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- The likely contenders to buy Siemens' Innomotics
- Can domestic defence production strike the Rs 3 trillion mark?
- Growing machine vision market drives 3D cameras demand
- How to create a resilient supply chain
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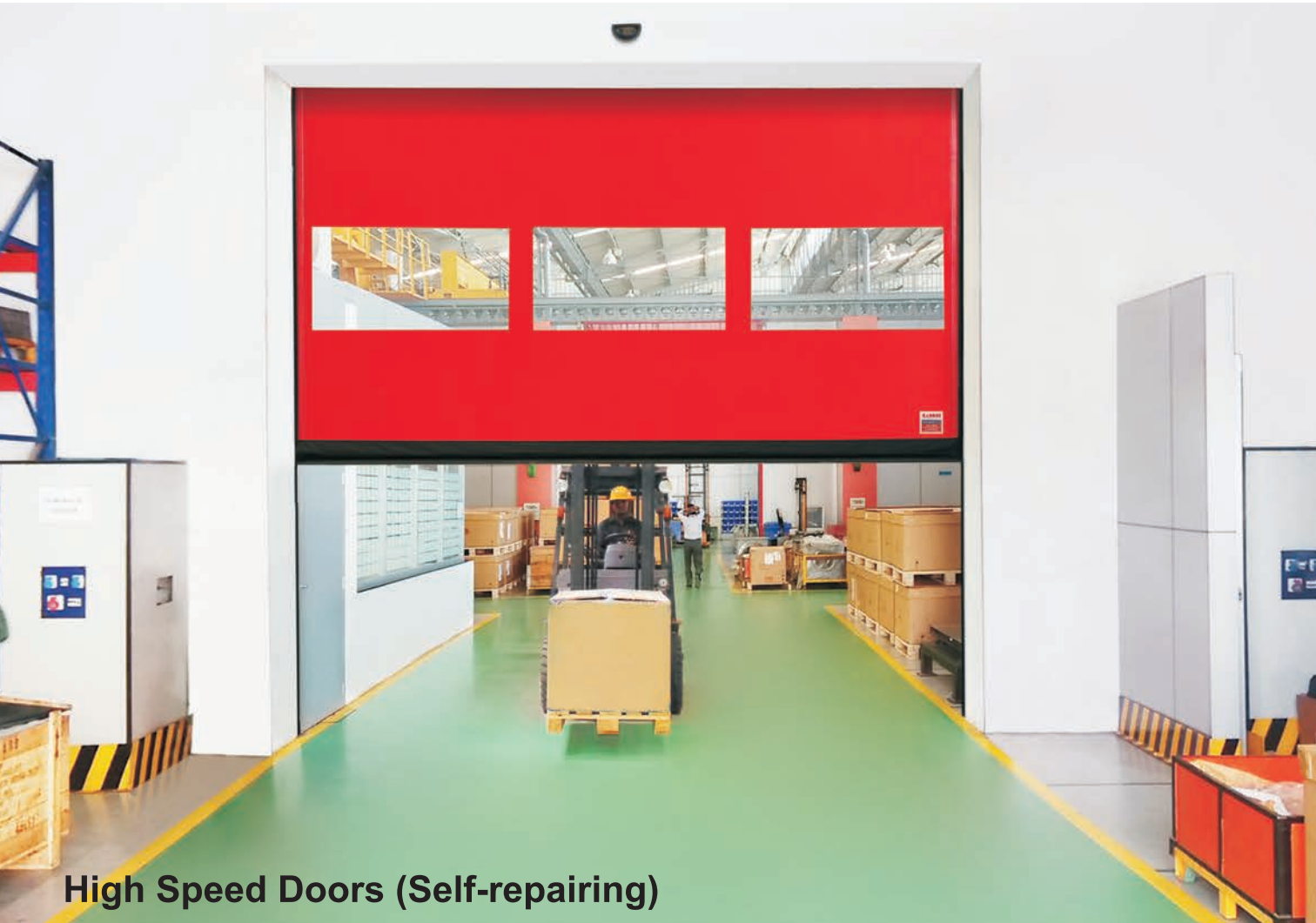




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Will exports turn positive amid Red Sea crisis?

Armed conflict in the Red Sea is affecting the global trade as the movement of goods has been hindered by the conflict since November last year. As things stand, Indian exports have been impacted by a slowdown in global growth. The tightening of interest rates due to rising inflation, especially in advanced Western economies, has led to a slowdown in business, investment and trade. India's goods exports fell marginally to \$36.92 billion in January 2024, from \$38.45 billion in December 2023. However, on an annual basis, merchandise exports grew by 3.13 per cent during January.

In January 2024, India's goods trade deficit narrowed almost 12 per cent compared with the previous month, as imports fell more steeply than exports. So far this fiscal (April 2023-January 2024), India's merchandise exports stood at \$ 353.92 billion, down 4.89 per cent annually, while merchandise imports stood at \$ 561.12 billion, down 6.71 per cent annually. Overall trade deficit, including merchandise and services, stood at \$ 70.43 billion during the April 2023-January 2024 period, down from \$111.99 billion in the year-ago period.

To help exporters tide over the crisis, according to Commerce Secretary Sunil Barthwal, the government has informed the banks to extend credit to exporters, and Exim Bank and ECGC (Export Credit Guarantee Corporation of India) have been told to not increase insurance rates. This may bring a temporary relief to exporters.

About 30 per cent of Indian exports are routed through the Red Sea. After the start of Israel-Hamas conflict in October 2023, freight charges have been increasing raising concerns among exporters. While the initial shocks of the Red Sea crisis have been absorbed, it remains to be seen whether Indian exporters are able to share the rising freight charges with their customers when renegotiating contracts in April.

Besides, Indian exporters are facing the problem of non-tariff barriers from developed countries. The Indian government has created a task force to investigate the issues of non-tariff barriers, sanitary and phytosanitary issues with various countries, and find ways to push exports.

Meanwhile, despite a difficult year, India's engineering goods exporters are still hopeful of ending 2023-24 in the black, with shipments to 13 major markets growing in January. Exports of engineering goods, which have accounted for a quarter of India's merchandise exports in recent years, rose for the second straight month in January 2024, albeit at a slower pace of 4.2 per cent compared to 9.8 per cent in December. Cumulative exports so far this year now stand at \$88.1 billion, just 0.2 per cent below the \$88.27 billion recorded between April 2022 and January 2023.

The major drivers for the growth were iron and steel products, copper products and electric machinery, with demand from South Asia and Europe also propping up volumes. Surprisingly, exports to China (15.1 per cent) and Russia (30.8 per cent) witnessed a strong growth.

Though the government remains optimistic about India's export nearly reaching the previous year's record of \$ 776 billion, in reality the task will be daunting in the face of cooling commodity prices and uncertain global demand.

A stylized, handwritten signature in black ink that reads 'Pratap Padode'.

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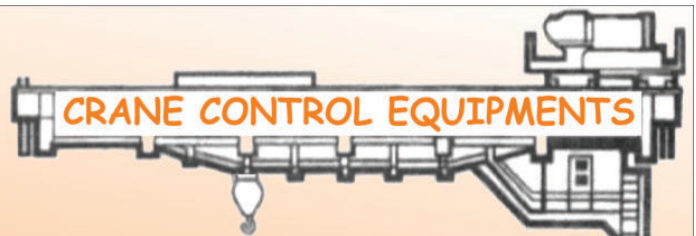
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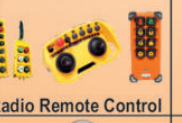
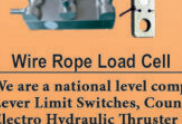
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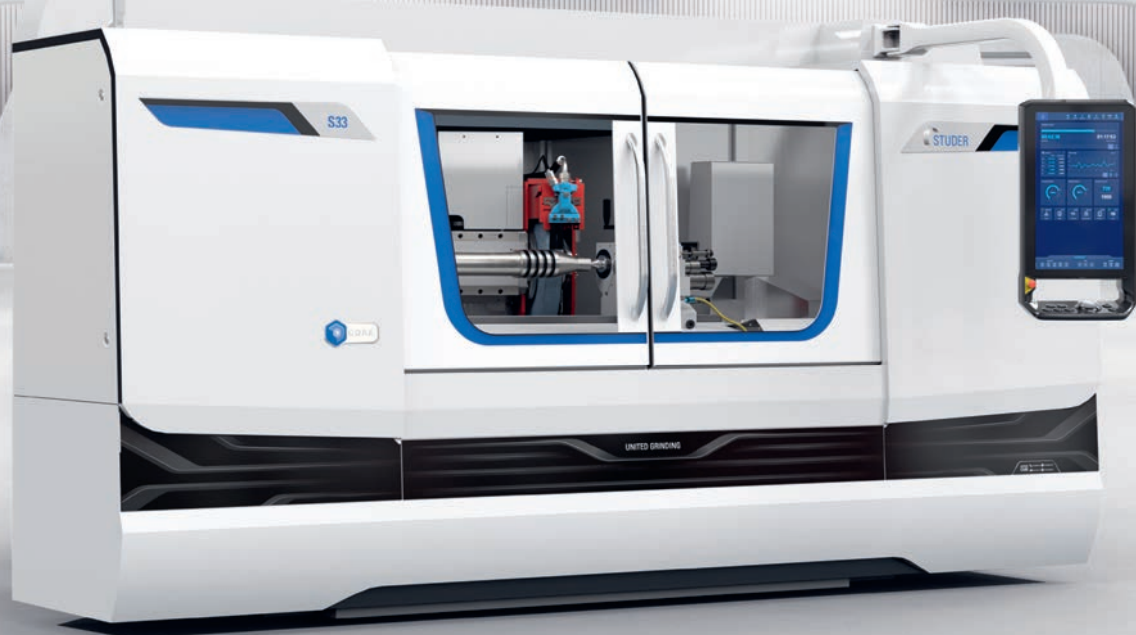
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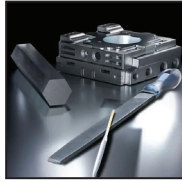
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- The relay measures the line current from each of the phases and if it exceeds the set threshold, then relay extends a trip signal after an operating time. The relay's operating time is determined by selecting one of the four inverse time characteristics. The relay has facility to active / inhibit the high set protection feature. The relay output contacts are self reset / Hand reset type. Relay operation without any fault current is determined by trip test facility.
- The relay provides time graded phase protection of generators, transformers, feeder, capacitors, etc.

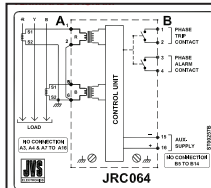
About the company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

Contact:

JVS Electronics Pvt Ltd, Bangalore

Mobile: 09448288863

Email: bangalore@jvselectronics.in



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COMPOUND BALL SPLINES

IBK Engineers Pvt Ltd offers a wide range of compound ball splines - ball screw spline (FBR type).

Features:

- This is spiral type ball spline. An integration of Rotary ball spline and ball screw.
- The combination of the two nuts achieves linear, rotary, and helical motion.
- SCARA Robots, wafer polishing equipment, winding machines.

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

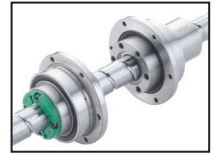
Contact:

IBK Engineers Pvt Ltd, Bengaluru

Tel: 080-26321112

Mobile: 09880566644

Email: raju.kn@ibizkart.com



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PF SERIES FIXED PUMP

HTM Hydraulics Pvt Ltd offers a wide range of PF Series fixed pump.

Features:

- For high pressure applications and extreme conditions including dirty environments, extreme temperatures, and long & difficult duty cycles. Compatible with various water-based, phosphate ester and MIL-SPEC fluids makes these pumps ideal for testing aerospace components.
- One split-flow pump can supply independent flows from upto ten separate outlets.

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 straining for customers in India and abroad. HTM group has headquarters in Bangalore, India.

Contact:

HTM Hydraulics Pvt Ltd, Bangalore

Tel: 080-41572101

Mobile: 09741165877

Email: info@htmhydraulics.co.in



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M: 9945357998

E: aravinda@imtma.in

Hannah Victoria

M: 9731040077

E: hannah@imtma.in

END MILL, T SLOT CUTTER, T SLOT TABLE

Shenoy Engg Pvt Ltd offers a wide range of end mill, T slot cutter, T slot table.

Features:

- Shenoy Engineering has number of VMCs, conventional milling machines and Plano miller, manned by experienced operators.
- They can take up job work on these machines with their or customer's material, apart from machining the standard or non-standard T slots. Linear & circular T slots are offered for job work.
- Standard & non-standard end mills (for slotting), T slot cutters, T slot tables as per the customers' requirement are offered. End Mills & T slot cutters are made of case hardening steel, case hardened & ground. Standard, center clamping carbide inserts are used.

About the company: Shenoy Engg Pvt Ltd has developed a number of grinding attachments which enhance the capabilities of existing machines.

Contact:

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



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EARTH LEAKAGE RELAY

JVS Electronics Pvt Ltd offers a wide range of earth leakage relay (Setting Range 0.3 To 1.8A) JRC 172.

Features:

- The relay measures the earth leakage current from the CBCT and if it exceeds the threshold, it extends a trip signal after the operating time.
- The relay used for protection of LV/MV distribution systems requiring very high sensitivity for earth faults.

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

Contact:

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



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ADHESIVE GRIPPERS - ADHESO

Schunk Intec India Pvt Ltd offers adhesive grippers Adheso.

Features:

- The gripper technology of ADHESO grippers is based on an adhesive system modeled on nature. The adhesive forces used by animals such as geckos for locomotion are now being utilized by Schunk for handling applications in the most diverse of fields.
- The bionically inspired ADHESO gripper technology is based on the principle of adhesion and uses inter molecularly acting Van der Waals forces to handle various work pieces.
- SCHUNK's application experts take advantage of these benefits and develop customer-specific adhesive grippers with ADHESO gripper technology.

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

Contact:

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



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COMPACT TOUCH PROBES FOR TURNING MACHINES

Blum-Novotest Measuring offers compact touch probes for turning machines - TC54-10/TC64-10.

Features:

- The trigger signal is generated via shading of a miniature light barrier. The trigger signal is generated via shading of a miniature light barrier.
- Touch probes by BLUM can be used for the most varied measurement and monitoring tasks in CNC machining centres.

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

Contact:

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



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Heat Treatment Sales & Services, Ahmedabad offers complete repairing, servicing and calibration of all kinds of digital portable metal hardness testers. The company has factory trained engineers who can handle repairing, servicing and calibration of all portable metal hardness testers. The company offers the services of refurbished and reconditioned metal hardness tester with 6 months warranty, which includes parts and labour charges also. However, the dispatching/transportation cost and related expenses such as packing charges



are not included in the warranty. One can dispatch their fault hardness tester properly packed/crated and they will provide a free written estimate upon thorough examination of their portable hardness tester. The company also maintains a complete stock of spares and accessories like impact devices, impact bodies, standard test blocks, support rings, batteries, etc. According to them, when a complete service with spares is conveniently available why do users think of buying a new LEEB hardness tester? It is much more economical to get the existing hardness tester repaired, reconditioned, and refurbished or rebuilt at a fraction of the cost.

Contact:

Heat Treatment Sales & Services
Contact Person: Mr. Bharat Shah
L/119 GIDC Industrial Estate, Odhav
Ahmedabad 382 415
Tel: 079-22870144/Mobile: 08980718181
Email: info@enmatest.com
URL: www.enmatest.com, www.enmatest.co.in

VIBRATORY FURNACE CHARGER

Elektromag-Joest Vibration Pvt Ltd offers a wide range of 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.
- With constant improvement in technology, furnaces require rapid and uniform charging to keep pace with the melting power of the system for which the Furnace chargers are the optimum solution.
- By using the furnace charger, controlled vibrations the metal is uniformly fed into the furnace whereby the melting cycle is reduced and the furnace life and the bridging forming situation is avoided.
- 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.

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

Contact:

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



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CABLE DRAG CHAINS

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

Features:

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

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

Contact:

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



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TWIN SPINDLE ADVANCED CNC CHUCKER MW120EXG

Meiban Engineering Technologies Pvt Ltd offers a wide range of twin spindle advanced CNC chucker MW120EXG.

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Email: office@meibanengg.com

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accordance with the relevant standard and widely used in various utilities and industries.

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materials sourced from reliable and authentic vendors.

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Contact:

E-Tech Power Engineers, Greater Noida
Mobile: 09873348550, 09540199500
Email: etechnoida@gmail.com



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Pristine Engineering Services offers a wide range of multi-function meter. These meters are manufactured with the latest production procedures, using the best quality raw materials, in accordance with market standards.

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Contact:

Pristine Engineering Services Pvt Ltd,
Mumbai
Tel: 022-67206220
Mobile: 09867018848
Email: pristine.engg@gmail.com



ELECTRICAL PANELS

Industrial Engineering Services offers a wide range of electrical panels. These products are manufactured under the supervision of qualified engineers to maintain international quality standards.

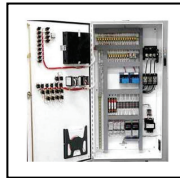
The electrical panels are fabricated with quality raw materials procured from reliable vendors.

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Contact:

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Mobile: 09898779955
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Contact:

Veer Industries, Delhi
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Mobile: 09810317562
Email: veerindustries09@gmail.com



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Electro Cables Industries offers a wide range of win cab screen cables that are fire resistant, durable in service and have good flexibility. The production process of these cables involves a hot-dip galvanisation and uninterrupted monitoring of the cables.

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Contact:

Electro Cables Industries, Indore
Tel: 0731-4027510
Mobile: 09479445990
Email: skjain@wincables.com



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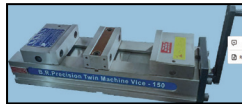
Contact:

Ereva Transformers & Switchgear,
Ghaziabad
Mobile: 09718370172
Email: ets.ctpt@gmail.com



PRECISION TWIN MACHINE VICE - BR - TWIN - 150

B R Precisions offers precision twin machine vice model type BR - Twin - 150. B R Twin vice 150 made out of high tensile casting powerful with high absorption and has strong anti tension which can keep long durability for absorption and has strong rigidity with high precision. Body surface are flame hardened and grounded tenon slot grounded machined.



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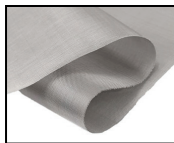


Contact:

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

NICKEL WIRE MESH

Raj Filters & Wiremesh Pvt Ltd offers a wide range of nickel wire mesh. Nickel wire mesh is woven using high-purity nickel wire. This wire mesh is mostly preferred in corrosive environments such as filtration of liquids, gas, etc.



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Contact:

Raj Filters & Wiremesh Pvt Ltd, Vadodara
Mobile: 09724190931
Email: support2@rajfilters.com

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Contact:

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

EDGE PROTECTION TAPE

Mexim Adhesive Tapes Pvt Ltd offers a wide range of edge protection tape. Used in protective packaging and sealing voids in packaging, generally used on fragile / expensive products during packaging. EPT also finds applications in Home and Play-School environments.



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Contact:

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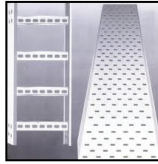
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Contact:

Dhwani Polymer India Private Limited,
Ahmedabad
Mobile: 09033012056
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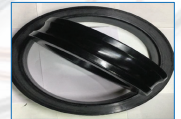
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Factory 2: 204/1 Pratham Inds Estate, Tungarphata, Sativali, Vasai (E), Thane-401208
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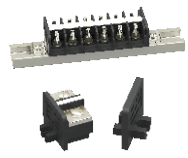
Precision PS1, PS2 Series



Terminal Strips TPB Series



Terminal Blocks TB Series



LED Module Pilot Light LM/PCB2 Series



LED Module Pilot Light LML8/LM8 Series



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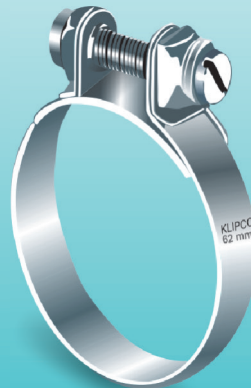
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INITIAL PAGES' INFORMATION OF THE DIARY:

- Conversion Tables
- Weights & Measures
- Unit Conversion Factors & Conversion Power Tables
- Squares, Cubes, SQ. & Cube Roots
- Circumference & Area of Circles
- Non - Ferrous Metals
- Composition of Metals & Alloys
- Wire & Sheet Gauge
- Weight of Steel, Cast Iron, Materials & Mild Steel
- Dead Weight of Materials
- Live Loads on Floors & Roofs
- Rolled Steel Beams- Dimensions & Properties
- Equal & Unequal Dimensions & Properties
- Whitworth Standard Bolts & Nuts
- Square & Round Bars
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- Atomic Weight & Nuclear Cross Section
- Set Screws Hexagon Head
- Technical Information
- Useful Notes on Cement
- Dimensions & Technical



CONVERSION TABLES

Length (continued)

