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RENEWABLE

RAILWAYS

INDUSTRIES/OEM

POWER

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Solutions
for a
**Brighter
world**

Company Profile

Raychem RPG (P) Limited was incorporated in 1989 and is a 50:50 joint venture between **STE** USA and **RPG** Enterprises, India.

TE Connectivity is a USD13 billion global provider of engineered electronic components for thousands of consumer and industrial products; network solutions and systems for energy and telecommunication markets; and specialty products.

RPG Enterprises, established in 1979, is one of India's fastest growing business groups with a turnover touching Rs 18,000 crore. With over 15 companies in its fold, the group has a strong presence in Infrastructure, Automotive tyres, IT, Pharmaceuticals, Plantations and Power ancillaries.

The Business

Raychem RPG is involved in technologies; strengthening the infrastructure segment of the economy in the following business segments:

- Energy Products
- Transformers
- Oil & Gas
- Exports
- Solar & EMS

Energy Products Division, a strategic business unit of Raychem RPG views its activities as a solution provider for enabling technology that improves the performance, reliability and economy of electrical network and equipment. The company is committed to providing its customers with sustainable and true end-to-end solutions for Reliable Connections, Asset & Personnel Protection and Theft & Loss Reduction.

Reliable connections

Raychem's connections system are designed to improve the performance, reliability and economy of electrical network and equipment.

Our wide range of reliable connector systems and technologies are not just considered to be the most advanced technology available in the world, but are also way ahead of the conventional system presently available in India for over-ground and underground applications.



Solutions offered

- Power Cable Accessories for almost all types of power cables up to 245kV
- Low/Medium Voltage Connection Systems
- High Voltage Connection System
- Cable Preparation Tools
- Installation, Maintenance and Audits

Power Cable Accessories

Raychem's power cable accessories for almost all types of power cables up to 245kV have over 40 years of design life – which has been proven by long-term aging tests and as witnessed in the field. Raychem products are distinguished by their good insulating & sealing characteristics, high mechanical toughness and superior resistance to weathering and chemicals, such as UV radiation and alkaline soils.

All MV, HV and EHV cable accessories include a specially designed stress control mechanism, which controls the electrical stress distribution for enhanced product performance. In terminations, the insulating tubing ensures non-tracking and an erosion resistant surface even at extreme operating conditions.



Product Range

- Power Cable Joints & Terminations up to 245kV
- Switchgear & Motor Connection System
- Link Boxes & Sheath Voltage Limiters
- Cable End Caps
- Cable Entry Sealing System
- Cable Sealing Glands
- Cable Repair Kits, Ties and Cleats
- Installation & Spiking Tools
- Fault Passage Indicators
- Tamper Proof Meter Boxes & Connectors

Low/Medium Voltage Connection Systems

Raychem's wide range of reliable connectors and accessories for low/medium voltage cable and overhead networks, substations, grounding applications, rail transport and infrastructure cover most applications in an electrical network.



Product Range

- Insulating Piercing Connectors & LV ABC accessories
- Mechanical Connectors with Shear Head Bolts
- Bolted Connectors and Clamps
- Wedge Connectors & In-line Dis-connectors
- Distribution Boxes with/without Spring Loaded Bushbars

HV Connection System

Raychem RPG has been continuously expanding and manufacturing connectors for grid stations all over India. It supplies a full line of connectors for high voltage cables and overhead networks, substations, grounding applications, rail transport infrastructure and industrial applications.

Anti Corona Range



Aluminium
Connectors
up to 400kV

UHV Range



Aluminium
Connectors
up to 800kV

Sinemex Range



Aluminium
Connectors
up to 220kV

Cable Preparation Tools

Raychem RPG in partnership with Ripley (leading global manufacturer of wire and cable preparation tools, serving linemen, technicians and installers for over 30 years) offers full product line of high quality wire and cable preparation tools and accessories for the Transmission & Distribution Networks.

These tools intended to splice and terminate cable while meeting specific application needs including accurate removal of insulation, semi-conductive sheathing, protective jacketing and other materials to produce a consistent, uniform preparation of cable ends.



