotive, and construction. We also offer solvent-free adhesives, a sustainable alternative that reduces environmental impact, enhances safety, and maintains air quality, ideal for industries prioritising eco-friendly solutions. With global R&D expertise, Parson empowers customers by delivering cutting-edge adhesive solutions and seamless integration into manufacturing processes.

How are you preparing your employees to be future-ready by up-skilling and training?

Our employees are our most valuable asset. We have developed a robust training framework that focuses on advanced technologies, process innovation, and sustainability. We will introduce learning initiatives with leading institutes and certifications to ensure our team remains at the forefront of industry advancements. We also emphasise cross-functional training to build a versatile workforce capable of addressing future challenges.

What kinds of emerging trends do you

foresee in the adhesives industry in the near future?

Key trends include the rise of adhesives, with the growing preference for faster curing structural adhesives. The demand for customised adhesives designed for specific applications will also redefine the competitive landscape since we already have a huge catalogue of products.



Our efforts are centered around optimising processes, enhancing product quality, and reducing operational costs.

What are your plans for business growth in the near future?

At Parson Adhesives, we are paving the way for a brighter future by combining innovative technologies with a highly skilled team and robust financial growth. With over 50 per cent growth in sales, we are accelerating our momentum to deliver cutting-edge adhesive solutions across diverse industries. Our strategic focus is on driving impactful innovation, ensuring quality excellence, and advancing sustainability. We aim to achieve this by setting realistic goals, streamlining sales processes, expanding our team, and fostering meaningful customer relationships through tailored solutions. These initiatives position us as a key differentiator in the market and a value-driven partner for our clients.

To maintain our competitive edge, we are reducing delivery costs, optimising sales strategies, and expediting the launch of new products that cater to evolving industry needs. This includes expanding our market share, enhancing profitability, and solidifying our position as a leader in adhesive technology.

Parson Adhesives, established in 2013 in India, has successfully expanded its reach to neighbouring countries, including Nepal, Bangladesh, Sri Lanka and so on. With the relocation of our Vadodara facility to a larger industrial space, we are gearing up for a significant 100 per cent business expansion in 2025.

As we step into this growth phase, we are also investing in upskilling our sales and marketing teams to align their capabilities with our technology-driven vision. This proactive approach ensures a winning combination of innovation, customer satisfaction, and sustained growth in 2025 and beyond.



"Magal Engineering sees EV market as a big opportunity."

Established in 1992, Magal Engineering Co India Pvt Ltd has evolved into a world-class entity, renowned for its superior sheet metal forming machines and cutting-edge solutions. In this interview, **M K Narasinga Rao, Managing Director, Magal Engineering Co India Pvt Ltd**, highlights trends in the sheet metal forming industry and the company's future plans.

Could you briefly introduce Magal Engineering?

Magal Engineering Co India Pvt Ltd is a prominent player in the engineering and manufacturing sector, specialising in high-quality, precision-engineered products. With over 25 years of experience, the company is known for designing, developing, validating, and manufacturing advanced mechanical assemblies. Established in 1992, Magal Engineering Co India Pvt Ltd has evolved into a world-class entity, renowned for its superior sheet metal forming machines and cutting-edge solutions. With a rich history spanning over 25 years, we have solidified our position in the market, earning the trust and goodwill of countless customers across India.



M K Narasinga Rao,
MD, Magal Engineering Co India Pvt Ltd

What are key challenges facing the Indian manufacturing sector today?

Despite a large workforce, there is a significant gap in the skills required for modern manufacturing processes, partly due to inadequate vocational training and education systems. We need to enhance vocational training programs and align educational curricula with industry needs to equip workers with relevant skills. Global supply chain risks, including potential delays and elevated costs, pose challenges to manufacturing operations. There is a need to develop resilient supply chains through diversification of suppliers and adoption of digital supply chain management tools.

How is the market for sheet metal forming?

The sheet metal forming industry is undergoing significant evolution, driven by technological advancements and shifting market demands. The integration of robotic automation and AI is enhancing efficiency and safety in sheet metal forming. Collaborative robots (cobots) work alongside human operators, while AI systems optimise process parameters and monitor production in real-time. The adoption of Internet of Things (IoT) devices allows for real-time monitoring and data collection from machinery. Coupled with AI, this data facilitates predictive maintenance, reducing downtime and enhancing productivity.

The sheet metal forming market is evolving through the adoption of advanced technologies, innovative materials, digitalisation, and sustainable practices, positioning the industry to meet modern manufacturing challenges effectively.

How critical are skilled people for the growth of the manufacturing sector?

A skilled workforce is a cornerstone of growth for the manufacturing sector. Investing in skill development not only boosts productivity and innovation but also positions the sector for long-term success in a competitive global landscape. Skilled personnel are crucial to the growth of the manufacturing sector as they enhance productivity, enable the adoption of advanced technologies, ensure quality standards, drive innovation, and reduce downtime. Countries with a skilled workforce attract more investments in manufacturing. A skilled workforce enhances efficiency, competitiveness, and the sector's ability to adapt to evolving global demands.

Employee reviews indicate that Magal Engineering places importance on skill development, providing opportunities for employees to enhance their competencies.

➤ Continuous learning and upskilling: We offer

training programs on emerging technologies, tools, and best practices. We provide certification courses and encourage participation in workshops or seminars.

- Embrace digital transformation: We train employees to use digital tools and software that enhance productivity and efficiency. We foster a culture of adaptability to rapidly evolving technologies like AI, IoT, and automation.
- Develop soft skills: We take steps to enhance critical skills such as problem-solving, communication, teamwork, and leadership to navigate dynamic work environments. We focus on emotional intelligence and adaptability to handle changes effectively.

What kinds of new opportunities are you eyeing to tap for growth?

Magal Engineering is actively exploring new growth opportunities by diversifying its product offerings and expanding into various sectors. In addition to serving the automotive industry, Magal Engineering is extending its reach into the aerospace and defence sectors, demonstrating a strategic move to leverage its engineering expertise across multiple industries. By broadening its product portfolio and entering new markets, Magal Engineering aims to drive sustainable growth and enhance its competitive position in the global market.

How is Magal Engineering tapping into automation and sustainability trends?

We are actively embracing automation and sustainability to drive growth and operational excellence for our customers. Magal Engineering is actively encouraging and supporting their customers in implementing advanced automation technologies to enhance manufacturing efficiency, reduce waste, and improve product quality. By automating processes, we help our customers minimise energy consumption and optimise resource utilisation, aligning with sustainable manufacturing practices.

What are your growth plans in the coming years?

The company plans to showcase its latest solutions for EVs at events like IMTEX Forming. Magal is broadening its product offerings to cater to the precision sheet metal industry, aiming to meet the evolving demands of various sectors.

The company has transitioned an ongoing agency business with Deratech Industries into a joint venture, Deratech Machines India Pvt Ltd, to enhance its capabilities and market reach. With over 25 years in the industry, Magal Engineering continues to focus on innovation and delivering high-quality sheet metal forming solutions, reinforcing its position as a trusted partner.

SME

News Snippet

Schneider Electric to install solar modules at six Bisleri plants

Bisleri International Pvt Ltd has partnered with Schneider Electric's Sustainability Business to enhance energy efficiency and expand the use of renewable energy. This initiative is a key step under 'Bisleri's Greener Promise', reinforcing the company's commitment to a sustainable future. As part of the partnership, up to 13.6 MW of solar power will be installed across six major Bisleri International plants in Maharashtra, Tamil Nadu, Karnataka, and Uttar Pradesh.

Angelo George, CEO, Bisleri International, said, "Our collaboration with Schneider Electric underscores our commitment to sustainable solutions and the economic benefits of renewable energy. The project is set to increase Bisleri's green energy usage to nearly 33 per cent while improving energy efficiency by 2.5 per cent across its manufacturing plants. Additionally, this

initiative is expected to cut carbon emissions by approximately 16,000 tons per year, further advancing Bisleri's sustainability goals".

Deepak Sharma, Zone President, Greater India, MD & CEO, Schneider Electric India, shared, "At Schneider Electric, we are committed to enabling businesses to reduce their environmental footprint by embracing cleaner and smarter energy solutions. Our Sustainability division has been a pioneer in enhancing energy efficiency across sectors. Our association with Bisleri International will further optimise the use of renewable energy. We congratulate Bisleri in their quest to become a Green Yodha for the planet. Collaborations like these are pivotal for a sustainable future, and by integrating innovative energy solutions, we will collaborate with Bisleri to bolster efficiency and foster a sustainable future for all."

