

Derwent
Top 100
Global
Innovator
2020

Susol Super Solution

PV Combiner Box

Photovoltaic Combiner Box

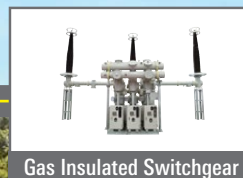
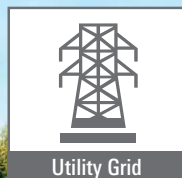


LS ELECTRIC

Your total solution provider

LS, who launched the PV business in 1986 for the first time in Korea, has been offering various power generation systems such as home, industrial, and floating PV.

We give optimized solutions and benefits to achieve the best power generation efficiencies of our customers based on expertise and lengthy experience over 30 years in the photovoltaics industry with top-class power electronic technological prowess and our global presence.

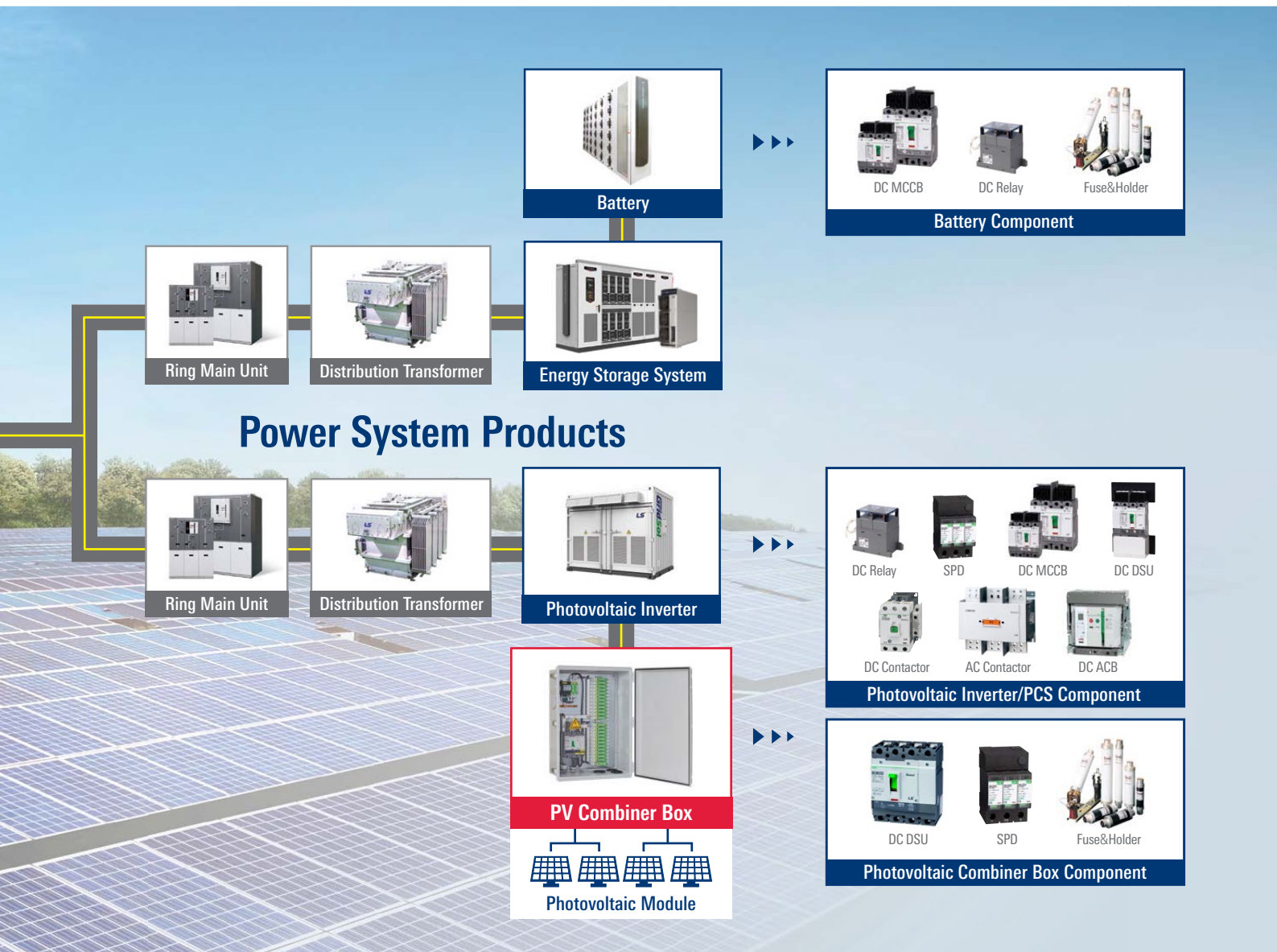


PV Combiner Box

Japan's First and Largest Mega Solar Project

In 2009, LS entered the Japan's photovoltaics market for the first time by Korean companies. Based on its accumulated project experiences and technological reliability, it established Japan's largest 40MW Mito New Town mega solar power station in Ibaraki Prefecture (2014), Japan's first 39MW solar power station with ESS in Chitose, Hokkaido (2017), and the 18MW Hanamizuki mega solar power station in Ishikawa Prefecture (2019). Based on its global-level technological prowess in the smart energy sector and EPC capabilities, LS has been recognized for its know-how not only in supply of solutions but also with respect to construction, operation and maintenance of power plants.





World's Largest DC Island Project

With KEPCO, LS established the largest DC island in the world in Seogeocho-do, Jindo-gun, Jeollanam-do, Korea (2019). Through this project, the new renewable energy system that generates direct current such as photostatic power generation can be directly linked to the energy storage system and other facilities used battery. This in turn reduced the process of power conversion such as necessary ransformers in the existing AC power supply and improved energy efficiencies and miniaturized power supply facilities.

