JOINTS

EFSJ 6.6 - 11kV Straight Joints (Paper to Paper & Paper to XLPE)

EPKJ 11kV - 36kV XLPE Straight Joints

EPKJ 22kV - 36kV Paper to Paper & Paper to XLPE Straight Joints

MXSU 11kV - 36kV XLPE Straight Joints

TKN/U 0.6 - 1kV Low Voltage Straight Joints

EFSJ
6.6kV - 11kV STRIGHT JOINTS FOR 3 - CORE SCREENED OR BELTED PAPER CABLES AND TRANSITIONS TO POLYMERIC CABLES.

The Raychem EFSJ-11 series of joints has been designed to combine the best features of compound filled joints with modern materials and heat-shrinkable technology. The joint is robust and can be energised immediately after installation. Each kit covers a range of cable sizes.

The basic kits are designed for lead (PILC) cables with either screened or belted construction.

Modification kits may be added for paper to plastic transition, 3-core and single core trifurcating joints.

Raychem mechanical earth connection kits can be added to eliminate the need for plumbing.

Additional kits are available for aluminium sheathed (PICAS) cables if required.*

Product features

Reduced installation time
Heat-shrinkable components in conjunction with stress reliving mastics and insulating core spacer are quick and simple to install eliminating labour intensive tasks such as taping, plumbing and compound filling.

Immediate energisation
The joint can be energised on completion. No cooling or curing time is required.

Range taking
Each joint kit covers several cable sizes. Only four base kits are necessary from 16mm2 to 300mm2.

The correct kit for your application can be selected with the help of the joint designer overleaf.

Universal
The base joint can be used on belted or screened insulation, with PILC or PICAS* cable constructions.

Modification kits convert the joint for paper to plastic transitions.

Robust
Raychem's tough heat-shrinkable cable jacketing materials have been used for many years and have proved a reliable means of protecting and sealing underground joints.

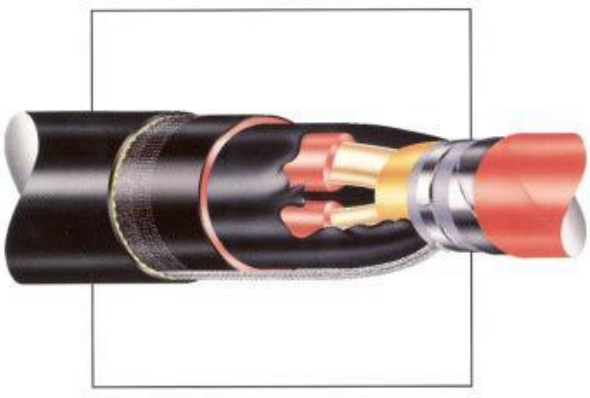
Factory engineered
Pre-engineered components ensure the required insulation thickness for both the cable core and belt insulation without adding excess bulk

Compact
The joint size is minimised by eliminating bulk hand applied tape, insulating compound and lead sleeve or cast iron case.

Unlimited shelf life
The kit materials are not subject to any deterioration if stored at ambient temperatures up to 50°C

*Please consult your local Raychem specialist distributor or Raychem sales office.

Extensive testing and experience
The EFSJ-11 series has been thoroughly type tested using relevant sections from several industry approved joint standards such as engineering recommendation C90, VDE and IEC. Test report UVR81 10 summarizes the tests. The joints have been installed in most areas where MIND cables are prevalent such as UK, Malaysia, Hong Kong, Australia, New Zealand, India and Sri Lanka.



EFSJ-11 SELECTION CHART

For 6.6kV - 11kV straight joints for 3-core screened or belted cables and transitions to polymeric cables

Joint system designer

This worksheet enables you to arrive at a part number for an EFSJ straight or transition. Choose one figure from the left-hand column of each table:

Voltage
Base Modules
Transition Modules
Armour Modules
Solderless Earthing Modules.

Typical part number: **EFSJ- 11 C T1-T9 G6-G9 L1-L3/A1**

Voltage in kV	
11	For 6.6—11kV

Base modules - always choose the module to suit the largest cable size

Size in mm²	6.6kV	11kV
A	25 - 50	16 - 50
B	70 - 120	50 - 95
C	120 - 240	95 - 185
D	240 - 300	185 - 300

For transition joints only please use following module. Transition modules - 3 core paper to single core polymeric.

Size in mm²	6.6kV	11kV
T1	25 - 70	16 - 50
T2	70 - 120	50 - 95
T3	120 - 185	95 - 185
T4	185 - 300	185 - 300

Transition modules - 3-core paper to 3-core polymeric.

Size in mm²	6.6kV	11kV
T6	25 - 70	16 - 50
T7	70 - 120	50 - 95
T8	120 - 185	95 - 185
T9	240 - 300	185 - 300

Steel wire armour modules - for 3-core polymeric

Size in mm²	6.6Kv	11kV
G6	25 - 70	16 - 50
G7	95 - 120	70 - 95
G8	150 - 185	120 - 185
G9	240 - 300	240 - 300

Mechanical earth kits - for lead sheath.