SME



"We can support India's next wave of industrial growth."

With over 40 years of experience, Knowell International Pvt Ltd is one of India's leading bearing distributors and suppliers. In this interview, **Jatin Shah, Managing Director and CEO, Knowell International Pvt Ltd**, highlights the importance of bearings in propelling the growth of the manufacturing sector and the company's strategy to stay ahead in the industry.

Can you give us an overview of Knowell International's journey in becoming one of the largest bearing distributors in India?

Established in 1984, Knowell International started with a clear mission, to bridge the gap between high-quality bearings and the growing demand for India's industrial sector. Over the last four decades, we have built our reputation on trust and reliability, and live by our motto 'Service without Compromise' to provide our customers with 100 per cent genuine products with prompt customer service.

Our success is rooted in three key pillars: quality, customer service, and nationwide reach. We work closely with globally renowned bearing manufacturers such as NACHI, FYH, KHK, NMB, IJK, SAMICK, RHB and ISC, ensuring we bring advanced, efficient and reliable products to our customers. Through our bearings we are able to provide efficiency not only in terms of production but also from a cost-saving perspective.

In addition to this, our Pan-India distribution network, supported by over 60 authorised distributors, allows us to provide timely deliveries across key industrial clusters.

Finally, our commitment to technical expertise and after-sales support ensures that customers get the right solutions tailored to their specific application needs, whether it's for precision engineering, automotive, or heavy machinery.

Based on these foundational pillars, we are proud to be recognised as one of India's largest and most trusted industrial bearing distributors.



Jatin Shah,
MD and CEO, Knowell International
Pvt Ltd

What are the major drivers influencing the growth of the Indian bearings industry currently? How is Knowell positioning itself to leverage these opportunities?

The Indian bearings market is witnessing strong growth, driven by expanding manufacturing capabilities, rapid infrastructure development, and increased investment in sectors such as automotive, railways, renewable energy, and industrial automation. Additionally, the push for 'Make in India' is boosting domestic manufacturing across sectors, directly increasing the demand for high-performance bearings.

Knowell International is well-positioned to leverage these opportunities through strategic product diversification, strong global partnerships, and our extensive inventory storage capabilities.

As one of the largest stockists of bearings in India, we stock a wide range of bearings that not only enable us to cater to a wide range of industries but also make us a one-stop shop for any type of bearing needs. We constantly introduce cutting-edge bearing technologies, such as high-speed precision bearings, maintenance-free bearings, and energy-efficient units, to meet evolving industry requirements.

Additionally, our technical consultation capabilities also allow us to work closely with OEMs and manufacturers to offer customised bearing solutions that enhance equipment performance and lifecycle.

How do you view the outlook for the Indian bearings industry over the next five years?

The Indian bearings industry is set for strong growth over the next five years, driven by government initiatives

like 'Make in India' and infrastructure expansion. Increased domestic manufacturing and PLI schemes will reduce import dependence and boost local production. Increased investments in roads, railways, and metro projects are already driving industrial bearings demand, while the automotive sector's shift to EVs and stricter emission norms will require advanced, energy-efficient bearings. However, challenges like fluctuating raw material costs, competition from global players, and the need for technological upgrades persist.

Overall, the industry is poised for steady expansion, backed by rising demand from automotive, industrial, and infrastructure sectors, positioning India as a major player in the global bearings market.

For Knowell International, this is an opportunity to deepen our domestic footprint while also expanding into emerging sectors. Our focus will remain on product innovation, technical advisory services, and strengthening our supply chain, ensuring we can support India's next wave of industrial growth efficiently.

How is Knowell International contributing to the growth of India's manufacturing sector? What are the different sectors it has impacted?

Our bearing solutions play a crucial role in critical manufacturing processes across industries. In automotive manufacturing, our precision ball bearings and roller bearings support high-speed machining and assembly lines, ensuring reduced downtime and improved efficiency.

In the steel and cement industries, our heavy-duty roller bearings and pillow block units enhance the durability and performance of rotating machinery. Knowell has also made significant contributions to renewable energy projects, supplying specialised bearings for wind turbines and solar systems.

Moreover, in the textile, food processing and packaging sectors, our miniature bearings, roller bearings and linear bushings have supported high-speed automation, helping customers adopt Industry 4.0 practices.

What emerging trends are you observing in the bearing industry? How is your company keeping up with them?

The bearing industry in India is at the precipice of change and with the manufacturing push in the country, it is evolving to keep up with the growing demand. One of the most interesting trends we are slowly seeing develop is a change from a price conscious to quality conscious consumer.

We see more customers now opting for bearings that will provide their machinery with longevity and better

quality. Secondly, there is a growing demand for energy-efficient bearings to not only reduce overall costs but also extend service life. Lastly, with an increase in manufacturing and exports within the country, there is a stronger demand for application-specific bearing designs, especially for emerging sectors.

Knowell International is actively aligning with these trends by partnering with innovative global brands that are heavily in research and technology to meet these demands.

What innovations is Knowell adopting to stay ahead in the ever-evolving bearings market?

To stay ahead in the competitive landscape of bearing distribution, we have been investing both in product innovation and digital transformation.

On the products front, we are constantly working with our global partners to bring their latest innovations to the market promptly. We are also investing heavily into increasing our inventory capabilities to meet the demand we anticipate in the future.

We have a warehouse with 40,000 sq. ft. storage capability coming up by May 2025 that will not only help us store more products but provide our customers with more optionality and prompt delivery. Automation is a key part of this facility which will enable us to process orders in shorter amounts of time.

For digital transformation, we are looking at both online as well as offline channels to increase our reach to customers. We are investing in software to increase inventory allocation and tracking of goods. Additionally, we are increasing our presence in online spaces to build awareness for our products, educate people about our product quality and efficiency, and make their information more readily available to our customers.

Finally, what are Knowell International's future plans?

Looking ahead, Knowell International aims to strengthen its position as a leading bearing distributor in India while expanding our footprint in more industrial and remote areas across India.

We are also exploring opportunities to collaborate with OEMs across different industrial verticals, offering them our technical expertise and supply chain capabilities. With our new warehouse facility, we are confident in catering to different companies with diverse requirements. Our long-term strategy is to be seen not just as a bearing supplier, but as a solutions provider – a partner who can guide customers through product selection, performance optimisation, and lifecycle management, making us the first choice for industrial bearings in India.



"Schmersal is committed to safety for man and machine."

The Germany-based Schmersal Group develops and produces systems and solutions for its customers worldwide to help boost machine safety and occupational health and safety. In this interview, **Ranjith Kumar, General Manager – West, Schmersal India Pvt Ltd**, highlights on the evolving manufacturing landscape in India and explains importance of machine safety for the success of Make in India initiative.

How is Schmersal supporting the growth of Indian manufacturing?

Schmersal is supporting the growth of Indian manufacturing by enhancing safety—or, in other words, providing peace of mind—to all manufacturers. Here are a few highlights:

- **Enhanced safety standards:** We help Indian manufacturers improve workplace safety and reduce incidents. Our solutions not only protect workers but also enhance productivity and reduce downtime.
- **Improved efficiency:** Our advanced safety technologies help Indian manufacturers optimise their production processes. For example, our solutions enable faster machine setups, minimise downtime due to safety incidents, and improve overall equipment effectiveness (OEE).
- **Technology transfer:** Our presence facilitates technology transfer, bringing the latest safety technologies and best practices from around the globe to the Indian manufacturing sector. We cater to all sectors and end-user industries with our safety products and solutions.



Ranjith Kumar,
GM – West, Schmersal India Pvt Ltd

measures, we help improve the overall productivity of machines.

tec.nicum's expertise, combined with Schmersal's extensive product range, enables us to provide tailored solutions that meet the specific needs of each industry. This makes us a valuable safety solutions partner for various industries, helping them create safer and more efficient work environments. Advanced solutions such as Safety with IoT and safety software like Digital LOTO allow Schmersal to provide intelligent safety solutions to Indian industries.

What are the key challenges in the path of Make in India? What are the probable solutions to overcome these challenges?