Adjustable Cable
Stripper



Semi-con
Scoring Tool



Semi-con
Shaving Tool



End Strippers



Adjustable
Jacket Slitter



Adjustable End
Stripper/
Jacket Stripper

Asset & Personnel Protection

Raychem's solutions for Asset & Personnel Protection are known for its high performance standards in electrical distribution networks, power substations, railways and OEM applications.

We provide our customers with polymer based insulation enhancement and protection system ranging from 1.1kV to 800kV. Our range of services include supply, design, installation, maintenance, energy/network audit, as well as complete diagnostics.



Product Range

- Insulation Enhancement System - Raysulate
- Polymeric Insulators
- Hollowcore Bushings
- Operating Rods
- Surge Arrester
- Personnel Protective Equipment – Elecsafe

Raysulate - Insulation Enhancement System

Safety and reliability of high voltage equipments is vital and Raychem RPG is committed to pioneer improvements in performance of these equipments. Frequent tripping on account of phase-to-phase or phase-to-earth flashovers due to inadequate electrical clearances considerably reduces the reliability and life of these equipments. This can now be avoided through Raysulate.

Raysulate range of products have unmatched field performance. Raysulate products come in the form of Heat Shrink Tubes, Tapes, Sheets and pre-formed shapes to enhance insulation of live points of any shape and voltage grade.



All the products are made of special formulation for electrical use and are UV Stable & weather resistant

Product Range

- Heat Shrinkable Insulation Tubing
- Heat Shrinkable & Cold Applied High Voltage Insulating Tapes
- Heat Shrinkable High Voltage Insulating Sheets
- Rigid Red Barrier Boards
- Cold Applied MV & LV Shrouds for Insulating Live Parts of Switchgear & Outdoor Grid Components
- Creepage Extenders for Enhancing Creepage of Insulators
- Medium & Low Voltage Line Covers

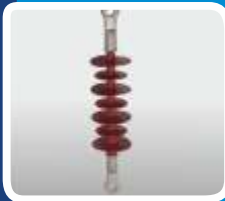
Polymeric Insulators

Raychem's competence in material science is fundamental to its ability to design polymeric insulators that meet application requirements even for severe environments. Raychem RPG, having about three decades of experience, has worked closely with customers to optimise the design and installation of its products in some of the most challenging environments of the world.



Product Range

- Suspension & Tension Insulators upto 72.5kV
- Station Post Insulators up to 765kV
- Line Post Insulators up to 42kV
- Hollowcore Insulators up to 765kV
- Railway Insulators



Operating Rods

Raychem's Operating Rods are hollow or solid insulation parts made of fiber-reinforced epoxy resins with metal connection fittings. They can withstand extreme mechanical and electrical loads and are suitable for integration in high voltage equipments where high insulation strength combined with high mechanical strength and low weight is an asset. Operating Rods are used for voltage levels ranging from 50 kV to 800 kV. They are available in various diameters.

Applications

- Bushings for transformers, walls and dead tank breakers
- Grading capacitors, chamber and support insulators for life tank breaker
- Current & voltage transformers in oil and SF6
- Cable terminations
- Surge arresters



Hollowcore Bushings

Raychem's range of Hollowcore Bushings is made of glass-fiber reinforced resin tube with silicone rubber housing. The superior material properties are especially adapted for high voltage applications in outdoor service.

Surge Arrester

Raychem offers an extensive range of polymeric and porcelain surge arresters for distribution and transmission networks that are in service around the world and are protecting installations in all climatic conditions.

Our Surge Arresters for voltage power distribution systems up to 800kV are designed to reliably protect your valuable assets from over voltage. They withstand severe outdoor exposure over long operating lifetime and help maintain service reliability in both overhead and underground installations.



Low Voltage

Provides protection for LV overhead lines, consumer in-house supplies, distribution transformers and other appliances

Medium Voltage

For indoor and outdoor applications, for protection of overhead lines, DC locomotives, switchgear applications and motor protection

High Voltage

For protection of transmission systems up to 800kV

Surge Monitoring Systems

Accurately and reliably detect and measure current impulses, leakage current

Elecsafe - Personnel Protective Equipment

Elecsafe is a complete range of personnel protective equipment that comply with set standards and regulations. Elecsafe offers a comprehensive safety solution to electrical operators from the hazards of their job.



