

# ONE-FIFTY SPEED™ Joints

HIGH VOLTAGE NETWORK COMPONENTS



## Linking the Future

As the worldwide leader in the cable industry, Prysmian Group believes in the effective, efficient and sustainable supply of energy and information as a primary driver in the development of communities.

With this in mind, we provide major global organisations in many industries with best-in-class cable solutions, based on state-of-the-art technology. Through two renowned commercial brands - Prysmian and Draka - based in almost 100 countries, we're constantly close to our customers, enabling them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

In our energy business, we design, produce,

distribute and install cables and systems for the transmission and distribution of power at low, medium, high and extra-high voltage.

In telecoms, the Group is a leading manufacturer of all types of copper and fibre cables, systems and accessories - covering voice, video and data transmission.

Drawing on over 130 years' experience and continuously investing in R&D, we apply excellence, understanding and integrity to everything we do, meeting and exceeding the precise needs of our customers across all continents, at the same time shaping the evolution of our industry.





# What links power grids to sustainability?

Cable solutions to support the development of smarter and greener power grids.

From Asia-Pacific to the Americas, and from Europe to the Middle East to Africa, Prysmian cable solutions sit at the heart of the development of power grids worldwide, helping major utilities in transmitting and distributing power to their customers.

Unmatched in our manufacturing capabilities and with an unwavering commitment to R&D, we design, produce and install low, medium, high and extra-

high voltage underground and submarine cables and systems, along with network components and value-added engineering services.

Always aware of the need to minimize our impact on the planet, we're constantly driving innovation in our industry, aiming to optimise supply chain processes, reduce total cost of ownership for our customers and help them achieve sustainable, profitable growth.

# SPEED™ line concept

The SPEED™ line joints are designed to connect two high voltage extruded cables in a fast and reliable way. Speed joints are based on the cold shrink techniques and are available up to 170 kV  $U_m$ .

Prysmian has developed a proprietary formulation of the EPR (Ethylene -Propylene Rubber) compound with superior characteristics which guarantees an unsurpassed reliability of the products. EPR materials have been used over 30 years for voltage classes up to 550 kV  $U_m$ .

Prysmian one-piece pre-moulded joint insulators and stress cones are completely manufactured in-house. Each single joint insulator is mechanically and electrically routine tested in the factory, according to the applicable standards.

Prysmian HV accessories have proven to be extremely reliable, making them the market leader in terms of design and quality. Most major utilities worldwide use Prysmian HV accessories/products as the benchmark in terms of performance and service.



# ONE-FIFTY SPEED™ Joints

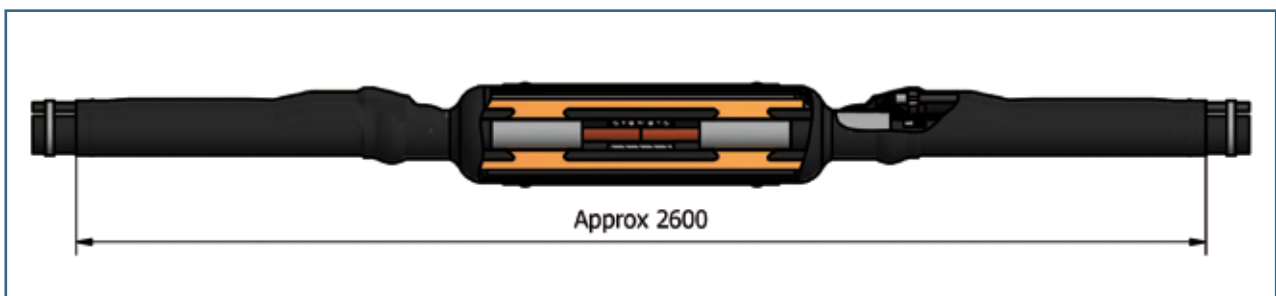
Accessories for HV extruded cables have a significant importance in the reliability of any cable circuit. Different designs are currently available on the market.

Prysmian has combined the best available technologies in the market to design a new generation of one piece pre-moulded joints. The joints are delivered to the customer pre-expanded in the Prysmian factory on carrier tubes.