The Make in India initiative aims to transform India into a global manufacturing hub by encouraging both domestic and foreign investments. Our manufacturing facility in Ranjangaon, Pune, produces Make in India products. While we do not face significant challenges, addressing the following issues can further strengthen the initiative:

- **Regulatory complexity:** Simplify and digitise regulatory procedures through single-window clearance systems to avoid lengthy approval processes, bureaucratic hurdles, and policy ambiguities. Regularly update policies to align with industry needs and reduce compliance burdens. Enhancing the ease of doing business with predictable tax regimes is crucial.
- **Skill gap:** There is a lack of specialised skills required for advanced manufacturing processes. Strengthen

Are you seeing an increase in awareness about machine safety in India?

Yes, there is a growing awareness of machine safety in India. We have a dedicated safety service division, tec.nicum, which is part of the Schmersal Group. It offers a comprehensive range of services to Indian industries to ensure compliance with machine safety regulations as per ISO standards and Indian standards (BIS). By prioritising safety and risk reduction through appropriate control

vocational training programs and industry-academia partnerships. Focus on skill development through initiatives like Skill India and apprenticeship programs while incentivising companies to invest in employee training.

- **Technology adoption & R&D limitations:** Indian manufacturers often lag in adopting cutting-edge technologies due to high costs and limited collaborations. Encouraging joint ventures with global firms, offering tax incentives for R&D, and fostering innovation hubs and incubation centers can help bridge this gap.
- **Policy consistency & global competition:** Maintain uniformity in national and state-level policies. Establish a feedback mechanism with industry stakeholders to ensure effective policy implementation. Compete with countries like China, Vietnam, and Bangladesh by offering competitive financial incentives such as subsidies, tax breaks, and improved credit availability. Strengthening trade agreements will further integrate India into global supply chains.

By addressing these challenges with targeted solutions, the Make in India initiative can unlock its full potential and position India as a global leader in manufacturing.

With sustainability becoming a critical factor across industries, how is Schmersal tapping into these trends?

Our sustainability journey begins with a commitment to gradually reducing company-related CO₂ emissions. We rely on renewable energy at our production site and have built a solar power plant covering 2,500 m², a ground-mounted system with a capacity of 300 kW. This plant supports the factory's power consumption, generating up to 50 per cent of our daily power needs, approximately 1,100 units per day.

Additionally, we ensure that every machine we purchase is energy-efficient, reducing power consumption. Our Energy Management System helps monitor and track power usage, aligning with our innovation roadmap to transition towards clean and



Schmersal's sustainability journey begins with its commitment to gradually reducing company-related CO₂ emissions.

sustainable energy sources. This ensures a more resilient and environmentally friendly future, both for Schmersal and for society.

What emerging trends do you foresee in the manufacturing sector in the near future?

We foresee several emerging trends shaping the manufacturing sector in the near future, including IIoT, SaaS, and Industry 5.0:

- **Industry 4.0 & 5.0:** The continued rise of Industry 4.0, followed by Industry 5.0, will integrate advanced technologies such as AI, IoT, robotics, and cloud computing to further automate and optimise manufacturing processes.
- **AI-powered predictive maintenance:** Using AI to predict equipment failures and schedule maintenance proactively, minimising downtime.
- **Robotic Process Automation (RPA):** Automating repetitive tasks to free up human workers for more complex and value-added activities.
- **Cybersecurity:** Strengthening cybersecurity measures to protect critical infrastructure and data from cyber threats.
- **Green manufacturing:** Increasing focus on sustainability through energy efficiency, waste reduction, and renewable energy sources.
- **Circular economy principles:** Encouraging product designs that enable reuse, repair, and recycling,



Schmersal plans to start an electronic product assembly at its plant in India.

minimising waste and maximising resource utilisation. Additionally, Make in India initiatives will continue to boost domestic manufacturing in high-growth sectors such as electronics, automotive, and pharmaceuticals. India's strong IT services industry will expand further, driven by global demand for digital solutions. Renewable energy sources like solar and wind power will fuel growth in power generation and manufacturing, while the healthcare sector will create opportunities for medical

device manufacturing. The rise of e-commerce will also drive demand for efficient logistics and supply chain solutions.

By embracing these trends and capitalising on these opportunities, India can solidify its position as a global manufacturing and technology hub.

What are your growth plans for Schmersal India in the coming years?

India has made impressive progress over the past decade. When we established our facility in 2013, India's GDP was \$1.8 trillion. Today, it has grown to \$3.7 trillion. Exports have also increased significantly, from \$200 billion to over \$750 billion.

Schmersal aims to target renewable energy usage to 50 per cent of the total by 2026. We are also planning to start an electronic product assembly at our plant in India. As part of a BIS (Bureau of Indian Standards) committee, we contribute to enhancing Indian safety standards to align with ISO norms, ensuring sustainable growth in machine safety. We also aim for in-house accredited QC labs by 2026.

At Schmersal, we see tremendous opportunities in the automation segment and remain committed to ensuring safety for both man and machine.

SME

News Snippet

Tata Motors unveils India's first hydrogen truck trials

In a landmark development towards India's vision of achieving net-zero emissions by 2070, Tata Motors, the country's largest commercial vehicle manufacturer, has launched the first-ever trials of hydrogen-powered heavy-duty trucks. This historic trial, which marks a significant step towards sustainable long distance cargo transportation, was flagged off by Shri Nitin Gadkari, Hon'ble Union Minister of Road Transport & Highways, Shri Pralhad Joshi, Hon'ble Union Minister of New and Renewable Energy. The ceremony also saw the participation of Girish Wagh, Executive Director, Tata Motors, among other distinguished delegates from the Government of India and the two companies.

Through this pioneering initiative, Tata Motors underscores its commitment to leading the charge in sustainable mobility solutions, aligning with India's broader green energy goals. It was awarded the tender for this trial, which is funded by the Ministry of New and Renewable Energy under the National Green Hydrogen Mission. It marks a significant step forward in assessing the real-world commercial viability of using hydrogen powered vehicles for long distance haulage as

well as setting-up the requisite enabling infrastructure for their seamless operation.

The trial phase will span up to 24 months and involves deployment of 16 advanced hydrogen-powered vehicles with varying configurations and payload capacities. These trucks, equipped with new age Hydrogen Internal Combustion Engines (H₂-ICE) and Fuel Cell (H₂-FCEV) technologies, will be tested on India's most prominent freight routes, including those around Mumbai, Pune, Delhi-NCR, Surat, Vadodara, Jamshedpur and Kalinganagar.

Flagging-off the trial, Shri Nitin Gadkari, Hon'ble Union Minister of Road Transport and Highways, Government of India, said, "Hydrogen is the fuel of the future with immense potential to transform India's transportation sector by reducing emissions and enhancing energy self-reliance. Such Initiatives will accelerate the transition to sustainable mobility in heavy-duty trucking, and move us closer to an efficient, low-carbon future. I congratulate Tata Motors for taking the lead in this significant step towards enabling hydrogen-powered green and smart transportation."

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Igus Adds AI Robot Advisor for RBTX.com

Even companies with no prior knowledge of robotics can put together cost-effective LCA solutions according to the plug-and-program principle.

Igus has added a new AI chatbot to the online platform RBTX.com. The interactive consultant is designed to enable companies with little previous experience and technological expertise to quickly and reliably put together Low Cost Automation (LCA) solutions to become more competitive. First users are enthusiastic about the intuitive AI solution.

A lot of companies already know that automation offers enormous potential for meeting the challenges of a rapidly changing working world. However, the crucial question remains: how do you implement them? RBTX provides the answer: there are over 500 robot solutions on the online marketplace, 95 per cent of which cost less than €12,000. Even companies with no prior knowledge of robotics can put together cost-effective LCA solutions according to the plug-and-program principle. "With RBTX, we want to eliminate all the barriers that stand in the way of companies entering the world of automation - step by step," says **Alexander Mühlens, Vice President and Head- Low Cost Automation, igus**. The decisive factor here, for example, is to ensure guaranteed interoperability of all the components we offer, which makes it virtually impossible to make the wrong purchase. "A further step in this direction is the introduction of a new AI advisor that interacts with interested parties to reduce the time they spend searching for components in a range that keeps on growing."

AI advisor works with empirical data from hundreds of successful LCA projects

The new AI chatbot at <https://chat.rbt.eu> supports users in finding suitable LCA components through written interaction. The AI draws on empirical data from hundreds of projects that companies have already successfully automated with the help of RBTX. The answers are correspondingly targeted. An example: a small workshop is suffering from a labour shortage and would like to automate the loading of its CNC machine with blanks. The company's technical manager calls up the new AI chatbot and asks it the following question:



"Which robot is suitable for loading my CNC machine?" Within a few seconds, the AI provides the answer: "The robolink robot arm from igus would be a suitable solution here. The arm moves along five axes, has a reach of 790mm, a speed of seven picks per minute and can detect the position of the components using a 3D camera. The price starts at €2,766" (price may vary by country). After this answer, the user asks which gripper would work. The AI consultant replies: "A parallel gripper from Zimmer would be a suitable choice." In this kind of seemingly natural dialogue, users gradually put together their own individual LCA solution.

