



Raychem MXSU Jointing System up to 36 kV Complete With Mechanical Connectors

Raychem
from TE Connectivity

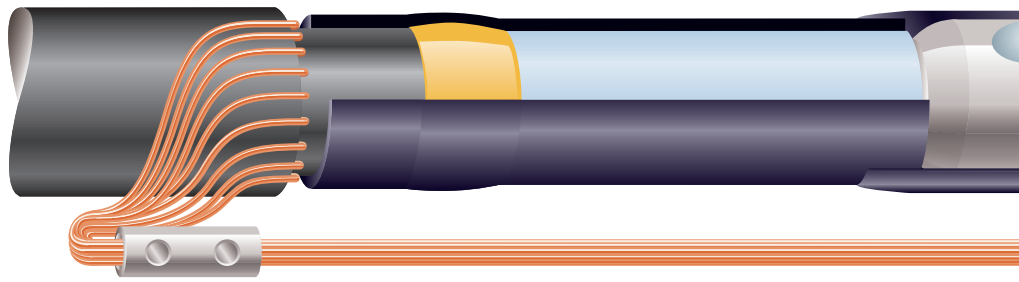
Raychem MXSU Jointing System for Polymeric Insulated Cables

MXSU is based on a joint design using mechanical connectors

- Mechanical connectors for conductor and wire shield are supplied with the kit
- Kits are widely range taking and cover most conductor constructions including their tolerances
- No crimping tools or tool maintenance required
- Short and space saving design for installation
- Improves installation reliability
- Has unlimited shelf life, simplifies material logistics and reduces cost
- Avoids bulky waste and costly waste disposal
- Exceeds international performance standards including CENELEC HD 629 or IEC 60502-4 for joints

Modern jointing

Today's jointing technology must achieve higher levels of reliability and flexibility to meet the demand of operators who are under increasing pressure to improve network efficiency. In an environment with less engineering resources for product selection, outsourced services, emphasis on repair time and a variety of cable and conductor types in the network, a universal joint including range taking screw connectors ensures reliable application and service.



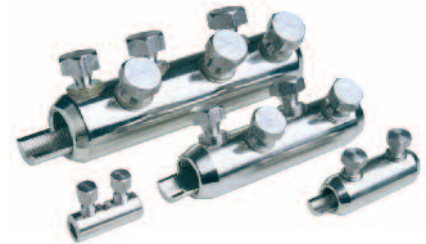
Mechanical shear bolt connectors

All joint kits incorporate a Raychem designed screw connector with shear head bolts to ensure a reliable pre-engineered electrical connection for the different conductor materials, shapes and types used in today's network. The pre-set shear torque of the bolts ensures that the correct contact pressure is always achieved. The specially designed contact surface on the inside of the connector breaks up any conductor oxide layer and ensures reliable service over the entire life time of the joint. The connectors have been tested in accordance with IEC 61238-1 class A.

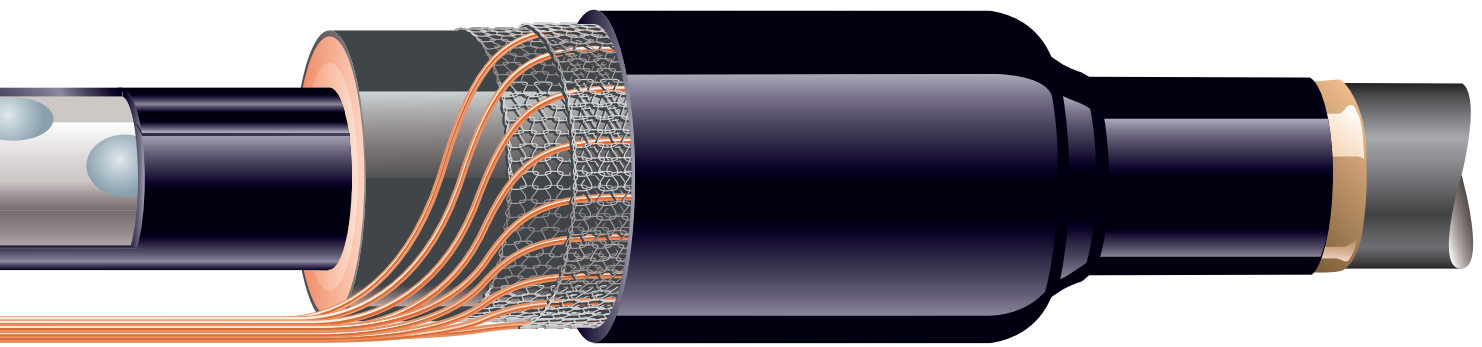


TE Connectivity BSM type connectors used for aluminium and copper conductors

- pre-set shear torque provides safe and reliable installation
- removable half shell insert provide core centering
- tin-plated and greased contact surface for corrosion protection
- shorter length compared to compression connectors
- excellent tensile performance due to special bolt tip design



Cordless impact wrench for simple and easy installation of mechanical connectors.



Electrical stress control

The stress control tubing at each cable end in combination with the yellow stress grading mastic at the screen cut provide a precisely defined impedance characteristic which smoothes the electrical field. For ease of installation, a stress control patch is applied around the mechanical connector to provide a similar function.

