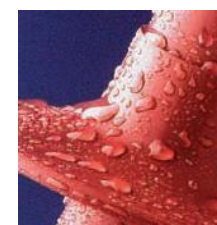




Power cable accessories

up to 35 kV

catalog 2025



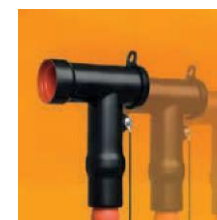
INTRODUCTION
TE Connectivity
Cable accessories - production,
technology, standards

2



Section I
Terminations - low and medium voltages

33



Section II
MV Switchgear connection system

55



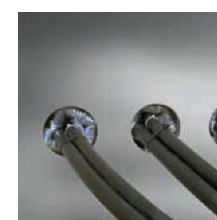
Section III
Low voltage joints

71



Section IV
Medium voltage joints

93



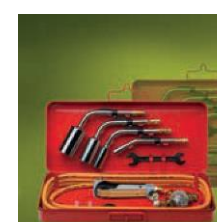
Section V
Sealing and fixing systems

113



Section VI
Insulation tubing, tapes and wraparounds

123



Section VII
Tools and accessories for installation

137

GRID CONNECTIVITY + RELIABILITY

You're faced with daily challenges, like unforgiving environments, installation accuracy, constantly evolving technology, and animal-induced outages. We're ready to help. With over 60 years of electrical engineering experience and a global workforce dedicated to the Energy industry on a local level, we know how to make every connection count across the energy landscape.

+ EQUALS MORE

We're with you every step of the way to keep the backbone of your grid connected, from generation to transmission to distribution to wherever energy is needed.

Comprehensive solutions and services from a single partner:

- Cable Accessories
- Connectors & Fittings
- Insulation & Protection
- Metering
- Installation Training



INNOVATION + COLLABORATION



WE ARE THE BRANDS YOU RELY ON

Our experience is built on the foundation of industry-leading quality brands, so if you know Raychem, you know TE Connectivity. We are the inventors of heat shrink technology, and we have nearly three decades of proven performance in cold-applied technologies.▼

Joined TE Connectivity

1994	KRIES	2024
1878	CROMPTON INSTRUMENTS	2002
1917	UTILUX	2001
1937	BOWTHORPE EMP	2001
1941	AMP	1999
1946	SIMEL	1999
1957	RAYCHEM	1999



EXTREMES + RELIABILITY

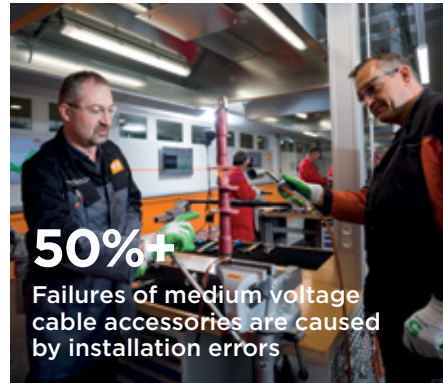
Frigid winters. Intense sun. Salinity. Conditions might get tough, but the power needs to stay on. That's why we are relentlessly dedicated to materials science and testing in our labs to deliver built-in reliability. You can trust our products to perform even in harsh environments, and to help protect your assets for their service lifetime.

MATERIAL INNOVATION

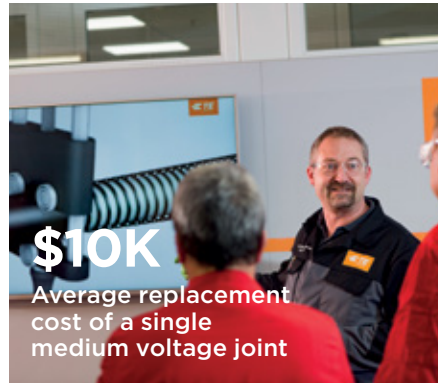


INSTALLING EXCELLENCE IN ENERGY NETWORKS

The right products alone don't ensure grid reliability. Correct installation is a key factor that determines long-term product performance and grid reliability. Network outages are a costly disruption and they can be prevented with proper training.



50%+
Failures of medium voltage cable accessories are caused by installation errors



\$10K
Average replacement cost of a single medium voltage joint



2500
Installers trained globally every year by TE

GLOBAL TRAINING EXPERTISE

Our training programs help installers realize the full potential of our reliable technology and serve as a valuable asset to your team – and to your network. We provide comprehensive product training from low, medium and high voltage cable accessories, to wildlife and asset protection products. We also offer customized programs for different applications: Underground, Overhead, Substation, Renewable Energy, Nuclear Power, Mining, Rail, Shipbuilding & Offshore.

Give your installers access to decades of expertise with customized programs that combine high-quality course content with practical, in-field applications.

AT OUR TRAINING CENTERS

- Modern locations around the world (USA, Germany, France, Russia, China)
- Training and assessment of your trainers
- Instruction from our Field Service Technicians, Product Managers and Electrical Engineering Experts

AT YOUR JOB SITE OR FACILITY

- Real-time failure investigation in the field
- Cost-effective refresher courses
- Training and assessment in familiar environments

AT OUR DISTRIBUTOR LOCATIONS

- Customized training events at distributor locations
- Dedicated training capabilities through selected partners

TRAINING COVERS A WIDE RANGE OF PRACTICAL TOPICS:

- Cable Construction
- Cable Preparation & Tips
- Modern Tools & Techniques
- Important Installation Considerations

TO SCHEDULE AN INFORMATION SESSION OR LEARN MORE:

Visit [TE.com/trainingcenter](https://te.com/trainingcenter) or contact your local sales team or distribution partner.

GLOBAL TESTING FROM ACCREDITED LABORATORIES

RIGOROUS TESTING AND RUGGED PRODUCTS ARE OUR STANDARD

Our ISO-17025 accredited engineering laboratories perform critical electrical, mechanical, and environmental tests in accordance with international quality testing standards as listed below. We place a special focus on customer-related testing and as your testing partner, we can perform accredited testing in 20+ competencies for a broad range of products up to 245 kV, such as connectors, insulators, wildlife and asset protection and cable accessories.



TESTING STANDARDS
IEEE, ANSI, ASTM, CENELEC, NEMA, DIN, EN, IEC, NF, EATS



150+
Engineers dedicated to new product development

OUR TESTING INCLUDES:

- High Voltage Testing
- Short Circuit Testing
- Temperature Rise Testing
- Material Testing
- Artificial Pollution Testing
- Robustness Testing



40+
Experts working in our engineering laboratories around the world

FOR MORE INFORMATION VISIT [TE.COM/ENERGY](https://te.com/energy)

DIFFERENT TECHNOLOGIES - BEST SOLUTIONS

Cable accessories technologies

Over 60 years TE Connectivity offers a comprehensive range of Raychem cable accessories up to 220 kV. Tailored for the applications we offer different technologies such as:

- heat-shrink
- elastomeric
- resins
- gels.

Technologies variety enables us to offer customer best solution in class, to meet all specific operation requirements and conditions. Please refer pages 8-13 to get more information about cable accessories technologies.

QUALITY STANDARDS, ENVIRONMENT, HEALTH AND SAFETY

ISO 9001, ISO 14001

The quality standards of all materials throughout the entire manufacturing process beginning with the raw materials and continuing through to the packaged product are continuously monitored and documented. Materials as well as complete accessories are regularly re-qualified. As a result of our well established Quality Management System including quality assurance, TE Connectivity Energy Division continuously achieves re-certification according to ISO 9001 and also to ISO 14001.

Environmental regulations "RoHS", "REACH"

TE is committed to compliance with all applicable environmental, health and safety laws also to the protection of our employees and the environment. These efforts have been driven by directives as the "Restriction of Hazardous Substances" (RoHS) and "Registration, Evaluation and Authorization of Chemicals" (REACH), which requires the substantial elimination of lead, cadmium, hexavalent chromium, brominated flame retardants and mercury from the products. We have been one of the first companies which implement the RoHS and the REACH directives into the manufacturing process.

Waste management

The usage of only ecologically sound and recyclable components, the continuously reduction of packaging materials and saving energy are other initiatives to support the effort of environmental protection.



UNIVERSAL SOLUTIONS FOR FOR DIFFERENT CABLES CONSRUCTIONS

Universal cable accesories for cables of various designs

Power cables operated over the world and produced in accordance with international IEC, CENELEC, IEEE as well as local specification BS, VDE, GOST etc. may differ each other by voltage level, insulation, metal shield and armour construction. Beeing a global company, TE Connectivity is committed to ensuring that Raychem cable accessories are universal, cover a wide range of cable designs, meet international standards and are easy to install. Our system of solderless earthing kits ptovide easy adaptation accessories to cables, including cables with non-standard construction and various type of metal shied or armour.



Standard cable designs

The cable accessories in this catalog are designed especially for cables manufactured in accordance with European standards (IEC, CENELEC, VDE, etc). In case if cable design differs significantly from the standard one or brand new, our more than 60 years experience allows us to modify existing products and develop new ones. Raychem cable accesories designs, used materials and technologies provide wide range possible application.

POWER CABLES BASIC FEATURES AND DESIGN ELEMENTS

Voltage	1 kV / 6 kV / 10 kV / 20 kV / 27 kV/ 35 kV / 45 kV (voltage class of electrified railways)
	aluminum / copper
Core	solid (class 1) / stranded (class 2) / flexible (class 5)
	round / sector
Section, mm²	1,5 / 2,5 / 4 / 6 / 10 / 16 / 25 / 35 50 / 70 / 95 120 / 150 / 240 300 / 400 / 500 / 625 / 800 / 1000 1200
Number of cores	1 / 3 / 3ph+1e / 3ph+2e / 3ph+3e / 4 / 5
Insulation	XLPE / EPR / MI(MIND) / PVC / rubber
Semiconductive layer	conductive paper (belted or individual core) / extruded / easy strip
Metal screen	copper wire / copper tape / aluminum wire / laminated foil
Armor	steel tape / steel wire / aluminum wire
Outer shell	Jute / PVC / PE / rubber / FR, LSF polymeric compounds and low smoke emission



HEAT-SHRINK TECHNOLOGY

General



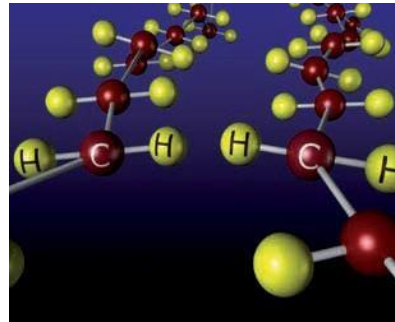
Heat-shrinkable products are supplied in the expanded form to a customer in a kit together with all other components needed for successful installation of the cable accessory. During an installation the tubing shrinks down to a cable construction underneath and builds up a high pressure resulting in very good sealing and excellent electrical behavior.



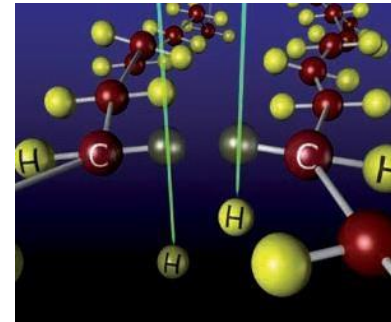
Properties of Raychem products

The Raychem heat-shrink technology is based on specially formulated thermoplastic polymer materials. The compounds for these materials are designed, selected and mixed in TE own compounding factories. Sophisticated process controls during extrusion, cross-linking and expansion ensure uniform wall-thickness before and after installation. TE cross-linked materials show mechanical and chemical resistance as well as exceptional electrical and weathering performance. Other advantages of our heat-shrinkable products are the excellent ageing characteristics and the unlimited shelf life.

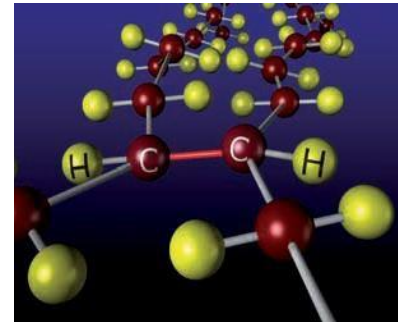
Cross-linking process



Thermoplastic polymer materials are composed of extremely long, very thin molecules in a random arrangement. The strength of such a material depends upon the distance between its molecules and the crystalline nature of its molecular structure. As the material is heated, these crystals disappear. The molecules can then slip past each other easily and the material flows. While in this heated condition the material may be formed into almost any desired shape. Then, when the material is subsequently allowed to cool, the crystals reform and again provide substantial strength to retain the polymeric in the shape in which it has been formed.



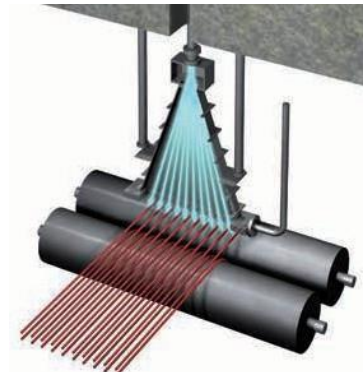
With the introduction of atomic energy, the important discovery was made that the exposure of some polymeric materials to high-energy electron beams can cause the permanent cross-linking, or intermolecular joining, of adjacent molecules. This cross-linking results in the chemical bonding of the polymeric structure into a new three-dimensional system.



Once the material has been cross-linked, it will not melt or flow at any temperature. When the material is heated, the crystals still disappear as before, but it will no longer flow or change shape because the cross-links act as ties between the molecules. The cross-linked structure, however, is elastic. Thus, when it is heated to a temperature where the crystals have melted, the material behaves like rubber.

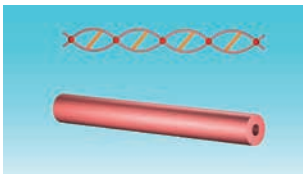
HEATSHRINK TECHNOLOGY

Cross-linking with electron-beam

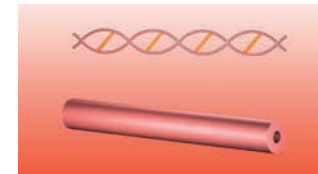


Cross-linking by electron-beam was pioneered by Raychem and is still the most commonly employed method. Other methods are cross-linking with a radioactive source like Cobalt or with chemicals. Not being properly controlled they could cause harm for people, environment and material based on the aggressive ingredients which are responsible for the cross-linking process. The materials used for heat-shrinkable products manufacturing include various compounds and additives, the amount of which is strictly calculated. This gives the polymer such properties as shape memory, as well as very precise tolerances for size, wall thickness and longitudinal shrinkage. Correctly formulated polymer determines the quality of the heat-shrinkable material, withstand weathering and aging processes, short shrinkage time and contraction force. The tubes in beaming machine receive high-energy electrons dose. Polymeric materials exposed to a high-energy electron beam that causes permanent cross-linking, or intermolecular joining, of adjacent molecules. To ensure uniform crosslinking, the tube is repeatedly irradiated from all sides in the beaming machine.

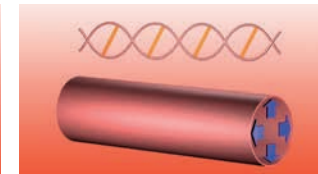
Expansion process



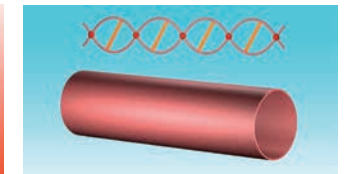
Beaming the tubing causes permanent cross-linking of adjacent molecules. The graphic is an enlarged schematic view of a very small cross-linked section of extremely long molecules and an end view of a piece of heat-shrinkable tubing.



Once the tubing has been cross-linked, the next step in imparting shape memory is to heat the compound above its crystalline melting point. The molecules are then tied together only by the cross-links.



While hot, the tubing is deformed by applying pressure, thus stretching the cross-linked molecule. Long-term experience in process know-how is required to avoid eccentricity and longitudinal shrinkage of the tubing.

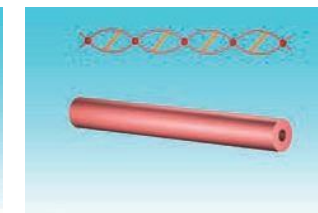


While in this deformed position, the tubing is cooled; the crystals then reappear, thereby locking the structure together in this deformed condition indefinitely. This is the form in which tubing is supplied to customers and can be stored without shelf life limitations.

Shrinking process

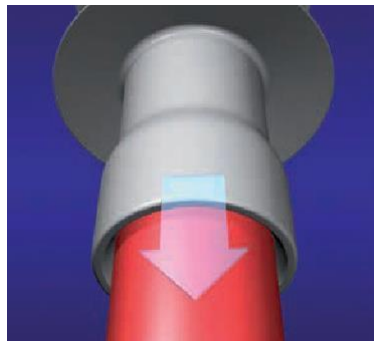


During installation the tubing is heated, melting the crystals. The cross-links allow the material to return to its original shape.



After cooling, the crystals reform and the tubing is locked in its recovered form.

PUSH-ON TECHNOLOGY



General

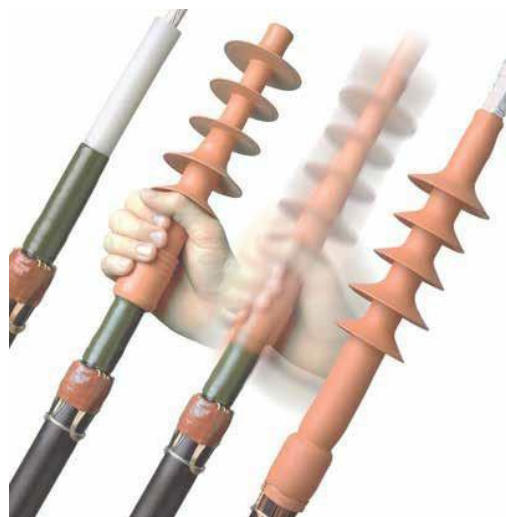


Products of this technology are stored and supplied unexpanded. These products are pushed on a prepared cable during their installation. Sometimes special tools might be required for this action. Being pushed and installed materials stay expanded. Different silicones and more rigid EPDM are employed for push-on technology. The more flexible material is used, the installation becomes easier and the application range becomes wider. Materials used for this technology are susceptible for mechanical damage. The art combining high flexibility with split & tear and weathering performance were utilized in TE

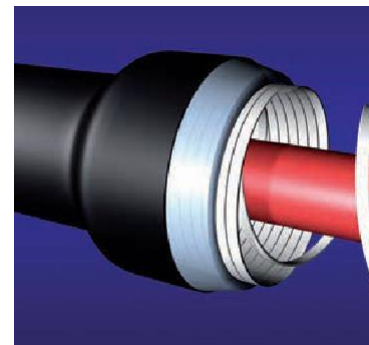
Properties of TE Connectivity push-on products

Energy push-on materials. TE Connectivity produces push-on cable accessories of a cross-linked, highly-flexible silicone body, which ensures easy and tool-free installation. TE Connectivity products are designed to ensure no slippage from the cable during the all operation conditions. The accessories have exceptional electrical and weathering performance and they are resistant to UV-light, contamination, track and erosion.

Our push-on cable accessories do not required any special tools for their installation, which should be performed at ambient temperature above 0 °C. The accessory body is pushed onto the prepared cable up to the correct position and builds up a high pressure for a reliable sealing, stable positioning and of course excellent electrical behavior after the installation.



PRE-EXPANDED TECHNOLOGY



General



All materials exhibit tension set (less shrinkage behavior) over time, which limits the application range and the storage time. To ensure sufficient pressure for electrical and mechanical sealing purposes, the tension set must be considered when the application range is defined.

TE Connectivity pre-expanded joints properties

The cross-linked, high flexible silicone body is expanded on a robust holdout, which prevents the products from premature deform and collapse. Long-term performance of this type of cable accessory depends on its correct positioning, which is easily controllable and adjustable during the installation within TE products.

Our accessories are designed to be used with mechanical connectors and lugs and are adapted for all commonly employed cable screens. The accessories have exceptional electrical and weathering performance and they are resistant to UV-light, contamination, track and erosion. Raychem pre-expanded cable accessories have a shelf life of 24 months after manufacturing.



RESIN TECHNOLOGY

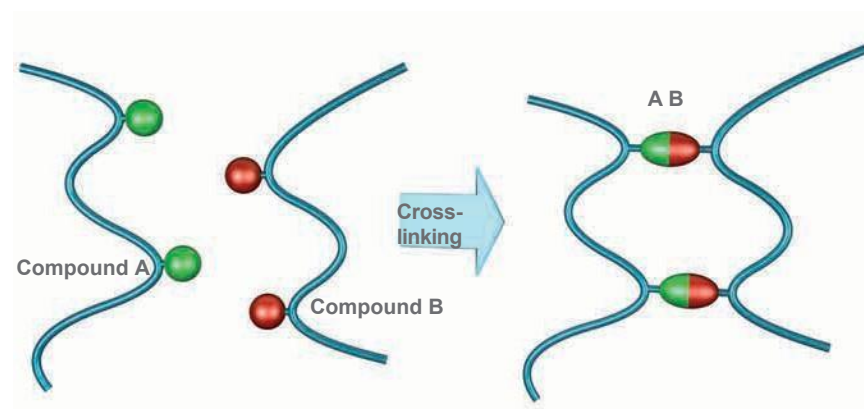


General

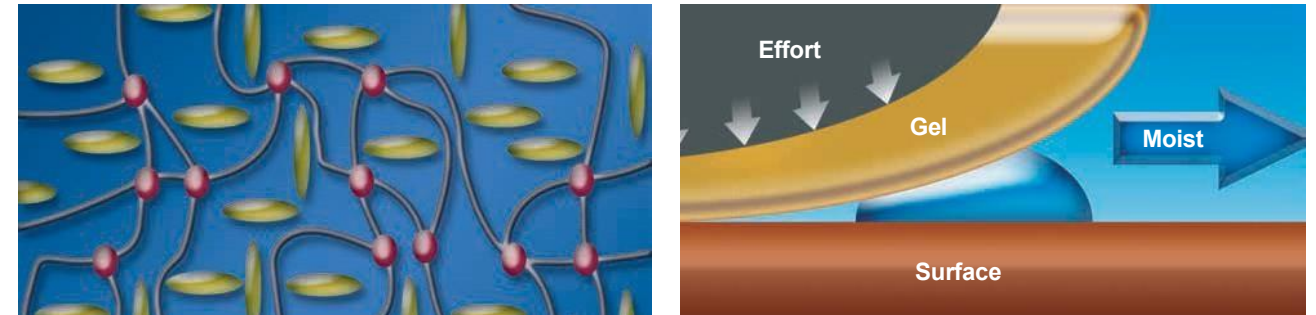
Filling materials consist of two resin components supplied separately from each other e.g. in bags or cans. During an installation the components are mixed together and poured into joint's housing for curing. Polyurethane or epoxy materials, emerge by cross-linking of a resin with a reactive isocyanate or polyamine hardener, were very often used in the past. The exothermal hardening process produces heat and the materials could be dangerous and hazardous for the health and the environment due to included isocyanates or bisphenols. After cross-linking most mixtures become a solid polymeric material.

Properties of TE Energy GUROFLEX material

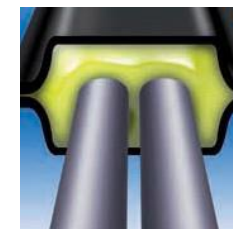
To reduce a health risk and allow installations at low temperatures TE Energy has developed the GUROFLEX casting material consisting of 2 isocyanate-free resin components. Upon mixing the two components are cross-linked with each other by a non-exothermal process. Cross-linked GUROFLEX resin adheres to nearly all cable materials and stays elastic. The material exhibits excellent insulation properties and also accommodates thermal expansions of insulated cables. GUROFLEX resin covers and adheres to metal components, protects them from corrosion and is re-enterable after the installation. The installation of GUROFLEX resin is possible at the temperatures as low as -10 °C and in service it is resistant to the temperatures below -20 °C. GUROFLEX resin is easy to handle because it is not subject to any safety classification during use, transportation or disposal. The material is environmentally friendly, non-toxic and non-hazardous but has, like all other resin materials, a shelf life of 24 months after manufacturing.



GEL TECHNOLOGY



General



Gel technology is used in low voltage applications. The housing of supplied accessory is filled with the gel already from a factory. The cable connection area is positioned in the middle of the opened joint housing and slightly pressed into the gel together with appropriate connectors. The installation is completed by closing of the housing. The installed accessory can be put immediately into the service.

Raychem PowerGel is especially developed for electrical applications from -40 °C to +90 °C continuous temperature. PowerGel consists of silicone oil embedded in a cross-linked silicone matrix, which combines the advantages of solid (elastic memory) and liquid (wetting and conforming to a surface) sealing materials.

Properties of Raychem PowerGel



Excellent insulation properties, thermal and UV stability also halogen-freeness are features of Raychem PowerGel just like the unlimited shelf life, the excellent dielectric properties and the extremely high elongation and elasticity. Raychem accessories using PowerGel are suitable for polymeric cables in indoor or outdoor applications with possibility of underground, direct buried or immersion in water. PowerGel applicable for polymeric cables with small cross section, indoor, outdoor and underground installation. Material is environmentally friendly. If the cable accessories needs to be opened for disassembly, the joint body could be easily released from the gel.

Raychem PowerGel displaces possible moisture, wets and prevents the metal surface from corrosion by applying a thin layer of silicone oil on it. Joint housing made by UV-resistant, halogen-free material provide excellent mechanical protection, additional insulation and necessary force to squeeze gel. Gel filled cable accessories can be put into operation immediately after installation, applicable temperature range -40° - +90°C.



TESTING

Purpose of the tests

To evaluate ability of cable accessories for reliable operation at least 30-40 years. TE Connectivity cable accessories are developed and tested in accordance with international standards such as IEC, CENELEC and IEEE. And they also comply to existing national standards (e.g. GOST). Test reports on our cable accessories and materials.

Valid IEC / CENELEC standards

The currently relevant international standards tested to are:

HD623.S2:2006	Specification for joints, stop ends and outdoor terminations for distribution cables of rated voltage 0,6/1,0 kV
IEC 60502-4:2005 HD629.1.S2:2006	Test requirements on accessories for use on power cables of rated voltages from 3,6/6 (7,2) kV up to 20,8/36 (42) kV. Part 1: Cables with extruded insulation.
HD629.2.S2:2006	Test requirements on accessories for use on power cables of rated voltages from 3,6/6 (7,2) kV up to 20,8/36 (42) kV. Part 2: Cables with impregnated paper insulation.
EN 61442:2006	Test methods for accessories for power cables with rated voltages from 6 kV ($U_m = 7,2$ kV) up to 36 kV ($U_m = 42$ kV).

Voltage range

To cover all typical voltages in distribution networks, TE Energy tests cable accessories to the highest sets of rated voltages: 3,8/6,6 (7,2) kV; 6,35/11 (12) kV; 8,7/15 (17,5) kV; 12,7/22 (24) kV; 19/33 (36) kV; 20,8/38,5 (42) kV and higher voltages.

Test Center

In Energy Division Headquarter Ottobrunn, Germany, one of our largest laboratories, we test joints, terminations, and switchgear connectors from 400 V up to 245 kV within the 2400 m² indoor, or 600 m² outdoor testing areas. Our engineers run type tests according to CENELEC – HD 629, IEC 60840, or IEC 62067 (up to 245 kV). This laboratory also performs sustaining tests to check product performance and quality, as well as customer specific tests. In addition, TE engineers test the full range of specifications, including: Impulse level, partial discharge and other electrical parameters, Environmental conditions, exposure to salt and humidity, pressure variations.



TESTING

Partial discharge measurements

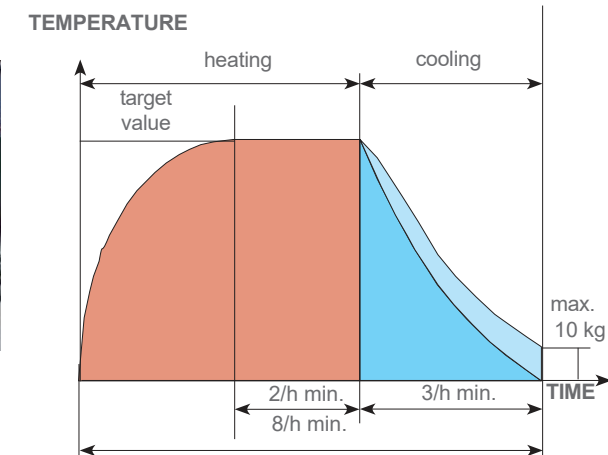


Partial discharge (PD) occurs in air gaps between insulation materials or cable different layers under operation voltage. Cable screen cut can create high level of electrical stress. If electrical stress is out of control, PD will occurs. The level of PD is quite low (pC), but in case of long term impact destroy insulation. So PD measurement is the primary method to evaluate the quality and integrity of cables and cable accessories in terms of operation life. Since measurement equipment has certain limitations and sensitivities, the IEC standard defines 10 pC as the minimum level of PD. In Raychem cables accessories PD level does not exceed 1 pC because they consist of high quality insulation materials and effective stress control system. PD measurements require sensitive equipment that distinguishes PD from background noise. PD should not occur at a voltage level $2xU_o$. In our facilities we routinely perform PD tests during the development and qualification of cable accessories. PD tests are carried out before, during and after thermal cycling testing.

Cyclic testing

The test loop shall consist of cable with accessories. The cable conductor shall be heated and stabilized for at least 2 h at a temperature 90°C, 110°C or 130°C and then cooling down. These tests simulate real operating conditions, but under more harsh rejimes, and therefore accelerate the aging of cable accesories.

In addition cable joints are placing in water pool or special vessel for sealing test at pressure of 200 kPa. Load cycling voltage test ($2xU_r$) consists of 126 cycles of 8 hours each (more than 1000 hours in total).



Impulse tests

The impulse generator simulates lightning surge impulses that can be induced in the network. Typically, 10 impulses each of positive and negative polarity are applied to the samples before and after the load cycling tests. As a result, no breakdowns or arcing should occur. However, some test conditions involve preheating the conductors above specified values.

DC voltage tests

DC tests are not applicable to polymeric insulated cables, but are very useful for paper insulated cables. DC voltage tests conducted under operating conditions can even damage polymeric insulated cables. Six times the rated voltage is applied to the cable for 15 minutes. There must be no electrical breakdown during this process or arc overlap.

AC voltage tests

AC voltage tests are standard tests for cables. They are also performed before and after accelerated aging tests. A voltage of $4.5xU_o$ is applied to the cable. The type of failure and voltage level can provide useful information for statistical reports of aged materials failing.

Salt fog and humidity tests

Cable accessories must perform withstand to certain concentration of salt fog during 1000 hours tests. Similar tests applicable for indoor terminations in high humidity condition. In this case, samples are irrigated with conductive solution within 300 hours. These two type tests indicate resistance of the samples to moisture ingress, rain, dust, conductive contaminants and salt water.

SOLDERLESS EARTHING TECHNOLOGY

General



Type of neutral grounding and requirements for the grounding assembly



Solderless earthing advantages based on scrupulously developed and tested technology of earthing bundle and used materials quality. That's why solderless earthing system developed by Raychem has been successfully used in cable networks worldwide for decades, and applicable both for cables produced in accordance with international standards IEC, CENELEC, BS, GOST (etc.) and for cables of new, non-standard cables (e.g. cables with aluminum alloy shields).

Type of neutral grounding is an important factor that must be taken into account when cable line designed. Different types of insulated or grounded neutral can be used in medium voltage cable networks.

Raychem solderless earthing systems for decades have been successfully used in cable networks with insulated neutral, where currents in normal operation mode and the short circuit currents are essentially higher than in systems with earthed neutral.

Cable sheath and armour solderless earthing system provided by TE Connectivity comply following requirements:

- a) continuous operation currents withstand
- b) short-circuit current withstand
- c) avoid heating due to eddy currents (important for single-core cables)

All materials and components used in earthing kits, including roll springs, contact plates and earthing braids, comply to international DIN and ISO standards, and ensure constant pressure, low transient resistance, corrosion resistance and mechanical strength.

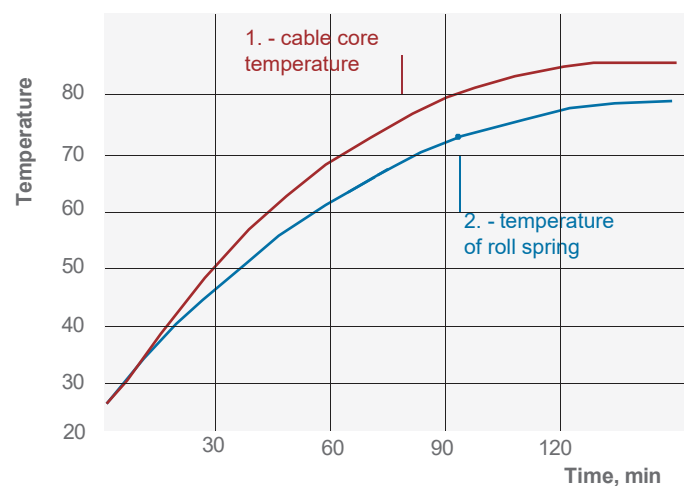


Diagram performs single core cable solderless earthing bundle heating graph in case of continuous operating current. The heating of the earthing in the area where installed roll spring (2) is less than the heating of the cable core (1).

MECHANICAL CONNECTOR TECHNOLOGY

General



Being integrated part of cable accessories supplied mechanical connectors and lugs must comply to following requirements throughout their entire service life:

- a) sustainable transient electrical resistance;
- b) temperature in connection point must be less or equal to the conductor temperature;
- c) the short-circuit currents should not have negative affect to features specified in a) and b);
- d) longitudinal static withstand must be suitable for application.

Testing according to IEC 61238-1



Our mechanical lugs and connectors are tested in accordance with IEC 61238-1, Class A:

-load cycling tests: 1000 cycles performed: applying to loop with installed connectors operating current increasing reference conductor temperature 120°C - 140°C and remain in this mode for 10 minutes and then cool down temperature to below 35°C.

- Short-circuit current test: After 200 heating cycles, the test loops are subjected to short circuit currents, 6 times, to raise the conductor temperature 250°C - 270°C within 1 second from ambient temperature (< 35°C).

-Transient resistance measurement: the initial resistance of the connection is comparing with the same length conductor resistance: before and after 200 heating cycles and short-circuit current tests, and then every 75 heating cycles.

The resistance should not change more than 100% after full test cycle (especially after short-circuit current tests) and should not increase more than 15% during the last 750 cycles. The variation of measured resistance values of different samples (usually 6 pcs.) must not exceed a certain range.

- Mechanical tests: the contact connections are tested within 1 minute for longitudinal load, 40N/mm² for aluminum conductors and 60N/mm² for copper conductors, but not more than 21 kN. During these tests, conductor should not slip out of connector.

IEC 61238 Class A testing ensures comparable results for all samples tested. Comprehensive factory testing of raw materials and finished products, combined with production process control, provides consistent quality for the millions of connectors and lugs we produce.

Properties of TE Connectivity mechanical lugs and connectors



The design of our connectors and lugs, selection of raw materials and the manufacturing process, whether tinning or hot forging, are specified to the conditions and requirements of use. The bolts are coated with grease to ensure a stable head breakout torque. Contact grease is also applied inside the connectors and lugs. Medium and low voltage connectors and lugs have a large application range. At high voltage, the design is based on one specific cross-section only, but take into account the thickness of the cable insulation.

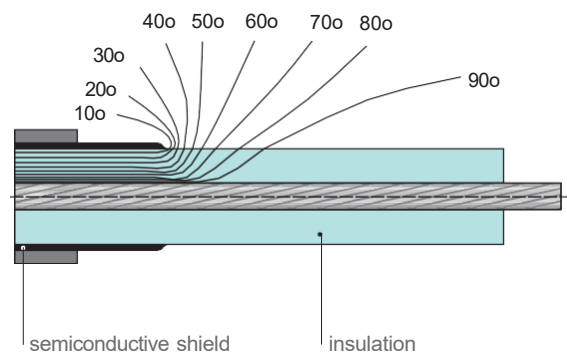
The lugs and connectors are mounted in the center of the core. For this purpose, special plates are used at medium voltage, and at high voltage, lugs and connectors are made with a hole in the center.

Connectors and lugs can be used on copper and aluminum conductors with different construction (round, sector shape, multi-wire, solid) with cross-sections up to 2000 mm². All Raychem cable accessories kits for XLPE and paper insulated cables are supplying with such kind of mechanical lugs and connectors.



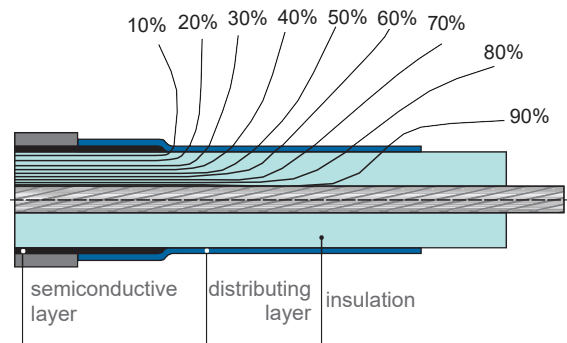
ELECTRICAL STRESS CONTROL

Uncontrolled electrical field in screen cut



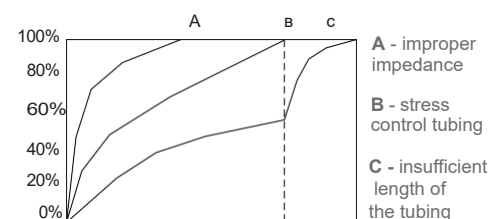
The outer conductive layer of the cable is removed at the cable's end and forms a sharp edge resulting in a high electrical stress indicated by the narrow equipotential lines. If this area is not treated with an effective stress control system then it will lead to electrical discharges with material ageing. Also voids inside or in between insulating materials can cause such discharges. These "partial" discharges cause a failure of the dielectric well before its intended service life has been reached. In addition, the stress at the screen end is high enough that even the smallest notch can cause a breakdown.

Electrical field with a stress control system (tubing or coating)

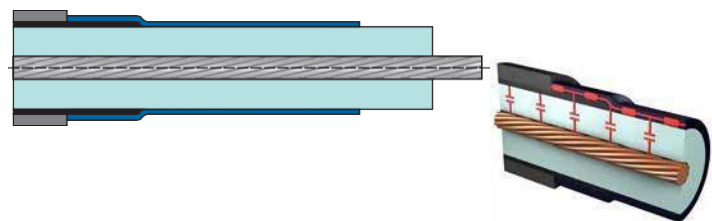


Raychem medium voltage cable accessories include stress control coatings or tubing with a carefully controlled volume resistivity and permittivity to smooth out the high stress. The electrical field strength at the end of the screen cut is reduced to a level well below the upper limit for long term operation. This slim stress control system can be used on a variety of cable types, including paper cables, and accommodates variations of cable dimensions.

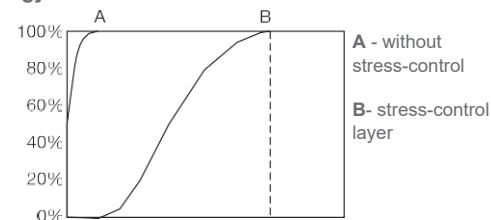
Technology of semi-conductive stress control material



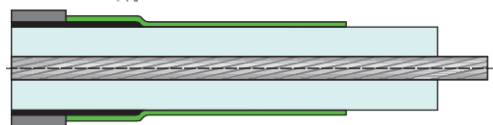
The non-linear impedance of the stress control tubing avoids an increase of the amplitude. The stress is distributed over a longer control area (B). This is based on the interaction between the resistive components of the applied coating and the capacity of the cable insulation. By an improper selection of the materials the impedance would lead to an unacceptable steep voltage rise at the screen end (A). Reducing the length or wrong positioning results in discharge at the tubing end (C). All Raychem cable accessories take these effects into account.



Technology of non-linear stress control material



The stress control base material is enriched with zinc oxide (ZnO) and it has insulating characteristics up to a specific voltage. The material behaves similar to a varistor and becomes conductive if the field strength is higher than a certain switching point. The resulting voltage distribution allows a short termination length while the electrical stress at the screen end area is kept low. Higher voltage load does not result in higher amplitude of the electrical field strength but only the control area will become longer.

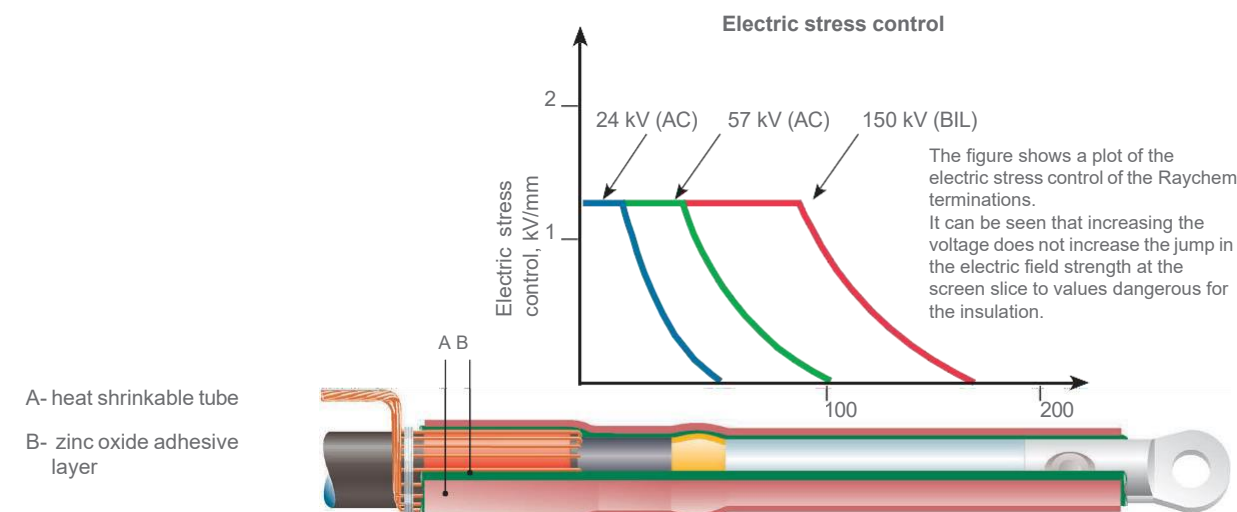


ELECTRICAL STRESS CONTROL

Material for nonlinear stress control in TE Connectivity terminations

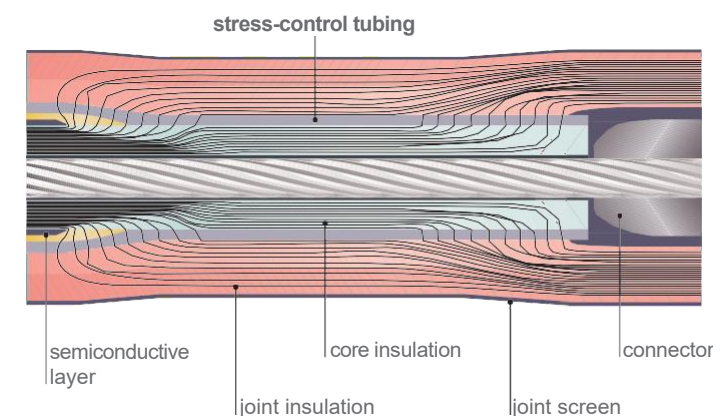
TE Connectivity has formulated electrical stress control material, which is based on long experience with Raychem ceramic semiconductor technology (ZnO).

In addition to stress control function, this adhesive layer melts when heated and fills all irregularities, bonds to the insulation and provides superb electrical performance on the insulation surface, to avoid partial discharge occurs. The majority of Raychem terminations based on zinc oxide-based electric field distribution technology. The figure shows a graph of the electric field distribution as a function of the applied voltage.



Semiconductive stress control tubings in TE joints

Stress control tubings positioning on semiconductive screen both sides of the cable. Stress distribution in cable joint is same as in terminations. Semiconductive tube together with yellow tape with specific dielectric permittivity allow to reduce high stresses over the connector of the joint. Extruded inner insulating and outer conductive layers of triple layer tubing eliminate internal discharges. Thickness of insulating layers depend on voltage level. Such stress control technology help to avoid pencilling of insulation in connection area or specific connector shape design.