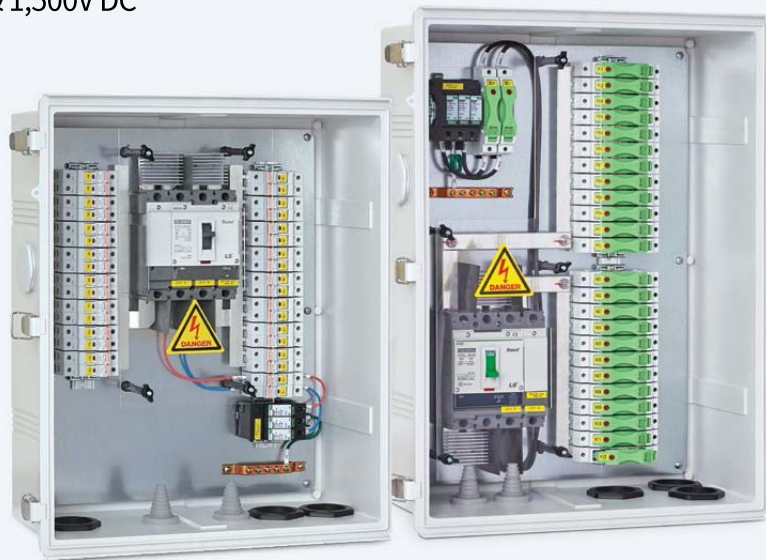
LS is leading the new energy projects in the DC distribution field, which is at the initial stage in the global market.



Optimized performance for PV systems

String combiners that protect and enhance the performance of PV systems for 1,000V & 1,500V DC

Applying accurate components is necessary to photovoltaic systems. The photovoltaic systems are expected to perform for more than 20 years, so the reliability and quality of the products should be considered for long service life with optimum performance. Cost-efficiency is also an important factor from the point of view of profitability in the PV business investment. As developed based on customers' needs, LS's PV combiner boxes provide optimum connections and protections from the modules to the inverters.



High reliability & safety

- Designed in accordance to the latest IEC Standards.
- All necessary protections included to guarantee the right protection of the system.
- Tough laboratory tests to ensure a long service life under operational conditions. Also, each unit is inspected before dispatch for assuring highest level of quality.
- LS's experience and know-how are applied to the product to achieve optimum performance

Ready for 1,000V and 1,500V

- LS combiner boxes are available for both 1000V DC and 1500V DC architectures in commercial and utility scale projects.

Cost-efficient design & easy installation

- LS provides reliable and economical combiner boxes based on customers needs. Our cost efficient products can reduce the TCO in each project.
- All the combiner boxes are ready to connect and easy to wire in the field for saving time and money of the customers.
- Push in connectors to reduce installation and commissioning time by a half
- Push in connectors to allow fast and secure connection of strings

Convenient maintenance

- LS combiner boxes are designed thinking always in the customer. Even to help in maintenance tasks after some years of installation in the field.

