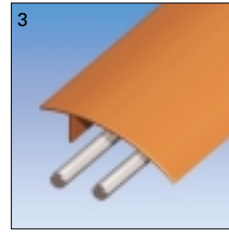
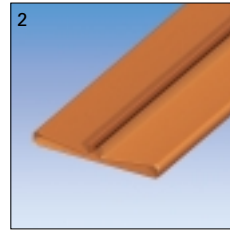
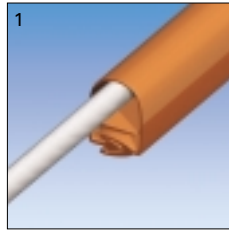


**tyco**

*Electronics*

**Solutions for electrified  
railway systems**





**Insulation Enhancement System – Raychem**

- 1. MVLC: (Medium Voltage Line Cover)** Provides insulation for catenary, droppers and associated conductors against contact with trees, birds, wildlife or even vandalism. Simple, fast wraparound installation.
- 2. IBIC: ("I" Beam Insulation Cover)** Prevents accidental bridging between "I" section steelwork and live catenary or associated equipment by wildlife. Installation is clip-on, tool-free and fast.
- 3. TCWC: (Twin Contact Wire Cover)** Provides an insulating platform above Twin or Single contact wires. Used in tunnels, under bridges, or in stations where there is reduced clearance. Attaches to contact wire with industrial standard clamps.
- 4. BISG: (Bus Insulation Squirrel Guard)** Can be mounted horizontally or vertically on any MV insulator or bushing, to prevent wildlife bridging phase to ground. Designed to eliminate accidental flashover on trackside substations and all associated equipment.

**HV Connectors – Simel**

- 5. SUBSTATION CONNECTORS:** A full range of HV connectors for substation applications is available, suitable for tubular and flexible conductors. Tee, Derivation and Termination available for aluminium, copper or bimetallic joins from 30kV to 330kV.
- 6. GROUNDING CONNECTORS:** A range of copper compression connections is available for constitution of the earthing grid and connection of the grid to the frames.

**Catenary Dropper System – Amp, Simel**

- 7. & 8. CATENARY DROPPER SYSTEM:** The catenary connection dropper provides mechanical and electrical binding between the carrier and the contact wire. An insulated version is also available for tunnel crossing. Custom designs are available on request. The examples shown are adjustable (number 7) and fixed-length (number 8).