Shield continuity

Typical shield wire cross sections up to 35mm² can easily be connected with the mechanical connector supplied in the kit. Positioned at the oversheath cut back, the connection provides a smooth profile and resists mechanical damage. There is no need for a crimping tool and its maintenance. Two shear bolts provide the required contact force in order to ensure safe installation and reliable performance during load cycling in service as well as during short circuit conditions. An additional layer of copper mesh is applied around the joint to provide satisfactory shielding and protection.

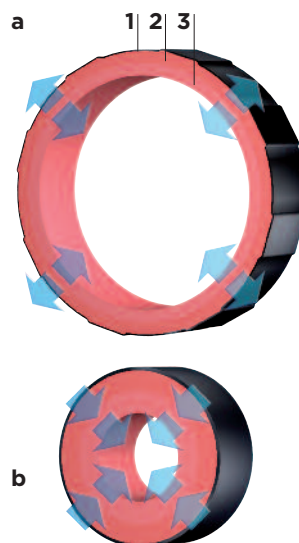
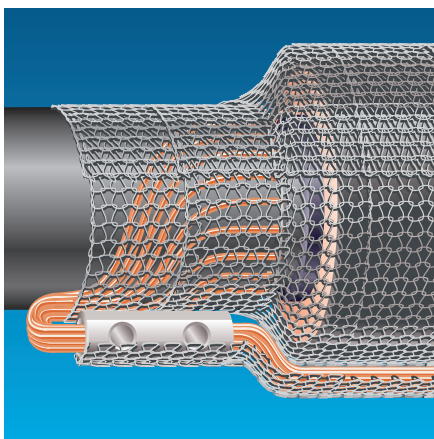
Rayfit joint body (a) expanded shape (b) recovered shape

The conductive outer layer (1) together with the insulating middle layer (2) represent the heat shrinkable hold out for the inner elastomeric layer (3) of the joint body. During the shrinking process the stored recovery force of the elastomeric layer is released and adds up to the recovery force generated by the heat shrinkable outer layers of the joint body. The resulting high compression forces as well as the perfect ability of geometrical adjustment are providing tight electrical interfaces and a perfect seal against moisture ingress.

The elastomeric properties of the inner insulation layer of the joint body allow for any cable diameter compensation and adjustment resulting from the load cycling of the cable. At the same time the two outer heat shrinkable layers provide a tight and rigid belt for the joint body representing a high level of mechanical protection against outer environmental interferences such as soil weight or pebble stones etc.

Robust outer sealing and protection

Modern cable laying techniques require a robust oversheath replacement capable of withstanding high mechanical stresses during conventional cable laying as well as mechanical impact occurring during the entire cable life time. The thick-wall heat-shrinkable tubing is internally coated with a hot melt adhesive to ensure an effective moisture seal and corrosion protection for the joint. When installed, the joints provide the similar level of protection and thickness as modern cables with PE oversheath. All voltage sheath testing commonly used today after cable laying or as control test methods have easily been passed.



This is the kit...

Pre-engineered components including mechanical shear bolt connectors.

**Summary of type tests performed on Raychem joints MXSU****CENELEC HD 629.1 S1
IEC 60502-4**

Raychem joints MXSU passed all tests for XLPE insulated cables according to CENELEC HD 629.1 S1 or IEC 60502-4 including impact tests at ambient and at low temperature.

**Additional tests reflecting
future network operation**

Raychem joints MXSU were subjected to additional tests which are not part of any European standard but reflect future demands in modern network operation: Overload operation of cables: More than 800 hours of electrical heat cycling at conductor temperatures of 130 °C with a voltage of 2.5 times the operating voltage U_0 .

Oversheath testing as the routine test method of cable networks: Voltage withstand tests between the screen wires and the water bath for 15 minutes at 15 kV DC and at 8 kV AC.

IEC 61238-1 class A

Mechanical connectors used in Raychem joints MXSU, pass the requirements in accordance with IEC 61238-1 class A.