Length (inches/millimeters)	inches	millimeters	feet	yards	meters	centimeters	decimeters	kilometers	micrometers
1/16	0.0625	1.5875	0.0125	0.00694	0.00381	0.381	0.0381	0.00381	381
1/8	0.125	3.175	0.025	0.0139	0.00762	0.762	0.0762	0.00762	762
3/16	0.1875	4.7625	0.0375	0.0208	0.01143	1.143	0.1143	0.01143	1,143
1/4	0.25	6.35	0.05	0.0278	0.01524	1.524	0.1524	0.01524	1,524
5/16	0.3125	7.9375	0.0625	0.0347	0.01905	1.905	0.1905	0.01905	1,905
3/8	0.375	9.525	0.075	0.0417	0.02286	2.286	0.2286	0.02286	2,286
7/16	0.4375	11.1125	0.0875	0.0486	0.02667	2.667	0.2667	0.02667	2,667
1/2	0.5	12.7	0.1	0.0556	0.03048	3.048	0.3048	0.03048	3,048
9/16	0.5625	14.2875	0.1125	0.0625	0.03429	3.429	0.3429	0.03429	3,429
5/8	0.625	15.875	0.125	0.0694	0.0381	3.81	0.381	0.0381	3,810
11/16	0.6875	17.4625	0.1375	0.0764	0.04191	4.191	0.4191	0.04191	4,191
3/4	0.75	19.05	0.15	0.0833	0.04572	4.572	0.4572	0.04572	4,572
13/16	0.8125	20.6375	0.1625	0.0902	0.04953	4.953	0.4953	0.04953	4,953
7/8	0.875	22.225	0.175	0.0972	0.05334	5.334	0.5334	0.05334	5,334
1	1	25.4	0.2	0.1111	0.06096	6.096	0.6096	0.06096	6,096
1.25	1.25	31.75	0.25	0.1389	0.0762	7.62	0.762	0.0762	7,620
1.5	1.5	38.1	0.3	0.1667	0.0914	9.14	0.914	0.0914	9,144
1.75	1.75	44.45	0.35	0.1944	0.1067	10.67	1.067	0.1067	10,668
2	2	50.8	0.4	0.2222	0.1219	12.19	1.219	0.1219	12,192
2.25	2.25	57.15	0.45	0.25	0.1372	13.72	1.372	0.1372	13,716
2.5	2.5	63.5	0.5	0.2778	0.1524	15.24	1.524	0.1524	15,240
2.75	2.75	69.85	0.55	0.3056	0.1677	16.77	1.677	0.1677	16,764
3	3	76.2	0.6	0.3333	0.1829	18.29	1.829	0.1829	18,288
3.25	3.25	82.55	0.65	0.3611	0.1982	19.82	1.982	0.1982	19,806
3.5	3.5	88.9	0.7	0.3889	0.2134	21.34	2.134	0.2134	21,336
3.75	3.75	95.25	0.75	0.4167	0.2286	22.86	2.286	0.2286	22,860
4	4	101.6	0.8	0.4444	0.2438	24.38	2.438	0.2438	24,384
4.25	4.25	107.95	0.85	0.4722	0.2591	25.91	2.591	0.2591	25,902
4.5	4.5	114.3	0.9	0.5	0.2743	27.43	2.743	0.2743	27,426
4.75	4.75	120.65	0.95	0.5278	0.2896	28.96	2.896	0.2896	28,944
5	5	127	1	0.5556	0.3048	30.48	3.048	0.3048	30,480
5.25	5.25	133.35	1.05	0.5833	0.3201	32.01	3.201	0.3201	32,004
5.5	5.5	139.7	1.1	0.6111	0.3354	33.54	3.354	0.3354	33,528
5.75	5.75	146.05	1.15	0.6389	0.3507	35.07	3.507	0.3507	35,052
6	6	152.4	1.2	0.6667	0.3659	36.59	3.659	0.3659	36,576
6.25	6.25	158.75	1.25	0.6944	0.3812	38.12	3.812	0.3812	38,120
6.5	6.5	165.1	1.3	0.7222	0.3964	39.64	3.964	0.3964	39,648
6.75	6.75	171.45	1.35	0.75	0.4117	41.17	4.117	0.4117	41,172
7	7	177.8	1.4	0.7778	0.4269	42.69	4.269	0.4269	42,696
7.25	7.25	184.15	1.45	0.8056	0.4422	44.22	4.422	0.4422	44,220
7.5	7.5	190.5	1.5	0.8333	0.4574	45.74	4.574	0.4574	45,744
7.75	7.75	196.85	1.55	0.8611	0.4727	47.27	4.727	0.4727	47,268
8	8	203.2	1.6	0.8889	0.4879	48.79	4.879	0.4879	48,792
8.25	8.25	210.65	1.65	0.9167	0.5032	50.32	5.032	0.5032	50,328
8.5	8.5	217	1.7	0.9444	0.5184	51.84	5.184	0.5184	51,840
8.75	8.75	223.35	1.75	0.9722	0.5337	53.37	5.337	0.5337	53,376
9	9	229.7	1.8	1	0.5489	54.89	5.489	0.5489	54,896
9.25	9.25	236.05	1.85	1.0278	0.5642	56.42	5.642	0.5642	56,424
9.5	9.5	242.5	1.9	1.0556	0.5794	57.94	5.794	0.5794	57,952
9.75	9.75	248.85	1.95	1.0833	0.5947	59.47	5.947	0.5947	59,472
10	10	255.2	2	1.1111	0.6099	60.99	6.099	0.6099	60,992
10.25	10.25	261.55	2.05	1.1389	0.6252	62.52	6.252	0.6252	62,520
10.5	10.5	267.9	2.1	1.1667	0.6404	64.04	6.404	0.6404	64,048
10.75	10.75	274.25	2.15	1.1944	0.6557	65.57	6.557	0.6557	65,576
11	11	280.6	2.2	1.2222	0.6709	67.09	6.709	0.6709	67,104
11.25	11.25	286.95	2.25	1.25	0.6862	68.62	6.862	0.6862	68,632
11.5	11.5	293.3	2.3	1.2778	0.7014	70.14	7.014	0.7014	70,160
11.75	11.75	299.65	2.35	1.3056	0.7167	71.67	7.167	0.7167	71,688
12	12	305.9	2.4	1.3333	0.7319	73.19	7.319	0.7319	73,216
12.25	12.25	312.35	2.45	1.3611	0.7472	74.72	7.472	0.7472	74,744
12.5	12.5	318.75	2.5	1.3889	0.7625	76.25	7.625	0.7625	76,272
12.75	12.75	325.15	2.55	1.4167	0.7777	77.77	7.777	0.7777	77,796
13	13	331.5	2.6	1.4444	0.793	79.3	7.93	0.793	79,320
13.25	13.25	337.95	2.65	1.4722	0.8082	80.82	8.082	0.8082	80,844
13.5	13.5	344.3	2.7	1.5	0.8235	82.35	8.235	0.8235	82,368
13.75	13.75	350.75	2.75	1.5278	0.8387	83.87	8.387	0.8387	83,892
14	14	357.1	2.8	1.5556	0.854	85.4	8.54	0.854	85,416
14.25	14.25	363.55	2.85	1.5833	0.8692	86.92	8.692	0.8692	86,940
14.5	14.5	369.9	2.9	1.6111	0.8845	88.45	8.845	0.8845	88,464
14.75	14.75	376.35	2.95	1.6389	0.8997	89.97	8.997	0.8997	89,988
15	15	382.75	3	1.6667	0.9149	91.49	9.149	0.9149	91,512
15.25	15.25	389.15	3.05	1.6944	0.9302	93.02	9.302	0.9302	93,036
15.5	15.5	395.5	3.1	1.7222	0.9454	94.54	9.454	0.9454	94,560
15.75	15.75	401.95	3.15	1.75	0.9607	96.07	9.607	0.9607	96,084
16	16	408.3	3.2	1.7778	0.9759	97.59	9.759	0.9759	97,608
16.25	16.25	414.75	3.25	1.8056	0.9912	99.12	9.912	0.9912	99,132
16.5	16.5	421.15	3.3	1.8333	1.0064	100.64	10.064	1.0064	100,656
16.75	16.75	427.55	3.35	1.8611	1.0217	102.17	10.217	1.0217	102,180
17	17	433.9	3.4	1.8889	1.0369	103.69	10.369	1.0369	103,704
17.25	17.25	440.35	3.45	1.9167	1.0522	105.22	10.522	1.0522	105,228
17.5	17.5	446.75	3.5	1.9444	1.0674	106.74	10.674	1.0674	106,752
17.75	17.75	453.15	3.55	1.9722	1.0827	108.27	10.827	1.0827	108,276
18	18	459.5	3.6	2	1.0979	109.79	10.979	1.0979	109,800
18.25	18.25	465.95	3.65	2.0278	1.1132	111.32	11.132	1.1132	111,324
18.5	18.5	472.3	3.7	2.0556	1.1284	112.84	11.284	1.1284	112,848
18.75	18.75	478.75	3.75	2.0833	1.1437	114.37	11.437	1.1437	114,372
19	19	485.1	3.8	2.1111	1.1589	115.89	11.589	1.1589	115,896
19.25	19.25	491.55	3.85	2.1389	1.1742	117.42	11.742	1.1742	117,420
19.5	19.5	497.95	3.9	2.1667	1.1894	118.94	11.894	1.1894	118,944
19.75	19.75	504.35	3.95	2.1944	1.2047	120.47	12.047	1.2047	120,468
20	20	510.8	4	2.2222	1.2199	121.99	12.199	1.2199	121,992
20.25	20.25	517.25	4.05	2.25	1.2352	123.52	12.352	1.2352	123,516
20.5	20.5	523.65	4.1	2.2778	1.2504	125.04	12.504	1.2504	125,040
20.75	20.75	530.05	4.15	2.3056	1.2657	126.57	12.657	1.2657	126,564
21	21	536.45	4.2	2.3333	1.2809	128.09	12.809	1.2809	128,088
21.25	21.25	542.85	4.25	2.3611	1.2962	129.62	12.962	1.2962	129,612
21.5	21.5	549.25	4.3	2.3889	1.3114	131.14	13.114	1.3114	131,136
21.75	21.75	555.65	4.35	2.4167	1.3267	132.67	13.267	1.3267	132,660
22	22	562.05	4.4	2.4444	1.3419	134.19	13.419	1.3419	134,184
22.25	22.25	568.45	4.45	2.4722	1.3572	135.72	13.572	1.3572	135,708
22.5	22.5	574.85	4.5	2.5	1.3724	137.24	13.724	1.3724	137,232
22.75	22.75	581.25	4.55	2.5278	1.3877	138.77	13.877	1.3877	138,756
23	23	587.65	4.6	2.5556	1.4029	140.29	14.029	1.4029	140,280
23.25	23.25	594.05	4.65	2.5833	1.4182	141.82	14.182	1.4182	141,804
23.5	23.5	599.9	4.7	2.6111	1.4334	143.34	14.334	1.4334	143,328
23.75	23.75	606.35	4.75	2.6389	1.4487	144.87	14.487	1.4487	144,852
24	24	612.7	4.8	2.6667	1.4639	146.39	14.639	1.4639	146,376
24.25	24.25	619.15	4.85	2.6944	1.4792	147.92	14.792	1.4792	147,900
24.5	24.5	625.55	4.9	2.7222	1.4944	149.44	14.944	1.4944	149,424
24.75	24.75	631.95	4.95	2.75	1.5097	150.97	15.097	1.5097	150,948
25	25	638.3	5	2.7778	1.5249	152.49	15.249	1.5249	152,472
25.25	25.25	644.75	5.05	2.8056	1.5402	154.02	15.402	1.5402	154,000
25.5	25.5	651.15	5.1	2.8333	1.5554	155.54	15.554	1.5554	155,524
25.75	25.75	657.55	5.15	2.8611	1.5707	157.07	15.707	1.5707	157,048
26	26	663.9	5.2	2.8889	1.5859	158.59	15.859	1.5859	158,572
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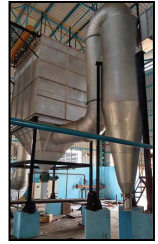


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- Remote Boiler Level Indicators
- Capacitance Level Indicators / Switches / Transmitters
- Ultrasonic Level Transmitters / Indicators / Switches
- RF Capacitance type Level Transmitters
- Reed level Transmitters / Indicators / Switches

LEVEL SWITCHES

- Displacer Operated Level Switches
- Float Operated External Cage / Magnetic Level Switches
- Reed Level Switches
- Conductivity Level Switches
- Rotary Paddle Level Switches
- Cable and Float Level Switches
- Gear Box Oil Level Float Switches
- RF Capacitance Level Switches
- Vibrating Fork Level Switches

FLOW SWITCHES

- Globe / Vane Type Flow Switches
- Indicating Flow Relays → Sight Flow Indicators
- Thermal Dispersion Flow Switches

FLOW METERS

- Paddlewheel Flow Meters
- Electromagnetic Flow Meters
- Ultrasonic Flow Meters → Variable Area Flow meters

OPEN CHANNEL FLOW TOTALISERS / METERS

- Ultrasonic Open Channel Flow Totalisers
- Rate of Flow Transmitters
- Mechanical Open Channel Flow Meters

LOSS OF HEAD INDICATORS

- Capacitance type Loss of Head Indicators
- Float type Loss of Head Indicators

VALVES

- Blow Down Valves
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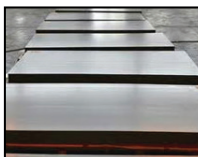
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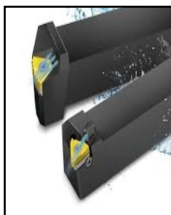
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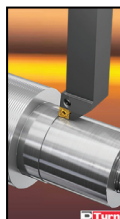
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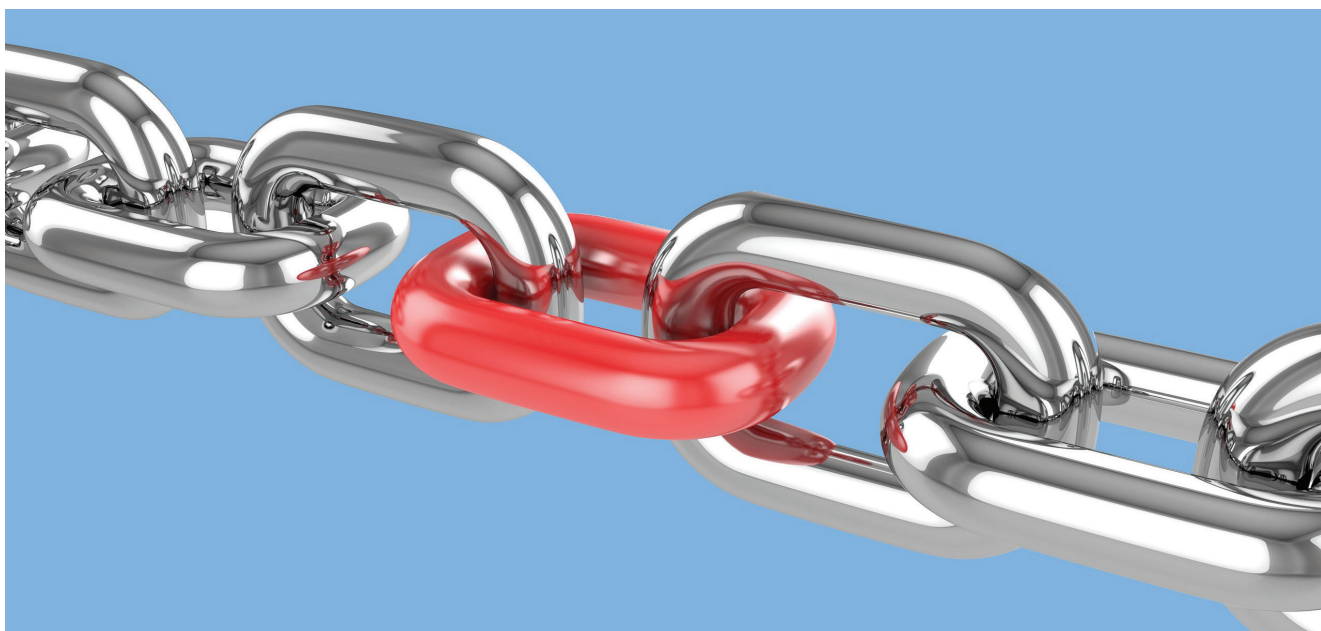
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How to create a resilient supply chain

In today's world, disruption can occur anywhere. In this article (which is the first part of the 3-part series), **R Jayaraman** explains the various dimensions to be considered while building a resilient supply chains (RSC).



Authors David and Edith Simchi Levi published an early article on resilient supply chains in the HBR (Harvard Business Review) in June 2020. They recommended mapping of the supply chain, conducting stress tests, identifying bottlenecks and then drive towards the solutions. Major solutions included shifting manufacturing from China, creating more facilities in other countries (what has now become the China +1 policy), reshoring, and the like. As this was written in the covid era, the focus was on the immediate – how to get safely out of the stranglehold of the ‘supply disruptions’ caused by covid. Since then, three years have passed and much has happened. The idea of China +1 has caught on, and things are moving quite fast in this direction.

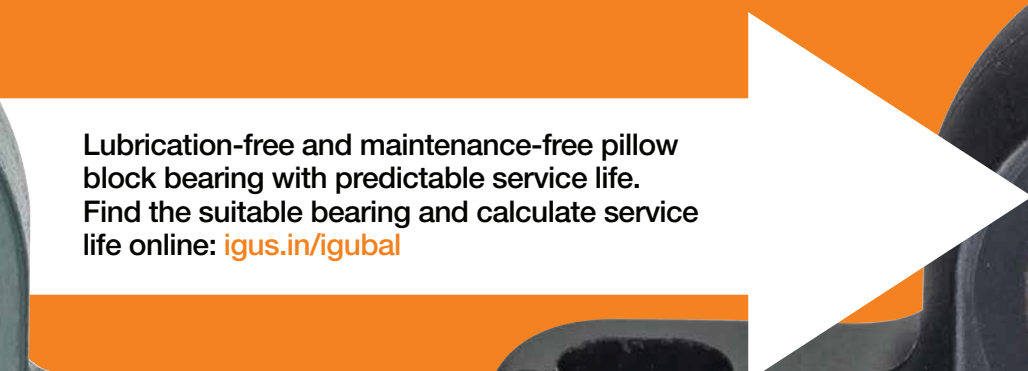
Vietnam, Malaysia, and India have been the major beneficiaries. This is likely to continue for some more time. However, this is a myopic view, and needs to be expanded to consider the way ‘resilient supply chains (RSC)’ should be built in the future. Let’s examine the various dimensions of this response.

To begin with, one needs to appreciate that the ‘supply chain’ is now an inclusive term. While Porter introduced the concept of a ‘organisational value chain’, which included all the departments of a company working together, he showed the supply chain as representing the external suppliers and vendors who vend parts, components, raw materials to the company, which then converts all these into value added outputs, sold in the market (refer Figure 1).

The traditional view of a supply chain is represented in the Porter Value Chain diagram as ‘Procurement + Inbound Logistics’. However, in the current scenario, the ‘supply chain’ has morphed into a larger entity, encompassing the value creation processes, and the products/ services distribution processes as well, in addition to the suppliers and vendors. This is a much broader way of looking at the supply chain and suits the current reality of business. With heightened competition, an organisation needs to marshal all its resources and activities, create a holistic alignment, and integrate itself with the markets and suppliers, so that, its responses to both these entities are swift and speedy. Clearly, this is a new way of looking at the supply chain and has several implications on the issue of

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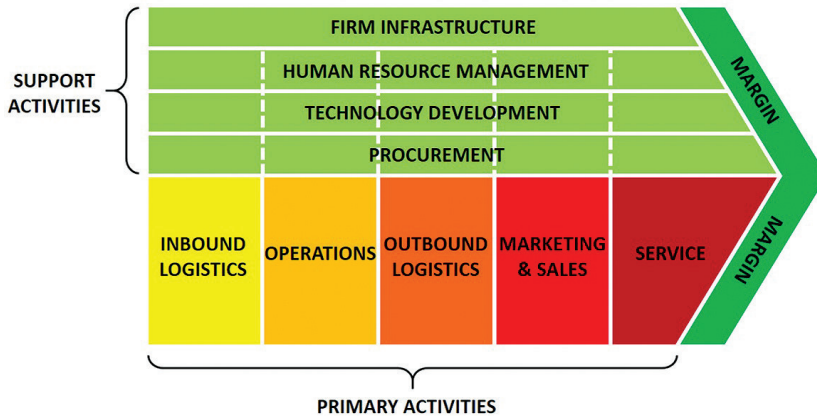


Figure 1: Porter Value Chain diagram

creating an RSC.

Let's first look at the modern 'Integrated Supply Chain Value Diagram (ISCVD)', see the Figure 2 showing the three centres of the ISC.

The three centres of a modern supply chain need to work together in unison to create value as desired by the markets. Resilience applies to each of these centres, and not just to the 'Vendors and Suppliers' centre only, as has been the implicit assumption of David and Edith Simchi. Disruption can occur anywhere. For example, take the disruptions caused by the ship 'Greenpeace' getting stuck in the Suez Canal. Or the more recent events in the Red Sea due to the increasing attacks by pirates and Houthis. These events disrupted the front end of the Integrated Supply Chain (ISC). Some years back, the floods due to inclement weather in South East Asia caused the value creating centre to suspend its operations. This is a central disruption, so to say. And, the Covid, disrupted the back end of the ISC. Any discussion on resilience must be inclusive and consider the ISC for lasting solutions. There are many implications of this approach.

First, in view of the turbulence caused due to different conflicts between countries, the uncertainty of the availability of the transportation waterways and other channels (including airways, with the recent issue of the 'opening doors' of the Boeing 737), and road closures due to land slippage/ landslides, the front

end of the ICS can develop bottlenecks, seriously disrupting the supply to waiting customers. Second, power outages, natural calamities, water shortages, employees' absenteeism, etc. disrupt the central part of the ISC – the value creation centre. Third, which has dominated the resilience concerns, has been the disruptions in the back end of the ISC. Thus, resilience applies equally to each of the centres.

This increases and enhances the scope of resilience discussions. Mere reshoring may not be the full answer to the US concerns in keeping their manufacturing activities going, as the occurrences in the Red Sea may put paid to customers receiving their goods in time. But for the Indian Navy, this waterway, which is currently a global hotspot, may develop into another major conflict zone. Similarly, for the last many years, several Indian companies, like the TVS group, have been supplying components to US auto companies. Now, these companies will find it difficult to transport to the US through the Red Sea. While the back-end centre for US auto companies is the problem area, TVS group companies have a disruption in their front end.

It is clear that, due to the connected nature of the ISC, a problem in the front end of one company, can create a problem in the back end of another, and so on.

Thus, if a company wants to design an RSC, then the ISC way of looking at the holistic picture would be very useful. Let's see how this view can help.

The whole issue of resilience has developed because of two reasons. **First**, the root cause, is the indiscriminate and short-sighted pouring of US and European investments into China, which is violative of all principles of investments. Putting all eggs into one basket is neither good for the basket nor for the chicken. But the US and EU appeared to be hell-bent on ignoring this sage advice. **Second**, shutting down of local capacities, along with the R&D. Fortunately, some amount of R&D was still kept in the US and EU, mainly due to the work being done in their universities, (in addition to industrial R&D), where, the educators guarded their activities against the marauding business community. The amount of mud slung on universities and colleges for making higher education 'more expensive' is not a joke. This is a Nelson's eye view of education, ignoring the benefits and highlighting only the 'problem'. Much before this El Dorado type of raids into China, professors from Harvard, Gary Pisano and Willy Shih, had warned of the ills of 'offshoring American manufacturing'. They lamented the loss of R&D talents, patents and design capacities (March 2012, HBR).

Both these developments exacerbated the covid disruptions. The point was not merely that US companies could not receive supplies from China, it was also that nothing was available or could be developed

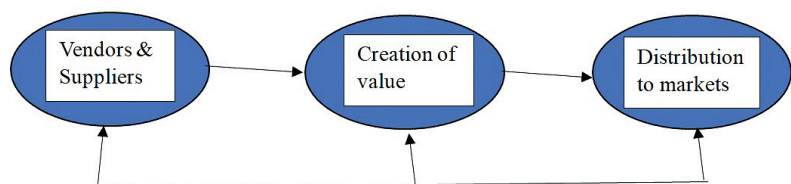


Figure 2: Three centres of the Integrated Supply Chain

in the short term (as a 'bridging loan') to tide over the supply loss. As a result, a 'chain reaction' was set off. Disruption in component supplies disabled the full capacity running of the 'value creation' centre, due to which, companies could not produce and dispatch goods to full capacity, leading to a vicious cycle of a downward spiral. This was a catastrophic development, but many pundits saw it only as a 'supply chain' issue, meaning, only the back-end centre had been affected. Ignoring the effects of the other two centres is a serious gap, and could lead to sub optimal solutions.

So, what are the solutions? If we compare the ISC to a human body, any malaise in the body should be treated, keeping in mind the side effects of the prescribed medicines. Steroid based medicines can strengthen the body, but, in the long run, they can ruin it too. A dose of medicines to fight cancer also has the

problem of destruction of good cells too, which are required to fight. Several psychotropic medicines have undesirable side effects. However, what is common is that a holistic approach is what is required. Merely appointing more suppliers will only lead to the situation prevalent in the 1980's and 90's, when the US auto industry purchased components and parts from many suppliers, as a policy to keep costs down.

Each supplier would compete with a host of other suppliers, and reduce the supply price, so that they can continue to receive orders. Toyota changed this policy to 'either one or two dedicated' suppliers. To make this policy work, the company invested into the suppliers, and appointed sensei to ensure high quality, controlled cost production, to create win-win situations for both, buyer and seller, using lean management techniques. However, these policies need to be

re-examined, to create a holistic solution, to create an RSC.

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(This is the First article of 3-Part series column)

About the author:



R Jayaraman is the Head, Capstone Projects, at 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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NEWS SNIPPET

Toyota Material Handling joins hand with Gideon for new automated solutions

There is an increasing demand for automation and flexible robotics solutions on the market today. To successfully address this growing demand, Gideon and Toyota Material Handling Europe (TMHE) are joining forces through strategic cooperation on the development of new automated solutions. Toyota Material Handling is the largest entity of Toyota Industries Corporation (TICO), the global leader in industrial materials handling. The European organisation is active in more than 30 countries across Europe, and with the team of over 12,000 employees provides comprehensive portfolio of counterbalances forklift trucks and warehouse equipment to the market.

By implementing Gideon's AI-powered autonomy software stack on Toyota vehicles, the market will get solution to some of the unsolved automation problems through significantly shortened project implementation timelines, focusing primarily on collaborative case picking for retail order fulfilment and autonomous truck unloading



and loading.