"First users are enthusiastic about the new AI advisor"

Companies experimenting with automation are enthusiastic about the new AI chatbot. "A wide range of customers have already given us feedback that they have used the AI robot advisor. It has given them a better feel for the possibilities of LCA and significantly accelerated the search for suitable components," says Mühlens. "We are therefore planning to expand the AI advisor with additional functions in future." It should be possible for the advisor to embed images and video material from references in its answers and develop complete LCA solutions with a target price.



Igus Robots Harvest Grapes

One of the engineers' key achievements was the development of a vehicle that can withstand the harsh conditions of the vineyard for a long time while minimising maintenance work for winemakers.



Motion plastics reduce maintenance costs

One of the engineers' key achievements was the development of a vehicle that can withstand the harsh conditions of the vineyard for a long time while minimising maintenance work for winemakers. The key to success: a carefully considered choice of components. Among other things, the engineers opted for an energy chain made of high-performance plastic from igus to guide the hydraulic and electric cables from the vehicle to the harvesting head. The e-chains not only prevent the cables from kinking and jamming, but eliminate the risk of them becoming entangled in the vines as well. "They also help increase the longevity of the machine," says Jörg Ottersbach, Head- e-chains, igus. "Our energy chains are made of durable high-performance plastic that is corrosion-free and resistant to UV radiation and chemicals. This means they retain their mechanical specifications for years without the need for maintenance." The engineers have also replaced classic metal rolling bearings with plastic

ones. In the past, the ball bearings were so badly damaged by the grape must that, despite daily lubrication, they only lasted one season and then had to be replaced.

Vibrating vines due to beater unit

Another component of the solution is the Steep Slope Harvester CH 500, an attachment that can be connected to the front loading area of the tracked vehicle in 30 minutes using six bolts. It looks a bit like an oversized nutcracker: two movable arms, connected at the top of the machine, embrace the vine. The insides of these arms contain shaking rods that make the vine vibrate at up to 620 movements per minute and shake off the grapes. A collection system under the beater catches the grapes and transports them to a collection container via a conveyor system. The harvesting machine travels down the vineyard at speeds of up to 4.5km/h - significantly faster than any human harvester. On the way back, it even reaches speeds of up to 9km/h, supported by the cable winch. Back on the trailer, employees then empty the container and position the vehicle for the next row of vines until the entire harvest has been brought in. **SME**

Whether you're visiting the Christmas market with friends or enjoying Christmas dinner with family, a good mulled or special wine is a must. To offer people this, winemakers must increasingly rely on automation during the grape harvest. However, slopes with a gradient of 75 per cent and narrow rows of vines were previously considered impossible to automate. The German company CH engineering GmbH has developed a particularly compact harvesting vehicle for precisely this area of application.

The base of the harvester from the Mosel is the UT110evo tracked vehicle. With a width of 1.32m, a length of 3.2m and a weight of 2.7t, it is light and compact enough to be transported on a tractor trailer. This means that it can also be used in vineyards with narrow access roads. After arriving at the destination, a ramp on the side of the trailer folds out and the vehicle drives over it into the row of vines. A cable winch connects the vehicle with the trailer and supports it with a tensile strength of 1.5t, enabling it to handle gradients of up to 75 per cent. In these extreme locations, drivers can align the angle of their seats with the horizon to reduce the strain on the body.



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SPAC Pneumatic: The Journey of Innovation

With over two decades of experience, SPAC Pneumatic has built a legacy of trust, quality, and innovation.



In an era where industrial efficiency and innovation go hand in hand, SPAC Pneumatic stands as a beacon of excellence in the field of pneumatic solutions. With a legacy spanning over two decades, the company has firmly established itself as a leader, offering high-quality, reliable, and cost-effective products to industries across India. Aligned with the 'Make in India' initiative, SPAC Pneumatic is not only advancing domestic manufacturing but also setting new benchmarks in precision engineering and customer satisfaction.

At the heart of SPAC Pneumatic's operations is a relentless commitment to quality and innovation. The company's state-of-the-art die-casting plant ensures that every product meets the highest standards of durability and precision. With a sprawling manufacturing space of 25,000 sq ft and four specialised production units, SPAC Pneumatic is equipped to serve a diverse array of industries efficiently. The recent 40 per cent increase in manufacturing capacity further reinforces its ability to meet growing market demands while maintaining stringent quality control.

A comprehensive range of products for every industry

SPAC Pneumatic offers an extensive portfolio of products designed to optimise efficiency and enhance productivity across various industrial applications. From precision-engineered pneumatic cylinders and versatile valves to robust air preparation units and seamless one-touch fittings, every product is crafted with meticulous attention to detail. The range also includes

pneumatic tubing, air blow guns, control panels, and other essential components that ensure seamless operation in industries such as automotive, railways, pharmaceuticals, textiles, food and beverage, construction, and aerospace, among others.

The company's dedication to innovation is reflected in its product development strategy. By continuously integrating advanced technology and industry-specific requirements, SPAC Pneumatic ensures that its offerings not only meet but exceed customer expectations. This customer-centric approach has solidified its reputation as a trusted partner in industrial automation.

SPAC Pneumatic understands that every industry has unique requirements. That is why we provide customised solutions tailored to specific operational needs. Our consultation and design expertise enable us to develop personalised pneumatic systems that maximise efficiency and productivity. Whether it's modifying existing setups or creating entirely new configurations, our engineering team works closely with customers to ensure seamless integration and optimal performance.

Unparalleled service and support

Beyond manufacturing excellence, SPAC Pneumatic is committed to providing exceptional after-sales service. The company's 24/7 WhatsApp service, led by Ms. SPACialist, offers instant guidance for quick resolutions. Additionally, SPAC Pneumatic has developed a series of step-by-step service videos, offering valuable insights into product maintenance, troubleshooting, and best practices. These videos serve as a knowledge hub for both new and experienced users, enabling them to maximise the lifespan and performance of their pneumatic equipment.

When you choose SPAC Pneumatic, you are not merely selecting a product, you are investing in the future of Indian manufacturing. With cutting-edge technology, an expansive product range, and unwavering service support, SPAC Pneumatic continues to redefine industry standards, ensuring that businesses operate with efficiency, reliability, and unstoppable versatility.

SME

(Communication provided by the management of the company)



Smart Seals for High Security

Safcon offers smart seals to power utilities for providing maximum protection to their smart meters and prevent electricity theft, says **Rajesh Kumar Banka, Managing Director, Safcon Seals Pvt Ltd.**



High security RevGuard smart security seal installed on meter.

Today, all over the world, traditional energy meters are being replaced with new-generation smart meters. These smart meters are being deployed globally at a fast pace. With the installation of smart meters, visits to consumer premises will be reduced to a negligible amount as smart meters collect the consumed meter reading remotely, eliminating the need for consumers to visit the premises to collect the meter reading for monthly billing.

Hence, it has become a necessity to use high-security smart seals to protect the smart meters and prevent revenue losses. The purpose of a security seal is to protect the revenue completely by preventing unauthorised access for meter tampering. The accuracy of the meters determines the accuracy of recorded revenue. This new tamper-resistant smart security seal is designed to replace traditional plastic seals. It is smarter, more secure, and facilitates power utilities to provide maximum protection to their smart meters to prevent electricity theft.

Importance of high-security smart seals

We all understand the importance of security. We

update the security features of our mobile phones every other day. We even hire security guards to protect our houses, offices, and warehouses with reputed professional security agencies. The use of AMI, prepaid, and smart meter systems translates to fewer in-person visits to consumer premises. Hence, we need to upgrade the meter sealing with high-security smart seals to provide the highest protection to AMI, prepaid, and smart meters.

The smart security seal plays a key role in the automation and secured management of smart meters. Compared with traditional plastic seals, there are many advantages including more convenience, intelligence, automation, and a higher level of secured sealing. The RevGuard meter seal provides integrity, prevents unauthorised access, tampering, and avoids the usage of illegal and duplicate seals.

