Top 100
Global
Innovator
10년 연속 선정

VOLTAGE SAG PROTECTOR

LS ELECTRIC

Compensate for the voltage sag and perform multiple monitoring functions with single unit

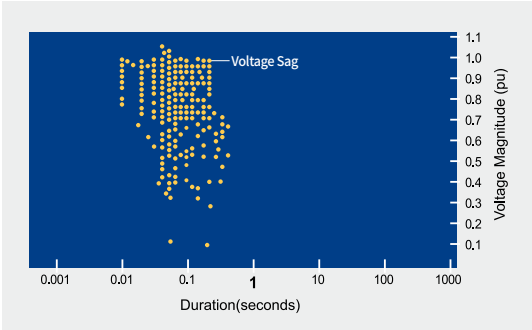
VOLTAGE SAG PROTECTOR

The most common accident in KEPCO's 345kV and 154kV lines is the voltage sag, which does not last for even a second. However, because of this short-lived power failure, production lines may be forced to stop The sag protector protects the loads and the equipment through the high-speed switching, which kicks in 2ms or less, from a 15% voltage sag to a 100% power failure.
The history of the accidents can be checked through the monitor mounted on the equipment. The equipment can also be monitored remotely through Ethernet, USB, RS-485, or other communication features. Also, the equipment uses the Ultra-Capacitor instead of a battery, removing the need for a cooling fan and making it easy and cheaper to maintain.

Contents

Do not be afraid of voltage sags any more

The LSTSP keeps the load equipment going even during a power failure of one second.



Voltage sag event

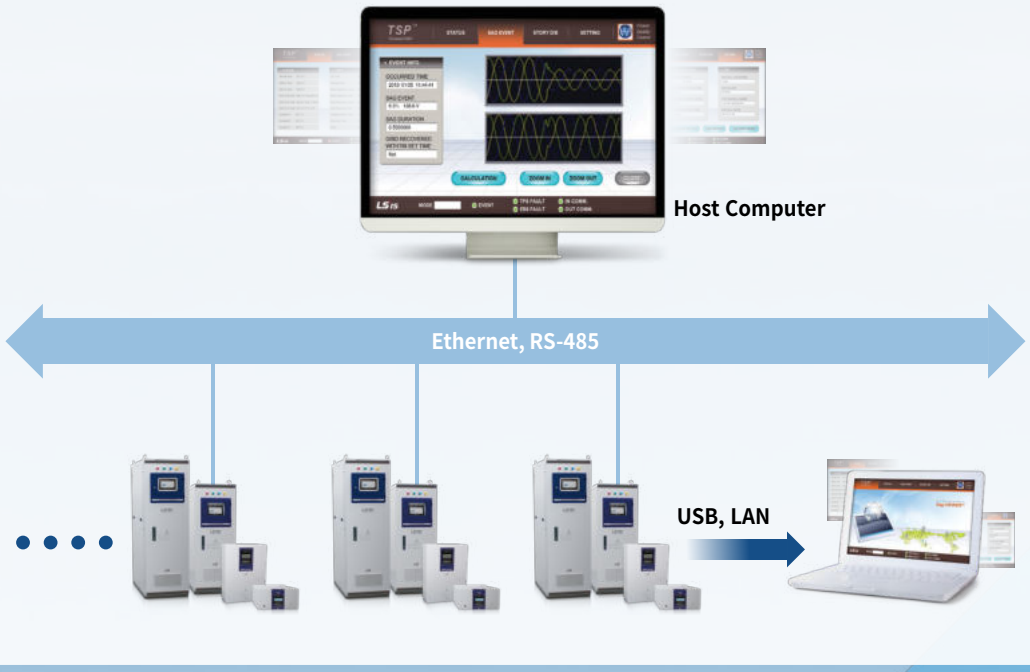
Do not be afraid of voltage sags any more

Voltage sag accident occurrence

KEPCO's 345kV and 154kV

The most common accident in KEPCO's 345kV and 154kV lines is the voltage sag, which does not last for even a second. Therefore, the compensation for one second of power failure is rational.

LSTSP communication feature



Unit monitoring feature

• Can monitor each unit through the dedicated HMI.