Product Range

- Safety helmet with sensors
- Arc face shield
- Insulated gloves
- Insulating mats
- Di-electric shoes
- Full body harness
- Arc flash clothing
- Eye wear protection
- Electrical safety training
- Safety Audit and risk assessment

Theft & Loss Reduction

Today in India, over 22% of the total electrical energy is lost because of Aggregate Technical and Commercial (AT&C) losses making a woeful comparison with global standards. If the losses are not kept in check, it is estimated to cost over Rs. 30,000 crores to Indian distribution utilities.

The technical losses are mainly because of the type of conductors used, transformer capacity, and other equipments used for transmission and distribution of electricity. The commercial losses are mainly due to meter tampering, power theft and collection inefficiency.

Raychem understands the problem and offers unique solutions which help Indian utilities to bring down the losses significantly.



The solutions offered

- Replacing bare conductor with LV ABC & accessories
- Anti-theft Distribution Boxes
- Anti-theft Tamper Proof Meter Units
- Low Loss Wedge Connectors
- Medium Voltage / High Voltage Covered Conductor
- RAYFEED
- TRAFCONNECT
- Visual Fault Passage Indicator

LV ABC

LV-Aerial Bundled Conductor System is an effective solution offered by Raychem which prevents theft by direct tapping, the most basic method of stealing electricity.

Raychem was one of the first to pioneer the connection, anchoring and suspension of low-voltage insulated overhead systems. Our continuous efforts in research and development have led to state of the art product lines, meeting the demands of modern network design, operation and maintenance. Our piercing connector service lines can be connected to live lines with maximum safety to linemen.

The major advantages of LV ABC are

- Total elimination of faults on LT lines
- Improved reliability
- Avoidance of theft by direct tapping
- Avoidance of overloading of Distribution transformers



Anti-Theft Distribution Box

Raychem's anti-theft distribution box is more reliable and capable of completely eradicating the menace of power theft by direct tapping, the most common way of stealing power.

This Anti-theft distribution box has a host of highly advanced features that makes electricity theft simply impossible.



Features

- It is equipped with the patented enclosed Novel bus-bar system that is completely tamper proof and prevents access to the metal portion as well. As the bus bar is accessible only through a specialized tool, creating an illegal connection becomes simply impossible
- Anti-theft distribution box features the Electro-magnetic lock, which opens only with a specific current pulse provided through a handheld device. The handheld device is password protected, which makes creating a replica of it difficult
- It gives a well-organized appearance to the connection point and improve service quality

Anti-theft Tamper Proof Meter Units

Raychem has an innovative solution to encompass energy meter, to prevent tampering on low voltage distribution networks and the non-reversible plug-in type LT connector, to make it completely theft free and tamper proof.



Key Features

- Tamper proof during transportation & installation
- None of the tamper-sensitive parts are left unprotected
- Permanent irreversible locking system
- Compatible to all makes of energy meters
- Flame retardant & weather resistant
- Easy installation



MV / HV Covered Conductors

Raychem's MV/HV (up to 52kV) Covered Conductor provides the effective solution to prevent the revenue loss due to theft by direct tapping, outages due to conductor clashing, tree faults and other problems associated with bare overhead conductors.

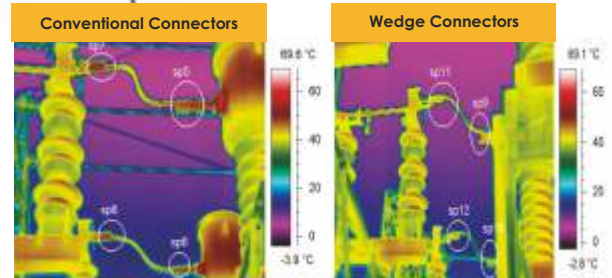
Covered conductors offered have been type tested up to 33kV at CPRI as per European Norms and also at site abroad, a tree that had fallen across the three phases was left in same position for over 180 days without having any outage or damage to conductors. This has proved the reliability and effectiveness of covered conductors in preventing the system failure on account of transient faults created in system due to falling trees and branches or conductor clashing.

Low Loss Wedge Connectors

Raychem Wedge Utility Connectors are designed around an engineering principle which we call 'Wedge Pressure Technology'.

