



# String combiners for solar photovoltaic systems

## Portfolio overview

# String combiners

## Unmatched protection and control

In a photovoltaic system the modules are arranged in strings and fields depending on the type of inverter used, the total power and the technical characteristics of the modules. The connection of modules in series is made on the modules themselves, while the parallel connection of the strings is made inside string boxes that accommodate, along with the interconnection systems, also the overcurrent protection devices, disconnectors and surge protection devices.

### String boxes

The installation of a photovoltaic system often occurs in complex logistic situations, critical from the environmental and time perspective. The availability of tested and certified pre-assembled components allows the installer to avoid unnecessary on site assembly, wiring and certification activities for the string boxes. String boxes enclose functions such as string protection, protection against overvoltage and disconnect, with components suitable for the string's various voltage levels and the number of connected strings.

### Multi-output string boxes

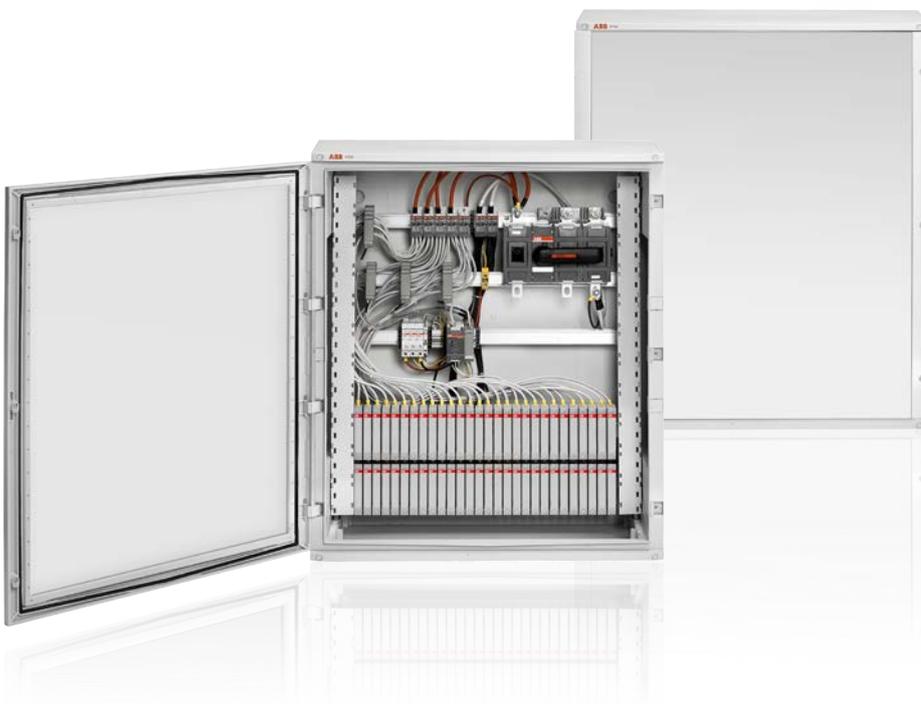
The development and the increasingly frequent adoption of multi-string inverters has made it necessary to reduce the costs and the space occupied by the string boxes, to bring together in a single switchboard the protective devices and disconnectors of multiple strings intended to be connected to a specific inverter input. Multi-string inverters resolve in an easy and cost-effective way system conditions characterized by modules installed in different leaning and exposure positions or minimize the problems related to systematic shading of parts of the system.



The string boxes form subsystems that can be standardized according to the number of strings, voltage and rated current. ABB offers different product ranges, each dedicated to specific installation conditions with typical configurations.

#### String boxes for monitoring

The string monitoring is an important function in running medium and large size installations, since it allows to improve the manufacturability and maintenance of the system. ABB offers a series of pre-wired string boxes for all installation conditions: they are equipped both with devices necessary for string protection, surge protection and disconnection, and with useful devices for string monitoring.

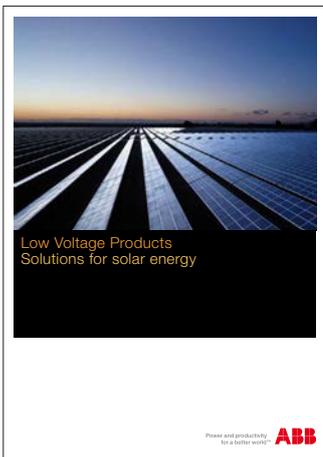


# A complete set of information, a touch away from your fingers

Value added services in combination with products and solutions make ABB offer unique. ABB also provides a wide range of documents and information intended for the renewable energy industry. With services like publications, catalogs, websites, blogs and video tutorials, in digital or printed versions, you can always find a tailor made solution for your requirement and for your applications.