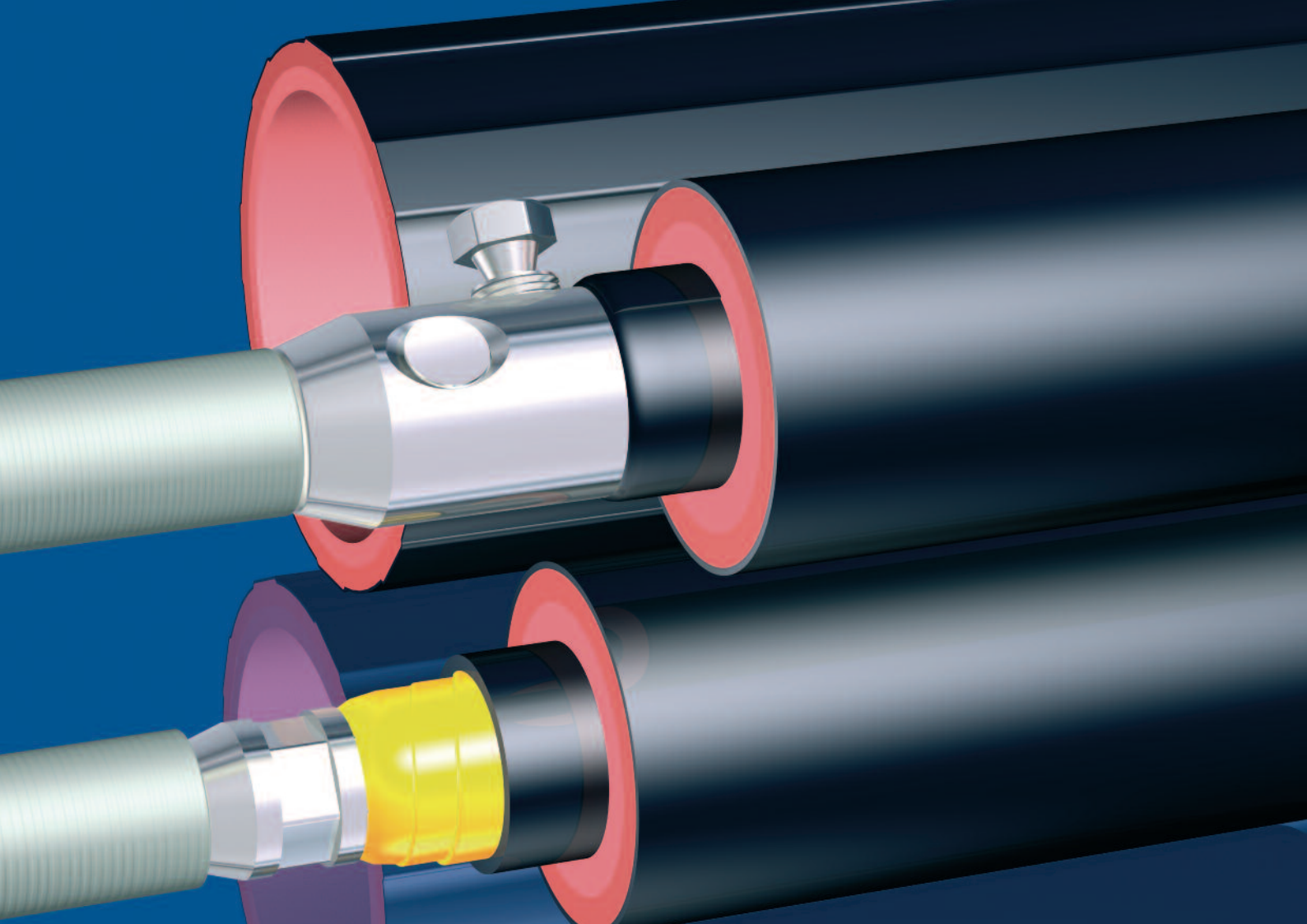
While TE Connectivity (TE) has made every reasonable effort to ensure the accuracy of the information in this catalog, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this catalog are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications. Raychem, TE Connectivity and TE connectivity (logo) are trademarks.

TE Energy – innovative and economical solutions for the electrical power industry: cable accessories, connectors & fittings, insulators & insulation, surge arresters, switching equipment, street lighting, power measurement and control.

Tyco Electronics Raychem GmbH
a TE Connectivity Ltd. Company
TE Energy
Finsinger Feld 1
85521 Ottobrunn/Munich, Germany

Phone: +49-89-6089-0
Fax: +49-89-6096345

energy.te.com



Raychem Heat-shrinkable Joint Sleeve Rayfit
for Medium Voltage Joints up to 36 kV

Raychem
from TE Connectivity

Raychem Heat-shrinkable Joint Sleeve Rayfit for Medium Voltage Joints up to 36 kV

Raychem Rayfit represents the new generation of heat-shrinkable jointing technology. It is based on a triple-extruded heat-shrinkable elastomeric joint sleeve component. The system is suitable for paper and polymeric cable constructions and is designed to accommodate modern jointing requirements such as mechanical shear bolt connectors.

Main features

- Triple-extruded body provides a pre-engineered joint unit with fewer kit components
- Advanced shrink behaviour and profile-following are combined with a significant reduction in shrink time
- High recovery forces result in tight electrical interfaces and perfect sealing ability
- Optimised heat transfer due to reduced thermal capacity
- The reduced overall joint diameter provides a slimmer and space- saving profile
- As an alternative to crimp connectors, kits can be selected with mechanical shear bolt connectors for conductor and shield continuity
- Unlimited shelf-life simplifies material logistics and reduces cost
- Exceeds international performance standards including CENELEC HD 629 and IEC 60502 for joints and IEC 61238 for TE Connectivity BSM type mechanical connectors

Modern jointing

Today's jointing technology is required to be simpler and more economical yet provides higher levels of reliability and flexibility for operators who are under increasing pressure to improve network efficiency. Rayfit achieves these objectives and has additional valuable features including:

- **high recovery forces**
- **reduced installation time**
- **slim and space-saving design**

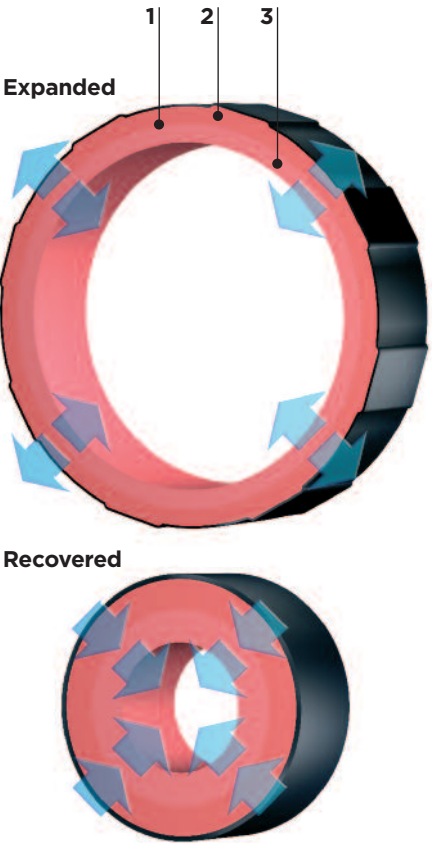
Kits are easy to select, will accommodate a variety of cable and conductor types and can include all components necessary to complete the joint. Important among the range of features is the option to include purpose-designed range-taking mechanical shear bolt connectors for conductor and shield wires.