Sag event information provision

• **Event information**: Date, hour, and minute of the occurrence, duration, Sag level (rms/p.u.), system recovery status, compensation success/failure

• **Wave form information**: Wave form of the voltage and the current, load voltage wave form (including two cycles before and after the sag occurrence)

• **Provision of the user sag data**: Direct connection method (USB, LAN), remote access method (Ethernet, RS-485)

Event management through the Sag-Viewer

• **1 page report**: Shows the wave forms of the voltage at the power source and the load voltage in a single screen (zoom in/out available)

• **Comprehensive report**: Analysis of the sag occurrence information over a longer period of time (Criteria: SEMI-F47, CBEMA, ITIC, IEC-61000-4-11, Power Vaccine Curve)

• **Settings**: Location of installation and the installer

VOLTAGE SAG PROTECTOR

For compensating AC 3-phase power sources No-battery voltage-sag compensator

One-stop solution

- Compensate and monitor voltage sags with a single unit
- Free Sag-VIEWER Monitoring S/W

High performance

- Non-interruption, high speed switching within 2ms
- Compensation for power failures through the parallel compensation method
- Low stand-by power for the Off-Line compensation
- Pure Sine Waveform Output
- 7" TFT LCD HMI Monitor
- More resistant against over-current or over-voltage
- Inrush current limiting and stabilizing functions
- Noise filtering function expanded
- CE certified
- Various communication modes supported, including Ethernet, USB, and RS-485, etc.
- Automatic emergency By-Pass Switch (option)
- Patented technology
- CE (K5476/L13,TUV)

Highly efficient and environmentally-friendly

- No Battery
- No Cooling FAN
- No Maintenances

Cost-effective

- Ultra-Capacitor that lasts 15 years
- No additional equipment necessary
- A remarkable 98% efficiency, resulting in a low stand by power consumption

Key Applications

- Semi-conductors
- Display
- PCB
- Steel making
- Paper making
- Chemical
- Tire
- Auto-mobile
- Communication
- Textile
- Medical service

Model Number and Ordering

AC Single phase

AC 1-phase

Rated voltage [V]	
1	110
8	208
2	220

Capacity [kVA]	
005	0.5 Note1)
010	1
020	2
030	3
050	5 Note2)
100	10

Note1) Wall mount type only
Note2) Stand type only

Product type	
S	Stand
W	Wall mount
T	Tower Note3)

Note3) 10kVA modle only

AC 3 - phase

Phase / wiring	
33	AC 3P 3W
34	AC 3P 4W

Rated voltage [V]	
8	208
2	220
3	280
4	440

Capacity [kVA]	
005	5
010	10
020	20
030	30
050	50
080	80
100	100
150	150
200	200

ETS Single phase

AC 1-phase

Rated voltage [V]	
1	110
8	208
2	220

Capacity [kVA]	
005	0.5 Note1)
010	1
020	2
030	3
050	5 Note2)
100	10

Note1) Wall mount type only
Note2) Stand type only

Product type	
S	Stand
W	Wall mount

Only applicable to single phase

ETS 3 - phase

AC 3-phase	
33	AC 3P 3W
34	AC 3P 4W

Rated voltage [V]	
8	208
2	220
3	280
4	440

Capacity [kVA]	
005	5
010	10
020	20
030	30
050	50

AC single phase (Stand Type, Wall Mount Type)

Model list

AC Single phase (Stand Type)

Type		LSTSP-1V010	LSTSP-1V020	LSTSP-1V030	LSTSP-1V050	LSTSP-1V100
Capacity	[kVA]	1	2	3	5	10
Frequency	[Hz]	50/60Hz±5Hz, Auto Detection				
Rated Voltage	[V]	AC 110V±10% / 208V±10% / 220V±10%				
Size W×H×D	[mm]	320×160×440	400×200×480		430×530×280	
Weight	[kg]	18	27	31	44	48

AC Single phase (Wall Mount Type)

Type		LSTSP-1V005	LSTSP-1V010	LSTSP-1V020	LSTSP-1V030
Capacity	[kVA]	0.5	1	2	3
Frequency	[Hz]	50/60Hz±5Hz, Auto Detection			
Rated Voltage	[V]	AC 110V±10% / 208V±10% / 220V±10%			
Size W×H×D	[mm]	230×122×520	320×160×440	400×200×480	
Weight	[kg]	10	18	27	31

AC Single phase (Tower Type)

Type		LSTSP-1V100
Capacity	[kVA]	10
Frequency	[Hz]	50/60Hz±5Hz, Auto Detection
Rated Voltage	[V]	AC 110V±10% / 208V±10% / 220V±10%
Size W×H×D	[mm]	430×530×280
Weight	[kg]	55

Single phase HMI structure and features

Single phase HMI structure

- The need for the configuration by the user is minimized, by employing a higher-precision sensor for detecting the voltage and current.
- With a simpler design of the LCD Display screen, the user operation and monitoring are made more convenient.
- With the RS-485 communication mode supported, it is now possible to check the sag statistics and compensation status from a distance.