**HV Surge Arrester – Bowthorpe**

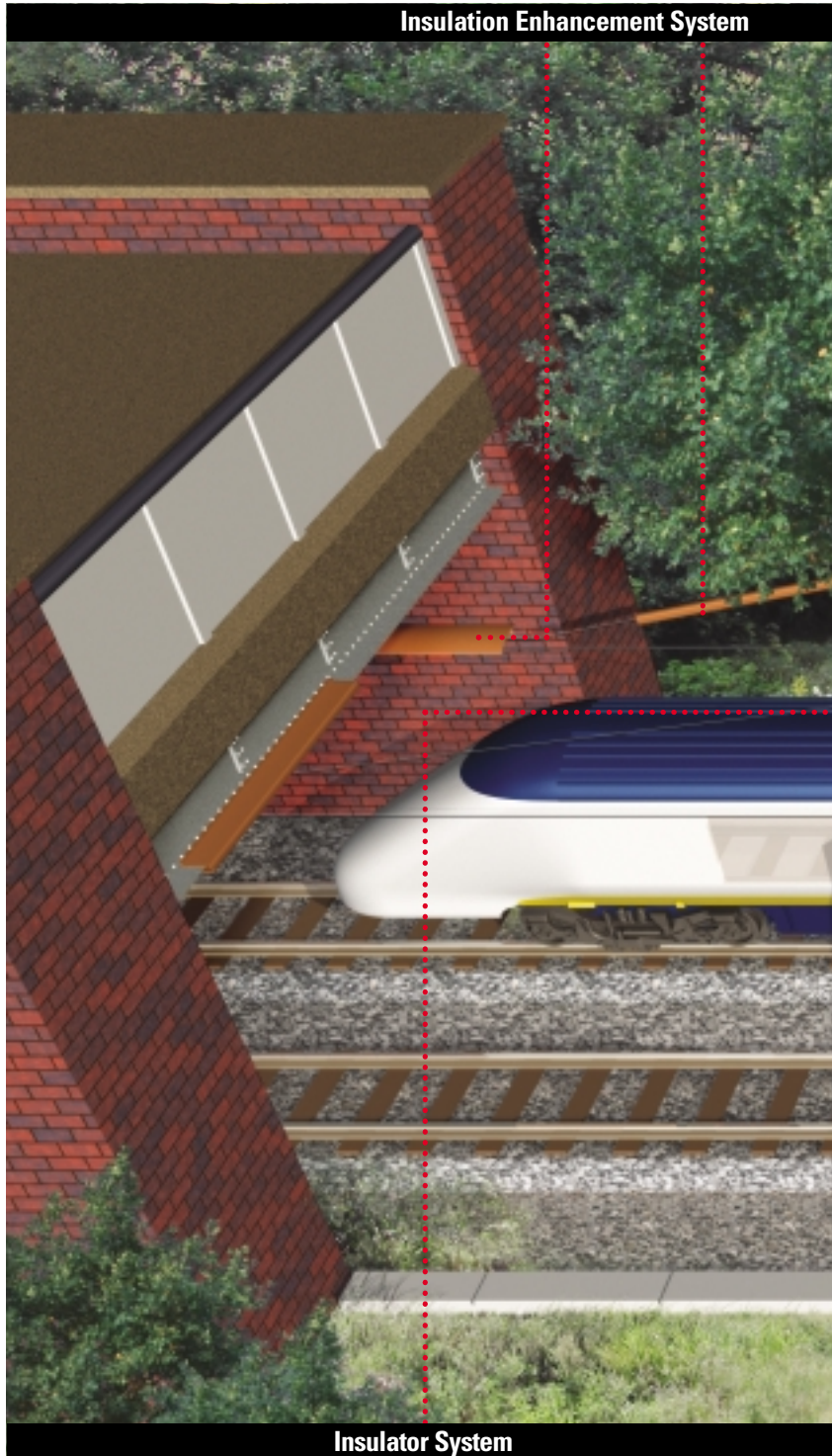
- 9. SURGE ARRESTERS:** DC & AC Traction Surge Arresters are suitable for installing on rolling stock or at the trackside. The HE60MC or HSR-R ranges have a rugged and compact design capable of withstanding mechanical forces experienced in such installations.

**HV Cable Accessories – Raychem**

Under the well-established brand names Guro and Raychem, Tyco Electronics offers a comprehensive range of HV cable accessories for all cable types. The most innovative utilities and industries – including, mining, marine, and offshore – around the world use these power-cable accessories. Designed to withstand environmental extremes and high pollution levels over long operating lifetimes, they help maintain service reliability in both overhead and underground installations. These specially formulated insulation materials resist tracking and degradation caused by erosion, ultraviolet light and other environmental stresses.

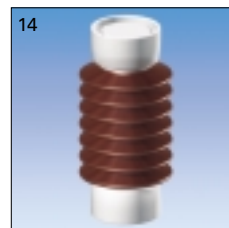
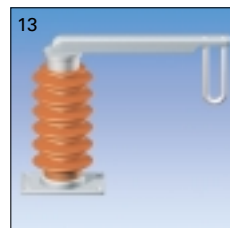
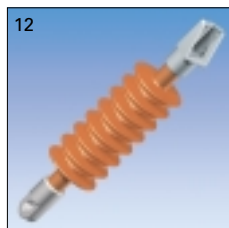
- 10. CABLE JOINTS** Suitable for all common polymeric cables - cross-bonding, shield break and external grounding arrangements are easily accommodated. Link boxes can be easily attached, adopting the network design requirement. Short installation time reduces outages, whilst extensive field experience and rigorous testing have proven the reliability of the technology used.