## Catalog

Low-voltage Products.  
Solutions for solar energy



## Panorama

Solar power. Low-voltage solutions for  
a safe and reliable photovoltaic system



A valuable technical resource accompanying the designer during the engineering stage for implementation of a photovoltaic installation, from initial specifications to commissioning. This publication describes in depth the aspects concerning not only the basic architectures, but also the specific components required for engineering, inspection and management of a photovoltaic system, both on the DC and AC sides. In addition to schematics and detailed circuit diagrams, the catalog illustrates the complete offer for ABB photovoltaic applications, ranging from safety assemblies to string combiners and recombiners, through switches, disconnecting switches, panels and accessories.

A streamlined publication intended for installers, which describes the architecture and products for photovoltaic installations by ABB.

Numerous examples are complemented by a practical analysis of the aspects related to system protection and management. In this scenario, ABB is showcasing not only its assemblies, but also a set of pre-assembled “plug & play” solutions conceived to speed up the activity in your installations.

A website gathering all of the digital resources related to low-voltage products for photovoltaic applications. Product specifications, Application Notes, regulatory studies, case studies, social network groups, newsletters... a contribution towards the culture of renewable energies, capitalizing not only the know-how of the experts of our group, but also the expertise of installers and designers who use ABB products worldwide.



**Website**

**Low-voltage products for solar power**

An online resource providing the opportunity to navigate through the wide portfolio of products, system and low-voltage solutions by ABB. A valuable tool for an in-depth analysis of the aspects related to the value of photovoltaic chain, with dedicated contents concerning creation, transmission and distribution of energy in both on-grid and off-grid applications.



**Blog**

**Conversations**

Join the conversation on the current changes in trends and technologies. In this tagged blog you can subscribe the channel dedicated to renewable energies or any thematic channel to ask questions, share your opinions with other users of the community and download documentation concerning solar and wind-power applications.



**Video tutorials**

**Garage Nuggets**

These video tutorials provide the user with a clear and direct approach to the applications of the solar energy industry, taking advantage of a large impact audiovisual communication. Information on installations, products and regulations are offered in a graphically attractive appearance for a quick learning. In Garage Nugget No. 5 and 6 “Multipurpose outdoor enclosures” and “Gemini challenges the sun” the narrating voice describes the ABB product portfolio for photovoltaic market. Specifically, the videos provide a detailed description of Gemini enclosure features, manufactured with techniques and materials conceived to withstand the environmental conditions and safety of photovoltaic systems, both outdoor and indoor.