Wedge Pressure Technology has formed the basis for a complete family of connectors that outperforms other convectional connector technologies, resulting in 'lowest life cycle cost'. Wedge Connectors (Boltless Connectors) overcome the physical and electrical limitations of traditional compression or bolted connectors; resulting in low technical losses and efficient, consistent current flow.

The Wedge Connectors provide the most cost-effective solutions to a wide range of power connections and grounding challenges.



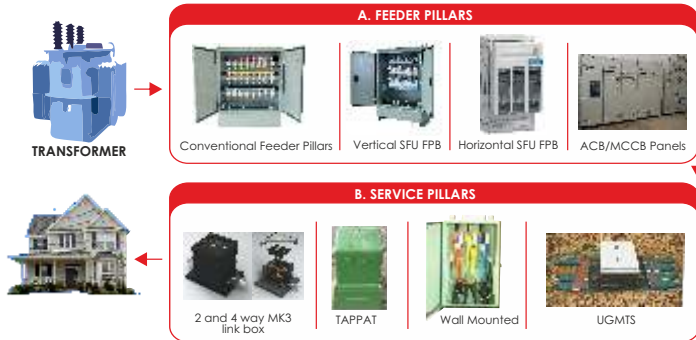
Features

- Designed specially to manage the peak power transmission temperature up to 250 degrees.
- Provides an efficient electrical connection for any type of power conductor combination
- Withstands severe electrical and mechanical stresses
- Easy installation without damage to conductors
- Easy removal of connector without damaging the conductors and is re-usable

RAYFEED: LV DISTRIBUTION PILLARS

Raychem RPG is at the forefront of providing Indian power utilities with innovative Feeder and Service pillars that meet their exclusive needs in terms of customized features, product quality, suitability for Indian environment, cost and after sales services.

Our unmatched portfolio includes wide range of Feeder and service Pillars for varied requirements.



A. FEEDER PILLARS

Conventional Feeder Pillar



We design, manufacture and offer a wide range of single & double door Low Voltage Distribution Feeder Pillars with or without protection device.

We test our Feeder Pillars on stringent industry parameters for assured performance. Our Feeder Pillars are highly cost-effective and value for money.

Advantages

- Durable: Strong & sturdy construction
- Anti-theft: Use of special hardware to avoid tampering
- Low Maintenance: Special non-corrosive coating
- Safe: Optional Smart locking, Maximum opening for user access

Features

- Current Rating: 400A to 1200A
- Manufacture according to customer requirement & specifications
- Both FRP & Steel enclosure available
- Ingress protection level of IP54 & IP55
- EC grade Aluminium busbar as per IS5082. Copper busbar also available
- Full rated neutral busbar

Feeder Pillar with Vertical Switch Fuse Unit

NH vertical switch fuse disconnectors are three-pole fuse-switches for busbar mounting where three single-pole fuse-switches are vertically arranged in one unit. Each of the feeder terminals is directly connected to one phase of a three-phase busbar system. The outgoing terminals are equipped with terminals for cable conductors.

Integration of enclosures, switchgear and fuses ensures that they work in perfect harmony & tested as a complete system to satisfy all the requirements of distribution network operators and industry.



Features & Advantages

- Current rating : 400A to 1000A
- Both FRP & Steel enclosure options
- Ingress protection level of IP54 & IP55
- Short circuit capacity up to 50kA, 1 Sec.
- Easy voltage measurement, comfortable access with standard voltage testers
- Fully Insulated & touch proof
- Easy and safe connection & disconnection of fuse
- Compact & modular construction

Feeder Pillar with Horizontal Switch Fuse Unit

The NH Fuse-Switches, horizontal design series offers plant designers and switchgear manufacturers a modular system with reliable and easy-to install switching devices. The feeder pillar with horizontal SFU optimizes space & reduces overall height of the system for special applications in power distribution utilities & industrial segment.