WEATHERING AND AGEING RESISTIVITY

Properties

The performance of Raychem cable accessories is the result of the interaction between material formulations, product design, the manufacturing process and correct selection for the application. The excellent behaviour of Raychem insulation materials for low, medium and high voltage cable accessories is achieved by the special formulation adapted to product and application. Chemical components included in the material work as fire extinguisher and avoid the building of tracking. Raychem materials for outdoor applications resist weathering processes like contamination,UV-light, dust and have long time stability even in the most severe environments.

Testing

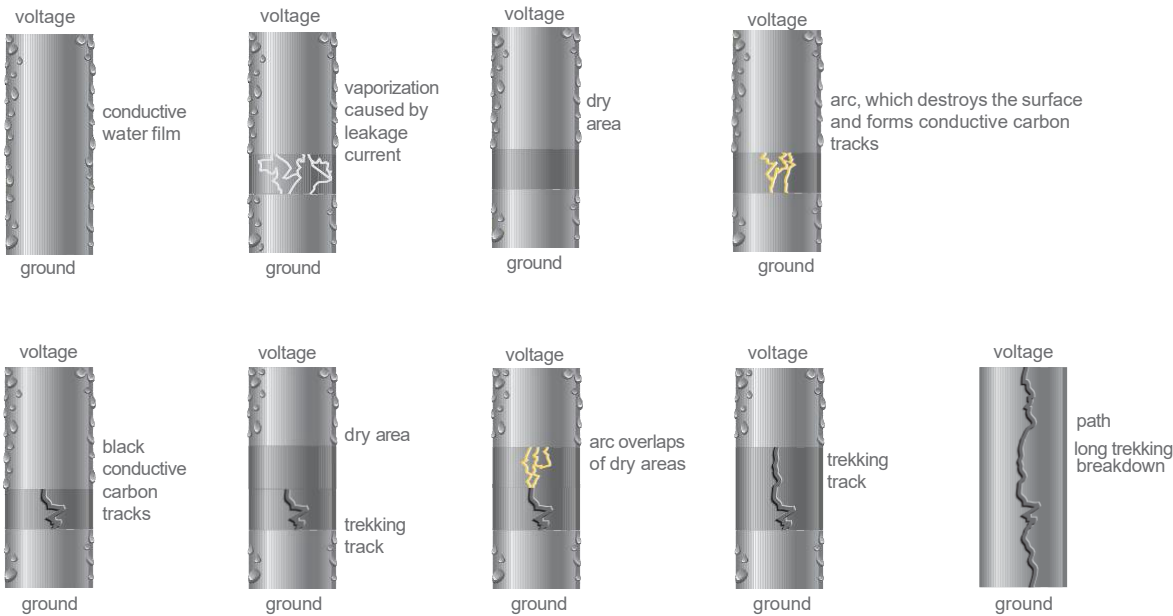
To evaluate the lifetime performance of different materials and designs TE Energy regularly perform listed tests:

- Tracking and Erosion Resistance Test (TERT) according to IEC 60587
- Humidity Test according to IEC 61442
- Salt fog Test according to IEC 61109
- UV resistance test according to ISO 4892

The Tracking and Erosion Resistance Test (TERT) show the appearance of tracking or erosion on material samples by periodically increased contamination and voltage. In the other tests the complete products are stressed with humidity, salt fog or intensive UV light and tested afterwards.

Over time, the outer surface of terminations, especially outdoor terminations, becomes contaminated and leakage currents start to increase under humid conditions. Under certain weather conditions, these leakage currents can deteriorate the outer surface of the terminations through the formation of tracking tracks (fast process) or erosion (slow process). In both cases, this leads to cable accessories failure.

Tracking and erosion



Pictures show the occurrence of tracking . In erosion, the erosion process goes deep into the material.

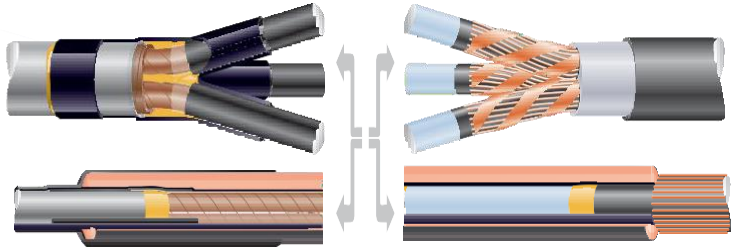


Sample damaged by tracking



Sample damaged by erosion

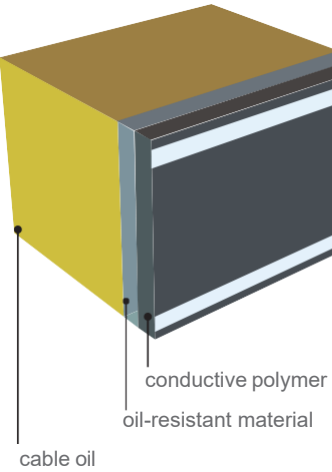
CABLE OIL WITHSTAND



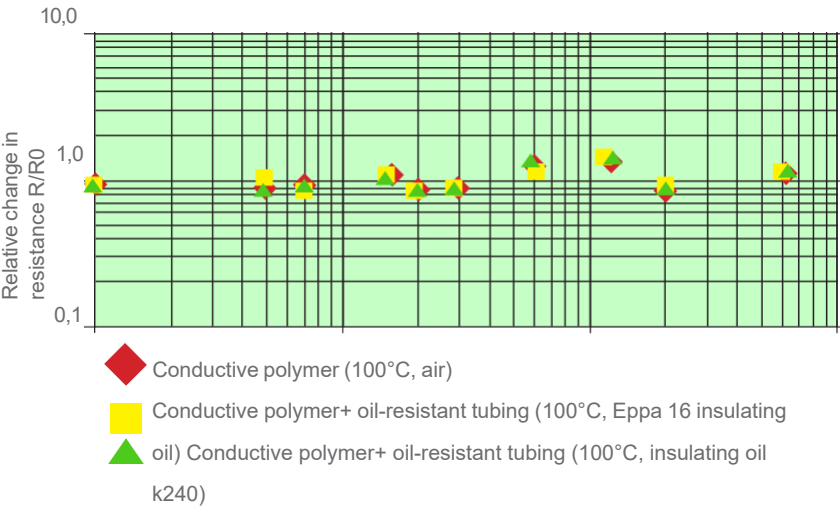
Requirements for oil withstand

Mass-impregnated (MI) cables long-term operation conditions has typical load cycling curve. And thus insulation sealing is one of main requirements to MI cables.Oil must retained in the cable and moisture from the air must not penetrate to insulation. Oil impregnation must not escape from the cable and moisture from the air must not penetrate the insulation. The oil barrier in transition joints when connecting paper-insulated and polymeric insulated cables has one more function. It protects polymeric-insulated cables from oil or its vapors. Polymeric materials significantly change their structure under oil impact. As a result, service life of the joint and cable is reduced.

Long-term testing of the oil-resistant barrier

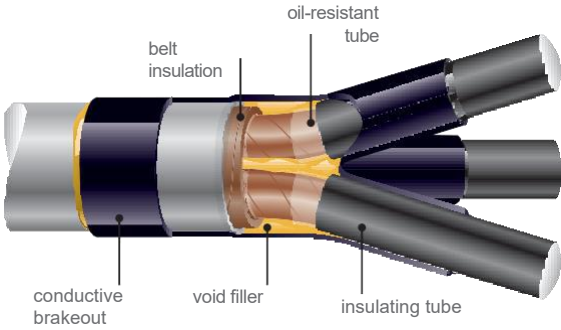
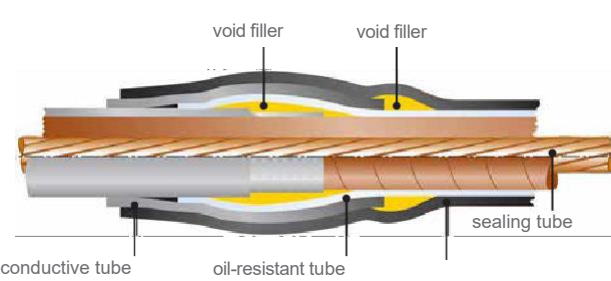


Tests under intensive aging conditions



Properties of TE Connectivity oil resistant materials

Raychem has developed special oil-resistant tubing to protect against the oil penetration and its vapors. Sealing properties of the oil-resistant tubes has been confirmed by test procedures when oil is heated up to 100°C and left in this state for 10,000 hours. During the tests, conductive polymer samples are placed on the outer surface of the oil-resistant tubes. Measurements at the end of the test confirmed that the resistance of conductive materials remains the same whether the tests are performed in oil or in air.



FLAME RESISTANCE AND NON-COMBUSTIBILITY

Application range



Requirements and tests in accordance with IEC and GOST

Cables in non-combustible and flame-retardant versions are used where fire can create a threats for crowdly areas (in large buildings, stores, hospitals, railway stations, airports, subways, etc.) or cause significant damage to equipment, e.g. on oil offshore platforms.

Non-flammable cables must not spread combustion along the cable line. Fire-resistant cables are designed to transmit electricity even during a fire in order for the electrical equipment to continue to operate. Cable accessories, as part of the cable line, must fulfill the basic requirements for non-combustibility and fire resistance of the entire line.

Various tests are carried out to evaluate and compare the fire resistance properties of cables. Special material tests include tests for flammability, smoke emission, toxic gas emission, while the cable itself is tested for the resistance of the electrical insulation under special conditions when exposed by flame.

Standard tests for cables:

A:

according IEC 60332-1 and GOST R MEC 60332-1

Flame propagation test

The behavior of the material is evaluated by flame propagation tests, which determine the amount of oxygen to sustain combustion (oxygen index) or the ignition temperature of the material (temperature index).

B:

according IEC 61034 and GOST 12.1.044-89

Smoke emission testing:

The cable should emit a small amount of smoke when burning. The amount of smoke is characterized by the smoke density or smoke generation ratio.

C:

in accordance IEC 60754, GOST 12.1.044-89, NPB 248-97

Test on gases evolved during combustion of materials from cables:

The gases emitted during combustion shall not be toxic and shall not have a damaging effect on equipment. The gases released during combustion are analyzed by toxicity index or by the amount of acid gases (correlated with halogen content).

D:

according IEC 60331 and GOST R MEC 60331

Insulation resistance test:

The cable must withstand the voltage for a strictly defined time under special conditions of exposure to the burner flame. According to IEC 60331 the flame exposure time is 90 minutes. On customer request this time can be increased to 180 minutes. The voltage remains on for another 15 minutes after the burner is switched off.

The cable may be specified according to any combination of tests, e.g. **A, B, C** or **B, C, D**. IEC GOST R is identical to the corresponding IEC standards.



FLAME RESISTANCE AND NON-COMBUSTIBILITY

Joints with non-combustibility properties

Not all cable tests for non-combustibility and flame retardancy are applicable to cable accessories.

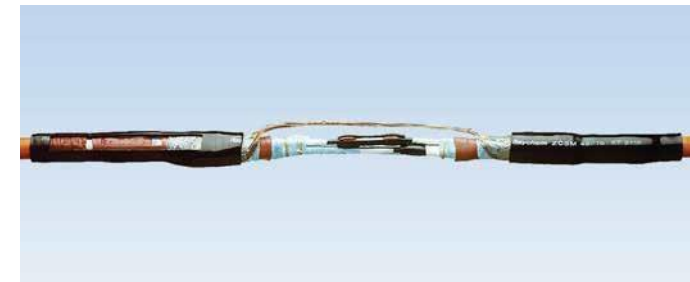
Non-flammable joints can burn in case of fire, but self-extinguishing is the absence of flame. In addition, they should have a less smoke and toxic gas emission. For cable accessories correct selection, it is necessary to know the requirements for non-combustibility, smoke, corrosive and toxic gases emissions.

Raychem cable accessories includes materials that meet the non-combustibility test requirements for Type A, B or C cables (standard test methods are listed above).

Properties of Raychem materials used in special cable accessories are mentioned on pp.124 etc.

Flame-retardant joints

Various designs and material used by manufacturers for producing flame retardant cable. We have developed and tested components performs fire barrier functions and can absorb heat energy. Usage of such materials help us to produce a joints meets customer specific requirements.

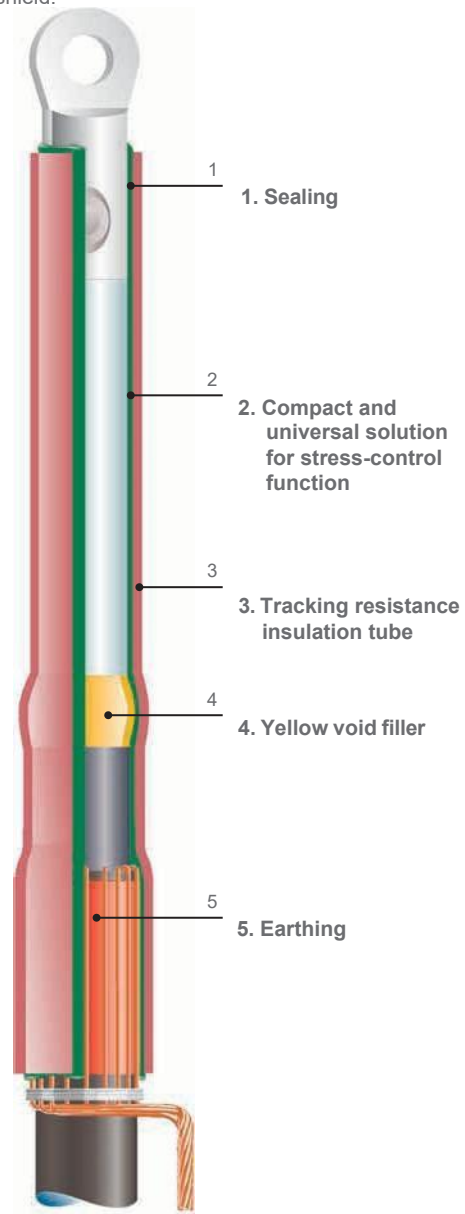


MEDIUM VOLTAGE TERMINATIONS

TE Connectivity accessories provide a universal system of indoor and outdoor terminations for paper or polymeric insulated cables, for single or three core cables, for cables with round or sector shaped conductors and most types of screening or armouring.

The termination's materials possess exceptional resistance to prolonged electrical stress and weathering, but are also capable of being shrunk down quickly to fit and seal a cable.

Drawing shows the design of a modern Raychem termination for a single-core cable with polymeric insulation and a copper wire shield.



Durable sealing is achieved by special Raychem sealants on the inside of non-tracking, weather-resistant components. By applying heat on the components, the shrinking action of the tubing causes the hot-melt sealant to flow into place. In case of three core cables, a sealant-lined heat-shrinkable breakout installed over the cores and cable crutch provides a sealed and weather-resistant surface from the terminating lugs to the cable oversheath.

To meet the need for space-saving, flexible termination design, adaptable to different types of compact equipment, TE Connectivity has developed a material with carefully controlled non-linear impedance based on ceramic semiconductor technology (ZnO), applied as coating inside the tubing. The stress control coating is softened by the applied heat and conforms and bonds to even irregular insulation surfaces to ensure a void free contact. For more details on stress control for terminations, see page 23.

The superior non-tracking characteristics and long-term erosion resistance of Raychem terminations have been exhaustively demonstrated in comparative tests at major independent laboratories and TE Energy's own extensive development facilities. These results are borne out by the continuing performance of over a million units installed in tropical, desert, arctic and industrially polluted climates, confirming that Raychem terminations do not track even in severe service conditions and verifying their exceptional erosion resistance and reliability. Decades of Raychem terminations application confirm that this material resists surface electrical discharges even in the hars environment conditions and performs exceptional erosion resistance and reliability. Tracking and erosion process described on page 24.

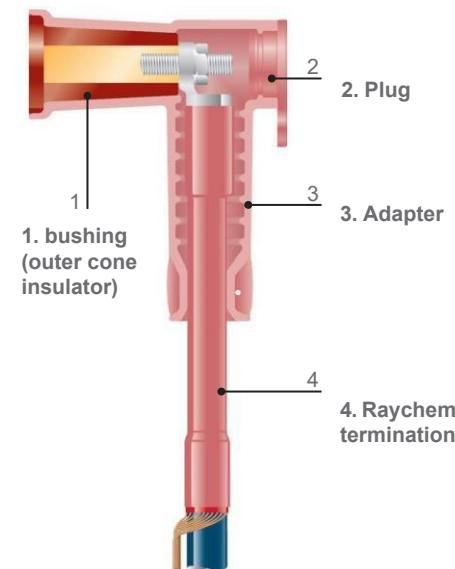
Semiconductive void filler is easily applied in form of a short adhesive tape to screen cut of extruded or easy strip polymeric cable. It ensures that, independent of the type of semi-conductive screen or removal method, no air voids can cause discharges in the high stress area of the screen end.

Earthing wires or braids are imbedded in the sealing mastic to prevent any corrosion by moisture ingress. For cables with tape screen or metal sheaths with armour solderless earthing systems are either provided within the termination kit or can be ordered separately.

MEDIUM VOLTAGE CONNECTION SYSTEM

TE Connectivity has developed Raychem Insulated and Screened Adapter System for connecting cables to gas insulated switchgears and transformers. Besides insulated RICS adapters introduced in this page, we are producing screened adapters - RSTI for cables up to 42 kV and cross-sections up to 10000 mm². RICS and RSTI adapters can be used for double cable and surge arrester connection.

In drawing below you will find construction of RICS-3133 insulated adaptor designed to work in combination with Raychem terminations.



Gas-insulated switchgear is equipped with bushings for connecting cable lines. It is designed to fit bushing profiles according to EN 50181 type C.

The outer part of adapter is sealed with removable elastomeric plug that can be removed for cable test.

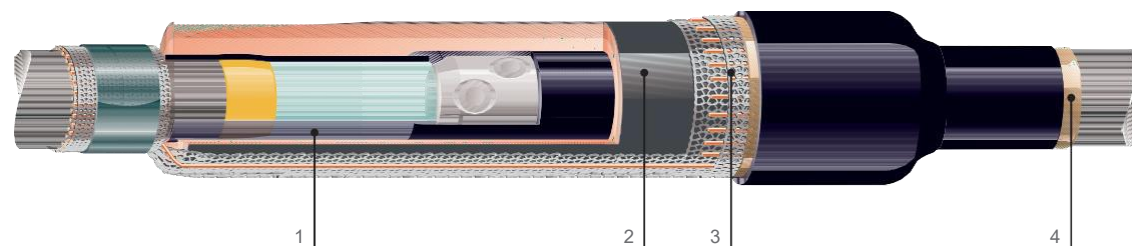
Adapter body is elastomeric part installed in connection point. The non-tracking elastomeric housing has excellent erosion resistance, dielectric properties and environmental resistance, giving superb performance in areas of high humidity and electrical stress. They have been subjected to cycling tests under water tests simulating live operation.

Adapter designed and tested to work in combination with Raychem terminations, both for paper and polymeric insulated cables.

The elastomeric body is simply pulled over a termination, even with bulky mechanical lugs, and covers a wide cross section range. Adapter is supplied with stainless steel stud, washer and nut for connecting to the bushing. The adapter can easily be removed and reinstalled without the need for additional material or tooling, allowing access to the bushing connection for test purposes.



MEDIUM VOLTAGE JOINTS



Product design

The design of a single-core joint for a polymeric insulated cable is described here. The same design principles are used for 3-core cables. For transition joints, special oil barrier tubing are used to transform a draining oil (MI) as well as non draining oil (MIND) paper insulated cable into a quasi polymeric insulated cable with a radial field.

1. Electrical stress control

The stress control tubing and the patch have a precisely defined impedance characteristic which smoothes the electrical field over the connector and cable screen ends. During the installation of the joints, the special void filling yellow tape will be compressed by the two stress control tubing.

2. Insulation and screen

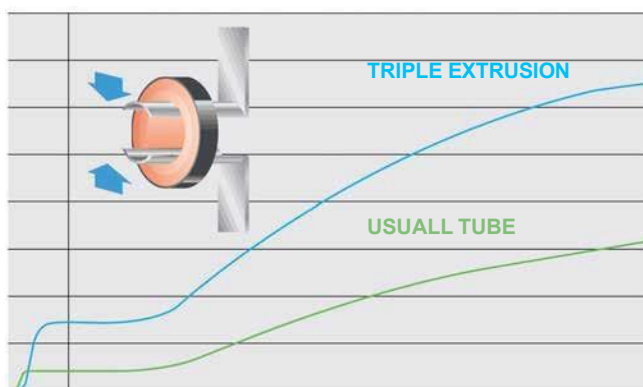
The triple extruded joint body provides the correct thickness of insulation (red) in one installation step. The insulation screen is provided by the outer wall of the tubing, which is of heat-shrinkable conductive polymer (black). This technique saves installation time and ensures a flawless bond between joint insulation and screen, even up to 42 kV.

3. Metallic shielding

Copper mesh and roll springs ensure the correct screen connection across the joint area and make electrical contact with the outer screen of the joint. The design passed tests up to 11 kA short circuit and up to 400 A currents simulating ground fault situation.

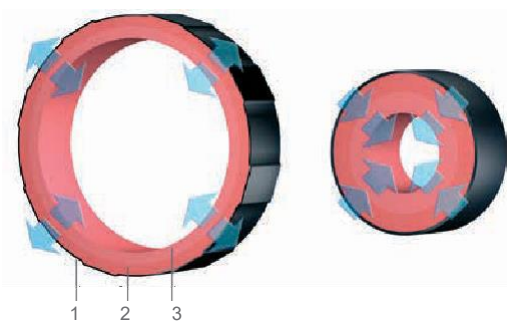
4. Outer sealing and protection

The heat used to shrink the outer tubing causes the pre-coated adhesive to melt and flow, resulting in a lasting moisture and corrosion barrier on the cable oversheath. The outer tubing provides mechanical impact and chemical resistance as expected from cable oversheaths. For armoured cables, Raychem joints incorporate either a quick to install galvanised steel joint case or steel tape or fibre glass reinforced heat-shrink wraparound.



a) Expanded

b) Recovered



- 1- conductive heat-shrink layer
- 2- insulated heat-shrink layer
- 3- insulated elastomeric layer

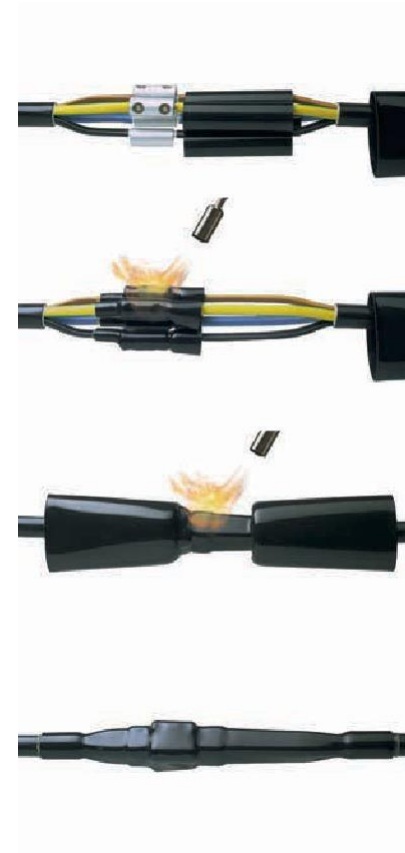
Triple elastomer extrusion technology

The triple extruded joint body, supplied in an expanded form, consists of 3 bonded layers, see picture a) below. The two heat-shrinkable outer layers (1. black conductive, 2. red insulating) hold the inner elastomeric layer (3. red insulating) at full diameter. Application of the heat causes the outer layers to shrink, allowing the elastomeric, insulating layer to contract at the same time and closely fit on the jointing cable. Elastomers typically experience a reduction of the contraction force after storage and at cold temperatures. By applying heat this effect is overcome thus allowing an unlimited storage time and installations at low temperatures. The rubber-like characteristics of the insulation material combined with the rigid outer heat-shrinkable wall enable the joint to follow the thermally induced dimensional changes of the cable insulation.

LOW VOLTAGE JOINTING SYSTEM

The Raychem low voltage jointing system for mechanical or crimp connectors is widely used and acknowledged as a highly dependable and easy-to-install jointing method for 3- and 4-core paper cables and also for 4- and 5- core polymeric insulated cable types.

The principle of the construction and the simple way of installation are described on a joint for 0,6/1,0 (1,2) kV polymeric insulated cables.



Installation

The cable ends are prepared according to the installation instruction, the smaller inner tubing and the outer tubing are slipped over the cores and the conductors are connected with mechanical or crimp connectors. All joints are designed to allow crossing of the cable cores.

The inner tubing are positioned over the connectors and shrunk down. They fit tightly and the wall thickness is adapted to the core insulation even over bulky mechanical connectors. The adhesive in the pre-coated tubing seals out moisture and corrosion and confirms to the thermal expansion of the cable.

The mechanical and sealing functions of the oversheath are assured by a thick-wall tubing positioned over the jointing area and shrunk. A durable and repeatable seal is produced by means of a hot-melt adhesive pre-applied to the entire length of the tubing.

The outer tube installed over the connector and shrunk down. This thick-walled tube provides mechanical protection, seals the connection and restores the outer jacket. The entire inner surface of the tube is coated with fusion adhesive. The joint is complete and can be put into operation immediately.



Blank lined area for notes on page 28.



Blank lined area for notes on page 29.





Section I
Terminations

1 kV terminations for 3, 4 and 5 core polymeric insulated cables.....32

Indoor and outdoor terminations for three-core paper-insulated cables
in common sheath 6 and 10 kV 34

Terminations for single core polymeric insulated DC cables 3 kV..... 36

Terminations for paper-insulated cables with cores
with separate shield 35 kV 37

Terminations for three-core unscreened cables with PVC-insulation 6 kV.....38

Terminations for screened flexible rubber insulated cables 6 kV.....39

Indoor terminations for three-core screened polymeric insulated cables
10, 20 and 35 kV 40

Solderless earthing kits for terminations installed in screened, 3-core
polymeric insulated cables..... 41

Outdoor terminations for three-core screened polymeric insulated cables
10, 20 and 35 kV 42

Solderless earthing kits for terminations installed in screened, 3-core
polymeric insulated cables..... 43

Indoor terminations for single-core screened polymeric insulated cables
10, 20 and 35 kV 44

Solderless earthing kits for terminations installed in screened, single core
polymeric insulated cables..... 45

Outdoor terminations for single-core screened polymeric insulated cables
10, 20 and 35 kV 46

Solderless earthing kits for terminations installed in screened, single core
polymeric insulated cables..... 47

Pre-expanded indoor terminations for single-core screened polymeric
insulated cables 10, 20 and 35 kV..... 48

Terminations for single core polymeric insulated cables for railway
application up to 27 kV..... 50

Terminations for screened, polymeric insulated filter cables
up to 150 kV D.C..... 51

NOTE
Terminations for polymeric insulated screened cables are universal and can be used
for insulated cables as follows for cross-linked polyethylene (XLPE) and ethylene
propylene insulated cables (EPR)

Terminations for 3, 4 and 5 core polymeric and paper insulated cables up to 1 kV

CABLE

The terminations are designed for 3, 4 and 5-core polymeric and paper insulated cables with or without armour and 3- and 4-core paper insulated cables including cables with reduced neutral conductor.

For example:
for plastic insulated cables: NAYY, NAYBY, NAKBA,BBГ, ABBГ, ПBГ, AПBГ, AнBГб, AABeY.
-for paper insulation: ACБY, YAKY, XAKXS, KнFтA, AYKY, CYKY,CNKODY, ANKOY, ANKOPV, NAYY, NAYBY, NAKBA, PP 00-A, XP 00-A,N(A)YY, PP 41-A, N(A)YBY, N(A)YC(W)Y,IPO 13, N(A)KBA.

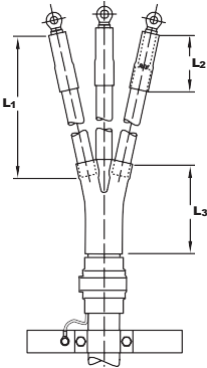
DESIGN OF TERMINATION for polymeric-insulated cables

The cable crutch is sealed by an adhesive lined heat-shrinkable breakout, which is installed over the cores and the end of the oversheath. Heat-shrinkable tubing seal between the cable lug and the end of the core insulation. For single core cables only a lug sealing tubing is needed. All materials are resistant to UV-light and weathering. A solderless earth connection system consisting of a roll spring and an earth braid is included in terminations for armoured cables. In case UV-light protection of the core insulation is required, the EN-CGPT insulating tubing can be ordered separately. All terminations can be ordered as complete kits or as components. Kits with the modification code -L12 include mechanical lugs with a busbar connection hole for M12 connection bolts and modification code -L16 include mechanical lugs with a busbar connection hole for M16 connection bolts.

CONSTRUCTION

For paper-insulated cables
Heat- shrinkable tubes are installed on the stripped cable cores. All materials are resistant to UV-light and weathering. Brakeout and tubing protect the cable spine from moisture and oil leakage. The kit includes an solderless grounding system consisting of a roller spring, grounding wire, copper mesh and insulating tube. The L12 modification includes bolt lugs with M12 bolt hole and, correspondingly, the L16 modification with M16 bolt.

FOR 3-CORE CABLES
The termination includes in addition a solderless neutral connection system for the aluminium sheath, consisting of stainless steel hose clamps, an earth braid and a mechanical lug.



L1, L2, L3 - see tables for termination selection

Terminations for 3 and 4 core paper-insulated cables with bolted lugs

Cross section (mm²)	Ordering description	Dimensions (mm)	
	Core length L1, (mm)* 1000 x 4 = 4000	L ₃	L ₂
3-core cables			
25 - 70	GUST-01/3x 25- 70/1000-L12	165	80
70 - 120	GUST-01/3x 70-120/1000-L12	215	100
120 - 240	GUST-01/3x120-240/1000-L12	220	150
4-core cables			
25 - 70	GUST-01/4x 25- 70/1000-L12	165	80
70 - 150	GUST-01/4x 70-150/1000-L12	215	100
120 - 240	GUST-01/4x120-240/1000-L12	220	150

NOTES:	*Length of cores L1 is determined according to the place of installation, but not less than 100 mm. The sum of L1 lengths will not exceed 4 times the L1 length of this table. To order termination without lugs, remove -L12 from the description. All 3-core cable termination include sheath grounding materials. Termination for other cable types and cross sections can be ordered on request. Please contact TE Connectivity local offices.
--------	---

Terminations for 3, 4 and 5 core polymeric insulated cables up to 1 kV

Terminations for 3 and 4 core polymeric insulated cables

Cross section (mm²)	Ordering description		Cross section (mm²)	Ordering description		Dimensions (mm)	
	Kits with bolted lugs			Kits without lugs		L ₃	L ₂
	Cables without armor	Cables with tape armor		without armor	with tape armor		
6 - 25	EPKT-0015-L10	EPKT-0015-L10-CEE01	4 - 35	EPKT-0015.	EPKT-0015-CEE01	95	50
25 - 70	EPKT-0031-L12	EPKT-0031-L12-CEE01	25 - 70	EPKT-0031.	EPKT-0031-CEE01	165	100
50 - 150	EPKT-0047-L12	EPKT-0047-L12-CEE01	70 - 150	EPKT-0047	EPKT-0047-CEE01	215	100
120 - 240	EPKT-0063-L12	EPKT-0063-L12-CEE01	150 - 400	EPKT-0063.	EPKT-0063-CEE01	220	150

NOTE	* Terminations are supplied with a four-core brakeout. For 3-core cable with concentric neutral, the shield wires are sealed with mastic tape S1061 (approximately 50 mm of this tape is required per termination) and then insulated with MWTM tubing. S1061 tape and MWTM tube must be ordered separately. Terminations for other cross-sections, voltages and cable types are available on request. Please contact TE Connectivity offices for more information.				
Cross section (mm²)	Ordering description			Dimensions (mm)	
	Cables without armor		Cables with tape armor	L ₃	L ₂
10 - 35	POLT-01/5X 10- 35*		POLT-01/5X 10- 35-CEE01*	95	50
35 - 70	POLT-01/5X 35- 70-L12		POLT-01/5X 35- 70-L12-CEE01	165	100
70 - 120	POLT-01/5X 70-120-L12		POLT-01/5X 70-120-L12-CEE01	215	100
150 - 240	POLT-01/5X150-240-L12		POLT-01/5X150-240-L12-CEE01	220	150

NOTE	* Terminations with a cross-section of 10-35 mm² are only supplied without lugs and are supplied with a four core breakout; all others are supplied with a four core breakout. To order terminations without lugs, remove -L12 from the description. Terminations for other cross-sections, voltages and cable types are available on request. Please contact TE Connectivity local offices.
------	--

Brakeouts and tubes for 4-core and 5-core polymeric insulated cables

Cross section (mm²)	Ordering description		Cross section (mm²)	Ordering description	Dimensions (mm)	
	Brakeout	Insulation tubing		Tubing with adhesive	L ₃	L ₂
4-core cables						
1,5 - 10	502S013/S	CGPT 9/ 3-0	1,5 - 10	MWTM-10/ 3- 50/S	60	50
4 - 35	502K033/S	CGPT 12/ 4-0	4 - 35	MWTM-16/ 5- 50/S	95	50
25 - 95	502K046/S	CGPT 18/ 6-0	25 - 70	MWTM-25/ 8-100/S	165	100
50 - 150	502K016/S	CGPT 24/ 8-0	70 - 150	MWTM-35/12-100/S	215	100
120 - 400	502K026/S	CGPT 39/13-0	150 - 400	MWTM-50/16-150/S	220	150
5-core cables						
35 - 95	603W035/S.	CGPT-18/ 6-0	25 - 70	MWTM-25/ 8-100/S	180	100
50 - 150	603W040/S	CGPT-24/ 8-0	70 - 150	MWTM-35/12-100/S	180	100
120 - 240	603W040-R01/S	GPT-39/13-0	150 - 240	MWTM-50/16-150/S	180	150

NOTE	For outdoor terminations the cores can be protected against weathering and UV-lightwith the insulating tubing EN-CGPT. Tubing lengths depend on the local installation requirements. For single core cables only a lug sealing MWTM tubing is needed. For core protection CGPT tubings should be ordered separately. Technical for berakout ordering see page 116, for MWTM see page 125, for CGPT see page 124. Terminations and components for other cable types are available on request. Please contact TE Connectivity local offices.
------	---

Indoor terminations for three-core belted, paper insulated cables with one common metal sheath 6 kV and 10 kV

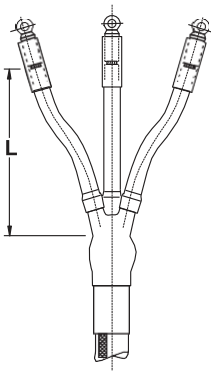
CABLE

The indoor termination is designed for 6 kV and 10 kV three core belted, paper insulated (MI) cables.
For example: ACБ, ААБУ, ACБУ, СБ2п, ACБ2пr, СБ ACБГ, N(A)KBA, N(A)KLEY

CONSTRUCTION

The paper cores are covered with oil barrier tubing. The crutch is filled with an oil resistive yellow mastic and is sealed with an adhesive lined, conductive breakout which is installed over the cores and the end of the metal sheath. Yellow stress control mastic is laid around the ends of breakout fingers and the cores are covered with red, non-tracking tubing. The end of the termination is sealed either to the cable lug or to the solid conductor with a sealing boot.

The kit includes a solderless earth connection. Kits with the modification code -L12 include mechanical lugs with a busbar connection hole for M12 connection bolts, with code -L16 for M16 bolts.
When mounting the RICS adapter on a GUST termination, modification -L16 must be ordered (see pages 56, 57).



L - see table

Indoor terminations with mechanical bolted lugs and without lugs

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description		Dimensions L (mm)
		bolted lugs	without lugs	
3,6/6 and 6/10	25 - 50	GUST-12/ 25- 50/ 450-L12	GUST-12/ 25- 50/ 450	450
		GUST-12/ 25- 50/ 800-L12	GUST-12/ 25- 50/ 800	800
		GUST-12/ 25- 50/1200-L12	GUST-12/ 25- 50/1200	1200
	70 - 120	GUST-12/ 70-120/ 450-L12	GUST-12/ 70-120/ 450	450
		GUST-12/ 70-120/ 800-L12	GUST-12/ 70-120/ 800	800
		GUST-12/ 70-120/1200-L12	GUST-12/ 70-120/1200	1200
	150 - 240	GUST-12/150-240/ 450-L12	GUST-12/150-240/ 450	450
		GUST-12/150-240/ 800-L12	GUST-12/150-240/ 800	800
		GUST-12/150-240/1200-L12	GUST-12/150-240/1200	1200

NOTE

*Used cable lugs must be longitudinally sealed
The core lengths can be reduced to the requirements at the place of installation, the minimum core length is 450 mm.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Outdoor terminations for three-core belted, paper insulated cables with one common metal sheath 6 kV and 10 kV

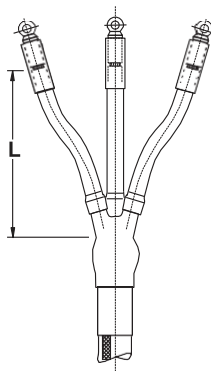
CABLE

The outdoor termination is designed for 6 kV and 10 kV three core belted, paper insulated (MI) cables.
For example: ACБ, ААБУ, ACБУ, СБ2п, ACБ2пr, СБ ACБГ, N(A)KBA, N(A)KLEY

CONSTRUCTION

The paper cores are covered with oil barrier tubing. The crutch is filled with an oil resistive yellow mastic and is sealed with an adhesive lined, conductive breakout which is installed over the cores and the end of the metal sheath. Yellow stress control mastic is laid around the ends of breakout fingers and the cores are covered with red, non-tracking tubing. The end of the termination is sealed either to the cable lug or to the solid conductor with a sealing boot.

The kit includes a solderless earth connection. Kits with the modification code -L12 include mechanical lugs with a busbar connection hole for M12 connection bolts, with code -L16 for M16 bolts.



L - see table

Outdoor terminations with mechanical bolted lugs and without lugs

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description		Dimensions L (mm)
		bolted lugs	without lugs	
3,6/6	25 - 50	GUST-12/ 25- 50/ 800-L12	GUST-12/ 25- 50/ 800	800
		GUST-12/ 25- 50/1200-L12	GUST-12/ 25- 50/1200	1200
	70 - 120	GUST-12/ 70-120/ 800-L12	GUST-12/ 70-120/ 800	800
		GUST-12/ 70-120/1200-L12	GUST-12/ 70-120/1200	1200
	150 - 240	GUST-12/150-240/ 800-L12	GUST-12/150-240/ 800	800
		GUST-12/150-240/1200-L12	GUST-12/150-240/1200	1200
6/10	25 - 50	GUST-12/ 25- 50/ 800-L12	GUST-12/ 25- 50/ 800	800
		GUST-12/ 25- 50/1200-L12	GUST-12/ 25- 50/1200	1200
	70 - 120	GUST-12/ 70-120/ 800-L12	GUST-12/ 70-120/ 800	800
		GUST-12/ 70-120/1200-L12	GUST-12/ 70-120/1200	1200
	150 - 240	GUST-12/150-240/ 800-L12	GUST-12/150-240/ 800	800
		GUST-12/150-240/1200-L12	GUST-12/150-240/1200	1200

NOTE

*Used cable lugs must be longitudinally sealed
The core lengths can be reduced to the requirements at the place of installation, the minimum core length is 800 mm.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

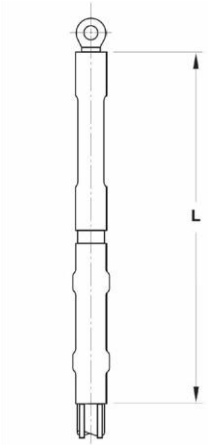
Terminations for polymeric-insulated single core cables up to 3 kV DC

CABLE

Here you can find terminations for polymeric-insulated single-core cables up to 3 kV DC. For example: PBPng(A)- HF, PvBPng(A)-HF.

CONSTRUCTION

polymeric insulated cables
Solderless earthing system consists of two insulated ground wires and two roll springs, to provide separate grounding of the copper shield and armor. The earth connection area is sealed and insulated with mastic and heat shrink tubing. Yellow void filler mastic is applying around the edge of the copper shield and the conductive tubing is seated in place. Tracking resistance insulating tube is placed on top and shrunk from the conductive tube to the lug.



L - see table

Termination without lugs*

Cross section (mm²)	Ordering description	Dimensions (mm)
		L
120 - 240	EPKT-7C1XI-CEE01	500
300 - 630	EPKT-7D1XI-CEE01	500

NOTE
*Used cable lugs must be longitudinally sealed. Kits with bolted lugs are available on request. Terminations for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Terminations for screened, paper insulated cables (MIND) with one metal sheath per phase for voltage 35 kV

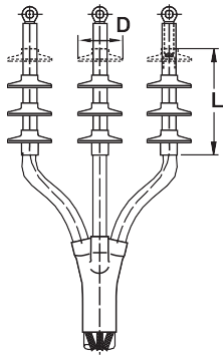
CABLE

Termination is designed for 35 kV screened three and single core paper insulated cables (MIND) with one metal sheath per phase. For example: ЛАОСБУ, HAKnFtA, HAKNY, HknFty, AMKTQYPVsp., AMKTOYPVsp., AOSB, NPZO 13, NPZOP 13, NPZO 23.

CONSTRUCTION

Yellow, oil resistant void filling tape is laid around the end of the metal sheath and the paper cores are completely covered with oil barrier tubing. An oil resistant sealing boot ensures a pressure tight seal to the cable lug. Short conductive tubing rebuilds the screen from the metal sheath to the covered paper core.

Yellow stress grading mastic is laid around the end of the conductive tubing and a stress control tubing is shrunk over the conductive tubing and the covered paper insulation. The end of the cores and the stress control tubing are insulated with non-tracking insulating tubing. Additional skirts are installed onto the tubing (see table). Solderless earth connections can be ordered separately. On the outer tubes are shrunk with additional tracking-resistant insulating skirts (quantities - see table).



L, D - see table

Indoor terminations without lugs and grounding accessories

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description	Dimensions (mm)		Quantity of skirts
			L	D	
20/35	50 - 95	EPKT-36C1MI-CEE01	430	95	3 x 2
	120 - 185	EPKT-36D1MI-CEE01	430	115	3 x 2
	240 - 500	EPKT-36E1MI-CEE01	430	115	3 x 2

Outdoor terminations without lugs and grounding accessories

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description	Dimensions (mm)		Quantity of skirts
			L	D	
20/35	50 - 95	EPKT-36C1MO-CEE01	560	95	3 x 4
	120 - 185	EPKT-36D1MO-CEE01	560	115	3 x 4
	240 - 500	EPKT-36E1MO-CEE01	560	115	3 x 4

NOTE
*Used cable lugs must be longitudinally sealed. One kit includes materials for 3 phases. Terminations for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Solderless earth connection

Cross section (mm²)	Ordering description		
	For 3-phase cable, including brakeout	For 1 phase cable with lead sheath	For 1 phase cable with AL sheath
35 - 150	EAKT-1678	-	-
70 - 150	EAKT-1678	-	SMOE-61832**
150 - 240	EAKT-1679	EAKT-1669-DE01**	SMOE-61832**

NOTE
** Three sets of accessories for solderless grounding must be ordered for one termination (for 3 phases). Solderless grounding kits include roller springs, grounding conductors and insulating tubing. Additionally, EAKT-167x kits include a heat-shrinkable brakeout for sealing the spine of three-core cables.