Raychem Rayfit joint sleeve

The triple layer heat-shrinkable joint sleeve combines:

- 1 heat-shrinkable outer conductive layer**
- 2 heat-shrinkable insulation layer**
- 3 elastomeric insulation layer**



A triple-extruded hybrid component combining heat-shrink and elastomeric technology

ERIT	ERIC	ERIH
12 kV	24 kV	36 kV

Raychem Rayfit joint sleeve

The outer conductive layer and insulating middle layer provide the heat-shrinkable hold-out for the inner elastomeric layer of the joint sleeve. During the heat-shrink installation process, the stored recovery force of the elastomer is released and combines with the recovery force of the heat-shrinkable layers.

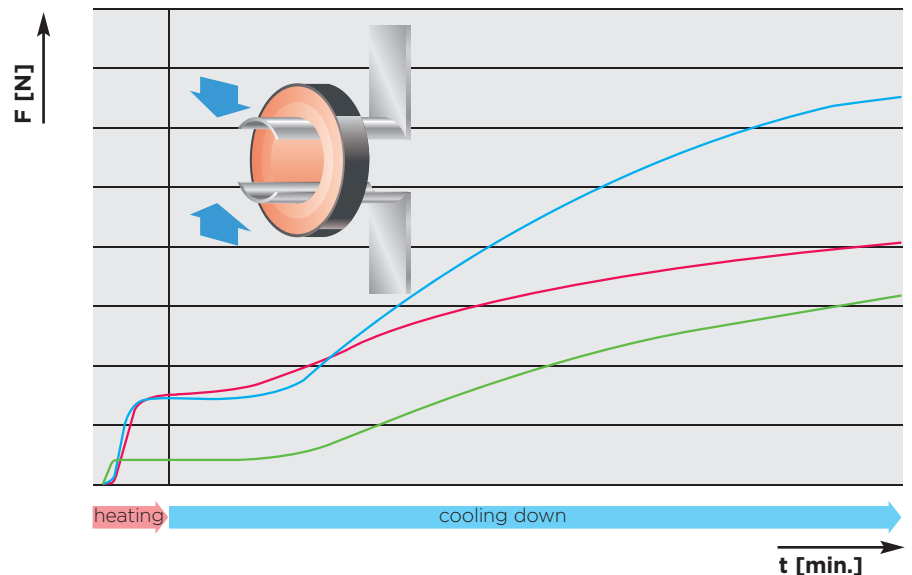
As a result, the electrical interfaces are reduced to the minimum and the joint sleeve provides a tight electrical interface.

The elastomeric characteristic of the materials, combined with the rigid outer heat-shrinkable (screen) layers enable the joint to follow the thermally induced dimensional changes of the cable insulation.



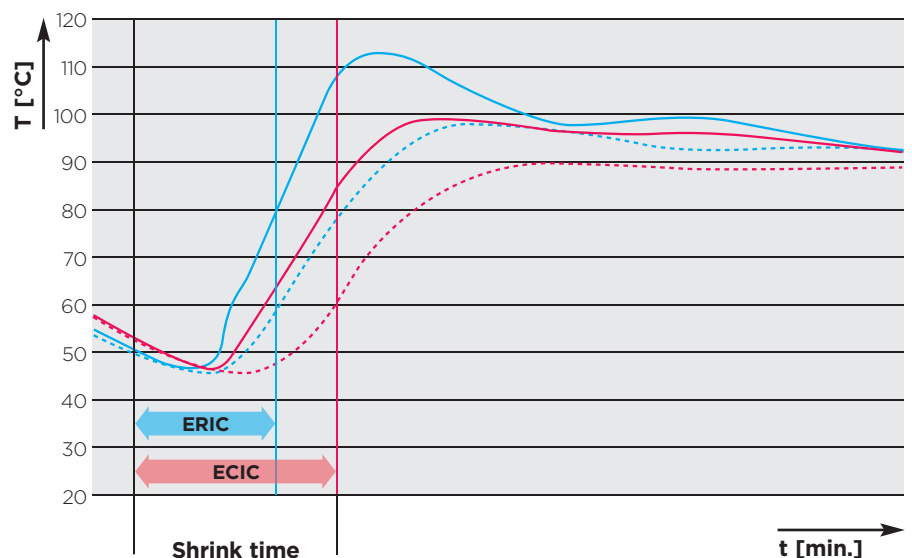
Joint sleeve recovery forces during installation

- New triple layer elastomeric ERIT
- Dual layer elastomeric ECIT
- Co-extruded heat-shrinkable sleeve CICM (non elastomeric)