Size in mm²	6.6kV	11kV
L1	25 - 50	16
L2	70 - 120	25 - 70
L3	150 - 300	95 - 300

Mechanical earth kits - for aluminium sheath.

A1		50 - 300

Example: EFSJ-11-A
11kV 3 core paper cable inline joint 16-50mm²
Example: EFSJ-11-B-T2
11kV 3 core paper to 3 single core XLPE transition joint 50 - 95mm²
Example: EFSJ-11-C-T8-G8
11kV 3 core paper cable to 3 core XLPE with steel wire armours transition joint 120 - 185mm²

EPKJ IN LINE JOINTS

11 - 36kV XLPE inline joints
22 - 36kV inline paper joints

EPKJ - XX X / XXX-XXX - X

Voltage

Up to 17.5kV	=17
24kV	=24
36kV	=36

Size

12kV mm²	17.5kV mm²	24kV mm²	36kV mm²	
35 - 70	25 - 50	25	50 - 70	=A
95 - 185	70 - 150	35 - 70	95 - 150	=B
240 - 400	185 - 300	95 - 240	185 - 400	=C
500 - 630	400 - 500	300 - 400	500 - 630	=D

Inline Joint Type

Single core plastic without armour	=1XU-1XU
Single core to 3-core plastic without armour	=1XU-3XU
3-core plastic without armour	=3XU-3XU
Single core HSL paper	=1HL-1HL
Single core HSL to 3-core HSL paper	=1HL-3HL
Single core HSL paper to 3-core S/B paper	=1HL-3SB
3-core HSL paper	=3HL-3HL
3-core HSL paper to 3-core S/B paper	=3HL-3SB
3-core Screened/Belted	=3SB-3SB

Armour code:

Tape Armour	=T
Wire Armour	=W

Ordering Sample:
EPKJ17C3XU3XU = inline joint for 3-core plastic cable to 3-core plastic cable 17.5kV 185mm²

EPKJ TRANSITION JOINTS

22 - 36kV Paper to XLPE transition joints

EPKJ - XX X / XXX-XXX - X

Voltage

24kV	=24
36kV	=36

Size

12kV mm²	17.5kV mm²	24kV mm²	36kV mm²	
35 - 70	25 - 50	25	50 - 70	=A
95 - 185	70 - 150	35 - 70	95 - 150	=B
240 - 400	185 - 300	95 - 240	185 - 400	=C
500 - 630	400 - 500	300 - 400	500 - 630	=D

Inline Joint Type

Single core plastic to single core HSL paper	=1XU-1HL
Single core plastic to 3-core HSL paper	=1XU-3HL
Single core plastic to 3-core S/B paper	=1XU-3SB
3-core plastic to single core HSL paper	=3XU-1HL
3-core plastic to 3-core HSL paper	=3XU-3HL
3-core plastic to 3-core S/B paper	=3XU-3SB

Armour code:

Tape Armour	=T
Wire Armour	=W

Ordering Sample:
EPKJ17C3XU3SB = Transition joint for 3-core plastic cable to 3-core screened/belted cable 17.5kV 185mm²
Note: "Transition" refers to a joint involving cables of different insulation types. (i.e. paper-to-plastic)

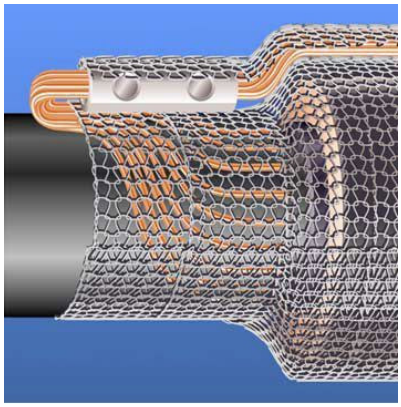
MXSU

11kV - 36kV Universal jointing system for polymeric insulated

MXSU is based on a complete product concept

- Mechanical connectors for conductor and wire shielded 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 for joints and IEC 61238-1 for mechanical connectors

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. An additional layer of copper mesh is applied around the joint to provide satisfactory shielding and protection.