Patric Hed, SVP Logistics Solutions at Toyota Material Handling Europe (TMHE) stated, "Gideon has developed an impressive software stack and vision modules, combining flexible, intelligent autonomous behaviour with specific logistics application focus and user friendliness that will add value to our

customers over the coming years."

As the first result of this cooperation, Toyota (TMHE) plans to present new application solutions to the market during 2024, starting with order fulfilment solutions for retail distribution.

Gideon builds flexible, autonomous material handling solutions that automate even most complex warehouse and manufacturing material handling operations. The company's autonomous mobile robots are powered by proprietary spatial AI and 3D vision technology, enabling businesses to automate and orchestrate workflows of humans, robots, and other equipment, supported by real-time data.

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The Red Sea crisis: Lessons for logistics sector

Certain geopolitical complexities, such as the ongoing Red Sea crisis, present challenges in the smooth maritime operations and affect global trade. **Pushpank Kaushik** shares some valuable thoughts on sustaining the growth of India's logistics and shipping sector amid these crises.



player in global trade, India encounters challenges arising from geopolitical and global circumstances. The logistics and shipping sector, which had grappled with the impact of COVID earlier, now confronts a new hurdle – the Red Sea crisis triggered by the Iran-backed Houthis

bolster sea trade benefitting India's logistics and shipping sector along with economic growth, attracting more foreign direct investment (FDI). Currently, this neutral stance redirects FDI flows favorably, notably surpassing China, with a significant rise in investment from the US.

Regional cooperation: To uphold global trade, India must foster strong relations and collaboration with other nations. This involves ensuring route availability and engaging in joint projects to enhance global trade efficiency for cost effective import and export processes.

Transparency: Utilising real-time tracking through technological advancements, logistics and shipping firms can offer customers instant access to product status updates. This ensures transparency, minimises uncertainties and addresses potential shipping delays. Such proactive measures build trust during regular operations and also prove invaluable in challenging situations.

Focus on value-added services: Indian logistics and shipping firms can broaden their business scope beyond basic transportation by integrating value-added services like packaging, freight forwarding and customs clearance in

India's trade heavily relies on maritime transport, with approximately 95 per cent of the volume and 70 per cent of the value, reported by the Ministry of Shipping. As the 16th largest maritime country globally, India's ports and shipping industry play a crucial role in fostering trade and commerce. In FY23, merchandise exports through the sea route reached \$ 447.46 billion and sea ports handle trade for key export destinations including the US, UAE, Saudi Arabia, Hong Kong, China, Germany and the Republic of Korea. Primary commodities managed by Indian ports encompass petroleum products, coal, automobiles, iron ore, engineering goods, chemicals, and electronics.

However, being a significant

movement in Yemen. The resulting impact includes a slowdown in global trade, disruptions in the export-import flow, longer turnaround times and shifts in sea routes. These factors collectively contribute to the increased difficulty and risk associated with India's maritime trade.

How can the Indian shipping sector sustain the growth?

Navigating prolonged geopolitical tensions demands strategic measures for the Indian logistics and shipping industry to weather the challenges. Here are key actions that need to be taken to ensure the sectors' growth amid such complexities:

Active geopolitical participation:

India, like China, Germany and Brazil, maintains a crucial geopolitical stance. Positioned neutrally, it actively participates in cross-border manufacturing value chains, aligning with global trade norms. Its strategic location fosters diverse trade relationships, creating investment prospects and mitigating sea trade tensions. However, addressing geopolitical challenges proactively with larger economies will

India, like China, Germany and Brazil, maintains a crucial geopolitical stance. Positioned neutrally, it actively participates in cross-border manufacturing value chains, aligning with global trade norms.

While India has successfully reduced turnaround time by 27 per cent and to 85 hours, over the past four years in sea trade, as mentioned by the Finance Minister in the budget session, the current challenging conditions necessitate enhanced container capacity.

Utilising real-time tracking through technological advancements, logistics and shipping firms can offer customers instant access to product status updates. This ensures transparency, minimises uncertainties and addresses potential shipping delays.

challenging times. These services will enhance customer satisfaction and also strengthen Indian trade.

More containers: Indian shipping and logistics firms must acquire additional containers to facilitate increased product and goods shipments, minimising the impact of extended turnaround times. While India has successfully reduced turnaround time by 27 per cent and to 85 hours, over the past four years in sea trade, as mentioned by the

Finance Minister in the budget session, the current challenging conditions necessitate enhanced container capacity. This expansion will contribute to a more efficient trade process, accommodating larger freight volumes at once, thereby reducing both additional fuel costs and delays in global trade.

During challenging periods, collaboration between India's logistics and shipping firms and the government is essential for sustained resilience. With ports managing 95 per cent of the nation's international trade volume, fostering trade activities and private involvement in port infrastructure becomes pivotal. In challenging times, proactive measures, such as lowering fuel prices, expanding port and warehouse facilities, and fostering international cooperation, are imperative for navigating difficulties and ensuring seamless trade.

Geopolitical complexities can disrupt the seamless flow of the

sector and influence global trade. Therefore, adopting a precautionary approach is crucial to minimise the impact on India's economy and businesses in this sector. Implementing effective strategies is essential for sustaining and achieving projected growth, ultimately bolstering sea trade and the maritime supply chain.

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About the author:



Pushpank Kaushik is the CEO of Jassper Shipping. Based in Hyderabad, Jassper Shipping has strived to become a leader in ship broking, NVOCC, and fuels.



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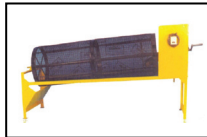
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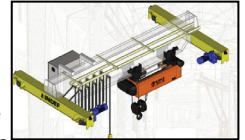
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Why is UPS industry banking on green technology?

Rising energy prices and environmental awareness is driving companies to develop green uninterruptible power supply (UPS) technology to reduce energy consumption.

Numerous industries have experienced a transition, with companies switching from physical documents to digitalization. With the huge market adoption of the internet, sectors are investing in managing humongous amounts of data. But, there is always a threat of losing important business data due to unexpected loss of power that can damage CPUs. Hence, to avoid any data loss, the acceptance of uninterruptible power supply (UPS) is surging across all industries. Government initiatives for digitalisation, together with economic growth, infrastructure projects, and surveillance needs, are also aiding the growth of UPS market in India.

Measures, such as installing UPS battery, are necessary for various economic segments of the country to work efficiently with negligible downtime. According to ResearchAndMarkets, India UPS battery market - valued at \$ 139.65 million in 2023 - is anticipated to grow at a CAGR of 11.36 per cent in the next five years owing to rising dependence on electricity, expanding commercial and industrial segments, with power outages being a frequently occurring in the country, specifically during peak consumption hours, an uninterrupted power supply is a mandate.

Some growth hurdles

Despite being a reliable and highly responsive system guaranteeing an immediate power supply in the event of a power failure, the major concern for the UPS industry is the significant upfront investment. Corporate setups on a large-scale run into tens of thousands

of dollars for the machinery alone. These major installations also require an infrastructure setup that can significantly increase the total setup cost. Therefore, not all users could afford UPS, hampering the market's growth.

Additionally, the maintenance cost of UPS is much higher, especially for corporate offices and industries, as it involves many UPS connections and requires a skilled electrician to be appointed to manage wiring systems and ensure error-free services. The UPS system draws more power than a standalone device in terms of power consumption. The amount required is significantly higher than the actual amount needed by the devices, as UPS needs to keep its batteries always charged. This adds to the cost for the user.

Therefore, UPS system's high capital cost and operational expenditure are factors limiting the growth of the market.

The rise of green technology

Like other industries, electrical equipment makers are also adopting eco-friendly measures to bring down their carbon footprint. **Meenu Singhal**, Regional MD, Socomec Innovative Power Solutions Pvt Ltd, said, "The electrical sector is adopting quickly to the technologies like IoT and remote monitoring. The entire sector is moving towards a sustainable and resilient energy landscape. Using of environment friendly products like advanced lithium-ion batteries is being promoted. Many players have shifted focus completely towards green manufacturing practices and played a part in the transition to a low-



carbon economy. Adopting such measures lead to efficient use of resources and improves reliability, control and monitoring and also optimises the electrical installations. The manufacturers are also constantly exploring ways to design products that exceed expectations in terms of energy efficiency and sustainability."

The past few years have seen a speedy hike in energy prices and environmental awareness by consumers. For these reasons, various companies have developed an UPS technology to reduce energy consumption, also referred to as green UPS technology. Green design reduces the power consumption of UPS systems by up to 75 per cent compared to conventional UPS systems. Thus, an energy-efficient design has become one of the top factors for customers to consider when comparing UPS products. Further, green UPS solutions have advanced monitoring and thermal designing systems that reduce heat generation.

Meenu Singhal said, "Balancing regulatory requirements and environmental standards with the primary needs of customers to help them met Net Zero emission targets is a challenge. Keeping in mind our

customers' needs, we devise solutions and products that consume less energy and are eco-friendly. We conduct life cycle assessments to ensure minimal environmental impact and improved performance. Our focus will continue to be on improving our products' sustainability performance."

He adds, "Socomec's continuous investment in cutting-edge technology ensures unmatched UPS longevity, empowering our customers to meet sustainability goals and contribute to a greener future. One of our solutions, MODULYS XM is designed with a life expectancy of 20 years making it a 'Forever Young' product. Under this concept, the life style extension of the UPS comes with plug-ins of modules and other subassemblies with a 20-year guaranteed compatibility. The system's components are easy to recycle, keeping in mind the design, making it an eco-design concept. With remote troubleshooting technology, Socomec experts connect to the UPS system, run remote tests and diagnostics – all with zero transport-related carbon emissions."

Burgeoning data centres drive green UPS demand

Due to the rising of data-related services in India, there has been a huge increase in the demand for data centers, which is driving the demand for UPS batteries across the country. The growing utilisation of cloud computing & virtualization has led to a rise in data centers. The rising colocation providers across India are highly inclined toward remodeling their data center UPS solutions to meet the customer demand to deliver the data rapidly, thus, propelling the demand for data center UPS solutions.

In addition, the life expectancy of a UPS in a data center is about 10-15 years. Lead-acid battery works for about 3-6 years, while lithium-ion battery lasts 10 years or longer. Due to the latest advancement in UPS batteries, companies in India are highly focused on designing advanced battery systems for data centers. This battery of UPS has 46

per cent lesser footprints and is 20 per cent lighter compared to traditional lead acid battery systems. Thus, the growing deployment of UPS batteries for data centers, due to their numerous advantages such as high energy efficiency, high performance, and lightweight, is compelling the India UPS battery market growth.

Eco-friendly alternatives

Amidst growing concerns about climate change, manufacturing facilities worldwide are realising the importance to implement sustainable practices. With the aim of conserving energy and reducing their carbon footprints, more vendors are coming up with an eco-friendly UPS or with an eco-mode built in. Vendors have been launching eco-friendly UPS technology offering higher efficiency of up to 94-97 per cent against the normal 80-88 per cent.

"With automation, companies are able to reduce their cost of production by making processes more efficient and improve the product quality. By incorporating artificial intelligence (AI) and other digital tools, our products have become more intelligent and meet customer's non-standard requirements. This enables in increasing productivity and customer's satisfaction," said **Shivaji Waghmare**, CEO & CTO, Fuji Electric India.

Government is planning to add 25 GW per annum of solar capacity, offering huge potential to grow for Indian manufacturers. At present, equipment for solar energy sector is dominated by imports; but, now the government is promoting local manufacturing. "We see this as a big opportunity to grow our business and, hence, we are developing new products (like solar inverters) for solar energy sector. We are also diversifying our product range and scaling up offerings for this sector," says Shivaji Waghmare.

At the Renewable Energy India Expo 2023, Fuji Electric India introduced the PV1500 series central inverters for large-scale solar plants, which helps in energy saving and reducing pollution. "We have a lot of



other solar and solar-hybrid products, and energy storage systems. All these systems help customer to generate electricity through solar or use batteries instead of diesel generators," he adds.

Summing up

Today's evolving customer needs for more reliable, super-efficient and intelligent solutions, fosters innovation in product design and development by leveraging modern technologies. "The adoption of advanced technologies leads to lesser downtime, reduces wastage, increases operational efficiency and production speeds, resulting in overall cost reduction of the electrical infrastructure. These factors also help manufacturers to reduce the carbon footprint and contribute to sustainability goals. By adopting modern technology, manufacturers gain customer trust and establish a competitive edge, particularly in industries where product quality is a critical factor. Many global markets have high tech standards, and the adoption of modern technologies helps Indian manufacturers meet these standards, enhancing their access to international markets," said Meenu Singhal.

In the coming years, green UPS demand is anticipated to increase at a substantial rate, mainly driven by various applications in IT networks and telecommunications. Owing to this, the India UPS batteries market is also expected to witness a surge. **IPF**



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Grid integration: Balancing load regulation and renewable energy

A pressing energy grid challenge is much of the infrastructure requires extensive updates to meet future needs. Those involved can pursue numerous possibilities depending on budgets, time frames and other factors, says **Emily Newton**.



An electrical grid's load regulation refers to its voltage stability as demand shifts. Loads can rise as more people charge their electric cars or use other power-intensive products. However, renewable energy grid integration efforts can also impact load regulation, although professionals can cope with it in numerous ways.

Weather can affect renewable energy output

A lack of ideal weather conditions could affect the amount of energy produced in a given area. Those fluctuations could impact load regulation and give people another factor to consider when moving forward with renewable energy grid integration plans.

Climate change expected to curb solar output in Western Australia

A 2023 study from researchers in Australia involved model creation to explore how the country's warming

climate could affect solar energy output. Participants used simulated regional models to identify changes in Australia's solar distribution and variability in a high-emissions future.

The region-specific results show solar reliability and availability could increase in Eastern Australia by 2099. Additionally, that part of the country should have fewer overcast days, reducing the solar power intermittency that can interfere with grid loads.

Conversely, Western Australia would have fewer consecutive periods where solar is a feasible energy source, plus more cloudy days. The researchers concluded that the region must become more reliant on energy storage products to keep the grid stable.

However, the team recognised the need for additional research, including studies about different renewable energy sources and the impact of extreme weather events, such as bushfires. The more that's learned about probable climate change impacts, the more confidently

decision-makers can optimise load regulation while pursuing renewable energy grid integration upgrades.

Icy conditions partially blamed for power outages

Elsewhere, research indicated ice on wind turbines could cause an 80 per cent decrease in power production by reducing the blades' aerodynamics. Some turbines have frozen and ceased to work during ice storms, resulting in power reliability challenges. However, this storm-linked variability could also affect load regulation.

Analysts said frigid conditions in Texas during 2021 partially

It's too short-sighted to attribute increased loads solely to changes driven by rising renewable energy adoption rates. That factor plays a role, as do other fluctuations common during less tolerable weather.

contributed to blackouts in areas hit by winter storms. However, they cited inadequate grid preparedness for seasonal weather as a more significant factor.

Things can get complicated because people typically use more electricity in extreme weather, such as to run portable heaters, air conditioners, electric blankets and fans. It's too short-sighted to attribute increased loads solely to changes driven by rising renewable energy adoption rates. That factor plays a role, as do other fluctuations common during less tolerable weather.

Grid management must address renewable energy grid integration

A pressing energy grid challenge is much of the infrastructure requires extensive updates to meet future needs. Those involved can pursue numerous possibilities depending on budgets, time frames and other factors. For example, reconditioned transformers have shorter lead times than new ones, which could help people deal with emergencies faster.

Leaders have also invested in connected technologies to enhance grid management outcomes. Smart sensors can continuously gather data and monitor loads, alerting users to abnormal conditions.

Parties with authority may consider approving smart sensors to monitor grid voltage fluctuations across a set time frame, such as a year. They can then use that data to inform renewable energy integrations with an existing or newly updated grid.

Basing decisions on real-time information will be increasingly important, particularly as some studies reach conflicting conclusions about how renewables will impact the grid's stability.

Renewable energy strengthens grid resilience

A 2021 Dartmouth Engineering study found renewable energy would make the United States power grid more resilient. Researchers concluded that after examining more than 175,000 of the country's power resources, from transmission lines to substations. Their models suggested energy professionals can simultaneously pursue grid updates while prioritizing increased sustainability through renewables.

High solar adoption rates could strain the grid

A 2022 University of Nottingham study reached a different conclusion when participants used smart meter data to track grid loads and resilience. Their findings indicated a high solar uptake could increase grid failures since resilience varies throughout a typical day.

Some battery backups support grid reliability

A 2021 Stanford University study analysed multiple grid stability scenarios where renewable energy accounted for all United States power needs.

One takeaway suggested linking large, interconnected geographic regions resulted in smoother renewable energy grid integration by elevating overall power



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availability. Another interesting conclusion was that long-duration batteries did not improve grid stability. However, people could get better results with backup power by linking several batteries with storage durations of four or fewer hours. These results can help power professionals get the best outcomes while regulating loads and increasing renewable energy usage.

How will you handle renewable energy grid integration needs?

Research highlights how renewable energy adoption is an emerging matter that professionals must handle carefully to keep the grid functioning well. More states and countries are increasing their dependence on clean power. As a result, people will learn important lessons about load regulation and other necessities to prevent blackouts and increase the public's confidence in gradual fossil fuel reduction.

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About the author:

Emily Newton is a tech and industrial journalist and the Editor-in-Chief of Revolutionized Magazine. Subscribe to the Revolutionized newsletter for more content from Emily.



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IEEMA to host ELECRAMA 2025 from Feb 22-26 in Delhi-NCR

ELECRAMA 2025, which will have the theme of “Reimagining Energy for Sustainable Future”, expects business enquiries worth \$ 20 billion.

Indian Electrical & Electronics Manufacturers’ Association (IEEMA), the apex association of manufacturers of electrical and industrial electronics and allied equipment in India, formally announced the 16th edition of ELECRAMA, the world’s largest electrical show.

The next edition of ELECRAMA, the world’s largest show for electrical and allied electronics industry, will be held from February 22-26, 2025, in Delhi-NCR with the theme of “Reimagining Energy for Sustainable Future”. The event aims to foster dialogue and collaboration towards achieving a greener, more resilient energy ecosystem. ELECRAMA 2025 will host industry leaders, policymakers, and stakeholders to explore cutting-edge innovations, trends, and solutions driving the sector’s growth.

Commenting on the launch of the 16th edition of ELECRAMA, R K Singh, Minister of Power, New & Renewable Energy, Government of India, said, “The government has transformed the power sector from power-deficient to power sufficient by adding about 200 GW of generation capacity in the past 9 years. We have connected the whole country with a unified grid, which is capable of transferring 116,000 MW from one part of the country to another. All these steps are powering the future of India. ELECRAMA is a reflection of how we are powering the future. I am happy to see the new themes introduced for ELECRAMA 2025. These themes directly support the government’s long-term vision and initiatives with a focus on reimagining energy for sustainable future.”

Speaking at the launch, Ghanshyam Prasad, Chairperson & Ex-Officio Secretary, Central



Electricity Authority, Ministry of Power, Govt. of India, said, “ELECRAMA is fully aligned with the industries, and I regard it as a futuristic one, because it comes at a time when we are embarking on a road of transitioning from conventional to non-conventional energy sources.

And the industry is currently facing numerous challenges, including keeping the existing ones while also promoting and demonstrating the presence of new creative solutions and technologies.”

Hamza Arsiwala, President, IEEMA, highlighted the significance of ELECRAMA in shaping the industry’s trajectory. He emphasised, “Today, India stands proudly self-reliant, poised to lead the global stage. ELECRAMA 2025 is set to propel our power sector towards an ‘all-electric future.’ Building on the resounding success of ELECRAMA 2023, we anticipate ELECRAMA 2025 to be even more substantial – Bigger. Better. Bolder.”

Adding to this, Vikram Gandotra, Vice President, IEEMA, stated, “ELECRAMA 2025 promises to be a groundbreaking event, showcasing an impressive array of cutting-edge products and technologies in the realm of new energies, including green hydrogen, digital energy,

renewables, EV charging, energy storage, fuel cell, AI, and IoT.

The 16th edition expects business enquiries worth \$ 20 billion, with participants from 100+ countries and 10+ dedicated country pavilions.”

Deepak Sharma, Managing Director & CEO, Schneider Electric India Pvt Ltd, said, “Congratulations to IEEMA team for lifting the curtains from Elecrama 2025, which is a powerful platform to bring Industry leaders and Policy makers together, fostering dialogues, showcasing innovative technologies, and enabling knowledge sharing. It was wonderful to hear the progressive views of industry peers and experts during the event today.”

Stephan Hesselmann, Minister Counsellor, Embassy of the Federal Republic of Germany; Eric Fajole, Trade Commissioner, Embassy of France and Schneider Electric India committed to be a part of ELECRAMA 2025.

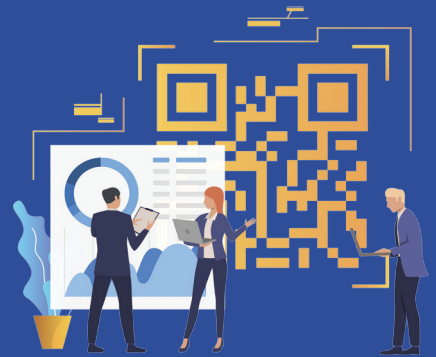


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“AI & smart metering are changing the dynamics in power sector”

The 16th edition of ELECRAMA, as per the organiser Indian Electrical and Electronics Manufacturers Association (IEEMA), is expected to be “bigger, better and bolder”. As India gears up to host the world’s largest biennale of electricals and electronics trade show in early 2025 (February 22-26), Manish Pant caught up with **Hamza Arsiwala**, President of IEEMA and CMD of the Mumbai-based power products manufacturer Stelmac, in New Delhi to get a sense of the paradigm shifts taking place in the country’s power sector. Edited excerpts...

You have said that while today India is *aatmanirbhar* (self-reliant) in electricals and electronics, going forward it will be manufacturing for the world. What makes you so optimistic about the sector’s potential?

There are two drivers behind this. Firstly, India is being seen as an upcoming global manufacturing hub. With the world increasingly looking at China Plus One there is a growing interest in Indian technology and products, propelling companies here to expand their capacity by up to three times in the short term. Parallely, there’s a huge domestic demand owing to the movement towards net zero through a new renewable grid of solar and wind, which will lead to a growing demand for cables, conductors and switchgear.

Are schemes such as Production Linked Incentives (PLI) and Revamped Distribution Sector Scheme (RDSS) having an impact?

Tremendously so! For instance, RDSS is aimed at overhauling the electricity distribution companies (discoms), which due to their socioeconomic commitments were under tremendous financial stress in terms of both cash and reserves. They had to be supported substantially by the government as today power has become an essential need like food clothing and shelter. In the past too, some initiatives were taken to reform the segment.



However, the RDSS has proved to be most effective due to the Rs 3 lakh crore allocation for measures such as smart metering and distribution automation. These grants are linked to a discom’s performance. Restoring stability at discoms is very important as they are the key component in reaching electricity to consumers.

Other programmes such as Mission on Advanced and High-Impact Research (MAHIR) emphasise on R&D. Then there is the green hydrogen programme that is being developed keeping in mind our future needs. There is a lot of focus on developing the electrical vehicle (EV) infrastructure. The PLI scheme is encouraging the manufacturing of solar panels in India rather than importing them from China. All these programmes

are playing an important role in providing resources as well as creating new jobs.

Has the disconnect between the government, industry and academia been bridged?

This government has been very proactive on that front. As IEEMA, our role is to bridge the gap between the industry and policymakers. Also, the Union Minister of Power & New and Renewable Energy (Raj Kumar Singh) is not only available for discussions at short notice but is also an active participant in all the industry platforms. His sole guidance to us is to scale up capacity by threefold to ensure the economic growth of the country. We get similar support from the Ministry of Commerce and Industry. The industry has responded positively to these initiatives. They have not only multiplied their capacities multifold but have also seen their revenues double. Admittedly, there are major challenges that need to be actively addressed. While scaling capacities we also need to focus on fundamental issues such as quality, safety, reliability and cost. Failing which, we won’t be able to effectively harness the emerging opportunities. IEEMA is, therefore, working on several programmes like closely collaborating with several MNCs having great processes for our MSME members all over the country. India’s power sector growth story is getting propelled and fuelled with everyone’s participation.