Terminations for unscreened, 3-core polymeric insulated cables 6 kV

CABLE

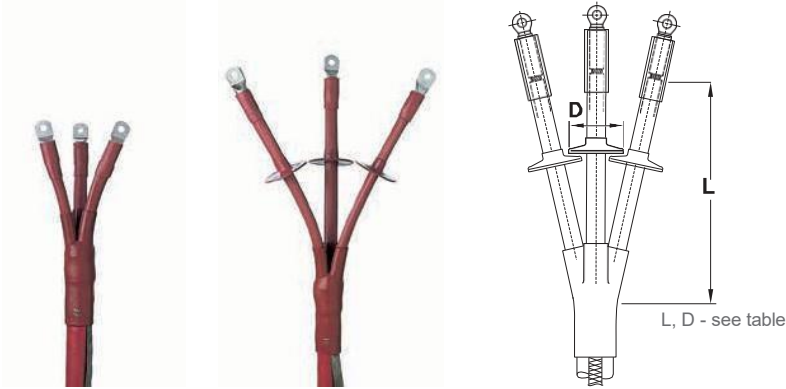
Indoor and outdoor terminations are designed for 6 kV unscreened three core PVC insulated cables with and without armour, copper tape or wire shield. For example: АПБГ , YAKYFtly, YKYFoy, YKYFtly, AYKCY, CYKCY, CHKCE-R, NAYFGY, PP 41-(A), PP 44-(A), PP45-(A), N(A)YFGY

CONSTRUCTION

The cores are covered with non-tracking insulating tubing. The area between the end of the oversheath and the cores is sealed and protected by a non-tracking insulating breakout. Solderless earth connections can be ordered separately. Outdoor terminations differ from indoor terminations by the length of the conductors and the skirts.

The kit with modification -L12 includes mechanical bolted lugs with M12 bolt hole and, respectively, modification -L16 with M16 bolt hole.

When mounting the RICS adapter on an EPKT-20xx termination, modification -L16 must be ordered (see pp. 56, 57).



Indoor terminations

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description		Dimensions L (mm)
		bolted lugs	without lugs.	
3,6/6	16 - 50	EPKT-2041-L12	EPKT-2041	450
		EPKT-2043-L12	EPKT-2043	800
	70 - 120	EPKT-2051-L12	EPKT-2051	450
		EPKT-2053-L12	EPKT-2053	800
	150 - 240	EPKT-2061-L12	EPKT-2061	450
		EPKT-2063-L12	EPKT-2063	800

Outdoor terminations

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description		Dimensions		Quantity of skirts
		bolted lugs	without lugs.	L (mm)	D (mm)	
3,6/6	16 - 50	EPKT-2294-L12	EPKT-2294	1200	76	3 x 1
	70 - 120	EPKT-2304-L12	EPKT-2304	1200	95	3 x 1
	150 - 240	EPKT-2314-L12	EPKT-2314	1200	95	3 x 1

Solderless earth connection **

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description
3,6/6	16 - 95	SMOE-60805
	120 - 300	SMOE-60873

NOTE

*Used cable lugs must be longitudinally sealed.
**SMOE kit includes a roll spring and grounding conductor.
The core lengths can be reduced to the requirements at the place of installation, the minimum core length is 250 mm for indoor application and 550 mm for outdoor application.
Terminations for other cable types and cross sections can be ordered on request.
Terminations for motor connection to the BRNO are available on request.
Please contact local TE Connectivity offices for more information.

Terminations for flexible, screened, rubber insulated cables 6 kV

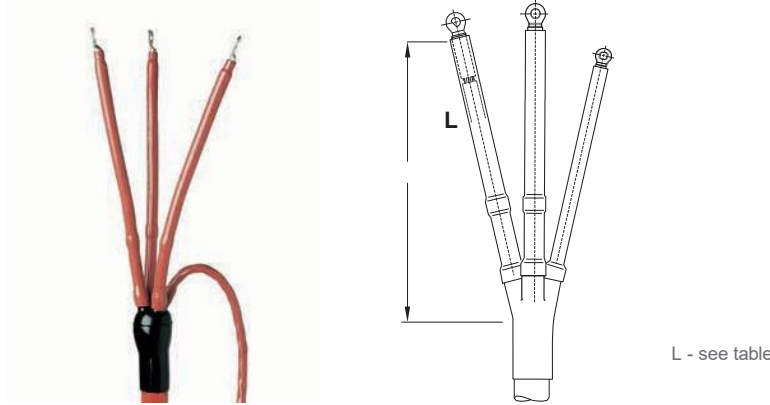
CABLE

The termination is designed for 6 kV screened, flexible, rubber insulated cables. For example: CGE, CGEpE, NYHSSYCY, NTS, NSS.

DESIGN OF TERMINATION

Stress grading mastic is wrapped around the area of the screen cut. All phase cores are covered with non-tracking insulating tubing. Earth cores are covered by insulating tubing and sealed by mastic. The area between the end of the oversheath and the cores is sealed and protected by a 4-core black breakout. The cores remain flexible and can be bent like the cable. The terminations for indoor and outdoor installation differ in the length of the cut. Outdoor terminations do not require the installation of skirts.

The design of termination allows possibility installation on 6 kV cables: with 4 cores (3phases+1neutral), with 5 cores (3phases+1neutral+1k), with 6 cores (3phases+2neutral+1k), with 6 cores (3phase+3neutral).



Terminations without lugs* for flexible screened rubber insulated cables

Rated voltage Uo/U (kV)	Cross section (mm²)	Ordering description	
		Indoor installation	Outdoor installation
3,6/6	25 - 50	EMKT-6I/25-50	EMKT-6O/25-50
	50 - 95	EMKT-6I/50-95	EMKT-6O/50-95
	120 - 240	EMKT-6I/120-240	EMKT-6O/120-240

NOTE

*Used cable lugs must be longitudinally sealed.
Minimum core length for indoor terminations 300 mm. Minimum core length for outdoor terminations 500 mm.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Indoor terminations for screened, 3-core polymeric insulated cables 10 kV, 20 kV and 35 kV

CABLE

The indoor termination is designed for 10 kV, 20 kV and 35 kV screened three core polymeric insulated cables with copper wire with or without armour or copper tape shield.

For example: APvP, APvVV, APvBbshpv, PvP2g, APvEV, PvEPu, APvEgap, K(A)9RVSBPMn- g(A)-HF, K(A)9RVSKPMng(A)-HF, N(A)2XSY, N2XSEY, N(A)2XS2Y, 2XSEYBY, AHXCMK- WTC, Wiski, AXCESS, EXCEL, FXCEL, RG70RNR



CONSTRUCTION

The cable is transformed to quasi 3 single core cables which allow crossing the cores even in confined connection spaces. The cores are covered with conductive tubing from the crutch area close to the screen end. The crutch area is sealed and protected with an adhesive lined, conductive breakout which is installed over the cores and the end of the oversheath. Yellow stress grading mastic is laid around the end of the screen cut. A non-tracking insulating tubing coated with stress control and sealing mastic is installed between the end of the conductive tubing and the cable lug.

Kits for solderless earth connection of armor, copper tape or aluminum wire screen (APvP-TAL type cables, etc.) must be ordered separately (see p. 41, 43).

Kits with the modification L12 includes mechanical lugs with a busbar connection hole for M12 connection bolts, accordingly, modification L16 with a busbar connection hole for M16 and modification L20 with M20 bolt.

When mounting the RICS adapter on a POLT termination, the -L16 modification of the appropriate type must be ordered (see pages 56, 57).

Indoor terminations for cables with copper wire shield with and without lugs and without solderless earth connection

Rated voltage Uo/U (kV)	With mechanical lugs			Without lugs*		
	Cross section (mm ²)	Ordering description for termination by length		Cross section (mm ²)	Ordering description for termination by length	
		L = 450 mm	L = 1200 mm		L = 450 mm	L = 1200 mm
6/10	25 - 70	POLT-12C/3XI-H1-L12	POLT-12C/3XI-H4-L12	25 - 70	POLT-12C/3XI-H1	POLT-12C/3XI-H4
	70 - 150	POLT-12D/3XI-H1-L12A	POLT-12D/3XI-H4-L12A	95 - 240	POLT-12D/3XI-H1	POLT-12D/3XI-H4
	120 - 240	POLT-12D/3XI-H1-L12B	POLT-12D/3XI-H4-L12B		-	
	240 - 400	-	POLT-12E/3XI-H4-L16B	240 - 500		POLT-12E/3XI-H4
	500 - 630	-	POLT-12F/3XI-H4-L20A	500 - 630		POLT-12F/3XI-H4
12/20				10 - 25	POLT-24B/3XI-H1	POLT-24B/3XI-H4
	25 - 70	POLT-24C/3XI-H1-L12	POLT-24C/3XI-H4-L12	25 - 70	POLT-24C/3XI-H1	POLT-24C/3XI-H4
	50 - 150	POLT-24D/3XI-H1-L12A	POLT-24D/3XI-H4-L12A	70 - 185	POLT-24D/3XI-H1	POLT-24D/3XI-H4
	120 - 240	POLT-24D/3XI-H1-L12B	POLT-24D/3XI-H4-L12B			
	150 - 400	-	POLT-24E/3XI-H4-L16B	185 - 400		POLT-24E/3XI-H4
20/35	50 - 120	-	POLT-42D/3XI-H4-L12	50 - 120		POLT-42D/3XI-H4
	120 - 300	-	POLT-42E/3XI-H4-L16	150 - 300		POLT-42E/3XI-H4
	240 - 400	-	POLT-42F/3XI-H4-L16	300 - 400		POLT-42F/3XI-H4

NOTE	*Used cable lugs must be longitudinally sealed.
	The length of the cores can be determined by the installation requirements. Minimum core length of unarmored cable: 320 mm for Uo/U= 6/10 kV; 360 mm for Uo/U= 12/20 kV; 600 mm for Uo/U= 20/35 kV.
	The solderless earth connection kit must be ordered separately.
	Terminations for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Solderless earth connection of terminations for screened, 3-core polymeric insulated cables

Solderless earth connection of copper tape shield, tape and wire armored

Rated voltage Uo/U (kV)	Cross section (mm ²)	Ordering description			
		copper wire shielded cable	cable with copper tape shield		
		wire armor	without armor	tape armor	wire armor
6/10	10 - 50		EAKT-1655	-	-
	35 - 120	EAKT-1642	EAKT-1656	EAKT-1675-CEE01	-
	95 - 240	EAKT-1643	EAKT-1657	EAKT-1676-CEE01	EAKT-1657 + EAKT-1643
	240 - 500	EAKT-1645	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1645
12/20	25 - 70	EAKT-1642	EAKT-1656	EAKT-1675-CEE01	-
	50 - 150	EAKT-1643	EAKT-1657	EAKT-1676-CEE01	EAKT-1657 + EAKT-1643
	120 - 400	EAKT-1645	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1645
20/35	50 - 150	EAKT-1644	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1644
	50 - 300	EAKT-1645	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1645
	300 - 500		EAKT-1659	-	-

NOTE	The EAKT-165x kit includes 3 roll springs and 3 ground conductors.
	The EAKT-167x kit for cable with steel tape armor, includes an extra large roll spring.
	The EAKT-164x kit for cable with wire armor, includes clamping rings, grounding conductor and adhesive tubing.

Solderless earth connection of aluminum wire shield (APvP TAL cables)

Ordering description	Aluminum shield cross-section (mm ²)	Core cross-section (mm2) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
POLT-3x/A185	25 - 185	35 - 300	35 - 240	35 - 120

NOTE	Solderless earth connection for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.
------	--

Outdoor terminations for screened, 3-core polymeric insulated cables
10 kV, 20 kV and 35 kV

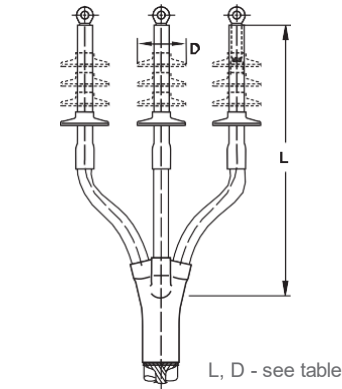
CABLE

The outdoor termination is designed for 10 kV, 20 kV and 35 kV screened three core polymeric insulated cables with or without armour or copper tape shield. For example: APvP, APvVV, APvBbshpv, PvP2g, APvEV, PvEPu, APvEgap, K(A)9RVSBPMn- g(A)-HF, K(A)9RVSKPMng(A)-HF, N(A)2XSY, N2XSEY, N(A)2XS2Y, 2XSEYBY, AHXCMK- WTC, Wiski, AXCESS, EXCEL, FXCEL, RG70RNR



DESIGN OF TERMINATION

The design and installation is the same as for indoor terminations. In addition skirts are installed onto the tubing (see table). The cable is converted into three single-core cables, allowing the cores to be phased even in confined spaces. Conductive tubes are shrunk onto the cores from the spine to the end of the core shield. The spine area is sealed and protected by a conductive brakeout with adhesive, which is shrunk onto the cores and the end of the outersheath. Yellow mastic has stress-control condition and is applied around the end of the core shield. A non-tracking insulating tubing coated with stress control and sealing mastic is installed between the end of the conductive tubing and the cable lug.



Kits for solderless earth connection of armor, copper tape or aluminum wire screen (APvP-TAL type cables, etc.) must be ordered separately (see p. 41, 43). For cables with tape or wire armor, order terminations with the modification -T and -W, accordingly. Kits with the modification L12 includes mechanical lugs with a busbar connection hole for M12 connection bolts, accordingly, modification L16 with a busbar connection hole for M16 and modification L20 with

Outdoor terminations for cables with copper wire shield with and without lugs
and without solderless earth connection

Rated voltage Uo/U (kV)	With mechanical lugs			Without lugs*		
	Cross section (mm ²)	Ordering description for termination by length		Cross section (mm ²)	Ordering description for termination by length	
		L = 450 mm	L = 1200 mm		L = 450 mm	L = 1200 mm
6/10	25 - 70	POLT-12C/3XO-H1-L12	POLT-12C/3XO-H4-L12	25 - 70	POLT-12C/3XO-H1	POLT-12C/3XO-H4
	70 - 150	POLT-12D/3XO-H1-L12A	POLT-12D/3XO-H4-L12A	95 - 240	POLT-12D/3XO-H1	POLT-12D/3XO-H4
	120 - 240	POLT-12D/3XO-H1-L12B	POLT-12D/3XO-H4-L12B			
	240 - 400	-	POLT-12E/3XO-H4-L16B	240 - 500	-	POLT-12E/3XO-H4
	500 - 630	-	POLT-12F/3XO-H4-L20A	500 - 630	-	POLT-12F/3XO-H4
12/20				10 - 25	-	POLT-24B/3XO-H4
	25 - 70	POLT-24C/3XO-H1-L12	POLT-24C/3XO-H4-L12	25 - 70	POLT-24C/3XO-H1	POLT-24C/3XO-H4
	50 - 150	POLT-24D/3XO-H1-L12A	POLT-24D/3XO-H4-L12A	70 - 185	POLT-24D/3XO-H1	POLT-24D/3XO-H4
	120 - 240	POLT-24D/3XO-H1-L12B	POLT-24D/3XO-H4-L12B			
20/35	150 - 400	-	POLT-24E/3XO-H4-L16B	185 - 400		POLT-24E/3XO-H4
	50 -120	-	POLT-42D/3XO-H4-L12	50 - 120		POLT-42D/3XO-H4
	120 - 300	-	POLT-42E/3XO-H4-L16	150 - 300		POLT-42E/3XO-H4
	240 - 400	-	POLT-42F/3XO-H4-L16	300-400		POLT-42F/3XO-H4

NOTE

*Used cable lugs must be longitudinally sealed. The length of the conductors can be determined according to the place of installation. Minimum core length of unarmored cable: 320 mm for Uo/U= 6/10 kV; 460 mm for Uo/U= 12/20 kV; 700 mm for Uo/U= 20/35 kV.

Quantity of skirts per phase: 12 kV - 1 pc; 24 kV - 3 pcs; 42 kV - 4 pcs

Diameter of skirts "D": A - 76 mm; B - 76 mm; C - 85 mm; D - 95 mm; E - 115 mm; F - 135 mm.

The solderless earth connection kit must be ordered separately. Terminations for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Solderless earth connection of terminations for screened, 3-core polymeric insulated cables

Solderless earth connection of copper tape shield, tape and wire armor

Rated voltage Uo/U (kV)	Cross section (mm ²)	Ordering description			
		copper wire shielded cable	cable with copper tape shield		
			without armor	tape armor	wire armor
6/10	10 - 50		EAKT-1655	-	-
	35 - 120	EAKT-1642	EAKT-1656	EAKT-1675-CEE01	-
	95 - 240	EAKT-1643	EAKT-1657	EAKT-1676-CEE01	EAKT-1657 + EAKT-1643
	240 - 500	EAKT-1645	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1645
12/20	25 - 70	EAKT-1642	EAKT-1656	EAKT-1675-CEE01	-
	50 - 150	EAKT-1643	EAKT-1657	EAKT-1676-CEE01	EAKT-1657 + EAKT-1643
	120 - 400	EAKT-1645	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1645
20/35	50 - 150	EAKT-1644	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1644
	50 - 300	EAKT-1645	EAKT-1658	EAKT-1677-CEE01	EAKT-1658 + EAKT-1645
	300 - 500		EAKT-1659	-	-

NOTE

EAKT-165x kit includes 3 roll springs and 3 ground conductors.

EAKT-167x kit for cable with steel tape armor, includes an extra large roll spring.

EAKT-164x kit for cable with wire armor, includes clamping rings, grounding conductor and adhesive tubing.

Solderless earth connection of aluminum wire shield (APvP TAL cables)

Ordering description	Aluminum shield cross-section (mm ²)	Core cross-section (mm2) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
POLT-3x/A185	25 - 185	35 - 300	35 - 240	35 - 120

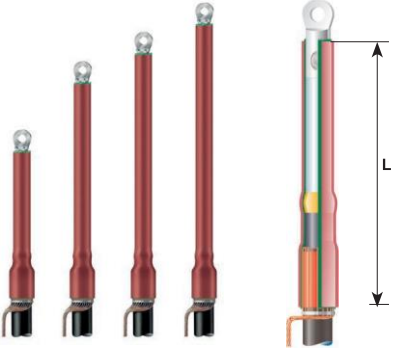
NOTE

Solderless earth connection for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Indoor terminations for screened, 1-core polymeric insulated cables 10 kV, 20 kV and 35 kV

CABLE

The indoor termination is designed for 10 kV, 20 kV and 35 kV screened single core polymeric insulated cables.
For example: АпвБ, ПвП, YHAKXS, XUHAkXS, YHkXS, AXEkVCY, AXEkVCEY, CXEkVCEY, N(A)2XSy, SZAQkrKM, SZAXRkKM, XHE 49, XHP 48, EHP 48, N(A)2XS(F)2Y, AHXAMK-W, NF C 33-223.



DESIGN OF TERMINATION

The terminations are universal and suitable both for cables with cross-linked polyethylene insulation and for cables with ethylene-propylene insulation.
The wires of the cable shield or the grounding conductor and the cable lug are sealed with non-tracking mastic. Yellow stress grading mastic is laid around the end of the screen cut.
A non-tracking insulating tubing coated with stress control. It insulates and seals the core between the end of the cable outer jacket and the cable lug.

Kits for solderless earth connection of armor, copper tape or aluminum wire screen (APvP-TAL type cables, etc.) must be ordered separately (see pages 45,47)

Indoor terminations for cables with copper wire shield without armor

Rated voltage Uo/U (kV)	With mechanical lugs		Without lugs*		Dimensions
	Cross section (mm ²)	Ordering description	Cross section (mm ²)	Ordering description	L (mm)
6/10	25 - 70	POLT-12C/1XI-L12	25 - 95	POLT-12C/1XI	250
	70 - 150	POLT-12D/1XI-L12A	95 - 240	POLT-12D/1XI	250
	120 - 240	POLT-12D/1XI-L12B	-	-	250
	185 - 300	POLT-12E/1XI-L16A	240-500	POLT-12E/1XI	300
	185 - 400	POLT-12E/1XI-L16B	-	-	300
	500 - 630	POLT-12F/1XI-L20A	500 - 800	POLT-12F/1XI	300
	800 - 1000	POLT-12F/1XI-L20B	-	-	300
12/20	25 - 70	POLT-24C/1XI-L12	25 - 70	POLT-24C/1XI	340
	50 - 150	POLT-24D/1XI-L12A	70 - 240	POLT-24D/1XI	340
	120 - 240	POLT-24D/1XI-L12B	-	-	340
	150 - 400	POLT-24E/1XI-L16B	-	-	340
	500 - 630	POLT-24F/1XI-L20A	400 - 800	POLT-24F/1XI	340
	800 - 1000	POLT-24F/1XI-L20B	-	-	340
20/35	35	POLT-42C/1XI-L12	35	POLT-42C/1XI	500
	50 - 120	POLT-42D/1XI-L12	50 - 120	POLT-42D/1XI	500
	120 - 240	POLT-42E/1XI-L12A	150 - 300	POLT-42E/1XI	500
	185 - 400	POLT-42F/1XI-L16A	400 - 500	POLT-42F/1XI	500
	500 - 630	POLT-42F/1XI-L20B	-	-	500
	800 - 1000**	POLT-42G/1XI-L20B	500 - 800	POLT-42G/1XI	560

NOTE

*Used cable lugs must be longitudinally sealed.
** Maximum cable diameter is 70 mm.
One kit includes material for 3 phase.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Solderless earth connection of terminations for screened, 1-core polymeric insulated cables

Solderless earth connection for copper tape or bonded aluminium tape shield for cables without armor

Ordering description	Core cross section (mm ²) for cables with rated voltage Uo/U		
	6/10 kV	12/20 kV	20/35 kV
Cables with bonded aluminium tape shield (cables type AHXAMK-W)			
SMOE-62609	25 - 120	25 - 120	
SMOE-62589.	95 - 400	50 - 240	
Cables with copper tape shield			
EAKT-1655	25 - 70		
EAKT-1656	35 - 120	25 - 70	
EAKT-1657	95 - 240	50 - 150	25 - 70
EAKT-1658	240 - 500	120 - 400	35 - 300
EAKT-1659	630 - 800	500 - 800	240 - 800

NOTE

One kit includes materials for 3 phase.
Terminations for other cable types and cross sections can be ordered on request.
Please contact TE Connectivity offices for more information.

Additional kits for solderless earth connection of aluminum wire shield (APvP TAL cables)

Ordering description	Aluminum shield cross-section (mm) ²	Core cross-section (mm2) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
POLT-1x/A120	25 - 120	120 - 630	95 - 630	35 - 400
POLT-1x/A185	25 - 185	120 - 500	95 - 500	35 - 300
POLT-1x/A240	25 - 240	120 - 500	70 - 500	35 - 300

NOTE

One kit includes materials for 3 phase.
Terminations for other cable types and cross sections can be ordered on request.
Please contact TE Connectivity offices for more information.

Additional kits for solderless earth connection of aluminum wire armor

Ordering description	Armor diameter, mm	Core cross section (mm ²) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
Cables with aluminum wire armor (for full axial load)				
EAKT-1636	21 - 32	35 - 70	35 - 50	-
EAKT-1637	33 - 50	95 - 400	70 - 300	50 - 240
EAKT-1638	51 - 67	500 - 800	400 - 800	240 - 630

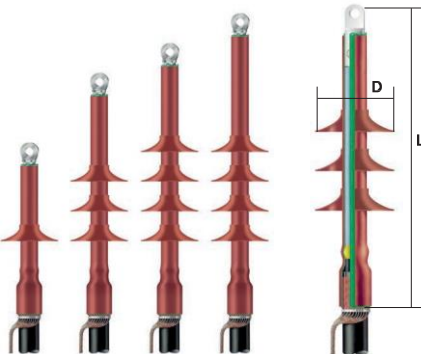
NOTE

One kit includes materials for 3 phase.
Fittings for other cable types and cross-sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Outdoor terminations for screened, 1-core polymeric insulated cables
10 kV, 20 kV and 35 kV

CABLE

The indoor termination is designed for 10 kV, 20 kV and 35 kV screened single core polymeric insulated cables.
For example: АnББ, ПnП, YHAKXS, XUHAKXS, YHKXS, AXEKVCY, AXEKVCEY, CXEKVCEY, N(A)2XSY, SZAQkrKM, SZAXRkKM, XHE 49, XHP 48, EHP 48, N(A)2XS(F)2Y, AHXAMK-W, NF C 33-223.



DESIGN OF TERMINATION

The design and installation is the same as for indoor terminations. In addition skirts are installed onto the tubing (see table). The wires of the cable shield or the grounding conductor are sealed with non-tracking mastic. Yellow stress grading mastic is laid around the end of the screen cut. A non-tracking insulating tubing coated with stress control. It insulates and seals the core between the end of the cable outer jacket and the cable lug.
Kits for solderless earth connection of armor, copper tape or aluminum wire screen (APvP-TAL type cables, etc.) must be ordered separately (see p. 45, 47).

Outdoor terminations for cables with copper wire shield without armor

Rated voltage Uo/U (kV)	With bolted lugs		Without lugs		Dimensions
	Wire cross section (mm ²)	Ordering designation	Wire cross section (mm ²)	Ordering designation	L (mm)
6/10	25 - 70	POLT-12C/1XO-L12	25 - 95	POLT-12C/1XO	300
	70 - 150	POLT-12D/1XO-L12A	95 - 240	POLT-12D/1XO	300
	120 - 240	POLT-12D/1XO-L12B	-	-	300
	185 - 400	POLT-12E/1XO-L16B	240 - 500	POLT-12E/1XO	300
	500 - 630	POLT-12F/1XO-L20A	500 - 800	POLT-12F/1XO	300
	800 - 1000	POLT-12F/1XO-L20B	-	-	300
12/20	25 - 70	POLT-24C/1XO-L12	25 - 70	POLT-24C/1XO	440
	50 - 150	POLT-24D/1XO-L12A	70 - 240	POLT-24D/1XO	440
	120 - 240	POLT-24D/1XO-L12B	-	-	440
	150 - 400	POLT-24E/1XO-L16B	185 - 400	POLT-24E/1XO	440
	500 - 630	POLT-24F/1XO-L20A	400 - 800	POLT-24F/1XO	440
	800 - 1000	POLT-24F/1XO-L20B	-	-	500
20/35	50 - 120	POLT-42D/1XO-L12	50 - 120	POLT-42D/1XO	560
	185 - 400	POLT-42F/1XO-L16A	400 - 500	POLT-42F/1XO	560
	500 - 630	POLT-42F/1XO-L20B	-	-	560
	800 - 1000**	POLT-42G/1XO-L20B	500 - 800	POLT-42G/1XO	560

NOTE

*Used cable lugs must be longitudinally sealed.
** Maximum cable diameter is 70 mm.
One kit includes material for 3 phase.
Quantity of skirts per phase: 12 kV - 1 pc; 24 kV - 3 pcs; 42 kV - 4 pcs
Skirt diameters: A - 76 mm; B - 76 mm; C - 85 mm; D - 95 mm; E - 115 mm; F - 135 mm.
Terminations for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Solderless earth connection of terminations for screened, 1-core polymeric insulated cables

Solderless earth connection for copper tape or bonded aluminium tape shield for cables without armor

Ordering description	Core cross section (mm ²) for cables with rated voltage Uo/U		
	6/10 kV	12/20 kV	20/35 kV
Cables with bonded aluminium tape shield (cables type AHXAMK-W)			
SMOE-62609	25 - 120	25 - 120	
SMOE-62589.	95 - 400	50 - 240	
Cables with copper tape shield			
EAKT-1655	25 - 70		
EAKT-1656	35 - 120	25 - 70	
EAKT-1657	95 - 240	50 - 150	25 - 70
EAKT-1658	240 - 500	120 - 400	35 - 300
EAKT-1659	630 - 800	500 - 800	240 - 800

NOTE

One kit includes materials for 3 phase.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Additional kits for solderless earth connection of aluminum wire shield (APvP TAL cables)

Ordering description	Aluminum shield cross-section (mm) ²	Core cross-section (mm2) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
POLT-1x/A120	25 - 120	120 - 630	95 - 630	35 - 400
POLT-1x/A185	25 - 185	120 - 500	95 - 500	35 - 300
POLT-1x/A240	25 - 240	120 - 500	70 - 500	35 - 300

NOTE

One kit includes materials for 3 phase.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Additional kits for solderless earth connection of aluminum wire armor

Ordering description	Armor diameter, mm	Core cross section (mm ²) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
Cables with aluminum wire armor (for full axial load)				
EAKT-1636	21 - 32	35 - 70	35 - 50	-
EAKT-1637	33 - 50	95 - 400	70 - 300	50 - 240
EAKT-1638	51 - 67	500 - 800	400 - 800	240 - 630

NOTE

One kit includes materials for 3 phase.
Fittings for other cable types and cross-sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Pre- expanded indoor terminations for polymeric insulated single-core screened cables up to 35 kV

CABLE

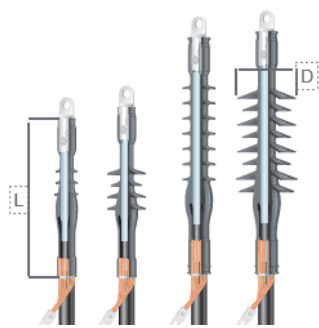
Pre- expanded indoor terminations for screened polymeric insulated single-core cables for voltages 10, 20, and 35 kV. For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEgap, K(A)9RVP- , N(A)2XS(2)Y, N2XS(F)2Y, HXCMK, AHXAMK-W, Multi Wiski, RG7H1R, etc.



CONSTRUCTION

Raychem terminations CSTI/O cold shrink terminations are made from a high performance, liquid silicone material which is specially formulated for excellent tracking and split resistance. The extra-long, silicone stress cone is integrated within the termination which ensures correct positioning. Moisture sealing at the lug is integrated into the termination body, eliminating the need for additional sealing tapes. They offer a reliable, fast and easy-to-install system to ensure trouble free service and maintain high network reliability. All key components are pre-expanded on one holdout system, allowing neat installation in compact environment on the prepared cable.

Raychem terminations CSTI/O are designed to cover a wide range of applications and to accommodate the variety of cable and conductor types used in the networks. Range-taking, mechanical lugs ensuring reliable installation and service can be supplied with the kit.



Termination with mechanical bolted lugs for copper wire screened cable without armor

Rated voltage Uo/U (kV)	Cross section (mm ²)	Ordering description	Dimensions (mm)		
		Indoor terminations	Insulation diameter (min. - max.)	Cable diameter (max.)	L
6/10	70 - 150	CSTI-3122-ML-2-13	13,7 - 20,8	22,0	300
	95 - 240	CSTI-3132-ML-4-13	20,8 - 28,4	34,0	355
	240 - 400	CSTI-3142-ML-6-13	28,4 - 33,6	50,0	355
	500 - 630	CSTI-3152-ML-7-17	34,0 - 40,0	58,0	375
12/20	25 - 95	CSTI-5122-ML-1-13	17,9 - 25,0	34,0	350
	120 - 240	CSTI-5132-ML-4-13	25,0 - 32,0	50,0	355
	300 - 400	CSTI-5142-ML-6-17	32,6 - 37,8	58,0	355
	500 - 630	CSTI-5152-ML-7-17	42,6 - 49,2	58,0	380
20/35	50 - 150	CSTI-7122-ML-1-13	27,4 - 31,4	42,0	490
	95 - 150	CSTI-7132-ML-4-13	29,9 - 36,5	48,0	500
	185 - 400	CSTI-7142-ML-6-17	34,5 - 46,6	59,0	530
	500 -630	CSTI-7152-ML-7-17	44,8 - 51,2	65,0	540
	800 -1000	CSTI-7162-ML-8-21	50,6 - 60,8	73,0	560

NOTE

One kit includes materials for 3 phases.
In the case of cables with armor, an additional check of the cable dimensions is required.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Pre- expanded outdoor terminations for polymeric insulated single-core screened cables up to 35 kV

CABLE

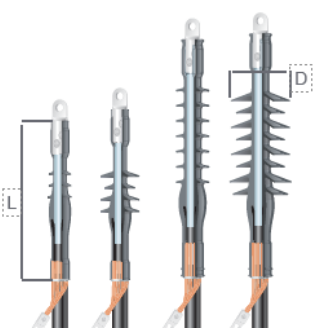
Pre- expanded indoor terminations for screened polymeric insulated single-core cables for voltages 10, 20, and 35 kV. For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEgap, K(A)9RVP- , N(A)2XS(2)Y, N2XS(F)2Y, HXCMK, AHXAMK-W, Multi Wiski, RG7H1R, etc.



CONSTRUCTION

Raychem terminations CSTI/O cold shrink terminations are made from a high performance, liquid silicone material which is specially formulated for excellent tracking and split resistance. The extra-long, silicone stress cone is integrated within the termination which ensures correct positioning. Moisture sealing at the lug is integrated into the termination body, eliminating the need for additional sealing tapes. They offer a reliable, fast and easy-to-install system to ensure trouble free service and maintain high network reliability. All key components are pre-expanded on one holdout system, allowing neat installation in compact environment on the prepared cable.

Raychem terminations CSTI/O are designed to cover a wide range of applications and to accommodate the variety of cable and conductor types used in the networks. Range-taking, mechanical lugs ensuring reliable installation and service can be supplied with the kit.



Terminations with mechanical bolted lugs for copper wire screened cable without armor

Rated voltage Uo/U (kV)	Cross section (mm ²)	Ordering description	Dimensions (mm)		
		Outdoor terminations	Insulation diameter (min. - max.)	Cable diameter (max.)	L
6/10	70 - 150	CSTO-3122-ML-2-13	13,7 - 20,8	22,0	355
	95 - 240	CSTO-3132-ML-4-13	20,8 - 28,4	34,0	360
	240 - 400	CSTO-3142-ML-6-13	28,4 - 33,6	50,0	360
	500 - 630	CSTO-3152-ML-7-17	34,0 - 40,0	58,0	380
12/20	25 - 95	CSTO-5122-ML-1-13	17,9 - 25,0	34,0	355
	120 - 240	CSTO-5132-ML-4-13	25,0 - 32,0	50,0	360
	300 - 400	CSTO-5142-ML-6-17	32,6 - 37,8	58,0	360
	500 - 630	CSTO-5152-ML-7-17	42,6 - 49,2	58,0	380
20/35	50 - 150	CSTO-7122-ML-1-13	27,4 - 31,4	42,0	490
	95 - 150	CSTO-7132-ML-4-13	29,9 - 36,5	48,0	500
	185 - 400	CSTO-7142-ML-6-17	34,5 - 46,6	59,0	530
	500 -630	CSTO-7152-ML-7-17	44,8 - 51,2	65,0	540
	800 -1000	CSTO-7162-ML-8-21	50,6 - 60,8	73,0	560

NOTE

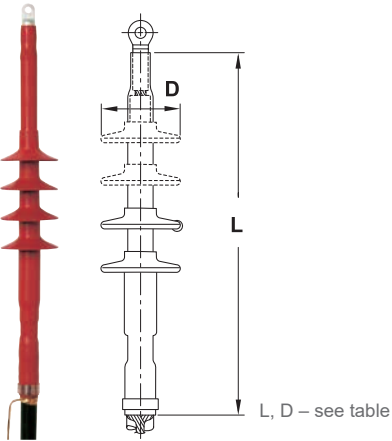
One kit includes materials for 3 phases.
In the case of cables with armor, an additional check of the cable dimensions is required.
Terminations for other cable types and cross sections can be ordered on request.
Please contact local TE Connectivity offices for more information.

Terminations for screened, polymeric insulated cables for electrified Railway systems 25 kV A.C.

Terminations for 26/45/52 kV cables used in the electrified Railway network.

CABLE

The termination is designed for screened single core polymeric insulated cables with wire shield, cross section from 150 mm2 to 400 mm2 and diameter over insulation between 30 mm and 45 mm. Cables designed for A.C. voltages (3 phase systems) Uo/Um of 30/52 kV or 41/72,5 kV usually meet the dimensional requirements. The termination is tested to IEEE-48-1990 which exceeds the requirements of IEC-60840-1999-2 for cables and accessories with max. system voltages Um up to 52 kV. This covers applications in railway net works with nominal voltage of 25 kV (phase to ground) as defined in EN-50163 with Umax1 of 27,5 kV (no time limit) and Umax2 of 29 kV (max. 5 min).



DESIGN OF TERMINATION

The cable is prepared in the same simple and easy way as for Raychem medium voltage terminations without sanding or penciling. Based on the design of Raychem high voltage terminations, the termination consists of a staggered layer of stress control tubing and patches. A heat-shrinkable non-tracking insulation tubing is shrunk over the stress control system and ensures a reliable seal to the lug and the oversheath. In addition skirts are separately installed onto the tubing thus allowing also upside down installations.

A mechanical lug covering cross sections from 150 mm2 to 400 mm2 is supplied with the kit. The palm hole of the lug allows busbar connection with M16 bolts. The termination is supplied as a single phase termination. The termination has no supporting function and needs to be fixed at top and bottom. A solderless earth connection for cables with metal sheath is available on request.

Terminations with mechanical bolted lugs

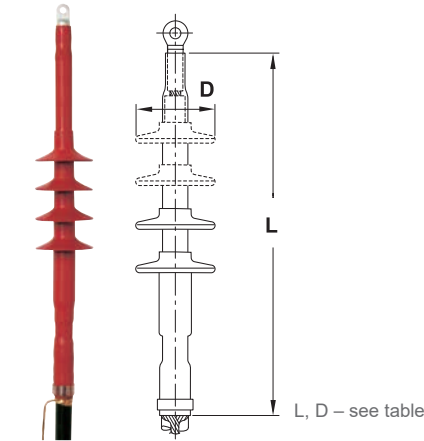
Ordering description	Cable dimensions			Dimensions of the termination		
	Cross section (mm2)	Insulation diameter (mm)	Outer diameter (mm)	Lengt (mm)	Skirt diameter (mm)	Quantity of skirts
Indoor						
RWIT-25/1x120-300-L12	120 - 300	30-45	60	750	176	2
RWIT-25/1x300-400-L12	300 - 400	42-47	65	780	176	2
Outdoor						
RWOT-25/1x120-300-L12	120-300	30-45	60	900	176	4
RWOT-25/1x300-400-L12	300 - 400	42-47	65	930	176	4

NOTE	One kit includes materials for 1 phase.
	Terminations for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Terminations for screened, polymeric insulated Filter Cables up to 150 kV D.C.

CABLE

The termination is designed for screened single core polymeric insulated cables with wire shield or metal sheath, cross section from 35 mm2 to 240 mm2 and diameter over insulation between 26 mm and 52 mm. Cables designed for D.C. voltages 111 kV or 150 kV usually meet the dimensional requirements.



DESIGN OF TERMINATION

The cable is prepared in the same simple and easy way as for Raychem medium voltage terminations without sanding or penciling. Based on the design of Raychem high voltage terminations, the filter cable termination consists of a staggered layer of stress control tubing and patches. A heat-shrinkable non-tracking insulation tubing and shed are shrunk over the stress control system and ensure a reliable seal to the lug and the oversheath. A mechanical lug cove ring cross sections from 35 mm2 to 95 mm2 or 95 mm2 to 240 mm2 is supplied with the kit. The mechanical lug has a M10 thread on the top for easy connection to connecting busbars. The termination is supplied as a single phase termination. A solderless earth connection for cables with metal sheath is included in the termination kit.

TESTING AND PERFORMANCE

Neither national nor international secifi - cations exist for filter cable terminations. By understanding the specific operation requirements of a filter cable termination, Raychem developed a test specification and qualified the filter cable termination FCEV to these requirements. The over -view of qualification tests is summarized in a table below.

Ordering description				Dimensions of the termination		Quantity of skirts
	Core diameter (mm)	Insulation diameter (mm)	Max. outer diameter (mm)	Lenght L (mm)	Skirt diameter (mm)	
FCEV-111	6 - 11,5	26 - 38	53	500	165 or 176	1
FCEV-150	6 - 11,5	26 - 38	53	700	165 or 176	2
FCEV-150-1	10,5 - 21,5	38 - 52	73	700	165 or 176	2

NOTE	One kit includes materials for 1 phase.
------	---

Overview of qualification tests:

Types of tests	Passed requirements	
	FCEV 111	FCEV 150
Partial discharge test	< 3 pC @ 42 kV AC	< 3 pC @ 60 kV AC
DC withstand test	> 8 hours @ - 200 kV	> 8 hours @ - 275 kV
	> 8 hours @ + 200 kV	> 8 hours @ + 275 kV
Impulse tests (wave shape 1.2/50 μs)	> 1000 pulses @ - 240 kV	> 1000 pulses @ - 320 kV
	> 1000 pulses @+ 240 kV	> 1000 pulses @+ 320 kV
50 Hz AC withstand test	> 10 minutes 60 kV	> 10 minutes @ 85 kV

NOTE	Detailed test reports are available on request.
------	---



Section II

MV Switchgear connection system

Connection systems for bushings according to EN 50181 type C1 (630 A) and type C2 (1250 A) up to 42 kV

TE Connectivity connection systems for small-sized gas-insulated switchgear	54
RICS-31 Insulated T-adapters for voltages up to 10 kV	56
RICS-51 Insulated T-adapters for 10 and 20 kV.....	57
RSTI Screened separable T-connection system for 10, 20 and 35 kV	58
RSTI - VS Voltage sensors for network monitoring	60
Smart RSTI+ CAPDIS Network Monitoring System	61
RDA Surge arresters for insulated T-adapters	62
RSTI - SA Surge arresters for screened adapter	63

Screened, separable elbow and straight connection system for gas insulated switchgears and transformers with bushings according to EN 50181 type A (250 A), up to 24 kV

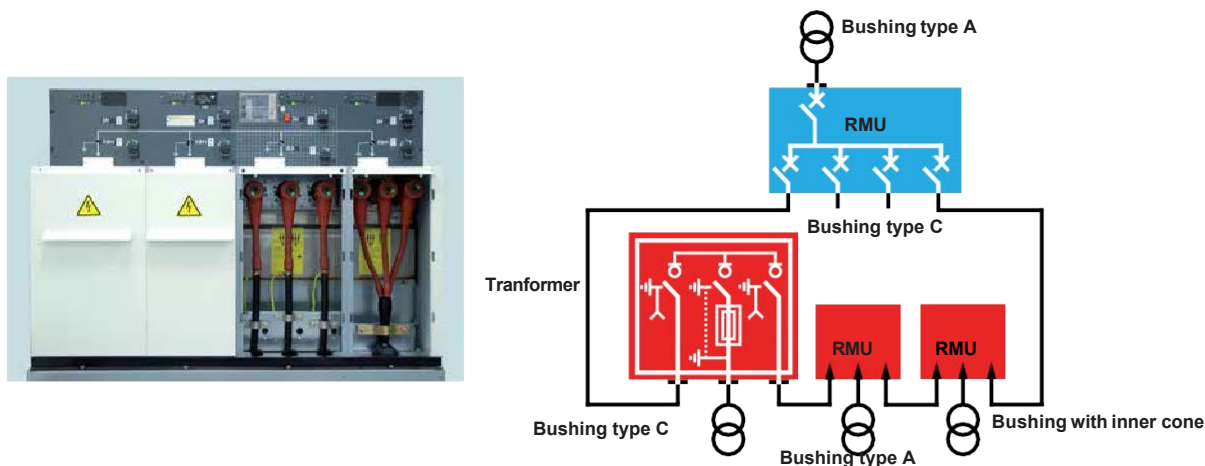
RSES, RSSS Screened adapters for voltages up to 20 kV	64
Accessories for insulated and screened adapters RICS, RSTI, RSES, RSSS	65

Plug In Termination System up to 52kV for Gas Insulated Switchgear

RPIT Plug in termination for voltages up to 52 kV	66
---	----

TE Connectivity connection systems for compact switchgears

Nowadays, gas-insulated switchgears (gas-insulated and vacuum-insulated) are very common. Such switchgears have compact cable compartments, closed on all sides by metal walls, and therefore, fully screened. The cables in such compartments are connected to special bushings with an external or internal cone. In addition to switchgear, transformers also be equipped with such bushings. Types of bushings for switchgear and transformers are described in international standards EN 50180, EN 50181.