Adopted LS components

- LS components are applied for accurate operation and optimization of the solution.
- All the components of LS are comply with the applicable standards.

Specifications

Combiner type		DC 1000V	DC 1500V
General data			
Rated DC voltage		≤ 1,000V DC	≤ 1,500V DC
Inputs		12, 16, 20	12, 16, 20
Outputs		1-2	
Input connectors		WM4C connectors or cable glands	
Input connector technology		Push in connectors (up to 16mm² cable)	
DC earthing system		Floating, negative grounded or positive grounded	
Monitoring		No	
Main electrical current protection			
Rated DC current per input		≤ 25 Amps (single or double string connection)	
Maximum fuse size		≤ 32 Amps	
Protection against overcurrent		PV fuse-links according to IEC 60269	
Fuses		Both poles or one pole fuses	
Switch disconnector breaking & making capacity (IEC 60947-3)		≤ 500A (other options under demand)	
Surge protections			
Surge protection device		Type II	
Auxiliary contacts		AL	
Enclosure			
Enclosure material		PC (Poly carbonate)	
Door Type		Opaque, hinged door	
Enclosure dimensions (W x H x D)	12CH	530 x 630 x 255 mm	530 x 730 x 255 mm
	16/20CH		630 x 830 x 285 mm
Enclosure fixing system		Wall mounted	
Degree of protection		IP65	
Degree of resistance to impacts		IK07/08	
Environmental data			
Operating temperature		-20°C ~ +50°C	
Height above Sea level		≤ 1,000m	
Humidity		≤ 95%	
Standard		IEC 61439-1&2	

Features

Lightning and surge protection

LS's surge protective devices are developed and certified based on international standards, so they ensure a high level of quality reliability.

Gore PolyVent

By increasing the ventilation of the combiner box, Poly Vent maintains the pressure balance of internal and external, and prevents deformation of the enclosure. It also maximizes the capabilities and longevity of internal components by minimizing condensation.

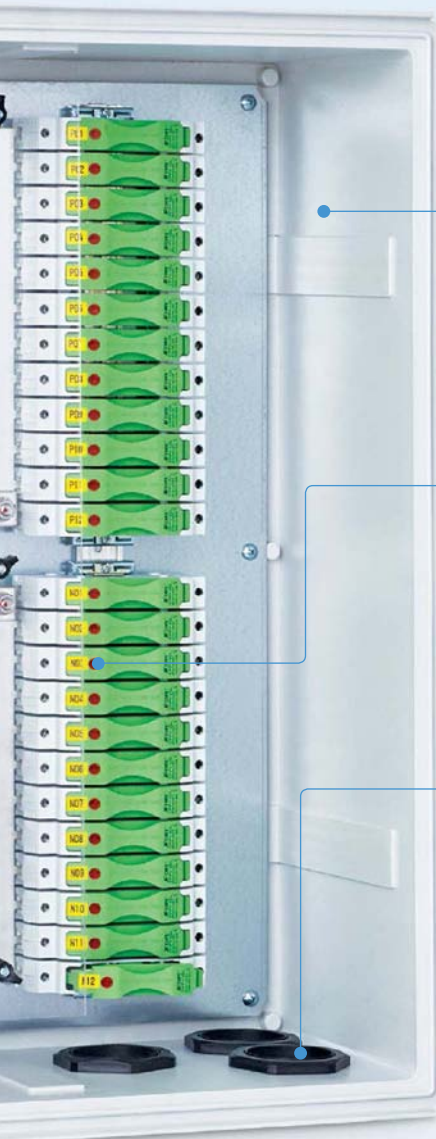
Switch-disconnector

LS's switch-disconnectors are developed and certified based on international standards, so they ensure a high level of quality reliability.



Type Designation

LS	PV	-	DC	10	-	12	
Company Name	Product Name		Voltage Type	Rated Voltage		String Channel	
LS	Photovoltaic Combiner Box		DC	10	1000V	12	12CH
			DC	15	1500V	16	16CH
						20	20CH



IP65 enclosure

IP tests in a laboratory ensure the reliability of our product and guarantee the resistance of our product to harsh conditions and environments.