Also, do you see a significantly reduced dependence on Chinese imports?

The government has put in place strong curbs on imports from China. Although we still see a trickle of Chinese equipment in the private sector – which is understandable on account of issues with the manufacturing capacity – there is constant counselling by the concerned government ministries on scaling up capacities and building new technologies to reduce our dependence on external sources. Earlier, smart meter imports used to be in the range of nearly 70 per cent. We have prevailed on our members to bring that down to 30 per cent. IEEMA has a programme called Electroverse for startups, which was initiated ahead of ELECRAMA 2023.

We were pleasantly surprised after 100-odd startups sent in their applications. We selected ten to showcase their products at ELECRAMA. The kind of technologies those startups have created in artificial intelligence (AI), EVs, battery storage, carbon capture, etc., is simply mindboggling. For example, to counter the geopolitical challenges in the procurement of lithium-ion for EV batteries, they have come up with sodium-ion technology. The element is easily available in India. Thanks to our engineering talent, most MNCs have their R&D and development centres here. Since, we already have that strength, we now need to harness it to our benefit.

As one of the strongest advocates of the smart grid,

how do you see the programme faring?

The advent of AI, smart metering, distribution automation, etc., is changing the dynamics right from the generation to the plug point. Although the movement towards smart grids started a decade ago, its impact will become visible soon. The use of smart meters will ensure that not just the utilities get value for the consumption, but also the consumer can monitor the electricity being used on different devices at home for greater efficiency.

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NEWS SNIPPET

Schneider Electric launches Easy UPS 3-Phase 3M Advanced

Schneider Electric, the global leader in the digital transformation of energy management and automation, recently introduced the Easy UPS 3-Phase 3M Advanced, which is a robust uninterruptible power supply designed to protect critical loads. The UPS offers modular scalable architecture, making it an easy-to-install, easy-to-service, easy-to-configure, and easy-to-scale solution for small and medium data centers, as well as critical commercial and industrial applications. The product has a power range of 100-250 kW (400V) 3-Phase and is ideal for businesses that require reliable and efficient power supply. Made in India, this UPS provides reliable power with advanced features, robust electrical specs, and a compact design. Start-up service is included for optimal performance, quality, and safety.

This EcoStruxure-connected UPS is designed to be installed quickly and easily in the data center or electrical room. It features a wide operating temperature range and strong overload protection, all within a compact footprint. With its exceptional combination of low Total Cost of Ownership, competitive specifications, and ease of use, the Easy UPS 3M Advanced is the obvious choice for ensuring business continuity.

Easy UPS 3M Advanced is a highly reliable power



supply system that delivers long-lasting performance and power stability. This EcoStruxure connected UPS has a modular architecture, advanced product features, and robust electrical specifications. It offers a wide operating temperature range and strong overload protection in a compact design. The scalability feature allows the user to expand its system gradually, while internal

redundancy options enhance availability. Additionally, the startup service optimises the system's performance, quality, and safety.

Sharing his thoughts on the product, Sachin Bhalla, Vice President, Secure Power Division, India and SAARC, Schneider Electric, said, "It gives me immense pleasure in introducing the 'Made in India' Easy UPS 3-Phase 3M Advanced, a product specially designed for the Indian market. Schneider Electric has been a trusted partner in the industrial electrical and electronic space for over six decades, and our newest addition to the family is built on our strength of Innovation. The newest UPS promises unmatched reliability, continuous power monitoring to mitigate fluctuations, and connected tech, providing low downtimes and increased efficiency to customers. This product is the ideal solution for businesses seeking optimised capital expenditure, competitive specifications, and ease of use to ensure business continuity."

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“Fuji Electric India aims to double its business in next 4-5 years”

With over 100 years of expertise in power electronics industry, Fuji Electric is committed to contribute towards creating a sustainable society. Its solutions are designed to answer the complex power backup and Automation challenges and shaping the future of industries. As the company continues to push the boundaries of what is possible, it remains steadfast in its commitment to sustainability, innovation, and customer satisfaction. Fuji Electric stands as a testament to the power of technology to drive positive change and create a better world for generations to come. FEI, the preferred energy and automation solution provider, is a part of the 100-year-old Fuji Electric Group. In this interview with Rakesh Rao, **Shivaji Waghmare**, CEO & CTO, Fuji Electric India, elaborates on the evolution manufacturing sector in the country and the company’s plans to tap new business opportunities.

Kindly brief us about Fuji Electric India’s manufacturing operations.

Fuji Electric India, which employs about 1600 people, has two manufacturing facilities in the country at Chennai and Pune. Last year, we recorded a turnover of around Rs 1100 crore and we are targeting to reach Rs 1300 crore this year. In terms of product line, we have two divisions for energy and automation related products. Energy division primarily offers Online UPS and Servo Controlled Voltage Stabilizer (SCVS) while automation unit provides products like AC Drive, PLC, HMI, DCS, Instrumentation, ED&C and power semiconductors, etc. Automation products are manufactured in Chennai, while products related to energy division are produced in Pune and Pune.

What kind of changes are you witnessing in the manufacturing sector because of the need to alleviate effects of climate change?

Amidst growing concerns about climate change, manufacturing facilities worldwide are realising how important it is to implement sustainable practices. Having admitted that they play a major part in environmental problems. We at FEI



taking creative steps to cut back on their carbon footprint, preserve resources, and help create a more sustainable future.

For example, in electrical equipment industry, a lot of power is wasted during testing processes (which are critical for the industry). So, we are opting for green testing methods to decrease wastage. This helps us in reducing energy consumption and saving energy.

We are making more and more investments in energy-efficient technologies and procedures in an effort to reduce our overall energy usage. This includes integrating

renewable energy sources like solar power, adopting cutting-edge automation products, and creating efficient production schedules. With such practices, we are able to reduce energy waste in addition to minimising their environmental effect.

On the factory floor, we are using automation to improve the quality and speed of manufacturing. So, we are taking continuous steps to improve quality & performance, and reduce cost of production.

Would you like to share with us some of the measures taken by your company to achieve the objective of sustainability?

As highlighted earlier, sustainability is a must for survival and growth in the industry. Companies in India, which is a developing country, have to speed up their development cycle, upgrade their products for cost reduction, adding new feature, etc. For this, R&D and engineering play a big role. We are investing in the development of energy-efficient products and also putting in money to increase manufacturing capability to meet rising demand. These investments (in R&D and manufacturing) are helping us to be sustainable.

How is Fuji Electric helping its

customers to achieve their net zero emission targets?

Fuji Electric's diverse strategy for helping clients reach net-zero emissions is a reflection of their strong commitment to environmental stewardship. By means of a blend of energy-efficient technologies, Power Semiconductor, integration of renewable energy, and cooperative collaborations, Fuji Electric is significantly contributing to the development of a more sustainable industrial environment. Fuji Electric is a dependable partner that offers the knowledge and solutions required to promote change and help the industries reach their carbon neutral goals as they work to reduce emissions.

For example: Earlier, customers used diesel generators (which cause environmental pollution) for their electricity requirement. By opting for UPS, companies can get rid of polluting diesel generators. While people also use gas generators to reduce the pollution, many UPS are not suitable for gas generators. So we have developed UPS products which are compatible with gas generators. This way the user is able to bring down energy cost, reduce pollution and take steps towards Net Zero emission.

At the Renewable Energy India Expo 2023, we introduced the PV1500 series central inverters for large-scale solar plants, which also helps in energy saving and reducing pollution. We have a lot of other solar and solar-hybrid products, and energy storage systems. All these systems help customer to generate electricity through solar or use batteries instead of diesel generators. Besides, we offer Active Harmonic Filter (AHF) to mitigate harmonics, reduce process-related voltage fluctuations and improve equipment operating life and system capacity. It can be part of a power factor correction and harmonic filtering system. This way energy efficiency is increased; thus helping customers in their path of sustainability.

How important is green manufacturing practices for

By incorporating AI and other digital tools, our products have become more intelligent and meet customer's non-standard requirements.

India to gain a competitive edge in the global marketplace?

Green manufacturing practices help you reduce losses (product as well as operating losses), lower production cost and make you more competitive. Hence, it is important for Indian manufacturers to follow green manufacturing processes. For example, we are doing regenerative load testing as result energy is not burned into the resistors, but it is fed back to the grid; leading to big energy savings and cost reduction. This is an example of how green way of manufacturing can help the company to be more competitive in the market.

Why is usage of modern technologies and automation critical for achieving sustainability goals?

With automation, companies are able to reduce their cost of production by making processes more efficient and improve the product quality. By incorporating artificial intelligence (AI) and other digital tools, our products have become more intelligent and meet customer's non-standard requirements. This enables in increasing productivity and customer's satisfaction. So, all the modern technologies (AI, digitalisation, advanced automation, etc) definitely improve the performance and reduce the cost of production.

How do you see the performance of the Indian manufacturing sector at present?

As India is consumption based economy, the impact of external vagaries on the country is minimum. India is on the growth path now with many companies investing in the country. Government is also

helping the manufacturing sector by promoting Make in India initiative and announcing policies that are conducive to local manufacturing. India's domestic market itself is very huge and diverse, which offers effective cushion to protect against global slowdown. India's future is stable and really good.

What kinds of growth opportunities you are looking to tap?

There is a lot of scope in India itself to grow the business with a similar product portfolio. We are planning to invest in expanding our manufacturing and R&D capabilities in India, with the aim to double our business in the next 4-5 years. At present, we are focusing on growing our existing business by widening our product portfolio for solar and automation segments. We are also keeping a close watch on the electric vehicle charging sector.

Government is planning to add 25 GW per annum of solar capacity, offering huge potential to grow for Indian manufacturers. At present, equipment for solar energy sector is dominated by imports; but, now the government is promoting local manufacturing. We see this as a big opportunity to grow our business and, hence, we are developing new products (like solar inverters) for solar energy sector. We are also diversifying our product range and scaling up offerings for this sector.

With India gaining global prominence, activities in the manufacturing sector is expected to gain momentum. To meet production speed and quality needs, companies will have to opt for automation in their manufacturing set up, which in turn will generate demand for Fuji Electric products. So, we are expanding our solutions for automation segment.

IPF


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“There will be a growing use of alternate fuels for gensets”

Cummins India is one of the leading power solutions providers in the country. The company has a strong manufacturing backbone and boasts six state-of-the-art manufacturing plants and distribution facilities. **Shveta Arya, Business Head, Power System Business, Cummins India**, in this interview, gives an overview of the power gensets market in India and also informs about the recent trends in the industry.

Kindly brief us about Cummins' power gensets business in India.

In the Power Systems Business, the company designs and manufactures engines powering integrated power generation solutions covering a broad power range of 7.5 kVA to 3750 kVA and high horsepower engines ranging from 700 HP to 4,500 HP for industrial applications.

The gensets are engineered to serve the diverse needs of customers across manufacturing, infrastructure, healthcare, commercial and residential realty, data centres, pharma, and many more, and the engines are tailored to meet the demands of high-power applications across marine, railways, defense, mining, oil and gas, compressors, and construction sectors.

How is the market for power genset in India? Of the various types of gensets (such as diesel, natural gas, and alternative fuel-powered), which are experiencing high demand?

As of the present moment, the market for power gensets in India is witnessing a mix of dynamics influenced by various factors. Traditionally, diesel gensets have been predominant in the Indian market due to their cost



effectiveness, reliability, and widespread availability.

Based on usage, the market is divided into industrial, commercial, and residential categories. Among these segments, the commercial segment dominates the market, primarily due to the steady expansion of the service sector in the form of hotels, healthcare facilities, restaurants, IT hubs, and financial institutions. Besides these, there is a notable increase in demand for power gensets from the data center segment due to data localisation and increased data storage requirements. These trends coupled with the government's push for infrastructure development are driving demand for power gensets.

Looking into the future, the prospects for the power genset market in India appear promising. Despite a significant reduction in the power deficit, there is an increased focus on power reliability across

industries, commercial establishments, and residential complexes. The government's emphasis on initiatives like Make in India and the Atmanirbhar Bharat Abhiyan is also expected to boost domestic manufacturing of gensets, further driving market growth.

Last year, Cummins India launched CPCB IV+ compliant generators. What are the advantages of these generators for the users (compared to other types of gensets available on the market)?

Cummins India's CPCBIV+ compliant range represents a remarkable engineering achievement. We have transformed the traditional genset engine which is a mechanical device into sophisticated electronic technologies integrated with intelligent control systems, advanced after-treatment systems, remote monitoring, and predictive maintenance capabilities. This transformation has resulted in a significant 90 per cent reduction in particulate matter (PM) and harmful nitrogen oxide (NOx) emissions from genset exhaust compared to the previous range of gensets.

The integration of advanced engine technologies and after-treatment systems enhances system durability by offering superior performance, improved fuel economy, and equipment reliability. This not only enables our customers to meet their diverse backup power needs but also helps them contribute toward environmental sustainability. Additionally, customers are not required to install any retrofit devices

There is a notable increase in demand for power gensets from the data center segment due to data localisation and increased data storage requirements.

Traditionally, diesel gensets have been predominant in the Indian market due to their cost effectiveness, reliability, and widespread availability.

or dual fuel kits to manage emissions in the field, thus reducing the total cost of ownership.

Which are the other technological advancements that Cummins is offering in power gensets?

At Cummins, we are driven by innovation and a commitment to create a positive environmental impact. As we draw on our illustrious legacy of 60+ years in India and over a century of global experience, we are confident in our ability to utilise advanced digital tools, adhere to stringent emission norms, and tailor our products to meet specific market and customer needs.

Cummins-powered gensets compliant with the latest emission norms of CPCB IV+ exemplify this commitment, offering clean and efficient power solutions that address the evolving needs of our customers while staying committed to environmental sustainability.

The Cummins-powered CPCB IV+ compliant gensets are equipped with advanced after-treatment systems with proven technology and compact design that includes Selective Catalytic Reduction (SCR), Diesel Exhaust Fluid (DEF) lines, DEF supply unit, and DEF tank which are all supplied in-house.

Further, these gensets have a closed-loop system with real-time remote monitoring. This system significantly enhances the

Despite their reliability and technological advancements, diesel gensets often face challenges in the form of sustainability concerns, stringent regulations, and cost variations due to fuel price fluctuations.

performance and reliability of gensets, as it continuously assesses the genset's operating performance and emission compliance, ensuring it stays within optimal parameters. In case of any deviations, the system raises an alarm allowing for immediate corrective actions. The customers also receive alert notifications via SMS and E-Mail, enabling timely responses thus minimising downtime, and ensuring that the gensets operate at peak performance levels, ultimately contributing to their overall reliability and longevity.

What are the key hurdles in the growth of the power genset market in India?

Diesel gensets, often operating in the background, play a pivotal role in fueling India's economic growth and transformation. Diesel gensets reliability, durability, adaptability, and technological advancements ensure a consistent and uninterrupted power supply, thereby mitigating risks,

Despite a significant reduction in the power deficit, there is an increased focus on power reliability across industries, commercial establishments, and residential complexes.

enhancing productivity, and driving sustainable development.

However, despite their reliability and technological advancements, diesel gensets often face challenges in the form of sustainability concerns, stringent regulations, and cost variations due to fuel price fluctuations.

In addition to the above, the adoption of advanced technologies, such as renewable energy integration, energy storage solutions, and smart grid technologies, face barriers related to cost, scalability, and technological readiness. While these innovations hold the potential to improve genset efficiency and reduce environmental impact, their high upfront costs and limited market maturity can slow down adoption rates.

Diesel gensets reliability, durability, adaptability, and technological advancements ensure a consistent and uninterrupted power supply, thereby mitigating risks, enhancing productivity, and driving sustainable development.

There are regular efforts and initiatives driven by various stakeholders, including government bodies, industry players, and consumers, to promote sustainable and resilient energy solutions to address these.

What kinds of emerging trends are you witnessing in the power genset industry?

The Indian Power generator industry is undergoing a transformative

phase, characterised by innovation and adaptation to meet future needs. Diesel Generator industries anticipate growth in the coming years, driven by technological advancements and strong infrastructure development. The mushrooming high-rise buildings, commercial offices, and shopping complexes contribute to this growth trajectory. Additionally, increasing advancement in the construction segment, the growing manufacturing industry, and the rising number of data centers are escalating the demand for uninterrupted power supply, thus fueling the growth of the power genset market in India.

Furthermore, there could be a growing trend towards the use of gas and other alternate fuels for gensets. Also, microgrids are expected to gain traction to provide more distributed power and to utilise cleaner fuels in an optimised way.

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Innomotics up for sale; but who will buy this motor giant?

In November of last year, Siemens announced that it is actively seeking a buyer for its Innomotics business. In this article, **Vanessa Lopez** explores the likely contenders to buy this motor giant.

In 2022, Siemens announced its intention to separate its motors division, large drives division, and a handful of other related divisions into a separate entity: Innomotics. In November of last year, the company quietly took this a step further and announced in a press release that it is preparing Innomotics for sale and is actively seeking a buyer.

The sale of Innomotics would represent another example of significant M&A activity within the low voltage motor market. In 2022, Siemens announced the sale of its NEMA division to ABB. A year later, WEG announced the acquisition of Regal Rexnord's Industrial electric motors. While these acquisitions were significant, they pale in comparison with the scale of the sale of Innomotics. The third largest player in the LV AC motor market, the newly established entity is estimated to have approximately €3 billion in total revenue and over 15,000 employees.

As we review Innomotics, we are left wondering: who will purchase this motor giant? We investigate key possible suitors for Innomotics.

Competitive motor suppliers

In considering potential purchasers, notable motor vendors such as ABB, WEG, Nidec, and Wolong emerge as key contenders. Each of these companies would stand to gain from increased market share and expanded capacity. However, there are uncertainties regarding approval from the European Commission for such acquisitions within the EU.

ABB

ABB, a prominent motor supplier with a heritage dating back over 130



years, was formed in 1988 through a merger of industry powerhouses. Competing in various sectors, including electrification and automation, ABB has consistently ranked among the top motor suppliers for many years. ABB is no newcomer to acquiring major motor suppliers and in 2011 made its largest acquisition to date, acquiring Baldor Electric for over \$4 billion.

Pros:

- ❑ In recent years, ABB has actively competed for market share, striving to secure and retain its position as a global industry leader. A substantial acquisition of a major competitor would firmly cement its position as the largest motor supplier in the world.
- ❑ With a proven track record of managing substantial acquisitions, ABB, having paid \$4 billion for Baldor in 2011, is well-positioned to navigate and capitalize on the opportunities presented by the potential acquisition of Innomotics.
- ❑ ABB is widely recognized for delivering high quality motor products. Siemens, similarly, has a well-established reputation for its motors. The similarities in these product portfolios would further strengthen ABB's image as a premium vendor.

Cons:

- ❑ ABB's potential acquisition of Innomotics may face scrutiny

under the EU's antitrust policy, designed to prevent anti-competitive practices and maintain a fair market. The European Commission is likely to conduct a thorough evaluation of the acquisition's impact on competition within the EU motor sector. An acquisition of this scale would award ABB a nearly 30% share of the low voltage AC motor market across the EMEA region.

- ❑ The potential acquisition of Innomotics, valued at €3 billion, prompts questions about ABB's financial readiness. The magnitude of the investment raises questions about ABB's willingness to allocate a significant portion of its financial resources to this acquisition. Shareholders and investors may scrutinize the financial implications.
- ❑ Furthermore, considering the recent finalization of its acquisition of Siemens' NEMA division, ABB might well be in the process of integrating it into its operations. This ongoing integration could potentially divert resources, attention, and management focus. Undertaking another major acquisition like Innomotics in close succession might strain ABB's internal resources and impact the smooth integration of both acquisitions.

WEG

WEG, established in 1961, introduced electric motors as one of its first offerings. With over 60 years



in the motor industry, WEG has grown and expanded outside of South America to be

the second-largest motor vendor globally. A well-established giant, WEG has a history of being strategic with its motor acquisitions. WEG's most recent motor acquisition was that of Regal Rexnord's Industrial Electric Motors and Generators business in mid-2023.

Pros:

- ❑ If WEG purchases Innomotics it would enable the company to gain a significant foothold in both EMEA and APAC – two regions where WEG has been historically weak (relatively speaking).
- ❑ While currently sitting in second place in the low voltage AC motor market rankings, WEG would leap into the number one spot by a significant margin with an acquisition of this size. The revenue from Innomotics would nearly double WEG's market presence.
- ❑ Acquiring Innomotics, a historically European-centric business, would allow WEG to access an extensive distribution network in the EMEA region that it has not previously had. Recent moves by WEG, including the expansion of a manufacturing plant in Turkey, show an appetite for the company to increase its presence within the region.

Cons:

- ❑ While WEG has a history of acquiring other motor vendors, its acquisitions have historically been "fire sales". For years, WEG has been able to capitalize on securing businesses that others may be trying to get rid of. WEG's past success in capitalizing on distressed businesses may not align with Innomotics' premium price point.
- ❑ With the deal still pending

closure, WEG's recent announcement of the acquisition of Regal Rexnord's Industrial Motors and Generators business introduces the potential for internal pushback in starting another acquisition so quickly.

- ❑ One considerable difference between the two companies is the product mix. WEG's business model seems to rely on simplicity and an abundance of motors, while Innomotics focuses on customer customizability. Integrating these two starkly different approaches may pose a challenge. However, it could also present an opportunity for WEG to diversify its product offering in the future.

Nidec



Nidec, founded in 1973, is a motor pioneer. With a global foothold, the company has established itself as a top motor vendor, holding the 4th spot globally. Nidec has a long-standing history of acquiring vendors, with one of its most recent being Emerson Electric's Motors division and its French counterpart Leroy-Somer.

Pros:

- ❑ Although Nidec is a major player in the EMEA region, it currently holds less than 10% of the market. This gives it an advantage for potential acquisition approval under EU antitrust policies.
- ❑ Acquiring Innomotics would give Nidec access to a motor line that is relatively similar in terms of product offering, potentially facilitating a smoother integration between the two companies.
- ❑ Nidec's revenue in the EMEA region would benefit heavily from the acquisition, as Innomotics has the highest share in the region. This could make Nidec's revenue in the

EMEA region similar to that of its Americas division.

- ❑ While other vendors have made recent acquisitions in the motor sector, Nidec's most recent major acquisition was Emerson and Leroy-Somer in 2017.
- ❑ Nidec has a long-standing history of making acquisitions and using them to expand its business. In its 50 years of operation, it has made 73 acquisitions, so it is not shy when it comes to acquiring other entities.

Cons:

- ❑ Nidec operates across various sectors, with motors constituting just a fraction of its overall business. This prompts the question of whether Nidec views the motor sector as a strategic priority for significant investment, especially given its diverse business portfolio.
- ❑ Nidec's motors business faced a loss in market share in 2022, adding a layer of uncertainty to the acquisition of a large entity like Innomotics.

Wolong



Established in 1984, Wolong, although a relatively recent entrant into the industry, has swiftly ascended to the fifth position globally in the motor market. Despite its relatively short history, the company boasts a unique approach to acquisitions – unlike many others, Wolong strives to retain the brand identity of businesses it acquires, with GE Industrial Motor being a prime example.

Pros:

- ❑ Wolong is strongest in the APAC region and has also been making progress in expanding in other regions. Having a <5% share in EMEA in 2022, the potential acquisition of Innomotics would significantly help it to grow in this region. It would also award the company the

top spot in the APAC market.