Tamper resistance

A common problem with traditional plastic seals is pre-tampering of anchors before installation, by pressing the anchors with pliers or filing the anchor with a file. Safcon effectively solved this problem by introducing a four-anchor polycarbonate security seal, in which two anchors come pre-locked from the factory and two anchors are used for locking. Since the security seal is pre-locked, there is no access to anchors and no possibility of pre-tampering of the meter seal before installation. Once the seal is locked, it has a four-anchor locking mechanism, which is impossible to open for tampering with the meters. The pre-locked anchor locking insert and housing body cannot be separated without visible signs of tamper damage. The removal of the wire connecting parts also facilitates easy detection of tampering because of an extremely clean look on-site.

Another major problem with the traditional plastic seal is reading the serial number with the naked eye due to the compact size of the seal and the serial number printed on a transparent body. To solve this problem, Safcon provides a serial number with a bigger font size for easy, error-free readability. In the present digital era, to read, record, and verify serial numbers digitally, the smart security seal is provided with 2D data matrix barcoded serial numbers for reading serial numbers with the help of a smartphone or barcode scanner. The barcode is provided on the front side of the anchor

locking insert for swift reading of the serial number. The barcode is directly laser engraved on the polycarbonate seal itself, eliminating over-pasted stickers that provide ample scope for counterfeiters to tamper with the seal.

It is human nature that anyone who reads the seal number from the barcode would find it rather difficult to read the seal number from the seal body. When the barcode is provided on the over-pasted sticker, counterfeiters can use duplicate seals with fake stickers. When field staff read the serial number, they may read it from the barcode sticker and verify the serial number directly printed on the seal. Thus, it becomes easier for counterfeiters to conduct meter tampering and replace the meter seal with a fake seal. Under no circumstances should the barcode sticker be over-pasted on the seal, as the transparency of the meter seal is also lost, making tamper evidence harder to trace.

Additionally, a hidden encrypted code is provided on the meter seal to deter the use of any duplicate seal for manipulation. Furthermore, the seal is provided with a logo and serial number on both the housing body and anchor locking insert to avoid part swapping for any malpractice.

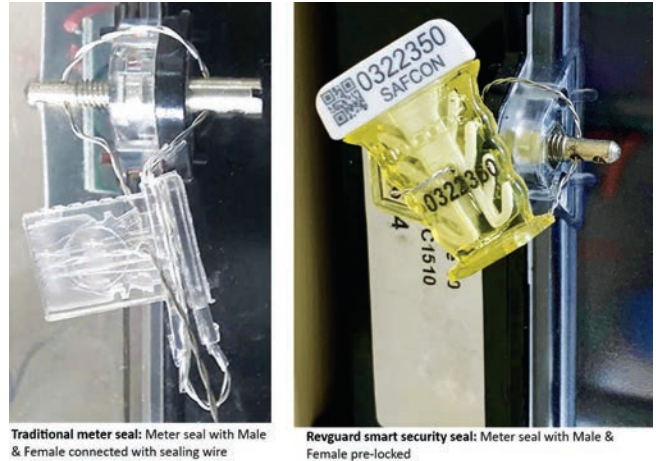
Innovative approach

Safcon's RevGuard tamper-resistant meter security seal is unique and patented. They are not manufactured by anyone else, making it virtually impossible to produce counterfeit seals. The RevGuard anchor (push-fit type) polycarbonate meter security seal is a well-researched, designed security seal. The seal is designed carefully to provide maximum protection to the energy meter to prevent meter tampering and electricity theft.

The selection of raw materials, seal construction, dimensions, customization, locking mechanism, and sealing wire are based on years of research. The RevGuard is 100% tamper-proof and an easy-to-lock meter seal. The RevGuard tamper-resistant polycarbonate security seal is designed for single use and cannot be opened and reused. The seal has four anchor locking mechanisms with an in-built molded stainless steel sealing wire. The seal wire must be cut with cutting pliers for removal.

The success of utility meter protection depends on the selection of the security seal, effective implementation, maintenance, and upgrading it from time to time. It requires proper attention to the entire process which includes selection, adoption, standardization, procurement, application, record keeping, vigilance, and most importantly, disposal.

For the implementation of a successful anti-theft meter protection program, power utilities need a long-term partnership with a security seal solution provider who can work with the meter management team of the



Comparison of traditional plastic seal (left) and Revguard smart security seal (right) after installation.

utility to provide the best security solutions based on regular field reports and expertise in the field.

Commitment to quality

Safcon is an Indian pioneer in tamper-evident security seals for over 25 years. An R&D-focused company, they have designed and developed several patented security seal solutions. Adhering to security norms and best business practices, Safcon ensures that their customers can rely on their products. Safcon takes every possible step to safeguard the interests of their database of utility customers spread across the globe.

Safcon revolutionises security seals, prioritising ease and efficiency while offering an array of benefits to its customers. Direct supply ensures the integrity and confidentiality of products, bypassing intermediaries for cost-effectiveness. Swift responses to product development cater to specific customer needs promptly. With stringent quality control measures in place, Safcon guarantees zero-defect products. The entire manufacturing process is conducted in-house, ensuring full control over quality and customization. Committed to customer satisfaction, Safcon adopts a customer-centric policy, prioritising their needs and preferences at every step.

In today's fast-changing world, one should not compromise on security quality. Safcon believes that 'Poor security is no security' and they are focused on technological developments.

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About the author:

With an experience of over 30 years in the security seal business, Rajesh Kumar Banka has invented many tamper evident security seals. He can be reached on email: rajesh@safcon.co.in

(Communication provided by the management of the company)



Avians Dock Shelters: The Smart Loading Bay Solution

Think of a dock shelter as a protective barrier that wraps around the truck while it's stationed at your warehouse door. It helps seal the gaps, ensuring that dust, wind, rain, and extreme temperatures stay outside—where they belong.

In the fast-moving world of logistics and warehousing, efficiency isn't just a goal—it's a necessity. The smoother the loading and unloading process, the better your operations run. But what about the outside factors you can't control? Rain, dust, extreme temperatures, or even pests can slow down productivity and compromise the quality of stored goods.

That's where Avians dock shelters come in. Designed to provide complete protection for your loading docks, these shelters create a secure seal between your facility and incoming trucks, preventing unwanted elements from sneaking in. The result? A cleaner, safer, and more efficient workspace.



What is a dock shelter?

Think of a dock shelter as a protective barrier that wraps around the truck while it's stationed at your warehouse door. It helps seal the gaps, ensuring that dust, wind, rain, and extreme temperatures stay outside—where they belong.

Not only does this keep your workplace clean and comfortable, but it also improves energy efficiency. Less air loss means lower heating and cooling costs—a win-win for any business looking to cut expenses.

Types of dock shelters

Different warehouses have different needs. That's why Avians offers a range of dock shelters to match various industry requirements:

1. Retractable dock shelter
 - Flexible curtains that adjust to different truck sizes.
 - Creates an airtight seal for better insulation.
 - Perfect for warehouses, distribution centers, and food storage facilities.
2. Inflatable dock shelter
 - Air-filled cushions that form a tight seal around the truck.
 - Best suited for temperature-controlled warehouses and cold storage.
 - Reduces energy loss and helps maintain strict hygiene standards.
3. Foam pad dock shelter
 - High-density foam pads compress against the

truck body.

- Ideal for facilities with multiple truck sizes.
- Offers maximum protection against harsh weather conditions.

Why should you choose Avians dock shelters?

1. Energy savings
2. Protection from weather & contaminants
3. Better safety & productivity
4. Durability with low maintenance

Industries that benefit from dock shelters

Avians dock shelters are a game-changer for several industries, including:

- Logistics & warehousing – Ensures smooth loading/unloading while maintaining temperature control.
- Food & beverage – Keeps food products fresh and contamination-free.
- Pharmaceuticals – Maintains a stable environment for medicines and healthcare products.
- Retail & e-commerce – Supports high-volume movement of goods efficiently.

Final thoughts

Avians dock shelters help save energy, protect goods, and create a safer workspace.

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ETONE Presses Set the Standard for Precision, Accuracy and Economy

Do you need high quality, robust mechanical presses for your factory? Magal Engineering has the answer.



The main products are high speed press, H Frame and C Frame power press, and stamping press machine to name a few.

They have a technical cooperation with Japan. They mainly manufacture open and closed 15T-1000T series precision punching machines in various specifications, especially 400T-800T closed double-point medium-speed precision punching machine and double-point, three-point four-guide pin 60T, 80T, 125T, 200T, 220T, 300T, 400T motor iron core high-speed automatic stamping production lines. Etone Machines have around 70 per cent of the mechanical and high-speed press market share in China.