Features

STATUS

- System status
- TSP status
- TSP configuration value
- Event history: Print the top two items
- History D/B history: Print the top four items

SAG EVENTS

- Shows the history of the SAGs that occurred in the system only, making it easier for the user to monitor the system

HISTORY D/B

- Shows the overall TSP status

SETTING

- Can manipulate the settings of the overall TSP

AC single phase (Stand/Wall Mount/Tower type)

Ratings and specification

AC-1 phase LSTSP

Type				LSTSP-1V005	LSTSP-1V010
Input Voltage		AC	[V]	Single Phase 110V±10% / 208V±10% / 220V±10% /240V±10%	
Input Frequen			[Hz]	50/60Hz±5Hz, Auto Detection	
Input Current	110V/208V/220V		[A]	4.5A / 2.4A / 2.3A	9.1A / 4.8A / 4.5A
Rated Output during Normal Operation	Output Voltage	AC	[V,Hz]	Single Phase 110V / 208V / 220V / 240V , 50/60Hz	
	Output Current		[A]	Same as AC Input	
	Instantaneous Overload Current			5 times of Rated Output Current Complying with the Thyristor Characteristics	
	Load Power Factor			Complying with the Normal Input	
Rated Output during Inverter Operation	Output Voltage	AC	[V]	Single Phase(Sine Wave) 110V±5% / 208V±5% / 220V±5% / 240V±5%	
	Normal Output Frequency		[Hz]	50/60Hz ±0.1Hz	
	Output Current 110V/208V/220V		[A]	4.5A / 2.4A / 2.3A	9.1A / 4.8A / 4.5A
	Instantaneous Overload Current			1.2 times of Rated Current	
	Load Power Factor			0.8	
Specification during Inverter Output Operation	Output Frequency			50/60Hz±0.1Hz	
	Output Voltage Waveform			Sinusoidal Wave	
	Waveform Distortion Rate(THD)			Less than 3% (In the load with the 100% power factor)	
	Compensation Voltage			Rated Voltage based 10.0% - 90.0% (default: 85%)	
	Return Voltage			Compensation based Voltage and 1.0% ~ 5.0% range of Rated Voltage (default: 3%)	
	Switching Time			0.8ms detection, 1.2ms inverter reaction (<2ms)	
	Compensation Time (Full load)			1 sec	
	Repetitive Compensation (Full load)			Continuous compensation in the interval of 10 seconds at 100% load 1 second power interruption. (Can be adjusted by the HMI settings) Up to 3 time continuous compensation without charge at 0.1 second	
TSP Protection	Overcurrent Protection			Threshold, By-Pass Switching by Internal SCR (Standard), Automatic Switching by ETS(Emergency Transfer Switch) (Option)	
	Overvoltage Protection				
Load Protection	TSP Low Voltage Protection				
	TSP Malfunction Protection				
Alarm (HMI Setting)				At Over voltage, Over current, System Fault	
Fault	System Fault			250VAC(120VA) / 220VDC(60W) / Relay a, b Contact	
	Power Fail (Sag or Interruption)				
Operating Environment	Place			Indoor Use Only (Customization Required for Outdoor Use)	
	Temperature			0°C~40°C	
	Humidity			15%~85% (No dew condensation)	
	Cooling Type			Natural Air Cooling(No FAN)	
	Voltage Resistance			Complying with IEC-62040-1	
Appearance	Size WxDxH [mm]	Wall mount		230x122x520	320x160x440
		Standard		-	320x440x160
		Tower		-	-
	Weight		[kg]	10	18
	Terminal Screw Size			M4	
HMI	H/W Specification			20x4 Text LCD, 4 Buttons, Built-in RTC (keeping time information for 3 years)	
	Sag Event Information			Sag event(time, sag voltage, sag duration) record, grid voltage, current, energy, frequency, Operation history	
Communication	DATA Communication			N/A	
	Monitoring				
	Information				
	Sag Waveform				
Certification					

Note) Above specification may change accoding to the circumstances of the manufacturer.