Features & Advantages

- Current rating : 100A to 630A
- Uniform installation depth
- Offer perfect protection against accidental contact for ultimate safety and visual appeal of the power distribution system
- Easy voltage measurement, Comfortable access with standard voltage testers
- Fully Insulated & touch proof
- Easy and safe connection & disconnection of fuse
- The wide range of accessories offers a multitude of modification and upgrade options to suit any need

B. SERVICE PILLARS

2 and 4 Way MK3 Underground Link Box

Low voltage underground 2 and 4 way link boxes are used for connecting and switching adjacent sections of low voltage 3 or 4 core cable from 70mm² to 300mm². They are supplied complete with a plastic foundation pad, outer enclosure set and concrete filled manhole cover.



Features and benefits

- Current Rating: 400A
- Compact modular concept reduces weight and space required for link box positioning, making installation possible in congested areas whilst reducing excavation and reinstatement costs
- Retained ABS moulded lid replaces the traditional cast iron diving bell lid, which reduces weight and is non-conductive making operation safer
- Integrated locking facility combined with the lid retaining system and toolbox, with fail safe positioning and operation
- Clear vacuum-formed body shell allows both easy cable installation and inspection prior to resin fill. Shell designed for crossing 300mm² cores with sufficient resin coverage
- Single resin casting eliminates moisture ingress issues that are associated with multiple cast link boxes
- Reduced number of connections improves electrical performance and product longevity
- Error-proof factory assembly due to torque and system control software and zero-fault technology

Tappat: Fully Insulated Service Pillar

The new TAPPAT LV Service pillar has been designed after extensive testing and field trials. It is a significant improvement over the existing feeder pillars and offers the following advantages:



Advantages

- Reduction in I²R losses
- Safe Insulated Connections, overcomes safety issues
- Lockable, tamper proof design hence reduces the risk of power theft and pilferages
- Easy sectionalizing
- Add-on connection possible

Features

- Current Rating: 400A
- Modular in design, allowing simple and efficient installation
- Compatible with both stranded and solid sector cables
- Compatible with existing "standard" LV main pillars
- Ability to be switched single phase (or 3 phase) with the use of fully insulated handles
- Easily accessible test points
- Compact, free standing design
- Able to be used on new or existing installations
- Mechanical connections – reduce the problems associated with some compression connectors
- Distribution blocks form an integral part of the unit
- Service take off's on both sides of the open point
- Customer connections can easily be transferred from one side to the other in the event of problems

Wall Mounted Service Pillar

These service pillars are specially designed for the areas where floor space is in a constraint and wall mounting is required. These are also suitable for meter rooms.



Features & Advantages

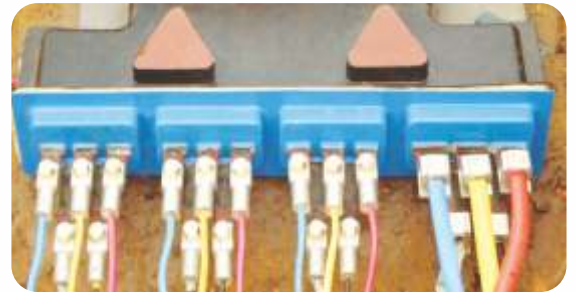
- Current rating: 400A
- Compact design
- Retrofit
- Fully insulated handle to switch single phase or three phase
- Mechanical connections
- Low I²R losses
- Safe Insulated Connections, overcomes safety issues
- Easy sectionalizing
- Add-on connection possible

LV Underground Distribution System

UGMTS

Under Ground Multi Transit System (UGMTS), a patented product of Raychem provides complete solution for

- Reliably connecting and switching adjacent section of LV cables
- Preventing power thefts and pilferages of expensive components
- Avoiding accidents and right of way issues in narrow and congested lanes
- Less outages and immediate restoration of faults



Features

- Current rating: 400A
- Low maintenance cost
- Surface materials are made of corrosion resistant polymers
- All components except links are factory casted with resin
- Zero floor space above ground
- 8 way-Bus Coupler arrangement optional

Remote Monitoring System

The substation Total Demand Monitor is easy to install (30-45 minutes), versatile and configurable metrology system. The total demand of the substation or feeder is calculated by the summation of the feeder loads and all loading parameters are measured. The system may be configured to measure transformer output and feeders by using Rogowski coils. Busbar voltage phase to phase angles may also be measured for the 3 phases. Working in conjunction with RTU; the data is transmitted to a central server over GPRS.