Magal Engineering has partnered with Zhejiang Etone Precision Machinery Co Ltd in India to offer you world-class mechanical and high-speed presses with a good balance of technical features and economic value.

Magal Engineering is India's premier one source company for supply, service and consultancy of mechanical & high speed presses, accessories for the press machines, sheet metal forming machines,



Magal Engineering has partnered with Zhejiang Etone Precision Machinery Co Ltd in India to offer highly efficient mechanical and high-speed presses. We offer presses of the brand ETONE from well-known press maker Zhejiang Etone Yitian Precision Machinery Co Ltd.

About Etone - Zhejiang Yitian Precision Machinery Co Ltd

Zhejiang Etone Precision Machinery Co Ltd is a professional large-sized, high-speed and precision forging and pressing equipment manufacturer in China. The factory is equipped with state-of-the-art quality controlled machinery such as a large number of high precision CNC machining equipment, various precision testing instruments as well as facilities for rigorously testing the machines before dispatch.

machines, metal processing and finishing equipment. Headquartered in Bangalore, the company has over 30 years of expertise and is the preferred partners for many overseas manufacturers in India.

Products from Zhejiang Etone Precision Machinery Co Ltd:

- Gantry type high-speed precision four pillar press – APJ series
- High-speed gantry press – APH Series
- Knuckle link type high-speed precision press – APZ Series
- High precision steel frame press – APA Series
- Double crankshaft precision steel frame press – APC Series
- Semi-closed high precision steel frame press – APD Series
- Closed-type double crankshaft precision steel frame press – APE Series
- Closed-type single crankshaft precision press – APF Series
- Straight column type double crankshaft powerful press – STD Series
- Closed-type double point gantry press – APG Series
- Peripheral equipment such as feeder, straighteners,

decoilers, cooler, die removal arm, and hydraulic die lifter

Post sales service for Etone products

To ensure the delivery of high quality service, Magal Engineering has a separate team of installation engineers and service technicians trained at the manufacturing factories at China. This team is trained and authorised by Zhejiang Etone Precision Machinery Co Ltd to accurately respond to the service and technical needs.

Besides responding to the customer's machine related queries, our staff also engages in preventive maintenance through an AMC contract. This ensures your mechanical presses are functioning smoothly all year, reducing down-time to a minimum.

Magal Engineering has steadily increased its installations since the company introduced Etone machines in the market and has acquired repeat sales due to high satisfaction level of its customers.

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For more details about Etone machines, contact Shashank from Magal Engineering Co India Pvt Ltd on Mob: +91 99165 34110, or send an email: sheila@magal.co.in

(Communication provided by the management of the company)

News Snippet

Montra Electric expands with e-SCV plant in Ponneri, Chennai

Montra Electric's e-SCV division, TIVOLT Electric Vehicles Private Limited has inaugurated its dedicated manufacturing plant for electric small commercial vehicles (e-SCV) in Ponneri, Chennai. The facility was inaugurated by Arun Murugappan, Executive Chairman, Tube Investments of India Limited (TII); in the presence of Jalaj Gupta, Managing Director, TI Clean Mobility Private Limited (Montra Electric (TICMPL)); and Saju Nair, CEO, Tivolt Electric vehicles Private Limited (SCV division of Montra Electric)

This facility, spread across approximately 500,000 square feet, has an annual production capacity of 50,000 vehicles, catering to the Small and Light Commercial Vehicle (SCV/LCV) segments. Located near the Kolkata highway, just 35 kilometers from Chennai city, the plant is designed to efficiently serve the growing demand for sustainable transportation solutions in India. The integrated workplace fosters a collaborative 'one team' culture to drive innovation and operational excellence.

Arun Murugappan, Executive Chairman, Tube Investments of India Limited (TII) said, "TICMPL is proud to inaugurate its first dedicated e-SCV plant in Tamil Nadu. We remain committed to innovative and sustainable clean mobility solutions. Montra Electric has been at the forefront of India's EV transformation, and this plant marks a significant step forward in our journey. As we prepare for the future, we are determined to contribute meaningfully to India's goal of achieving net zero carbon emissions by 2070."

Jalaj Gupta, Managing Director, Montra Electric (TI Clean Mobility Private Limited) said, "We are thrilled to inaugurate this plant in Ponneri. This facility is a testament to our vision of delivering cutting-edge, high-performance e-SCV. The launch of this plant not only strengthens our production capabilities but also reinforces our commitment to providing industry-leading EV solutions."

The plant will primarily manufacture EVIATOR, Montra Electric's latest breakthrough in the e-SCV segment. EVIATOR has a certified range of 245 km.

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Schmalz Jumbo Vacuum Lifters: Innovative Vacuum Lifting Solutions

Schmalz's Jumbo Vacuum Lifters combine efficiency and versatility to cater to material handling needs in diverse industrial applications.



In modern industrial environments, handling heavy and awkwardly shaped materials is a common challenge that affects productivity, operator safety, and workplace efficiency. Manual lifting not only increases the risk of workplace injuries but also leads to inconsistent performance due to operator fatigue. Industries like manufacturing, logistics, pharmaceuticals, and food processing require smarter, more ergonomic material handling solutions to maintain operational efficiency and worker well-being.

Schmalz's Jumbo Vacuum Lifters provide a transformative solution to these challenges by leveraging advanced vacuum technology for effortless and precise material movement. Designed with ergonomics and safety in mind, these lifters minimize physical strain, maintain consistent performance throughout shifts, and ensure that heavy materials are moved quickly and securely. By addressing the core issues of material handling, Schmalz has redefined the way industries approach productivity and employee safety.

Schmalz's Jumbo Vacuum Lifters combine efficiency and versatility to cater to diverse material handling needs. The range includes several variants, each optimized for specific applications. The JumboErgo, with its lifting capacity of up to 300 kg, is ideal for heavy-duty tasks like handling metal sheets, solar panels, or large wooden boards. Its adjustable handle design ensures comfortable operation, reducing operator fatigue during long shifts. The JumboFlex is perfect for industries requiring high-speed handling of lighter materials, such as packages or boxes, with a capacity of up to 50 kg. For vertical lifting tasks, the JumboSprint features a unique bow-shaped handle, capable of lifting between 85 kg

and 300 kg, making it suitable for sacks, barrels, and other similar materials. Additionally, the Jumbo Low-Stack variant addresses the challenge of lifting from ground level with a capacity of up to 80 kg, ensuring ergonomic handling in constrained spaces.

The versatility of the Jumbo Vacuum Lifters makes them indispensable across multiple industries. In logistics and warehousing, they improve the speed and safety of moving packages, boxes, and crates, ensuring consistent operator performance even during peak operational hours. The manufacturing and automotive industries benefit from the ability to handle heavy and awkwardly shaped parts like metal sheets and large components, reducing physical strain on workers and enhancing safety. In the pharmaceutical and chemical sectors, the lifters enable safe handling of sensitive materials, such as barrels and sacks, minimizing the risk of contamination and ensuring precision. Similarly, the food and beverage industry relies on the lifters to transport bulk materials like sacks and containers efficiently, adhering to strict safety and hygiene standards.

A key advantage of Schmalz's Jumbo Vacuum Lifters is their ability to maintain operator safety and comfort while boosting efficiency. Unlike manual handling, which often leads to operator fatigue and potential injuries, these lifters provide a seamless experience that minimizes physical strain. The ergonomic design, featuring adjustable handles and customizable grips, ensures operators can work comfortably without risking



The versatility of the Jumbo Vacuum Lifters makes them indispensable across multiple industries.



Schmalz's Jumbo Vacuum Lifters have revolutionised material handling across industries by delivering efficiency, safety, and ergonomic support.

repetitive strain injuries. By distributing the workload evenly and allowing effortless lifting, the lifters enable consistent performance throughout an entire shift, significantly improving workplace productivity and morale.

Schmalz's Jumbo Vacuum Lifters are not just tools; they are enablers of a safer, more efficient, and more productive workplace. By addressing the fundamental

pain points of manual material handling, these lifters provide industries with a reliable and ergonomic solution that enhances operational efficiency while prioritizing worker well-being. Whether it's lifting lightweight packages or heavy-duty materials, the Jumbo series ensures precision, safety, and comfort in every operation.