- ❑ One of Wolong's notable strategies is its history of preserving the identities of acquired motor vendors, such as ATB group and GE Industrial. This approach respects the heritage and legacy of these companies while fostering trust and continuity within the customer base. Innomotics, with its strong reputation from Siemens, could find value in maintaining brand identity.
- ❑ An acquisition of Innomotics might represent an opportunity for the company to further its ambitions to become a top motor drive vendor. Wolong is particularly strong in medium voltage drives and motors and so the large drives portion of Innomotics offering could represent "the icing on the cake".
- ❑ Wolong can be described as a hidden dragon in the motor market, having slowly crept up towards the top of the global suppliers list. The company has utilized a strategy of international expansion through acquisition and the sale of Innomotics represents a strategic opportunity to expand further internationally.

Cons:

- ❑ One potential challenge for Wolong in acquiring Innomotics lies in the strong ties the German company has with its customer base. The customer base may be hesitant or resistant to continuing to do business under new ownership, given the pride and loyalty associated with Innomotics' historical roots.
- ❑ Compared with the other companies we've examined above, Wolong has the lowest revenue in the motor market. If it was to acquire Innomotics, it would effectively triple its global revenues.
- ❑ Additionally, Wolong faces market challenges in China, where ongoing price erosion

in the motor market is anticipated to persist throughout 2024.

Danfoss



While Danfoss is not a motor supplier, the company has a rich history of operating in similar spaces to Innomotics. The company, dating back to 1933, has established itself as one of the top vendors in the low voltage drives space. The company has made acquisitions as large as \$3.3 billion to expand its reach.

Pros

- ❑ Danfoss, recognized for its reliability and top-notch products, aligns well with the quality associated with Innomotics. This shared commitment to product standards could foster a seamless integration of operations and enhance the overall product portfolio.
- ❑ Acquiring Innomotics would represent a strategic expansion into the medium voltage drives sector and also an entrance into the motors business for Danfoss. This expansion into new areas could open up additional revenue streams and strengthen Danfoss's position in the market. It would also serve as a rounding out of its industrial portfolio.
- ❑ Integrated motor and drive offerings are becoming more commonplace and this trend is expected to progress over the next decade. Adding motors to Danfoss's portfolio could help to future-proof its offering.

Cons

- ❑ Given Danfoss's recent substantial acquisition of Eaton Hydraulics in 2021, there may be concerns regarding the availability of funds or backing for another significant purchase.
- ❑ The introduction of motors to the Danfoss portfolio would represent a significant strategic move. Such

substantial changes are not undertaken lightly and may pose challenges in terms of operational adjustments.

Initial Public Offering (IPO)

While the goal seems to be selling Innomotics to a third party, Siemens has explicitly stated that an Initial Public Offering (IPO) is also under consideration. An IPO poses both challenges and opportunities for those within Innomotics, with a significant concern likely to be around dispersed decision-making among a broad shareholder base. Conversely, an IPO can serve as a morale booster, maintaining a sense of ownership within the company rather than a competitor acquisition.

Final thoughts

As we wait to see what the future holds for Innomotics, it is clear that the motor market is about to undergo some significant changes. With each option discussed having potential benefits and hurdles to consider we can only speculate on what is to come for Innomotics. While a motor vendor is a likely suitor for an acquisition, it is equally plausible that private equity firms or other industrial-focused companies are considering bidding for the business. In any case, we expect we will find out soon who is willing to acquire this motor market juggernaut. **IPF**

(This article is a part of Interact Analysis' annual report on the low voltage AC motor market.)

About the author:

Vanessa Lopez is a Research Analyst at Interact Analysis based in the US, specialising in the Industrial Automation sector. With a master's degree in communications and a background in quantitative and qualitative research, Vanessa brings a comprehensive skillset to her role.



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Hitachi Hi-Rel makes impactful presence at India Energy Week

At the recently concluded India Energy Week 2024 exhibition in Goa, Hitachi Hi-Rel Power Electronics Pvt Ltd made a significant impact, garnered enthusiastic engagement from a diverse audience, including representatives from various sectors both within India and internationally.

Hitachi Hi-Rel Power Electronics had an impactful presence at the recently concluded India Energy Week 2024 exhibition, which was held in Goa from February 6-9, 2024. The participation witnessed diverse audience, including representatives from all the larger public sector units and private sector players both from India and also from visitors across the globe.

India Energy Week 2024 is India's largest and only all-encompassing energy exhibition and conference. It brings together the entire energy value chain to catalyse India's energy transition goals. The event was organised against the scenic backdrop of Goa, known for its spirit of hospitality, natural beauty, and vibrant culture. Prime Minister Narendra Modi inaugurated India Energy Week 2024. His presence emphasised the significance of this event in shaping India's energy landscape. During the inauguration, PM Modi emphasised India's commitment to environmentally conscious energy sources and the expansion of energy sector in our growth story.

The senior management team represented Hitachi Hi-Rel Power Electronics at India Energy Week 2024. The team was honoured to have the esteemed presence of



Darshan N Shah, President - Sales & Marketing (Chief Sales & Marketing Officer); Aniruddh Brahmbhatt, Vice President - Business Execution; and Ramesh Ramanand, Vice President - Research & Development and Engineering. Their active participation, along with other senior sales and marketing officials from the organisation, reinforced its commitment to excellence and positioned Hi-Rel Power Electronics as a driving force in the energy and power electronics sector.

Darshan N Shah said, "Our participation at India Energy Week 2024 was more than just an exhibition; it was a strategic networking opportunity with prominent players in both Oil & Gas & Energy space. As we engaged with senior officials from both public and

private sector players, we reinforced our commitment for the collaborative growth. The energy landscape is evolving rapidly, and our interactions during the event allowed us to explore synergies, forge partnerships, and position ourselves as a trusted partner in India's energy transformation. We firmly believe that such strategic engagements will continue to propel our company forward and contribute to the advancement in the core segments like oil & gas & energy."

Hitachi Hi-Rel Power Electronics showcased the cutting-edge Power Electronics Products and Solutions, including Industrial UPS and Medium Voltage Drive (MVD) prototype product models. The participation allowed them to engage with industry leaders and experts.

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Germany's LAPP opens compounding plant in India

LAPP India aims to become a Euro 300-million company by 2027. This new facility equipped with cutting-edge technologies such as 'Automatic Dosage System' and predictive intelligence, signifies LAPP India's dedication to 'Make in India' initiatives.

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

This strategic expansion marks a significant milestone in LAPP India's growth journey and highlights its commitment to cater to the growing demand for its high-quality cables and connection systems across various sectors.

Matthias Lapp, Chairman of the Board of Lapp Holding SE & CEO LA EMEA, commented, said, "We are incredibly proud of the achievements of our team at LAPP India. The opening of this state-of-the-art compounding plant is a testament to the dedication and commitment to innovation at LAPP. This facility equipped with cutting-edge technologies such as 'Automatic Dosage System' and predictive intelligence, signifies LAPP India's dedication to 'Make in India' initiatives. It boosts local production and drives regional growth."

Coinciding with the launch of the new plant that is dedicated to backward integration and developing



LAPP's new compounding plant at Bhopal

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

Gary Bateman, Managing Director, LAPP India, said "The inauguration of our Bhopal plant signifies a transformative leap for LAPP India. Beyond meeting India's growing demand for high-quality cables, this state-of-the-art facility

signifies a commitment to fostering India's industrial growth by fueling innovation and local employment opportunities. The newly inaugurated plant holds a great significance for LAPP India as it is initiating a journey of backward integration for development of proprietary compound formulations."

LAPP India aims to be a Euro 300-million company by 2027, solidifying its position as a leading force in the Indian cable industry. With a vision for further expansion, Lapp and Bateman expressed their enthusiasm for establishing similar setups in the near future, solidifying their commitment to driving industry excellence in India.

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Finolex Cables to invest Rs 580 crore for capacity expansion

With the expansion of optic fibre cables (OFC) production capacity, the company aims to cater to the increasing need for OFC, fueled by the nationwide 5G roll-out and the growing requirement for fibre-to-home connectivity.

Finolex Cables Ltd, one of India's leading electrical and telecommunication cable companies, will invest Rs 580 crores for expanding its optic fibre cables (OFC) production capacity in Maharashtra. For this, the company has signed a Memorandum of Understanding (MoU) with the Department of Industries, Government of Maharashtra.

The envisioned investment is strategically aligned with the Prime Minister's vision of providing last-mile optical fibre-based connectivity to every village in the country. Anticipating a surge in demand, Finolex Cables is positioning itself to cater to the increasing need for optic fibre cables (OFC), fueled by the nationwide 5G roll-out and the growing requirement for fibre-to-home connectivity.

Highlighting Finolex Cables' commitment to fortifying its capabilities and product range in the optic fibre cables sector, the company, currently possessing a fibre drawing capacity of 40 lakh fibre km per year and a cabling capacity of 80 lakh fibre km per year, is set to establish an additional plant dedicated exclusively to fibre optic cables. This expansion initiative encompasses the installation of fibre draw towers and the implementation of backward integration for the production of glass preforms, crucial in the fibre drawing process. Notably, this aligns with the goals of the Government of India's Make in India program.

In a groundbreaking move, Finolex Cables aims to become the second company in the country to manufacture glass preforms, a vital component for optical fibre production. The proposed upgrade



will see the Draw Tower capacity doubling to 8 million fibre km per year, pushing the fibre optic cables' annual capacity to 10 million fibre km from the current 8 million fibre km. This expansion initiative is expected to generate direct and indirect employment opportunities for 400 plus individuals.

Under the terms of the MoU, the Government of Maharashtra has committed to actively supporting Finolex Cables Limited in obtaining the necessary registrations and approvals from the relevant state departments. This collaboration is anticipated to facilitate a seamless and successful implementation of Finolex Cables' ambitious expansion project, contributing significantly to the region's economic development and employment opportunities.

Speaking on this occasion, Mahesh Viswanathan, Deputy CEO & CFO, Finolex Cables Limited, expressed enthusiasm about the expansion plans and the collaborative effort with the Government of Maharashtra. "This strategic investment reinforces our commitment to contribute to the state's economic development and create employment opportunities.

We are grateful for the support from the Government of Maharashtra, and we look forward to a seamless and successful implementation of our expansion project," he said.

In order to augment the OFC business further, the company has also opened EPC division for executing orders for laying fibre-optic cable networks in various locations all over the country. The business has already commenced in Gujarat and is expected to be expanded to other geographies soon.

Finolex Cables is rapidly transforming from a manufacturer of wires and cables into an electrical products company, by expanding its product portfolio to market products like lighting, water heaters, fans, switches, switchgear, and electrical conduits. This reinforces its reputation of offering innovative products that cater to the needs of modern households.

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EverEnviro partners with EUSUSO for advanced CBG plants

EverEnviro adopts EUSUSO – Denmark's ECOGI Technology across MSW based CBG plants. It will leverage this cutting-edge technology through its associate partner Thermax Bioenergy Solutions Private Limited (TBSPL).

EverEnviro Resource Management, India's compressed bio gas developer through its associate partner Thermax Bioenergy Solutions (TBSPL), has inked an MoU with European Sustainable Solutions ApS (EUSUSO-Denmark). This aims to integrate EUSUSO's patented Gemidan Ecogi technology in EverEnviro's upcoming MSW based CBG plants across India to boost CBG production. The MoU was signed in the presence of Lars Lokke Rasmussen, Danish Foreign Minister.

European Sustainable Solutions ApS is a technology leader in waste management, bioenergy and green fuel production in Europe. The Danish urban municipal waste management handling technology is one of the most advanced in Europe. Gemidan Ecogi technology has shown promising results in Europe by effectively optimising the pre-treatment phase in CBG plants. With an efficiency rate of 99.996 per cent, this technology ensures careful segregation of organic and inorganic waste components and thereafter converts the organic constituents into bio-pulp that can be directly sent for biogas production.

Mahesh Girdhar, MD & CEO, EverEnviro said, "This collaboration is a testament to our commitment to build a robust CBG ecosystem for achieving India's energy needs. Leveraging technology to transform 'Waste into Wealth' significantly contributes towards building a cleaner and sustainable future, while supporting mitigation of methane emissions through degasification at CBG plants. We are confident that our partnership with EUSUSO-Denmark would help in bolstering CBG production and simultaneously

resolving the country's municipal waste management issues."

Greenhouse gas methane emissions generated from landfill waste dumps is one of the critical issues of urbanisation and landfills in India are reaching capacity, highlighting the pressing need to prevent further waste buildup.

This challenge can be navigated by embracing advanced technologies for generating clean fuels, decreasing methane emissions, promoting circularity, creating new employment opportunities, and rejuvenating soil health with fermented organic manure produced as byproducts of CBG production. The new technological overhaul will give a fillip to the Indian government's GOBARDhan initiative by accelerating the establishment of MSW based Compressed Bio Gas plants in the country. EverEnviro is already in process of establishing 8 MSW based CBG plants across New Delhi, Madhya Pradesh, and Uttar Pradesh.

Lars Rosgaard, CEO, European Sustainable Solutions stated, 'India is the fastest growing major economy in the world and one of the most attractive evolving markets. We endeavour to introduce some of the most unconventional, proven, and reliable Danish technologies here. Our vision goes beyond this milestone to 'Make this equipment in India' over the next 2-3 years while also bringing in a solution for handling paddy straw and producing sustainable aviation and shipping fuel. With vast agricultural land and industry, India has a great potential



to not only be self-sufficient in the production of green fuels, but to export it as well.'

Deodatta Deshpande, CEO, (TBSPL), said, "At TBSPL, we are committed to harnessing cutting-edge technologies that maximise the potential of diverse agro waste and biowaste as clean energy sources. The integration of the European Gemidan Ecogi technology in our upcoming MSW-based CBG plants represents a significant leap towards achieving this goal. This technology will streamline the pre-treatment phase by enhancing the segregation of municipal solid waste and converting it into bio-pulp, thereby optimising biogas production. We believe that bringing such pioneering sustainable technologies to India will facilitate energy transition necessary for the country to achieve net zero by 2070. Our aim is to bridge the gap between energy availability and energy sustainability."

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- Manish Bhatnagar, MD, SKF India Ltd
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- Prof R Jayaraman of S P Jain Institute of Management and Research
- Meenu Singhal, Regional MD, Socomec India
- Shubhankar Chatterji, Chief Supply Chain Officer, Cummins India
- Shivaji Waghmare, CEO, Fuji Electric India
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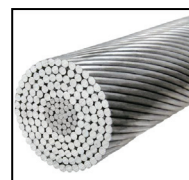
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India eyes Rs 3 trillion defence production by 2028-29

The Ministry of Defence was allocated Rs 6.21 lakh crore in the Union Budget 2024-25, which is the highest among the Ministries.

The annual defence production is expected to touch Rs 3 lakh crore from Rs 16,000 crore now, and defence exports Rs 50,000 crore by 2028-29, stated Rajnath Singh, Defence Minister, while insisting that the new-found thrust is a result of the government's focus on long-term gains to make India a developed nation by 2047.

"Earlier, India was known to be an arms importer. But today, under the leadership of the Prime Minister, we have come out of our comfort zone and found a place in the list of top-25 arms exporter nations. Seven-eight years ago, defence exports did not even touch Rs 1,000 crore. Today, it has touched Rs 16,000 crore. By 2028-29, annual defence production is expected to touch Rs 3 lakh crore and defence exports Rs 50,000 crore," said Rajnath Singh.

Capital acquisition

In the Financial Year 2023-24, capital acquisition worth more than Rs 435,000 crore has been given in-principle approval till now. The Ministry of Defence was allocated Rs 6.21 trillion in the Union Budget 2024-25, which is the highest among the Ministries.

In February 2024, the Cabinet Committee on Security approved several major defence deals, collectively worth over Rs 92,000 crore, to bolster the combat capabilities of the armed forces. These investments are part of India's broader strategy to enhance its defence capabilities and promote self-reliance in defence manufacturing.

IAF's Sukhoi fighter jet upgrades:



Hindustan Aeronautics (HAL), supported by the Defence Research and Development Organisation (DRDO), has secured approval from the defence ministry for a major upgrade of the Su-30MKI fighter jet fleet. This Rs 60,000 crore project aims to bolster the aircraft's capabilities through the integration of new radars, mission control systems, electronic warfare capabilities, and weapon systems.

Killer drones and supersonic missiles: One of the most significant contracts approved is for the acquisition of over 220 extended-range BrahMos supersonic cruise missiles. These missiles, with a strike range of 450 km, will be deployed Navy. This deal, valued at approximately Rs 19,500 crore, marks the largest-ever contract for the BrahMos missiles.

Advanced engines for fighter jets: In addition to the BrahMos deal, the Indian government also greenlit a project for the manufacture of new advanced engines for the existing fleet of MiG-29 fighters in the Indian

Air Force (IAF). The engines, to be produced by Hindustan Aeronautics Limited (HAL) in collaboration with Russia, will cost about Rs 5,300 crore.

High-powered radars and air defence guns: To further enhance India's defence capabilities, the government approved two other projects for the acquisition of high-powered radars and new versions of the L-70 air defence guns. Larsen and Toubro (L&T) will manufacture these systems with some foreign technology, with each project valued at around Rs 6,000 crore. The Cabinet Committee has also approved the ambitious Made in India Close-in Weapon System project, valued at around Rs 7,000 crore.

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Maharashtra government hosts defence equipment exhibition

Over 1,200 companies, specialising in the production of arms and other materials pertinent to the defence sector, participated in the expo.

India's largest defence equipment exhibition, Defence Expo, was recently organised by the Industries Department of the Maharashtra government at the International Exhibition and Convention Centre at Moshi near Pune. The exhibition was inaugurated in the presence of Ajay Bhatt, Union Minister of State for Defence, and Eknath Shinde, Chief Minister, Maharashtra.

The exhibition, spanning three days, was meticulously orchestrated under the ambit of the Atmanirbhar Bharat Yojana – a strategic initiative aimed at achieving self-reliance in various sectors, including defence. The overarching goal was to advocate for the domestic production of cutting-edge weaponry essential for the defence forces while simultaneously encouraging the active involvement of both small and large industries in the production processes, particularly those in the vicinity of Pune.

In an impressive show of support, over 1,200 companies, specialising in the production of arms and other materials pertinent to the defence sector, participated fervently in the Expo. This collective effort underscored a shared commitment to fortify the nation's defence capabilities through indigenous manufacturing.

The showcased exhibits at the Expo were nothing short of a testament to India's growing prowess in defence technology. From indigenously crafted tanks and protective vehicles to sophisticated missiles, air force helicopters, rocket launchers, and an array of ammunition, the exhibition provided a comprehensive glimpse into the nation's defence arsenal. In addition to the physical displays, the event featured enlightening lectures and

seminars delivered by esteemed defence experts, enriching the knowledge base of attendees.

Amidst the dynamic displays and discussions, significant announcements emerged during the inauguration of the MSME Defence Expo in Pune. Devendra Fadnavis, the Deputy Chief Minister of Maharashtra, seized the moment to declare an impending revision of the state's aerospace and defense manufacturing policy, initially formulated in 2017. This strategic move aimed at aligning the policy with contemporary needs and ensuring it continues to foster growth and innovation in the defense sector.

Adding another layer to this commitment, Uday Samant, the Minister of State Industries, revealed ambitious plans for the establishment of four defence manufacturing clusters in Nagpur, Shirdi, Pune, and Ratnagiri. These clusters, envisaged as hubs of innovation and production, are poised to play a pivotal role in bolstering the nation's defence capabilities and economic growth.

The attendance of VR Chaudhari, Air Chief Marshal, on the inaugural day elevated the significance of the event. Interacting with participating industries, he emphasised the Indian Air Force's (IAF) forward-looking perspective, aligning with the overarching goal of 'Aatmanirbhar Bharat' set by the Government of India. The IAF, in a showcase of its indigenous capabilities, displayed Advanced Light Helicopter MK-IV, Light Combat Helicopter, Aakash, and SAMAR missile systems.

The IAF also went beyond static displays, actively engaging with the



VR Chaudhari, Air Chief Marshal visiting the stalls at the exhibition

public through a dedicated publicity stall at the venue. This outreach initiative aimed to attract the youth, presenting them with insights into the multifaceted facets of the Indian Air Force and the diverse career opportunities it offers. The Induction Publicity and Exhibition Vehicle (IPEV) provided a near-real-life depiction of the IAF's functions and activities, further igniting curiosity among students from various educational institutions who attended the Expo.

Noteworthy exhibits at the Expo included the Advanced Light Helicopter Dhruv, Light Combat Helicopter Prachand, Dhanush artillery gun, Field Howitzer 77 Bofors gun, T-90 Bhishma and Arjun Tanks, and the Infantry Carrying Vehicle BMP-II. The Indian Air Force's Make in India initiative found expression through the display of Samar II and the Akash surface-to-air weapon system, showcasing the nation's capability to produce advanced defence technologies locally.

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Nibe signs multiple MoUs at MSME Defence Expo 2024

The company also showcased its diverse product line in three broad segments – defence, electronics and electronic vehicles.

Nibe Limited, a pioneering name in manufacturing critical systems for the defence sector, stood as a cornerstone of the inaugural Maharashtra MSME Defence Expo 2024, significantly contributing to its remarkable success. As the knowledge partners, Nibe Limited played a central role in orchestrating an event that exceeded all anticipations, establishing new benchmarks for collaboration and innovation within the defence sector.

With a strong participation of over 400 MSMEs and an impressive showcase of more than 300 stalls, the expo provided a vibrant platform for fostering growth and development within the MSME ecosystem. The event was inaugurated by Devendra Fadnavis, Deputy CM of Maharashtra, in presence of, Minister for Industries Maharashtra, Uday Samant; Higher and Technical Education Minister, Maharashtra Chandrakant Patil and Harshdeep Kamble, Principal Secretary, Industries and Mining, Maharashtra.

The defence expo also attended by the esteemed dignitaries, including the Air Chief Marshal Vivek Ram Chaudhari PVSM AVSM VM ADC Chief of Air Staff, Admiral R Hari Kumar PVSM AVSM VSM ADC Chief of Naval Staff, Army Chief General Manoj Pande PVSM AVSM VSM ADC Chief of Army Staff, Lt. General J.B Chaudhary PVSM SM VSM, and Major General C. S Mann Additional Director General Army Design Bureau. They recognised Nibe's efforts and role in facilitating knowledge sharing and collaboration between MSMEs, Tri-services, DPSUs, DRDO, and large corporates. They reaffirmed the company's leadership in driving industry-wide initiatives.

Ganesh Ramesh Nibe, Founder



Nibe Limited, said, "Nibe Limited is honoured to have been part of the Maharashtra MSME Defence Expo, an event that exemplifies our commitment to driving knowledge sharing and innovation. We believe that MSMEs are the key for fostering growth in the India's defence sector, and through initiatives like these, we can collectively work towards achieving self-reliance and excellence. As India continues its journey towards Atmanirbhar in defence manufacturing, Nibe Limited will continue its support towards the industry. The Maharashtra MSME Defence Expo stands as a testament to the collective efforts of all stakeholders involved and we are thankful for their contributions."

Balakrishnan Govind Swamy, CTO, Nibe Limited, added, "It has been exhilarating three days with Nibe Limited driving the success and growth in the sector. The brand was able to open doors for mutually beneficial opportunities for MSMEs and other industry players showcasing the technological advancement scope in the Indian defence sector. We are proud to be associated with the expo and we

hope to come back bigger and stronger the next year."

The groundbreaking event achieved many milestones including Nibe signing multiple MoUs to strengthen the Indian defence sector under land, aerospace and maritime applications including MoU for manufacturing of ammunitions for export with Munitions India Limited.

The brand also showcased its diverse product line in three broad segments – defence, electronics and electronic vehicles. The defence category included modular bridge, Pinaka launcher, MRSAM, Canister, Fin, small arms, mortar shells and propeller components. The electronic display had a line-up of drones, ruggedised panel PCs with consoles, fuel cells, Ethernet switches, MDP+LVJB+JC+PDU (modular bridge) and communication equipment.

