

Top 100
Global
Innovator
for 10 years

Susol

PV COMBINER BOX

Photovoltaic Combiner Box

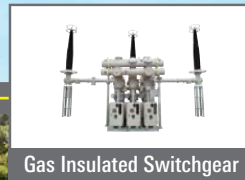
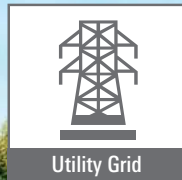


LS ELECTRIC

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.

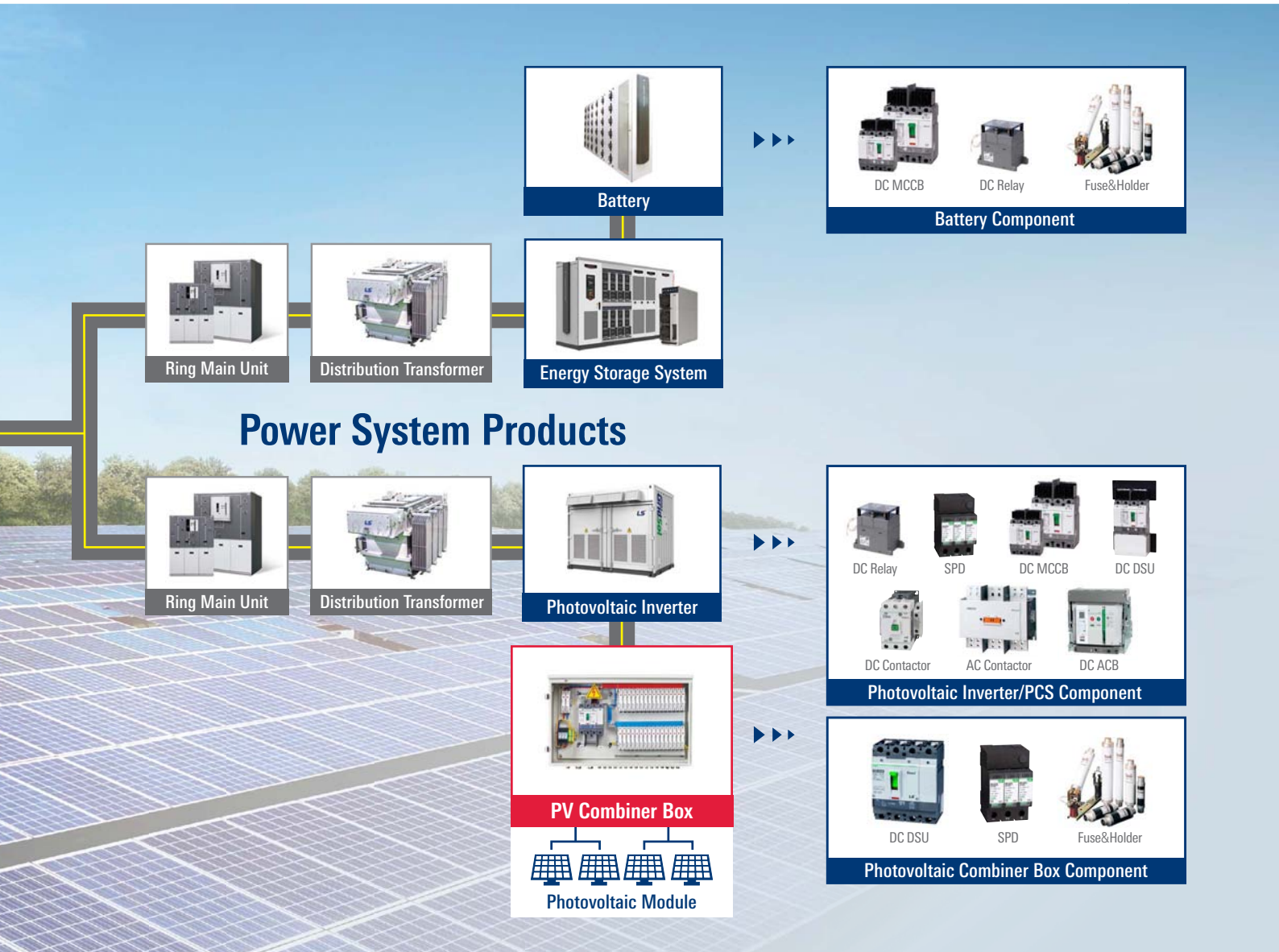


PV Combiner Box

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 and safety.