APPLICATION

TE Connectivity's connection systems to the gas-insulated switchgear meets all the requirements of different manufacturers' gas-insulated switchgear in terms of voltage levels, rated loads and cable types. We manufacture adapters for all connection options for the main types of bushings: "A", "B", "C", and "F", as well as for the inner tapered RMUs.

RELIABILITY

TE Connectivity's sealed, waterproof connection systems been used for decades and guarantee reliable and trouble-free operation in the harshest environments of and other equipment from various manufacturers.

TESTING

The connection systems comply with the CENELEC HD629.1 S2 standards VDE 0278 and ANSI IEEE 386, as well as tested in accordance with the internal standard PPS 3013. Reichem adapter connection systems have been type-tested with most of the switchgear currently used in networks worldwide. The test information is consolidated in reports, which are available on request.

BUSHINGS

For connecting cables to substations and transformers, two types of bushings, as described in EN 50180 and EN 50181, are used: outer taper and inner cones. TE Connectivity has developed connection systems and accessories for each type of bushing. The most common cable connection is with the use of bushings with outer cone type "A" and "C". Among the inner taper bushings, sizes "2" and "3" are most commonly used.

OUTER CONE BUSHINGS

There are several designs for the ratings 24-36-42-52-52-72.5 kV in voltage and 250-400-630-1250-2500 A in current. See page 63 for information on some of them.

INNER CONE BUSHINGS

There are several sizes of inner taper bushings. For voltage classes up to 52 kV and current loads from 800 to 1250 A, the most popular are bushings with inner cone sizes "2" and "3". RPIT plug-in termination are used to connect polymeric insulated cables.

Information on inner cone bushings

is provided on pp.63, 74.

BUSHINGS TYPE "C"

This is the most common type of bushings designed for current loads 630 to 1250 A and voltages up to 42 kV. Compatible adapters

- insulated RICS
- screened RSTI.

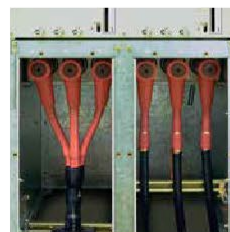
RICS insulated adapters allow the connection of paper-insulated and plastic (LDPE and EPR) insulated cables. RSTI screened adapters are only suitable for polymeric cables. Double connection of adapters on one phase, connection of surge arresters is possible. All adapters allow connection of both single and 3-core cables.

TYPE "A" BUSHINGS

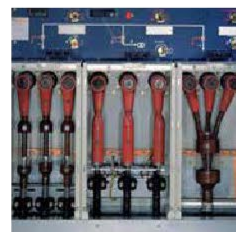
Designed for connection of cables with polymeric (LDPE and EPR) insulation to switchgears and transformers using RSES and RSSS adapters with plug-in contact. The rated current load is 250 A. Maximum voltage 24 kV.

ADAPTER ACCESSORIES

Accessories required for testing and measurement, connection pins, plugs, etc. have been developed RICS, RSTI, RSES/RSSS and RPIT adapters.



Siemens 8DJ10



Groupe Schneider
RM6



AREVA FBA

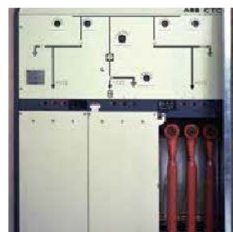
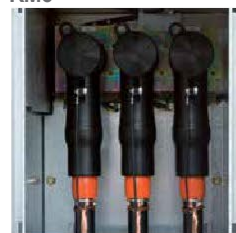


ABB CTC



RICS



RSTI



RSES



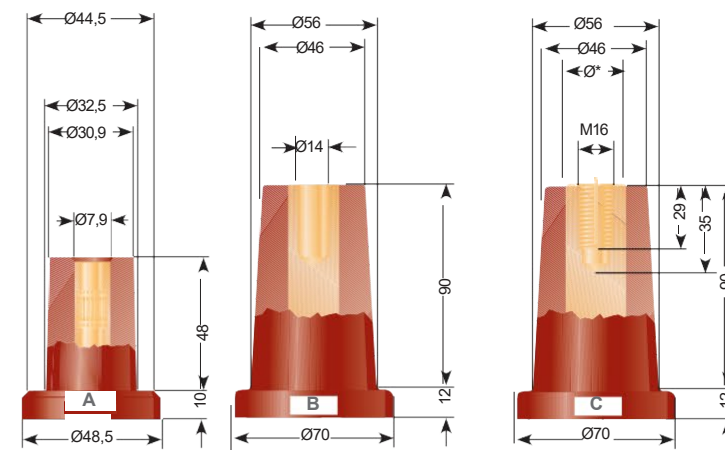
RSSS



RPIT

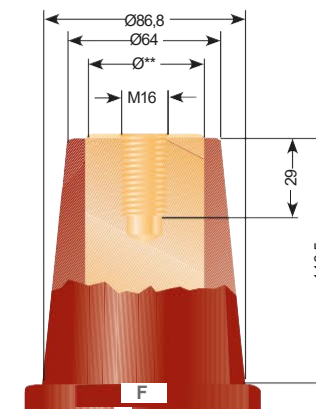
TE Connectivity connection systems for small-sized switchgears

Bushings with outer cone "A", "B", "C"
according to EN 50180 and EN 50181



* - 22 mm in case of 630 A
- 32 mm in case of 1250 A

Bushing with outer cone "F"
according to EN 50673



** - 22 mm in case of 630 A
- 32 mm in case of 1250 A
- 50 mm in case of 2500 A

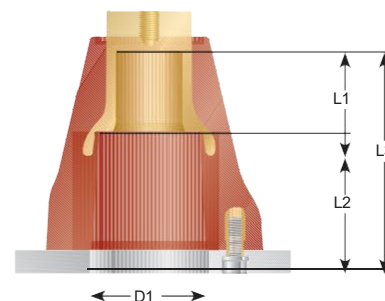
Bushings type	A	B		C		F		
Max. system voltage, kV	24	36		42		72,5		
Rated current, A	250	250	400	630	1250	630	1250	2500
Contact type	Plug-in, pin 7.9 mm	Plug-in, pin 14 mm		Threaded, stud M16		Threaded, stud M16		
Compatible adapters								
Adapter type	RSES-525 RSSS-525	RSES-64		RICS-31xx	RICS-51xx	RSTI	RSTF*	
	screened	screened		insulated		screened	screened	
Maximum , kV	24	36		12	24	42	72,5	
Compatible cables	XLPE, EPR	XLPE, EPR		Paper, XLPE, EPR		XLPE, EPR	XLPE, EPR	
Cross section	16 - 150 mm²	50 - 300 mm²		25 - 240 (300**) mm²		35 - 1000 mm²	up to 1200 mm²	
Double cable connection, surge arrester connection	—	—		—	✓	✓	✓	
Voltage test contact	option	✓		—		✓	✓	
Voltage sensor connection ***	✓	✓		—		✓	✓	

NOTE

* To order RSTF adapters, should be filled relise form.

** Only with mechanical bolt lugs included in the POLT-12E/3XI-H1-L16A or POLT-24E/3XI-H1-L16A termination

*** Voltage sensor according to IEC 61869-11:2017 for U_{max}=24 kV only. For more details see pp. 60, 61.



Bushings with inner cone "2" and "3" according to EN 50180, EN 50181

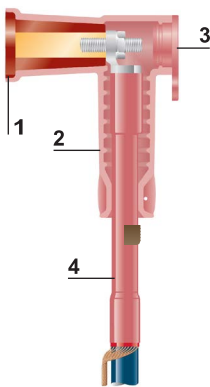
Cone size	2	3
L1 (mm)	~ 47	~ 90
L2 (mm)	~ 83	~ 110
L3 (mm)	~ 130	~ 200

The table shows the approximate dimensions required to determine the type of bushing installed in the equipment. See page 66 for exact dimensions of RPIS -2 and RPIS 3 bushings. 66.

RICS-31

Insulated adapters for voltages up to 10 kV

Insulated T-adapters for connection paper and polymeric insulated cables up to 10 kV to gas compact switchgear with C₁ (630A) and C₂ (1250A) bushings



- 1 Bushing type "C"
2 RICS-31xx adapter 3
Back plug
4 Raychem termination

The insulated adapter provides reliable sealing, insulation and electric connection between Raychem termination and gas-insulated switchgear up to 12 kV with bushing type "C" according to EN 50181.

RICS-31xx - CONSTRUCTION

The RICS adapter is made of high quality elastomer and is designed for T-connection of the cable lug of gas insulated socket and bushing of gas insulated switchgear where the insulation of the air gap is insufficient for the normal functioning of the equipment.
The elastomeric body has increased electrical strength and offers tracking and erosion resistance, environmental resistance to allow reliable operation in wet and dirty conditions and at high levels of electric field strength.
RICS-31xx adapters are quick and easy to install and work with all Raychem terminations for both paper and plastic (LDPE and EPR) insulated cables. Adapter can be easily removed and reassembled.

INSTALLATION

The elastomeric body is slid over termination with a mechanical lug. The cross-section range from 25 to 300 mm² covers the housing of same size.
The lug connectedo the bushing with an aluminum threaded rod with a shear bolt, allowing the adapter to be mounted without a torque wrench.
On request, the adapters can be equipped with a steel stud with washer and nut. In this case, the nut must be tightened with a torque controlled by a torque wrench. The back side of the adapter is securely sealed with an elastomeric plug.

TESTING

RICS adapters are tested in accordance with the requirements of CENELEC HD 629, GOST 34839-2022 including AC voltage, DC voltage, BIL, cyclic voltage tests (2.5 U_o phase/ground). All over-voltage tests were conducted in the confined space of the metal enclosure to create a model that approximates real-world conditions.
RICS adapters have withstood electrical design tightness tests under the most critical conditions, namely in a wet chamber, and 16 kV (more than 2.5 U_o) cyclic testing under water.



Rated voltage U _o /U (kV)	Cross section (mm ²)	Ordering description		
		T-adapter	Termination for single-core cable	Termination for three-core cable*
Polymeric insulated cable				
6/10	25 - 50**	RICS-3133-S	POLT-12C/1XH-L16	POLT-12C/3XH-H1-L16
	70 - 150	RICS-3133	POLT-12D/1XH-L16A	POLT-12D/3XH-H1-L16A
	120 - 240	RICS-3133	POLT-12D/1XH-L16B	POLT-12D/3XH-H1-L16B
	300	RICS-3133	POLT-12E/1XH-L16A	POLT-12E/3XH-H1-L16A
Paper insulated cable				
6/10	25 - 50	RICS-3133-S		GUST-12/25-50/450-L16
	70 - 120	RICS-3133		GUST-12/70-120/450-L16
	150 - 240	RICS-3133		GUST-12/150-240/450-L16

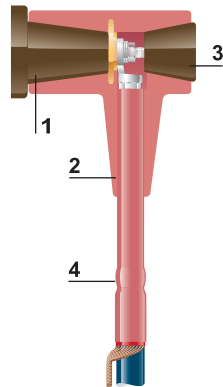
NOTE

* Termination core lengths may differ from those given in the table, see page 34 for GUST and pp. 40, 44 for POLT.
** Should be added additional tubing HVOT-38/12-150/147 (3 pcs.)
Insulation body, plug and threaded aluminum stud with shear bolt and washer are supplied in 3-phase configuration with installation instructions.
Termination with lugs must be ordered separately.
Steel studs are available for the adapter on request.
RICS type adapters are compatible with all TE Connectivity adaptors from the "End Couplings" section of this catalog.
Please contact local TE Connectivity offices for more information.

RICS-51

Insulated adapters for 10 and 20 kV

Insulated T-adapters for connection of 10 and 20 kV paper and polymeric insulated cables to gas insulated switchgear with C₁ (630A) and C₂ (1250A) bushings



- 1 Bushing type "C"
2 RICS-51xx adapter
3 Back plug
4 Raychem termination

The insulated adapter provides reliable sealing, insulation and electrical connection between Reichem termination and gas-insulated switchgear for voltages up to 24 kV with bushings type "C" according to EN 50181.

RICS-51xx - CONSTRUCTION

The RICS-51XX thick-walled adapter is made of high quality elastomer, which insulates the T-connection of the lug termination and bushing of a gas-insulated switchgear where the air gap insulation is insufficient for normal operation of the equipment.
The elastomeric body has increased electrical strength and has tracking and erosion resistance, resistance to environmental influences, provides reliable operation in conditions of high humidity and pollution, as well as at high levels of electric field strength. Adapters RICS-51xx are quick and easy to install and work in combination with all Reichem termination. Adapter can be easily removed and reassembled.

INSTALLATION

The thick-walled elastomeric housing slides over the termination with mechanical lug. The RICS-51xx adapter range covers the cross-sectional range from 25 to 300 mm² with three housing sizes, which are selected according to the table below.
The lug is connected to the bushing with a threaded rod and nut. The nut should be tightened with a torque wrench to the torque specified in the instructions. The back of the adapter is securely sealed with a threaded plug.

Tests

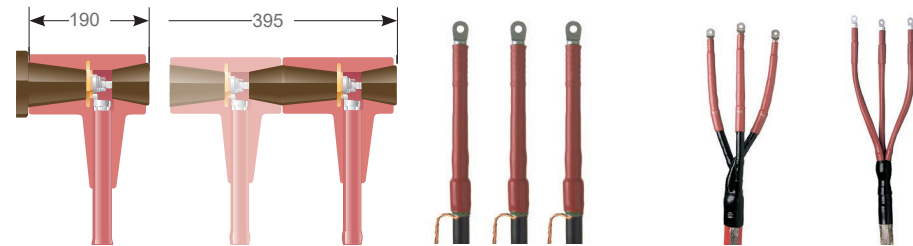
RICS-51xx adapters are tested in accordance with the requirements of CENELEC HD 629, 1 S2, VDE 0278 and ANSI IEEE 386 as well as the Raychem specification PPS 3013. In addition, the adapters have been type tested in conjunction with most of the existing gas-insulated switchgears. RICS adapters have been successfully tested under water: cyclic, dielectric and structural integrity tests. The test results can be found in the test reports, which are available on request.
Test pins for testing without removing the adapters are shown on page. 65.

Double connection

Second adapter must be ordered additionally according to the table below.

Connection of surge arresters

Connecting the arrester together with the adapter is shown on page 62. 62.



Rated voltage U _o /U (kV)	Cross section	Ordering description			
		T-adapter	second T-adapter for double connection	Termination for single-core cable	Termination for three-core cable*
Polymeric insulated cable					
6/10	25 - 70	RICS-5123		POLT-12C/1XI-L12	POLT-12C/3XI-H1-L12
	70 - 150	RICS-5133	RICS-5137	POLT-12D/1XI-L16A	POLT-12D/3XI-H1-L16A
	120 - 240	RICS-5143	RICS-5147	POLT-12D/1XI-L16B	POLT-12D/3XI-H1-L16B
	300	RICS-5143	RICS-5147	POLT-12E/1XI-L16A	POLT-12E/3XI-H1-L16A
12/20	25 - 70	RICS-5123		POLT-24C/1XI-L12	POLT-24C/3XI-H1-L16
	50 - 150	RICS-5133	RICS-5137	POLT-24D/1XI-L16A	POLT-24D/3XI-H1-L16A
	120 - 240	RICS-5143	RICS-5147	POLT-24D/1XI-L16B	POLT-24D/3XI-H1-L16B
	300	RICS-5143	RICS-5147	POLT-24E/1XI-L16A	POLT-24E/3XI-H1-L16A
Paper insulated cable					
6/10	25 - 50	RICS-5123			GUST-12/25-50/450-L16
	70 - 120	RICS-5133	RICS-5137		GUST-12/70-120/450-L16
	150 - 240	RICS-5143	RICS-5147		GUST-12/150-240/450-L16

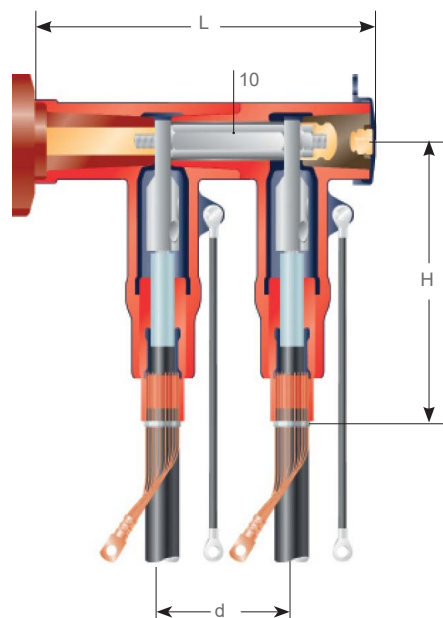
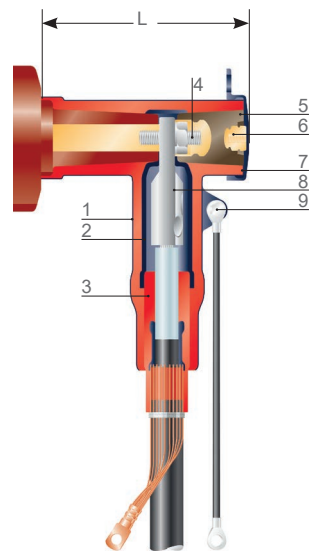
NOTE

* Termination core lengths may differ from those given in the table, see page 34 for GUST and pp. 40, 44 for POLT.
Insulation body, plug and threaded aluminum stud with shear bolt and washer are supplied in 3-phase configuration with installation instructions.
Termination with lugs must be ordered separately.
RICS type adapters are compatible with all TE Connectivity adaptors from the "End Couplings" section of this catalog.
Please contact local TE Connectivity offices for more information.

RSTI

Screened adapters up to 35 kV

Screened T-adapters for connection 10, 20 and 35 kV polymeric insulated cables to gas-insulated switchgear with C_1 (630A) and C_2 (1250A) bushings



RSTI - CONSTRUCTION

Reichem screened adapters are suitable for connecting single and three-core polymeric insulated cables to gas-insulated switchgear cells with type C bushings according to EN 50181 for voltages up to 42 kV. The connection can also be made for parallel connection of 2 and 3 cables with total load up to 1250 A. This configuration requires a secure mechanical fixing in the unit of each of the cables, without mechanical impact on the bushings.

The adapter body is made of high quality silicone rubber, protected from the outside by a layer of conductive shielding connected to ground. RSTI adapters can be used for both indoor and outdoor installation. Cable sheath testing can be performed without removing the screened adapter from the bushing. To check if voltage is present, design RSTI adapter includes a capacitive voltage divider for non-disconnected measurement of the adapter.

The modern design and material selection in combination with the special Raychem bolt lug allows a wide range of cable cross-sections to be covered with one adapter size. The bolt lugs included in the kit are designed for class 2 copper and aluminum conductors.

Double connection

Due to their compact design, the RSTI screened adapters allow even connections in standard cable compartments of the switchgear cubicles. The second adapter must be ordered according to the table on page 59. 59.

Connection of surge arresters

Connecting the arrester together with the adapter is shown on page 63. 63.

Screened adapter exceeds the requirements of CENELEC HD 629.1 S1, which national standards such as BS, VDE and others.

INSTALLATION

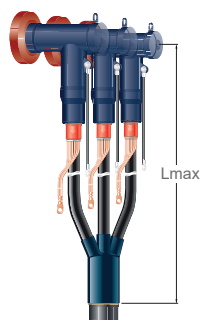
On the stripped cable with lubricant is pushed over the stress cone to equalize the tension of the electric field (geometrical stress control). Then installed bolted lug. After that, the main body of the adapter is installed with grease and connected to the bushing of the RMU using a stud and nut. The nut should be tightened with a torque wrench with the specified in the instructions. A plug with a capacitive voltage divider contact or a connection stud for double cable connection is installed on the reverse side.

- 1 Screened outer layer
- 2 Inner screened layer
- 3 Stress Cone
- 4 Pin with nut and spring washer
- 5 Back plug with contact
- 6 Capacitive voltage divider contact
- 7 Cover made of conductive material
- 8 Bolt lug
- 9 Body grounding point and grounding lead
- 10 Coupling stud

Dimensions

Base kit	L (mm)		H (mm)	d (mm)
	for one cable	for two cables		
RSTI-58xx	180	285	260	101
RSTI-78xx	183	295	300	101
RSTI-59xx, RSTI-79xx	196	315	372	120

Additional sealing kit for three-core cables with copper wire shield without armor



Ordering description	Cross section (mm²) for cables with rated voltage Uo/U			Dimensions		
	6/10 kV	12/20 kV	20/35 kV	Insulation diameter (mm)	Cable diameter (mm)	Lmax* (mm)
RSTI-TRF01	35 - 185	35 - 95	-	13,7 - 25,0	46,0 - 67,0	600
RSTI-TRF02	70 - 300	50 - 240	35 - 120	17,6 - 35,6	50,0 - 90,0	600
RSTI-TRF03	240 - 300	150 - 300	35 - 240	25,6 - 43,0	85,0 - 140,0	600

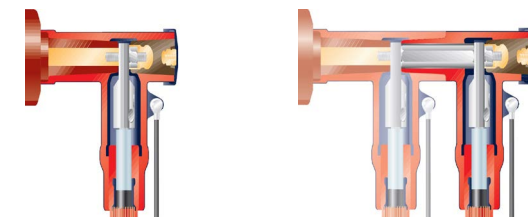
NOTE

* Kits with longer core lengths are available on request. When connecting three-core cables to compact RMU, the length of the conductors must be equal to the distance from the spine of the termination to the bushing, with no allowance for phasing.

RSTI

Screened adapters up to 35 kV

Screened T-adapters for connection 10, 20 and 35 kV polymeric insulated cables to gas-insulated switchgear with C_1 (630A) and C_2 (1250A) bushings



Rated voltage Uo/U (kV)	Cross section	T-adapter	Second adapter for double connection	Insulation diameter (mm)
6/10	35 - 95	RSTI-5851-CEE01	RSTI-CC-5851-CEE01	12,7 - 23,4
	95 - 240	RSTI-5853-CEE01	RSTI-CC-5853-CEE01	17,0 - 30,1
	185 - 300	RSTI-5855-CEE01	RSTI-CC-5855-CEE01	21,2 - 34,6
	240 - 400	RSTI-5856-CEE01	RSTI-CC-5856-CEE01	21,2 - 34,6
	500 - 630	RSTI-5953-CEE01	RSTI-CC-5953-CEE01	34,0 - 45,4
	800	RSTI-5954-CEE01	RSTI-CC-5954-CEE01	39,1 - 59,0
	1000	RSTI-5955-CEE01	RSTI-CC-5955-CEE01	39,1 - 59,0
12/20	35 - 70	RSTI-5851-CEE01	RSTI-CC-5851-CEE01	12,7 - 23,4
	95 - 240	RSTI-5854-CEE01	RSTI-CC-5854-CEE01	21,3 - 34,6
	185 - 300	RSTI-5855-CEE01	RSTI-CC-5855-CEE01	21,2 - 34,6
	400	RSTI-5951-CEE01	RSTI-CC-5951-CEE01	34,0 - 45,4
	500 - 630	RSTI-5953-CEE01	RSTI-CC-5953-CEE01	34,0 - 45,4
	800	RSTI-5954-CEE01	RSTI-CC-5954-CEE01	39,1 - 59,0
20/35	1000	RSTI-5955-CEE01	RSTI-CC-5955-CEE01	39,1 - 59,0
	35 - 95	RSTI-7851-CEE01	RSTI-CC-7851-CEE01	22,4 - 35,5
	95 - 150	RSTI-7852-CEE01	RSTI-CC-7852-CEE01	22,4 - 35,5
	120 - 240	RSTI-7853-CEE01	RSTI-CC-7853-CEE01	28,9 - 42,0
	185 - 300	RSTI-7855-CEE01	RSTI-CC-7855-CEE01	28,9 - 42,0
	240 - 400	RSTI-7951-CEE01	RSTI-CC-7951-CEE01	34,0 - 45,4
	500 - 630	RSTI-7952-CEE01	RSTI-CC-7952-CEE01	39,0 - 59,0
	800	RSTI-7953-CEE01	RSTI-CC-7953-CEE01	39,1 - 59,0
	1000	RSTI-7954-CEE01	RSTI-CC-7954-CEE01	39,1 - 59,0

NOTE

3-phase kit includes: screened body, stress cone, bolt lug, connection pin with nut and washer, plug with capacitive voltage divider contact, lubricant, and installation instructions. Solderless grounding kit must be ordered separately.

Solderless grounding kit

Ordering description	Cross-section (mm²) for Uo/U voltage cables		
	6/10 kV	8.7/15 kV	12/20 kV
For cables with aluminum or copper tape screen			
SMOE-62871	35 - 120	35 - 120	35 - 120
SMOE-62872	95 - 400	70 - 300	50 - 240

NOTE

Fittings for solderless earthing of other types of screen and armor of single-core cables - see pg. 45, 47. Contact TE Connectivity offices for more information.

RSTI - VS Voltage sensors for network monitoring

Voltage sensors for 10 and 20 kV screened adapters for gas-insulated units with C₁ (630A) and C₂ (1250A) bushings



The RSTI-VS voltage sensors are designed to integrate RSTI screened adaptors into SMART Grid networks and enable monitoring, control and protection of the network.

The voltage sensor, calibrated during manufacture, outputs a low-voltage signal, which is read by means of an integrated capacitive voltage divider.

The level of the signal and its accuracy allows it to be used for partial discharge control, power metering, quality assessment, and network condition monitoring

No additional processing devices are required - the signal is fed to the corresponding digital control, automation or relay protection terminals.

The use of galvanic isolation ensures safe operation and protection of the equipment, and the size of the sensor allows to maintain the compactness of connection realized in the RSTI line of adapters.

The sensors can be used in both new construction and modernization of existing networks.

Only a torque wrench is required to mount the RSTI- VS voltage sensors. RSTI-VS voltage sensors do not require external power supply.

Technical data of RSTI-VS sensors	
Electrical characteristics	
Insulation level	24 kV (max.) / 125 kV / 50 Hz
Um	24 kV
Rated voltage factor	1.2 x Upn and 1.9 x Upn/8h
Maximum PD level	<10 pCal @ 24 kV <50 pCal @ 28.8 kV
Signal Characteristics	
Accuracy class	Measurement 0.5% Protection 3P
Accuracy of harmonic measurement	Conforms to IEC 61869-11
Rated primary voltage, Upn*	20/√3 kV
Rated secondary voltage*	3.25/√3 B
Nominal conversion ratio,Kn1*	20 kV/3.25 V (or 10,000/ 1)*
Rated load, Rbr*	2 megohms (or any value ≥ 1 MΩ)* , 50 pF
Nominal frequency	50/60 Hz
Frequency range (-3dB)	5 MHz
Other characteristics	
Compliance with standards	IEC 61869-11 CENELEC HD 629.1 S2
Operating temperature	-40°C - +80°C
Length of connection cable*	3.5 / 5.0 / 7.0 m

Smart RSTI+ CAPDIS Network Monitoring System

Grid monitoring with RSTI - VS voltage sensors for 10 and 20 kV compact gas-insulated switchgear substations



Kries, a member of TE Connectivity Group, has developed a monitoring system condition of medium-voltage cable networks specifically for use in the compact gas-insulated switchgears.

The RSTI Smart Grid kit includes the RSTI-VS voltage sensor (1), screened RSTI adapter (2) and the CAPDIS terminal (3).

The monitoring system does not require external power supply and ensures safe operation in compact cable compartments of existing compact switchgear substations.

The system allows monitoring and evaluation of partial discharge (PD) levels. These include:

- PD measurement
- Localization of PD
- Determining the type of PD
- PD threshold value exceeding alarms

The monitoring system can be integrated into existing networks and as well as used in new construction and can be connected to the systems automation and control of networks. Resieved information of the PD level allows for the assessment condition of cable lines, it is possible to predict possible accidents.

In addition to RSTI adapters, the cable network monitoring system can be realized the basis of the following screened adapters: RSES, RSSS, RPIT, RSTF.

For more information, please contact TE Connectivity offices.

Smart RSTI + CAPDIS

- 1 Voltage sensor RSTI-VS
- 2 Screened RSTI adapter
(complete with connection cable and cover)
- 3 CAPDIS terminal

Ordering description	Type of installation	Connection cable length, m
RSTI-VS-24-BP-3.5M	Retrofit: RSTI, RSTI-CC, RSTI-SA	3,5
RSTI-VS-24-BP-5.0M	Retrofit: RSTI, RSTI-CC, RSTI-SA	5,0
RSTI-VS-24-BP-7.0M	Retrofit: RSTI, RSTI-CC, RSTI-SA	7,0
RSTI-58xx-VS-24-BP-3.5M*	New construction	3,5
RSTI-58xx-VS-24-BP-5.0M*	New construction	5,0
RSTI-58xx-VS-24-BP-7.0M*	New construction	7,0

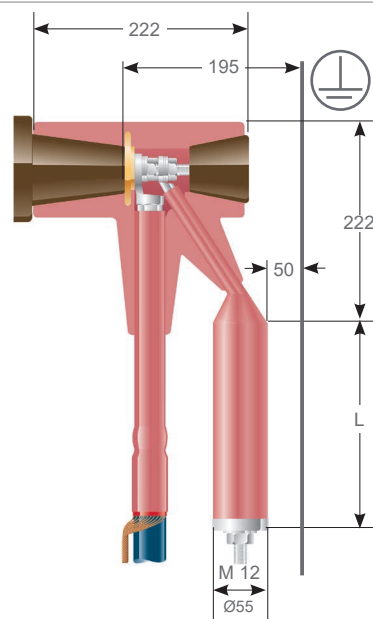
NOTE

* For adapter selection, see page 59.

RDA

Surge arresters for insulated adapters

Surge arresters for insulated adapters RICS-51 for voltages up to 20 kV



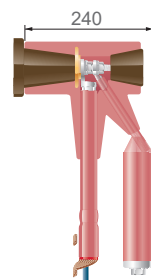
Modern gas-insulated switchgears are connected to a combined network of cable and overhead lines and must be protected against overvoltages induced in the network. Surge arresters are installed directly on the adapter connection pin and limit voltage level to a safe level.

RDA arresters can be installed together with any Raychem termination using the RICS-51x9 adapter. The adapter has an additional channel for connecting the arrester. The design of the adapter is not much larger than a conventional adapter, which allows it to fit into the cable unit dimensions of most existing switchgear substations.

RDA surge arresters are used for voltages from 6 to 24 kV. The arrester complies with IEC-60099-4, has a line discharge class 1 and a rated short-circuit current of 10 kA.

The RICS 5009-50-22 plug is temporarily permitted instead of the RDA arrester. Additional information on the arresters is available on request.

To prevent excessive mechanical stress on the bushing, it is recommended to install a support rail under the bottom flange of the arrester. Please contact local TE Connectivity offices for more information.



ОПН RDA

Заглушка

RICS-5009-50-22

Voltage Uo/U, (kV)	Cross section (mm ²)	Ordering description		discharge current, (kA)	current, (kA)	4/10 µs high current pulse, (kA)	Weight of the arrester (kg)	Height L, (mm)
		connecting surge arresters	SA RDA					
3,6/6	25 - 35**	RICS-5139-S	RDA-07	10	16	100	1,7	148
	50 - 150	RICS-5139	RDA-07					
	120 - 240	RICS-5149	RDA-07					
	300	RICS-5149	RDA-07					
6/10	25 - 35**	RICS-5139-S	RDA-12	10	16	100	2,2	200
	50 - 150	RICS-5139	RDA-12					
	120 - 240	RICS-5149	RDA-12					
	300	RICS-5149	RDA-12					
12/20	25 - 35**	RICS-5139-S	RDA-24	10	20	100	3,6	393
	50 - 150	RICS-5139	RDA-24					
	120 - 240	RICS-5149	RDA-24					
	300	RICS-5149	RDA-24					

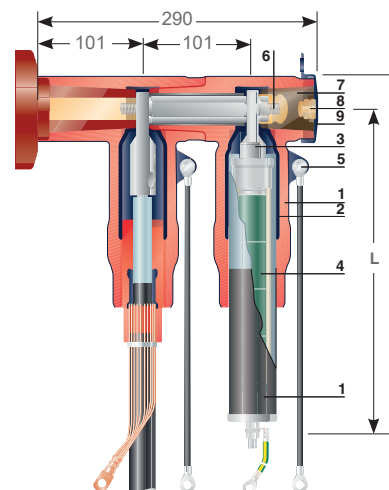
NOTE ** Should be added additional tubing HVOT-38/12-150/147 (3 pcs.)

Type of arrester	RDA-07	RDA-12	RDA-24
Long-term permissible overvoltage (kV)	7,0	12,0	24,0
Rated voltage (kV)	8,75	15,0	30,0
Remaining overvoltage (kV)W			
Lightning current pulse 8/20 µs			
5 (kA)	21,7	37,2	74,4
10 (kA)	23,3	40,0	80,0
20 (kA)	26,2	44,9	89,7
40 (kA)	30,6	52,4	105
Rectangular pulse 1/20 µ			
10 (kA)	-	43,9	87,2
Switching pulse 30/60 µsec			
125 (A)	31,5	27,5	55,0
500 (A)	32,4	29,6	59,2

RSTI - SA

Surge arresters for screened adapters

Surge arresters for RSTI screened adapters for voltages up to 35 kV



Modern gas-insulated switchgears are connected to a combined network of cable and overhead lines and must be protected against overvoltages induced in the network.

Surge arresters are installed at the connection point of the cable line and limit the voltage level. The arrester is mounted directly the adapter connection stud. Dimensions of the structure increase to the depth of the double adapter connection structure, which allows it to be used in cable unit of many standard switchgears RMU.

Combined connection of screened adapter and surge arrester complies with requirements CENELEC HD 629.1 S2. Surge arrester RSTI-SA is used for voltages from 10 to 35 kV. The surge arresters accorded with the requirements of IEC-60099- 4, has a line discharge class 1 and a nominal short-circuit current. 10 kA. Additional information on surge arresters is available on request.

To prevent excessive mechanical load on the bushing, should be install a support rail for the bottom flange of the arrester. Please contact local TE Connectivity offices for more information.

- 1 Screened body
- 2 Inner shielding layer
- 3 Pre-installed mechanical lug
- 4 Zinc oxide SA
- 5 Body grounding point and grounding leed
- 6 Connecting stud
- 7 Back plug with contact
- 8 Capacitive voltage divider contact
- 9 Cover made of conductive material

Voltage Uo/U, (kV)	Ordering description			Rated discharging current, (kA)	Rated current, (kA)	4/10 µs high current pulse, (kA)	Long-term current (A)		Weight (kg)	L (mm)
	T-adapter for connecting surge arresters	RSTI-SA ARRESTER	Extra set of pin *				1 ms	2 ms		
3,6/6	RSTI-5x5x-CEE01	RSTI-CC-58SA0605	RSTI-SA-PIN	5	16	65	75		2,5	285
6/10	RSTI-5x5x-CEE01	RSTI-CC-68SA1210	RSTI-SA-PIN	10	20	100		212	4,4	285
12/20	RSTI-5x5x-CEE01	RSTI-CC-68SA2410	RSTI-SA-PIN	10	20	100		212	4,8	400
20/35	RSTI-7x5x-CEE01	RSTI-CC-68SA4110	RSTI-SA-PIN	10	20	100		212	5,3	500

NOTE

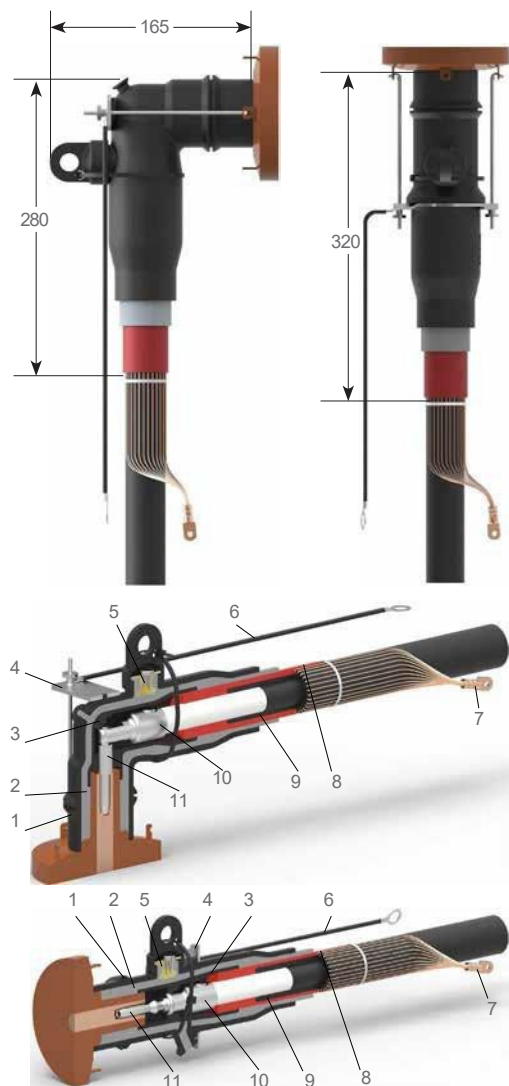
* When connecting the arrester to the RSTI-595x and RSTI-795x base kits, the RSTI-SA-PIN stud and washer kit must be ordered in addition.

Type of arrester	RSTI-CC-58SA0605	RSTI-CC-68SA1210	RSTI-CC-68SA2410	RSTI-CC-68SA4110
Long-term overvoltage (kV)	6,0	12,0	24,0	41,0
Rated voltage (kV)	7,5	15,0	30,0	51,3
Remaining overvoltage (kV)				
Lightning current pulse 8/20 µs				
2.5 (kA)	19	-	-	-
5 (kA)	20	39,1	78,2	133,6
10 (kA)	21,5	41,5	83,0	141,8
20 (kA)	-	45,7	91,4	156,1
Rectangular pulse 1/20 µ				
5 (kA)	21	-	-	-
10 (kA)	-	43,9	87,8	150,0
Switching pulse 30/60 µsec				
125 (A)	31,5	31,5	63,1	107,8
500 (A)	32,4	32,4	64,9	110,9

RSES, RSSS

Screened adapters for voltages up to 20 kV

Screened T-adapters and straight adapters for connection of polymeric-insulated cables up to 20 kV to gas-insulated switchgear and transformers with type A (250A) bushings



RSES/RSSS plug-in screened adapters are designed to connect one- and three-core polymeric-insulated cables to gas-insulated switches and transformers up to 24 kV. The adapter connects to bushings according to EN 50181 type A (250A).

CONSTRUCTION

The adapter housing with outer and inner conductive layers is made of thick-walled EPDM rubber and provides insulation and sealing of the connection to the bushing. The elastomeric silicone stress cone acts as an electric field and seal the cable side. The insulated section on the cable side allows testing of the cable oversheath under the voltage.

The mechanical lug conforms to IEC-61238-1 and can be installed on both copper and aluminum conductors (class 1 or 2). Raychem RSES/RSSS adapters are designed for outdoor and indoor. A capacitive voltage divider contact is integrated in the adapter housing for checking the presence or absence of voltage or phasing. The capacitive voltage divider contact is covered by a removable conductive cap.

INSTALLATION

The design of the adapter allows the use of tools for removing the semi-conductive screen with a minimum screen cut up to 40 mm. After cutting, a stress cone is slid over the lubricated cable, which at the same time seals the adapter securely to the cable's oversheath. The mechanical lug a large working range can be easily installed used breakaway bolts. The adapter housing is then slid on with lubricant.

For T-adapters, the contact stud is screwed into the lug with hexagonal wrench supplied. The adapter is fixed to the bushing by means of a removable fixing clip. For screened three-core cables with copper wire screen and without armor, the RSTI- TRF sealing kit must be ordered.

The parameters of the screened adapters exceed the requirements of the CENELEC HD 629.1 S2 standard, which includes BS, VDE as well as other national specifications.

- 1 Housing - conductive layer
- 2 Casing - insulated layer
- 3 Faraday cage
- 4 Fixing
- 5 Capacitive voltage divider contact
- 6 Grounding lead
- 7 Lug of CU wire screen
- 8 Sealing unit
- 9 Stress Cone
- 10 Lug with breakaway bolt
- 11 Silver plated contact pin

Rated voltage U _o /U (kV)	Cross-section* (mm²)	Insulation diameter (mm)	Ordering description	
			T-adapter	Straight adapter
6/10	16 - 70	12,7 - 19,2	RSES-VD-525A-E	RSSS-VD-525A-E
	95	17,9 - 25,0	RSES-VD-525B-E	RSSS-VD-525B-E
	95 - 150	17,9 - 25,0	RSES-VD-525C-E	RSSS-VD-525C-E
12/20	25 - 95	17,9 - 25,0	RSES-VD-525B-E	RSSS-VD-525B-E
	70 - 95	17,9 - 25,0	RSES-VD-525C-E	RSSS-VD-525C-E
	70 - 150	21,9 - 28,5	RSES-VD-525D-E	RSSS-VD-525D-E

NOTE

* for Al and Cu compressed conductors of class 1 and 2 according to IEC-60228.

RSxS-525x. Three phase materials included: screened body, stress cone, mechanical lug for phase core, fixing bracket, sealant and lubricant.

Adapter modifications should be used for other cable designs:

- E - Includes lug for grounding copper wire screen
- 01 - copper tape screen
- 02 - aluminum laminated screen

Accessories for insulated and screened adapters RICS, RSTI, RSES, RSSS

Additional accessories for adapters allow testing and earthing of cable lines, as well as assembling disconnectibly connections of 2 or more cables

RICS-5002-50-xx



RSTI-68TP



RSTI-68EAxx



RSTI-x8DEP



	Ordering description	Adapter type	Note
Test bushing	RICS-5002-50-24	RICS	length "L" 290 mm
	RICS-5002-50-25		length "L" 390 mm
	RSTI-68TR-310	RSTI	length "L" 310 mm
	RSTI-68TRL-460		length "L" 460 mm
Front plug	RSTI-68TP*	RSTI	Bushing type "C". Set for three phases.
Ground connection stud	RSTI-68EA20	RSTI	ball d= 20 mm
	RSTI-68EA25		ball d= 25 mm
Plug for live work	RSTI-58DEP*	RSTI	U _{max} = 24 kV
	RSTI-68DEP*		U _{max} = 42 kV

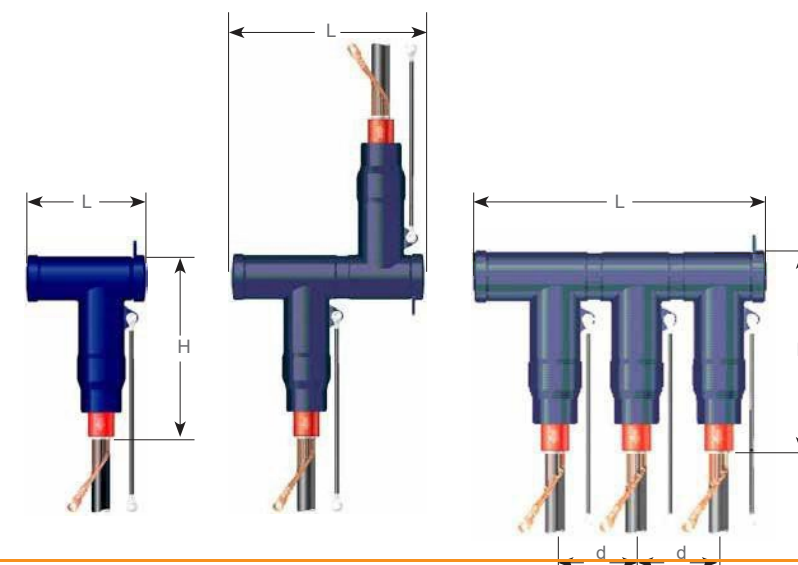
NOTE

* 3 pcs of plugs are supplied.
RSTI adapter corresponded for voltage class, must be ordered additionally.

To connect RSTI-585x or RSTI-785x adapters to the adapter series to the RSTI-595x and RSTI-795x must be ordered optional SA-PIN stud and washer kit.
Please contact local TE Connectivity offices for more information.