Joint sleeve temperature distribution during installation

- New triple layer elastomeric ERIC
 - interface stress control to joint sleeve
 - - - interface stress control to cable dielectric
- Existing dual layer elastomeric ECIC
 - interface stress control to joint sleeve
 - - - interface stress control to cable dielectric

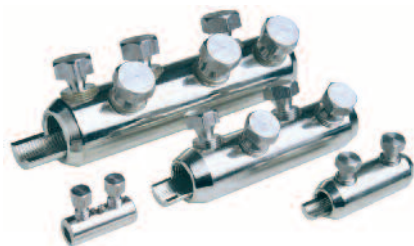


Other jointing elements

Mechanical shear-bolt connectors

Joint kits can be selected to include a TE Connectivity BSM type mechanical shear-bolt connector to ensure a reliable pre-engineered electrical connection for different conductor types and materials.

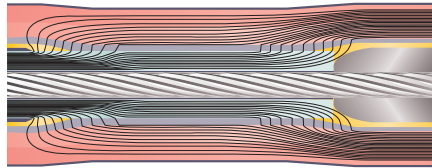
- range-taking sizes cover 25-400 mm² conductor cross-sections for aluminium and copper conductors
- pre-set shear torque provides safe and reliable installation
- removable half shell insert provide core centering
- tin-plated and greased contact surface for corrosion protection
- no need for compression tools or maintenance
- shorter length compared to compression connectors
- tested in accordance with IEC 61238
- excellent tensile performance due to special bolt tip design



Cordless impact wrench for simple and easy installation of mechanical connectors.

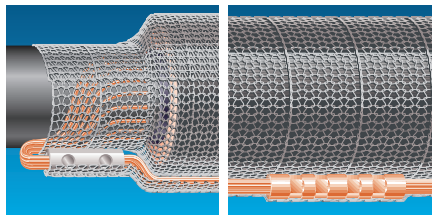
Electrical stress control

The stress control sleeves in combination with stress grading mastic at the screen cut provide a precisely defined impedance characteristic which smoothes the electrical field. For ease of installation, mechanical shear-bolt connectors are applied in combination with a stress control patch while joints with compression connectors use mastic tape for void filling and stress grading.



Shield continuity

With mechanical shear-bolt connectors as standard, typical shield wire cross sections up to 35mm² can easily be connected with the connector supplied in the kit. Positioned at the oversheath cut back, the connection provides a smooth profile and resists mechanical damage. There is no need for a crimping tool and its maintenance. Shear bolts provide the required contact force in order to ensure safe installation and reliable performance during load cycling in service as well as during short circuit conditions. An additional layer of copper mesh is applied around the joint to provide effective shielding and protection.



Joint kits for other connector technologies including deep indent and hexagonal compression are available.

Armouring

As some cable designs use a steel wire armour to provide a certain mechanical strength, joint designers have to provide the same performance. A steel wire armour wrap in combination with a heat-shrinkable sleeve or fibre reinforced wraparound are being used to fulfill the impact test requirements as requested e.g. in the CENELEC specification.



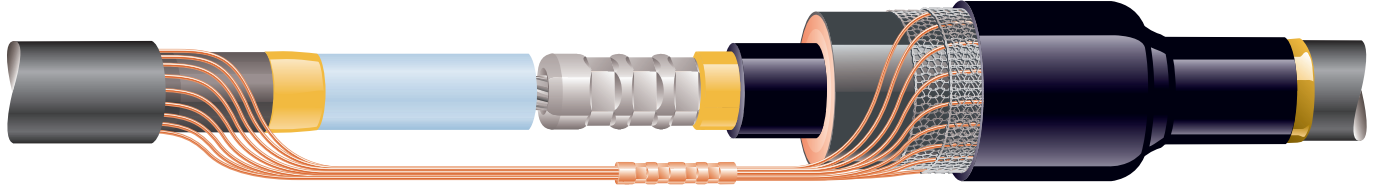
Robust outer sealing and protection

Modern cable laying techniques require a robust oversheath replacement capable of withstanding high mechanical stresses during conventional cable laying as well as mechanical impact occurring during the entire cable life. The thick-wall heat-shrinkable tubing is internally coated with a hot-melt adhesive to ensure an effective moisture seal and corrosion protection for the joint. When installed, the joints provide a level of protection and thickness equal to modern cables with PE oversheath. A space saving alternative using a fibre re-enforced wraparound sleeve coated with hot melt adhesive can be selected for installations in manholes and restricted joint bays.