Based on this concept the ONE-FIFTY SPEED™ ( $U_{max}=170$  kV) has been developed, industrialized and qualified.

The following types are now available:

- Type CSJ170 for the **un-sectionalized (continuous/straight)** joint design.
- Type CSJ-X 170 for the **sectionalized (cross bonding)** joint design.



Prysmian's cold shrink design guarantees a reliable solution with easier and faster installation using a minimum number of special tools.

## SPEED™ line Joint Benefits

- Partial Discharge sensor integration
- Optical fibers outlet integration
- Internal splicing optical fibers
- Metallic casing
- Mechanical protection box filled with cold pouring resin
- Integrated (metallic + mechanical) protection box, without filler

## SPEED™ line Joint Features

- Smart design, reduction of installation time and cost
- Delivered pre-expanded over carrier tubes, no specific tools required
- 100% factory routine tested
- Wide cable size range taking
- Compliance with majority of international standards
- ISO 9001 and ISO 14001 Qualified processes

# Product portfolio

## Type CSJ 170 for the un-sectionalized (continuous) joint design\*.

- ONE-FIFTY SPEED™ Basic (SR) (HST)
- ONE-FIFTY SPEED™ Basic + Metal Casing (CR) (metallic casing / HST)
- ONE-FIFTY SPEED™ Basic + Metal Casing + Protection box (CJ) (metallic casing / HST / mechanical protection box filled with resin compound)

## Type CSJ-X 170 for the sectionalized (cross bonding) joint design.

- ONE-FIFTY SPEED™ Basic (SDR) (water tightening tape / HST)
- ONE-FIFTY SPEED™ Basic + Metal Casing (CDR) (metallic casing / water tightening tape / HST)
- ONE-FIFTY SPEED™ Basic + Integrated Protection box (CPE) (Integrated metallic and mechanical protection box, without filler / HST)
- ONE-FIFTY SPEED™ Basic + Metal Casing + Protection box (CJ) (metallic casing / HST / mechanical protection box filled with resin compound)

\*HST = Heat Shrinkable Tube

Technical requirements ONE-FIFTY SPEED™		
System Voltage (Um)	[kV]	170
Dimensions:		
Min conductor size	[mm <sup>2</sup> ]	400
Max conductor size	[mm <sup>2</sup> ]	3000
Min insulation diameter	[mm]	49 (prepared XLPE)
Max insulation diameter	[mm]	112 (prepared XLPE)
Testing:		
HVAC routine test	100%	280 kV - 30 min / free of Partial Discharges
L.I. withstand voltage test	[kV+10/-10]	750
IEEE: 6 hrs. AC-test	[kV]	232
IEEE: 15 minute AC	[kV]	280
Nominal operating current	[A]	limited by cable specification
Short circuit current* (0,5 sec)	[kA]	63
Standards:		
Type Test according	IEC	IEC-60840
	IEEE	IEEE-St404

\* Other short circuit current values possible on request.

### **SPEED™ line Joints Advantages**

- One piece pre-moulded joint insulator, factory tested
- Cold shrink design, factory pre-expanded
- Suitable for all different metal sheath constructions
- Easy to install
- Short installation time
- Maintenance free

### **Main components**

Each ONE-FIFTY SPEED™ Joint includes the following main internal components:

#### **1. SPEED™ Joint Connector**

- Connector for cable conductors (Aluminium or Copper)



