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.
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 premoulded 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 CSJ 170 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™**

<table>
<thead>
<tr>
<th>System Voltage (Um)</th>
<th>[kV]</th>
<th>170</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min conductor size</td>
<td>[mm²]</td>
<td>400</td>
</tr>
<tr>
<td>Max conductor size</td>
<td>[mm²]</td>
<td>3000</td>
</tr>
<tr>
<td>Min insulation diameter</td>
<td>[mm]</td>
<td>49 (prepared XLPE)</td>
</tr>
<tr>
<td>Max insulation diameter</td>
<td>[mm]</td>
<td>112 (prepared XLPE)</td>
</tr>
<tr>
<td><strong>Testing:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HVAC routine test</td>
<td>100%</td>
<td>280 kV - 30 min / free of Partial Discharges</td>
</tr>
<tr>
<td>L.I. withstand voltage test</td>
<td>[kV+10/-10]</td>
<td>750</td>
</tr>
<tr>
<td>IEEE: 6 hrs. AC-test</td>
<td>[kV]</td>
<td>232</td>
</tr>
<tr>
<td>IEEE: 15 minute AC</td>
<td>[kV]</td>
<td>280</td>
</tr>
<tr>
<td>Nominal operating current</td>
<td>[A]</td>
<td>limited by cable specification</td>
</tr>
<tr>
<td>Short circuit current* (0,5 sec)</td>
<td>[kA]</td>
<td>63</td>
</tr>
<tr>
<td><strong>Standards:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type Test according</td>
<td>IEC</td>
<td>IEC-60840</td>
</tr>
<tr>
<td></td>
<td>IEEE</td>
<td>IEEE-S404</td>
</tr>
</tbody>
</table>

* 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)

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)

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**Optional components**

On request the following optional parts can be supplied:
- Partial Discharge sensor
- Optical fibers splicing or outlet

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

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

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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

Optional components
On request the following optional parts can be supplied:
- Single core bonding cable connection
- Partial Discharge sensor
- Optical fibers splicing

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

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

<table>
<thead>
<tr>
<th>Conductor [material]</th>
<th>[code]</th>
<th>[type]</th>
<th>connection *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>Al</td>
<td>stranded</td>
<td>Mechanical Connector / MIG weld</td>
</tr>
<tr>
<td>Copper</td>
<td>Cu</td>
<td>stranded milliken</td>
<td>Mechanical Connector / Hexagonal Indent Compression</td>
</tr>
</tbody>
</table>

* 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:

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

* After peeling and polishing the cable insulation surface
** Solutions for cable with bigger outer sheath diameter, available upon request.

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**Technical Table ONE-FIFTY SPEED™**

<table>
<thead>
<tr>
<th>Joint</th>
<th>Type</th>
<th>Outer protection</th>
<th>Additional protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Metallic casing</td>
<td>Water tightening tape</td>
</tr>
<tr>
<td>CSJ-X 170-Basic (SDR)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CSJ-X 170-Basic+ Metal Casing (CDR)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CSJ-X 170-Basic+ Integrated Protection box (CPE)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CSJ-X 170-Basic+ Metal Casing + Protection box (CJ)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CSJ 170-Basic (SR)</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSJ 170-Basic+ Metal Casing (CR)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CSJ 170-Basic+ Metal Casing + Protection box (CJ)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>General code</td>
<td>Sectionalized</td>
<td>Un-Sectionalized</td>
<td>Joint Type</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>CSJ-X 170-Basic (SDR)</td>
<td>•</td>
<td></td>
<td>Internal</td>
</tr>
<tr>
<td>CSJ-X 170-Basic + Metal Casing (CDR)</td>
<td>•</td>
<td>•</td>
<td>Optical</td>
</tr>
<tr>
<td>CSJ-X 170-Basic + Integrated Protection box (CPE)</td>
<td>•</td>
<td>•</td>
<td>PD-sensor</td>
</tr>
<tr>
<td>CSJ-X 170-Basic + Metal Casing + Protection box (CJ)</td>
<td>•</td>
<td>•</td>
<td>Internal optical fiber splicing</td>
</tr>
<tr>
<td>CSJ 170-Basic (SR)</td>
<td>•</td>
<td></td>
<td>Internal</td>
</tr>
<tr>
<td>CSJ 170-Basic+ Metal Casing (CR)</td>
<td>•</td>
<td>•</td>
<td>Optical</td>
</tr>
<tr>
<td>CSJ 170-Basic+ Metal Casing + Protection box (CJ)</td>
<td>•</td>
<td>•</td>
<td>PD-sensor</td>
</tr>
</tbody>
</table>
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

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

SIXTY SPEED™ ($U_m = 72.5$ kV)

ONE-TEN SPEED™ ($U_m = 123$ kV)

ONE-FIFTY SPEED™ ($U_m = 170$ kV)
Linking power grid to sustainability