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3D cameras to drive machine vision market growth

Revenue for 3D machine vision cameras is expected to grow from \$ 767 million in 2022 to almost \$ 1.6 billion in 2028, with particularly strong growth projected for time-of-flight and stereo-vision cameras, says **Jonathan Sparkes**.

3D cameras are projected to drive the global machine vision market over the next five years, fuelled by strong growth within mobile robots and robotic picking. The predicted CAGR for 3D cameras of 13 per cent out to 2028 is anticipated to be much higher than the single digit CAGR of 6.4 per cent anticipated for the global machine vision market as a whole. Revenue for 3D machine vision cameras is expected to grow from \$767 million in 2022 to almost \$1.6 billion in 2028, with particularly strong growth projected for time-of-flight and stereo-vision cameras.

Interact Analysis published the first edition of its report on the global machine vision market, which generated revenue of \$ 6.26 billion in 2023, down -2.8 per cent from 2022. Despite this slight contraction, we predict a steady growth rate of 6.4 per cent over the forecast period, with modest growth of 1.4 per cent expected in 2024.

Types of 3D machine vision camera

3D cameras can be divided into 4 product types, each of which has key features and advantages for different applications.

Structured light 3D cameras involve projecting a known pattern or sequence of light onto a surface and analysing the deformation or distortion of this pattern when it interacts with an object. The camera observes how the structured light is deformed and from this information it can calculate the depth and shape of objects in the scene. These cameras are mostly utilised when precise measurements and image acquisition are required, and are currently being deployed in bin picking applications. Structured light 3D cameras are often more expensive than other 3D camera types. An example of this camera would be Zivid 2.

Stereo-vision cameras are imaging devices equipped with two cameras

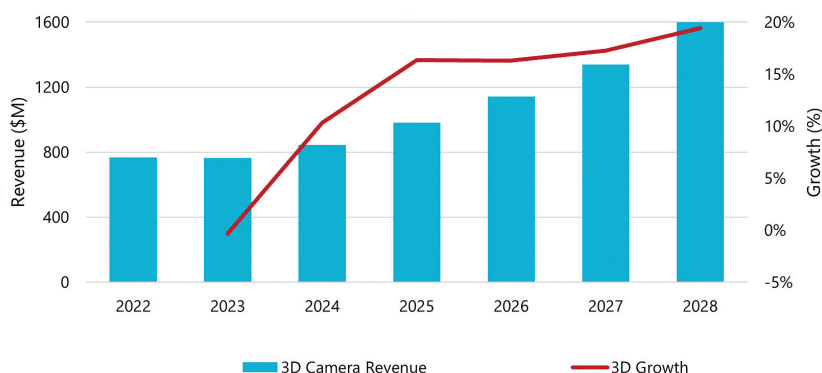


that perceive depth through binocular disparity. These cameras capture a pair of slightly offset images of the same scene. The disparity between corresponding points in the images is then used to calculate the depth information for objects in the scene. These cameras are most typically used in robotics and are particularly useful for autonomous driving, which provides significant growth potential. An example of this camera would be Basler's Stereo cameras.

Time-of-Flight 3D cameras are imaging devices that determine the distance to objects in a scene by measuring the time it takes for light to travel from the camera to the object and back. These cameras are most typically used when high speed, but lower quality, image acquisition is needed. Time-of-flight 3D cameras are also a cheaper option for mobile robots, enabling them to avoid obstacles and navigate around other robots. An example of this camera would be Lucid's Helios 2.

Laser triangulation 3D cameras employ the principle of laser triangulation to measure distances and create three-dimensional representations of objects or scenes. These cameras employ lasers to project a laser line or pattern onto

Revenue for Global 3D Camera Market & Growth 2022-2028

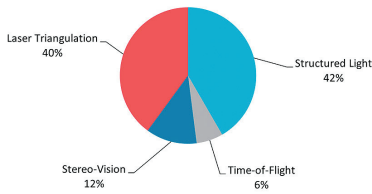


Source: Interact Analysis

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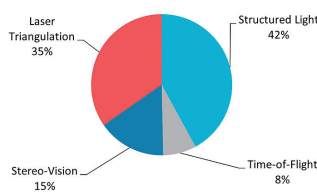
Figure 1: Strong growth of 13% is predicted for the 3D camera market over the next 5 years

Market Share for 3D Camera Types
2023



Source: Interact Analysis

Market Share for 3D Camera Types
2028



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Figure 2: Despite being cheaper products, strong market growth is the forecast for stereo-vision and time-of-flight 3D cameras

the target surface, and a camera observes the deformation or displacement of this line/pattern as it interacts with the object. The information captured is then processed to determine the depth or three-dimensional structure of the object. These cameras offer high accuracy and resolution, and are more typically used for quality inspection, although they also can also be used to guide mobile robots. An example of this camera would be LMI's Chroma-Scan.

The graphs above show expected changes to market share for each product type within the 3D camera market. What is particularly interesting is the projected growth for both stereo-vision cameras and time-of-flight cameras. Although they have respectively gained just three per cent and two per cent market share, this is considerable as both camera systems are far cheaper than

the other two product types. We predict a CAGR of 19 per cent for stereo-vision cameras and a CAGR of 17.3 per cent for time-of-flight cameras over the forecast period, which is far stronger than the overall growth forecast for the 3D machine vision camera market.

Why is the market for 3D machine vision cameras growing so fast?

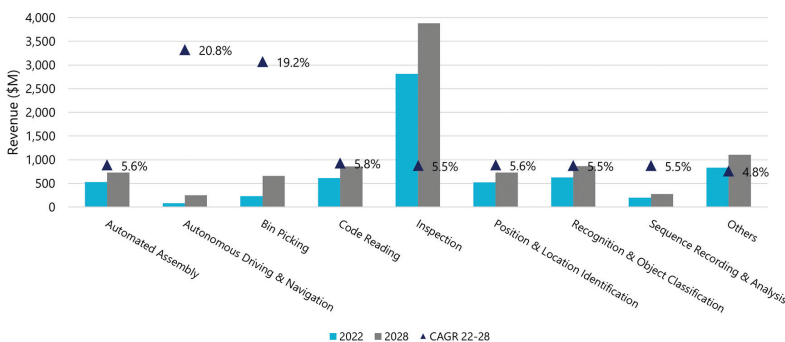
Key factors generating such high growth for 3D cameras over long term include anticipated price declines for all 3D camera types. This enables customers to upgrade their systems to include 3D cameras and replace slower, less accurate 2D systems. Strong growth is forecast in particular for robots, with a single 3D camera capable of carrying out the same tasks as several 2D cameras, resulting in robots becoming faster and more compact.

The market for 3D cameras continues to grow, with many new vendors entering the market each year. This allows for price competition and drives prices down, allowing more customers to adopt 3D vision systems. Pricing is especially aggressive in China where vendors are selling products at a cheaper price to gain market share from well-established western companies, and this is driving growth in the long term.

Market growth is particularly high in applications such as autonomous driving and bin picking. These two machine vision applications have the largest CAGR in our forecast and both applications really benefit from the implementation of 3D cameras. Autonomous driving, especially for mobile robots, is an extremely large growth area, where vendors are now integrating one (or more) 3D cameras to guide the robot. We provide in-depth information on mobile robots (where the market grew by 33 per cent in 2022) and you can find out more by clicking here. We also provide in-depth insight into the robotic picking market, which we also anticipate will grow significantly over the coming years.

Bin picking, including palletizing and de-palletising, is also a major growth area for 3D machine vision cameras. The expansion of the 3D camera market helps in substantial year-on-year growth in sales of **IPF** picking robots.

Applications for the Machine Vision Market



Source: Interact Analysis

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Figure 3: Autonomous driving and bin picking have projected CAGRs of 20.8% and 19.2% respectively

About the author:

Jonathan Sparkes is the Research Analyst at Interact Analysis (IA). An experienced professional, analytical, and highly educated researcher, Jonathan gained his analysis and modelling skills from a BSc in Mathematics. He works in IA's industrial automation sector with a focus on machine vision and is particularly interested in how technology can be used to improve systems.



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THEME: MISSION \$100 BILLION EXPORTS

The Indian Textile Industry witnessed a surge in demand with exports touching a record \$43 billion in FY22 post covid restrictions. During 2022-27, the textile industry worldwide is anticipated to witness a projected CAGR of 5.67 per cent, prompting the Government of India, on its part, to take various initiatives to revive the fortunes of the textile industry such as: formulation of the PLI scheme, launch of mega textile parks, signing of FTAs and MoUs with many countries, etc.

ISSUE HIGHLIGHTS:

ITJ Annual 2024 will suggest steps to be taken to give impetus to the "Mission \$100 billion" target. It will broadly highlight on:

- Impact of various government schemes and policies
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DMI 2024 sets the stage for innovation and collaboration

Over 300 companies at the Die Mould India (DMI) exhibition showcased various technological developments for the booming die and mould industry.

The highly anticipated Die Mould India exhibition was hosted by the Tool & Gauge Manufacturers Association of India (TAGMA), a premier platform for the die and mould industry, at the Bombay Exhibition Centre in Mumbai, from February 14-17, 2024. The four-day event showcased various technological developments for the booming die and mould industry.

It highlighted the opportunities and challenges and provided a platform for toolmakers to learn from the user industry. The exhibition's inauguration ceremony was graced by esteemed guests, Sachin Kulkarni (Executive Director - Corporate Procurement & Member of Board, Skoda Auto Volkswagen India Pvt Ltd) and Jim Walsh (Vice President - Tooling, Tata Electronics), who were joined by D M Sheregar, President of TAGMA India, and D Shanmugasundaram, Vice President of TAGMA India, alongside other dignitaries.

Indian toolmaking market

Welcoming the audience, Sheregar said, "As we gather here today, it is important to reflect on the current state of the Indian tooling



industry and the opportunities that lie ahead. Over the past two years, the Indian toolmaking sector has witnessed remarkable growth and achievements. According to the recently released Indian tooling report, the estimated market size of the Indian tooling industry stands at approximately Rs 23,600 crore, underscoring the immense potential of our industry. However, there is still considerable room for improvement, particularly when considering that around 34 per cent of the tooling demand is currently met through imports. It is imperative that we collectively target these areas for

improvement and work towards reducing our dependence on imports."

Sheregar also acknowledged the crucial role initiatives aimed at promoting indigenous manufacturing and fostering innovation will play in driving the growth and competitiveness of the industry. He called upon OEMs to collaborate with TAGMA in building a more robust and competitive tooling ecosystem in India.

Sachin Kulkarni highlighted India's remarkable economic growth, crediting the government's significant progress towards sustainable development. Emphasising the need for sustainable self-reliance, he underscored the Indian auto industry's substantial 7 per cent contribution to the nation's GDP. Commending the resilience of the supply chain industry, Kulkarni celebrated its growth from 2.3 million before COVID to an impressive 4.1 million, with a projected rise to 6-6.5 million by 2030. He attributed this success to the expanding middle class and easy access to finance, propelling the Indian auto industry to become the third-largest globally. As



a global OEM, Kulkarni emphasised the expectations from the tooling industry: quality and commitment. In closing, he expressed the need for continued support from the tooling fraternity, acknowledging their pivotal role in sustaining and advancing India's automotive growth story.

Jim Walsh shed light on India's matured automotive sector and the burgeoning electronic sector, emphasising the need for a focused approach. He said, "India's electronic manufacturing services (EMS) industry is growing rapidly and the companies are on the lookout for vendors. The geopolitical shifts are driving EMS to Southeast Asia and India. The world is looking towards India with hope. Companies moving their operations to India have four key expectations — speed, accuracy, innovation, and capacity. Sadly, Indian toolmakers are still unprepared to cater to the kinds of demands they have. I urge Indian toolmakers to rise to the occasion and focus on skill

development for their employees, enhance the capacity of their shop floor, focus on manufacturing accuracy and meet delivery timelines, among other aspects. India needs to seize the opportunity and bridge the existing gap."

Emerging trends

Shanmugasundaram delved into some of the trends shaping the industry. He said, "The tooling industry is diversifying beyond the automotive sector into emerging industries such as toy making, consumer durables, and aerospace, defence, and space. These sectors present lucrative opportunities for expansion and risk mitigation. The pandemic highlighted the importance of digital solutions, leading tooling companies to adopt advanced technologies for enhanced efficiency and productivity. Besides, with global customers demanding high precision and fast turnaround, the adoption of cutting-edge

technologies is imperative for Indian companies to remain competitive. Also, to meet the evolving customer demands, continuous skill development is essential for tooling professionals to stay updated with the latest technologies and practices."

He urged: "Together, let us navigate these trends, capitalise on opportunities, and collectively contribute to the growth and evolution of the tooling industry in India."

The 2024 edition of the Die Mould India exhibition featured over 300 exhibitors spanning 25,000 square meters and representing 12+ countries. Each exhibitor showcased the latest advancements in the tooling industry.

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NEWS SNIPPET

Airbus C295 programme receives nod from Indian regulator DGAQA

Marking a milestone in the 'Make in India' C295 programme, the Airbus Defence and Space Quality Management System (QMS) for the C295 aircraft has received approval from the Directorate General of Aeronautical Quality Assurance (DGAQA), the Indian regulatory authority, to produce detailed parts and sub-assemblies in India.

As per the approval, the certificate for which was formally handed over on February 12, 2024, Airbus Defence and Space is working with Tata Advanced Systems Limited (TASL) to produce detailed parts and sub-assemblies at various locations in India. The certificate of approval was presented by Sanjay Chawla, Director General of Aeronautical Quality Assurance, to Michael Schoellhorn, CEO of Airbus Defence and Space, and Masood Hussainy, Head, Aerostructures and Aeroengines, Tata Advanced Systems, at the C295 Main Components Assembly facility in Hyderabad. This is a



significant step of a comprehensive quality assurance roadmap agreed between Airbus Defence and Space and DGAQA for the C295 'Make in India' programme, in close collaboration with TASL.

India formalised the acquisition of 56 Airbus C295 aircraft to replace the Indian Air Force (IAF) legacy AVRO fleet, in September 2021. Under the contractual agreement, Airbus

will deliver the first 16 aircraft in 'fly-away' condition from its final assembly line in Seville, Spain. The remaining 40 aircraft will be manufactured and assembled by Tata Advanced Systems Limited (TASL) in India as part of an industrial partnership between the two companies. The first C295 aircraft was delivered to the Indian Air Force in September 2023. This certification is part of this programme, which involves the full development of a complete industrial ecosystem: from the production of detailed parts to assembly, test, delivery and maintenance of the complete lifecycle of the aircraft.

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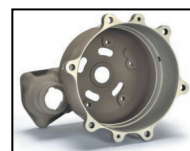
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“AMRs play a crucial role in interconnected workstations”

Indian manufacturers face multi-hurdles while meeting the demands of the evolving market. In this interview, **Subrata Karmakar, President, Robotics & Discrete Automation, ABB India** explains the importance of automated solutions such as robots, cobots, autonomous mobile robots (AMRs), etc in solving these challenges.

Could you please brief us about ABB's Robotics and Discrete Automation division in India? How has it grown over the last few years?

ABB Robotics & Discrete Automation stands out as a premier provider in robotics and machine automation globally, offering a unified range of solutions encompassing robots, Autonomous Mobile Robots (AMRs), and machine automation. Backed by our innovative software, we tailor comprehensive offerings to enhance efficiency and agility across various industries which include automotive, electronics, and logistics. Our aim is to empower companies, irrespective of their scale or sector, to adapt to the evolving landscape by fostering resilience and flexibility. We're committed to assisting customers in their journey towards the interconnected and cooperative factory of tomorrow.

ABB Robotics has established itself as the primary provider of solutions in India for over 25 years, boasting extensive experience in palletising for more than two decades. ABB Robotics stands as one of the top two providers of robotics solutions in the country, whether measured by units sold or the value of applications. For nearly 25 years, we have been the foremost supplier of robots and robot systems with the support of widespread sales and service network spanning the nation.

ABB Robotics holds the dominant position in delivering robotic automation solutions to India's



two-wheeler segment, capitalising on the automotive industry's significant adoption of robotic solutions. Moreover, segments such as food and beverage, consumer packaged goods, electronics, and logistics are witnessing a rapid uptake of robotics.

ABB's R&D team in India collaborates closely with the global R&D team to pioneer next-generation embedded software applications and digital solutions, exemplified by initiatives like remotely monitoring 8,000 robots across 40 countries. In recent years, ABB Robotics has experienced substantial growth both in sales and the expansion of its manufacturing footprint. This growth trajectory is particularly evident in the Indian unit's significant contributions to the division's global business and initiatives.

What kinds of changes are you witnessing on the shopfloor today compared to a decade before?

The evolution of technology and the emergence of the Internet of Things (IoT) have led to a notable transformation on shop floors compared to a decade ago. This transformation isn't merely a passing trend; rather, it signifies a necessary progression towards digitisation aimed at enhancing the efficiency, productivity, and profitability of manufacturing plants.

Furthermore, there is a pronounced trend towards collaborative applications, particularly evident in the accelerated adoption of cobots. These collaborative robots offer significant growth opportunities, driven by their user-friendly nature and their suitability for small and medium-sized enterprises (SMEs), among others.

Moreover, new segments such as logistics and healthcare are emerging as significant players in the realm of robotics, alongside retail and restaurants. The increasing accessibility of user-friendly robots is fostering growth within SMEs, representing a segment with considerable potential for expansion. In the domain of machine automation, there is a notable expansion in offerings, including track systems, machine-centric robotics, and vision technology, all of which are experiencing rapid growth.

Lastly, there is a growing demand from end-users for integrated

machine automation solutions that offer both flexibility and productivity simultaneously, indicating a shift towards more comprehensive and efficient operational practices on today's shop floors compared to a decade ago.

What are the key hurdles before Indian manufacturers? How is ABB helping them solve some of these challenges?

In today's Indian manufacturing sector, key challenges include enhancing productivity, flexibility, and adaptability to meet evolving market demands. ABB Robotics addresses these pain points by offering intelligent robotics solutions that extend beyond traditional manufacturing. These solutions cater to various high-growth segments such as healthcare, logistics, food and beverage, construction, and retail, including ecommerce. As a global leader in industrial automation, ABB's Machine Automation Division integrates state-of-the-art technology and advanced engineering to develop, manufacture, and distribute complete solutions. These encompass industrial electronics, software, mechatronic solutions, as well as technologies tailored for machine and factory automation, thereby assisting Indian manufacturers in overcoming their challenges and achieving operational excellence.

Is robotic density increasing in India? Do you have any data points to prove it?

In 2021, India experienced a remarkable surge in industrial robot sales, with a record 4,945 units installed, marking a 54 per cent increase from the previous year's 3,215 units in 2020. This elevated India to the tenth position globally in terms of annual installations, as reported by the International Federation of Robotics (IFR). The integration of robotics and automation has significantly enhanced workplace safety, efficiency, and productivity. For instance, according to the International Trade Administration,

a 1 per cent increase in robot density correlates with a 0.8 per cent rise in productivity. Industries adopting robotics have witnessed substantial productivity gains, particularly in sectors where automation was just beginning to be implemented.

The most notable growth in this domain is observed in general industry and small to medium-sized enterprises. This growth trajectory is propelled by the availability of smaller, more cost-effective, and user-friendly robots, exemplified by ABB's Cobot family. These robots play a pivotal role in automating repetitive, hazardous, or unclean tasks, thereby minimising the need for human involvement in potentially dangerous activities and enabling employees to focus on more rewarding and cognitive tasks.

Why the adoption level of advanced automation solutions is low in SMEs? Is the situation improving?

While SMEs and MSMEs play a crucial role in India's manufacturing sector, their adoption of advanced automation solutions has been limited. One of the primary challenges faced by these sectors in embracing factory automation, digitisation, and robotics is the need for mindset calibration regarding cost and complexity.

There exists a misconception that integrating robotics requires extensive engineering and programming expertise, deterring many SMEs and MSMEs from exploring these technologies. However, the reality is quite different. Modern robots are designed to be user-friendly, with features such as lead-through programming that allow end-users to program and deploy robots within minutes, without specialised training. This ease of use significantly reduces barriers to entry for new users and markets.

Despite these challenges, there is a noticeable improvement in the adoption of automation solutions among SMEs. Many SMEs in sectors like pharmaceuticals and electronics in India are increasingly deploying robots and cobots to capitalise on

the benefits of automation. These technologies make tasks safer, cleaner, and more efficient, particularly for repetitive tasks. As a result, small to medium sized enterprises are experiencing tangible benefits from automation solutions, showcasing a positive shift towards embracing advanced automation technologies in the sector.

What are the issues before Indian manufacturers when adopting automation?

Indian manufacturers face several key challenges when adopting automation and robotics. These include the need to adapt to changing consumer behavior, such as the rapid growth of e-commerce and increasing demand for product variety and customisation. Additionally, they must navigate uncertainties stemming from geopolitical issues, supply chain disruptions, and the transition to electric vehicle manufacturing for sustainable transport. Furthermore, they must address labour and skills shortages, exacerbated by an aging global population. To successfully overcome these hurdles in a sustainable and economically viable manner, Indian manufacturers must focus on addressing the entire value chain.

While automation has traditionally emphasised productivity and quality improvement, today's landscape requires a shift towards prioritising flexibility and simplicity for success. This is possible with adoption of automation across processes. Flexibility is now a strategic imperative across manufacturing, logistics, and consumption points, underscoring the need for agile and adaptable automation solutions in the Indian manufacturing sector.

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“Advanced technologies are essential for green manufacturing”

With climate change gaining centre stage, corporates are setting targets to achieve carbon neutrality goals across various levels of the organisation as well as the value chain of their businesses. Sustainability has become one of the core elements of the business strategies across industries, says **Phanindra Karody**, Head of Bangalore Plant Continental Automotive India, who has over 20 years of experience in manufacturing industry. In this interview with Rakesh Rao, he highlights environmental challenges before the manufacturing sector and probable steps to achieve sustainability goals.

Given the global turmoil, how was the performance of the Indian manufacturing sector (in general) and auto component industry specifically in 2023? What is your expectation for 2024?

The automotive industry overall experienced a major setback in 2020 because of the pandemic and semiconductor shortage. This also had an impact on auto components and manufacturing sector. But the year 2023 saw a revival in the performance of the auto component industry. Despite the challenges, the manufacturing sector in India showed resilience, contributing to a successful year.

The automotive component sector presents a significant potential for the nation, contributing approximately 50 per cent to the manufacturing GDP. In the fiscal year 2023, the Indian auto component industry achieved its highest-ever turnover, reaching Rs 5.60 lakh crore (USD 69.7 billion) and recording a remarkable growth of 32.8 per cent.

Looking ahead to 2024, expectations remain optimistic for the Indian Automotive industry. The global manufacturing landscape is undergoing significant transformations with the advent of Industry 4.0, marked by the integration of advanced technologies such as AI, robotics, and automation. These innovations are expected to enhance operational efficiency that will further contribute to the positive trajectory of the global automotive



industry in the coming year.

What changes are you witnessing in the auto and auto component manufacturing sector due to climate change gaining traction? What steps are being taken by your company to achieve the objectives of sustainability?

Sustainability has become one of the core elements of the business strategies across industries. This is especially true as corporates are setting targets to achieve sustainability goals not just at company levels but across various levels of the organisation as well as the value chain of their businesses.

Continental too has a strong focus in this area. At Continental, we do not see sustainability as a “Feel

good”, it is seen as a necessity for the future. We consider it important to factor-in sustainability at all levels of the production cycle, and the life cycle of our products as well. We are actively pursuing sustainability across various aspects of our business including the manufacturing process.

Our factories are designed for sustainable production that emphasises the efficient use of energy and materials. Over 97 per cent of the power used at the Bangalore plant is derived from renewable sources, contributing to a reduced carbon footprint. Globally, the company is committed to achieving carbon-neutral in overall production by 2040 with a more ambitious goal of eliminating CO₂ emissions throughout its entire value chain by 2050. Additionally, the plant was audited and received a gold certification in Green Plant Labeling. The Green Plant Label evaluates criteria such as energy efficiency, water consumption, emission control, waste and recycling management, and innovations in the research and development (R&D) space. We at Continental believe in ensuring that there are yearly benchmarks to achieve sustainability targets.

