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Headquartered in Vadodara, Yash Highvoltage is a leading Indian manufacturer of high-voltage and EHV condenser-graded transformer bushings, with over 35,000 units operating globally. The company introduced localized RIP bushings up to 245kV to the Indian market, way back in 2016, thereby reducing India's dependence on imports. In this interaction, we have **Keyur Shah, Chairman & Managing Director, Yash Highvoltage Ltd** explaining the critical role of transformer bushings, especially for a country like India that is in the midst of massive expansion of its power grid. Though the country is today largely dependent on imports, Keyur Shah is confident that with expanding domestic capacity and policy tailwinds for local manufacturing, India's dependence on imports for transformer bushings will significantly abate in the coming years

We see strong demand for RIP transformer bushings

Let us start with a basic understanding of transformer bushings. What is the precise role that bushings play in a transformer, and what is the difference between OIP and RIP bushings?

Transformer bushings provide the insulated path for electrical conductors to pass through the grounded transformer tank; they keep the high-voltage conductor electrically isolated from the earthed enclosure while allowing safe connection to the outside network. Practically, bushings are critical for safe passage of power in-and-out of transformers.

The core technical difference between OIP (Oil-Impregnated Paper) and RIP (Resin-Impregnated Paper) is the insulating medium and construction: OIP bushings use oil impregnated cellulose paper and rely on an oil-filled insulation system, whereas RIP bushings are made of dry-type and oil-free insulation system comprising crepe paper and resin.

From a technical perspective, are RIP bushings more efficient than OIP bushings?

'More efficient' depends on the application. RIP bushings typically offer advantages in compactness, reduced maintenance (no oil handling), improved mechanical robustness, and better performance against moisture ingress and partial discharge in dry conditions. For many new-build and retrofit applications especially where lifecycle reliability and logistics matter – RIP is preferred. However, OIP still has proven long-term service in heavy-duty installations and may be



Overview of the Vadodara (Halol) plant of Yash Highvoltage Ltd

Established in 1973, EMCO ELECTRONICS™ is an ISO 9001:2015 certified company that provides solutions for Electronics based measuring, monitoring and controlling systems for acclaimed brands in the Indian and International markets. We engineer and deliver trust-able, high quality products for electrical measurement, monitoring and control of power transformers.

EE products include Automatic Voltage Regulating Relays, Tap Position Indicators, Temperature Indicators, Transducers, etc.

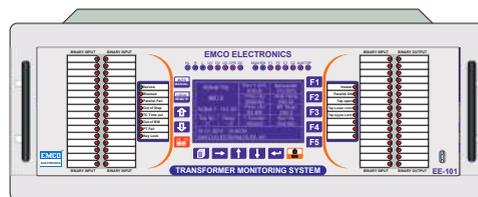
Transformer Monitoring System / Tap Change Controller cum Transformer Monitoring Unit (TMCTS) EE-101

Engineered from our legacy of over 75 years, the EE-101 Transformer Monitoring & Tap Change Controller cum Monitoring System is one of a kind, future ready model for substation automation. A user friendly design, it can be customized to cater to the needs and requirements of the customers. Our path breaking technology has been extensively installed and commissioned at many utilities / substations, and power plants in India and abroad.

Key Features : (TMS/TMCTS/Digital RTCC)

- 5.1" Large Graphics display with 16 front keys for User friendly interface.
- Status LEDs to indicate various states of Transformer and Controller.
- MODBUS, IEC-61850/PRP Protocols for Communication.
- Event recording and Data logging of all required parameters.
- Programmable Analog Inputs and Outputs.
- Programmable Binary Inputs and Outputs.
- Parallel operation of Transformer using I/M/S/F & Circulating Current Method.
- Cooling/Temperature control with 6 level settings.
- Life Time consumption calculation of Transformer.
- Windows based front-end application for easy configuration.

Digital RTCC Panel



EE-101 TMS

Automatic Voltage Regulating Relay



EE-301M



EE-303C

IEC61850 with ETH/FO
Or MODBUS with RS485



EE-301E

Tap Position Indicator



EE-610(dual 4-20mA o/p)



EE-610(All options)



EE-608

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TRANSDUCER



EE-701
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EE-611BT
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(4/8 Channel Temperature Controller)



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RIP transformer bushings fitted on a transformer

chosen for specific legacy or thermal reasons. The industry sees RIP as the modern, maintenance-friendly choice in many high-voltage use cases.