- The enclosure was made of metal (SS304) to increase durability.
- It is designed based on the latest IEC standards and has been certified as CB. (CB/CE 61439-1/2)
- All components are powered by LS Electric, which has been proven reliable.
- In order to secure reliability, it was tested under stricter conditions than the solar power plant usage environment.

Optimized for solar power plants.

- Since it is usually installed under the frame, it is designed to be less than 500mm in height and less than 200mm in depth.
- Although it is a non-communication type, it is easy to maintain because you can visually check the presence or absence of failure by applying FUSE/FUSE FOLDER with lamps.
- ALL components are purchasable separately.
- Both DC1500V/DC1000V can respond 12ch/16ch.
- The sun cover type has a heat dissipation structure considering direct sunlight and can be safely installed even on the roof.

Specifications

Combiner		DC 1000V	DC 1500V
General data			
Rated DC voltage		≤ 1,000V DC	≤ 1,500V DC
Inputs		12, 16	12, 16
Outputs		1-2	
Input connectors		Cable glands	
DC earthing system		Floating, negative grounded or positive grounded	
Monitoring		No	
Main electrical current protection			
Rated DC current per input		≤ 25Amps (single or double string connection)	
Maximum fuse size		≤ 35Amps	
Protection against overcurrent		PV fuse-link according to IEC 60269	
Fuses		Both poles or one pole fuses	
Switch disconnecter breaking & making capacity (IEC 60947-3)		≤ 500A (other option under demand)	
Surge protections			
Surge protection device		Type 2	
Auciliary contacts		AL	
Enclosure			
Enclosure material		SS304 (Painting 5Y 7/1)	
Sun cover material		55% Al-Zn hot-dip coated steel (Painting 5Y 7/1)	
Door type		Opaque, hinged door	
Enclosure dimensions(W×H×D), mm	12CH	700×500×200(240 [*])	700×500×200(240 [*])
	16CH	800×500×200(240 [*])	800×500×200(240 [*])
Enclosure fixing system		Wall mounted/ Roof mounted [*]	
Degree of protection		IP65	
Degree of resistance to impacts		IK07/08	
Enviromental data			
Operating temperature		-20°C ~ +50°C	
Height above Sea level		≤ 1,000m	
Humidity		≤ 95%	
Standard		CB/CE 61439-1&2	

^{*} Sun cover type

Features

Common

PolyVent

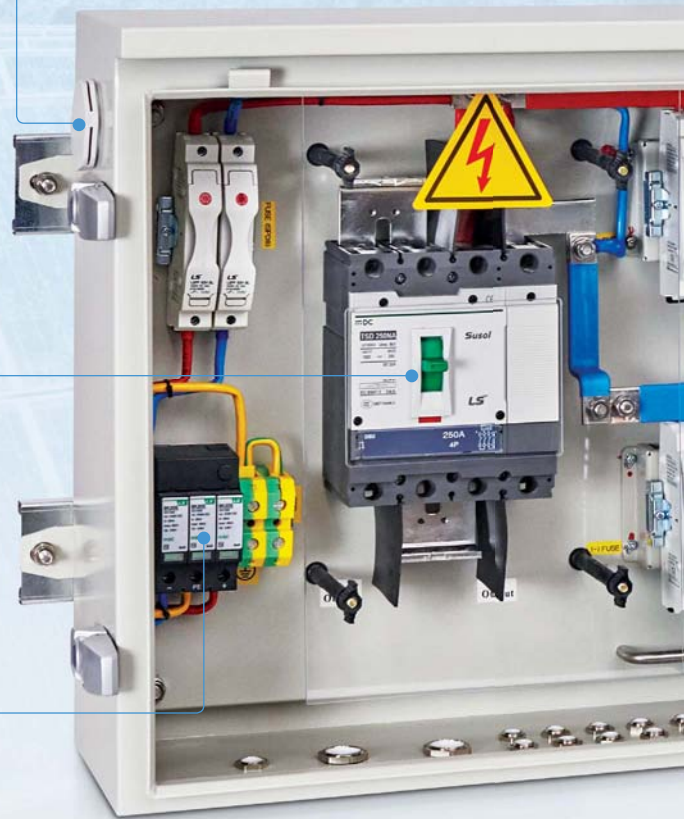
By increasing the ventilation of the combiner box, Poly Vent maintains the pressure balance of internal and external, and prevents deformation of the enclosure. It also maximizes the capabilities and longevity of internal components by minimizing condensation.