Across our plants, we re-use the packaging material and are scraping out one time use packaging material. This has helped us recycle about 3,000 kgs of product packaging at Manesar plant in 2020. The plant also recycled 100 per cent of the 102 tonne of waste generated in the past years. In the Bangalore plant,

Continental has saved close to over 1,468 trees till date by using recyclable bins instead of cardboard boxes.

With the advent of smart manufacturing technologies, lesser time is taken to produce a product. Automation and digitization of manufacturing processes improves the efficiency of the workers. We have deployed COBOTs at our plants programmed to work along with humans. They take over repetitive tasks which allow the workers to focus on more productive aspects of the production chain. At present we are using 1,600 Cobots globally that are working hand-in-hand with their human colleagues.

Implementing industry 4.0 practices at our plants is helping us revolutionise the way we manufacture, improve, and distribute our products. Smart technologies like Augmented Reality (AR) can assist in remotely carrying out preventive maintenance and helping technicians carry out real-time repairs with remote guidance from experts. For example, a technician wearing AR glasses can stream, in real-time, what they see and hear to a subject matter expert watching on a computer screen from anywhere in the world. Leveraging AR technology, the Bengaluru plant has reduced production time by 25 per cent and managed to bring down the error rate to zero. This also eliminates the dependency of service technicians travelling to the location to fix a breakdown, thus, contribute to reduce carbon footprint.

Using big data analytics in the manufacturing process can further help manufacturers predict maintenance needs, prevent downtime, and create a safer work environment. They can gain insights into their production processes, optimise their supply chain, reduce costs, and improve the quality of their products.

Industry 4.0 has presented new opportunities to unlock process innovations to develop sustainable, environmental friendly materials, decarbonise energy, tap digital innovation, and extend the cycle of

goods within a “zero waste to landfill” framework.

Continental is also working towards creating a green and sustainable ecosystem, ensuring that suppliers align with environmentally responsible practices. Waste management is a key focus, with efforts to minimise waste generation and maximise recycling. Overall, sustainability is ingrained in Continental’s business strategy, reflecting a commitment to responsible and eco-friendly practices across all facets of its operations.

Government regulations and consumer demand for environmentally conscious choices are further propelling these changes in the automotive industry. Automotive companies are now integrating sustainability into their core strategies which reflect a broader industry commitment to address these challenges. Overall, the automotive and auto component manufacturing sector is embracing a paradigm shift towards greener, more sustainable practices to align with global efforts in mitigating climate change.

How is your company helping your customers (the auto makers) to achieve their Net Zero emission targets?

Continental is actively supporting its customers, the auto makers, in achieving their Net Zero emission targets through a multi-faceted approach. For Example, Continental introduced the “Net|Zero|Now” program which propagates immediate action for climate change mitigation, reducing the global carbon footprint. The program aims to enable customers with ambitious sustainability goals to neutralize the remaining carbon backpack of their relevant business with Continental.

Sustainability is the key driver in the company’s corporate strategy for innovation. Continental’s sustainability goals are divided into four categories namely, carbon neutrality across the entire value chain, emission-free mobility and industry, a circular economy, and

responsible value chains. This is what the organisation aims to achieve by the year 2050.

How critical will be “green engineering/manufacturing (sustainability)” practices for India to gain competitive advantage in the global marketplace?

As the world focuses on environmental concerns and climate change, consumers, businesses, and governments are prioritizing sustainable practices. Embracing green engineering not only aligns with global sustainability goals but also enhances India's reputation as a responsible and forward-thinking manufacturing hub.

For many years now, Continental India’s Bengaluru plant has been using energy-efficient procedures to increasingly optimize the manufacturing process. The plant not only uses a host of 500KW panels installed on the rooftop to aid the electricity needs but has also set up a 5MW solar plant that results in 94 per cent of energy consumption happening through renewable sources, the rest of which is provided by the State Government.

Continental is looking to achieve carbon neutrality through its manufacturing processes by 2040 and extend this to its entire value chain by 2050. With a firm eye on this target, processes across the organisation are swiftly implementing more sustainable practices.

Integrating green engineering and manufacturing practices is not only critical for addressing environmental challenges but it also provides India with a strategic advantage in the increasingly competitive global marketplace. It aligns with global trends, satisfies consumer preferences, ensures regulatory compliance, and enhances efficiency, ultimately contributing to a more sustainable and competitive future for Indian industries.

Why is it necessary for Indian manufacturers to adopt modern technologies & automation for improving competitiveness and

"green manufacturing"?

Adopting modern technologies is essential for improving competitiveness and achieving "green manufacturing" goals. Incorporating these advanced technologies enhances efficiency, precision, and speed in production processes, enabling manufacturers to stay competitive in the global marketplace. Automation reduces manual labour, minimises errors and increases overall productivity, which is crucial for meeting the demands of modern supply chains.

Moreover, these technologies contribute significantly to "green manufacturing" by optimising resource utilisation, minimising waste, and reducing environmental impact. Automation allows for precise control over energy consumption, leading to more sustainable operations. Digitalisation allows real-time monitoring and data analytics, enabling manufacturers to identify areas for improvement in energy efficiency and waste reduction.

Utilising robots, AI, and 3D printing in manufacturing processes promotes sustainability by enabling the production of lighter and more energy-efficient components. This, in turn, aligns with global efforts to reduce carbon emissions and address climate change.

These modern technologies have been deployed at our plants as well. At the Bangalore plant, COBOTs are deployed to carry out risky activities such as handling sharp, pointed or hot workpieces or dangerous

screwing. These cobots work side by side with humans and take over repetitive tasks which allow the workers to focus on more productive aspects of the production chain.

The adoption of modern technologies and automation acts as a dual strategy for Indian manufacturers – it enhances competitiveness by improving efficiency and productivity while simultaneously supporting "green manufacturing" practices, aligning with the global shift towards sustainability in the manufacturing sector.

How do you plan to scale up your business 'sustainably'? What kind of growth opportunities are you looking to tap in the coming years?

Consumers are becoming more aware and conscious, and they expect businesses to adopt sustainable manufacturing practices. Creating awareness and imparting knowledge on sustainability at the grassroots level can help new-age manufacturing companies to meet these changing consumer demands and stay competitive in the market.

Continental looks at sustainability from an all-encompassing perspective, including respecting the law, conserving resources, climate protection, fulfilling responsibilities towards employees and the wider society.

For example, since 2020, we have been purchasing green electricity for all plants globally. Further, we rely on self-generated energy, specially

designed green power purchase agreements, and energy attribute certificates (EACs). These certify from which sources and from which locations the green electricity originates. Coming closer to home - In India, we have adopted various measures to take us closer to our goals. 97 per cent of the energy used in Bengaluru plant is from renewable sources.

Continental is also taking decisive steps to increase workforce diversity. After all, a sustainable society has equal representation from all ethnicities, gender, and demographics. For many sectors, workforce diversity might not seem like a challenging goal. But manufacturing in India has typically had fewer women. This is one of our core commitments, and we have achieved this over the last few years in some parts. We also strive to hire all our workers, especially on the shop floor, from local communities. While we provide them with standard facilities like canteen, recreation, transport, there are also skill development programs that enable them to upskill and look at better opportunities. We are also ensuring more women representation at all levels of hierarchy.

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NEWS SNIPPET

NTPC Soars in ESG Score, Climbs by two levels in CDP Water Security Rating

NTPC's ESG Score has ascended by two levels, transitioning from a 'D' rating in 2022 to a commendable 'C' rating in 2023, in the Carbon Disclosure Project (CDP) Water Security Rating. This achievement serves as a testament to NTPC's unwavering commitment to environmental stewardship and sustainable practices, with a specific emphasis on water management.

Efforts to enhance water reuse and recycling have yielded positive outcomes, reflected in a significant decrease in specific water consumption in recent years. Despite the challenges posed by renewable energy integration and the implementation of wet flue gas desulfurisation systems, NTPC is actively reducing water consumption through innovative measures and efficient practices.

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“EVs present new challenges and opportunities for tool makers”

The utilisation of well-designed tools and moulds is instrumental in achieving cost efficiency throughout the manufacturing process. With technological advancements taking place in key user industries, the demand for high-precision tooling is on the rise. As these sectors embrace more sophisticated manufacturing processes, the tooling industry is poised to respond by delivering cutting-edge and precise solutions tailored to meet the sector’s specific requirements, says **Pankaj Abhyankar**, Senior Vice-President & Business Head, Godrej Tooling (a part of Godrej & Boyce Manufacturing Company), in this interview with Rakesh Rao.

Why are tools, moulds & dies so critical for the manufacturing industry?

In the manufacturing industry, tools, moulds, and dies hold a crucial role in ensuring success for various reasons. The utilisation of well-designed tools and moulds is instrumental in achieving cost efficiency throughout the manufacturing process. Efficiently designed tools play a pivotal role in minimising waste and optimising material usage, thereby not only reducing production costs but also enhancing the overall economic viability of the manufacturing operations. The ability to achieve cost efficiency is a paramount factor in maintaining competitiveness within the market, and the proper utilisation of tools and molds is integral to this pursuit.

Moreover, tools, moulds, and dies serve as facilitators for the automation of manufacturing processes. The incorporation of automation brings about improvements in production speed and efficiency, ultimately resulting in increased output. The seamless and dependable performance of these tools is indispensable for the successful implementation of automation, playing a key role in elevating productivity levels within the manufacturing industry. In essence, the synergy between well-designed tools, molds, and automation contributes significantly to the overall



success and efficiency of manufacturing operations.

How is Godrej Tooling supporting the growth of user-industries? Would you like to highlight some of your new offerings?

We introduce innovative tool designs that enhance efficiency, precision, and yield to reduce production costs and it can significantly contribute to the growth of user-industries. The part production industry that we serve is on a growth trajectory with increased demands from domestic as well as overseas customers. High levels of production activities demand reliable and timely output from all

equipment. Godrej Tooling, being a developer of mass production tooling solutions, has demonstrated superior performance with innovative solutions and provides the lowest TCO (Total Cost of Ownership) by:

- ☐ Higher die life
- ☐ Build quality of dies & tools
- ☐ Multi-cavity/family dies
- ☐ IoT-enabled smart dies
- ☐ Better yield compared to industry standards
- ☐ Well-engineered to reduce cycle time
- ☐ Lesser unplanned maintenance breaks

This would enable user-industries to enhance their output and be competitive relative to their peers.

As the leading supplier of high-precision tooling solutions, how do you see the evolution of the tooling industry in India? Which industries are driving the demand for tools?

The tooling sector in India has undergone significant evolution propelled by various factors. As the manufacturing landscape in the country expands and undergoes modernisation, there is a heightened demand for high-precision tooling solutions across multiple key industries. Notably, sectors such as the automotive industry have emerged as substantial contributors to the increasing need for advanced tooling solutions. The automotive sector, experiencing continuous

growth and innovation, consistently requires sophisticated tooling solutions for the precise manufacturing of components and ensuring top-notch production quality. The evolution of the EV era is offering newer challenges and opportunities for the tooling industry. Many new rules are being re-written. For example:

- ❑ The entire structural body of a vehicle is now possible to make in Three Diecast parts using Giga-press against hundreds of parts joined together in the conventional method of vehicle build. This helps in meeting the inherent demand for light-weighting vehicles specifically for EVs.
- ❑ The part acceptance criteria are re-defined to meet the stringent quality standards required for the precision manufacturing processes.
- ❑ Newer manufacturing processes like 3-D printing are being integrated and adapted by the tooling industry to reduce rejections and enhance productivity.
- ❑ The expertise of today will become irrelevant in the near future. Newer and compensating opportunities will be available for those who would like to learn and adopt.

In tandem with this, the surge in electronics manufacturing in India, particularly in the production of consumer electronics and electronic components, has further intensified the demand for precision tooling. This encompasses tools designed for moulding, stamping, and machining electronic parts, highlighting the industry's need for accuracy and efficiency.

Additionally, the railways sector has played a pivotal role in driving the demand for high-precision jigs & fixtures within the country. The success of the Vande Bharat trains has prompted investments in the railways and private sectors for building new generation trains which is the demand driver for tooling. Precision machining and tooling prove indispensable for

manufacturing components that are crucial to railway infrastructure. The railways encourage Indian manufacturers to develop import substitutes under "Make in India" which offers opportunities for domestic manufacturing industries. The demand for increased production and superior build quality from railway production units and workshops resulted in the automation of many assembly processes that were traditionally being done manually.

It's crucial to emphasise that the increasing need for high-precision tooling is intricately tied to the growth and technological advancements within key industries. As these sectors undergo evolution and embrace more sophisticated manufacturing processes, the tooling industry is poised to respond by delivering cutting-edge and precise solutions tailored to meet the specific requirements of these dynamic sectors.

What are the key challenges before the toolmakers today? Will the growing electric vehicle industry and rising use of additive technology (3D printing) affect the demand for tooling?

The key challenges faced by Indian toolmakers are the capability and infrastructure gap as compared to more mature and experienced Korean, Japanese, and Chinese toolmakers. The OEMs in India still rely majorly on them for their critical part development. These critical technology gaps need to be bridged with a sense of urgency by the domestic toolmakers and supporting industry bodies like TAGMA for capability building and workforce skilling.

The growing electric vehicle sector presents a dual landscape of challenges and opportunities. Adapting to the shifting demand for specialised tools in the production of components specific to electric vehicles such as batteries, motor drive units & light-weight structural parts is imperative. The EV industry is in a nascent phase wherein newer technologies, materials, and

processes are being explored and adapted at a faster pace. The tooling industry needs to cater to this need for concurrent tooling development, adapting to product changes, and supply of tools at challenging lead times.

Concurrently, the increasing adoption of additive technologies such as 3D printing introduces a revolutionary factor, prompting toolmakers to delve into inventive methods and integration strategies. Instead of viewing 3D printing technology as a threat to tooling demand, it should be applied successfully in tooling development as we, at Godrej Tooling, have done in diecasting dies for conformal cooling to address the thermal balancing problem. The toolmakers should explore 3D printing technology to address the challenges of proto tool & tool development lead time, production cycle time, etc.

What are key trends to watch out for in the tooling industry in the coming years?

The new trends that the tooling industry is closely observing are in terms of increased traction for EVs, light-weighting in the auto sector, and the emergence of new sectors owing to increased localisation. The tooling industry is expected to raise its level in terms of capability and infrastructure to support customers to meet the localisation mandate by GOI.

The shift to EV is resulting in increased demand for plastic moulds and aluminium forging to replace sheet metal parts. Light-weighting is key to the success of EVs and it will address the vital parameter for the increase in range & efficiency (kilometres per charge). For BIW structural parts, high-integrity UHSS or aluminium/magnesium diecast parts will be the norm of the future. It would require stricter quality norms of porosity, warpage, and elongation to meet structural strength and safety standards. It will demand mastery and application of the latest foundry technology of high-level vacuum, thermo-regulation, vacuum dosing system, jet cooling, and squeeze

technology.

The newer sector of aerospace, defense, and medical equipment offers additional opportunities to the domestic tooling industry owing to the localisation drive through the "Make in India" initiative by the Government of India. However, these sectors are characterised by entry barriers in terms of stricter rules of statutory compliance and very high-quality norms of acceptance.

Given the global turmoil, how was the performance of the Indian tooling industry in 2023? What is your expectation for 2024?

The auto sector contributes to the 60 per cent demand of the tooling industry and has a major influence on its performance. Post-covid downfall, the auto sector was not able to ramp up production as desired due to continued chip shortage and irregular shipment of input material. The drop in sales in FY 22 by 12 per cent from the pre-covid levels could be attributed to it. It had an adverse impact on the performance of the tooling industry

as well. However, in FY23 auto industry resurged with a about 25 per cent recovery from the previous year and marched to FY24 with a 6-7 per cent increase from the previous year.

The FY23 proved to be a fruitful period for the Indian tooling industry. It has witnessed a commendable surge in demand for tool development. About 30 per cent increase in RFQs for new launches and face lift programs are seen in the current FY24 also and the tooling kick-off is being done with the same pace.

According to industry data by TAGMA, the demand growth rate for commercial toolrooms will continue to march ahead with a CAGR of 7-8 per cent by FY28.

What are your growth plans for Godrej Tooling in the next 2-3 years?

At Godrej Tooling, we serve our client industry through three product lines - namely, diecasting dies, sheet metal tooling, and industrial machines. These 3 LOBs offer distinctive advantages to customers with lower TCO (Total Cost of

Ownership) than the industry average. Such leadership position by Godrej Tooling is led by continually applying innovation in products & processes, keeping abreast with the latest technology and making it available to Indian OEMs, access to technology experts through tie-ups, and applying their expertise in developing tooling solutions.

The new opportunity being explored by us in supporting the aerospace industry for its complex and precision tooling needs. We also want to remain at the forefront of the EV industry by investing in developing tooling solutions for large and complex light-weight parts in UHSS and aluminium structural castings. We are also applying innovative manufacturing technologies for tooling development.

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NEWS SNIPPET

Honeywell joins hand with Green Solutions Corp for Vietnam's hydrogen plant

Honeywell has signed a Memorandum of Understanding (MoU) with The Green Solutions Group Corporation (TGS) on the Tra Vinh Green Hydrogen project, Vietnam's first green hydrogen plant in the Mekong Delta. Honeywell Battery Energy Storage System helps decrease costs and carbon emissions while providing grid stability from renewable power sources, enabling the production of green hydrogen at the Tra Vinh hydrogen plant.

Honeywell will bring to the project its ready now technologies such as project automation design and management, and energy management for energy transition, including battery energy storage systems (BESS), to enable TGS to integrate renewable energy sources into the green hydrogen plant.

"Honeywell's battery energy storage system will play a



key enabling role in the Tra Vinh Green Hydrogen project. It will extend renewable energy from TGS's solar farms beyond sunlight time as well as extend wind power when the winds are calm. Honeywell's BESS platform helps decrease costs and carbon emissions by providing grid stability from renewable power sources, thus enabling the production of green

hydrogen at the Tra Vinh plant," said Ramanathan Valliyappan, Regional General Manager of Honeywell Process Solutions. In addition to BESS, Honeywell will provide extensive solutions and expertise covering the entire hydrogen value chain to help TGS operate safely, profitably, and meet its renewable energy production goals. Vietnam has pledged to become net zero by 2050. By some estimates, it is one of the top five countries likely to be most affected by climate change, with possible severe social and economic risks.

IPF

Igus fixed flange bearings become intelligent

New generation of igubal spherical bearings is equipped with predictive maintenance system.

Expensive machine and vehicle breakdowns due to undetected faults in heavy-duty fixed flange bearings: these will soon be a thing of the past thanks to a new generation of two- and four-hole fixed flange bearings. Their special feature is that the bearings, which are made of lubrication-free high-performance plastic, are equipped with miniature wireless sensors, enabling condition monitoring and predictive maintenance.

A technician looks at his smartphone: a conveyor belt of a beer bottle discharge system contains a fixed flange bearing that is approaching its wear limit. Previously, the problem might not have been detected and cause an expensive system failure. Today, however, the technician can simply replace the bearing during a break in production - knowing definitely that the hundreds of other bearings also communicate with him. "This scenario is no longer science fiction. As part of our smart plastics range, we are gradually equipping plain bearings made of high-performance plastics with networked sensors," said Thomas Preißner, Head of Business Unit igubal Spherical Bearings at igus. "Our two- and four-hole fixed flanged bearings from the igubal series now also enable condition monitoring and predictive maintenance to prevent unforeseen damage."

Flange bearings transmit their status wirelessly

And this is how the new Industry 4.0 bearings work: igus integrates an abrasion sensor into the polymer spherical ball: a thin circuit board close to the running surface. There is also a battery for the power supply without cables. This means that the

bearing for spherical levelling can continue to move independently. Wear interrupts the conductor paths of the circuit board. If the electronics lose the signal of a conductor path, they know that the wear has reached a certain level. The sensor transmits a digital signal via a long-range network (LoRa), a wireless standard for the Internet of Things that is known for its energy efficiency. The receiver is the i.Cee switch cabinet module, which analyses the data.

The associated software now knows that the conductor path is worn out, and infers the percentage of abrasion. Over time, the sensor itself wears away layer by layer - parallel to the bearing's running surface. It continues to send out signals that allow conclusions to be drawn regarding the bearing's condition. Users can see the remaining service life and when maintenance is due on a web-based dashboard, which they can access from anywhere in the world with a PC, tablet or smartphone.

First pilot customer for smart fixed flange bearings

The new fixed flange bearings are currently in the prototype phase. However, they have already convinced one pilot customer: the Société Nationale des Chemins de Fer Luxembourgeois (CFL). Luxembourg's national railway company operates a 200-metre washing system that cleans local and long-distance trains every day. In the past, gearbox malfunctions on the washing trolley



repeatedly led to costly system failures. The operator therefore abandoned lubricated standard ball bearings and instead used the networked spherical balls from igus in the UC bearing housings.

The advantage is that the spherical balls made of high-performance plastics are corrosion-free, resist chemicals and enable low-friction and maintenance-free dry operation thanks to incorporated solid lubricants. "The other bearings have to be lubricated every few weeks, which is very time-consuming," said CFL Maintenance Manager Mike Feinen. "We have therefore ticked off this maintenance issue."

Thomas Preißner, added, "The new networking feature puts the icing on the cake. Thanks to continuous condition monitoring, CFL can prevent failures, plan maintenance work ideally and make full use of the polymer bearings' service life." **IPF**



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India's electrical industry set to double by 2030, to become \$ 130 billion



India's electrical equipment industry is poised for substantial growth, with forecasts indicating a doubling in size by 2030, reaching a market valuation of \$ 130 billion. Hamza Arsiwala, President, Indian Electrical & Electronics Manufacturers' Association (IEEMA), anticipates a medium-term horizon for this expansion, with industry growth expected to double and exports projected to increase 2.5 times within the next seven years.

Arsiwala highlighted the sector's resilient recovery post-COVID-19, achieving an average compound annual growth rate (CAGR) of 8 per cent over the past five years as per Economic times. The fiscal year 2022-23 witnessed the industry's size surpassing \$ 60 billion, with exports contributing significantly at \$ 11 billion.

Notably, exports experienced a robust 17 per cent CAGR in rupee terms over the last five years, driven by strategic free trade agreements with countries like Australia and the UAE. The electrical and allied electronics industry, a key player in the transmission and distribution (T&D) space for renewable energy projects is vital to the renewable energy sector's success.

The majority of supplies are directed towards renewable energy projects, complementing its dominant role in overall energy generation. Additionally, the industry's growth is fuelled by sectors such as railways, real estate, smart infrastructure projects, core industries, data centres, defence, and charging infrastructure.

The industry is actively addressing environmental concerns, with ongoing assessments and reviews of carbon emissions policies. Employment generation is a significant impact area, with over 2.2 million jobs attributed to the electrical and allied electronics industry, constituting 7.2 per cent of India's total manufacturing segment in GDP and approximately 45 per cent in the capital goods sector. Looking ahead, the industry is positioned for global expansion, aiming to more than double its global export share by 2047. This growth signifies a significant stride in the international market and underlines the industry's pivotal role in India's economic landscape.



Best Power Equipments unveils growth plans for 2024

Best Power Equipments (BPE), a leading Indian multinational manufacturer, has announced its strategic plans, including significant investments and expansion initiatives in Orissa. This substantial investment marks a decisive step towards expanding operations and contributing to the growth of the region. BPE aims to continue its commitment to innovation, sustainability, and global expansion to meet aggressive goals set for 2025.

Furthermore, the Odisha government has sanctioned a 3-acre plot where BPE will make a multimillion-dollar investment to establish a factory near Bhubaneswar in the next three years. This initiative aims to enhance skill development and create employment opportunities.