- 11. 52kV and 72kV TERMINATIONS** Heat-shrink technology offers the reliability of 30 years of field performance with polymeric terminations. For higher voltage classes we offer 145kV to 170kV prefabricated joints and terminations for indoor and outdoor switchgear and transformers.

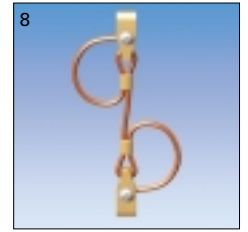
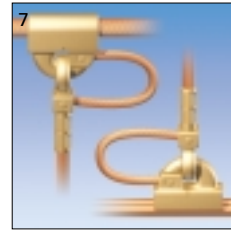
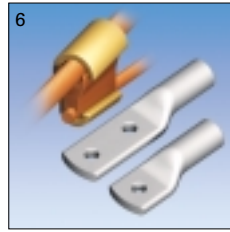
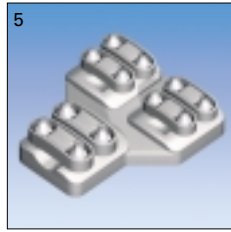
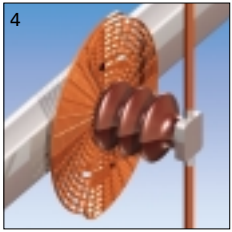