Switch-disconnector

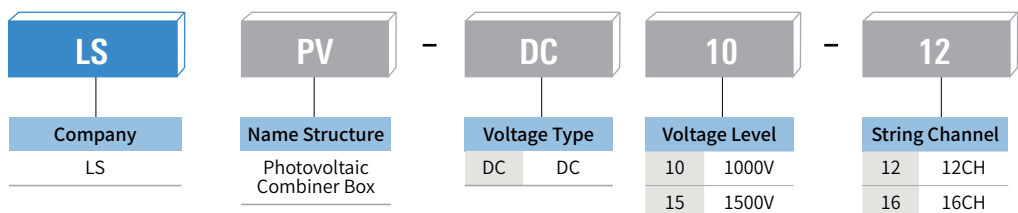
LS's switch-disconnectors are developed and certified based on international standards, so they ensure a high level of quality reliability.

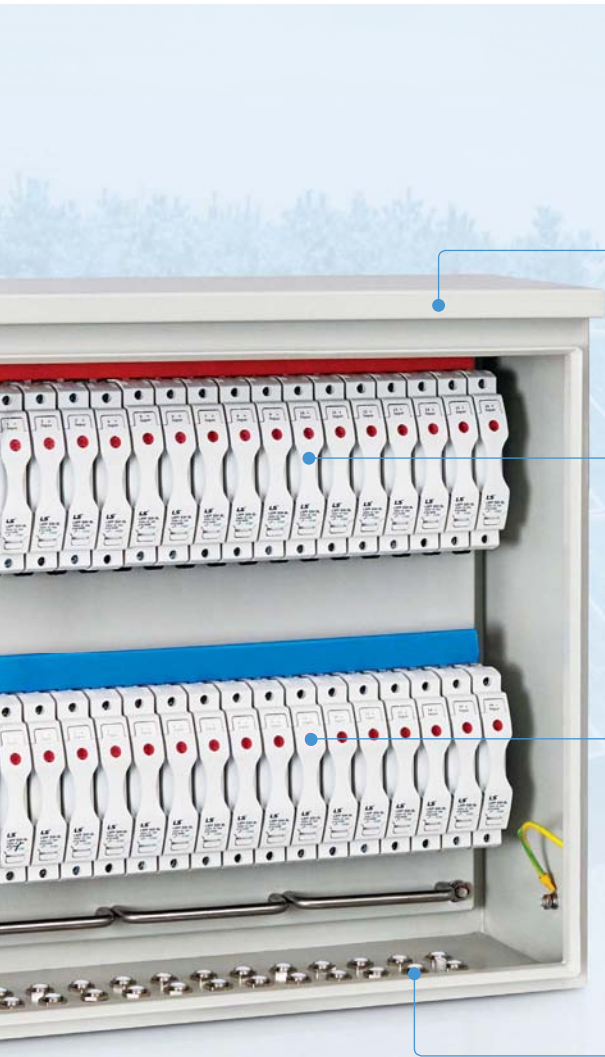
Lightning and surge protection

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



Type Designation





IP65 enclosure

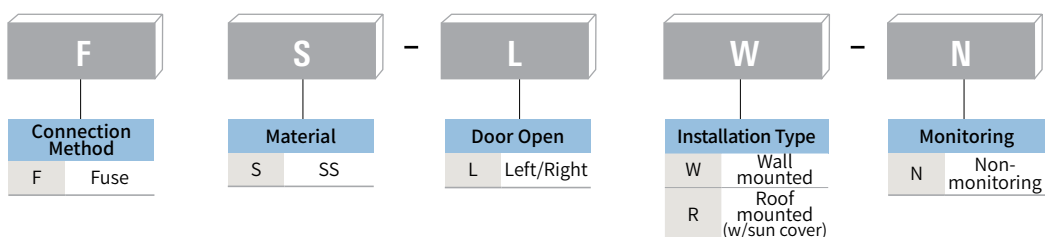
IP tests in a laboratory ensure the reliability of our product and guarantee the resistance of our product to harsh conditions and environments.

Fuse and 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 gland

It is equipped with cables of various diameters and can be sealed with flame retardant and high level of protection grade (IP66).



Features

Sun cover type

IP65 sealing

The sealing function between sun cover and combiner box is always maintained to ensure IP65 performance.

Gap for cooling

Cooling effect by air convection due to the gap between sun cover and combiner box.