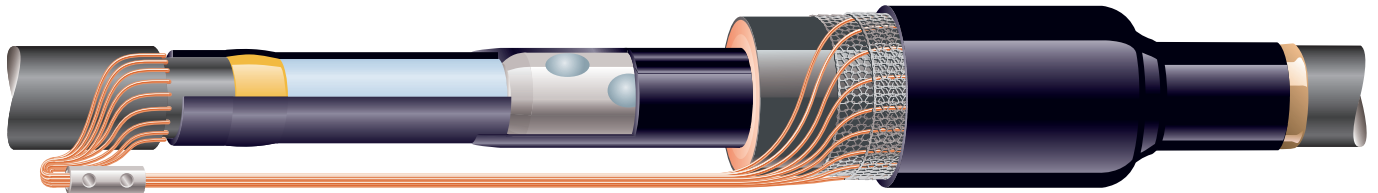


Product families for polymeric insulated cables

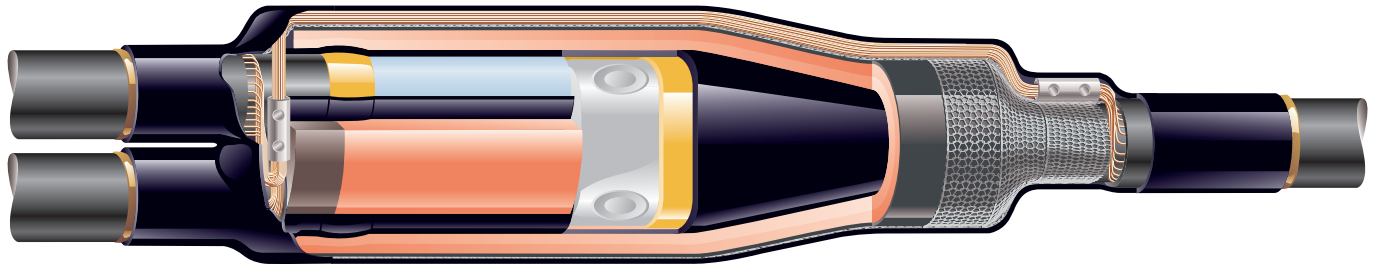
Raychem medium voltage joints **SXSU** up to 36 kV using compression connectors



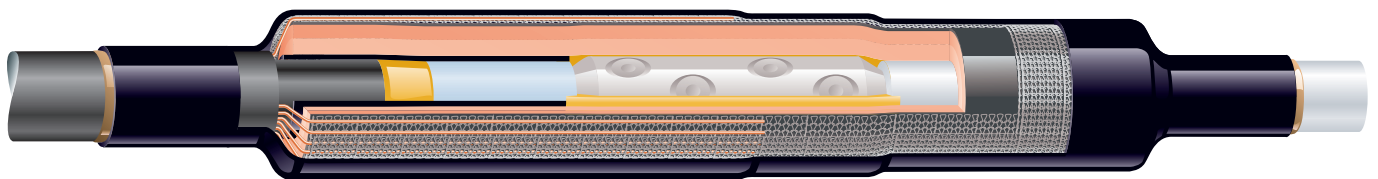
Raychem medium voltage joints **MXSU** up to 36 kV including mechanical connectors



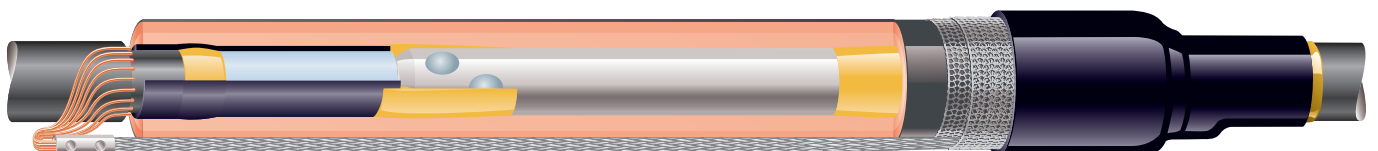
Raychem medium voltage branch joints **MXSB** up to 24 kV including mechanical connectors