**Insulation Enhancement System**

**Insulator System**

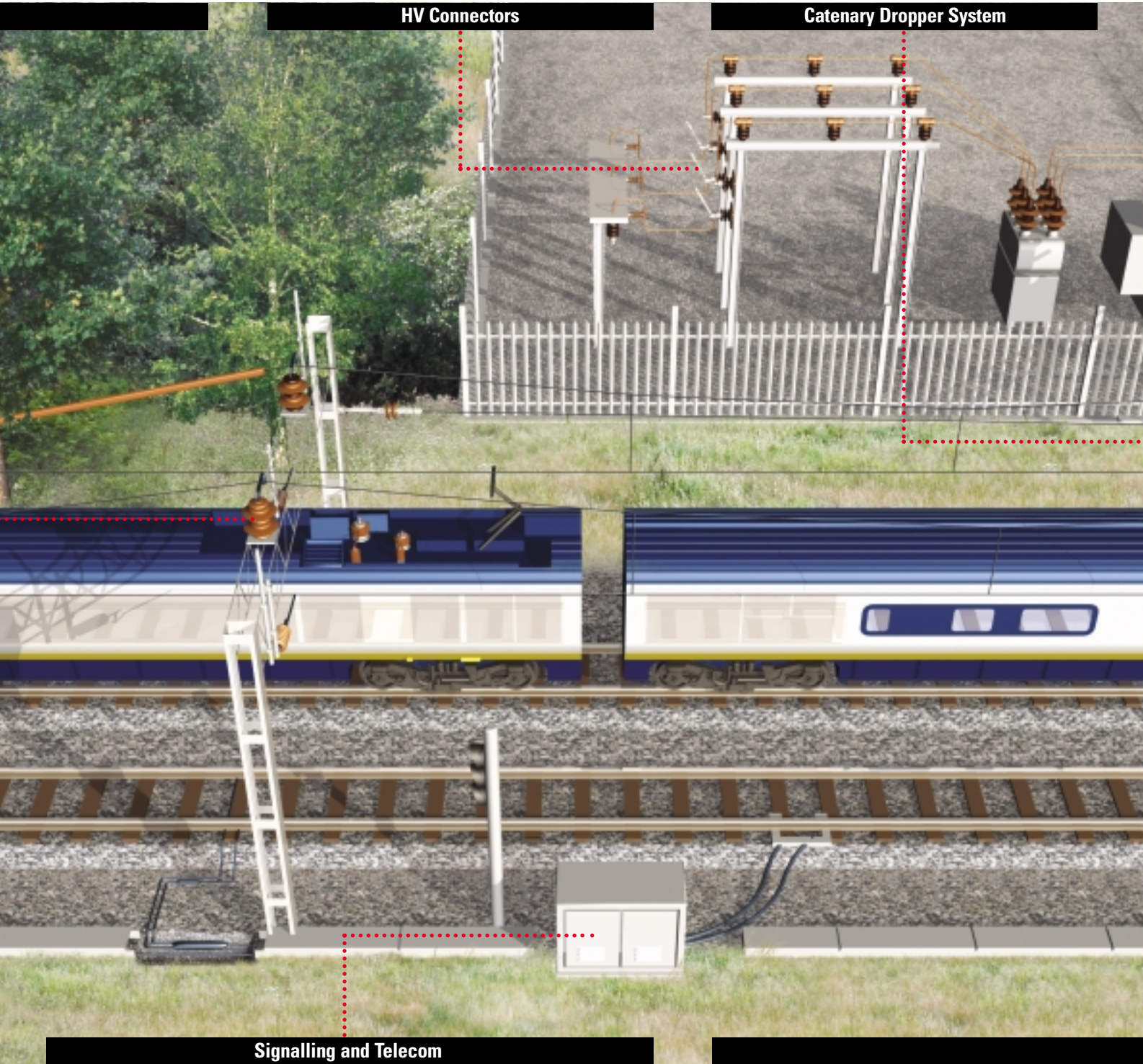




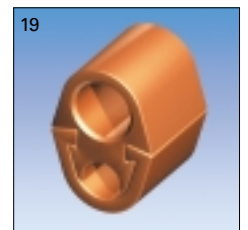
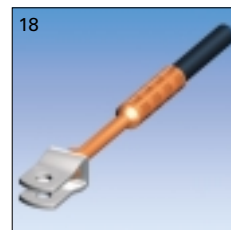
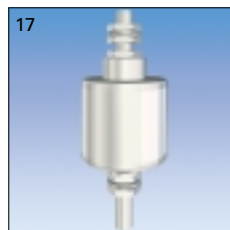
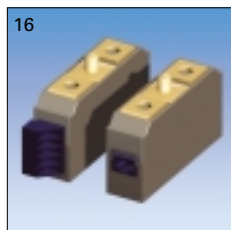
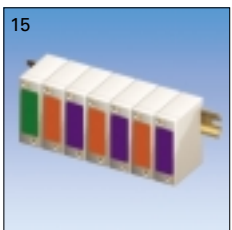


**HV Connectors**

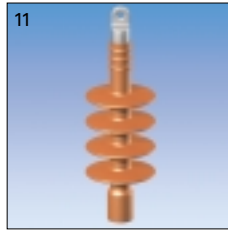
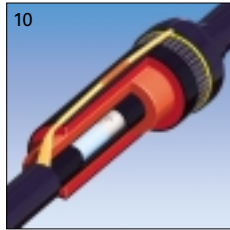
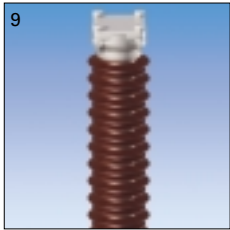
**Catenary Dropper System**