Fuse & Fuse holder

The system and peripherals are protected with fuses installed on the positive and negative side of each string. And you can check the condition of fuses with LED status indicator.

Cable entry

A wide range of cables can be easily mounted. In addition, it is possible to apply fireproof materials and to seal with high level of protection grade(IP66).

F	P	-	L	W	-	N
Internal Connection	Enclosure Material		Door Open	Enclosure Fixing System		Monitoring
F Fuse	P Poly Carbonate		L Left/Right	W Wall mounted		N Non-monitoring
			U Up/Down			

Switch-disconnectors



Characteristics

- Applications such as photovoltaic(PV) power generation, UPS and data center
- Compact size implemented
- Maximum breaking capacity
- Nominal voltage ranges up to 1000/1500Vdc

Rating

AF		250AF
Type		NA-Type
Model		TSD250NA
Pole		4P
Rated current, In		200, 250A
Rated operational voltage, Ue		DC 1500V
Rated insulation voltage, Ui		DC 1500V
Rated impulse withstand voltage, Uimp		8kV
Rated short-circuit breaking capacity, Icu		Icw* 3kA, Icm** 3kA
Category		A
Life cycle (time)	Mechanical	10,000
	Electrical	2,000
Dimension (W×H×D, mm)		140×170×92
Standards		IEC/EN60947-2 & GB14048.2
Certification		CCC, CB

* Icw: Rated short-circuit withstand current(kA), 1s

** Icm: Rated short-circuit making capacity(kA)

Surge protective devices _ BK Series (DC/DIN type)



Characteristics

- DC system surge voltage protection
- Rating : ~ DC 1500V
- Pole : 3P
- Grades : Class II
- Status indication
 - Steady state : Green
 - After the accident : colorless (black)

Rating

Type	DC Type	
	BK20S-DC1000	BK20S-DC1500
Number of poles	3P	
Rated voltages, Un	DC 1000V	DC 1500V
Max. continued-operation voltage, Uc	DC 1200V	DC 1500V
Voltage protection level, Up	≤ 3.9kV	≤ 4.5kV
Nominal discharge current, In	20kA	20kA
Max. discharge current, Imax	40kA	40kA
Grades (Test Class)	Class II	
Reaction time	< 25ns	
Status indication	Have status indication	
Operating temperature range	-40°C ~ 80°C	
Cross-sectional area of the connecting	6mm ² or more	
Accessories	AL <small>Note1)</small>	
Standard	IEC 61643-11 / UL1449	
Certification	CE, UL	CE

Note 1) The AL contact accessories are not sold separately.
You need to choose these accessories when you place your order for the product.
Please be mindful of this fact when you place your order.

Quality & Service

World best quality and service!

We satisfy global customers by providing differentiated values.