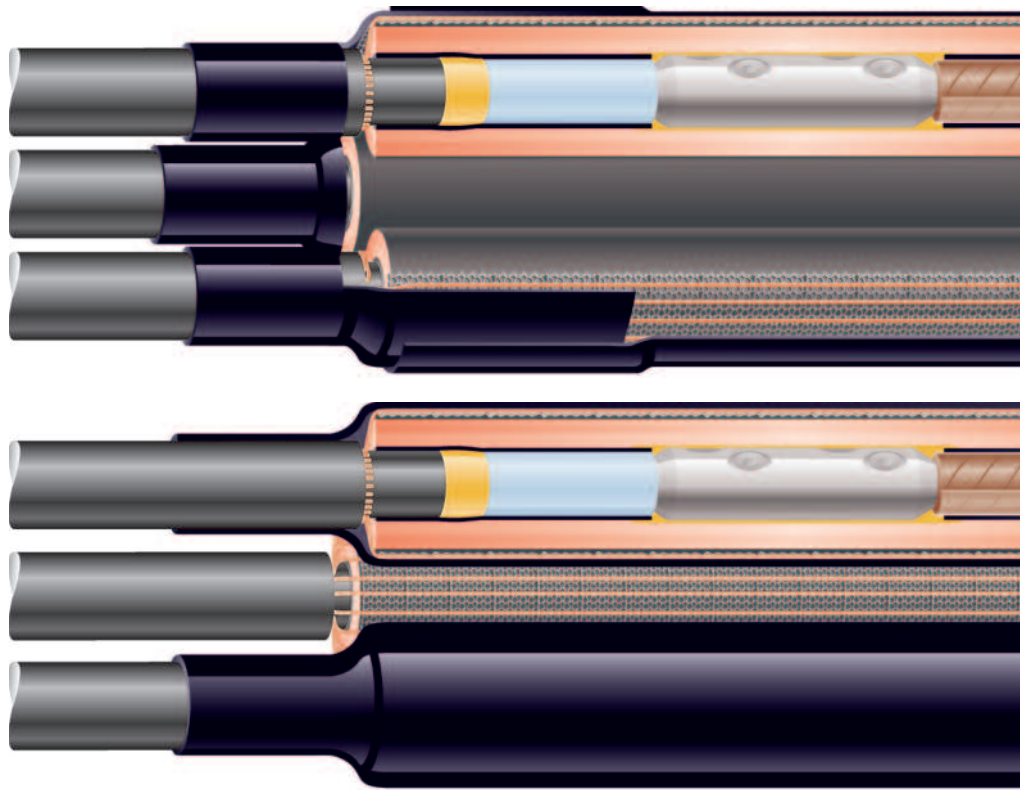


Raychem single core live end seals (stop end) **MXSE** up to 36 kV

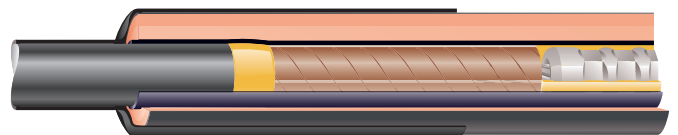
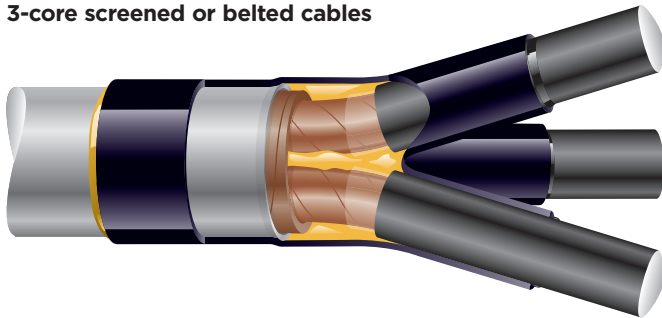
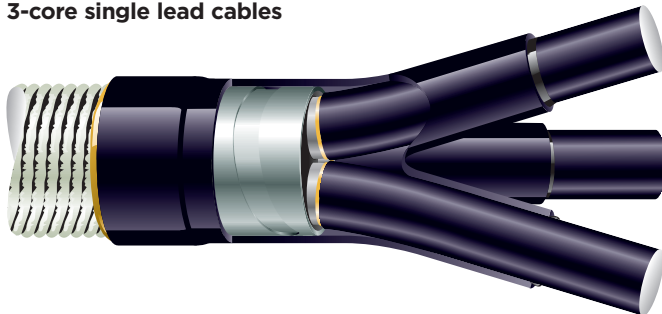