In conclusion, Schmalz's Jumbo Vacuum Lifters have revolutionised material handling across industries by delivering efficiency, safety, and ergonomic support. They eliminate the challenges of manual lifting, reduce workplace injuries, and ensure consistent performance throughout shifts. For industries looking to optimize their material handling processes, the Jumbo series offers a reliable, innovative, and transformative solution. With Schmalz, material handling becomes not only faster and safer but also a key driver of productivity and workforce satisfaction.

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For details, contact the Marketing Department of Schmalz India Pvt Ltd, Pune, on Tel: +91 20 6911 5500 or email: marketing@schmalz.co.in

(Communication provided by the management of the company)

Communication Feature

Phoenix Contact's True Power Reliability for Machine Building



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In recent years, one of the core goals for machine building industries around the globe has been to build more sustainable manufacturing processes. One of the biggest challenge for the manufacturing industries is implementing highly-reliable power solutions at their research and manufacturing facilities that not only support sustainability goals, but also improve competitiveness by reducing costs, reducing energy price volatility, and providing other value-added benefits to the manufacturing process. Now-a-days industries are using more and more automation products to get effective and efficient results but more electronics are more prone to surges and availability.

Phoenix Contact offers reliable power solutions for the machines & equipment:

- Robust surge protection devices to protect the machines against surges & lightning
- Rugged power supply for superior system availability
- UPS solution assuring seamless operation with best-in-class power buffering, backup, and redundancy



- Device circuit breakers to ensure equipment availability against short circuit & overloads
- Multifunction energy meters for monitoring of power quality

Customers enjoy advantages such as reduce complaints, early fault detection, reduce downtime & increase system availability, and real time monitoring.

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For details, Phoenix Contact India Pvt Ltd, New Delhi, on Email: adverts@phoenixcontact.co.in

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Ensuring Precision in CNC Milling with OTT-JAKOB

Importance of clamping force in a CNC milling spindle and how to measure the clamping force.

What is tool clamping force in a CNC milling machine spindle?

Tool clamping force is the force used to hold the tool holder rigidly in the spindle of a CNC milling machine. This ensures that the tool stays in spindle, strongly during machining operations.

Why tool clamping force is important in a CNC milling machine?

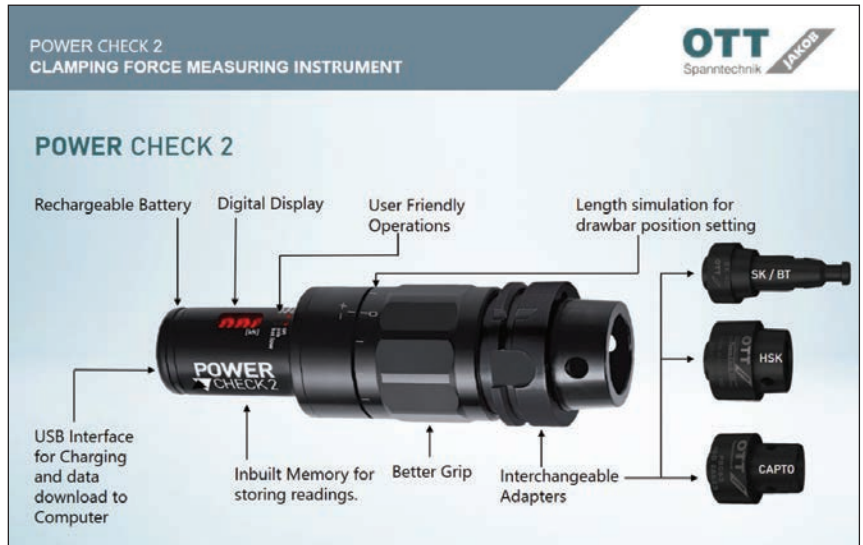
Tool clamping force plays a crucial role in machining process. It ensures that the tool is securely held in place, preventing any movement or slippage during cutting operation. This rigidity is essential for maintaining machining accuracy, precision, and high-quality surface finish. Additionally, proper clamping force significantly reduces the risk of tool breakage and potential damage to the workpiece, ultimately enhancing process reliability and efficiency.

What happens if tool clamping force in the spindle is not enough?

If the tool clamping force is insufficient, the tool may slip or move during machining, resulting in a loss of accuracy. This can lead to poor surface finishes and defects in the workpiece. Additionally, inadequate clamping force increases tool wear and the risk of premature tool breakage. In drilling operations, it may also cause oversized or oval-shaped holes, compromising the quality and precision of the final product.

How does automatic tool clamping and unclamping happen in the CNC machining centre?

Automatic tool clamping and unclamping are typically managed by a specialised mechanism consisting of several key components. The drawbar is a rod that pulls the tool holder securely into the spindle. Special springs generate the necessary clamping force by remaining compressed. For tool release, hydraulic or pneumatic cylinder pushes the drawbar, allowing the tool to be released efficiently.



What engineering and technology does OTT-JAKOB add to the machine?

OTT-JAKOB optimises CNC machine's spindles with high-quality clamping systems, ensuring reliable and precise tool holding. Our innovative sensor solutions enable real-time monitoring of temperature / position of drawbar/ position of piston and improved process control. The force intensification mechanism enhances clamping performance, while complete drawbar solutions provide seamless integration. Extensive trials and testing guarantee durability and efficiency, and compact design solutions ensure space-saving and efficient implementation.

How to measure the clamping force of the spindle?

To ensure optimal performance and monitoring the measuring tool of clamping force is essential. OTT-JAKOB offers the Power-Check 2, a reliable instrument with digital display designed for precise and efficient clamping force measurement. By maintaining the tool clamping force, manufacturers can plan preventive maintenance, thereby enhancing machining accuracy, tool longevity, and overall process reliability, making it a critical aspect of CNC machining technology.

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(Communication provided by the management of the company)



“Radiant Thermal designs boilers to minimise steam costs.”

Indore-based Radiant Thermal Engineers specialises in manufacturing and supplying boilers and heat exchangers for industrial applications. In this interview, **Sanjay Sharma** and **Kamlesh Rathore**, **Directors of Radiant Thermal Engineers**, discuss their product development strategies and growth plans for the coming years.

Could you please brief us about your company?

We are a steam boiler manufacturing company established in the year 2000 and based in Indore. We fabricate boilers and their accessories required for steam generation and distribution in plants requiring process heating. Our primary customers include dairies, food, confectioneries, chemicals, textiles, and oil plants. We produce approximately 10 to 12 boilers with accessories annually. Legal inspections and approvals by the Department of IBR (Indian Boiler Regulations) are conducted through the Directorate of Boilers, Madhya Pradesh, Bhopal, on a regular basis.

What is driving the market?

We are performing very well this year as plant installations are growing rapidly. The demand for commodities is increasing, and government support for new plant installations has been extremely helpful.

What changes have been brought about in your company due to the Covid 19 pandemic?

The pandemic underscored the importance of adaptability, particularly in industries that embrace technological advancements. Fast adaptation of information and communication technology was our key learning. Additionally, we strictly implemented all health and safety regulations released by the administration during the pandemic.

How is the demand for your products and solutions? What makes them unique from those of your competitors?

Demand for our products is currently at an all-time high, as we operate in the energy equipment sector. Efficient energy generation and distribution become crucial in challenging times, and our preparedness allowed us to meet market needs effectively, giving us an edge over competitors.

Which new products or solutions have you introduced in the market in the last two years?



Sanjay Sharma,
Directors of Radiant Thermal
Engineers



Kamlesh Rathore,
Directors of Radiant Thermal
Engineers

Every product we release comes with updates or modifications to previous designs, ensuring improved user-friendliness and enhanced features.

What are the key challenges faced by your customers today? How is your company helping them overcome these challenges?

The rising cost of steam is a significant challenge for our customers. We design and develop boilers and systems that minimise steam costs, ultimately reducing the production costs of their final products.

What are the emerging trends in your industry?

Cogeneration, the simultaneous generation of power and steam, is becoming a prominent trend, especially among smaller boiler users seeking improved energy efficiency.

What kind of new opportunities are you looking to tap into the market?

We plan to expand into power generation boilers to enhance our product line and improve profitability.

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Prime Metallic High Speed Doors by Gandhi Automations

Prime Metallic Door provides a variety of applications, which include internal use as a partition between two rooms and external use as a secure hall closing door.