Yash Highvoltage also offers high-current bushings – what are they and where are they deployed?

High current bushings are designed to carry very large currents (high ampacity) while keeping dielectric and thermal performance within safe limits. You will find them on power transformers used in utility grids, large interconnecting transformers, generation plants, and heavy industrial installations where both high voltage and high through current are required. These are specialized products requiring robust mechanical, thermal and contact designs.

Yash Highvoltage® offers an indigenous range of high-current bushings rated up to 25,000 Amps, available in both OIP and RIP technologies. We are proud to be the first company in India to manufacture and supply transformer bushings with a 25,000 Amp rating.

We understand that there are very limited suppliers for transformer bushings globally – whether OIP and RIP. According to you what are the reasons?

A few structural reasons restrict the number of suppliers:

- Technical complexity and the need for high precision manufacturing and testing
- Significant capital investment for controlled facilities, testing rigs and long R&D cycles to meet international standards, like IEC, IEEE etc.
- Stringent qualification cycles required by utilities and OEMs

These factors mean only specialized players with deep engineering expertise and quality credentials typically succeed.

Yash Highvoltage® recently went public through an IPO to part-finance a greenfield RIP bushings plant in Gujarat. Can you elaborate on the project? Where does it currently stand and what are the R&D and testing capabilities being developed at the new facility?

Yes, we raised capital through an SME listing and used a portion of the proceeds to set up a greenfield facility for manufacturing condenser graded RIP/RIS transformer bushings in Vadodara-Suncity, Savli area of Gujarat. The project is intended to scale RIP manufacturing, localize critical processes, widen the export market and enhance in-house testing capability. We have completed the foundational and groundbreaking milestones and are in an advanced stage of construction, which will soon be followed by equipment commissioning.

What is the current capacity of RIP bushings at your company's existing plant, and what impact will the new plant have on the overall capacity?

Our existing Vadodara (Halol) plant's installed annual capacity is commonly referenced at 7,000 bushings. The split is across OIP, RIP and high-current products with RIP accounting for 3000 units. The greenfield RIP project is intended to materially increase RIP capacity and reduce lead time, moving us from being a domestic supplier to a significantly larger one for both domestic and export markets for RIP bushings.

What is the import dependency on raw materials for RIP bushings? Do you see this reducing in the coming years?

RIP cores and insulators indeed have import dependency even today. That said, with the upcoming plant and localization initiatives of Yash Highvoltage®, we are actively developing in-house capabilities for producing RIP cores and associated processes, which is expected to reduce import dependency over time – both for cost control and to strengthen the 'Make in India' supply chain. Market import data also shows ongoing imports of RIP bushings to India, which domestic capacity expansions can substitute.

What is the demand-supply situation of RIP bushings in the domestic market? What is India's overall dependency on imported RIP bushings?

Demand is strong with rising global energy requirement due to rapidly rising data centre installations, urbanisation and industrialisation, EV infrastructure, high-speed railway and metro electrification, dedicated freight corridors, renewable expansions, etc. sharply augmenting per-capita power consumption and adding pressure on power grids.

With increased transmission and distribution capex, grid modernization and the transformer replacement/refurbishment

BTS series

— battery pack testing system —



±0.02% F.S.

Voltage/Current Accuracy

±0.05% F.S.

Power Accuracy

200V/ms

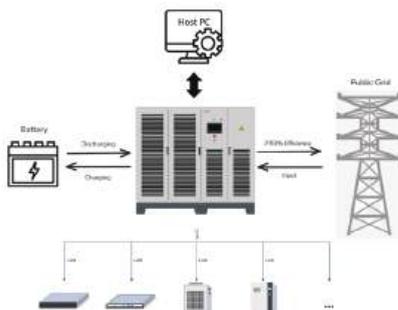
Voltage Slew Rate

8ms

Current Transition Time

The ACTIONPOWER BTS Battery Test System is a highly adaptable platform designed to support comprehensive EV battery testing in accordance with international and Chinese standards such as:

- GB/T 31467.1-2015 – High Power Application Test Procedures for Lithium-ion Battery Packs and Systems for EVs
- GB/T 31467.2-2015 – High Energy Application Test Procedures
- GB/T 31467.3-2015 – Safety Requirements and Test Methods
- GB/T 31484-2015 – Cycle Life Requirements and Test Methods
- GB/T 31485-2015 – Safety Requirements and Test Methods
- GB/T 31486-2015 – Electrical Performance Requirements and Test Methods





245kV RIP bushing



High-current OIP bushing

cycle, several public tenders and utility procurements including POWERGRID's, shows active requirement for high-voltage RIP bushings.