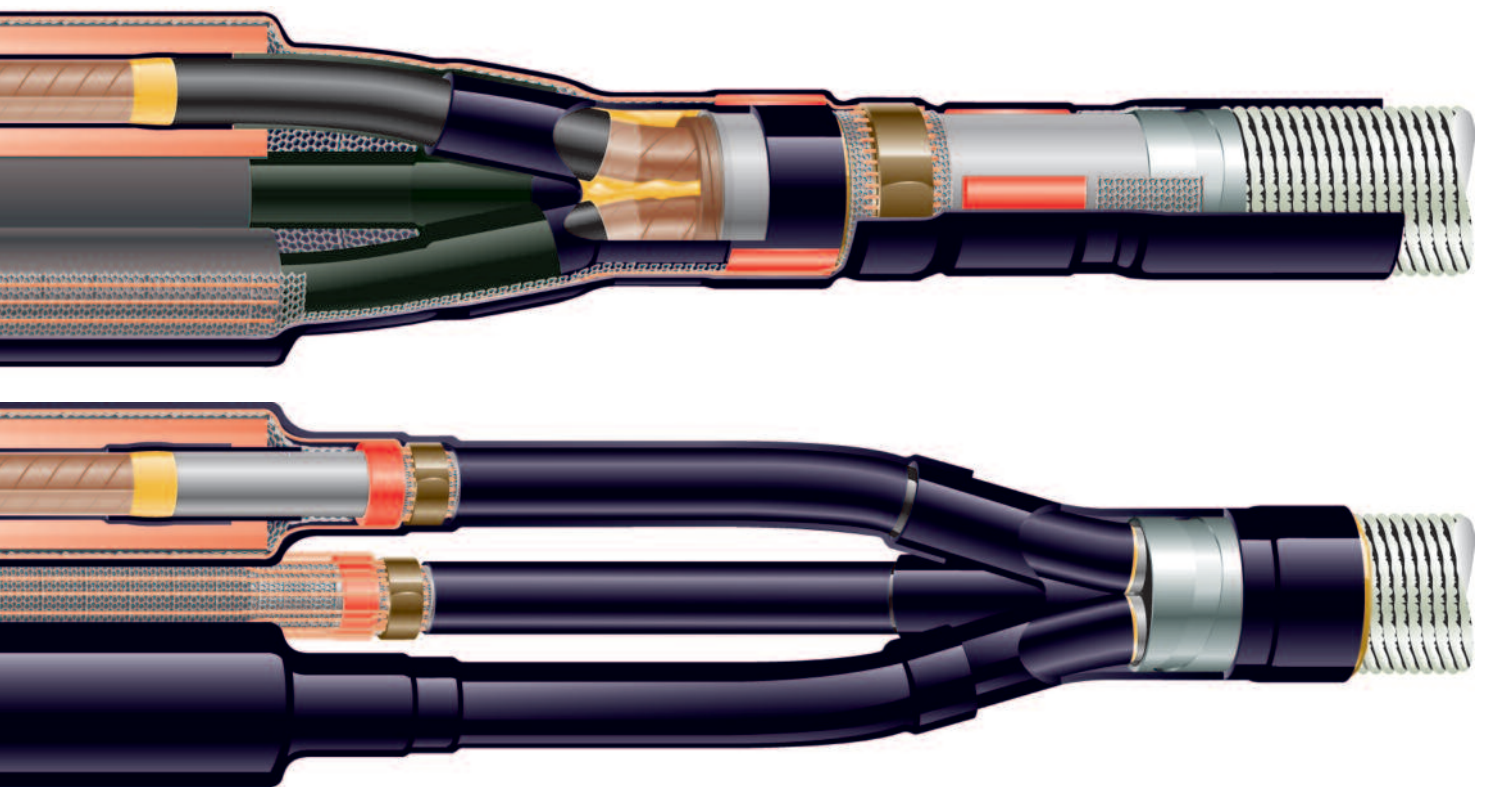
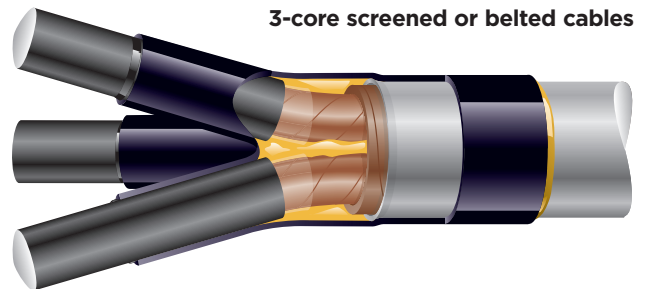
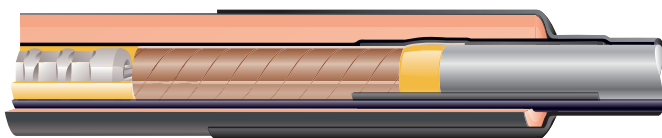
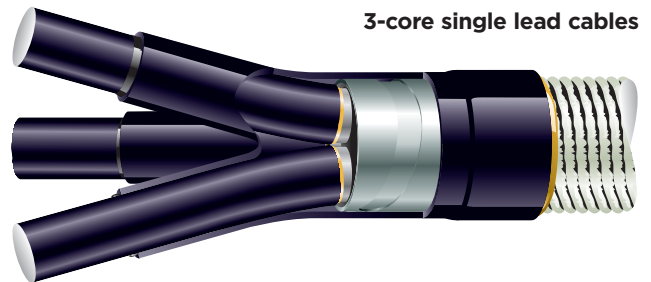
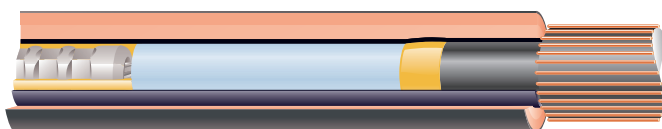
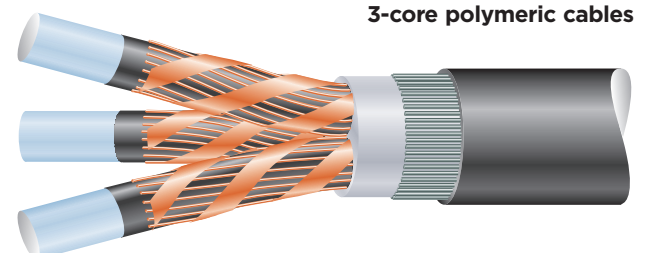
Raychem medium voltage repair joints **MXSU-L** up to 24 kV including mechanical connectors



Raychem transition joints MXSU up to 24 kV including TE Connectivity BSM type mechanical shear bolt connectors**Raychem universal jointing system EPKJ-R to connect all common cable types using compression connectors****System technology**

Few heat-shrinkable components like oil barrier sleeves, conductive breakouts etc. transfer paper cables into quasi polymeric type allowing the use of the same jointing sleeves.

3-core screened or belted cables**3-core single lead cables****1-core lead sheathed cables**

**3-core screened or belted cables****1-core lead sheathed cables****3-core single lead cables****1-core polymeric cables****3-core polymeric cables**

About TE Connectivity

TE Connectivity is a global, \$14 billion company that designs and manufactures approximately 500,000 products that connect and protect the flow of power and data inside the products that touch every aspect of our lives. Our nearly 100,000 employees partner with customers in virtually every industry – from consumer electronics, energy and healthcare, to automotive, aerospace and communication networks – enabling smarter, faster, better technologies to connect products to possibilities.

More information on TE Connectivity can be found at: www.te.com

While TE Connectivity (TE) has made every reasonable effort to ensure the accuracy of the information in this catalog, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this catalog are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications. Raychem, TE Connectivity and TE connectivity (logo) are trademarks.

TE Energy – innovative and economical solutions for the electrical power industry: cable accessories, connectors & fittings, insulators & insulation, surge arresters, switching equipment, street lighting, power measurement and control.

Tyco Electronics Raychem GmbH
a TE Connectivity Ltd. Company
TE Energy
Finsinger Feld 1
85521 Ottobrunn/Munich, Germany

Phone: +49-89-6089-0
Fax: +49-89-6096345

energy.te.com