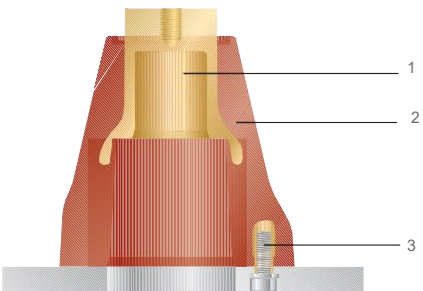
Examples of adapter connections and overall dimensions

Basic kit	L (mm)			H (mm)	d (mm)
	per one cable	for two cables	for three cables		
RSTI-58xx	195	300	405	299	101
RSTI-78xx	195	305	400	340	101
RSTI-59xx, RSTI-79xx	209	330	435	412	120



RPIT
Plug In termination system up to 52 kV

Plug in termination system for switchgear and transformers up to 52 kV



- Screened connection to compact switchgears of cables for voltage up to 52 kV
- Connection corresponds to bushings with internal cone according to EN 50180 and EN 50181.
- Contact part is designed for connection of Al and Cu conductors of different types designs that comply with IEC 60228.
- Connection of cables up to 1000 mm2.
- Fully sealed system with metal flange.
- A bronze flange is included for use in coastal areas.
- Contact for voltage monitoring (optional).

RPIT - CONSTRUCTION

RPIT's line of screened adapters for both single and three-core cables up to 42 kV to can be connected to "size 2" and "size 2" inner type bushing, which rated for 800 and 1200 A.

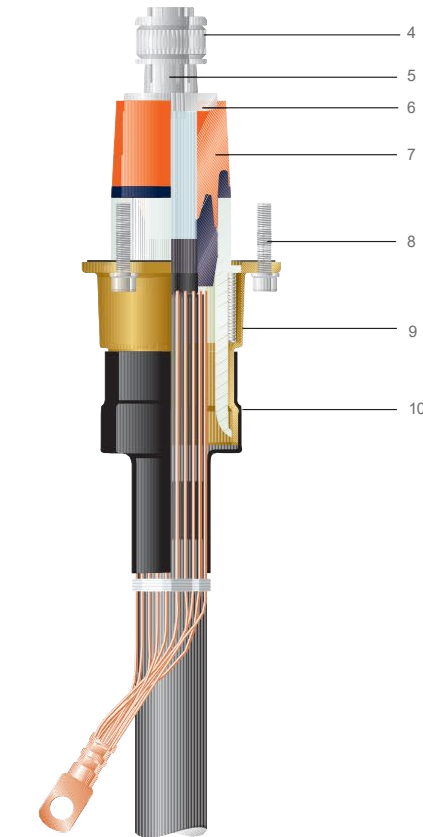
Adapters for bushings with inner tape, must match exactly geometric dimensions of the cable, so to select an adapter you need to specify the exact diameter of the core, insulation and semi-conductive screen.

For more information, please contact your TE Connectivity representative.

INSTALLATION

A heat-shrinkable tube and a metal flange with O-ring are slid over the pre- straightened and stripped cable.

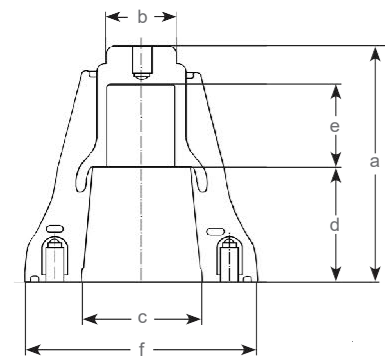
The electrical contact is made by means of a lug with a multilamellar ring exactly corresponding to the contact surface inside the bushing. A special crimping tool is required to mount such a lug on the cable core. A stress cone is mounted on the cut of the semi-conductive screen. The polymer spring-loaded sleeve presses the stress cone tightly against the inner surface of the epoxy insulator. The metal flange is bolted to the bushing. The connection is sealed with an O-ring, metal flange and heat shrink tubing.



- 1 Conductive part
- 2 Epoxy insulation
- 3 Hexagon socket bolt
- 4 Multilamellar contact ring
- 5 Collet wedge clamp
- 6 locking ring
- 7 Stress Cone
- 8 HHexagon socket bolt
- 9 Metal protective cover
- 10 Sealing heat shrinkable sleeve with adhesive

BUSHINGS.

RPIT screened adapters can be connected to all bushings according to EN 50180/50181 with internal cone sizes "2" and "3". TE Connectivity manufactures its own bushings, which can be are installed in equipment from various manufacturers.



Dimensions of RPIS-2-VD and RPIS-3-VD insulators

Cone size	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)
2	140	50	69,5	69	(48)	136
3	217,5	58	92,5	97,5	(90)	163

RPIT
Plug In termination system up to 52 kV

Plug in termination system for switchgear and transformers up to 52 kV

RPIT adapters for single core screened cables 12 - 52 kV

Ordering description*	Cone size	Rated current, A	Voltage, kV	Section, mm²	Conductor diameter, mm	Insulation diameter, mm
RPIT-321x	2	800	12	120 - 400	12,0 - 24,6	21,0 - 33,0
RPIT-521x	2	800	24	50- 400	7,6 - 24,6	21,0 - 39,0
RPIT-721x	2	800	42	50 - 400	7,6 - 24,6	23,55 - 42,0
RPIT-331x**	3	1250	12	240 - 1000	14,0 - 40,0	26,0 - 47,6
RPIT-531x**	3	1250	24	150 - 1000	14,0 - 40,0	26,0 - 53,2
RPIT-731x**	3	1250	42	70 - 1000	7,6 - 40,0	26,0 - 58,8
RPIT-831x	3	1250	52	50 - 500	7,6 - 27,6	26,0 - 55,0

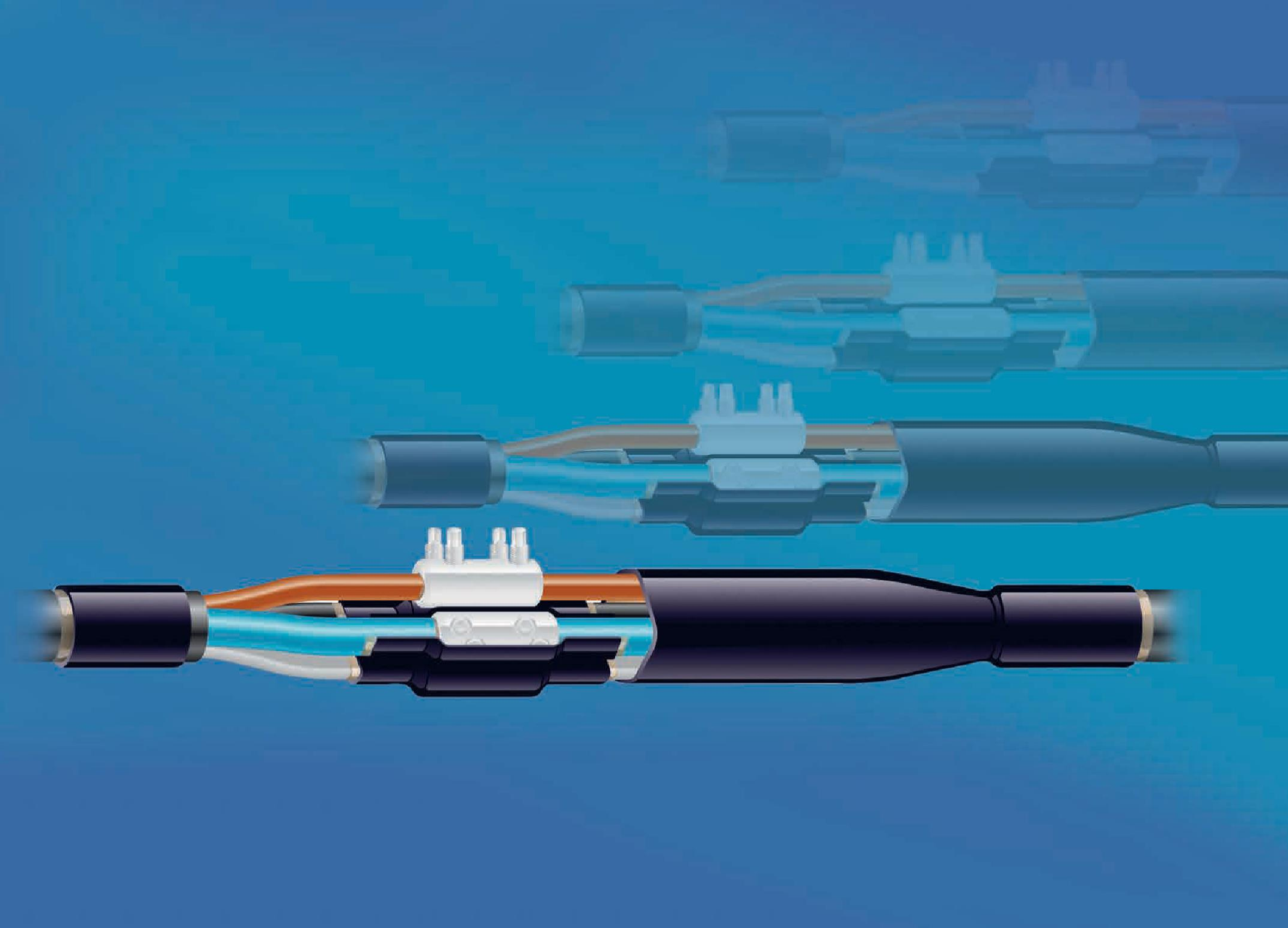
NOTE

Materials for three phases are included.
* The exact description for the order can only be determined after filling relise form.
** Additional tool IT-1000-036-XL is required for 800 mm2 and 1000 mm2 cross-sections
RPIT adapters with voltage monitoring contact are manufactured for voltages up to 42 kV and cross-sections up to 630 mm2.

Accessories for screened adapters for bushings with inner cone "2" and "3"



Description	Ordering description	Note
Bushing with inner cone	RPIS-2 RPIS-2-VDD RPIS-3 RPIS-3-VDD	Bushing for installation in switchgear
Insulated plug	RPIC-2 RPIC-3	For isolating the bushing when no cable is connected. Can be either a temporary or permanent solution
Insulated cover	RPIT-2-IS RPIT-3-IS	For isolating a live RPIT adapter
Protective cap	RPIT-2-PC RPIT-3-PC	To protect the disconnected RPIT from mechanical damage and contamination
Plug for high voltage testing	RPIT-2-TS RPIT-3-TS	For high voltage testing of cable terminated with RPIT adapter



Section III

Low voltage joints and branch joints

Joints for polymeric insulated cables	70
Joints for paper-insulated cables	72
Transition joints for connecting polymeric and paper insulated cables	73
Joints for rubber insulated cables	74
Tapping sleeves for polymeric insulated cables	75
Joints for control cables with DuraSeal type insulated connector	76
Insulated connectors type DuraSeal	77
Inline and branch joints, repair wraparound with PowerGel gel filler	78
GelBox-SL connectors and kits with PowerGel gel filler for street lighting networks	80
GUROFLEX joints for polymeric insulated cables	82
GUROFLEX filler joints for polymeric insulated cables up to 25 mm ²	84
GUROFLEX joints for polymeric insulated cables cross sections from 35 mm ² to 240 mm ²	85
GUROFLEX two-component filler for polymeric insulated cables	86
Insulated compact ring type connector with insulation piercing for 4-core cables	87
GURO joint clamp for conductors up to 25 mm ²	88
BSLB connectors with shear bolts for conductors up to 240 mm ²	89

Joints for polymeric insulated cables

CABLE

The joints are designed for 3-, 3,5-, 4- and 5-core polymeric insulated cables. For example: VVG, AVVB, VVbShv, APvVBbShv, NYM, N(A)YY, NAYBY, N2XY, AXMK, AMCMK, MCCMK, N2XH, N2XCH, NHXH, NHXCH.

Design

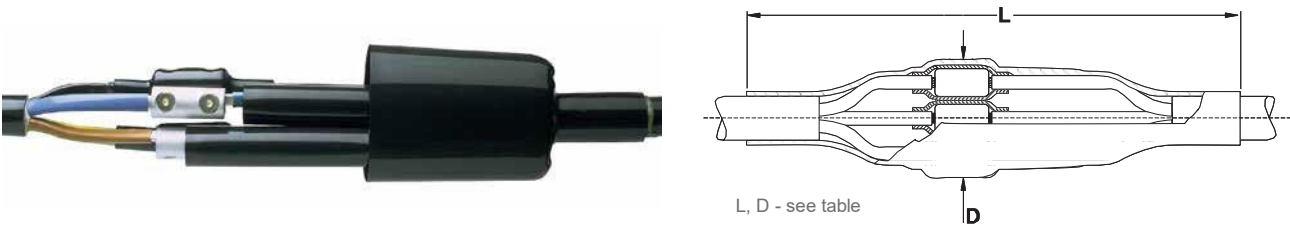
For cables without armor

The joint consists of four or five inner and one outer heat-shrinkable insulating tubings. The connectors are insulated and sealed with thick-walled tubing that has a heat-melting adhesive applied to the inside surface. A thick-walled heat-shrinkable tubing with a larger diameter provides external protection and sealing. All joints allow crossing of cores during phasing. For joints supplied without connectors, the dimensions of crimp connector or mechanical bolt connector used, must not exceed the given in the table.

Design

For cables with steel tape armor

The design differs from a regular joint in that the kit additionally includes a tinned copper mesh and roll springs. The tin-plated copper mesh is wrapped around the joint area and serves as a mechanical protection and electrically connects the cable armor by roll springs.



Joints with mechanical connectors for 4-core polymeric-insulated cables

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description for cables		Joint dimensions (mm)	
		without armor	with armor	L	D
0,6/1	1,5- 6	POLJ-01/4X 1- 6	POLJ-01/4X 1- 6-T	230	25
	4 - 16	POLJ-01/4X 4- 16	POLJ-01/4X 4- 16-T	300	35
	10- 35	POLJ-01/4X 10- 35	POLJ-01/4X 10- 35-T	450	50
	25- 70	POLJ-01/4X 25- 70	POLJ-01/4X 25- 70-T	600	70
	70- 120	POLJ-01/4X 70-120	POLJ-01/4X 70-120-T	650	80
	150- 240	POLJ-01/4X150-240	POLJ-01/4X150-240-T	800	110
	300	POLJ-01/4X300	POLJ-01/4X300-T	850	120

joints with mechanical connectors for 5-core polymeric-insulated cables

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description for cables			Joint dimensions	
		without armor	with steel tape armor	with wire armor	L	D
0,6/1	1,5- 6	POLJ-01/5X 1- 6	POLJ-01/5X 1- 6-T	-	230	25
	4 - 16	POLJ-01/5X 4- 16	POLJ-01/5X 4- 16-T	-	300	35
	10- 35	POLJ-01/5X 10- 35	POLJ-01/5X 10- 35-T	POLJ-01/5X 10- 35-W	450	50
	25- 50	-	-	POLJ-01/5X 25- 50-W	600	70
	25- 70	POLJ-01/5X 25- 70	POLJ-01/5X 25- 70-T	-	600	70
	70- 120	POLJ-01/5X 70-120	POLJ-01/5X 70-120-T	POLJ-01/5X 70-120-W	650	80
	150- 240	POLJ-01/5X150-240	POLJ-01/5X150-240-T	POLJ-01/5X150-240-W	800	110

NOTE The joints are designed only for the connectors included in the kit. Other connectors cannot be used. joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Joints for polymeric insulated cables

joints without connectors for polymeric insulated cables without armor, with steel tape armor or aluminum tape screen

Rated voltage Uo/U (kV)	Cross section (mm²)		Order description for cables		Maximum connector dimensions (mm)		Joints dimensions (mm)	
	Crimping connection	Bolted connection	without armor	with armor	Length	Diameter	L	D
for the use of crimping or mechanical connectors								
0,6/1	1,5- 10		SMOE-81511	SMOE-81521	35	8	300	25
	1,5 - 10		SMOE-81511-CEE05*		35	8	230	25
	6- 25		SMOE-81512	SMOE-81522	75	12	500	40
	6- 25		SMOE-81512-CEE05*		75	12	450	40
	16- 50		SMOE-81513	SMOE-81523	95	18	650	50
	70- 150	70- 120	SMOE-81514.	SMOE-81524	130	26	850	80
	95- 300	150- 240	SMOE-81515	SMOE-81525	150	37	950	110
for the use of mechanical connectors								
0,6/1		10- 35	SMOE-81516	SMOE-81526	45	18	450	50
		10- 35	SMOE-81516-CEE05*		45	18	400	50
		25- 70	SMOE-81517	SMOE-81527	60	26	600	70
		70- 120	SMOE-81518	SMOE-81528.	75	29	650	80
		150- 240	SMOE-81519.	SMOE-81529.	85	38	800	110

NOTE * joints with code CEE05 can be used for 4 and 5 core cables. The dimensions of the connectors must not exceed the dimensions given in the table. The cross-section ranges given in the table are applicable for all types of PVC insulated cables using DIN compression connectors or mechanical connectors within the specified limits. BSLB mechanical connector are recommended for SMOE-815xx joints. See page 89 for more information. joints for other cable types and cross section can be ordered on request. Please contact local TE Connectivity offices for more information.

Joints for paper insulated cables

CABLE

Joints for 3-, 3½ - and 4 x core cables (3½ - cable with a smaller neutral cross-section) with paper insulation and steel tape armor, including cables with reduced neutral cross-section.
For example: AABI, AASHv, SB, ASBU, AABIU, N(A)KBA.

Design

Oil-resistant heat-shrinkable tubings are placed on the impregnated paper-insulated cores. Heat-shrinkable brakeout sealing in the cable spines. Mechanical bolted connectors are used to connect the cores in the set. The joints are insulated and sealed with thick-walled heat-shrinkable tubings with a layer of fusion adhesive on the inner surface. Thick-walled heat-shrinkable tubes with a layer of fusion adhesive on the inner surface seal the metal sheath and provide external protection. The kit includes additional materials for cable stripping.

3- x core cables

The kit includes fittings for solderless ground connection and connecting the neutral to the aluminum sheath with stainless steel screw clamps.

4- x core cables

The kit includes fittings for grounding of the metal sheath with roll springs and grounding conductor.

Transition from 3-core to 4-core cable

The kit includes fittings for solderless earthing and neutral connection to the aluminum sheath. Stainless steel screw clamps are used for this purpose and the metal sheath is earthed by means of roller springs and an earthing conductor.



L, D - see table

Joints for 4-core cables

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Joints dimensions (mm)	
			L	D
0,6/1	16- 95	GUSJ-01/4X 16- 95	800	70
	50-150	GUSJ-01/4X 50-150	900	80
	120-240	GUSJ-01/4X120-240	1100	120

Joints for 3-core cables

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Joints dimensions (mm)	
			L	D
0,6/1	16- 70	GUSJ-01/3X 16- 70	800	70
	50-120	GUSJ-01/3X 50-120	900	80
	120-240	GUSJ-01/3X120-240	1100	120

NOTE	Joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.
------	---

Transition joints for connecting polymeric to paper insulated cables

CABLE

Transition joints for connecting 3- and 4-core cables with and without armor, with and without paper and polymeric insulation.
For example, to connect cables: VVG, AVVB, VVbShv, NYM, N2XY, AMCMK with cables: AASHv, SBIU, AABv, AASHv, AAG, SBG.

Design

Cables are sealed using oil-resistant heat-shrink tubing and brakeout.
Core connections are insulated and sealed with thick-walled heat-shrinkable tubes with a layer of adhesive on the inner surface. Mechanical strength and sealing protected by heat shrink tubing. The set includes an solderless grounding system and neutral connection to the lead or aluminum cable sheath.



L, D - see table

Connection of 4-core paper to 4-core polymeric cable with mechanical connectors and solderless grounding system

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Joint dimensions (mm)	
			L	D
0,6/1	10- 35	TRAJ-01/4X 10- 35/4SB	500	50
	25- 70	TRAJ-01/4X 25- 70/4SB	800	70
	70-120	TRAJ-01/4X 70-120/4SB	900	80
	150-240	TRAJ-01/4X150-240/4SB	1100	120

Transition joints with mechanical connectors for 3- and 4-core paper-insulated cables and 4-core polymeric-insulated cables

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Joint dimensions (mm)	
			L	D
0,6/1	25- 70	TRAJ-01/4X 25- 70/3SB	800	70
	70-120	TRAJ-01/4X 70-120/3SB	900	80
	150-240	TRAJ-01/4X150-240/3SB	1100	120

NOTE	Joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.
------	---

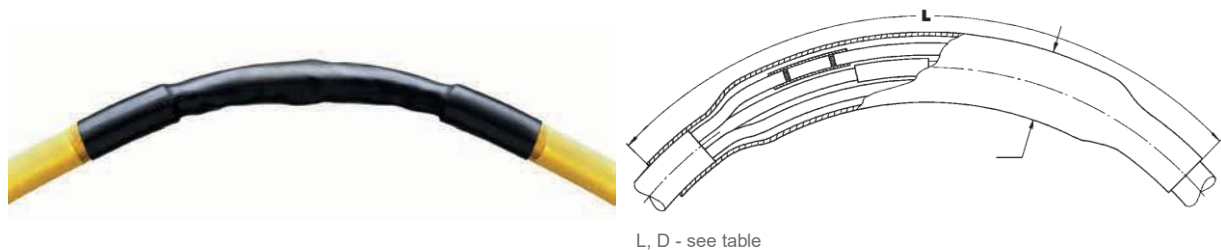
Joints for rubber insulated cables

CABLE

Joints for screened and unscreened flexible rubber insulated cables. The maximum number of cores is 5. For example: KG, KGN, KPG.

Design

The connectors are insulated using flexible tubing with heat-melting adhesive on the inner surface. External protection is provided by flexible thick-walled heat shrinkable tubing. The space between the cores is filled with elastic mastic. For screened cables, a copper mesh is included, which wrapped around the mastic.



Joints without connectors for unscreened cables

Rated voltage U _o /U (kV)	Cross section (mm ²)	Order description	Joint dimensions (mm)	
			L	D
0,6/1	1,5- 2,5	EMKJ-0002	300	20
	4- 6	EMKJ-0004	350	28
	10- 16	EMKJ-0017.	510	34
	25- 50	EMKJ-0027	560	55
	70-120	EMKJ-0037.	740	78

Joints without connectors for screened cables

Rated voltage U _o /U (kV)	Cross section (mm ²)	Order description	Joint dimensions (mm)	
			L	D
0,6/1	4- 6	EMKJ-0104	350	28
	10- 16	EMKJ-0117	510	34
	25- 50	EMKJ-0127	560	55
	70-120	EMKJ-0137	740	78

NOTE

Connectors are not included.

Joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

If the joint will not be subjected to bending loads, the joints specified on page 77 can be used for rubber insulated cables.

Branch joints for polymeric insulated cables

CABLE

The joints are designed for 3½-, 4-core cables (3½ - cable with a smaller cross-section neutral) with paper or polymeric insulation with and without armor.

For example: VVG, AVVG, APvP, NYM.

Core Types:

sm: stranded stranded

se: stranded single wire

rm: round stranded

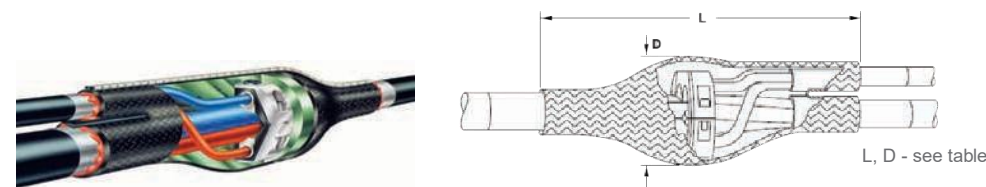
re: round stranded single wire

Design

Joints can be installed under voltage used insulated compact ring connector with insulation piercing.

For information on connectors, see page 87.

The mastic applied around the conductors reliable sealing and insulated conductors. The fiberglass reinforced heat sleeve restores the outer cover and provides mechanical strength to the connection.



Heat-shrinkable branch joints for 4-core polymeric-insulated cables complete with insulated compact ring connector with insulation piercing

Rated voltage Uo/U (kV)	Cross section (mm²)				Order description	Joint dimensions (mm)	
	main cable		branch cable				
	rm/sm	re/se	rm/sm	re/se		L (mm)	U (mm)
0,6/1	-	5 x 2,5 - 10	-	5 x 2,5 - 10	SMOE-81601*	250	50
	-	4 - 16	-	4 - 16	SMOE-82280*	380	55
	35 - /U	50 - 95	6 - 50	6 - /U	BMHM-1001-4B1-4874	500	135
	70 - 120	95 - 150	6 - 50	6 - 70	BMHM-1001-4B1-6875	500	135
	150	185se	6 - 70	6 - 70	BMHM-1001-4C1-6878	500	135
	185	240se	6 - /U	6 - /U	BMHM-1001-4D1-6879	500	155
	240sm	-	6 - 70	6 - 70	BMHM-1001-4D1-6880	500	155
	95 - 120	120 - 150	10 - 95/ 35 - 120	16 - 120/ 50 - 150	BMHM-1001-4D2-6877	560	155

Heat shrinkable branch joint without connectors

Rated voltage Uo/U (kV)	Cross section (mm²)		Ordering description	Max. connector diameter (mm)	Joint dimensions (mm)	
	main cable	branch cable			L (mm)	D (mm)
Branch joint for polymeric cables without armor						
0,6/1	16-185	6- 95	BMHM-1001-4B1	115	500	135
	95-185	6- 95	BMHM-1001-4C1	115	500	135
	95-240	6- 70	BMHM-1001-4D1	135	500	155
	95-240	6-150	BMHM-1001-4D2	135	560	155
Branch joint for polymeric cables with steel or aluminum tape armor						
0,6/1	16-185	16- 95	BMHM-1031-4C1-CEE01 + S1061-8-250**	115	560	135
	95-185	16- 95	BMHM-1031-4C1-CEE01		560	135
	95-240	50-120	BMHM-1031-4D1-CEE01		560	155

NOTE

* The kit includes single-core insulated connectors.

** Mastic S1061-8-250 must be ordered separately for cable cross-sections less than 95 mm².

Joint for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Joints for control cables with insulated connector DuraSeal type

CABLE

Joints for polymeric insulated control cables with and without armor. For example: KVVG, KPSVG.

Design

For cables without armor

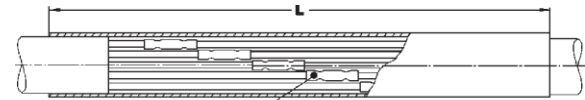
The cores are connected and sealed using DuraSeal connector. A cardboard body is placed in the connection area to give a circular shape, on which a thick-walled tubing is placed for protection and sealing.

For cables with steel tape armor

The connection is performed in the same way as for cables without armor. In addition, the connection area is wrapped with tinned copper mesh, which is fixed to the cable armor steps by roll springs. External mechanical protection and sealing is provided by a thick-walled heat-shrink tubing.



L, D - see table



DuraSeal connector with heat shrinkable tubing with fusion adhesive on the inside surface

Joints for polymeric insulated cables without armor

Rated voltage U _o /U (kV)	Number of cores	Cross section	Cable diameter (mm)		Order description	Size L (mm)
		(mm²)	min.	max.		
0,6/1	4 - 7	1,5 - 2,5	8	19	SMOE-81140	300
	8 - 14	1,5 - 2,5	12	22	SMOE-81141	300
	15 - 21	1,5 - 2,5	15	27	SMOE-81142	350
	22 - 40	1,5 - 2,5	20	35	SMOE-81143	350
	41 - 75	1,5 - 2,5	28	44	SMOE-81144	400

Joints for polymeric insulated cables with steel tape armor

Rated voltage U _o /U (kV)	Number of cores	Cross section	Cable diameter (mm)		Order description	Size L (mm)
		(mm²)	min.	max.		
0,6/1	4 - 7	1,5 - 2,5	17,5	21	SMOE-81140-T	450
	8 - 14	1,5 - 2,5	17,5	26	SMOE-81141-T	450
	15 - 21	1,5 - 2,5	22	30	SMOE-81142-T	550
	22 - 40	1,5 - 2,5	22	39	SMOE-81143-T	550
	41 - 75	1,5 - 2,5	27	47	SMOE-81144-T	650

NOTE

Joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Insulated DuraSeal type connectors

APPLICATION

DuraSeal provides hermetically sealed connections or terminations for installation on control cables.

CONSTRUCTION

The connector is a press-fit sleeve covered with a heat-shrinkable tubing with adhesive on top. Lugs with press-fit tubular part covered by heat-shrinkable tubing with adhesive on top.

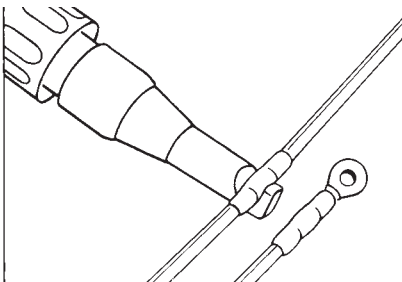
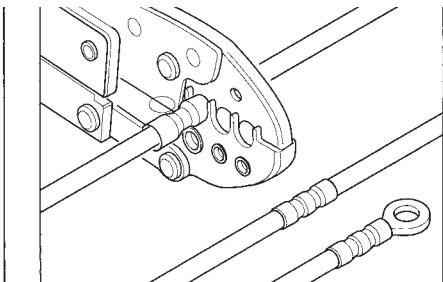
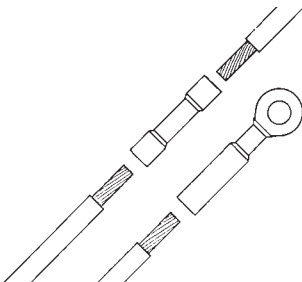


Installation of DuraSeal connectors

The required connector size selected. The insulation is removed from the ends of the conductors. At room temperature, the glue does not stick and the core ends are easily inserted into the connector.

A special tool, such as the Raychem AD 1522-1, is used to crimp connectors or lugs.

The joint is heated with a hot air stream so that the tubing shrinks and glue appears at the edges. It is recommended to use an industrial hitting fan for heating.



Insulated connectors

Cross section (mm²)		Order description	Color	Lengt (mm)	Diameter before shrinkage (mm)
min.	max.				
0,5	1,0	D-406-0001	●	32	6,0
1,5	2,5	D-406-0002	●	32	6,80
4	6	D-406-0003	●	38	8,50

Joints, branch joints and repair wraperounds with PowerGel gel filler

CABLE

The joints are designed for polymeric insulated cables without armor.
The maximum number of cores is 5.
For example: VVG, AVVG, APvP, N(A)YY, NYM, N2XY, YAKY, XAKXS, YKY

APPLICATION

This type of joints is designed for both indoor and outdoor installation as well as for underground.
The joints are tested in accordance with CENELEC EN 50393 standards, including cyclic testing of joints immersed in the to a depth of one meter, for three weeks.
The main area of application of these joints is street, garden and swimming pool, lighting, as well as connection of elements of intelligent systems inside buildings.

TECHNOLOGY ADVANTAGES

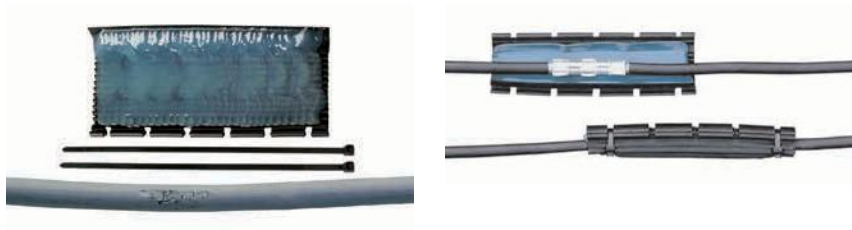
- PowerGel**
- Operating temperature range -40...+100 °C
 - Unlimited shelf life
 - IP-68 moisture protection
 - No halogens
 - UV resistance
 - Mechanically robust housing
 - Cross-sectional range from 1.5 to 50 mm²
 - Branching without cutting the line (for RayGel Plus-2 and RayGel Plus-3 joints complete with universal connector)
 - Environmental safety
 - No special tools are required for installation



RayGel Plus
inline and branch joints with universal connector block. The maximum number of cores is 5.



GelBox -
joints with insulation piercing connector block. Maximum number of cores - 4.



GelWrap - repair wraperounds

joints and branch sleeves, repair sleeves with PowerGel gel filler

RayGel Plus inline and branch joints

Rated voltage Uo/U (kV)	Cross section		Order description	Dimensions Length x Width x Height (mm)	
	Main (mm²)	Branch (mm²)		connector (max.)	joint
Joints without connectors					
0,6/1	2 - 3 x 1,5 - 2,5 (1 x 10-50)	2 - 3 x 1,5 (1 x 10-16)	RAYGEL-PLUS-0	26 x 24 x 16 *	100 x 37 x 24
	3 - 5 x 1,5 - 2,5 (1 x 10-50)	3 - 5 x 1,5 (1 x 10-16)	RAYGEL-PLUS-1	26 x 38 x 16 *	139 x 51 x 24
Joints complete with connectors					
0,6/1	3 - 5 x 1,5 - 6	3 - 5 x 1,5 - 6	RAYGEL-PLUS-2	complete	233 x 78 x 40
	3 - 5 x 6 - 16	3 - 5 x 2,5 - 16	RAYGEL-PLUS-3	complete	313 x 90 x 47

GelBox joints complete with piercing connection block.

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Dimensions Length x Width x Height (mm)
0,6/1	4 x 6 - 25 (35*)	GelBox-25	270 x 100 x 60
	5 x 6 - 16**	GelBox-25-5	270 x 100 x 60

GelWrap - Inline joint for single core cables and repair wraperound for cable sheaths

Rated voltage Uo/U (kV)	Cable diameter (mm)	Order description	Maximum connector length or damage area (mm)
0,6/1	4 - 18	GELWRAP-18/4-200	124
	10 - 33	GELWRAP-33/10-250	148

NOTE	* 35 mm²- insulation of cores must be removed (installation without puncturing the insulation)
	** separate connector for grounding conductor included
	Joints and wraperounds for other cable types and cross-sections can be ordered on request. Please contact local TE Connectivity offices for more information.

GelBox-SL connectors and kits with PowerGel gel filler for street lighting networks

CABLE

Cable branch connectors are designed for polymeric insulated cables without armor. The maximum number of cores is 5. For example: VVG, AVVG, APvP, N(A)YY, NYM, N2XY, YAKY, XAKXS, YKY

CONNECTOR ADVANTAGES

- GelBox and PowerGel filler.**
- Operating temperature range of PowerGel filler: -40...+100 °C
 - Unlimited shelf life
 - IP-68 moisture protection
 - No halogens
 - UV resistance
 - Mechanically robust housing
 - Cross-sectional range from 1.5 to 70 mm²
 - Supplied complete with universal connector
 - Environmental safety
 - No special tools are required for installation

APPLICATION

The GelBox-SL connection kits are designed for easy, convenient, leak-proof and reliable connection of cables specifically in street and trunk light poles.

GelBox-SL kits combine a robust and compact housing with a wide range of applications: trunk cable cross-sections from 6 to 70 mm2, charging cable cross-sections from 1.5 to 4 mm2. The cables can be connected separately.

Housing of GelBox-SL enclosure is halogen-free and filled with PowerGel, which provides a reliable seal and maintains its physical properties at temperatures rang from -40°C to +90°C during all exploitation time.

After installation, the enclosure is manually closed with the clatches. Cables are led out from the side with soft wavy edges. To secure the GelBox-SL inside the support, holes for a polymeric tie are provided in the housing.



GelBox-SL1-TB2-1



GelBox-SL2-TB3-4



GelBox-SL3-TB4-4

GelBox-SL connectors and kits with PowerGel gel filler for street lighting networks

GelBox-SL connectors

Order description	Cross section of main and branch cables (mm²)		Dimensions (LxWxD), mm
	magistral	branching	
GelBox-SL connectors			
GelBox-SL1-TB2-1	2 x 6 - 70	1 x 1,5 - 4	66 x 50 x 35
GelBox-SL2-TB3-4	3 x 6 - 70	4 x 1,5 - 4	66 x 70.5 x 35
GelBox-SL3-TB4-4	4 x 6 - 70	4 x 1,5 - 4	66 x 91 x 35



GelBox-SL1-TB2-1



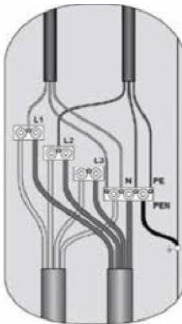
GelBox-SL2-TB3-4



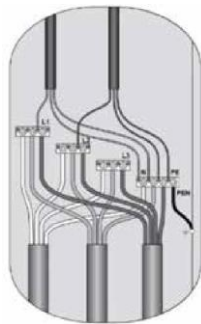
GelBox-SL3-TB4-4

Kits based on GelBox-SL connectors

Order description	Description and kit content		
GelBox-SL1-SET1-CON-E16(S10)	cable connection kit for two supports	3 x GelBox-SL1-TB2-1 1 x GelBox-SL2-TB3-4 1 x PE grounding conductor	
GelBox-SL1-SET2-BRA-E16(S10)	cable branching kit for supports	3 x GelBox-SL2-TB3-4 1 x GelBox-SL2-TB4-4 1 x PE grounding conductor	



GelBox-SL1-SET1-CON-E16(S10)



GelBox-SL1-SET2-BRA-E16(S10)

NOTE

Recommended parameters

- cable cross-section: > 35 mm²
- diameter of pole: > 110 mm
- hatch size: > 90x 300 mm

Connection and sealing kits for other cable types and cross sections are available on request. Please contact local TE Connectivity offices for more information.

Joints with GUROFLEX filler for polymeric insulated cables

CABLE

The joints are designed for 3-, 3½-, 4-, and 5-core cables (3½ - cable with a smaller neutral cross-section) with polymeric insulation without armor up to 240 mm². For example: VVG, AVVG, APvP, NAYY, NYM, N2XY.

Joint design

Filler

GUROFLEX filler is supplied in a two-compartment package. For information on the composition of GUROFLEX, see page 92. Voltage can be applied immediately after filler will full. For BV and PXE joints, other TE Connectivity filler are allowed to be used. For more information, please contact your regional representative offices.

Joint design

Housing and connector block (BV joints)

Transparent, impact-resistant housing of the BV and PXE joints consists of two halves with latches and is made of polycarbonate. BV joint housings are designed for cable diameters of 13-30 mm and PXE joints for cable diameters of 6-67 mm. With the polymer seals, the BV joint body can be easily installed without the need for adjustments to the cable diameter. The BV-XX-KS joints are supplied with a GURO insulated connector block for 4 or 5 conductors. PXE joints are supplied without connectors, complete with insulating separator. Optional PXE-SWA-SET kits are used to connect cables with steel tape or wire armor.



BV - joint with connector block and polycarbonate housing with end seal



Insulated connector block for 4 and 5 core BV joints



PXE - joint without connectors



PXE-SUx-GD kit content

joints with GUROFLEX filler for polymeric insulated cables

Joints with GUROFLEX filler and connector block for cables up to 25 mm cross-section ²

Rated voltage Uo/U (kV)	Cable diameter (mm)	Cross section (mm²)	Order description		Joint dimensions (mm)	
			With connector block	Without connector block	L	I
0,6/1	13 - 20	5 x 1,5 - 6	BV-0-GD-KS0	BV-0-GD	220	73
	16 - 25	5 x 6 - 16	BV-1-GD-KS1	BV-1-GD	230	80
	21 - 30	4 x 16 - 25	BV-2-GD-KS2	BV-2-GD	270	90

NOTE

Cross-sections are specified in accordance with CENELEC standard HD 603.
L= Enclosure length; I= Enclosure width.

Joints with GUROFLEX filler and without connectors for cables up to 240 mm²

Rated voltage U _o /U (kV)	Cable diameter (mm)	Cross section (mm ²)	Ordering designation	Maximum connector dimensions (mm)		Joint dimensions (mm)	
				Length	Diameter	L	I
0,6/1	for the use of crimp or mechanical* connectors						
	6 - 19	3-5 x 1.5-2.5 / 4 x 4	PXE-SU1-GD	25	4	160	34
	6 - 27	3-5 x 1.5-6 / 4 x 10	PXE-SU2-GD	30	6	190	35
	14 - 34	4 x 2.5 / 5 x 1.5-4 / 5 x 16	PXE-SU3-GD	35	10	240	50
	16 - 37	4-5 x 4-16 / 4 x 25	PXE-SU4-GD	40	12	270	58
	20 - 44	4-5 x 10-25 / 4 x 50	PXE-SU5-GD	50	23	360	85
	26 - 52	4-5 x 25-70 / 4 x 95 (150**)	PXE-SU6-GD	70	28	430	95
	35 - 67	4 x 70-150 (240**)	PXE-SU7-GD	85	38	530	117

NOTE

Cross-sections are specified in accordance with CENELEC standard HD 603.
BSLB mechanical connectors are recommended for PXE joints. See page 89 for more information.
L= Enclosure length; I= Enclosure width.
* Mechanical connectors may only be used after checking the dimensions given in the table.
** For crimp connectors only

Joints with GUROFLEX filler for polymeric insulated cables up to 25 mm ²

CABLE

Branch joints are designed for 3-, 3½-, 4-, and 5-core cables (3½ - cable with a smaller neutral cross-section) with polymeric insulation without armor, cross-section up to 25 mm². For example: VVG, AVVG, APvP, NAYY, NYM, N2XY.

Joint design

Filler
GUROFLEX filler is supplied in a double chamber package. For information on the GUROFLEX composition, see page 86.

Other TE Connectivity fillers may be used. For more information, please contact local TE Connectivity representative.

Design

Housing and connector block

The impact-resistant joint housing consists of two halves with latches and is made of transparent polycarbonate with a polymer coating. With sealed at the edges and designed for cables with a diameter of 13 - 30 mm. Housing can be installed quickly and easily without the need for adjustments to the cable diameter. The joints can be equipped with two types of tap clamps:
- insulated connector block;
- clamps for each conductor.



BAV-2U



With connector block



With clamping clips

Branch joints with GUROFLEX filler and connector block or clamping clips

Rated voltage Uo/U (kV)	Cross section		Order description	Dimensions	
	Main (mm²)	Branch (mm²)		Length (mm)	Width (mm)
with connector block					
0,6/1	4 x 6 - 25	4 x 4 - 25	BAV-2U-GD-KK2/4	238	110
	5 x 6 - 16	5 x 6 - 16	BAV-2U-GD-KK2/5	238	110
	or 5 x 10 - 16	5 x 2,5 - 6	-	-	-
with clamping clips (5 pcs.)					
0,6/1	5 x 2,5 - 25	5x1,5 - 25	BAV-2U-GD-5MC25U/I	238	110
	5 x 16 - 25	5x 16 - 25	BAV-2U-GD-5MC25	238	110

Branch joints with GUROFLEX filler without connectors

Rated voltage Uo/U (kV)	Cable diameter	Cross section		Ordering description	Dimensions	
	(mm)	Main (mm²)	Branch (mm²)		Length (mm)	Width (mm)
0,6/1	10 - 30	3 - 5 x 1,5 - 25	3 - 5 x 1,5 - 25	BAV-2U-GD	238	110

NOTE	Cross-sections are specified in accordance with CENELEC standard HD 603.
	joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Joints with GUROFLEX filler for polymeric-insulated cables for cross sections from 35 mm² to 240 mm²

CABLE

Branch joints are designed for 3½ and 4 core cables (3½ - cable with a smaller neutral) with polymeric insulation without armor for cross-section up to 240 mm². For example: VVG, AVVG, APvP, NAYY, NYM, N2XY.

Core Types:

sm: stranded stranded
se: stranded single wire
rm: round stranded
re: round single wire

Joint design

Filler

GUROFLEX filler is available in a double chamber bag (GD) or in cans (GC). BAV joints can be filled in different positions. For information on the composition of GUROFLEX, see page 86.
Voltage can be applied immediately after pouring.
Other TE Connectivity fillers may be used. For more information, please contact local TE Connectivity representative.