Sun cover

High Solar Reflectance(SR)

Even under direct sunlight, higher solar reflectance suppresses the temperature rise inside the combiner box.

Material	Solar Reflectance(SR)
55% Al-Zn hot-dip coated steel	70 ~ 75%
Zinc coated steel	30 ~ 40%
Color coated steel(Silver series)	50 ~ 60%

High corrosion resistance

Corrosion resistance is 3 to 6 times better than coated steel with the same coating thickness.

High heat resistance

Even at high temperature of 315°C, it can be used for a long time without surface discoloration or oxidation.

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
Life cycle (time)	Mechanical	10,000
	Electrical	1,000
Dimension (W×H×D, mm)		140×170×92
Standards		IEC60947-3 & GB/T14048.3
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)

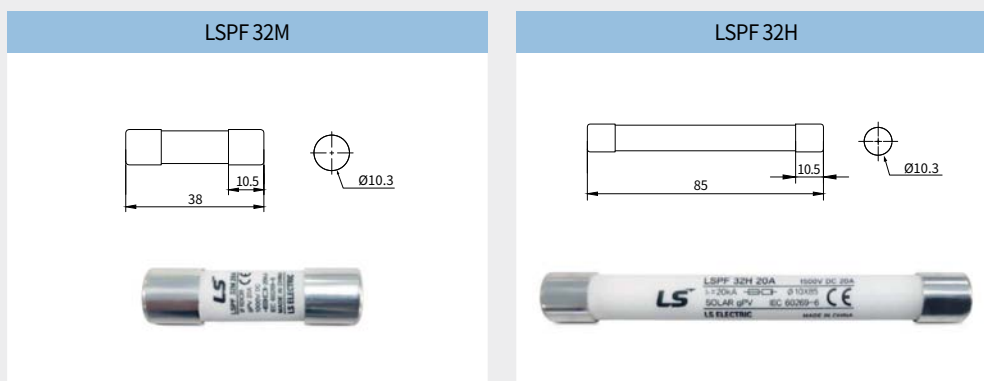
Rating

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 2	
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 ^{Note1)}	
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.

Fuse and Fuse Holder

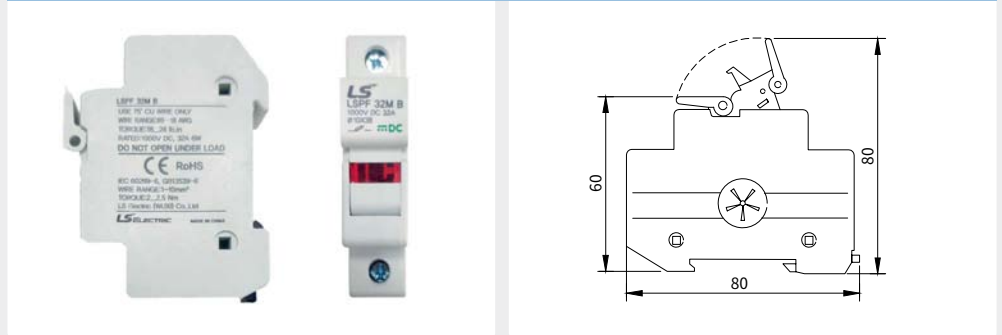
Fuse rating



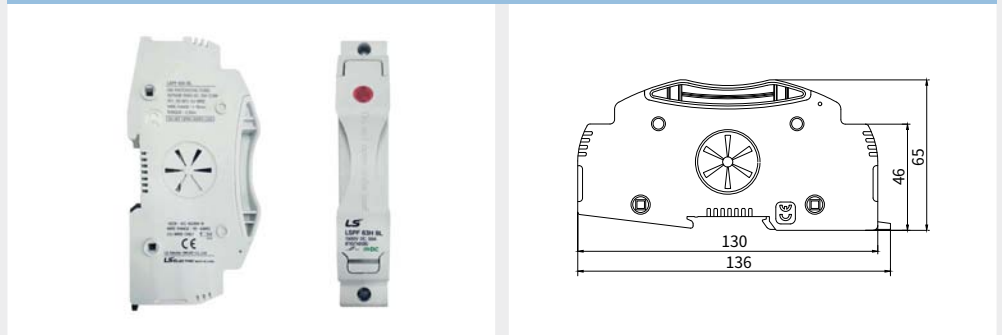
Type	Fuse	
Model	LSPF32M	LSPF32H
Rated Voltage	DC 1000V	DC 1500V
Rated Current	2A ~ 32A	2A ~ 32A
Class of Operation	gPV	gPV
Breaking Capacity	20kA	20kA
Time Constant	1 ~ 3ms	1 ~ 3ms
Size(mm)	10×38 mm	10×85 mm
Standard	IEC 60269-6	IEC 60269-6
Certificate	CE	CE