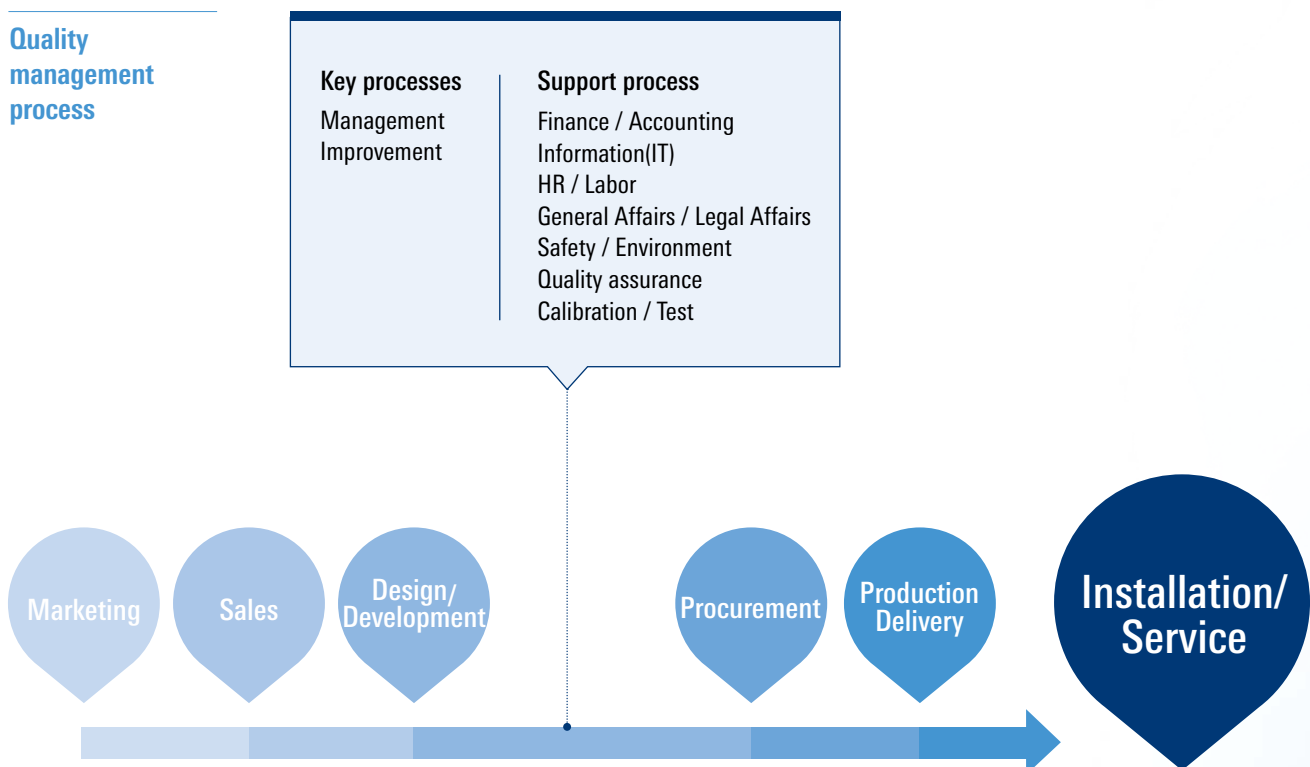
Quality management system

The quality management system of LS was established by incorporating the requirements of ISO 9001 (1993-), ISO14001(1996-), K-OHSMS(2008-), and TS16949(2010-), related laws and regulations, customer and market demands, and requirements identified in business operations. Product planning, development, manufacturing, and services have all been identified as key processes for delivering value to customers. Infrastructure such as IT systems and facilities as well as management and support processes have also been added to the system to ensure efficient operations. This system has been applied to all domestic and overseas worksites to improve performance.

Quality management that meets the global standard

The quality management system in the production sites is the most important part to take a leap forward to become a leading company. LS is enhancing customer satisfaction by performing verifications of various on-site conditions and comparative tests with competing products, etc. and producing high-quality products pursuant to the operation of R&D test laboratories. LS's such quality management activities are leading to the acquisition of various certifications and awards and building a foundation to realize the quality of global standard that can compete in the overseas market.

Quality management process



LS is enhancing customer satisfaction by performing verifications of various on-site conditions and comparative tests with competing products, etc. through the operation of R&D test laboratories and producing high-quality products.

Power Testing & Technology Institute

Equipped with short circuit testing facility of 2,000MVA capacity (first in the Korean private sector), high voltage testing facility, and reliability testing facility, LS offers a global top class testing and evaluation services as a KOLAS(Korea Laboratory Accreditation Scheme) accredited testing laboratory. Moreover, through strategic partnerships with overseas accredited testing laboratories including the UL(US safety standard), CE (EU certificate), ASTA (UK), KEMA (the Netherlands), and CESI (Italy), its test and evaluation reports are mutually recognized – rendering it as a testing laboratory center with global recognition and trust.

Types of tests

Power Test

- Mechanical and electrical performance of electrical power equipment
- Dielectric test, continuous current test and general characteristic test on high and low voltage switchgears
- Evaluation of the load current switching, mechanical operation, temperature-rise, dielectric and short-circuit making and breaking performance of low-voltage power equipment

Reliability Test

- Evaluation of the product's durability by generating a variety of excessive noises such as the radiation noise of walkie-talkies and mobile phones, electrostatic discharge and surges
- Simulation tests of weather conditions, vibration and impact, etc. to evaluate the reliability of the product

Renewable Energy Test

- Performance evaluation of protective relay and measuring instruments
- Tests related to the characteristics, environment and loads of products mounted on an electric vehicle
- Performance evaluation of energy storage systems





Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



- According to The WEEE Directive, please do not discard the device with your household waste.



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Technical Question or After-sales Service

Customer Center-Quick Responsive
Service, Excellent technical support

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