#### **2. SPEED™ Joint Insulator**

- Elastic EPR pre-moulded joint insulator; pre-expanded in the factory



#### **3. SPEED™ Joint Tapes**

- Self amalgamating tapes as water barrier

#### **4. SPEED™ Joint Tubes**

- Heat shrinkable tubes for protection

## Joint design outer protection

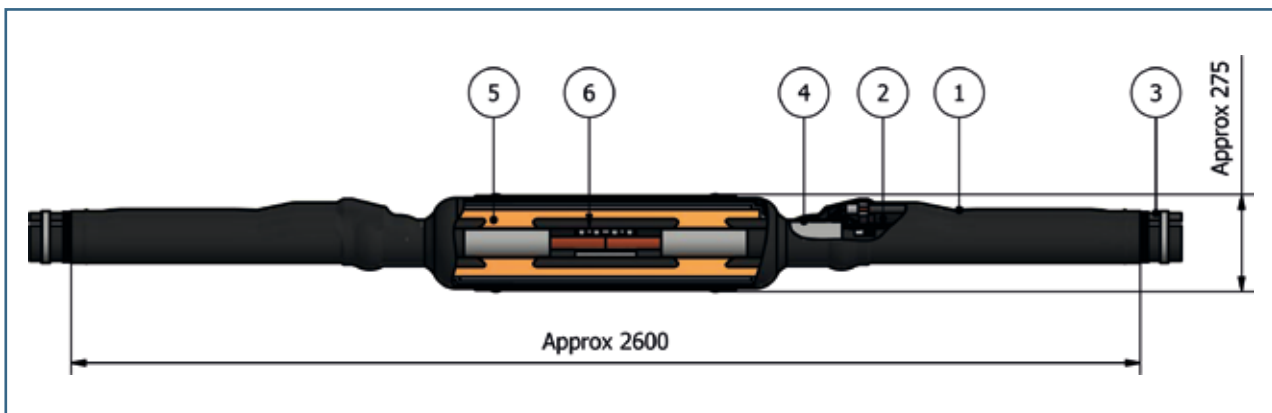
### ONE-FIFTY SPEED™ Basic (SDR)

The ONE-FIFTY SPEED™ joint Type CSJ-X 170 (Basic design) includes the following outer protection:

- Flexible covering (self amalgamating tapes and Heat Shrinkable Tubes)



CSJ-X 170 SDR / Basic



- |  |  |
|--|--|
| 1 Heat shrinkable tubes (Polyolefin)                 | 4 Single core bonding cable connection |
| 2 Water proof tapes                                  | 5 Premoulded sleeve                    |
| 3 Single core cable for cross-bonding (not included) | 6 Connector                            |

### Optional components

On request the following optional parts can be supplied;

- Partial Discharge sensor



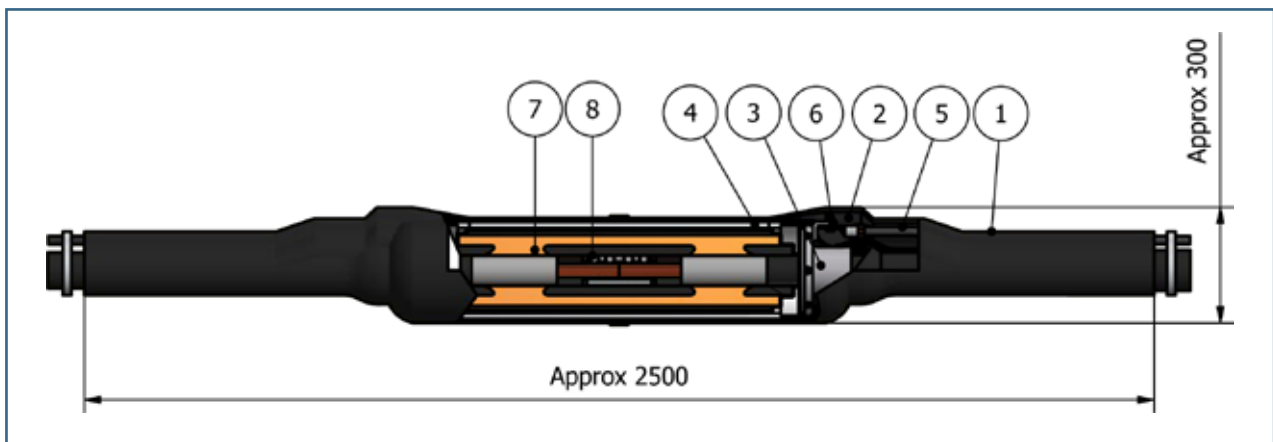
### ONE-FIFTY SPEED™ Basic + Metal casing (CDR)

The ONE-FIFTY SPEED™ joint Type CSJ-X 170 (Basic + Metal casing design) includes the following outer protection:

- Heat Shrinkable Tubes
- Self amalgamating tapes as water barrier
- Metallic casing
- Insulating ring (for sectionalized type only)



CSJ-X 170 CDR / Basic + Metal casing



- |   |   |
|---|---|
| <b>1</b> Heat shrinkable tubes (Polyolefin) | <b>5</b> Single core cable for cross-bonding (not included) |
| <b>2</b> Water proof tapes                  | <b>6</b> Single core bonding cable connection               |
| <b>3</b> Metallic Casing (Aluminium)        | <b>7</b> Premoulded sleeve                                  |
| <b>4</b> Insulating ring (Polypropylene)    | <b>8</b> Connector  |

### Optional components

On request the following optional parts can be supplied;

- Partial Discharge sensor
- Optical fibers splicing or outlet

## Additional outer protection

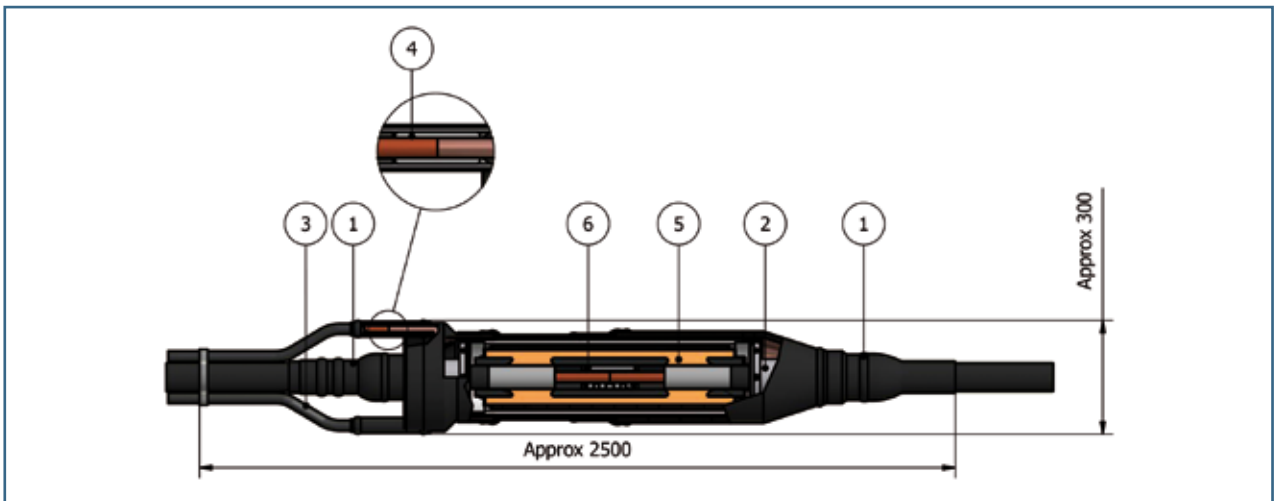
### ONE-FIFTY SPEED™ Basic + Integrated Protection box (CPE)

The ONE-FIFTY SPEED™ joint Type CSJ-X 170 (Basic + Integrated Protection box design) includes the following outer protection:

- Heat Shrinkable Tubes
- Integrated Metallic/Polyethylene mechanical casing, without filler



CSJ-X 170 CPE / Basic + Integrated Protection box



- |  |   |
|--|---|
| <b>1</b> Heat shrinkable tubes (Polyolefin)                    | <b>4</b> Single core bonding cable connection |
| <b>2</b> Integrated casing (Copper) with outer protection (PE) | <b>5</b> Premoulded sleeve                    |
| <b>3</b> Single core cable for cross-bonding (not included)    | <b>6</b> Connector                            |