Traditional industry entrances do not provide the necessary protection for today's volatile security landscape. Normal Rolling Shutters do not mitigate tailgating and piggybacking, even when used in conjunction with access control devices. As a result, High Speed Doors are growing in popularity due to their ability to effectively control access while creating a clear trail, which is ideal for regulated industries.

High Speed Door-Prime Metallic is the unsung hero of warehousing facilities for any industry. Their top speeds, combined with top security, protect against unwanted burglars. Prime Metallic Door provides a variety of applications, which include internal use as a partition between two rooms and external use as a secure hall closing door. The door also ensures environmental separation, energy efficiency, and time efficiency, leading to hastening the logistics process.

Characteristics

Prime Metallic Doors fast opening and closing speeds sharply reduce the potential for tailgating, piggybacking, or people on foot sneaking in through the doorway. Door has an inbuilt inverter motion system to adjust different speeds, with progressive control of acceleration and deceleration during braking. High Speed Doors also reduce the potential for accidents caused by material



handling equipment. Opening speed of 2.5 m/s and closing speed of 0.5 m/s.

Prime Metallic door includes double-skinned aluminium alloy anodised with 40 mm polyurethane foam insulation. It is designed to provide sturdiness during the closed condition and also gives better separation between different working areas, is characterised by a thermal intensity, or is intended for different uses. The door reduces leakage of heat and air and preserves heat.

The contactless operation of the door leaf prevents surfaces from being scratched, while the optional transparent vision laths remain transparent even after extensive use. Additional features include the capacity to withstand wind pressure in Class IV, subject to standard EN 12424.

In high-traffic environments, these doors maintain a smooth flow of material handling equipment in and out of the warehouses while ensuring building security. The doors are designed with minimal maintenance, energy-efficient motors, and self-diagnostic controllers to ensure trouble-free, efficient operation day in and day out.

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

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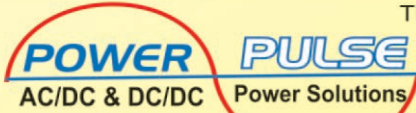
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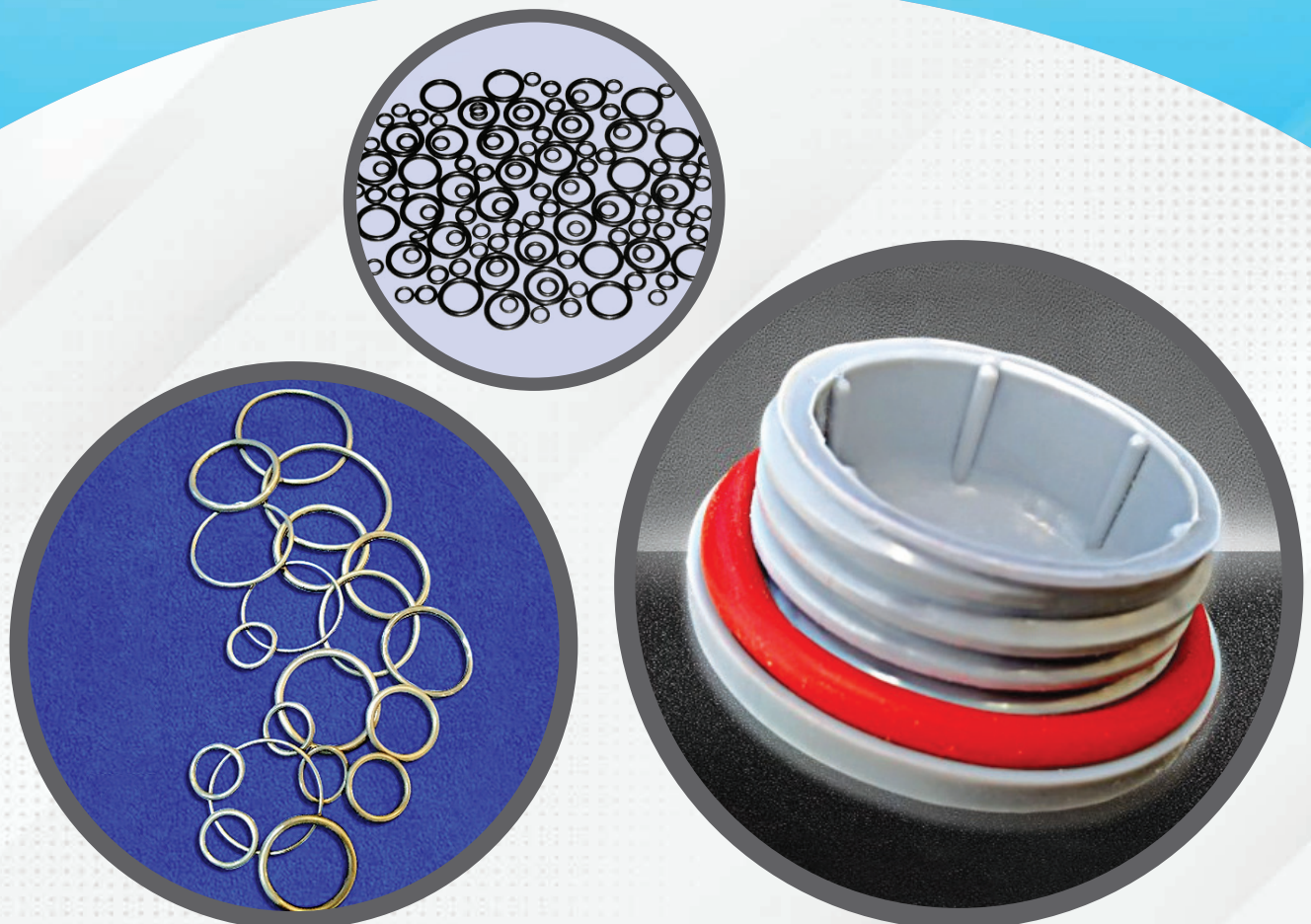
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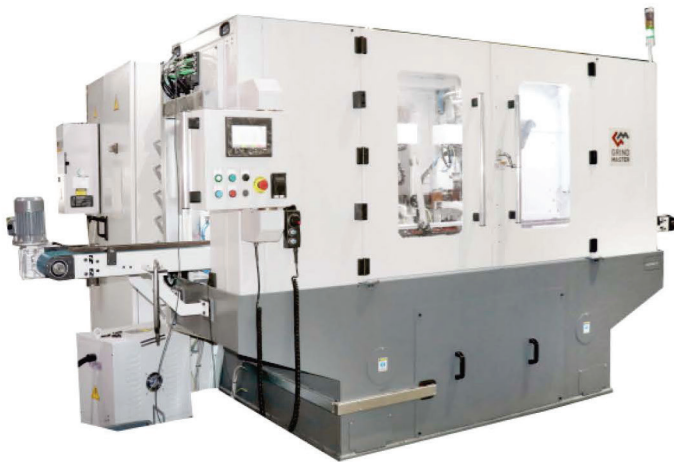
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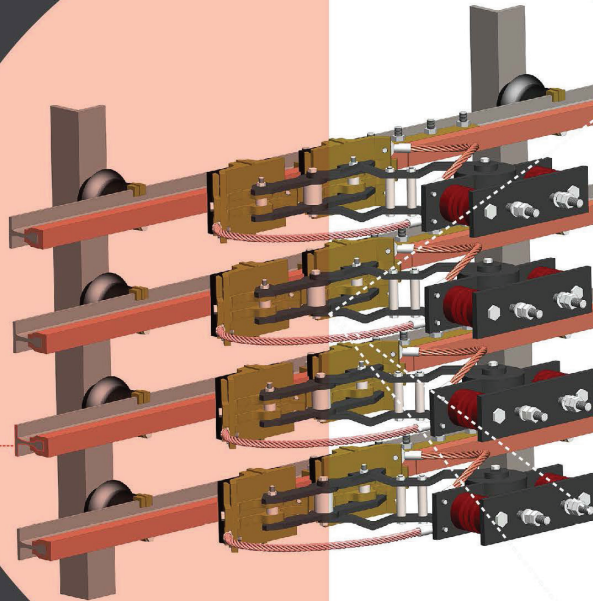


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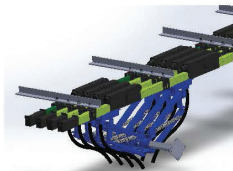
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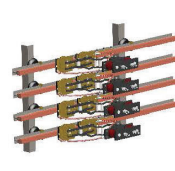
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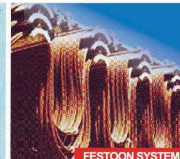
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