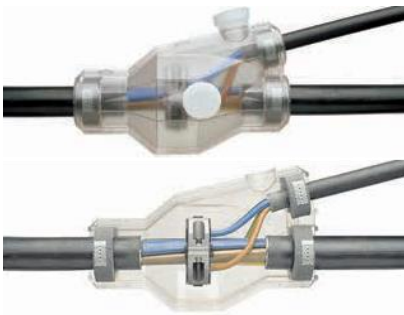
Joint construction

Body and connector

The shockproof enclosure is made of transparent polypropylene with snap locks (MM5) or transparent polycarbonate with snap locks (BAV), with polymer sealing of the entry holes. The enclosure is easily installed without the need to adjust the cable diameter. Suitable for cable diameters of 27-65 mm.
Joints with insulated compact ring-type connectors with insulation piercing are available. For information about connectors, see page 87.



MM 5, MM 7



BAV-C5, BAV-C7



Insulated compact ring-type connector with insulation piercing

Branch joint for 4-core polymeric-insulated cables without armor, complete with compact piercing ring connector

Rated voltage Uo/U (kV)	Cross section (mm²)				Order description	Joint dimensions (mm)	
	main cable		branch cable			L (mm)	D (mm)
	rm/sm	re/se	rm/sm	re/se			
0,6/1	35 - 70	50 - 95	6 - 50	6 - 70	MM-5-GD170-4874	295	175
	70 - 120	95 - 150	6 - 50	6 - 70	MM-5-GD170-6875	295	175
	240	-	6 - 70	6 - 70	MM-7-GC490-6880	480	230
	95 - 120	120 - 150	10 - 95rm.	16 - 120re.	MM-7-GC490-6877	480	230
			35 - 120sm	50 - 150se			
	150-240	150-240	95-150	95-150	MM-C7-GC-CEE01**	484	212

Branch joint for 4-core polymeric-insulated cables without armor and without connectors

Rated voltage Uo/U (kV)	Cable diameter (mm)	Connector diameter max. (mm)	Cross section (mm²)		Order description	Joint dimensions (mm)	
	main/resp.		main	branch		L (mm)	D (mm)
0,6/1	27-55 / 16-36	105	6 - 50	6 - 70	MM-5-GD	295	175
	37-60 / 16-57	140	6 - 50	6 - 70	MM-7-GD	480	230
	45-65 / 16-50	140	6 - 70	6 - 70	BAV-C7-GC	484	212

NOTE	Cross-sections are specified according to CENELEC standard HD 603 for use with ring type connectors.
	Joints for other cable types and cross sections can be ordered on request. Please contact local TE Connectivity offices for more information.

Two-component GUROFLEX filler for polymeric insulated cables

PROPERTIES AND APPLICATION

GUROFLEX is an ecological, environmentally friendly, easy-to-use, heat-free, 2-component material based on hydrocarbonate mastic. GUROFLEX can be used for all types of cables up to 1kV installed in the ground, i.e. for cables with polyethylene, PVC and paper insulation. GUROFLEX has excellent insulating properties, is hydrophobic and provides excellent corrosion protection.

GUROFLEX is perfectly suited for filling all rigid joint housings for voltages up to 1 kV. No special safety measures required when using GUROFLEX.

METHOD OF APPLICATION

The compound is supplied in a double chamber or in cans. Immediately before application, the two components are mixed (approx. 3 minutes), which changes the molecular structure of the material - polymerization.

When polymerized, the composition hardens but retains elasticity.

The storage time of the mixed material is approximately 3-4 minutes. The joint can be backfilled in the trench immediately after filling by GUROFLEX.

CHARACTERISTICS

- Electrical strength: $U_d > 10 \text{ kV/mm}$
- Relative dielectric constant: $\epsilon \sim 4$
- Specific resistance: $Q > 10^{13} \Omega \text{cm}$
- Relative density: $\rho = 1.22 \text{ g/cm}^3$
- Min. storage temperature: -20°C
- Min. installation temperature: -10°C
- Shore A hardness: ~ 20
- Shelf life: 2 years at 23°C
- Color: green



GUROFLEX 2-component compound, supplied in two-chamber packages



GUROFLEX 2-component compound supplied in cans



Joint with GUROFLEX filler

Order description		Volume (~ l)	Weight (~ kg)	Quantity of composition for the hull
Double chamber package	Can			
GUROFLEX-N-D035	-	0,35	0,43	BV-0, BV-1, PXE
GUROFLEX-N-D055	-	0,55	0,67	BV-2, PXE
GUROFLEX-N-D080	-	0,8	0,98	BAV-2
GUROFLEX-N-D140	-	1,4	1,71	MM-5
GUROFLEX-N-D160	GUROFLEX-N-C160	1,6	1,95	MM-5
GUROFLEX-N-D170	GUROFLEX-N-C170	1,7	2,07	MM-5
GUROFLEX-N-D215	GUROFLEX-N-C215	2,15	2,75	BAV-5
GUROFLEX-N-D245	GUROFLEX-N-C245	2,45	2,99	-
-	GUROFLEX-N-C385	3,85	4,84	BAV-C5
-	GUROFLEX-N-C490	4,9	5,98	MM-7
-	GUROFLEX-N-C570	5,7	6,95	BAV-C7, MM-7

NOTE

GUROFLEX can be ordered in a different volume on request.

Insulated compact ring-type connector with insulation piercing for 4-core cables

PROPERTIES AND APPLICATION AREA

The HEL ring type connector is specially designed for simple and installation and provides maximum safety when branching from a live cable.

The connector can be used on copper and aluminum stranded and single stranded conductors, PVC insulated or cross-linked polyethylene insulated cables.

The compact design allows the connector to be installed in appropriately sized compression-filled joints and in Reichem heat-shrinkable joints of type BAV, BMHM, MM.

TYPES OF CORES

sm: sector multicore

se: sector solid

rm: round multicore

re: round solid

Installation

The outer cover of the main cable is removed and insulating separators are installed between the cores. The two halves of the enclosure are placed over the conductors and lightly bolted together. cores of the cable to be tapped with the insulation removed are inserted into the branching holes and

are fastened with bolts. The housing halves are bolted down to the end, with the contact segments piercing the insulation of the main conductors. metal housing of the connector is not energized.

Characteristics

- For 4-core and 3½-core cables (3½ - cable with a smaller neutral)
- Contact segments with limited-depth
- Notched branch openings
- No use is required
- torque wrench
- Conforms to the requirements of VDE 0220

Materials

- Housing: high-strength aluminum alloy
- Contact segments: electrolytic tinning bronze
- Insulating parts: glass fiber reinforced polymer
- Bolts: galvanized steel



Insulated compact ring-type connector with insulation piercing for 4-core cables

Ordering description	Cross-section (mm2)				Dimensions A / B / diameter	Branch key	Weight
Standard connector	main		branch				
	rm/sm	re/se	rm/sm	re/se	(mm)	(mm)	(kg/100 pcs)
HEL-4874	35- 70	50- 95	6-50	6-70	87/ 87/ 96	6 / 5	42,4
HEL-6875	70-120	95-150	6-50	6-70	87/ 87/ 96	6 / 5	42,2
HEL-6876	95-120	120-150	6-50	6-70	91/ 87/100	6 / 5	44,6
HEL-6877	95-120	120-150	10-95rm	16-120re	100/120/142	6 / 6	46,0
			35-120sm	50-150se			
HEL-6878	150	185se	6-70	6-70	103/ 93/115	6 / 5	60,0
HEL-6879	185	240se	6-70	6-70	110/ 115/124	8 / 5	69,4
HEL-6880	240sm	-	6-70	6-70	110/ 115/124	8 / 5	69,4
HEL-6880.1	185-240sm	185-240se	6-70	6-70	110/ 115/124	8 / 5	70,0
HEL-5877	-	120-150	10-95rm	16-120re	100/120/142	6 / 6	46,0
			35-120sm	50-150se			

NOTE

A= height, B= width

GURO clamping clips for conductors up to 25 mm²



GURO universal clamping clips with separate connection and insulating cap



GURO clamping clips insulated cap



GURO clamping clips without insulating cap

GURO universal clamping clips with separate connection and insulating cap

Cross section (mm²)		Order description	Quantity in package (pcs.)
Basic	branching		
2,5 - 25	1,5 - 25	GURO-MC25U-5	5

GURO clamping clips with common connection and insulating cap

Cross sectional combinations (mm²)		Order description	Quantity in package (pcs.)
Main	Branch		
16 10 - 16 6 - 16	1,5 - 16 2,5 - 10 4 - 6	GURO-MC16+5	5
25 16 - 25 10 - 25	2,5 - 25 6 - 16 10	GURO-MC25+5	5

GURO clamping clips with common connection without insulating cap

Cross sectional combinations (mm²)		Order description	Quantity in package (pcs.)
Main	Branch		
25 16 - 25 10 - 25	2,5 - 25 6 - 16 10	GURO-MC25-5	5

BSLB connectors with shear bolts for conductors up to 240 mm²



CONSTRUCTION

The BSLB range of compact connectors is designed for low-voltage joints. Cross-section ranges from 1.5 mm² to 240 mm is covered by four housing sizes.

The connector housings are made of aluminum alloy and coated with tinning. Inner surface of the housing is notched. The connectors are available with or without partition. The bolts are coated with grease.

ADVANTAGES OF BSLB

CONNECTORS

- Wide operating range
- Applicable for Al and Cu conductors of various constructions
- Compact
- Shearing off the bolt head ensures that the contact is secure
- Conforms to IEC - 61238 (class A) and DIN-47640**
- No special tools required

Order description		Al round multicore	Al round solid	Al sector multicore	Al sector solid	Cu round multicore	Cu round solid	Cu sector multicore	Cu sector solid
BSLB-4/16*	Cross section (mm²)					1,5 - 16	1,5 - 16		
	Core diameter (mm²)					1,5 - 5,0	1,5 - 4,6		
BSLB-6/25** (1)	Cross section (mm²)	6 - 25	6 - 25			6 - 25,0	6 - 25,0		
	Core diameter (mm²)	2,8 - 6,5	2,7 - 5,7			2,8 - 6,5	2,7 - 5,7		
BSLB-10/50	Cross section (mm²)	10 - 50	10 - 50	10 - 50	10 - 50	10 - 50	10 - 50	10 - 50	10 - 50
	Core diameter (mm²)	4,0 - 9,1	3,5 - 7,8			4,0 - 9,1	3,5 - 7,8		
BSLB-35/95	Cross section (mm²)	35 - 95	35 - 95	35 - 95	35 - 95	25 - 95	35 - 95	35 - 95	35 - 95
	Core diameter (mm²)	6,6 - 12	6,1 - 11,0			5,6 - 12,9	6,1 - 11		
BSLB-25/150 S-AS	Cross section (mm²)	25 - 95	25 - 95	25 - 150	25 - 150	25 - 95	25 - 95	25 - 150	25 - 150
	Core diameter (mm²)	5,7 - 12,5	5,5 - 11,0			5,7 - 12,5	5,5 - 11,0		
BSLB-95/240	Cross section (mm²)	95 - 240	95 - 240	95 - 240	95 - 240	70 - 240		95 - 240	
	Core diameter (mm²)	11,0 - 20,0	10,5 - 18,0			9,3 - 20,0			

NOTE

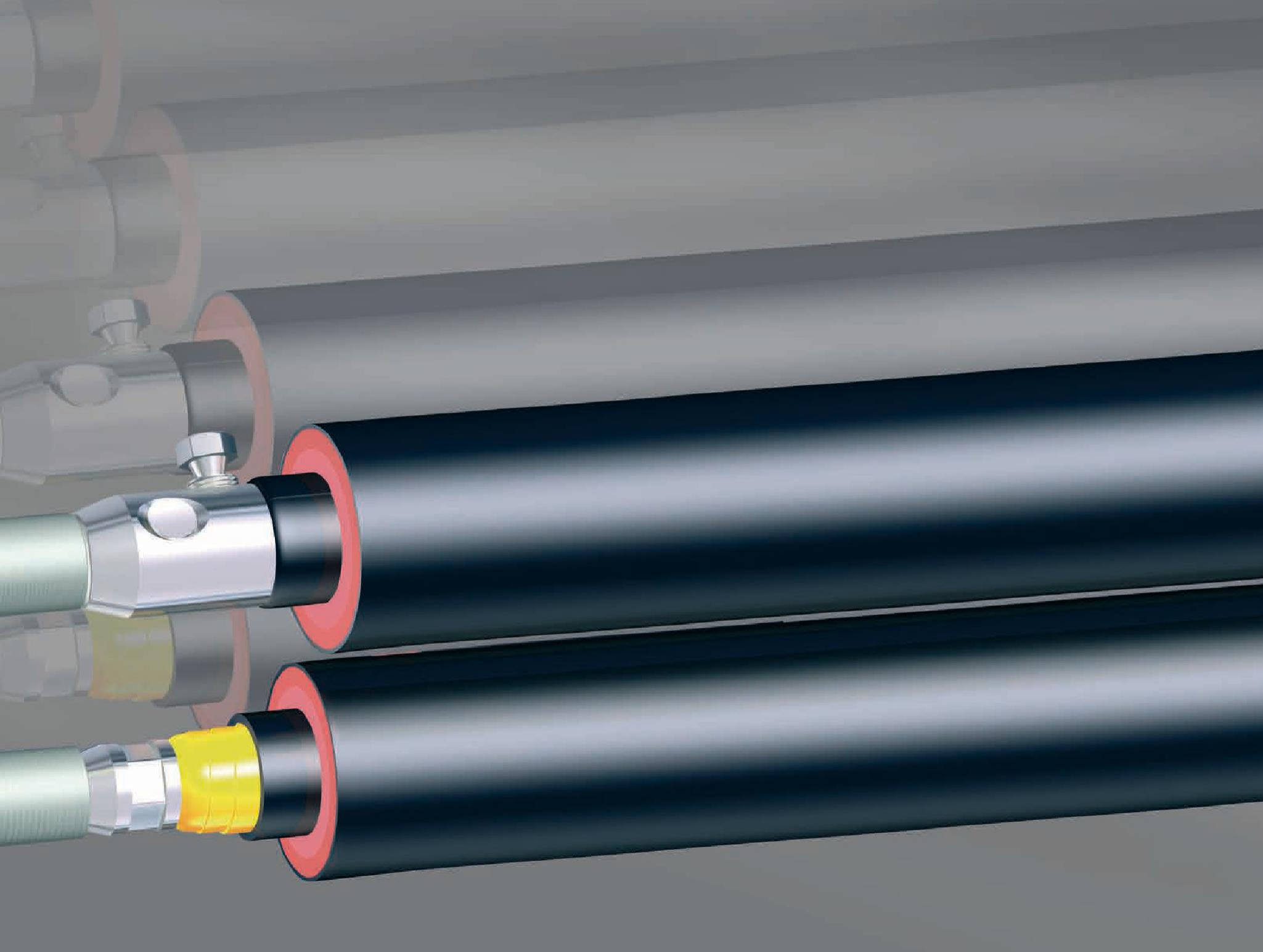
* BSL-4/16: body material - brass, bolts - without shear bolts

** BSLB-6/25 according to IEC 61238 (class A) but do not accorded to DIN 4760

(1) For connector without partition, the name starts with BSLU, except BSLB-6/25

Dimensions of BSLB connectors

Order description	Lenght (mm)	Outer diameter (mm)	Quantity of bolts	AF head size (mm)
BSLB-4/16	30	12	2	2.5 (internal)
BSLB-6/25	40	14	2	5 (internal)
BSLB-10/50	40	18	2	10
BSLB-35/95	50	25	2	10
BSLB-25/150 S-AS	70	28	2	13
BSLB-95/240	90	37	4	10



Section IV
Medium voltage joints

Joints for three-core cables
with paper insulation in common sheath for voltage 6 and 10 kV.....92

joints for three-core unshielded cables
PVC-insulated up to 6 kV94

Joints for flexible screened rubber insulated cables up to 6 kV.....95

Joints for screened three-core cables
with polymeric insulation for 10, 20 and 35 kV voltage96

Joints for screened single-core cables with polymeric insulation with copper wire or
tape screen for 10, 20 and 35 kV voltage.....98

Repair joints for screened single-core cables with polymeric insulation with copper wire
or copper tape screen for 10, 20 and 35 kV voltage.....100

Joints for screened single-core cables with polymeric insulation with aluminum wire
armor for 10, 20 and 35 kV voltage.....101

Joints and additional kits for transposition of copper wire screen for screened
single-core cables with polymeric insulation for 10, 20 and 35 kV voltage.....102

Additional kits for screened single-core cables with polymeric insulation with aluminum
wire screen for 10, 20 and 35 kV voltage.....103

Branch joints for screened single-core cables with polymeric insulation for 10, and 20
kV voltage.....104

Elastomeric pre- expanded joints for screened single core cables
with polymeric insulation for 10, 20 and 35 kV voltage 105

Transition joints for connection of three-core paper-insulated cables for voltage 6 and
10 kV to screeened single-core cables with polymeric insulation for voltage 10 or 20
kV106

Transition joints for connecting screened cables with
polymeric insulation to paper insulated cables with separate sheaths for voltage 35 kV
for voltage 35 kV108

NOTE
Joints for polymeric-insulated shielded cables are universal and can be used for cables made from cross-linked polyethylene insulation (LDPE / XLPE) and also for cables made from ethylene propylene insulation (EPR / EPR).

Joints for three-core paper insulated cables with one common metal sheath 6 and 10 kV

CABLES

Joints for three-core cables with paper insulation with one common metal sheath for voltage 6 and 10 kV. Cables can have one common metal sheath or separate shields on each core. For example: ASB, AABU, ASBU, SB2L, ASB2LG, SB, ASBG, N(A)KBA, N(A)KLEY.

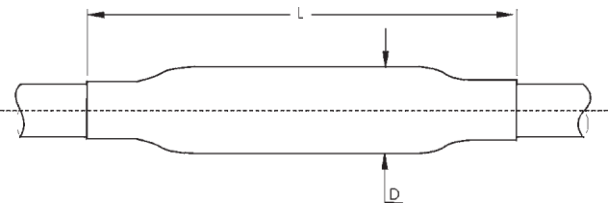
Cables with common one common metal sheath

Transparent heat shrinkable oil-resistant tubings are installed on the paper insulation of the cores. The spine of the cable termination is filled with a yellow color special mastic tape, equalizing the electric field strength and with oil resistance. Cable cores are connected by bolted connectors included in the kit of the joint. The connectors are covered with mastic plates to equalize the electric field strength. The insulation of the cores above the connectors is restored by heat-shrinkable tubes with adhesive.

The space between and around the conductors is filled with a fusion mastic that is fully compatible with the paper insulation of the cable. The heat shrinkable tubing is shrunk down onto the joint area and seals the metal sheaths of the cables, the mastic softens, fills the the inner space of the joint and displaces the air. A solderless grounding system and metal mesh restores the metal sheath and reinforces the joint. The outer heat-shrinkable tubing seals and protects joint.



Cable with one common shield



L, D - see table

joints with mechanical bolted connectors

Joints for three-core cables with belt insulation in one common sheath for voltage 6, 10 and 20 kV				
Rated voltage Uo/U (kV)	Wire cross section (mm²)	Order description	Dimensions (mm)	
			L	D
3,6/6	35 - 50	GUSJ-12/ 35- 50	1050	90
	70 - 120	GUSJ-12/ 70-120	1250	120
	150 - 240	GUSJ-12/150-240	1250	140
6/10	25 - 50	GUSJ-12/ 35- 50	1050	90
	70 - 120	GUSJ-12/ 70-120	1250	120
	150 - 240	GUSJ-12/150-240	1250	140

NOTE joints for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.

Joints for three-core paper-insulated cables with conductors in separate sheaths for voltage 35 kV

CABLE

Joints for single or three-core paper-insulated cables with conductors in separate sheaths 35 kV.

For example: CAOSBU, COSSB, AOSBg, OSBU, N(A)EKEBY, N(A)EKBA.

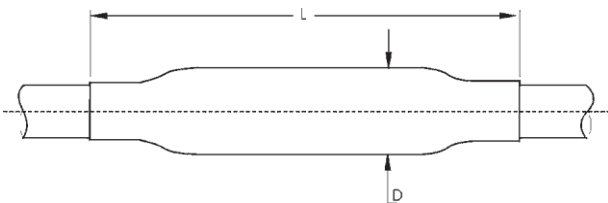
Design

For three-core cables, solderless grounding system provides a connection between the armor and the metal sheaths of the conductors. Heat-shrinkable brakeout and tubes seal and protect the metal sheaths. Oil-resistant yellow mastic is rolled out at the cut of the metal . The paper insulation of the conductors is completely covered with oil-resistant tubes. Short conductive tubes restore the shield at the transition point from the metal sheath to the paper insulation of the cores. The paper insulated transformed to polymeric-insulated cable. Yellow void filler mastic is applied to the end of the conductor tubes and over the connectors.

Heat-shrinkable stress-control tubing placed over the connection area of each core. A three-layer tubing is shrunk down over to provide the required insulation thickness and shielding layer. The copper mesh is wrapped around the connection area, restoring the metal shield. Metallic sheaths of the conductors jointed by solderless connection. For three-core cables, the armor is restored with a metal mesh. For single-core cables, outer heat-shrinkable thick-walled tubing with adhesive provides sealing and protection of the joint. Three-core cables protected by a reinforced heat-shrinkable wraparound. The joint is supplied with mechanical bolted connectors.



Cable with separate sheaths



L, D - see table

Joints with mechanical bolted connectors

joints for three-core cables with steel tape armor				
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Dimensions (mm)	
			L	D
20/35	70 - 120	GUSJ-42/ 70-120-3HL	2000	130
	120 - 240	GUSJ-42/120-240-3HL	2000	150

Joints for single-core cables without armor				
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Dimensions (mm)	
			L	D
20/35	70 - 120	GUSJ-42/ 70-120-1HL	2000	130
	120 - 240	GUSJ-42/120-240-1HL	2000	150

NOTE Joints for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.

Joints for three-core unscreened PVC-insulated cables for voltage 6 kV

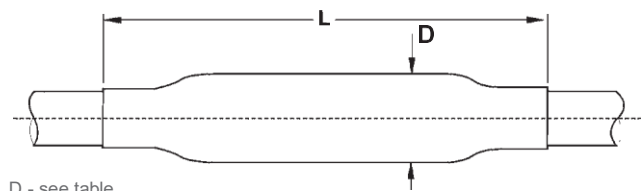
CABLE

Joints for three-core cables without semi-conductive screen with armor and copper wire or copper tape shield for 6 kV.

For example: AVVG, VVBbshv, VVB, NYSY, NAYSEY.

Joint design

The core connection point is insulated with mastic and heat-shrinkable thick-wall tubing with adhesive. Tape armor and tape shield restored with copper mesh. An solderless grounding system provides electrical contact with the armor or copper screen. External protection and sealing is provided by heat shrinkable tubing with adhesive. Mechanical bolted connectors are included in the joint kit.



L, D - see table

Transition joint design for connection to single-core screened polymeric-insulated cables

The cores of shielded cables covered with yellow void filler mastic and heat-shrinkable tubing to equalize the electric field strength. The cores are connected with mechanical bolted connectors, which are included in the kit of joints. The connection area is wrapped with a mastic cuff to equalize the electric field strength. A two-layer elastomeric tubing is placed over to provide the required insulation thickness and screened layer. A copper mesh is wrapped around the connection area. A solderless grounding system provides electrical contact with the armor or copper shield. External protection and sealing is provided by a heat-shrinkable tubing with adhesive.

Joints with mechanical bolted connectors for PVC insulated cables

Joints for cables with steel strip armor or common copper shield or wire shield				
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Dimensions (mm)	
			L	D
3,6/6	25 - 50	POLJ-06/3x 25- 50	1200	70
	70 - 120	POLJ-06/3x 70-120	1200	90
	150 - 240	POLJ-06/3x150-240	1200	100

Transition joints with mechanical bolted connectors for connecting PVC and polymeric insulated cables

Transition joints from 3-core unscreened PVC-insulated cables to single-core screened polymeric insulated cables					
Rated voltage Uo/U (kV)	Cross section (mm²)		Order description	Dimensions (mm)	
	3-core cable	1-core cable*		L	D
3,6/6	25 - 70	25 - 70	POLJ-12/1x 25- 70-3U	800	90
	70 - 120	70 - 150	POLJ-12/1x 70-150-3U	800	90
	150 - 240	150 - 240	POLJ-12/1x150-240-3U	800	100

NOTE	* The range is specified for 10 and 20 kV cables. Joints for other voltages, cross sections and cable types can be ordered on request.
------	---

Joints for flexible screened rubber insulated cables for voltage 6 kV

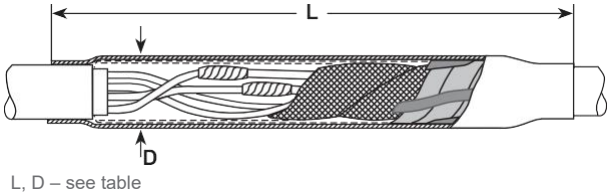
CABLE

Joints for 6 kV rubber-insulated screened flexible cables with one or three earth conductors.
For example: CGE, CGEpE, NYHSSYCY, NTS, NSS.

Design for flexible cables

Electrical field strength is equalized at the core connection point, sealed and insulated using void filling tapes and thick-walled heat-shrinkable tubing.
A semi-conductive tape applied over the insulating tubes restores the shield over the joint. The outer flexible, thick-walled protective sealing tubing maintains the flexibility of the joint and resists abrasion.

The inner space of the joint between the conductors and the outer tubing is filled with a flexible thermo-melting mastic.
All tubing included in the joint kit is lame retarded.



joints for flexible rubber insulated cables

Rated voltage Uo/U (kV)	Cables with three earthing conductors		Cables with one grounding conductor		Dimensions (mm)	
	Cross section (mm²)	Order description	Cross section (mm²)	Order description	L	D
3,6/6	-	-	10/ 10	EMKJ-2001	750	55
	25/10- 95/16	EMKJ-2201-CEE01	16/ 16- 95/ 95	EMKJ-2011	750	100
	120/16-185/35	EMKJ-2211-CEE01	120/120-185/185	EMKJ-2021	950	130

NOTE	The joints are designed for pressed connectors with a maximum length of 60 mm. The connectors are not included in the joint. Joint for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.
------	--

Joints for three-core screened polymeric insulated cables 10, 20 and 35 kV

CABLE

The joints are designed for screened three-core cables with XLPE and EPR insulation with copper wire, tape or laminated metal shield, with and without armor for 10, 20 and 35 kV. For example: APvP, APvV, APvBbShpv, Pvp2g, APvEV, PvpPu, APvEGAP, N(A)2XSY, N2XSEY, N(A)2XS2Y, 2XSEYBY, AHXCMK-WTC, RG70RNR.

Cables with copper wire and tape shield

The shield cut and the core connection point are wrapped with yellow void filler tape and then heat shrink tubing is placed over this area to equalize the electric field strength. The cores are connected using the mechanical connectors provided in the kit. The area of the connectors is wrapped with a mastic plate to equalize the field strength. A heat-shrinkable three-layer elastomeric tubing is then applied to ensure uniform insulation thickness and create a shield at the connection point. The copper mesh is wrapped around the joint and re-establishes the metal shield. For cables with a wire shield, a bolted connector is included. For tape shielded cables, a solderless grounding system is included in the joint kit. For cables with armor, a metal jacket or metal tape provides additional mechanical protection. External protection and sealing is provided by a thick-walled heat-shrinkable tubing with heat-melting adhesive on the inner surface.

Additional kit for sealing the transition joint from three-core cables to single-core cables

The design of the transition joint is similar to the connection joint for three-core cables. Single-core cables are sealed by a heat-shrinkable brakeout. The solderless earthing kit allows all typical shield combinations to be connected.

Additional kit for cables with aluminum wire shielding

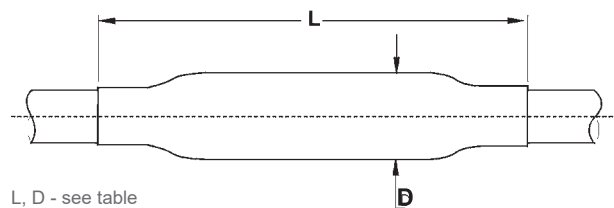
The kit allows the use of a joint sleeve for cables with aluminum shielding.



Joint for cables with wire shield



Cable joint with tape screen



L, D - see table

Joints for three-core screened polymeric insulated cables 10, 20 and 35 kV

Joints with mechanical bolted connectors

Joints for cables with copper wire or copper tape shielding						
Rated voltage Uo/U (kV)	Cross section* (mm²)	Order description for cables			Dimensions (mm)	
		without armor	with steel tape armor	with steel wire armor	L	D
6/10	25 - 70	POLJ-12/3x 25- 70	POLJ-12/3x 25- 70-T	POLJ-12/3x 25- 70-W	1100	80
	70 - 150	POLJ-12/3x 70-150	POLJ-12/3x 70-150-T	POLJ-12/3x 70-150-W	1100	90
	120 - 240	POLJ-12/3x120-240	POLJ-12/3x120-240-T	POLJ-12/3x120-240-W	1100	100
	240 - 400	POLJ-12/3x240-400	POLJ-12/3x240-400-T	POLJ-12/3x240-400-W	1400	120
	500	POLJ-12/3x500	POLJ-12/3x500-T	-	1400	130
12/20	25- 70	POLJ-24/3x 25- 70	POLJ-24/3x 25- 70-T	POLJ-24/3x 25- 70-W	1250	90
	70 - 150	POLJ-24/3x 70-150	POLJ-24/3x 70-150-T	POLJ-24/3x 70-150-W	1250	100
	120 - 240	POLJ-24/3x120-240	POLJ-24/3x120-240-T	POLJ-24/3x120-240-W	1250	110
	240 - 400	POLJ-24/3x240-400	-	POLJ-24/3x240-400-W	1400	120
	500	POLJ-24/3x500	-	-	1400	130
20/35	50 - 95	POLJ-42/3x 50-95	POLJ-42/3x 50-95-T	POLJ-42/3x 50-95-W	2200	130
	70 - 120	POLJ-42/3x 70-120	POLJ-42/3x 70-120-T	POLJ-42/3x 70-120-W	2200	150
	120 - 240	POLJ-42/3x120-240	POLJ-42/3x120-240-T	POLJ-42/3x120-240-W	2200	180
	240 - 400	POLJ-42/3x240-400	POLJ-42/3x240-400-T	POLJ-42/3x240-400-W	2200	190

NOTE

* Cross-section ranges are specified for cables with round multiwire conductors of class 2. For cables with sector conductors, the working range must be reduced by one step. Please contact TE Connectivity offices to select joints for other conductor designs.

** For cables with aluminum laminated shield (type AHXAMK-W), you must order the SMOE-62600 kit (see page 119 for details).

joints for other cross-sections, voltages and cable types are available on request.
Please contact local TE Connectivity offices for more information.

Additional kits for three-core joints for polymeric insulated cables

Additional kit for sealing the transition joint from three-core cables to single-core cables **		
Order description	Cross section (mm²)	Rated voltage Uo/U (kV)
SMOE-62800	25-240	6/10, 12/20

Additional kit for three-core cables with aluminum wire shield				
Order description	Aluminum shield cross section (mm²)	Cross-section (mm2) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
POLJ-3x/A185	25 - 185	35 - 300	35 - 240	35 - 120

Joints for single-core screened cables with polymeric insulation and copper wire or tape shield 10, 20 and 35 kV

CABLE

Joints for screened single-core cables with XLPE and EPR insulation with copper wire, tape or laminated metal for voltages 10, 20 and 35 kV.
For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEgap, N(A)2XS(2)Y, N2XS(F)2Y, HXCMK, AHXAMK-W, RG7H1R.

CONSTRUCTION

Cables with copper wire, tape or laminated metal shielding

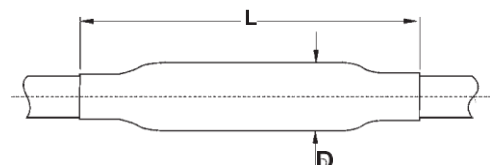
The shield cut-off area is wrapped with yellow void filler tape and then heat shrinkable tubing is placed over the to equalize the electric field strength. The are connected using the mechanical connectors provided in the kit. The connector area wrapped with a mastic plate to equalize the electric field strength. A heat-shrinkable, three-layer elastomeric tubing is then shrink down to provide an thickness of insulation, creating a shield at the connection point. The copper mesh wrapped around the joint and restores the metal shield. For cables with wire shield, the kit includes mechanical bolted connector. For tape shield cables, the joint kit includes a solderless grounding system, which is also applicable for AHXAMK-W type aluminum laminated shield cables (NK type cables). External sealing and protection provided by a thick-walled heat-shrinkable tubing.



POLJ joint with standard application range



POLJ joint with extended application range



L, D - see table

CONSTRUCTION

joints with extended application range

This type of joints allows the connection of cables with large differences in cross-sections. For example, when connecting cables with cross sections 25 - 240 mm² to cables with cross sections 185 - 630 mm². These joints are characterized by the use of a special transition connector and heat-shrinkable materials designed for the respective core diameters, insulation and oversheath.

Joints for single-core screened cables with polymeric insulation and copper wire or tape shield 10, 20 and 35 kV

Joints with mechanical bolted connectors

Rated voltage Uo/U (kV)	Cross section (mm ²)	Order description for cables		Dimensions (mm)	
		with copper wire shield	with tape, laminated and wire shield*	L	D
6/10	25 - 70	POLJ-12/1x 25- 70	POLJ-12/1x 25- 70-CEE01	550	45
	70 - 150	POLJ-12/1x 70-150	POLJ-12/1x 70-150-CEE01	550	55
	120 - 240	POLJ-12/1x120-240	POLJ-12/1x120-240-CEE01	550	65
	150 - 300	POLJ-12/1x150-300	-	-	-
	240 - 400	POLJ-12/1x240-400	POLJ-12/1x240-400-CEE01	650	75
	500	POLJ-12/1x500	-	700	85
	630	POLJ-12/1x630	-	700	85
	800	POLJ-12/1x800-CIS02	-	700	90
12/20	1000	POLJ-12/1x1000-CIS02	-	800	90
	25 - 70	POLJ-24/1x 25- 70	POLJ-24/1x 25- 70-CEE01	550	55
	70 - 150	POLJ-24/1x 70-150	POLJ-24/1x 70-150-CEE01	600	65
	120 - 240	POLJ-24/1x120-240	POLJ-24/1x120-240-CEE01	600	70
	150 - 300	POLJ-24/1x150-300	POLJ-24/1x150-300-CEE01		
	240 - 400	POLJ-24/1x240-400	POLJ-24/1x240-400-CEE01	650	80
	500	POLJ-24/1x500	-	800	90
	630	POLJ-24/1x630	-	800	90
20/35	800	POLJ-24/1x800-CIS02	-	900	90
	1000	POLJ-24/1x1000-CIS02	-	1000	90
	35 - 70	POLJ-42/1x 35- 70	POLJ-42/1x 35- 70-CEE01	750	65
	70 - 120	POLJ-42/1x 70-120	POLJ-42/1x 70-120-CEE01	750	70
	120 - 240	POLJ-42/1x120-240	POLJ-42/1x120-240-CEE01	750	75
	300 - 400	POLJ-42/1x300-400	-	800	85
	500	POLJ-42/1x500	-	900	95
	630	POLJ-42/1x630	-	900	95
	800	POLJ-42/1x800-CIS02	-	900	100
	1000	POLJ-42/1x1000-CIS02	-	900	100

Joints with extended application range

Rated voltage Uo/U (kV)	Cross section (mm ²)*	Order description for cables with CU wire shield	Dimensions (mm)	
			L	D
6/10	185-400/ 500	MXSU-3151-T6	700	85
	185-400/ 630	MXSU-3161-T6	700	90
12/20	185-400/ 500	MXSU-5151-T6	800	90
	185-400/ 630	MXSU-5161-T6	800	90

NOTE

* Joints are designed for cables with copper tape or aluminum laminated shield (e.g. type AHXAMK-W) and can also be used for cables with wire shield. To change from wire shielded to laminated shielded cables, joints for wire shielded cables should be used.

The kit includes materials for one phase.

Joints for other cross-sections, voltages and cable types are available on request.
Please contact local TE Connectivity offices for more information.

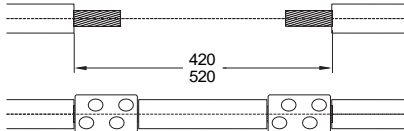
Repair joints for single-core screened cables with polymeric insulation and copper wire or tape shield 10, 20 and 35 kV

CABLE

Repair joints for screened single-core cables with polymeric (XLPE and EPR) insulation for voltage 10, 20 and 35 kV with copper wire shield without armor.
For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEGAP, N(A)2XS(2)Y, N2XS(F)2Y, HXCMK, AHXAMK-W, RG7H1R.

Repair joints

The design of the repair joint is similar. The long length of the repair joint removing the damaged part of the cable and replacing it by inserting a core section with two connectors. The length of such an insert can be up to 520 mm (for 10 and 20 kV cables) or 420 mm (for 35 kV cables). The bolted mechanical connectors included in the kit are designed for Class 2 copper and aluminum conductors.



Installation diagram for repair joint

Repair joints with mechanical bolted connectors

Rated voltage Uo/U (kV)	Cross section* (mm²)		Order description for cables with wire or tape shielding	Max. repair area (mm)	Dimensions (mm)	
	6/10 kV	12/20 kV			L	D
12/20	25 - 70	25 - 70	REPJ-24/1x 25- 70	520	1200	50
	95 - 150	70 - 120	REPJ-24/1x 70-150	520	1200	55
	150 - 240	120 - 240	REPJ-24/1x120-240	520	1200	70
20/35	70 - 120	-	REPJ-42/1x 70-120	420	1200	55
	120 - 240	-	REPJ-42/1x120-240	420	1200	70

NOTE	Kit includes materials for one phase.
	Joints for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.

Joints for single-core screened cables with polymeric insulation and aluminum wire armor 10, 20 and 35 kV

CABLE

Joints for screened single-core cables with polymeric (XLPE and EPR) insulation for 10, 20 and 35 kV with copper wire shield and aluminum wire tape armor.

Joints for cables with aluminum tape armor

The design of the joint is similar to the POLJ joint for single-core cable without armor. Additionally, the kit includes roller springs and grounding earth lead.
The armor and shield are joined separately from each other.

Joints for cables with aluminum wire armor

The design of the joint is similar to the POLJ joint for single-core cable without armor. In addition, armor connectors are included in the kit. Armor and shield are connected separately from each other.
Since the outer diameter of such cables are different them standard cables, the diameter should be checked before ordering.

Joints with mechanical bolted connectors

Joints for cables with aluminum wire or tape armor and copper wire shield*			
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description for cables with wire armor	maximum cable diameter
6/10	25 - 70*	POLJ-12/1x 25-70-AW	34,0
	70 - 95*	POLJ-12/1x 70-150-AW	36,0
	120 - 185*	POLJ-12/1x120-240-AW	42,0
	240 - 300	POLJ-12/1x240-400-AW	49,0
	500	POLJ-12/1x500-AW	58,0
	630	POLJ-12/1x630-AW	62,0
	800	POLJ-12/1x800-AW	64,0
12/20	95 - 185	MXAW-5131	43,0
	150 - 300	MXAW-5132	48,0
	240 - 400	MXAW-5141	54,0
	500	MXAW-5151	56,0
	630	MXAW-5161	60,0
	800	MXAW-5171	69,0
20/35	70 - 95*	POLJ-42/1x 70-120-AW	40,0
	120 - 240	POLJ-42/1x120-240-AW	58,0
	300 - 400	POLJ-42/1x300-400-AW	65,0
	500	POLJ-42/1x500-AW	67,0
	630*	POLJ-42/1x630-AW	71,0
	800	POLJ-42/1x800-AW	75,0

NOTE	* When selecting the joint, check that the outer diameter of the cable does not exceed that specified in the table.
	Joints for other cross-sections, voltages and cable types can be ordered on request. Please contact local TE Connectivity offices for more information.

Joints and additional kits for transposition of copper wire shields for single-core cables with polymeric insulation 10, 20 and 35 kV

CABLE

Transposition joints and additional kits for transposition of copper wire shields for single-core polymeric-insulated cables without armor at voltages of 10, 20 and 35 kV.

For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEgap, N(A)2XS(2)Y, N2XS(F)2Y, HXCMK, AHXAMK-W, RG7H1R.

The accessories are specially designed to reduce losses in the wire shields of single-core cables and are designed for cable lines with large cross-section with copper wire shields. With transposition, the cable line is divided into shorter lengths and the wire shields of the cables are transferred to other phases. It is acceptable to use a link boxes for transposition that can be installed in an excavation, underground well, or on a MV pole or on a special structure.

Two types of transposition accessories have been developed:

- Additional transposition kits for voltages up to 24 kV

Additional kits are included materials for outputting screens from three single-core POLJ-12/1x or POLJ- 24/1x joints (see page xxx).

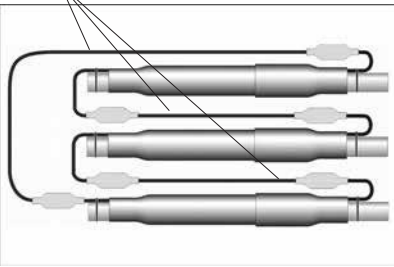
The transposition cable is not included in the kit.

- transposition joints up to 42 kV

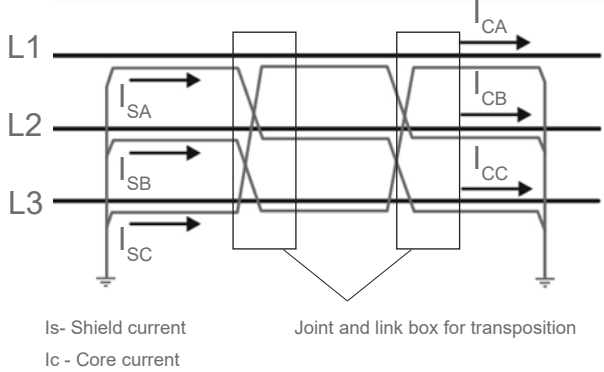
Joint includes a 35 kV joint and additional kit for the screen output.

The transposition cable is not included in the joint.

Transposition cable (not included)



Transposition of cable shields



Additional transposition kits for voltages up to 24 kV

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description for copper wire shielded cables
6/10	120 - 240	POLJ-24A /SB
12/20	300 - 800	POLJ-24B /SB

Transposition joints

Rated voltage Uo/U (kV)	Cross section (mm²)	Order description for copper wire shielded cables
20/35	70 - 150	POLJ-42/1x70-150-SB
	185 - 300	POLJ-42/1x185-300-SB
	300 - 400	POLJ-42/1x300-400-SB
	500	POLJ-42/1x500-SB
	630	POLJ-42/1x630-SB

NOTE

* The optional kit includes only materials for the screen output from the POLJ joint. The transposition cable must be ordered separately.

** Includes: POLJ joint and screen output materials. Transposition cable must be ordered separately.

Joints for other cross sections, voltages and cables with aluminum wire shield are available on request. Please contact TE Connectivity offices for further information.

Additional kits for single-core cables with polymeric insulation and aluminum wire shield 10, 20 and 35 kV

CABLE

Additional kits for POLJ joints for screened single-core cables with polymeric insulation (XLPE and EPR) and aluminum wire shield for 10, 20 and 35 kV.

Additional kits for cables with aluminum wire shield

Optional kit is designed to be used common with standard POLJ single core joints (see page 109).

Installation

Joint is assembled in the same way as the POLJ joint. The aluminum wires of the shields connected with bolt connectors, the number of which depends on the cross-section of the shield. External sealing and protection is provided by an additional thick-walled tubing, used common with tubing supplied with the joint.