**GEMINI challenges the sun.**

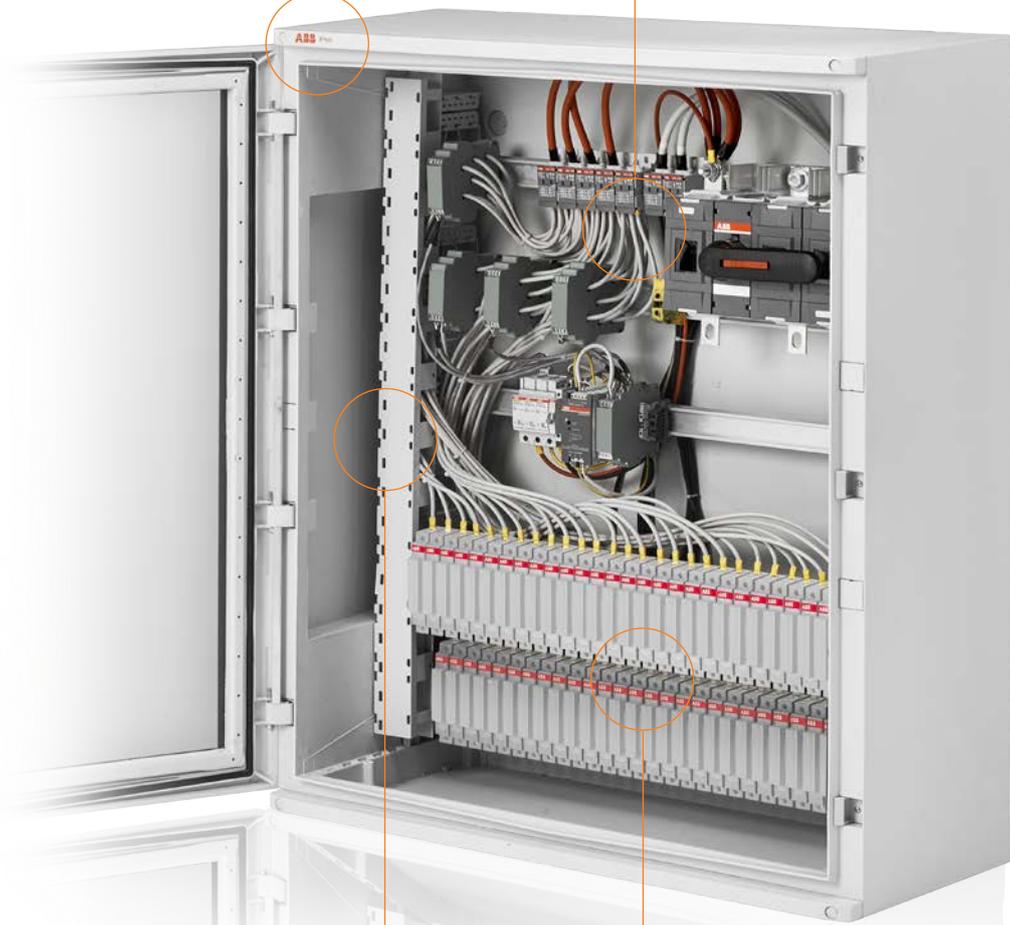


**Multipurpose outdoor enclosures.**

# String combiner Range plus

IP66 enclosures for extreme outdoor conditions resistant to atmospheric conditions and dusty environments. Thermoplastic material, 100% recyclable make it environmentally friendly

Components selected for protection are based on best in class photovoltaic products (OTDC Disconnectors, OVR PV SPDs, E 90 PV Fuse Holders, Gemini thermoplastic outdoor enclosures).



Efficient design enabling to have configurations from 1 to 32 strings in a single enclosure, making it easy for logistics and installation at site.

IP20 protection of components inside the combiner - No live parts are accessible directly inside the combiners ensuring safety of the installers.

## Design, production, quality and service

An essential factor in determining the success of a photovoltaic system is the accurate selection of its components, with particular attention to connections, and protections from the modules to the inverters.

As the photovoltaic system has to perform for more than 20 years in harsh environments, the products used should be considered of high quality and as a good investment for long lasting performance.

The string combiners are particularly important as they are usually installed under the photovoltaic panels and therefore exposed to the most harsh environment.

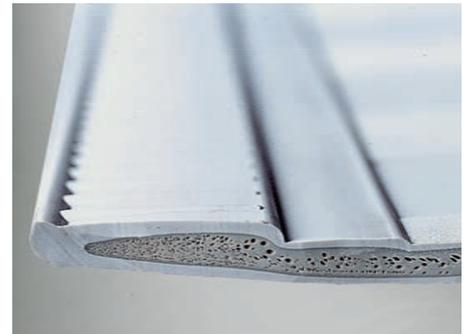
- ABB combiners host ABB components specifically made for photovoltaic applications, making it easy during maintenance to rely on one single producer and supplier, from components to the whole system.
- Capacity to deliver all over the world at your site.
- Comprehensive documentation for easy assembly at site.
- Service and support through ABB local sales organization worldwide.



Complete range to address the requirements in residential, commercial and utility scale projects in 1000V DC and 1500V DC applications.



To meet the demands of extreme climatic conditions up to 50 °C.



Thermoplastic manufactured with co-injection technique ensuring highest sturdiness but very lite in total weight as compared to metal enclosures.



Development and assembly process in accordance to the latest IEC Standards.



100% quality Inspection before dispatch, ensuring highest level of reliability.



String combiner box with monitoring options. Available with monitoring of current, voltage, temperature and status of disconnectors and/or surge protection devices. Communication over RS485 ensuring easy integration with the plant / inverter monitoring systems.