LSTSP-1V020	LSTSP-1V030	LSTSP-1V050	LSTSP-1V100
Single Phase 110V±10% / 208V±10% / 220V±10% /240V±10%			
50/60Hz±5Hz, Auto Detection			
18.2A / 9.6A / 9.1A	27.3A / 14.4A / 13.6A	45.5A / 24.0A / 22.7A	90.9A / 48.1A / 45.5A
Single Phase 110V / 208V / 220V / 240V , 50/60Hz			
Same as AC Input			
5 times of Rated Output Current Complying with the Thyristor Characteristics			
Complying with the Normal Input			
Single Phase(Sine Wave) 110V±5% / 208V±5% / 220V±5% / 240V±5%			
50/60Hz ±0.1Hz			
18.2A / 9.6A / 9.1A	27.3A / 14.4A / 13.6A	45.5A / 24.0A / 22.7A	90.9A / 48.1A / 45.5A
1.2 times of Rated Current			
0.8			
50/60Hz±0.1Hz			
Sinusoidal Wave			
Less than 3% (In the load with the 100% power factor)			
Rated Voltage based 10.0% - 90.0% (default: 85%)			
Compensation based Voltage and 1.0% ~ 5.0% range of Rated Voltage (default: 3%)			
0.8ms detection, 1.2ms inverter reaction (<2ms)			
1 sec			
Continuous compensation in the interval of 10 seconds at 100% load 1 second power interruption. (Can be adjusted by the HMI settings) Up to 3 time continuous compensation without charge at 0.1 second			
Threshold, By-Pass Switching by Internal SCR (Standard), Automatic Switching by ETS(Emergency Transfer Switch) (Option)			
At Over voltage, Over current, System Fault			
250VAC(120VA) / 220VDC(60W) / Relay a, b Contact			
Indoor Use Only (Customization Required for Outdoor Use)			
'0°C~40°C			
15%~85% % (No dew condensation)			
Natural Air Cooling(No FAN)			
Complying with IEC-62040-1			
400×200×480		-	-
400×480×200		430×530×280	
-	-	-	280×550×500
27	31	44	48(Tower 55)
M5		M6	
20x4 Text LCD, 4 Buttons, Built-in RTC (keeping time information for 3 years)			
Sag event(time, sag voltage, sag duration) record, grid voltage, current, wattage, frequency, Operation history			
RS485, Ethernet (Option)			
Sag-VIEWER, Up to 500 connections			
Sag history report such as occurrence time, duration, voltage waveform, compensation output waveform, sag history statistical report, grid voltage, current, wattage, frequency, operation history, XML support			
Max. from 2cycles before the event to 260ms after the event ends. 84 cycles (at 60 Hz)			
CE (K5476/L13,TUV)			

AC 3-phase

Model list

Three-phase LSTSP

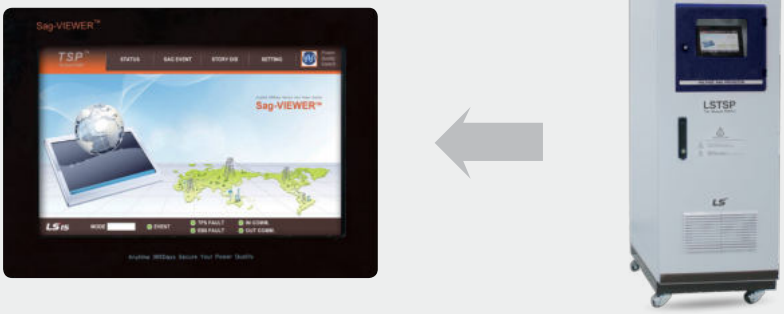
Type			LSTSP-3WV005/010	LSTSP-3WV020	LSTSP-3WV030	LSTSP-3WV050
Capacity		[kVA]	5/10	20	30	50
Frequency		[Hz]	50/60Hz±5Hz, Auto Detection			
Rated Voltage		[V]	AC 208V±10% / 220V±10% / 380V±10% / 440V±10%			
Size	W×H×D	[mm]	500×600×985	500×800×1,365	500×800×1,665	
Weight		[kg]	120/130	250	350	410

Type			LSTSP-3WV100	LSTSP-3WV150	LSTSP-3WV200	
Capacity		[kVA]	100	150	200	
Frequency		[Hz]	50/60Hz±5Hz, Auto Detection			
Rated Voltage		[V]	AC 208V±10% / 220V±10% / 380V±10% / 440V±10%		AC 208V±10% / 220V±10%	AC 380V±10% / 440V±10%
Size	W×H×D	[mm]	1,000×600×1,940	1,600×900×2,000	2,700×900×2,000	1,600×900×2,000
Weight		[kg]	650	1,200	1,600	1,300

3-phase HMI structure and features

3-phase HMI structure

- With the touch-sensitive type 7” LCD Touch Screen, the convenience of the user interface is maximized.
- Using a USB terminal, it is possible to save the history of Sag occurrence, etc.
- Using the LAN communication, it is possible to monitor the device and the load power consumption, etc.