Features

- Ease of Installation plug and play interface for both current sensors and voltage inputs (Live fit)
- Maximum no. of 6 LV feeders per metrology unit. Capable of daisy chaining up to 2 metrology units with a single using only 1 RTU
- Additional inputs for 2 temperature sensors
- 3 Phase + Neutral Current measured using Rogowski coils per feeder
- Voltage data aggregation of Min, Max, Average and RMS values
- LCD on RTU can be used to display Modbus parameters
- Configurable/programmable Alarms for all parameters
- Solid State Data Storage as backup
- Lockable case with overall dimensions of 425mm x 300mm x 180mm
- Ingress Protection IP65 (EN60529) and Impact Resistance IK06 (EN62262)

Advantages for network engineer & managers:

- Continuous substation monitoring and real time data : optimized decision making
- No calibration, no maintenance required
- Reduce losses, improve efficiency and cost of network
- Increase customer quality of service
- Integrate with current/future Smart Grid systems

TRAFICONNECT

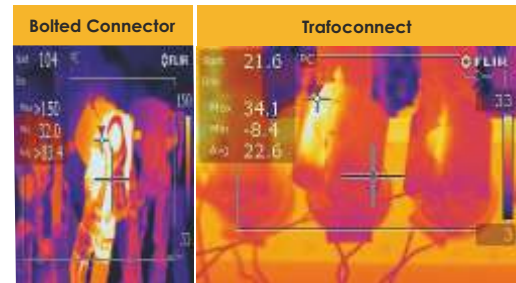
Transformer is a vital component of a distribution system. It has to deliver Reliable Power in a safe & efficient manner. However, 8% of the transformers installed worldwide fail on account of improper connector systems.

A conventional connector system used for LV cable connection, deploys crimping and tightening of the bolts. Over a period of time, it leads to a loose electrical contacts which causes sparks and hot spots. The contact resistance is high which adds to the losses of ailing utilities. The weight of the connector causes mechanical strains on the bushing of the transformer, leading to oil leakages.

Raychem's TRAFICONNECT is engineered to keep the contact resistance low for the lifetime of the transformer. Its lighter & pretty simple to install as it uses the modern shear bolt technology, hence avoiding the skill & tool dependent crimping methodology. It significantly increases the reliability of the transformer.



Temperature analysis



Features and Benefits

- Simple and easy Installation
- Light weight connecting system
- No tools required
- Low resistance (I^2R) losses
- Maintenance free
- Reliable & Insulated connection

Visual Fault Passage Indicator for Quick Fault Identification

Power networks are subjected to extreme weather events and pollution all-round the year. From lightening to high-speed winds, and from dust storms to environmental pollution; an array of factors could be detrimental to their smooth functioning.

The result is the appearance of faults from time to time and disruption in the power supply for long hours, causing huge revenue losses to the utilities.

The key to minimizing losses on account of faults lies in identifying the fault locations early and taking timely remedial measures. Raychem Fault Passage Indicators enable utilities to do so with ease. Raychem's FPIs help electricians attain quick visual or remote indication of the fault occurrence on an overhead electrical system.



Features

- Both communicable and non-communicable options available
- Suitable for 11kV, 33kV & 66kV overhead line with radial network & solidly earthed networks
- Bright visual indication
- Respond to both permanent faults, transient faults and auto recovery when fault disappear
- Measures di/dt, Configurable current magnitude, Configurable reset time & Indication time
- Configurable Inrush current restraint
- High accuracy in fault detection and ease of installation
- Light weight
- High wind resistance
- Compact design
- Long battery life
- Self-powered and easy battery replacement

Installation, Maintenance and Energy/Network Audits

Raychem RPG provides one stop, multi-disciplinary solutions to the power industry all over India.



Range of Services

- Cable route selection and thermal surveys
- Cable structure and support system designs
- Grounding and sheath bonding designs
- EHV cable installation
- LV ABC installations
- Installation of cable joints and terminations
- Cable spiking and hipot testing
- Contract maintenance (cable network services)
- Customised insulation solutions
- Audits and consultancy of cable networks
- Thermo-scanning
- Failure analysis
- Training programmes for engineers and jointers