# String combiner 1000V DC

## Technical features

<b>String combiner type</b>	<b>1 st.</b>	<b>2 st.</b>	<b>3 st.</b>	<b>4 st.</b>	<b>6 st.</b>	<b>8 st.</b>	<b>10 st.</b>	<b>12 st.</b>	<b>14 st.</b>	<b>16 st.</b>	<b>18 st.</b>	<b>20 st.</b>	<b>24 st.</b>	<b>28 st.</b>	<b>32 st.</b>
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### General Data

Maximum Voltage	1000VDC														
No of DC Input (+ & -, optional)	1	2	3	4	6	8	10	12	14	16	18	20	24	28	32
SPD protection	Type 2 Pluggable														
String protection	No			Per each incoming string											
Monitoring	No									Optional					
Monitoring Parameters	No									Current, temperature and SPD signal as standard. Optional to include Voltage and Disconnecter signal					
Communication Protocol	No									Modbus RTU					

### Enclosure Type

Model	Europa				Gemini										
Material Type	Thermoplastic														
Door Type/ Opening	Transparent, Hinged Door						Opaque, Hinged Door openable 180 Deg								
Lock Type	Click on push to lock						Doors supplied with 2 standard double bit locks (3 for sizes 5 and 6)								
Rated Service Voltage	1000VDC														
Degree of resistance to impacts	IK 10														
Degree of protection	IP65						IP66								
Recyclable	100%														

### Environmental data

Operating Temperature °C	-20°C upto +50°C														
Storage temperature °C	-20°C upto +60°C														
Resistance to Abnormal heat and fire	upto 750°C														
Height above Sea level	Up to 2000m														
Humidity	up to 95%														

### DC Input

Input Cable entry	M16 Cable Gland, 2,5 - 16 mm <sup>2</sup>														
Input Connection	Terminals				Directly on the Fuse Holder										
Fuse Type	No fuse				Cylindrical 10x38 gPV										
Fuse Size					15A										

### DC Output

Output Cable gland +/-	M16	M16	M16	M16	M25	M25	M25	M32	M32	M32	M32	M40	M40	M40	M40
Clamping cable diameter (m <sup>2</sup> )	2,5-16				25-50			70-120				150-240			
Conductor material	Copper/Alluminium														
Terminal Type	Pipe terminal							Ring Terminal							
Voltage DC	1000VDC														
Maximun current output	10A	20A	30A	40A	60A	80A	100A	120A	140A	160A	180A	200A	240A	280A	320A

# String combiner 1500V DC

## Technical features

String combiner type	16 st.	18 st.	20 st.	24 st.	28 st.	32 st.
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### General Data

Maximum Voltage (VDC)	1500					
No of DC Input	16	18	20	24	28	32
DC input for + & -	Optional available					-
SPD protection	Type 2 Pluggable					
Monitoring	Optional					-
Monitoring Parameters	Current, temperature and SPD signal as standard. Optional to include Voltage and Disconnecter signal					-
Communication Protocol	Modbus RTU					-

### Enclosure Type

Model	Gemini					
Material Type	Thermoplastic					
Door Type/ Opening	Opaque, Hinged Door openable 180 Deg					
Lock Type	Doors supplied with 2 standard double bit locks (3 for sizes 5 and 6)					
Rated Service Voltage	1500VDC					
Degree of resistance to impacts	IK10					
Degree of protection	IP66					
Recyclable	100%					

### Environmental data

Operating Temperature °C	-20°C upto +50°C					
Storage temperature °C	-20°C upto +60°C					
Resistance to Abnormal heat and fire	upto 750°C					
Height above Sea level	Up to 2000m					
Humidity	up to 95%					

### DC Input

Input Cable entry	M16 Cable Gland, 2,5 - 16 mm <sup>2</sup>					
Input Connection	Directly on the Fuse Holder					
Fuse Type	Cylindrical 10x85 gPV					
Fuse Size (A)	15					

### DC Output

Output Cable gland	M32	M32	M40	M40	M40	M40
Clamping area	70-120		150-240			
Conductor material	Copper/Aluminium					
Terminal Type	Ring Terminal					
Voltage DC	1500					
Maximum Current Output (A)	160A	180A	200A	240A	280A	320A



Main catalog:  
String combiners for solar photovoltaic systems.  
A plug & play solution for photovoltaic solar installations

Cod. 1SLC009000D0201

# Contact us

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1SLC009000B0201 - 1/2016