Fuse Holder rating

LSPF 32M B



LSPF 63H BL



Type	Fuse Holder	
Model	LSPF32M B	LSPF63H BL
Rated Voltage	DC 1000V	DC 1500V
Rated Current	32A	50A
Class of Operation	gPV	gPV
Signal Indicator	LED	LED
Wire Range	1 ~ 10 mm ²	1 ~ 16 mm ²
Torque	2~2.5 N.m	2.5 N.m
Size(WxHxD, mm)	18×80×60 mm	24×136×65 mm
Standard	IEC 60269-6	IEC 60269-6
Certificate	CE	CE

Quality & Service

World best quality and service!
 We satisfy global customers by providing differentiated values.

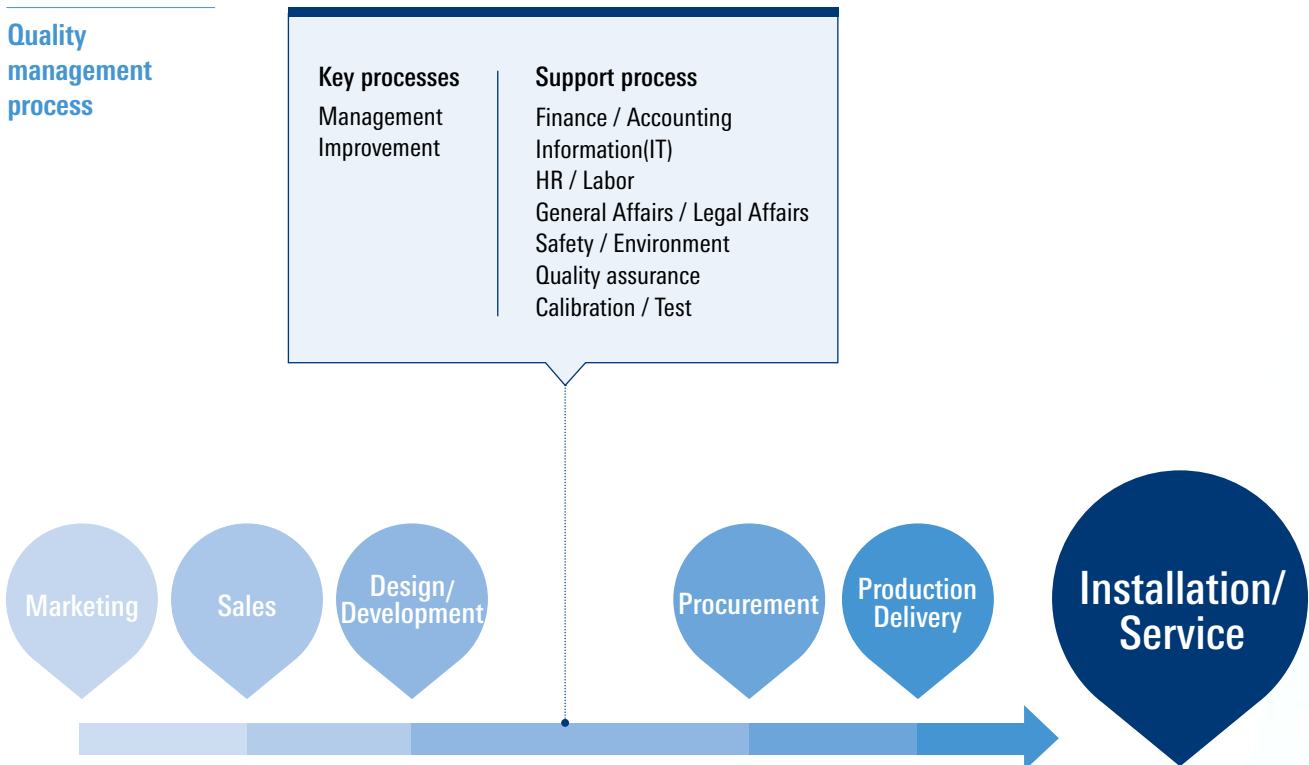
Quality management system

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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