At the same time, domestic supply has been relatively concentrated, relying on imports until Yash Highvoltage localised RIP bushings in 2016, which catered significantly to the domestic demand for RIP bushings up to 245kV. With expanding domestic capacity and policy tailwinds for local manufacturing, dependence on imports is seen to be gradually reducing but not yet eliminated.

We understand that Yash Highvoltage, in equal partnership with Quality Power Equipments, has acquired Sukrut Electric. Can you

please discuss the strategic importance of this acquisition for Yash?

The strategic rationale is simple: Sukrut brings legacy manufacturing capability in transformer components, complementary product lines, and access to new customers and technologies. This collaboration marks a significant consolidation in India's high-voltage equipment sector, bringing together Yash Highvoltage®, a prominent global provider of condenser-graded transformer bushings and Quality Power, known for its high-voltage power systems and energy quality solutions, aiming to strengthen Sukrut Electric's reach and scale in both domestic and global transformer markets.

How do you see the prospects for Yash Highvoltage in the coming years, especially in view of the capacity expansion of RIP bushings and the hugely anticipated transformer demand?

Grid modernization, renewable integration, transmission interconnections and initiatives like 'Make-in-India' and 'Self-reliant India' are naturally translating to growth transformers and bushings demands. Our H1FY26 performance underscores this growth potential in metrics like - revenue and profit improved materially year-on-year, reflecting strong order inflows and executions. With the greenfield RIP plant, testing facility upgrades, R&D investments, and Sukrut acquisition, we expect to strengthen market share, shorten lead times, and support both domestic and export customers – all of which underpin healthy growth going forward. ■

IndiGrid plans Rs.7,500-crore capex across power transmission and BESS

IndiGrid Infrastructure Trust (IndiGrid) has planned capital expenditure of nearly Rs.7,500 crore across its power transmission and BESS projects, including those of EnerGrid.

In a release, IndiGrid said that the combined under-construction portfolio capex across IndiGrid and EnerGrid stands at around Rs.7,500 crore.

EnerGrid (Enerica Regrid Infra Pvt Ltd) is a new investment platform co-promoted by IndiGrid along with British International Investment (BII) and Norwegian Investment Climate Fund (Norfund).

During the third quarter (Q3: October to December) of FY26, IndiGrid entered into definitive agreements to acquire two of EnerGrid's currently under-construction assets, one year post their respective commercial operations date.

These two projects are:

- A 125 MW/500 MWh standalone battery energy storage system (BESS) project in Uttar Pradesh, contracted by NTPC Vidyut Vyapar Nigam Ltd (NVN), for an enterprise value not exceeding Rs.957 crore
- An ISTS project in Madhya Pradesh (around 180 ckm of lines and 4,500 MVA of transformation capacity), for an enterprise value not exceeding Rs.1,577 crore



The Madhya Pradesh ISTS project represents the first power transmission acquired by EnerGrid in TBCB mode.

In Q3FY26, IndiGrid also entered into an agreement to acquire Gadag Transmission Ltd, an ISTS project, with around 187 ckm of lines and 1,000 MVA transformation capacity, located in Karnataka, from ReNew Power, for an enterprise value of Rs.372 crore. Subject to regulatory and contractual approvals, the acquisition is expected to be consummated by the end of the ongoing fiscal year. The Gadag project is operational since September 2024.

Power transmission portfolio: IndiGrid's own under-construction power transmission portfolio (excluding EnerGrid) currently includes four ISTS-TBCB schemes together envisaging around 504 ckm of transmission lines and 5,000 MVA of transformation capacity. These projects are spread across Maharashtra, Madhya Pradesh, Punjab and UT of Jammu & Kashmir.

As of December 31, 2025, IndiGrid had an operational power transmission portfolio spanning 18 states and two Union territories. This portfolio, dominated by ISTS-TBCB projects, comprised around 8,742 ckm of lines and a little over 20 GVA of transformation capacity. ■