BPE currently operates from six manufacturing units in Noida and Greater Noida. In this establishment, the company is set to focus on the production of Uninterruptible Power Supplies (UPS) and lithium batteries, further diversifying its product portfolio to meet the growing demands of the market.



BPE recently hosted the VISION 25 Meet in Goa, shedding light on their new product lines, such as Modular UPS and rack-mount UPS with lithium-ion batteries. Looking ahead to the 2025 plan, BPE has outlined its actions, including a product launch in the Philippines, Manila, and participation in the Middle East Energy 2024 event.

Prior to VISION 25, BPE participated in key events like the Southeast Asia Conference and Exhibition, Retail Partner Conclave, and was recognized as the most efficient UPS Solution Brand by NCN Magazine. These engagements provided the company with industry knowledge and sustainability.

Sushil Virmani, the Managing Director (BPE), shared his insights, stating, 'We are focusing on emerging trends and technologies, addressing challenges in the rapidly growing power solutions and lithium-ion batteries sector, particularly in high-demand segments such as healthcare manufacturing and data centers. Additionally, we are strategizing expansion plans for the upcoming years, demonstrating BPE's commitment to exploring new markets and introducing cutting-edge products. We are

enthusiastic about the promising opportunities on the horizon and have confidence in our ability to make a positive impact on the industry.'



Godrej & Boyce commissions Mumbai's first 400kV GIS Substation



As cities grow and industries expand, the demand for reliable and sustainable energy is more pressing than ever. Godrej & Boyce, the flagship company of the Godrej Group announced that its business Godrej Electricals & Electronics, is focusing on contributing to India's growing modern power infrastructure. The business has completed projects ranging from 132kV to 765kV and their current order bank stands at over 1700Cr in the substation segment.

The business commissioned eight substations in FY24, including the prestigious 400kV GIS vertical substation in Mumbai. This project adds a substantial 1500MVA to the city's energy capacity, addressing the escalating demand for power. By providing reliable, affordable, and sustainable energy infrastructure in metro cities, challenging terrains of North East states & Jammu, and regional hubs like Khavda in Gujarat. Godrej Electricals & Electronics is shaping the future of high-capacity, cutting-edge substation projects while addressing the power challenges of the country.

Raghavendra Mirji, Executive Vice President & Business Head, Godrej Electricals & Electronics, said, "With a commitment to reliability and sustainability, our strides in the substation sector signify not just a business success but a vital contribution to India's energy resilience. As we install Mumbai's first 400kV GIS Substation, adding 1500MVA capacity for the city, we are not merely building substations; we are laying the foundation for a future where energy is both abundant and green. We envision a landscape where cutting-edge technology meets the growing energy demands, fostering a brighter and more sustainable tomorrow for India."



Vikram Solar ranked in BNEF's Tier 1 Module Manufacturers List

Vikram Solar, one of India's leading module manufacturers, has re-entered in BloombergNEF coveted Tier 1 global module manufacturers list owing to its greater efficiency, bankability and high-quality products.

In 2014, Vikram Solar became India's only Tier 1 module manufacturer, featured in BNEF's list. Reclaiming

this position in 2024 reaffirms the company's commitment to product quality, customer focus, and overall reliability.

Bloomberg NEF is a prominent strategic research provider that focuses on global commodity markets and emerging technologies shaping the shift towards a low-carbon economy. It is ranking of PV module manufacturers is widely regarded as one of the most renowned, bankable, and rigorous systems in the industry. Recognised for its fairness, objectivity, and high credibility, it serves as a trusted reference for international financial institutions and is esteemed globally within the industry.

The Bloomberg NEF team confirmed that Vikram Solar met the new criteria for qualification as a Tier 1 module manufacturer adequately in 1st quarter 2024.

Gyanesh Chaudhary, Chairman & Managing Director (CMD), Vikram Solar said, "As a leading solar module manufacturer in India, we recognise our responsibility to accelerate the global solar transition. To this end, we have consistently invested in enhancing our R&D, operational capabilities, manufacturing capacity, and customer-centric approach to ensure consistent performance. Our initial recognition by BNEF as India's only Tier 1 module manufacturer fuelled our determination to spearhead global solar technology advancement. Vikram Solar's reaffirmation of its Tier 1 status this year reflects our unwavering commitment to delivering best-in-class, reliable solar solutions."



Waaree Energies to supply 280 MW solar modules to Mahindra Susten

Waaree Energies Limited, India's largest manufacturer of solar PV modules with the largest aggregate installed capacity of 12 GW, as of June 30, 2023, has entered into an agreement with Mahindra Susten a renewable independent power producer (IPP) player for the provision of 280 MW of solar modules. Waaree Energies Limited will supply 280 MW of AHNAY Series, Bi-55 545Wp modules to Mahindra Susten. Module delivery is expected during third quarter of Fiscal 2025.

The selected modules by Mahindra Susten are bifacial Glass-to-Glass with a 30-year output performance warranty. Waaree Energies Limited, India's largest manufacturer of solar PV modules with the largest aggregate installed capacity of 12 GW, as of June 30, 2023 (Source: CRISIL Report), marked by NABL approved laboratory, and the company's capacity to meet delivery timelines while ensuring quality products played a pivotal role in the company securing this project over its competitors.



Waaree Energies Limited's bifacial Glass-to-Glass modules incorporate improved efficiency and durability.

Hitesh Doshi, Chairman & Managing Director, Waaree Energies Limited, said, "Delving into this partnership with Mahindra Susten brings immense pleasure to Waaree Energies Limited. It is yet another step in our commitment to advancing India's clean energy transition as we embark on this journey, providing 280 MW of our AHNAY Series, Bi-55 545Wp solar modules. Our mission revolves around promoting the widespread adoption of sustainable energy solutions through strategic collaborations and partnerships."

Deepak Thakur, Managing Director & CEO, said, "We are pleased to announce our partnership with Waaree Energies Limited for supply of solar modules. Their 'Made-in-India' products perfectly align with our commitment of supporting 'Atmanirbhar Bharat' in our projects. In our pursuit of powering the nation with clean, sustainable energy, we are committed to significantly develop multiple IPP renewable energy projects. We are excited about the opportunities ahead as we expand our portfolio and contribute to a sustainable future with nation energy transition."



Crouzet Group pioneers manufacturing unit in Bangalore



With rich legacy of a century's experience in the Defence and Aerospace sectors globally, Crouzet marked a significant milestone on 22 November 2023

by inaugurating its cutting-edge production plant for relays in Bangalore, India. This momentous occasion was graced by the presence of David Arragon, CEO, Crouzet Group

The strategic establishment of this advanced facility marks Crouzet's commitment to meet the on growing demands of India's thriving space, railway, aerospace, and defence sectors. This pioneering move signifies a determination towards enhancing local innovation and production capacity while aligning seamlessly with the 'Make in India' initiative.

David Arragon remarked, "The inauguration of these state-of-the-art production plant marks a significant moment in Crouzet's history. We are thrilled to bring our expertise and advanced technology to India, empowering local capabilities and reinforcing our dedication to innovation and excellence."

This plant is specifically designed to produce hermetically sealed relays which are called as STPI relays in market, a groundbreaking venture for Crouzet within the Indian market. This move aims to contribute significantly to the country's technological advancement and economy.

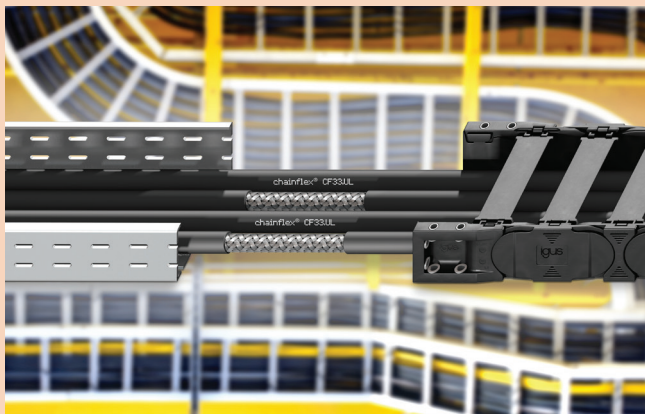
The inauguration ceremony witnessed a gathering of esteemed dignitaries and customer from HAL, NAL, ISRO, DRDO, Keltronics, Schneider, other industry leaders and key stake holders.



Igus launches first UL-listed motor cable for cable tray and e-chain

With the new chainflex cable CF33.UL, igus has developed the world's first motor cable for energy chains and cable trays with UL approval and a four-year functional guarantee in the energy chain. This allows the cable to be laid seamlessly from the energy chain to the cable tray without a plug connection in between. The CF33.UL also adds a shielded PVC motor cable to the chainflex range.

Cables are not exactly the most exciting products. Without a cable, however, you wouldn't be able to read this text. After all, they are essential for supplying us with electricity and data every day. A failing cable leads to considerable damage, especially in production. Cables have to withstand a wide variety of loads, such as heat, cold, high dynamics, UV radiation or even flames. Test certificates from Underwriters Laboratories (UL for short) are also required for uncomplicated export of machines and systems to the USA and Canada. igus has now developed the CF33.UL motor cable especially for cables in energy chains and cable trays. What makes them special is their UL listing ("Flexible Motor Supply Cable according to UL 2277"). Usually, UL-listed cables are only intended for fixed installation or occasional movement. UL approval for continuously moving energy chain cables has not existed up to now. "With the new motor cable, we are offering our customers a cable type



Chainflex cable CF33.UL ensures safe cable guidance in energy chains and cable rack with a four-year guarantee

that is suitable for both chains and cable trays. A plug connection is no longer necessary," explains Rainer Rössel, Vice President and Head, chainflex Cables Business Unit at igus. Users also avoid duplicated stock of cables for the chain and fixed installation.

"We also rely on the service life guarantee for our new motor cable. We provide our customers with tested and certified safety," Rössel. To this end, igus puts its cables through their paces in its own 3,800-square-metre laboratory. Thanks to this series of tests and 30 years of experience in the field of moving cables, igus has recently extended the guarantee on the new motor cable to four years or ten million double strokes. igus also uses the data from the laboratory for its online tools, such as the chainflex service life calculator. Here, customers can determine the cables' durability in their applications online. That way, chainflex cables allow customers to further improve the sustainability of their applications. The reason is that a cable that is replaced too soon or breaks entails a correspondingly high CO2 impact due to producing and transporting a substitute.



Hartek Power bags 113 crore order from SJVN Green Energy



Hartek Power Private Limited, the power systems and T&D business unit of Hartek Group, has won an order from SJVN Green Energy Limited. The project entails the

development, implementation, and maintenance of a 75 MW (AC) grid-connected solar PV power plant, along with a 132 kV Sub-Station, in Jamui, Bihar.

The scope of work encompasses various tasks, including land development, design and engineering. It also includes equipment procurement, testing at the manufacturer's works, packing, forwarding, and transportation. The responsibilities extend to associated civil and electrical works as well as services, permits, licenses, installation, erection, testing, commissioning, and performance demonstration of the solar projects.

The scope is considered to include all equipment, materials, and services necessary for the satisfactory operation of the solar project. Hartek Power will supply a 132 kV Sub-Station. The project, valued at 113 Crores, is a significant stride towards bolstering the renewable energy landscape in the region.

Sanjeev Gupta, CEO, Hartek Power, said, "We are honoured to have been entrusted with this substantial project by SJVN Green Energy Limited. This collaboration underscores our commitment to driving end-to-end sustainable energy solutions and contributing to the green energy transition in India. We are confident that our expertise and dedication will ensure the successful implementation and seamless operation of the 75MW solar project in Jamui."



Consistent Infosystems unveils UPS battery for uninterrupted power solutions

Consistent Infosystems, a leading provider of IT hardware, security and surveillance, print consumables, electronics and home entertainment products in India is proud to announce the launch of its latest product: Consistent UPS Battery. This groundbreaking addition to its portfolio represents a significant advancement in uninterruptible power supply (UPS) technology, offering unparalleled reliability and performance for businesses and individuals alike.

Designed with a focus on durability, efficiency, and seamless integration, Consistent UPS Battery is engineered to provide uninterrupted power to critical systems and devices during outages or fluctuation in the electrical supply. Whether safeguarding vital data centers, supporting telecommunications infrastructure, or ensuring the continuity of essential services, this innovative UPS battery delivers peace of mind and operational resilience in any environment.

Committed to environmental stewardship, the Consistent UPS Battery is crafted using eco-friendly materials and manufacturing processes, reducing its carbon footprint and contributing to a cleaner and greener future.

Equipped with advanced fast charging technology, the new UPS Battery ensures rapid recharging cycles, minimising downtime and maximising operational uptime for critical systems and devices.

Schmersal India celebration: Achieving milestones together!

Schmersal Group was established in the central part of Pune (Nucleus Mall, Camp) in 2018 and flourished from 2 to 43 team members.

The Schmersal India offers its customers the largest range of safety switching appliances and systems worldwide for the protection of human life and machines

Safety in system: Protection for man and machine!

highly competent in areas like machine safety, automation, explosion protection, and hygienic design.

As part of its global strategy, Schmersal India established a new competence centre for IT, software and engineering services in India (Schmersal Global Competence

products online which will be sent direct to customers for convenience.

The year 2023 was a fantastic year for Schmersal India in which the company celebrated milestones in the journey towards making India 'Atmanirbhar Bharat' by celebrating 10 years of their manufacturing facility, despite many challenges we achieved 1 million safety switches production and marked Rs 100 crore in their domestic sales.

The software company Schmersal Global Competence Centre had also achieved a vital milestone which are digital LOTO implementation and Industry Internet of Things (IIoT) Integration for major white goods giant in India.

With this Schmersal's both the companies in India SIPL and SGCC became the companies to qualify for 'Great place to work' in the very first year.

**Integrated safety solutions:
Streamlining production
processes and sustainability**

The year 2024 begun with big celebrations for Schmersal India as they commenced the new year 2024 with gratitude towards their planet.

Sven S Jacobi, Head of Quality Management Schmersal Group inaugurated 1st ever solar power plant in Schmersal India's production site.

Schmersal India is working in an active and sustainable way to reduce the impact of our activity on the environment.

This was a green project by Dnyaneshwar Pangarkar, Head-Operations and Shreeram Kelkar - Manager - Purchase and maintenance and team.

With this, Schmersal added another feature in their sustainability journey as energy production has a



The comprehensive range of more than 16,000 products includes safety switches, solenoid interlocks, emergency stop - switches, security sensors, safety mats with safety function, photoelectric light barriers and end switches, which include limit switches, position switches and micro switches.

Based on this program Schmersal configured, within the scope of the "Safety Services" from tec.nicum a tailor-made systems and industry solutions for machine safety.

Schmersal's safety services include application consulting, CE conformity assessment, risk assessment in accordance with the machinery directive, stop time measurements, training courses, guarding solutions, safety fences, and similar other services. They are

Centre) in 2022.

This latest facility of the Schmersal Group was established in the central part of Pune (Nucleus Mall, Camp) in 2018 and flourished from 2 to 43 team members. Custom Application Development, Microsoft Technologies, and SAP are overseen under IT services, whereas Embedded Development and IoT are our fundamental area of focus. Working as a separate entity from manufacturing site Schmersal India (Ranjangaon), Schmersal Global Competence Centre executes all the functions and responsibilities of the ITCC (IT Competence centre) and Engineering Centre.

Schmersal is accessible to businesses in all corners of the globe. They have also started webshop to purchase safety

key role to play when it comes to meeting climate targets and reducing CO2 emissions. There are many ways to reduce energy consumption, but without externally supplied energy, no machine and no industrial production will survive. To gradually reduce company-related CO2 emissions at this level as well, Schmersal relies on renewable energies at their production site.

The company has also built a solar power plant in an area covering 2500 m², this is a ground mounted system with capacity of 300KW.

The plant will support in the factories power consumption by generating energy upto 50 per cent of their current power consumption per day. It will generate around 1100 units/per day.

Utilising solar power decreases their dependence on fossil fuels, conserving these valuable resources for future needs. The benefits of solar power plants in this shift not only help in preserving natural resources. Reducing carbon footprint but also reduce the geopolitical and economic vulnerabilities associated with fossil fuel dependence. This transition underscores the importance of harnessing clean and sustainable energy sources to ensure a more resilient and environmentally friendly future.

Solar power plants do not produce greenhouse gas emissions during operation, making them an integral part of efforts to combat climate change. By reducing emissions, solar energy contributes to a healthier planet and a sustainable future.

Schmersal India is the seventh Schmersal subsidiary in which we produce green electricity from their own photovoltaic systems.

Schmersal will keep working on their values to take care of this planet.

Quality department inaugurated inhouse testing facility

As Schmersal follows a stringent testing to all their safety products; each switch undergoes a comprehensive evaluation. This rigorous approach guarantees



adherence to quality standards.

Bhushan Salunke, Quality Head, along with his team developed an in-house testing facility to perform endurance and life cycle tests on existing as well as newly developed products and mechanical properties (tension, compression, etc.).

Below are the benefits of in-house testing facilities

- ❑ For newly developed products, the life cycle or endurance test can be performed in-house.
- ❑ Faster and easy to validate the product life cycle or endurance test of an existing product if any raw material component changes.
- ❑ Cost and timesaving: These tests are more time-consuming and costly with third-party testing labs.
- ❑ Perform mechanical testing (tensile, compression, etc.) on raw material in-house.

Below are the facilities which we are planning to add in future

- ❑ Life cycle / Endurance testing unit for all type of limit / position switches
- ❑ Life cycle/ endurance testing unit for emergency push buttons.
- ❑ Salts Spray testing facility
- ❑ Ingress Protection (IP Test) testing facility.
- ❑ Lab accreditation by NABL or equivalent accreditation body

(e.g DAKKS etc)

This is a testament to Schmersal's commitment for making their safety products safer for man and machine.

Schmersal is hopeful for the year 2024 and is looking to double their



production by 2025 in India with 100 per cent localisation by 2026.

The company is also planning to start an electronic product assembly at their plant in India. They also aim for in-house accredited QC labs by 2026. They are working towards a goal to achieve Rs 250 crore domestics sales in the year 2024.

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(Communication provided by the management of the company)



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Avians Fire Rated Rolling Shutters: Enhancing fire safety

This Fire Rated Rolling Shutters act as a strong defence against fire, protect valuable assets, and keep people safe.

In today's world, safety in buildings is a top priority. When it comes to fire safety, Avians Fire Rated Rolling Shutters are a key player in making buildings safer. These shutters act as a barrier to stop the spread of fire and smoke in commercial and industrial spaces. Here's why Avians Fire Rated Rolling Shutters are important for fire safety.

What are fire rated rolling shutters?

Fire-rated rolling shutters are specially designed to keep fire and smoke from spreading within a building. Avians is a well-known company that makes these shutters. The company has customised it to meet different safety needs.

Key features of Avians Fire Rated Rolling Shutters:

- ❑ **Fire resistance:** Avians' shutters are built to withstand fire for a set amount of time, giving people more time to escape and firefighters more time to control the fire.
- ❑ **Safety standards:** Avians ensures their shutters meet strict safety rules and get certified by the right authorities.
- ❑ **Customisable:** Customers can choose the size, materials, and finish that suits their building's look and purpose.
- ❑ **Durability:** Avians' shutters can handle extreme conditions, so they last a long time.
- ❑ **Automatic:** They can be set to close automatically when a fire is detected, reducing the chance of mistakes.
- ❑ **Maintenance:** Avians helps with regular maintenance and provides guidance to make sure they work when needed.



What Avians Fire Rated Rolling Shutters do?

Avians Fire Rated Rolling Shutters help by:

1. **Containing fire:** Avians Fire shutter help to containing fire in that area & stop the fire's spread.
2. **Protecting assets:** In commercial and industrial spaces, protecting valuable assets is crucial. Avians' shutters offer a defence against fire damage.
3. **Ensuring safety:** The extra time these shutters provide can save lives by giving people more time to evacuate during a fire.
4. **Meeting rules:** Many building codes and insurance companies require these shutters in certain places. Avians' products ensure you meet those rules.

In conclusion, Avians Fire Rated

Rolling Shutters are an essential part of fire safety in modern buildings. They act as a strong defence against fire, protect valuable assets, and keep people safe. They also help buildings meet safety regulations. These shutters are not just products; they are a commitment to safety and peace of mind during fire emergencies.



For details, contact Avians at email: sales@avians.co.in, Tel: 8390300400, Website: www.avians.co.in

(Communication provided by the management of the company)



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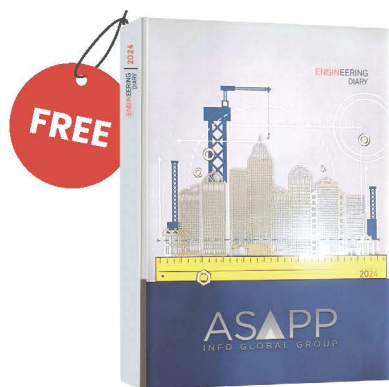


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Ministry of Heavy Industries

Shri @vijaymittal4, JS at MHI congratulated BHEL and Coal India Ltd. for signing a JV Agreement for setting up a Coal to 2000 TPD Ammonium Nitrate Plant using BHEL's in-house developed PFBG Technology especially suitable for high ash Indian coal.



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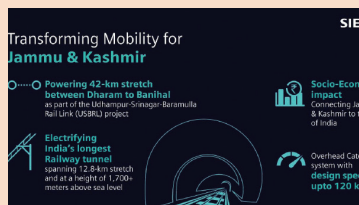
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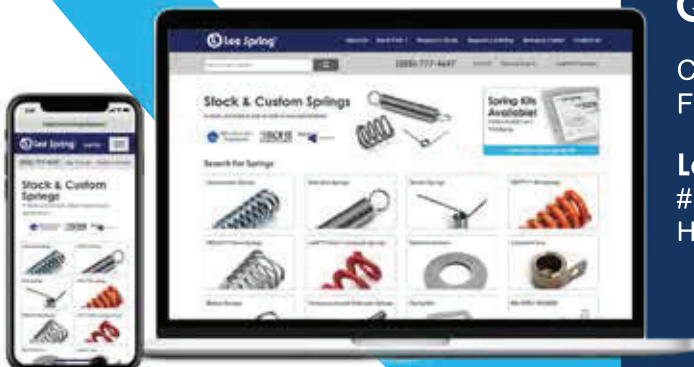
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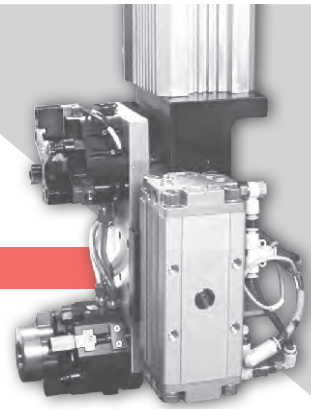


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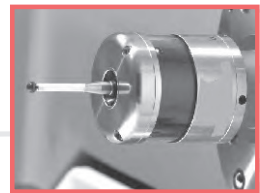
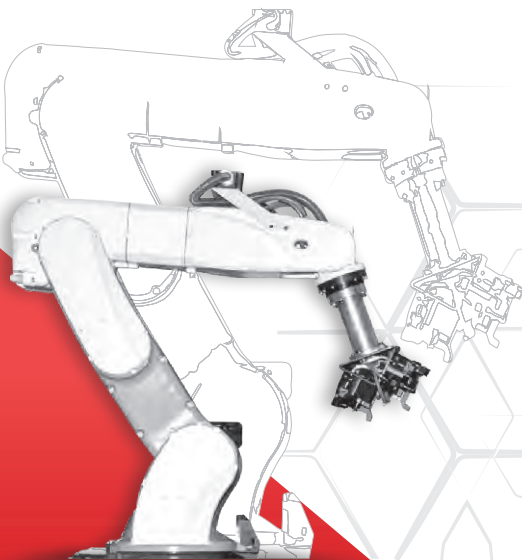
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