**Signalling and Telecom**





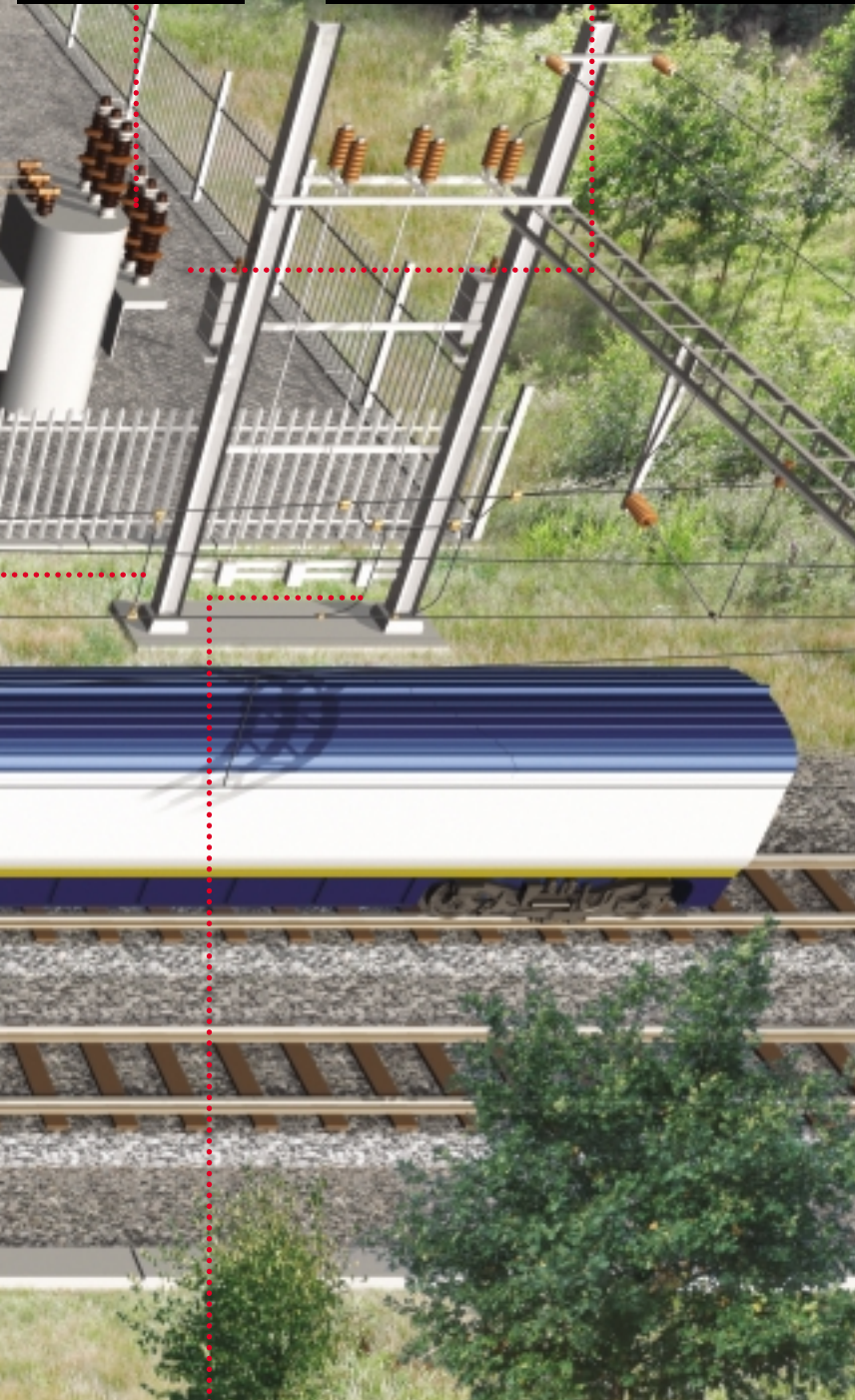


## Solutions for electrified railway systems

**HV Surge Arrester**

**HV Cable Accessories**

**Insulator System – Raychem, Dulmison, Morlynn**



**12. CATENARY INSULATORS:** Strut and tension applications using either porcelain, polymeric or hybrid technologies in catenary applications. Customers can specify required impact strength, handling, pollution resistance, cleaning and mechanical loading. The range of products extends from 750V DC (mainly porcelain) up to 15/25kV AC (porcelain and polymeric) and also 50kV AC (hybrid).