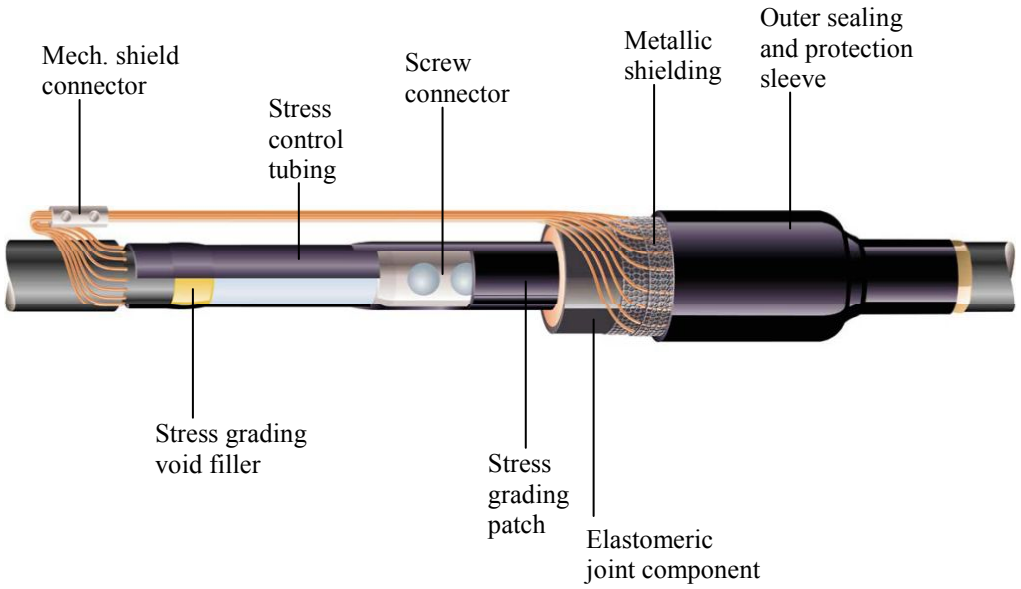
Electrical stress control
The stress control tubing at each cable end in combination with the yellow stress grading mastic at the screen cut provide a precisely defined impedance characteristic which smooths the electrical field. For ease of installation, a stress control patch is applied around the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

Robust outer sealing and Protection
The thick-wall heat-shrinkable tubing is internally coated with a hot melt adhesive to ensure a effective moisture seal and corrosion protection for the joint. When installed, the joints provide the similar level of protection and thickness as modern cable with PE oversheath.

Elastomeric insulation and screen
The heat shrinkable conductive layer of the screened elastomeric joint component holds the elastomeric insulation layer in its expanded stage when supplied. This enables the usage of a wide range of cable application diameters with only one kit.

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 material, shapes and types used in today's network.

MXSU
Design and construction



MXSU selection table

Single core kits

Voltage		Cables with wire screen
Uo/U (Umax)	**Kit-number**	**Appl. Range (based on al/rm)**
12kV	MXSU 3111	35 - 95mm²
	MXSU 3131	95 - 240mm²
	MXSU 3141	185 - 400mm²
24kV	MXSU 5111	35 - 95mm²
	MXSU 5131	95 - 240mm²
	MXSU 5141	185 - 400mm²
36kV	MXSU 6111	50 - 95mm²
	MXSU 6131	120 - 240mm²
	MXSU 6141	185 - 400mm²

3-core kits

Voltage		Cables with wire screen
Uo/U (Umax)	**Kit-number**	**Appl. Range (based on al/rm)**
12kV	MXSU 3311	35 - 95mm²
	MXSU 3331	95 - 240mm²
24kV	MXSU 5311	35 - 95mm²
	MXSU 5331	95 - 240mm²

INLINE JOINTS

For plastic and rubber insulated cables up to 1kV

For plastic insulated single and multi core control cables

SINGLE CORE CABLES

Size of conductor (mm²)	Cable core insulation Min dia (mm)	Dia max (mm)	Length max (mm)	Kit Number
1.0 - 2.5	2.9	6	25	**S1**
4 - 10	4	11	70	**S2**
16 - 35	6	16	70	**S3**
50 - 95	9	25	130	**S4**
120 - 150	12	30	130	**S5**
185 - 300	16	40	150	**S6**
400 - 630	22	50	170	**S7**

MULTI CORE CABLES
WITHOUT ARMOURS
WITH/WITHOUT ECC

Size of conductor (mm²)	Number of cores	Nominal cable O.D. min (mm)	Dia max (mm)	Length max (mm)	Kit number
1.5 - 6	2 - 3 - 4	9	10	35	**M1**
10 - 16	2 - 3 - 4	12	11	50	**M2**
16 - 35	2 - 3 - 4	16	16	70	**M3**
50 - 70	3 - 4	22	25	110	**M4**
95 - 150	3 - 4	35	35	130	**M5**
185 - 300	3 - 4	45	45	150	**M6**

MULTI CORE CABLES WITH
STEEL WIRE ARMOURS
WITH/WITHOUT ECC

Size of conductor (mm²)	Number of cores	Nominal cable O.D. min (mm)	Dia max (mm)	Length max (mm)	Kit number
1.5 - 6	2 - 3 - 4	9	10	35	**M1**
10 - 16	2 - 3 - 4	12	11	50	**M2**
16 - 35	2 - 3 - 4	16	16	70	**M3**
50 - 70	3 - 4	30	25	110	**MA7**
95 - 120	3 - 4	34	35	130	**MA8**
150 - 185	3 - 4	40	35	130	**MA9**
240 - 300	3 - 4	50	45	150	**MA10**