### Optional components

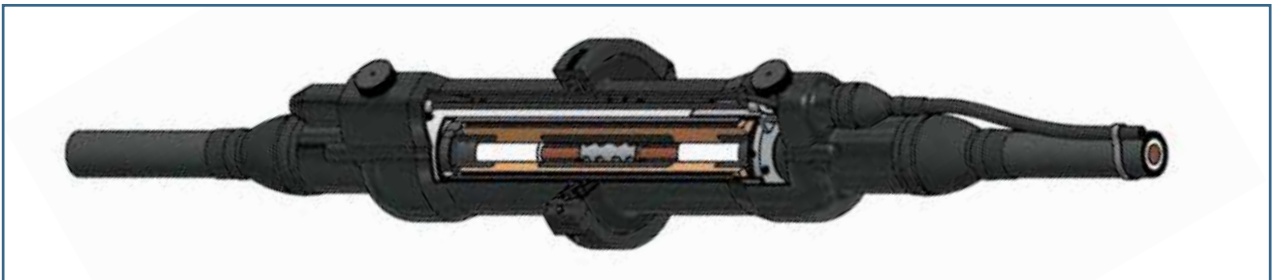
On request the following optional parts can be supplied;

- Concentric bonding cable connection
- Partial Discharge sensor
- Optical fibers splicing or outlet

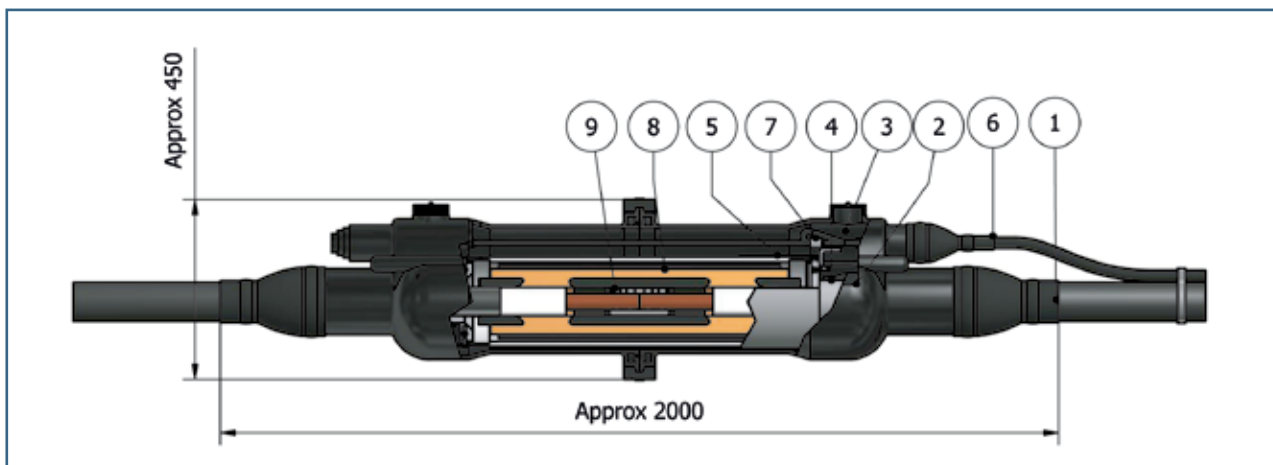
### ONE-FIFTY SPEED™ Basic + Metal Casing + Protection box (CJ)

The ONE-FIFTY SPEED™ joint Type CSJ-X 170 (Basic + Metal casing + Protection box design) includes the following outer protection:

- Heat Shrinkable Tubes
- Mechanical casing (protection box) filled with cold pouring resin
- Metallic casing



CSJ-X 170 CJ / Basic + Metal Casing + Protection box



- |   |  |
|---|--|
| <b>1</b> Heat shrinkable tubes (Polyolefin)       | <b>6</b> Concentric cable for cross-bonding (not included) |
| <b>2</b> Outer protection (XLPE)                  | <b>7</b> Concentric bonding cable connection               |
| <b>3</b> Insulating compound (cold pouring resin) | <b>8</b> Premoulded sleeve                                 |
| <b>4</b> Metallic Casing (Aluminium)              | <b>9</b> Connector   |
| <b>5</b> Insulating ring (Polypropylene)          |  |

#### Optional components

On request the following optional parts can be supplied;

- Single core bonding cable connection
- Partial Discharge sensor
- Optical fibers splicing

# Installation

For the installation of ONE-FIFTY SPEED™ Joints different conductors connections are available:

Connector installation			
Conductor [material]	[code]	[type]	connection *
Aluminium	Al	stranded	Mechanical Connector / MIG weld
Copper	Cu	stranded milliken	Mechanical Connector / Hexagonal Indent Compression

\* Large conductor cross sections different cable connection techniques may be applied.