**13. PORTAL INSULATORS:** High-strength Porcelain (C120) and Polymeric (E-glass or acid-resistant E-glass) cores designed for low deflection and single insulator support. A range of core diameters is available, based on long-term loading requirements, with housing, creepage and dry-arc distance as key design criteria.

**14. SUBSTATION INSULATORS:** Porcelain and Hybrid (porcelain core and polymeric housing) insulators for substation applications. Hybrids are generally specified where porcelain insulators have flashover issues or polymeric insulators have too much deflection under load in switching applications. Standard IEC or ANSI classifications are available.

**Signalling and Telecom – Bowthorpe, Dorman Smith**

**15. SURGE PROTECTORS:** RTM Single Phase Surge Protectors are employed on the incoming power supplies or tail cables, providing protection for the 100v and 140v power supplies in the SSI equipment cases and rooms.

**16. SURGE PROTECTORS:** The TLP range of Surge Protectors is employed on Telecommunication Equipment Transmission Lines, to reduce the likelihood of transmission-circuit damage as a result of power surges to STS Line Cards, Transmission Systems, STS Concept 32 Line Interface Cards and Pulse Code Modulation Line Regulators etc.

**17. SPG: (Spark Gap Device)** Designed for use with traction circuits to provide protection against lightning over-voltage on signalling and cable circuits.

**Connection Systems – Amp, Simel**

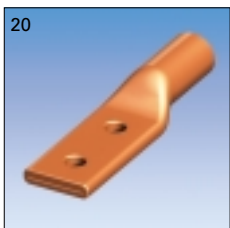
**18. BIMETALLIC CONNECTORS:** A crimp-type anchor sleeve for the protected wire, which provides a waterproof mechanical and electrical connection for the copper-protected carrier wire to the pole.

**19. DOUBLE BARREL CONNECTORS:** A branch-crimped connector for copper, aluminium and bimetallic wires, which provides an electrical connection between the carrier wire and an intermediate cable.

**20. SPADE CONNECTORS: Spade-end crimped lug:** Spade-end crimped lug: A copper, aluminium or bimetallic lug for electrical connection from a copper or aluminium wire to an item of apparatus.

**21. TEE CONNECTORS: Branch tee connector:** Branch tee connector: A copper or aluminium tee connector to make a mechanical and electrical connection between one end of a copper or aluminium conductor to a bare copper or aluminium bar.

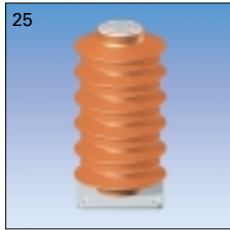
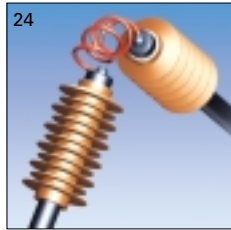
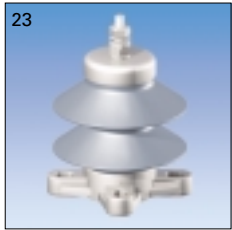
**22. CRIMPING TOOLS:** Tools and tooling to crimp the catenary connectors. A wide range of hydraulic equipment is also available to crimp the connectors and droppers to the catenary.



Note: the above list of catenary connectors is not exhaustive. Alternative and complementary connector designs can be proposed on request.