Additional kit for cables with aluminum wire shield (APvP TAL cables)

Order description	Aluminum shield cross section (mm²)	Core cross-section (mm2) for cables with rated voltage Uo/U		
		6/10 kV	12/20 kV	20/35 kV
POLJ-1x/A185	25 - 185	120 - 630	95 - 630	35 - 400
POLJ-1x/A240	150 - 240	120 - 800	95 - 800	50 - 500

NOTE

Prefabricated joints complete with aluminum wire screen materials are available on request.

The supplemental kit includes materials for one phase.

The application range is specified for class 2 round stranded conductors. Please contact TE Connectivity offices to select joints for other core designs.

Branch joints for screened polymeric-insulated single-core cables 10 and 20 kV

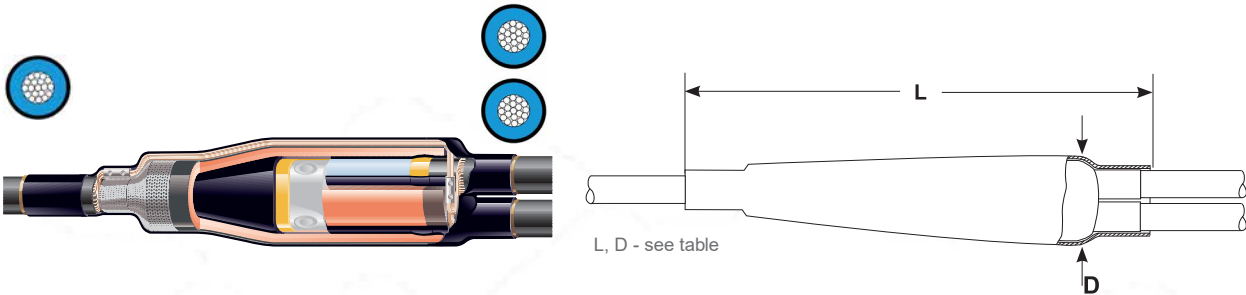
CABLE

Joints based on a designed connector, which allow to make branches from single-core cables with polymeric (XLPE and EPR) insulation and copper wire shield. The joints are designed for single-core polymeric-insulated cables for voltage of 10, 20 kV. For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEGAP, N(A)2XS2Y, N2XS(F)2Y, HXCMK, AHXAMK-W, RG7H1R.

CONSTRUCTION

Cable preparation is the same as for the installation of the inline joint. Before connecting the cables, the semi- conductive cut points are wrapped with yellow void filler mastic and then tubing for equalizing the electric field strength is placed on it. Cores of the three cables are connected by means of a specially designed mechanical bolted connector with shear-off bolts. Special profiles are used to seal the inter-cable space. Similarly to the inline joint, next elements are used for the branch joint: wrapping the joint with yellow mastic, shrinking stress-control tubing and a three-layer elastomeric tubing.

Copper mesh is used to restore the metal shield. Outer sealing is accomplished with thick-walled tubing and a two-fingered brakeout. All connectors are supplied as a kit. Branch joints are a cost-effective solution and often used in wind farms and solar power plants. No special tools are required for installation and the included connector in combination with the joint design ensures fast and reliable installation. The bolted mechanical connectors included in the kit are designed for Class 2 copper and aluminum conductors.



Branch joints with mechanical bolted connectors

Branch joint for copper wire shielded cables, including mechanical bolted connectors				
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Dimensions (mm)	
			L	D
6/10	35 - 95	MXSB-12A/1XU-2XU	550	80
	70 - 185	MXSB-12B/1XU-2XU	600	90
	150 - 300	MXSB-12C/1XU-2XU	650	95
12/20	35 - 95	MXSB-24A/1XU-2XU	550	80
	70 - 185	MXSB-24B/1XU-2XU	600	90
	120 - 300	MXSB-24C/1XU-2XU	650	95

NOTE Kit includes materials for one phase. Joints for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.

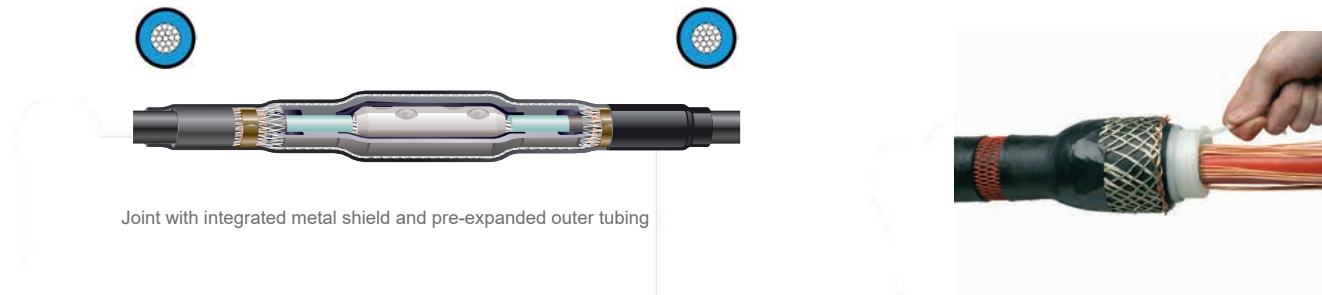
Elastomeric pre- expanded joints for screened single-core polymeric insulated cables 10, 20 and 35 kV

CABLE

Joints for screened single-core cables with polymeric (XLPE and EPR) insulation for 10, 20 and 35 kV. For example: APvPg, APvV, PvPug, PvP2g, APvEV, PvEPu, APvEGAP, N(A)2XS(2)Y, N2XS(F)2Y, HXCMK, AHXAMK-W, RG7H1R.

Joint design with pre- expanded outer tubing and integrated metal shield Joint body, copper mesh screen and outer tubing are supplied pre-expanded on a single spiral cord. As the cord is removed, joint elements shrink into the joint area. The integrated copper mesh shield is folded over the shield wires of the cables and secured with roller springs. This solderless grounding system is also suitable for cables with an aluminum laminated shield type AHXAMK-W (NK cables).

The edges of the outer pre-installed tubing are folded back onto the oversheath of the cables with already wrapped mastic to restore sealing and protect the connection. **The joints are delivered as pre- expanded and mounted on the cord.** **Shelf life:** 24 months from the production date. **It is recommended to install the joints at temperatures above 0 °C**



Joints with mechanical bolted connectors

Cables with wire and tape metal shield				
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description for cables	Dimensions (mm)	
			L	D
6/10	95 - 240	CSJA-12B/1XU-1XU-M	700	65
	185 - 300	CSJA-12C/1XU-1XU-M	700	70
	240 - 400	CSJA-12D/1XU-1XU-M	800	75
12/20	35 - 150	CSJA-24B/1XU-1XU-M	700	65
	95 - 240	CSJA-24C/1XU-1XU-M1	700	70
	120 - 300	CSJA-24C/1XU-1XU-M2	700	70
	185 - 400	CSJA-24D/1XU-1XU-M	800	80
	500	CSJA-24E/1XU-1XU-M1	900	85
	630	CSJA-24E/1XU-1XU-M2	900	85
20/35	95 - 240	CSJA-36D/1XU-1XU-M	800	75
	240 - 400	CSJA-36E/1XU-1XU-M1	900	80
	500	CSJA-36E/1XU-1XU-M2	900	90
	630	CSJA-36E/1XU-1XU-M3	900	90

NOTE Kit includes materials for one phase. Joints for other cross-sections, voltages and cable types are available on request. Please contact TE Connectivity offices for more information.

Transition joints for connection of three-core paper insulated cables 6 and 10 kV with single-core screened cables with polymeric insulation 10 or 20 kV

CABLE

Joints for connecting 3-core paper-insulated cables in a common sheath and single or three-core cables with polymeric (XLPE and EPR) insulation 6, 10 and 20 kV.

For example, for connecting cables of the following types: APvVV, PvPug, APvBbShpv, AHXCMK-WTC, N(A)2XS2Y, N2XS(F)2Y, RG7H1R, with cables of the following types: ASB, AABLU, SB, AAG, ASBG, SBG.

CONSTRUCTION

Connecting paper insulated cables and single-core polymeric-insulated cables

Paper insulation of conductors is sealed with heat-shrinkable oil-resistant tubings, then conductive tubes are installed on each core. The spine is filled with yellow void tape to equalize the electric field strength and sealed with an electrically conductive brakeout and adhesive. In this way, the paper insulated cable is transformed into a polymeric-insulated cable and further connection is carried out as for polymeric cables. At the point where the semi-conductive screen of the polymeric cable cut off and the conductive tubes end, yellow void filler tape is applied to the cores of the paper cable. Stress-control tubing are placed on the cores of the polymeric cables. The cable cores are connected using the mechanical bolted connectors supplied with the joint. The connection area is sealed with stress-control tubing. Heat-shrinkable three-layer tubings provides uniform insulation thickness and shields the connection area.

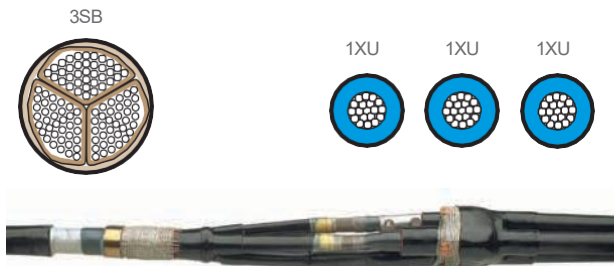
Metal sheath, armor or shield of a polymeric-insulated cable is connected by solderless connection. Metal tape wrapped around the joint shielded joint area and provides additional protection. Outer thick-walled heatshrinkable tubing with adhesive protects and seals the joint. For cables with aluminum laminated shield type AHXAMK-W, the grounding kit must be ordered separately.

Connection paper-insulated cables and three-core polymeric-insulated cables

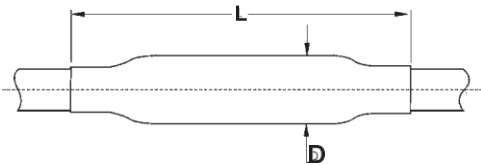
Joint design provides connection of shielded and unshielded polymeric cables. Installation and design of the joint is similar to the joint for single-core cables.

Kit includes a grounding system for various types of shields and armor. The kit includes an solderless system for various types of shields and armor.

Joint kit includes mechanical bolted core connectors.



Three-core paper-insulated cable with one common sheath and three single-core polymeric insulated cables



L, D - see table



Three-core paper-insulated cable with one common sheath and three-core polymeric-insulated cable

Transition joints for connection of three-core paper insulated cables 6 and 10 kV with single-core screened cables with polymeric insulation 10 or 20 kV

Transition joints with mechanical bolted connectors

Connection of screened single-core polymeric-insulated cables 10 or 20 kV and 3-core paper-insulated cables with one common sheath 6 and 10 kV						
Rated voltage Uo/U (kV)	Cross section (mm2) Insulation type		Order description Polymeric insulated cable		Dimensions (mm)	
	Paper	Polymeric	wire screen	tape screen	L	D
3,6/6 and 6/10	35 - 50	35 - 50	TRAJ-12/1x 35- 50	TRAJ-12/1x 35- 50-CEE01	950	90
	70 - 120	70 - 150	TRAJ-12/1x 70-120	TRAJ-12/1x 70-120-CEE01	950	120
	150 - 240	150 - 240	TRAJ-12/1x150-240	TRAJ-12/1x150-240-CEE01	950	140
	150 - 300	150 - 400	TRAJ-12/1x150-400	-	-	-

Connection of screened and unshielded three-core polymeric-insulated with three-core paper-insulated cable with one common sheath 6 and 10 kV				
Rated voltage Uo/U (kV)	Cross section (mm2)	Order description Polymeric insulated cable	Dimensions (mm)	
		without armor	L	D
3,6/6 and 6/10	35 - 50	TRAJ-12/3x 35- 50	1050	90
	70 - 120	TRAJ-12/3x 70-120	1250	120
	150 - 240	TRAJ-12/3x150-240	1250	140

Additional grounding kit for adapted transition joint TRAJ-CEE01 for single-core polymeric insulated cables with aluminum laminated shield (e.g. AHXAMK-W)		
Order description	Grounding lead	
	Length (mm)	Cross section (mm²)
SMOE-62600	800	35

NOTE	* Joints are designed for cables with copper tape or aluminum laminated shield (e.g. AHXAMK-W).
	Joints for other cross-sections, voltages and cable types are available on request.
	Please contact local TE Connectivity offices for more information.

Transition joints for connection screened polymeric insulated cables to paper insulated cables with separate sheaths 35 kV

CABLE

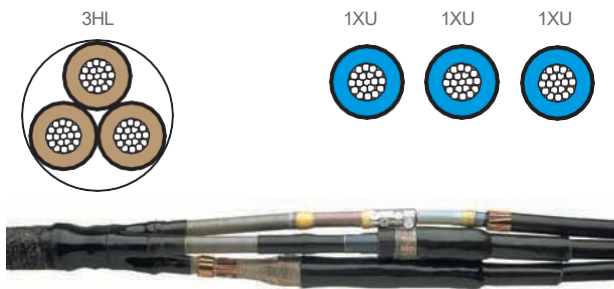
Transition joints for single or 3-core shielded paper insulated cables, with separate metal sheaths and single or 3-core 35 kV polymeric-insulated cables.

For example, for connecting cables of the following types: APvPg, PvPug, APvEV, N2XS(F)2Y, N(A)2XS2Y, AHXAMK-W, with cables of the following types: AOSB, , CAOSB, CAOSBG, CAOSB, OSBN.

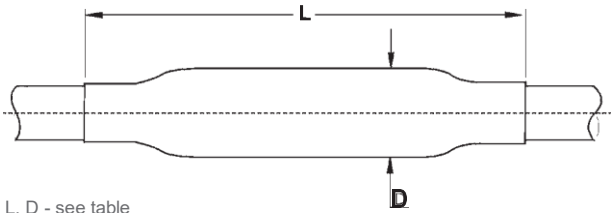
CONSTRUCTION

The contact between the metal sheaths and the paper cable armor is made by asolderless grounding system. Brakeout and tubes ensure sealing and protection of the sheathing spine. End point of the metal sheath is wrapped with yellow oil-resistant mastic tape to equalize the electric field, and the exposed areas of the paper insulation are protected with oil-resistant tubings. In this way, the paper-insulated cable is transformed into the cable with polymeric insulation, and then the connection is made as for polymer cables. Yellow tape is applied at the screen cut point. Stress-control tubing are placed on the cores. The cores are connected with mechanical bolted connectors, included in the kit

End of the paper insulation is sealed with yellow tape. Connectors are sealed with stress-control mastic. Heat-shrinkable elastomeric three-layer tubings provide uniform insulation and shielded connection area. Copper mesh restores the metallic shield. The metallic sheath and metallic shield of polymer cables are solderless connected. Outer thick-walled sealing tubes installed on each cable core.



3-core paper insulated cable with separate sheaths and single-core cable with polymeric insulation



L, D - see table

Transition joints for connection screened polymeric insulated cables to paper insulated cables with separate sheaths 35 kV

Transition joints with mechanical bolted connectors

Connection of screened single-core cables with polymeric insulation and 3-core paper-insulated cables with conductors in separate sheaths for voltage 10, 20 and 35 kV					
Rated voltage Uo/U (kV)	Cross section (mm²)		Order description	Dimensions (mm)	
	6/10 kV	12/20 kV		L	D
20/35	35 - 50	-	TRAJ-42/1x 35-50-3HL	1250	100
	70 - 120	-	TRAJ-42/1x 70-120-3HL	1250	130
	120 - 240	-	TRAJ-42/1x120-240-3HL	1250	150

NOTE	The joints are designed for cables with wire shield, copper strip or aluminum laminated shield (e.g. AHXAMK-W). Joints for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.
------	---

TRAJ-42/1x 35- 50-3HL

Connection of screened single-core polymeric-insulated cables and single-core paper-insulated cables with conductors in separate sheaths for voltage 20 and 35 kV				
Rated voltage Uo/U (kV)	Cross section (mm²)	Order description	Dimensions (mm)	
			L	D
20/35	35 - 50	TRAJ-42/1x35–50-1HL	1050	65
	70 - 120	TRAJ-42/1x70–120-1HL	1050	70
	120 - 240	TRAJ-42/1x120–240-1HL	1050	80

Additional grounding kit for TRAJ type transition joint for single-core polymeric-insulated cables with aluminum laminated shield (e.g. AHXAMK-W)		
Order description	Grounding lead	
	Length (mm)	Cross-section (mm²)
SMOE-62651	800	3 x 10

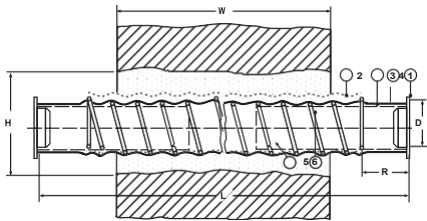
NOTE	Solderless grounding system must be ordered separately. The solderless grounding system includes: bolted connector, 3 insulated ground leads, heat shrinkable brakeout and insulating tubings. Joints for other cross-sections, voltages and cable types are available on request. Please contact local TE Connectivity offices for more information.
------	--



Section V Sealing and fixing systems

EPAF - Heat-shrinkable Wall Feed-through.....	112
RDSS - Rayflate duct sealing system.....	113
Heat-shrinkable cable brakeouts	116
Heat-shrinkable Sealing End Caps	117
Cable cleats for one and three cables	118

EPAF - Heat-shrinkable wall feed-through



- 1 Sealing cap
- 2 Outer sealing coating
- 3 Inner sealing coating
- 4 Heat-shrinkable tubing
- 5 Predetermined breaking point
- 6 Galvanized steel spiral

- Dimensions
- D Inner diameter of feed-through
 - a: as delivered
 - b: after free recovery
 - L Length
 - W Wall thickness
 - H Hole-through diameter

Cable diameter (mm)	Wall thickness W max.*	Diameter of hole H min.	Ordering description	Dimensions (mm)			
				D		L	R
				a min.	b max.	± 20 mm	± 20 mm
8 - 14	320	40	EPAF-2004EPAF-2004-CS004	16	8	700	90
12 - 25	320	55	EPAF-2008	28	10	700	90
18 - 36	420	70	EPAF-2010	41	16	800	90
29 - 56	320	90	EPAF-2020	59	26	700	90
55 - 98	370	140	EPAF-2030	106	54	760	115

NOTE For thicker walls, two seals can be joined and installed.

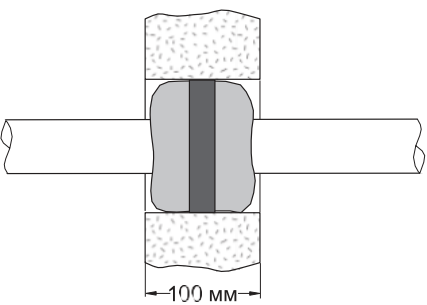
APPLICATION

The wall feed-through EPAF provides a reliable seal against water and gas for cables brought into buildings under-ground. When properly installed, test reports prove a water and gas tightness at an external pressure of 0,1 MPa between the wall and the feed-through as well as between the feed-through and the cables. The design allows removal of cables and installation of new cables in the same feed-through. For exceptionally thick walls, the feed-through can be easily prolonged with another one.

CONSTRUCTION

The feed-through EPAF consists of a galvanised steel spiral over which longer heat-shrinkable tubing with an adhesive coating inside is installed. An external coating of special primer improves the adhesion to various types of concrete and quick-drying cements. The ends of the tubing are protected with caps to allow cable installations at a later stage. When installing the cable, the end caps are removed and the adhesive coated tubing shrinks onto the cable. Cables are removed by cutting off the tubing at the end of the steel spiral. Upon pulling the steel spiral with a pair of pliers, it will break at a predetermined breaking point. The resulting new open end of the heat-shrinkable tubing can be shrunk onto the new cable.

RDSS - Rayflate duct sealing system



APPLICATION

The wall feed-through EPAF provides a reliable seal against water and gas for cables brought into buildings under-ground. When properly installed, test reports prove a water and gas tightness at an external pressure of 0,1 MPa between the wall and the feed-through as well as between the feed-through and the cables. The design allows removal of cables and installation of new cables in the same feed-through. For exceptionally thick walls, the feed-through can be easily prolonged with another one.

CLEAN, FAST AND EASY SEALING METHOD

The Rayflate seal consists of an inflatable bladder of flexible, metallic laminate, coated on both sides with a sealant strip. With the sealant strips lubricated, the product is simply wrapped around the cable and easily slides into the duct. The bladder is then inflated with a gas pressure tool which presses the sealant coating against the duct wall and the cable. Upon removal of the filling tube, an automatic gel valve system reliably retains the gas pressure in the Rayflate duct seal. The entire installation is performed within a few minutes – even in congested enclosures.

FLEXIBLE AND EASY TO DISMANTLE

Rayflate duct seals gets the pipe form, into which they are inserted and are not affected by the ovality of the pipe. Each system type covers a big range of cable and pipe diameters. The flexibility and versatility of the wrapping chamber allows it to be used not only for new cable lines, but also for existing lines. Against other methods which require dry surfaces, Rayflate duct seals can be installed when water is still flowing out of the duct – thus saving valuable installation time. Rayflate seals are easier to be removed from a duct or a pipe than other systems. This allows cables to be replaced in an upgrade or repair. Since ducts are not damaged by the Rayflate system, they can easily be sealed again.

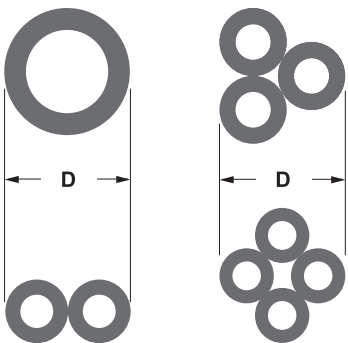
TESTING

Tests at room temperature showed water and air tightness at static pressures of more than 0,3 bar, even in conjunction with cable bending, vibration, torsion and axial pull. Resistance to common chemicals has been proven by immersion tests. The Rayflate system was tested with cables load-cycled at conductor temperatures of 90 °C, similar to specifications required for cable accessories. The sealing tests showed water and air tightness with internal duct pressures of 0,3 bar. Measurements and calculations of the diffusion rate indicate that a typical Rayflate duct seal will withstand a 3 m waterhead for 30 years after installation. The sealing performance after 30 years of life was confirmed by sealing tests with reduced internal bladder pressures. The test methodologies and parameters are set out in a detailed test report available from your local TE Energy products representative.

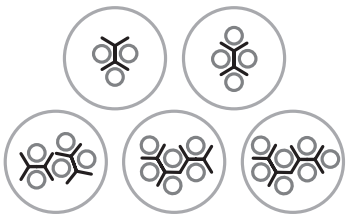
RDSS - Rayflate duct sealing system

Selection table for seals and inserts

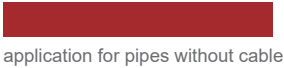
Each RDSS seals empty ducts (except for size 150) and ducts containing up to 2 cables. The table below shows the minimum and maximum diameter of the cable or of the sum of 2 cables depending on the duct size. All dimensions in mm.



Diameter of the cable or cable bundle.



If three or more cables have to be sealed, a RDSS-Clip is used in combination with the RDSS duct seal. The sealing clip has to be ordered separately. For each clip used, subtract 5 mm from the maximum cable diameter shown in the table to determine the maximum cable bundle diameter. One RDSS-clip seals up to 4 cables. If more cables are to be sealed, use one extra clip as shown above.



application for pipes without cable



application for pipes with cables

Inner Ø of pipe	Ordering description					
	RDSS-45 cable ø	RDSS-60 cable ø	RDSS-75 cable ø	RDSS-100 cable ø	RDSS-125 cable ø	RDSS-150 cable ø
32,5	0 - 14					
35	0 - 18					
40	0 - 27					
45	0 - 32	0 - 18				
50		0 - 30				
55		0 - 38	0 - 28			
60		0 - 45	0 - 30			
65			0 - 40			
70			0 - 46			
75			0 - 56	0 - 45		
80				0 - 52		
85				0 - 60		
90				0 - 66		
95				0 - 74		
100				0 - 80	0 - 65	
105				0 - 85	0 - 75	
110				0 - 90	0 - 83	
115				55 - 95*	0 - 91	
120				60 - 100*	0 - 95	
125					0 - 103	60 - 100
130					70 - 110*	60 - 107
135					75 - 115*	60 - 112
140					80 - 120*	60 - 118
145					85 - 125*	60 - 123
150					90 - 130*	60 - 129
155						60 - 134*
160						60 - 139*
165						105 - 145*
170						110 - 150*
175						115 - 155*
180						120 - 160*
inserts choose RDSS-clip	RDSS-Clip-45	RDSS-Clip-75	RDSS-Clip-75	RDSS-Clip-100	RDSS-Clip-125	RDSS-Clip-150

NOTE RDSS-Clip inter cable insert is used for two or more cables.

Installation tool

Rayflate duct seals can be installed using a wide variety of inflation tools, which have the capability to inflate the bag to 3,0 ±0,2 bar pressure. For recommended installation tools see the chapter "Tools and Accessories":

- inflation tool RDSS-IT-16,
- gas cylinders E7512-0160.

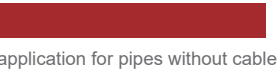
RDSS - Rayflate duct sealing system

Seals for large diameter pipes



RDSS-AD-210 adapters are designed for common installation with RDSS-125 and RDSS-150 duct seals for sealing pipes up to 210 mm in diameter. After lubrication of the sealing tape, the RDSS-AD-210 adapter is wrapped around the cable and inserted into the pipe. The twisted adapter is easily straightened in the pipe. The RDSS duct seal is then inserted between the cable and the previously installed adapter and inflated in the normal way. Some configurations may require two adapters. Details are given in the table. Adapters have been tested in conjunction with seals, including leak tests in conjunction with cable cycling, vibration and bending tests. Test reports are available on request. The table shows the minimum and maximum outside diameters of one or a bundle of cables that can be arranged according to the inner diameter of the pipe in appropriate combinations with RDSS duct seals and RDSS-AD-210 adapters. All dimensions are given in mm.

To seal multiple cables, use the appropriate insert according to the table on the previous page.



application for pipes without cable



application for pipes with cables

Inner Ø of pipe	Product combination			
	1xRDSS-AD-210 + RDSS-125 cable ø	2xRDSS-AD-210 + RDSS-125 cable ø	1xRDSS-AD-210 + RDSS-150 cable ø	2xRDSS-AD-210 + RDSS-150 cable ø
130	0*			
135	0*			
140	0 - 40			
145	0 - 50			
150	0 - 65			
155	0 - 83			
160	0 - 91			
165	0 - 103			
170	70 - 110	0*	60 - 107	
175	75 - 115	0 - 40	60 - 112	
180	80 - 120	0 - 50	60 - 118	
185	90 - 130	0 - 65	60 - 129	
190		0 - 83	60 - 135	
195		0 - 95	60 - 139	
200		0 - 103	105 - 145	60 – 100
205		75 - 115	115 - 155	60 – 112
210		80 - 120	120 - 160	60 – 118

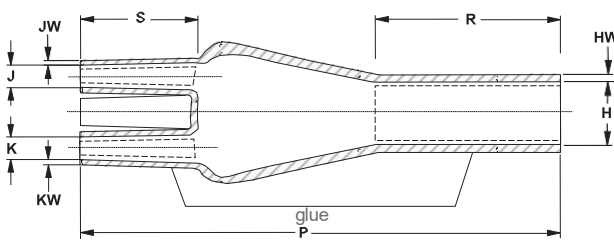
NOTE Application for empty ducts only

Heat shrinkable cable brakeouts



Application
For sealing of LV multi-core cables crutches and cable entries into ducts. To seal onto all common plastics and metals, all outlets are coated with hot-melt adhesive. The breakouts are resistant to UV-light and weathering.

The breakouts are available for 2-, 3-, 4-and 5-core cables, in a variety of sizes.
For dimensional details please see table below.

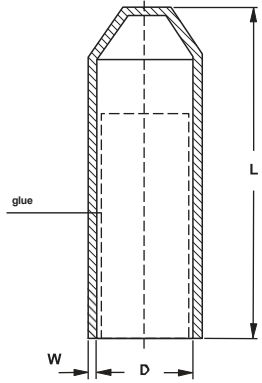


- Dimension
- H: Diameter of large outlet
 - J: Diameter of small outlet
 - K: Diameter of smallest outlet
 - P: Length of breakout
 - R: Length of large outlet
 - S: Length of small outlet
 - a: as delivered
 - b: after free recovery
- HW: Wall-thickness of large outlet
- JW: Wall-thickness of small outlet
- KW: Wall-thickness of smallest outlet

Recommended cross-section of polymeric insulated cables (mm²)	Ordering description	Dimensions (mm)										
		H		J		K		P	R	S	HW	JW/ KW
		a min.	b max.	a min.	b max.	a min.	b max.	b ±10%	b ±10%	b ±10%	b ±20%	b ±20%
for 2-core cables												
4 - 25	302K333/S.	28	9,2	15	4,1	-	-	90	20	25	3,2	1,6
35 - 150	302K224/S.	48	32	22	7	-	-	172	-	70	2,0	2,0
150 - 400	302K466/S.	86	42	40	17	-	-	200	-	75	2,5	2,5
for 3-core cables												
4 - 35	402W533/S.	38	13	16	4,2	-	-	103	45	28	2,7	1,5
50 - 150	402W516/S.	63	22	26	9	-	-	180	85	40	3,5	1,5
95 - 500	402W526/S.	95	28	44	13	-	-	205	90	45	3,5	2,5
-	402W248/S.	115	45	52	22	-	-	240	100	60	4,0	2,5
-	402W439/S.	170	60	60	30	-	-	252	90	66	4,2	2,6
for 4-core cables												
1,5 - 10	502S013/S	23	9,5	7	2	-	-	60	-	17	2,0	1,2
4 - 35	502K033/S	45	16,5	14	3,4	-	-	97	73	25	2,5	1,9
25 - 95	502K046/S	45	19	20	7	-	-	165	75	40	3,5	2,0
50 - 150	502K016/S	75	25	25	9	-	-	217	100	44	3,5	2,0
120 - 400	502K026/S	100	31	40	13,5	-	-	223	103	51	3,5	2,5
-	502R810/S	170	60	50	23	43	19	255	90	65	4,0	3,5
for 5-core cables (4+1)												
25 - 120*	603W035/S.	68	26	30	7	20	6	182	75	40	3,2	2,2
25 - 240	603W040/S	85	26	33	7	27	6	182	75	40	3,2	2,2

Heat-shrinkable sealing end cable caps

Application
The heat-shrinkable sealing end cable caps inside coated with hot-melt adhesive, end caps are used on plastic, paper and rubber insulated cables to seal and protect their ends during storage, transport and cable laying.
The caps are resistant to UV-light and weathering.



- Dimensions
- D_a: Diameter as delivered
 - D_b: Diameter after free recovery
 - L_b: Length after free recovery
 - W_b: Thickness after free recovery

Insulated caps 102L

Recommended cable diameter (mm)	Ordering description	Dimensions (mm)			
		D		L	W
		a (min.)	b (max.)	b (±10%)	b (±20%)
Insulated caps					
4 - 8	102L011-R05/S	10	4	38	2,0
8 - 17	102L022-R05/S	20	7,5	55	2,8
17 - 30	102L033-R05/S	35	15	90	3,2
30 - 45	102L044-R05/S	55	25	143	3,9
45 - 65	102L048-R05/S	75	32	150	3,3
65 - 95	102L055-R05/S	100	45	162	3,8
95 - 115	102L066-R05/S	120	70	145	3,8

Cable cleats for one and three cables



Both single and three cable cleats (triangle arrangement) are designed for cables with an outer diameter of up to 75 mm and are made of UV-resistant, impact-resistant, halogen-free, non-combustible polymer material with flammability class V0.

The cleats are tested in accordance with IEC 61914 and are highly resistant electrodynamic short-circuit effects, which prevents damage to cable construction elements.

Thanks to the innovative system of the ribs, the cleats simultaneously hold the cable and protect the outer sheath from damage. Also available with EPDM rubber inserts for additional protection of the cable outer sheath. The flat surface of the cable mount is ideal for mounting in tight spaces and allows for a variety of height configurations without special fasteners or adapters. Various mounting options are provided for flat installation, on rails, or through a center hole. Operating temperature range: -40 to +120°C.

Technical specification

Test requirements		Test result	Standard
Impact resistance		5 kg (20 J)	IEC 61914:2021 subclause 9.2
Side load test	Perpendicular thrust	28 kN max.	IEC 61914:2021 subclause 9.3
	Parallel thrust	16 kN max.	
Axial load test		1.7 kN max.	IEC 61914:2021 subclause 9.4
Resistance to electrodynamic loads		up to 130 kA @ 600 mm	IEC 61914:2021 subclause 9.5
Resistance to ultraviolet radiation	Xenon arc	1000 ȳ	IEC 61914:2021 subclause 11.1
	UVB 313 cycle 3	5000 ȳ	ASTM G154
Needle flame test		120 sec.	IEC 61914:2021 subclause 10.1
Hot wire test (960° GWT)		30 sec	IEC 60695-

Project data

Material type	Polymerized, 30% glass fiber reinforced nylon
Material color	Black
Material properties	Halogen-free without red phosphorus, self-extinguishing UL94 V0
Compliance with standards	IEC 61914:2021
Operating temperature range	-40°C to +120°C
Resistance to external influences	Very severe (classification according to IEC 61914:2021 Table 5)
Additional cable protection	EPDM inserts available for all sizes

Installation options



FLAT INSTALLATION



INSTALLATION WITH SPACER NUT

(for mounting on a mounting rail)



INSTALLATION THROUGH THE CENTER HOLE

(center bolt not included)

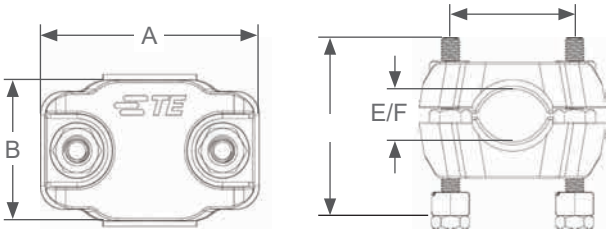


WITHOUT FASTENERS, WITH EPDM-INSERT



WITHOUT FASTENERS

Cable cleats for one cable

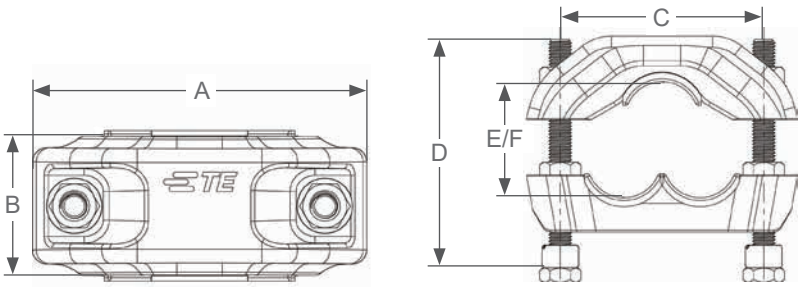


Ordering description	Installation options	A, mm	B, mm	C, mm	D, mm	min. cable Ø	max. cable Ø
CC15-26-INS	with inserts	96	60	64	90	15	26
CC15-26-FM	flat installation						
CC26-38-INS	with inserts	96	60	64	90	26	38
CC26-38-FM	flat installation						
CC38-50-INS	with inserts	114	60	80	100	38	50
CC38-50-FM	flat installation						
CC50-75-INS	with inserts	136	65	100	130	50	75
CC50-75-FM	flat installation						
CC75-100-INS	with inserts	164	70	126	150	75	100
CC75-100-FM	flat installation						
CC100-135-INS	with inserts	200	80	160	170	100	139
CC100-135-FM	flat installation						

NOTE

For other installation options - see pg. 118.

Cable cleats for three cable



Ordering description	Installation options	A, mm	B, mm	C, mm	D, m	min. cable Ø	max. cable Ø
CCT26-38-INS	with inserts	143	60	107	120	26	38
CCT26-38-FM	flat installation						
CCT38-50-INS	with inserts	173	60	139	140	38	50
CCT38-50-FM	flat installation						
CCT50-63-INS	with inserts	199	65	163	131500	50	63
CCT50-63-FM	flat installation						
CCT63-75-INS	with inserts	223	63	187	170	63	75
CCT63-75-FM	flat installation						

NOTE

For other installation options - see pg. 118.



Section VI
Heat-shrink tubings and repair wraparound

Heavy-walled heat-shrinkable tubings

FCSM - Heat-shrinkable, flexible, heavy-walled, flame-retarded, flexible tubings	122
WCSM - Heat-shrinkable, heavy-walled, halogen-free tubings for general purpose	123
ZCSM - Heat-shrinkable, heavy-walled, halogen-free, flame-retarded tubings for low fire hazard areas	124

Medium-walled heat-shrinkable tubings

MWTM - Heat-shrinkable, medium-walled, halogen-free tubings for general purpose	125
ZBIT - Heat-shrinkable, medium-walled, halogen-free, flame-retarded, flexible tubings	126
LVIT - Heat-shrinkable, flexible, medium-walled, halogen-free tubings.....	127

Thin-walled heat-shrinkable tubings

CGPT - Heat-shrinkable, thin-walled, flame-retarded tubings	128
---	-----

Heat-shrinkable, halogen-free, flame-retarded medium voltage busbar insulation

BBIT/BPTM - Heat-shrinkable, halogen-free, flame-retarded tubings for medium voltage busbar insulation.....	130
BBIT/BPTM/HVIS/HVBT - Heat-shrinkable, halogen-free, flame-retarded tubings, insulation sheets and insulation tapes.....	131
HVIS - Heat-shrinkable, halogen-free, flame-retarded insulation sheets for medium voltage busbar insulation	132

Repair wraparound

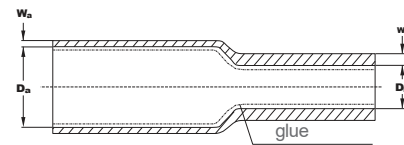
CRSM - Heat-shrinkable, halogen-free, repair wraparound for general purpose	133
MRSM - Heat-shrinkable, flexible, flame-retarded, repair wraparound.....	134
CNSM - Heat-shrinkable, fiber-reinforced repair wraparound.....	135

FCSM - Heat-shrinkable, flexible, heavy-walled, flame-retarded tubing

Electrical insulation and sealing purposes in the mining, construction and transportation industries and for similar applications, where flame retardation and flexibility are required. The tubing is coated with an inner sealant wall and it is weathering and UV-resistant.



Temperature range:	- 50 °C to+ 90 °C	
Delivery:	1000/S = with adhesive, measured lengths of 1 m	
Color:	Black	
Flame-retarded: (GOST R IEC 60332-1, IEC 60332-1)	have been tested	
Flammability: (IEC 60684-2 method A):	60 sec. max. self-extinguishing	
Electrical strength:	130 kV/cm	Diameter Diameter as delivered Diameter after free recovery



Dimensions::			
D:	Diameter	W:	Wall thickness
D _a :	Diameter as delivered	W _a :	Wall thickness as delivered
D _b :	Diameter after free recovery	W _b :	Wall thickness after free recovery

Recommended diameter (mm)		Ordering description	Dimensions (mm)			
			D		W	
min.	max.		a (min.)	b (max.)	a (min.)	b (max.)
3,5	8	FCSM- 9/3-1000/S	9	3	0,6	2,0
6,5	17	FCSM- 19/6-1000/S	19	6	0,7	2,4
10	25	FCSM- 28/9-1000/S	28	9	0,8	3,2
13	34	FCSM- 38/12-1000/S	38	12	1,0	4,1
17,5	46	FCSM- 51/16-1000/S	51	16	1,0	4,1
24	61	FCSM- 68/22-1000/S	68	22	1,0	4,1
33	81	FCSM- 90/30-1000/S	90	30	1,0	4,1
44	108	FCSM- 120/40-1000/S	120	40	1,0	4,1
69	159	FCSM- 177/63-1000/S	177	63	1,0	4,1

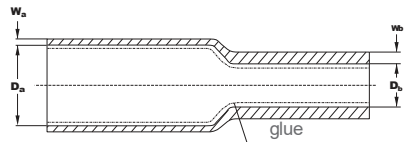
NOTE Other tubings lengths and tubings without adhesive are available on request

WCSM - Heat-shrinkable, medium-walled, halogen-free tubings
for general purpose

General electrical insulation and sealing purposes. The tubing is coated with an inner sealant wall. The sealant exhibits excellent bonding and sealing characteristics to all materials commonly used in the various cable insulation and sheath constructions, such as plastic, rubber, lead and aluminum. The tubing is weathering and UV-resistant.



Temperature range:	- 55 °C to + 90 °C (with adhesive)
Delivery:	With adhesive, measured lengths of 1 m
Color:	Black



Dimensions::			
D:	Diameter	W:	Wall thickness
D _a :	Diameter as delivered	W _a :	Wall thickness as delivered
D _b :	Diameter after free recovery	W _b :	Wall thickness after free recovery

Recommended diameter (mm)		Ordering description	Dimensions (mm)			
			D		W	
min.	max.		a (min.)	b (max.)	a (min.)	b (max.)
3,5	10	WCSM- 12/3-1000/S	12	3	0,8	2,0
4,5	14	WCSM- 16/4-1000/S	16	4	0,9	2,4
6,5	22	WCSM- 24/6-1000/S	24	6	1,0	2,7
9	31	WCSM- 34/8-1000/S	33	8	1,3	4,0
13	44	WCSM- 48/12-1000/S	48	12	1,5	4,5
17,5	50	WCSM- 56/16-1000/S	56	16	1,5	4,4
22	63	WCSM- 70/20-1000/S	70	20	1,4	4,4
27	81	WCSM- 90/25-1000/S	90	25	1,3	4,3
33	100	WCSM-110/30-1000/S	110	30	1,2	4,3
38	118	WCSM-130/35-1000/S	130	35	1,2	4,3
55	144	WCSM-160/50-1000/S	160	50	1,0	4,3
55	162	WCSM-180/50-1000/S	180	50	1,0	4,3
70	225	WCSM-250/65-1000/S	250	65	-	4,3
105	295	WCSM-320/95-1000/S	320	95	-	4,3
125	350	WCSM-385/110-1000/S	390	110	-	4,3

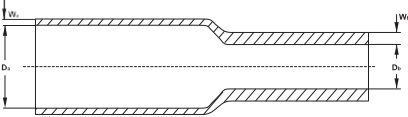
NOTE Other tubings lengths and tubings without adhesive are available on request.

ZCSM - Heat-shrinkable, heavy walled, halogen-free, flame-retarded tubings for low fire hazard areas

General electrical insulation purposes especially in low fire hazard areas.
The tubing is weathering and UV-resistant.



Temperature range:	- 55 °C to+ 140 °C (without adhesive)
Delivery:	A / U, in measured lengths of 1 m
Color:	Black
flame-retarding: (GOST R IEC 60332-1, IEC 60332-1)	have been tested
Oxygen Index (ISO 4589):	29 min.
Temperature index (ISO 4589):	250 °C min.
Smoke Emission Index (NES 711):	20 max.
Smoke Density (3m³) (IEC 61034):	passed tests Toxic
index (NES 713):	3 per 100 g max.
Acid gas output: (GOST 12.1.044, IEC 60754)	1.5% max.



Dimensions::
D: Diameter
D_a: Diameter as delivered
D_b: Diameter after free recovery
W: Wall thickness
W_a: Wall thickness as delivered
W_b: Wall thickness after free recovery

Recommended cable diameter (mm)		Ordering description	Dimension (mm)			
			D		W	
min.	max.		a (min.)	b (max.)	a (min.)	b (min.)
3,5	7	ZCSM- 8/ 3-1000/U	8	3	0,6	2,0
5,5	14,5	ZCSM- 16/ 5-1000/U	16	5	0,7	2,4
9	21,5	ZCSM- 24/ 8-1000/U	24	8	0,9	2,9
13	29	ZCSM- 32/12-1000/U	32	12	1,0	4,0
17,5	40,5	ZCSM- 45/16-1000/U	45	16	1,0	4,0
24	54	ZCSM- 60/22-1000/U	60	22	1,0	4,0
27,5	63	ZCSM- 70/25-1000/U	70	25	1,0	4,0
39,5	76,5	ZCSM- 85/36-1000/U	85	36	1,0	4,0
55	108	ZCSM-120/50-1000/U	120	50	1,0	4,2
82,5	162	ZCSM-180/75-1000/U	180	75	1,0	5,6

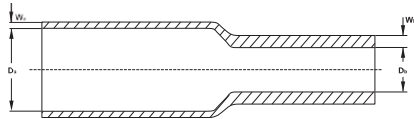
NOTE Other tubings lengths and tubings without adhesive are available on request.