All different type of metal sheaths can be connected within this joint design.  
The ONE-FIFTY SPEED™ Joints are easy to install, requiring a minimum of special tools.

Thanks to the pre-expanded rubber body the design of this joint results in a short assembly time without special skill requirements for the jointers.

## Basic steps:



### 1 Preparation cable ends

Peeling and polishing the insulation

### 2 Parking joint

Park the pre-expanded joint insulator

### 3 Conductors connection

Compression or shear bolt connector

### 4 Installing pre-expanded joint insulator

Removing support on both ends

### 5 Sealing

Apply self amalgamating tapes

### 6 Installing Heat Shrinkable Tubes (HST)

**Ready for service**



# Technical Information:

The ONE-FIFTY SPEED™ Joint model has been type tested according the applicable international (IEC/IEEE) standards, covering the following range of application numbers:

Range of Application			
Joint Model	Minimum insulation diameter [mm]	Maximum insulation diameter [mm]	Maximum Outer diameter [mm]
	prepared* XLPE/EPR	prepared* XLPE/EPR	complete cable**
Type 1	49	64	78
Type 2	63	81	98
Type 3	76	95	118
Type 4	90	112	141

conductor cross section range 400mm<sup>2</sup>-3000mm<sup>2</sup>

\* After peeling and polishing the cable insulation surface

\*\* Solutions for cable with bigger outer sheath diameter, available upon request.

Technical Table ONE-FIFTY SPEED™								
Joint	Type		Outer protection		Additional protection			
	General code	Sectionalized	Un-Sectionalized	Metallic casing	Water tightning tape	HST	Integrated protection box (metallic+mechanical)	Mechanical protection box (incl. resin compound)
CSJ-X 170-Basic (SDR)	•				•	•		
CSJ-X 170-Basic+ Metal Casing (CDR)	•			•	•	•		
CSJ-X 170-Basic+ Integrated Protection box (CPE)	•			•		•		
CSJ-X 170-Basic + Metal Casing + Protection box (CJ)	•			•				•
CSJ 170-Basic (SR)		•				•		
CSJ 170-Basic+ Metal Casing (CR)			•	•		•		
CSJ 170-Basic+ Metal Casing + Protection box (C)			•	•				•

## Additional Options

Joint	Type		Internal optical fiber splicing	Optical fiber outlet	PD-sensor
	Sectionalized	Un-Sectionalized			
CSJ-X 170-Basic (SDR)	•				•
CSJ-X 170-Basic + Metal Casing (CDR)	•		•	•	•
CSJ-X 170-Basic + Integrated Protection box (CPE)	•			•	•
CSJ-X 170-Basic + Metal Casing + Protection box (CJ)	•		•	•	•
CSJ 170-Basic (SR)		•			•
CSJ 170-Basic+ Metal Casing (CR)		•	•	•	•
CSJ 170-Basic+ Metal Casing + Protection box (C)		•	•	•	•

# SPEED™ line Joints Range

SPEED™ line Joints:

The following SPEED™ line Joints are available, all based on the same concept:

**SIXTY SPEED™ ( $U_m = 72,5 \text{ kV}$ )**

**≡ SPEED™ LINE 60**

**ONE-TEN SPEED™ ( $U_m = 123 \text{ kV}$ )**

**≡ SPEED™ LINE 110**

**ONE-FIFTY SPEED™ ( $U_m = 170 \text{ kV}$ )**

**≡ SPEED™ LINE 150**

## SIXTY / ONE-TEN / ONE-FIFTY SPEED™ Joint Advantages

The SPEED™ line product Range all have the same advantages:

- One piece pre-moulded joint insulator, factory tested
- Cold shrink design, factory pre-expanded
- Easy to install
- Short installation time
- Maintenance free

# Linking power grid to sustainability

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