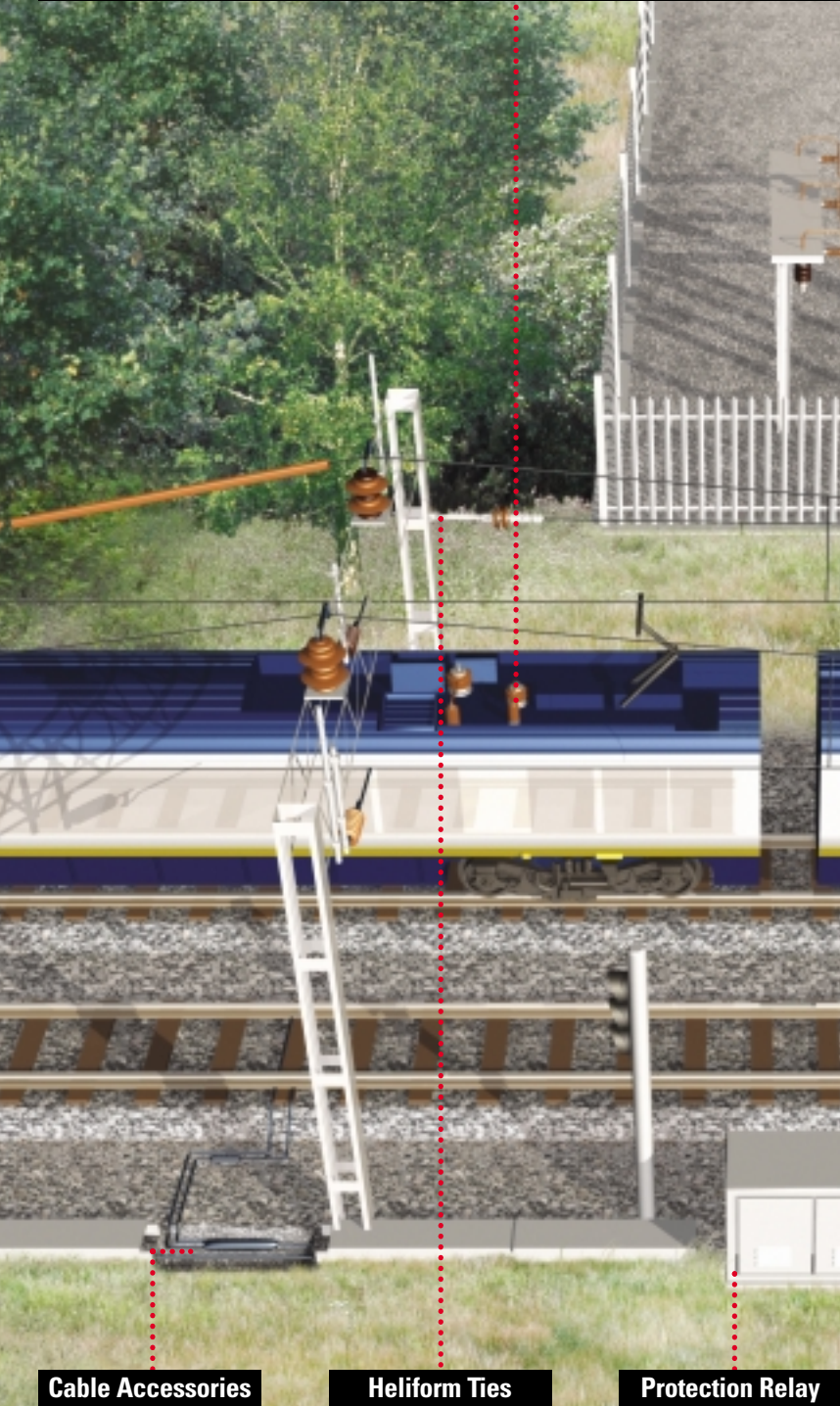
**Connection Systems**





## Solutions for electrified railway systems

### Rolling Stock



### Rolling Stock – Raychem

**23. SURGE ARRESTERS:** DC & AC Traction Surge Arresters suitable for installation on rolling stock or at trackside. The HE60MC or HSR-R ranges have a rugged and compact design capable of withstanding the mechanical forces experienced in such installations.

**24. CABLE ASSEMBLIES FOR ROOFLINES AND DOWNLEADS:** Custom-designed cable assemblies employ compact, self-supporting polymeric terminations, bushings or screened T-connectors for rolling-stock power-distribution applications. Fully tested for over-voltage and partial discharge, flexible, insulated inter-car jumper leads are also available.