MWTM - Heat-shrinkable, medium-walled, halogen-free tubing for general purpose

General electrical insulation, sealing and corrosion protection purposes. The tubing is available either with or without an inner sealant wall.
The sealant exhibits excellent bonding and sealing characteristics to all materials commonly used in the various cable insulation and sheath constructions, such as plastic, rubber, lead and aluminum. The tubing is weathering and UV-resistant.



Temperature range:	- 55 °C to+ 120 °C (without adhesive) - 55 °C to+ 90 °C (with adhesive)
Delivery:	A / U= without adhesive on spools (tubes on spools without adhesive available on request) 1000 / U = without adhesive, in measured lengths of 1 m 1000 / S= with adhesive, in measured lengths of 1 m
Color:	black



Dimensions::
D: Diameter
D_a: Diameter as delivered
D_b: Diameter after free recovery
W: Wall thickness
W_a: Wall thickness as delivered
W_b: Wall thickness after free recovery

Recommended diameter (mm)		Ordering description		Dimensions (mm)			
				D		W	
min.	max.	glueless	glued	a (min.)	b (max.)	a (min.)	b (max.)
3,5	9	MWTM- 10/ 3-A/U *	MWTM- 10/ 3-1000/S	10	3	0,3	1,0
5,5	14,5	MWTM- 16/ 5-A/U *	MWTM- 16/ 5-1000/S	16	5	0,3	1,4
9	22,5	MWTM- 25/ 8-A/U *	MWTM- 25/ 8-1000/S	25	8	0,4	2,0
13	31,5	MWTM- 35/ 12-A/U *	MWTM- 35/12-1000/S	35	12	0,4	2,0
18	45	MWTM- 50/ 16-A/U *	MWTM- 50/16-1000/S	50	16	0,5	2,0
21	57	MWTM- 63/ 19-1000/U	MWTM- 63/19-1000/S	63	19	0,6	2,4
24	68	MWTM- 75/ 22-1000/U	MWTM- 75/22-1000/S	75	22	0,6	2,7
28	77	MWTM- 85/ 25-1000/U	MWTM- 85/25-1000/S	85	25	0,6	2,8
32	86	MWTM- 95/ 29-1000/U	MWTM- 95/29-1000/S	95	29	0,7	3,1
37	104	MWTM-115/ 34-1000/U	MWTM-115/34-1000/S	115	34	0,7	3,1
46	126	MWTM-140/ 42-1000/U	MWTM-140/42-1000/S	140	42	0,7	3,1
55	144	MWTM-160/ 50-1000/U	MWTM-160/50-1000/S	160	50	0,7	3,2
66	162	MWTM-180/ 60-1000/U	MWTM-180/60-1000/S	180	60	0,7	3,2
88	220	MWTM-245/ 80-1000/U	-	245	80	-	2,4

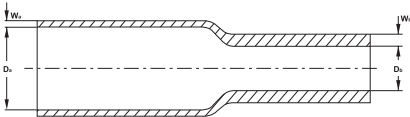
NOTE Other tubings lengths and tubings without adhesive are available on request.

ZBIT - Heat-shrinkable, medium-walled, halogen-free, flexible,
flame-retarded tubing

Halogen-free, medium wall heat-shrinkable tubing which insulates busbars and other electrical equipment to the same fire safety standards as modern Low Fire Hazard cables. ZBIT provides flashover protection and insulation enhancement up to 3.6 kV. It is ideal for enclosed and exposed conductors in substations, switchgear, motors and other applications. ZBIT is particularly valuable in places such as buildings, railways, tunnels, off-shore installations, ships, power plants and all areas where low fire hazard systems are required.



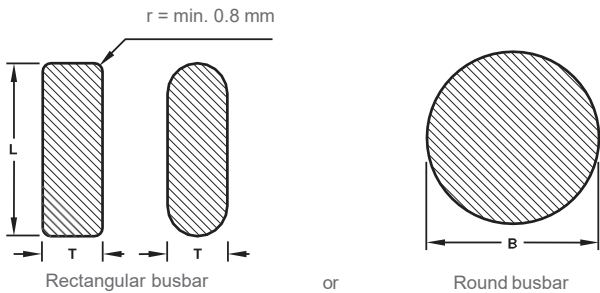
Temperature range:	- 55 °C to+ 140 °C (without adhesive)
Delivery:	A / U= without adhesive, on reels
Color:	Black
Flame-retarding: (GOST R IEC 60332-1, IEC 60332-1)	Have been tested
Oxygen Index (ISO 4589):	29 min.
Temperature index (ISO 4589):	250 °C min.
Smoke emission index (NES 711):	20 max.
Smoke Density (3m³) (IEC 61034):	passed tests Toxic
index (NES 713):	3 per 100 g max.
Acid gas yield: (GOST 12.1.044, IEC 60754)	1.5% max.



Dimensions::			
D:	Diameter	W:	Wall thickness
D _a :	Diameter as delivered	W _a :	Wall thickness as delivered
D _b :	Diameter after free recovery	W _b :	Wall thickness after free recovery

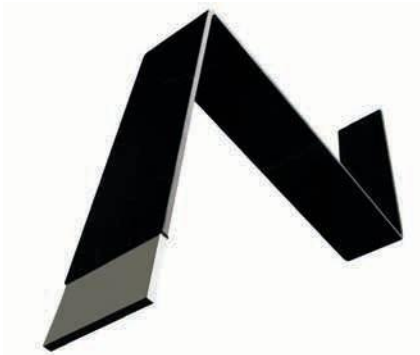
Recommended tire size (mm)				Ordering description	Dimensions (mm)			
rectangular busbar, L+T		round busbar, B			D		W	
					a (min.)	b (max.)	a (min.)	b (max.)
min.	max.	min.	max.					
39	75	25	50	ZBIT- 55/ 22-A/U	55	22	0.5	1.5
63	105	40	70	ZBIT- 80/ 35-A/U	80	35	0.5	2.0
95	180	60	120	ZBIT- 130/ 55-A/U	100	35	0.5	1.5

NOTE Other tubings lengths and tubings without adhesive are available on request.

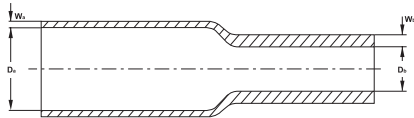


LVIT - Heat-shrinkable, flexible, medium-walled, halogen-free tubing

Electrical insulation, protection and sealing of flexible cables, joints, accessories, connections and variety of curved and bent busbars of both circular and rectangular cross-section.
The tubing is weathering and UV-resistant.



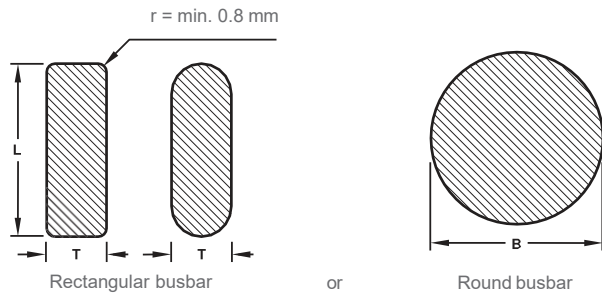
Temperature range:	- 50 °C to+ 105 °C (without adhesive)
Delivery:	A / U= without adhesive on reels
Color:	Black
flame-retarding: (GOST R IEC 60332-1, IEC 60332-1)	have been tested
Flammability: (IEC 60684-2 method A).	Self-extinguishing 60 sec. max



Dimensions::			
D:	Diameter	W:	Wall thickness
D _a :	Diameter as delivered	W _a :	Wall thickness as delivered
D _b :	Diameter after free recovery	W _b :	Wall thickness after free recovery

Recommended application (mm)				Ordering description	Dimensions (mm)			
rectangular busbar, L+T		round busbar, B			D		W	
min.	max.	min.	max.		a (min.)	b (max.)	a (min.)	b (max.)
17	39	11	25		LVIT-30/ 10-A/U	30	10	0,5
39	86	25	55	LVIT-75/ 25-A/U	75	25	0,5	1,5
65	140	40	90	LVIT-100/ 35-A/U	100	35	0,5	1,5
86	157	55	100	LVIT-150/ 50-A/U	150	50	0,5	1,5
190	280	120	180	LVIT- 235/105-A/U	235	105	0,5	1,5

NOTE Other tubings lengths and tubings without adhesive are available on request.



CGPT - Heat-shrinkable, thin-walled, flame-retarded tubing

Universal electrical insulation, corrosion protection and marking purposes. The tubing is weathering and UV-resistant.



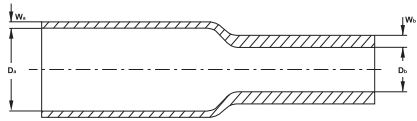
Temperature range: - 55 °C to+ 135 °C (without adhesive)

Delivery: without adhesive on reels

Color: Black

Flammability: Self-extinguishing 60 sec. max (IEC 60684-2 method A).

Diameter
Diameter as delivered
Diameter after free recovery



Dimensions::

D:	Diameter	W:	Wall thickness
D _a :	Diameter as delivered	W _a :	Wall thickness as delivered
D _b :	Diameter after free recovery	W _b :	Wall thickness after free recovery

Recommended diameter (mm)		Ordering description	Dimensions (mm)		
			D		W
min.	max.		a (min.)	b (max.)	b (min.)
0,6	1,3	CGPT- 1.5/0.5-0-SP	1,5	0,5	0,45
1,1	2,5	CGPT- 3/ 1-0-SP	3	1	0,55
2,2	5,0	CGPT- 6/ 2-0-0-SP	6	2	0,65
3,3	8,0	CGPT- 9/ 3-0-SP	9	3	0,75
4,5	10,5	CGPT-12/ 4-0-SP	12	4	0,75
7,0	16,0	CGPT-18/ 6-0-SP	18	6	0,85
9,0	21,5	CGPT-24/ 8-0-SP	24	8	1,00
14,5	35,0	CGPT-39/13-0-SP	39	13	1,15

NOTE Other tubings lengths and tubings without adhesive are available on request.

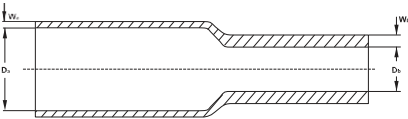


BBIT/BPTM - Heat-shrinkable, halogen-free, flame-retarded tubings
for medium voltage busbar insulation

The BBIT tubing provides an excellent insulating cover and flashover protection up to 36 kV system voltage over copper or aluminum busbars. The use of BBIT allows equipment designers freedom to reduce the air spacing between busbars by providing insulation enhancement. Because of its built-in flexibility BBIT can be used on irregular shapes without creasing of the tubing occurring. It has excellent resistance to tracking and weathering, and can be used indoors or outdoors.



Temperature range:	- 55 °C to+ 105 °C (without adhesive)		
Delivery:	A / U= without adhesive on reels		
Color:	red		
Flame-retarding: (GOST R MEC 60332-1, IEC 60332-1)	have been tested		
Smoke Emission Index (NES 711):	less than 120	Diameter Diameter as delivered Diameter after free recovery	
Acid gas outlet: (GOST 12.1.044, IEC 60754)	1% of weight max.		
Electrical strength: (IEC 60243)	180 kV/cm min.	@ 2 mm.	
	150 kV/cm min.	@ 2.5 mm.	
	120 kV/cm min.		



Dimensions::			
D:	Diameter	W:	Wall thickness
D _a :	Diameter as delivered	W _a :	Wall thickness as delivered
D _b :	Diameter after free recovery	W _b :	Wall thickness after free recovery

Recommended tire size (mm)				Ordering description	Dimensions (mm)			
rectangular busbar, L+T		round busbar, B			D		W	
min.	max.	min.	max.		a (min.)	b (max.)	a (min.)	b (max.)
BPTM - medium wall tube								
12	18	6,5	12	BPTM- 15/ 6-A/U	15	6	1,1	1,9
22	38	13,5	25	BPTM- 30/ 12-A/U	30	12	1,1	2,2
36	65	22	43	BPTM- 50/ 20-A/U	50	20	1,1	2,3
55	95	33	63	BPTM- 75/ 30-A/U	75	30	1,1	2,3
70	130	44	86	BPTM- 100/ 40-A/U	100	40	1,1	2,3
90	165	55	105	BPTM- 120/ 50-A/U	120	50	1,3	2,9
125	235	80	150	BPTM- 175/ 70-A/U	175	70	1,3	2,8
200	276	127	190	BPTM- 205/110-A/U	205	110	1,3	2,8
230	342	147	218	BPTM- 235/130-A/U	235	130	1,7	3,1
BBIT - thick wall tube								
17	28	11	20	BBIT- 25/ 10-A/U	25	10	1,6	3,6
28	45	18	32	BBIT- 40/ 16-A/U	40	16	1,6	3,6
44	69	28	47	BBIT- 65/ 25-A/U	65	25	1,6	3,6
69	102	44	72	BBIT- 100/ 40-A/U	100	40	1,6	3,6
102	148	65	105	BBIT- 150/ 60-A/U	150	60	1,6	3,6
133	196	85	125	BBIT- 175/ 80-A/U	175	80	1,6	3,6

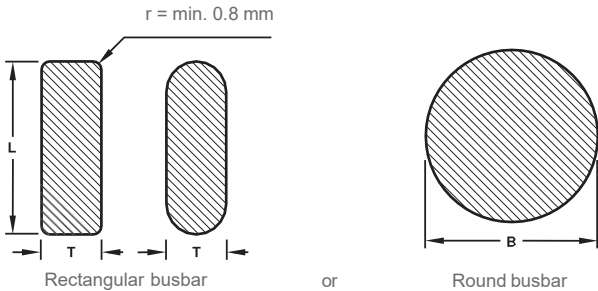
NOTE Other tubings lengths and tubings without adhesive are available on request.

Maximum change in tube length after free recovery: ±5% for BBIT tubing and+ 5% to 10% for BPTM tubing.
If two sizes of BBIT/BPTM tubing are suitable for the application, choose larger.

BBIT/BPTM/HVIS/HVBT - Heat-shrinkable, halogen-free, flame-retarded
tubings, insulation sheets and insulation tapes

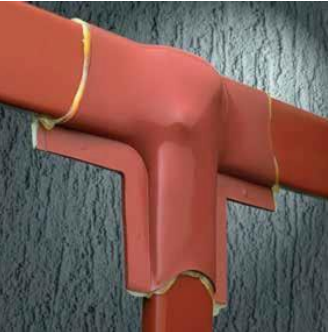
Distances between busbars after installation of insulation

Nominal voltage	Busbars with air gap (IEC 71-2)	BPTM/HVBT/HVIS		BBIT	
		busbar insulation		busbar insulation	
		Phase -Phase	Phase-Earth	Phase -Phase	Phase-Earth
(kV)	(mm)	(mm)	(mm)	(mm)	(mm)
Round busbar					
12	120	55	65	30	40
24	220	95	125	60	90
36	320	150	205	100	160
Rectangular busbar					
12	120	65	75	35	45
24	220	150	150	70	100
36	320	285	285	140	190



HVIS - Heat-shrinkable, halogen-free, flame-retarded insulated sheets
for medium voltage busbar insulation

HVIS is an adhesive coated, heat shrinkable sheet which provides insulation enhancement and protection against accidentally induced discharge. When heated the HIVIS sheet shrinks in two directions to tightly conform to complex shapes. HIVIS sheet will provide flashover protection up to 17.5 kV or up to 25 kV if the void-filling mastic is applied underneath the sheet, or up to 36 kV if a double layer of HIVIS is used. HIVIS sheet will cover almost any size or shape of busbar joint, making it ideal for insulating busbar tees, elbows and other connections where tubing and tape cannot be used.



Application: one layer up to 24 kV
double layer 36 kV

Temperature range: - 55 °C to+ 105 °C

Color: Red

Flame-retarding: have been tested

(GOST R IEC 60332-1, IEC 60332-1)

Smoke Emission Index (NES 711): less than 50

Emission acid gases: less than 2% by weight

(GOST 12.1.044, IEC 60754)

Delivery: in rolls in lengths of 0.5 m or 10 m

Ordering designation	Dimensions		
	width, mm	nom. length, m	nom. thickness, mm
	a (min.)	a	b
HVIS - 05	660	0,5	2,4
HVIS - 10	660	10,0	2,4

*a= as delivered; b= after free recovery. Longitudinal and transverse shrinkage: -25% ±10%.

If necessary, each busbar is wrapped with one mastic tape S1085. For rounding off protruding bolts, S1061 void filler tapes are used.

HVBT - Heat-shrinkable, halogen-free, flame-retarded insulated tapes
for medium voltage busbar insulation

HVBT is a heat-shrinkable, adhesive-coated tape which provides insulation enhancement and protection against accidentally induced discharge. It is designed to combine the integrity of a heat-shrink-able tubing with the versatility of a wraparound product. It is quick and easy to install. Upon application of heat the tape shrinks down and the adhesive lining melts amalgamating the over - lapping layers together, producing a complete lap to lap seal. HVBT will stick to itself and other insulating materials it will not adhere to metal or porcelain allowing easy removal for maintenance.



Application: single layer up to 17.5 kV
double layer 24 kV

Temperature range: - 55 °C to+ 70 °C

Color: Red

Flame-retarding: have been tested

(GOST R IEC 60332-1, IEC 60332-1)

Smoke Emission Index (NES 711): less than 50

Emission acid gases: less than 3% by

(GOST 12.1.044, IEC 60754)

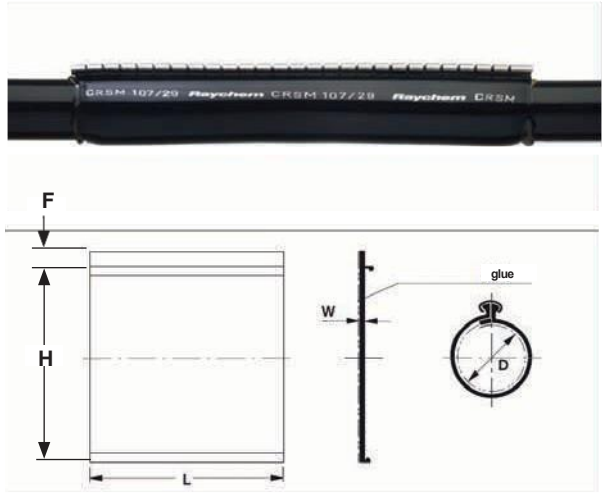
Delivery: A= in rolls 10 m long

Rectangular busbars		Round busbar		Ordering description	Dimensions		
width	tape length per meter of busbar	diameter	tape length per meter of busbar		width, mm	(nom. length, m/reel)	nom. thickness
mm	m	mm	m		a	a	b
25	10,0	12	5		HVBT-12-A	25	10
50	7,6	24	5	HVBT-14-A	50	10	0,86
75	11,4	50	10	HVBT-14-A	50	10	0,86
100	15,6	75	16,7	HVBT-14-A	50	10	0,86
150	25,0	-	-	HVBT-14-A	50	10	0,86
200	15,6	100	20,0	HVBT-16-A	100	10	0,86

(a) as delivered, (b) after free recovery. Maximum length change after shrinkage: -30%.

CRSM - Heat-shrinkable, halogen-free, repair wrapperounds
for general purpose

Heat-shrinkable, halogen-free CRSM repair wraparound are designed for fast and reliable repair of damaged plastic or metal cable oversheaths and restore the electrical and mechanical condition of the cable. The inner surface of the wraparound coated with heat-melting adhesive.



Temperature range: - 40 °C to+ 120 °C

Method of delivery: plate coated on one side with fusion adhesive and with a metal lock

Color: Black

Electrical strength: 120 kV/cm @ 1 mm

Dimensions:

D: Diameter
Da: Diameter as delivered
Db: Diameter after free recovery
L: Length
W: Wall thickness
Wa: Wall thickness as delivered
Wb: Wall thickness after free recovery
H: Wraparound width
F: Overlap width

Recommended cable diameter (mm)		Ordering designation	Dimensions (mm)						
			D		W		H	F	L
			a (min.)	b (max.)	a (min.)	b (min.)	(min.)	(min.)	a (±15 mm)
11	27	CRSM- 34/10- 500/S	38	9	0,3	2,0	120	12	500
		CRSM- 34/10-1000/S							1000
		CRSM- 34/10-1500/S							1500
17	43	CRSM- 53/13- 500/S	52	15	0,3	2,0	165	25	500
		CRSM- 53/13-1000/S							1000
		53/13-1500/S CRSM-							1500
24	68	84/20- 500/S CRSM-	82	21	0,3	2,0	260	34	500
		84/20-1000/S CRSM-							1000
		84/20-1500/S CRSM-							1500
32	86	107/29- 500/S CRSM-	108	27	0,3	2,0	340	34	500
		107/29-1000/S CRSM-							1000
		107/29-1500/S							1500
39	115	CRSM-143/36- 500/S	146	28	0,3	1,8	460	34	500
		CRSM-143/36-1000/S							1000
		CRSM-143/36-1500/S							1500
60	160	CRSM-198/55-1000/S	222	50	0,3	1,8	700	34	1000
		CRSM-198/55-1500/S							1500
105	200	CRSM-250/98-1000/S	261	91	0,4	1,8	820	34	1000
		CRSM-250/98-1500/S							1500

NOTE	The repair collar and lock can be cut to any required length at the installation site. Wrapperounds in other lengths can be ordered on request.
------	---

MRSM - Heat-shrinkable, flexible, flame-retarded, repair wraparound

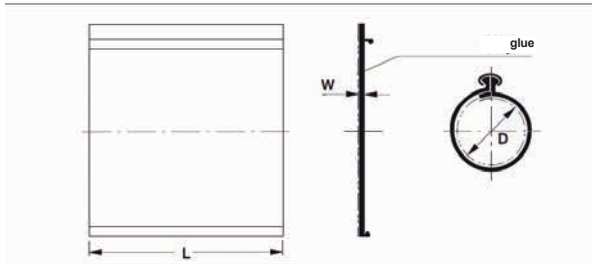
MRSM heat-shrinkable, flexible, flame-retarded, wraparound are designed for fast and reliable repair of damaged cables used in coal mining, construction, transportation and other similar applications where flame-retarding and flexibility are required. The inner surface of the sleeves is coated with a heat- melting adhesive. The metal lock can be removed after cooling.



Delivery: plate coated on one side with heat-melted adhesive and with a metal lock

Color: Black

Flame-retarding: self-extinguishing 60 sec. max. (according to IEC 60684 method A)



Dimensions:

D: Diameter

Da: Diameter as delivered

Db: Diameter after free recovery

L: Length

W: Wall thickness

Wa: Wall thickness as delivered

Wb: Wall thickness after free recovery

Recommended cable diameter (mm)		Ordering description	Dimensions (mm)				
			D		W		L
min.	max.		a (min.)	b (max.)	a (min.)	b (min.)	a (±15 mm)
25	40	MRSМ- 50/23-600/239	50	23	0,7	2,3	600
40	58	MRSМ- 73/38-750/239	73	38	0,9	2,3	750
58	89	MRSМ-100/51-750/239	100	51	0,9	2,3	750

NOTE Repair wraparound and lock can be cut to any required length on site. Wraparound in other lengths can be ordered on request.

CNSM - Heat-shrinkable, fiber-reinforced repair wraparounds

Heat-shrinkable, fiber-reinforced repair wraparound RFSM are designed for fast and reliable cable repair and are used increased mechanical strength is required. The inner surface of the wraparound is coated with a heat-melting adhesive. CNSM wraparound can be used as an outer cover in low and medium voltage joints.

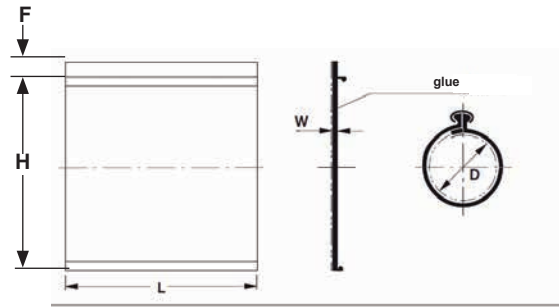


Temperature range: - 40 °C to+ 120 °C

Delivery: plate coated on one side with fusion adhesive and with a metal lock

Color: Black

Electrical strength: 120 kV/cm @ 1 mm



Dimensions:

D: Diameter

Da: Diameter as delivered

Db: Diameter after free recovery

L: Length

W: Wall thickness

Wa: Wall thickness as delivered

Wb: Wall thickness after free recovery

Ha: Wrapperound width as delivered

Fa: Width of overlap as delivered

Recommended cable diameter (mm)		Ordering description	Dimensions (mm)						
			D		W		H	F	L
min.	max.		a (min.)	b (max.)	a (min.)	b (min.)	a (min.)	a (min.)	a (±15 mm)
12	55	CNSM- 55/12-1000/S	68	12	1,5	3,0	215	20	1000
20	84	CNSM- 84/15-1000/S	97	15	1,5	3,0	305	20	1000
		CNSM- 84/15-1500/S							1500
25	100	CNSM-100/25- 750/S	113	25	1,5	3,0	355	20	750
		CNSM-100/25-1500/S							1500
30	125	CNSM-125/30-750/S	136	30	1,5	3,0	430	20	750
		CNSM-125/30-1500/S							1500
34	146	CNSM-146/34- 750/S	152	34	1,5	3,0	480	20	750
		CNSM-146/34-1500/S							1500
42	165	CNSM-165/42- 750/S	178	42	1,5	3,0	560	20	750
		CNSM-165/42-1500/S							1500
50	205	CNSM-205/50- 750/S	222	50	1,5	3,0	700	20	750
		CNSM-205/50-1500/S							1500

NOTE The repair wraparound and lock can be cut to any required length on site. Wraparound for other lengths can be ordered on request.



Section VII Tools and accessories for installation

FH-1630 gas torch kits	138
Spare accessories for gas torch FH-1630	139
Tool for removing extruded semi-conductive screen	140
Tool for removing easily strip semi-conductive screen	141
Cable cutting and installation tools	142
Spare accessories	146

FH-1630 gas torch kits

The FH-1630 torch assembly for rapid installation of heat-shrinkable materials offers maximum burning efficiency and the best available balance of surface preheat. All system components are fully compatible.

FH-1630-S-MC10 Gas torch assembly



Torch box with nozzles BN28, BN38 and PN17, HSZ torch handle, constant pressure regulator R1, automatic cut-off valve CV, long high pressure hose SW4 (4 m).

- Weight: 4.8 kg.
- Dimensions: 470 x 210 x 74 mm.

FH-1630-S-HNZ, FH-1630-S-HSZ torch handle



Torch handle with holder and shut-off valve for use on all FH-1630-S nozzles. Handle HSZ has in addition a pilot/full flame lever.

- Nozzle connection thread: R 3/8", right-hand thread.
- Right hose connection thread: R 3/8", left.

FH-1630-S torch nozzles



Ordering description	Flame diameter (mm)	Stern length (mm)	Gas consumption (kg/h)
For tubings shrinkage			
FH-1630-S-BN 28	28	195	0,46
FH-1630-S-BN 38	38	195	0,90
FH-1630-S-BN 50	50	195	2,00
For plumbing			
FH-1630-S-PN 17	17	195	0,24

FH-1630-PIE-MC10 Torch box with contents



Torch box with nozzles BN28, BN38, BN50 and PN18 nozzles, torch handle FH-1630-PIE with piezo ignition, LGS safety regulator and SW4 long high pressure hose (4 m).

- Weight: 4.8 kg.
- Dimensions: 450 x 210 x 74 mm.

FH-1630-PIE Torch handle with piezo ignition



Torch handle with piezo ignition, gas supply only while handle is pressed. Nozzle connection: bayonet socking.

- Hose connection thread: R 3/8", left

FH-1630-PIE Nozzles



Ordering designation	Flame diameter (mm)	Stern length (mm)	Gas consumption (kg/h)
For tube shrinkage			
FH-1630-PIE-BN 28	28	195	0,46
FH-1630-PIE-BN 38	38	195	0,90
FH-1630-PIE-BN 50	50	195	2,00
For plumbing			
FH-1630-PIE-PN 18	18	210	0,24

Accessories for gas torch assembly FH-1630

FH-1630-PIE-R1 Constant pressure regulator



Applicable on propane gas tanks with a capacity of 5 kg or 11 kg. Thread connection fits to all FH-1630 high pressure hoses.

- Gas flow: max. 6 kg/h
- Constant pressure: 2 bar
- Hose connection thread: R 3/8", left
- Gas bottle connection thread: W 21,8 x 1/14", left (DIN-Kombi)

FH-1630-PIE-CV Automatic cut-off valve



The automatic cut-off valve is fitted between the hoses SW4, SW5 or SW10 and the constant pressure regulator and cuts off the gas supply in the event of damage to the hose or torch handle.

- Connection threads: R 3/8", left

FH-1630-PIE-LGS Safety regulator



The safety regulator with integrated constant pressure regulator (2 bar, 2 kg/h) and automatic cut-off valve is fitted between the hose and the gas bottle.

- Hose connection thread: R 3/8", left
- Gas bottle connection thread: W 21,8 x 1/14", left (DIN-Kombi)

FH-1630-PIE-SW High pressure hoses



Fitted with screw connections for FH-1630 constant pressure regulator and torch handle.

- Connection threads: R 3/8", left
- Internal diameter: 4 mm
- Color: orange

FH-1630-PIE-SW 4	length of 4 m
FH-1630-PIE-SW 5	length of 5 m
FH-1630-PIE-SW 10	length of 10 m

FH-1630-S-TS1 Torch assembly



Torch assembly of nozzle BN38, torch handle FH-1630-S-HNZ and 5 m long pressure hose SW5.

Tools for removing extruded semi-conductive cable screen

IT-1000-017-20 Tool for removing extruded semi-conductive cable screen



IT-1000-017-20-BLADE
Tool blade for IT-1000-017-20

Designed for removing the semi-conductive screen of cables with cross-linked polyethylene insulation. The tool has a smooth adjustment of the cutting depth. The application range for screen diameter and voltage class is selected according to the table on page 149. 149.

The tool is equipped with a spare blade.

Supplied in a plastic carrying case.

- Working range: 18-60 mm
- Cutting depth setting step: 0.1 mm
- Semi-conductive screen cut chamfer: 20°
- Minimum step width of the semi-conductive screen 7 mm
- Number of guide roller settings: 5 (two forward, two backward, "0")

Tool Blade IT-1000-017-20.
Supplied in 1 piece.

IT-1000-017-30 (US02) Tool for removing extruded semi-conductive cable screen



Designed for removing the semi-conductive screen of cables with cross-linked polyethylene insulation. The tool has a smooth adjustment of the cutting depth. The application range for screen diameter and voltage class is selected according to the table on page 141. 141.

The tool is equipped with a spare blade.

Supplied in a plastic carrying case.

- Working range: 18-60 mm
- Cutting depth setting step: 0.1 mm
- Semi-conductive shield cut chamfer: 12°
- Minimum step width of the semiconducting shield 25 mm
- Number of guide roller settings: 5 (two forward, two backward, "0")

IT-1000-030-2 Tool for removing extruded semi-conductive cable screen



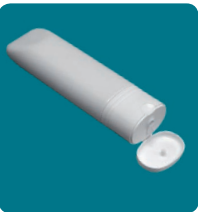
IT-1000-030-2-BLADE
Tool blade IT-1000-030-2

TE's Screen Removal Tool IT-1000-030-2 for bonded screens on round conductors of MV Cables, incl. 1 spare blade, silicone grease and allen key delivered in a robust polypropylene box. Suitable for one and three core cables.

Supplied in a plastic carrying case.

- Working range: 10-50 mm
- Cutting depth setting step: 0.1 mm
- Minimum step width of the semiconducting shield 25 mm
- Number of guide plate settings: 3 (two forward, "0")

Blade for tool IT-1000-030-2.
Supplied in sets of 5 pcs.



IT-1000-030-2-GREASE
Silicone lubricant for tool IT-1000-030-2

Tool for removing easy strip semi-conductive screen

IT-1000-011-SCS Tool incision of semi-conductive, easy strip screen



The tool is designed for making longitudinal, spiral and circular incision of specified depth on the surface of easy strip semi-conductive screen of cables with ethylene-propylene insulation or cross-linked polyethylene insulation. The depth of incision can be precisely adjusted to suit a wide range of cable designs.

- Working range: 8-51 mm.
- Maximum incision depth: 4 mm.
- Incision depth setting step: 0.05 mm.
- Number of spiral incision width settings: 5 (four forward, "0").

IT-1000-011 Scoring tool for easy strip screens



Fixed blade scoring tool for easy strip conduct layer.

Order description	Scriber depth, mm
IT-1000-011	0,4
IT-1000-011-0.6	0,6

Table for selecting the tool for removing the semi-conductive screen by cable cross section

	IT-1000-017-20 IT-1000-017-30 (US02)	IT-1000-017-30-2	IT-1000-011-SCS
	Ø 18-60 mm	Ø 10-50 mm	Ø 8-51 mm
Uo/U (Um), kV	Cable cross-section, mm²		
6 / 10 (12)	70* - 1200	25 - 1000**	25 - 1000**
12 / 20 (24)	70 - 1200**	25 - 800**	25 - 800**
20 / 35 (42)	25 - 630**	25 - 500**	25 - 500**

NOTE	The dimensions shown in the table correspond to cables manufactured according to IEC-60502. Please contact TE connectivity offices for more information. * When selecting, compare the insulation diameter of the cable with the MINIMAL allowable diameter for which the tool is designed. ** When selecting, compare the insulation diameter of the cable with the MAXIMALLY allowable diameter for which the tool is designed.
------	--

Cable cutting and installation tools

IT-1000-001-CEE02 Tool kit



The tool kit contains all basic tools usually required for the cable preparation and the installation of accessories. Following tool sets are assembled in a leather case:

Kit content
1 x Plastic pusher
1 x Hammer, 300 g
1 x Screwdriver, 3.5 mm
1 x Screwdriver, 6.5 mm
1 x Hacksaw
1 x Hacksaw junior
1 x Pipe wrench, 250 mm
1 x Pipe wrench, 160 mm
1 x Pincers, 180 mm
1 x Blunt nose pliers, 180 mm
1 x Scissors, 200 mm
1 x Folding ruler, 2 m
1 x Wire brush
1 x Hook knife
1 x Cable knife
1 x Sharpening stone, 125 x 100 mm
1 x File set, medium size
1 x Control mirror, 100 x 100 mm
1 x Spreader 3 way
2 x Core separator
6 x Cleaning tissues
1 x Refillable solvent bottle (empty), 0,4 litre
1 x Diameter tape, 2 m
1 x Scoring tool for easy-strip screens
1 x Leather tool case, 400x125x280 mm
1 x Tee-handle spinner wrench, 300 mm
1 x Hexagon insert socket for wrenches, 10 mm
1 x Hexagon insert socket for wrenches, 13 mm
1 x Hexagon insert socket for wrenches, 17 mm
1 x Hexagon insert socket for wrenches, 19 mm
1 x Hexagon insert socket for wrenches, 22 mm
1 x Hexagon insert socket for wrenches, 24 mm
1 x Hexagon insert socket for wrenches, 27 mm

IT-1000-019 Installation tool



Tool for holding mechanical connectors in position while tightening the bolts.
Length of handle: 205 mm
Application range: Ø 15 - 60 mm.

Cable cutting and installation tools

EXRM-1228 Extended Hexagon Insert Socket



Extra long hexagon insert socket wrench, used for the installation of RICS-adaptors.
Insert socket size: 19 mm.

EXRM-0607 Cable knife



Cable knife with fixed blade Length: 175 mm.

EXRM-0947 Hook knife for removing PVC and rubber oversheath



Cable knife for oversheath stripping for cables with an outer diameter > 20 mm. Hook form of the blade ensures an easy and safe dismantling.

KMS-K-INT Cable tool for cutting plastic cable oversheath



Used for cutting the oversheath of cables of various cable .
The cutting depth is adjustable.

KMS-ERSATZMESSER Knife blades for KMS-K-INT

Blade kit for tool KMS-K-INT
Supplied in sets of 5 pcs.

EXRM-0764 Insulation stripping string



Insulation stripping string for plastic insulated cables.
Length: 2000 mm.

IT-1000-024 Insulation and oversheath stripping tool



Designed for insulation removing and oversheath stripping of plastic insulated cables, ranging from 35 mm2 10 kV to 500 mm2 35 kV. The automatic feed (2 steps) and the 0 position, for a radial cut, allow a quick, safe and exact cutting of the cable oversheath and insulation. The special shape of the knife lifts the sheath at the cutting point and thus prevents damage to any components underneath. Tool is supplied completely with an operating manual in a box.
Application range: Ø 15 - 50 mm, thickness up to 10 mm.

IT-1000-024-01 Knife blades for IT-1000-024

Blade kit for tool IT-1000-024.
Supplied in sets of 5 pcs.

Cable cutting and installation tools

KR-600 Ratchet type cutter



Ratchet type cable cutter for aluminium and copper conductors, stranded or solid up to 400 mm2.
Application range: Ø max. 52 mm.

EPPA-004 Cleaning tissues



A special type of cellulose paper multiple folded and impregnated with isopropyl alcohol.
Cleaning tissues can be used to clean and degrease the surface of metal, plastic, rubber, etc. components before the installation of heat-shrinkable products. Supplied in individual sachets.
Size: 140 x 200 mm, folded to 60 x 80 mm
Packaging: 50 pcs. in a box. mm

Insulation stripping pliers EXRM-1004

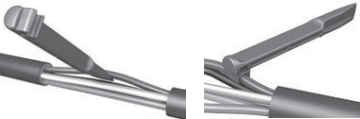


Insulation stripping tool for paper insulated cables.
Length: 190 mm
Application range: Ø 15–50 mm

Core bend-out tool EXRM-2014-CBT-16



Wedge side of the tool used for quick and easy spreading of LV cable cores and integrated claw on the other tool's side designed for bending out and proper positioning of cable cores for branch joints.
Application range: 4 -16 mm²
Material: highly impact resistant reinforced plastic



Inflation toolRDSS-IT-16



Inflation tool for RDSS duct seals complete with ON/OFF switch and an automatic pressure monitoring system.
The required CO2 gas cylinders (E7512-0160) must be ordered separately.

CO2 gas cylinder E7512-0160



Gas cylinder for inflation of RDSS duct seals by installation tool RDSS-IT-16. Each gas cylinder inflates about 5 pieces of RDSS-100.
Content: 16 g of CO2
Packaging: 10 cylinders in a boxone pack

Cable cutting and installation tools

Lug crimping tool IT-1000-035 for RPIT adapter



The tool is designed installing the wedge and Multilam contact ring. The tool can also be used for disassembly. The tool is compatible with most internal cone press fit adapters.
For core cross sections of 800 mm²and 1000 mm², order tool IT-1000-036-XL.

Kit content
1 x Compression head (for sizes "2" and "3")
1 x Assembly lever
1 x Chain
1 x Presetting bushing (size "1")
1 x Presetting bushing (size "2")
1 x Presetting bushing (size "3")
1 x Hexagon SW4
1 x Hexagon SW6
1 x Key SW36

Additional accessories

EPPA-034 Roll springs



Roll springs of constant pressure are used in the armature of solderless connection of shell and armor.

Ordering description	Application range, Ø mm		Width, mm
	min.	max.	
EPPA-034-E	17	29	25
EPPA-034-F	30	39	25
EPPA-034-G	40	60	25
EPPA-034-H	50	75	30

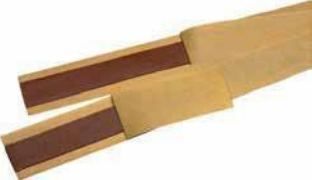
S1061 Filler tape



Black mastic used as a filler and for leveling the surface under shrinkable products, for sealing, corrosion protection and volumetric filling of voids.

Ordering description	Width (mm)	Thickness (mm)	Length (mm)
S1061-1-100	40	1,0	100
S1061-1-3000	40	1,0	3000
S1061-8-250	60	3,0	250
S1061-8-3000	60	3,0	3000

S1085 Sealing tape



Red-colored tracking resistant insulating mastic with low melting point and retaining plasticity at low temperatures. It is used for sealing heat-shrinkable tubing on cables.

Ordering description	Width (mm)	Thickness (mm)	Length (mm)
S1085-1-500	20 2±	1.0± 0.3	600 +10/-5

EPPA-076-5 silicone grease



Silicone grease is used for mounting and dismounting of insulated and screened adapters. It is supplied in aluminized foil bags. One packet contains 5 g of lubricant.

EPPA-064 silicone grease



Silicone grease is used for mounting and dismounting of insulated and screened adapters. Supplied in tubes. One tube contains 60 g of lubricant.



Long-term test of GUST-12 termination and GUSJ-12 joint on paper-insulated cables in the laboratories of TE Connectivity's research center.

Representative offices in CIS countries

"Tyco Electronics Raychem GmbH"

AZERBAIJAN

1014 Baku city.
49, Fizuli street
"SCS" Plaza, 5th floor, office 12. Tel:
+994 12-597 00 49
Fax: +994 12-597 00 48
aalkhanov@te.com

KAZAKHSTAN

A05A6C1 Almaty city.
404/67, Seyfullina avenue, Office
504 Tel: +7 727-272 03 18
EN-KZ@te.com

Astana city.
Tel: +7 701-784-02 30
EN-KZ@te.com

"Tyco Electronics Ukraine Limited"

UKRAINE

04050 Kiev city.
13, Pimonenko street
Building 7A, office 11
Tel.: +380 44-206 22 66
EN-UA@te.com

Official representative offices

"Tyco Electronics Raychem GmbH" in CIS countries

ARMENIA

YERENERGO"
375001 Yerevan city.
11, Tumanyan street
Office 7
Tel: +374 10-542 122
Fax: +374 10-582 060
info@yerenergo.am

GEORGIA

Nodar Mgebrishvili
0179 Tbilisi city.
19, Radiani street
Tel: +995 99-562 791
Fax: +995 32-230 392
nomgeb@wanex.net

KYRGYZSTAN

served by a representative office
"Taiko Electronics Reichem GmbH"
in Kazakhstan

MOLDOVA

Igor Beyu
2068 Chisinau city.
19/5ul., Miron Kostin street, ap. 63
Tel./Fax: +373 691-31 833
ilinte4@gmail.com

TAJIKISTAN

Akmal Karimov
734024 Dushanbe city.
43, Adkhamova street
Tel: +992 98 507 35 00
akarimov.s@gmail.com

TURKMENISTAN

served by a representative office
"Taiko Electronics Reichem GmbH"
in Kazakhstan

UZBEKISTAN

AEC-Consulting LLC
100059 Tashkent city.
Yakkasaray district
91, Shota Rustaveli street
Tel: +998 90 3540568
saidolim.artikov@gmail.com



te.com/energy

te.com/energy

© 2023 TE Connectivity. All rights reserved. EPP-0500-CIS-8/23

Raychem, TE Connectivity and the TE Connectivity logo are trademarks.

Although TE Connectivity (TE) has made every reasonable effort to ensure accuracy of the information contained in this catalog, TE cannot guarantee that this information will be error free. For this reason, TE makes no representations or warranties that such information is accurate, reliable or current. TE reserves the right to make any changes to the information at any time and without notice. TE expressly disclaims any implied warranty with respect to the information contained herein, including, without limitation, implied warranties of merchantability or fitness for a particular purpose. Product dimensions in this catalog may be for reference only and are subject to change without notice. Product names are also subject to change without prior notice. For current dimensions and product names, please contact TE.

Connect with us:

[TE.com/energy-contact](https://te.com/energy-contact)