**25. POLYMERIC PANTOGRAPH OR BUSBAR INSULATORS:** Low-weight, low-maintenance polymeric insulators for customised applications. The tough polymeric housing and robust construction offer improved pollution performance and high reliability.

### LV Cable Accessories – Raychem, Guro

**26. LV CABLE ACCESSORIES:** The Guro and Raychem brands offer cable accessories for all cable types. Using specially formulated insulation materials, they help maintain service reliability in both overhead and underground installations and resist tracking and degradation caused by erosion, ultraviolet light etc. Low-voltage joints are available in polymeric, gel and resin technologies. Low-voltage terminations are available in heat-shrink, sealing systems available in cold-applied technology for ducts and heat-shrink for feed-through systems. Other components available are breakouts, sealing caps, heat-shrink repair tape, heat-shrink wraparound, heat-shrink tubing and cold-applied insulating sleeves.

### Heliform Ties – Dulmison

**27. DEAD ENDS AND SPLICES:** Heliform and wedge-connection systems used in overhead power networks worldwide, designed to fit the specific conductor size and material specification. The range of products available includes: Ampact Tap Connectors, Heliform Dead Ends, Heliform Line Guards, Heliform Repair Sleeves.

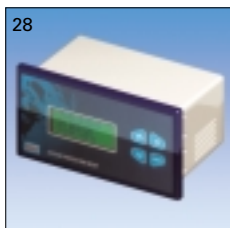
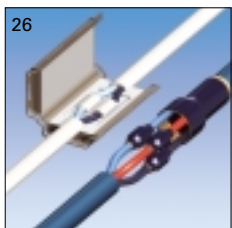
### System Protection – Crompton

**28. SYSTEM PROTECTION RELAY:** An electronic protective device to monitor trackside signalling power feeders, with higher sensitivity and quicker response time than traditional fuses. Allows smaller cable diameters to be used over longer distances with substantial cost savings. Measures, displays and communicates the supply levels, and is fully programmable with up to 12 trip functions, and measures events which can be time- and date- stamped.

### Cable Accessories

### Heliform Ties

### Protection Relay



**Tyco Electronics Energy Products is a worldwide leader with innovative solutions from the power plant to the end user.**



**Cable accessories**

- Low-voltage accessories
- Medium-voltage joints
- Medium-voltage terminations
- Medium-voltage switchgear connection systems
- High-voltage accessories
- Qualified nuclear products



**Connectors and fittings**

- Interconnection products for control wiring
- Solderless terminals and splices
- Terminal blocks
- Bolted connectors and clamps
- Insulation piercing connectors
- Copper compression connectors and lugs
- Bimetallic connectors and lugs
- Mechanical connectors and lugs
- Wedge-pressure technology connectors
- Heliform, cast and compression fittings
- Transmission-line spacers and dampers
- Application tooling



**Insulators and insulation**

- Insulators
- Insulation enhancement



**Surge arresters**

- Low-voltage surge arresters
- Medium-voltage surge arresters
- High-voltage surge arresters



**Switching, protection and lighting**

- MCBs and MDRCs
- Distribution boards
- Fused switches from 32 to 800 A
- MCCBs from 16 to 3200 A
- Panel boards
- Switchboards to 6300 A
- Packaged substations
- Identification solutions for control wire used in panels and switchgear
- Photocontrols
- Street lighting boxes



**Power measurement and control**

- Digital metering systems
- Kilowatt-hour energy meters
- Transducers
- Protector trip relays
- Meter relays
- Digital indicators
- Analogue instruments
- Current transformers
- Shunts
- Generator set controllers

**tyco**

*Electronics*

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<http://energy.tycoelectronics.com>

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**Energy Division – economical solutions for the electrical power industry: cable accessories, connectors & fittings, electrical equipment, instruments, lighting controls, insulators & insulation enhancement and surge arresters.**

*a vital part of your world*