Features

STATUS

- System status
- TSP status
- TSP configuration value
- Event history: Print the top two items
- History D/B history: Print the top four items

SAG EVENTS

- Shows the history of the SAGs that occurred in the system only, making it easier for the user to monitor the system
- Can monitor the sag status and compensation status of the accident history through graphs and texts

HISTORY D/B

- Shows the overall Sag protector status

SETTING

- Can manipulate the settings of the overall Sag protector

Ratings and specification

Three-phase LSTSP

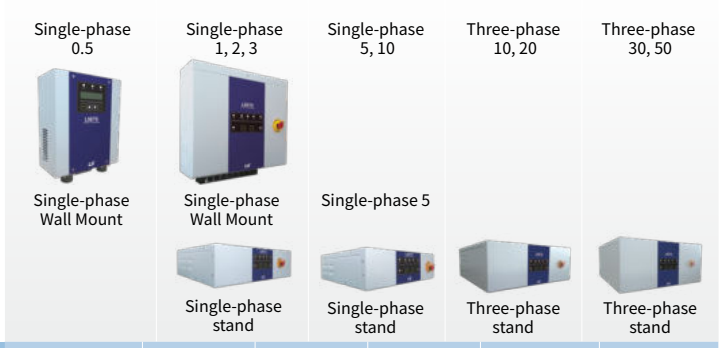
Type				LSTSP-3WV005/010	LSTSP-3WV020	LSTSP-3WV030
Input Voltage	AC		[V]	3-Phase 208V±10% / 220V±10% / 380V±10% / 440V±10%		
Input Frequency			[Hz]	50/60Hz±5Hz , Auto Detection		
Input Current	208V/220V/380V/440V		[A]	005: 14A/13A/ 8A/ 7A 010: 28A/26A/15A/13A	56A/52A/30A/26A	83A/79A/46A/39A
Rated Output during Normal Operation	Output Voltage	AC	[V,Hz]	Phase 208V / 220V / 380V / 440V, 50/60Hz		
	Output Current		[A]	Same as AC Input		
	Instantaneous Overload Current			5 times of Rated Output Current Complying with the Thyristor Characteristics		
	Load Power Factor			Complying with the Normal Input		
Rated Output during Inverter Operation	Output Voltage	AC	[V]	3-Phase(Sine Wave) 208V±5% / 220V±5% / 380V±5% / 440V±5%		
	Normal Output Frequency		[Hz]	50/60Hz ±0.1Hz		
	Output Current 208V/220V/380V/440V		[A]	005: 14A/13A/ 8A/ 7A 010: 28A/26A/15A/13A	56A/52A/30A/26A	83A/79A/46A/39A
	Instantaneous Overload Current			1.2 times of Rated Current		
	Load Power Factor			0.8		
Specification during Inverter Output Operation	Output Frequency			50/60Hz±0.1Hz		
	Output Waveform			Sinusoidal Wave		
	Waveform Distortion			Less than 3% (In the load with the 100% power factor)		
	Rate(THD)			Rated Voltage based 10.0% - 90.0% (default: 85%)		
	Compensation Voltage			Compensation based Voltage and 1.0% ~ 5.0% range of Rated Voltage (default: 3%)		
	Return Voltage			0.8ms detection, 1.2ms inverter reaction (<2ms)		
	Switching Time			1 sec		
	Compensation Time (Full Load)			Continuous compensation in the interval of 10 seconds at 100% load 1 second power interruption. (Can be adjusted by the HMI settings) Up to 3 time continuous compensation without charge at 0.1 second		
TSP Protection	Repetitive Compensation (Full Load)			Threshold, By-Pass Switching by Internal SCR (Standard), Automatic Switching by ETS(Emergency Transfer Switch) (Option)		
	Overcurrent Protection					
Load Protection	Overvoltage Protection					
	TSP Low Voltage Protection					
Alarm (HMI Setting)				At Over voltage, Over current, System Fault		
Fault	System Fault			250VAC(120VA) / 220VDC(60W) / Relay a, b Contact		
	Power Fail (Sag or Interruption)					
Operating Environment	Place			Indoor Use Only (Customization Required for Outdoor Use)		
	Temperature			'0°C ~ 40°C		
	Humidity			15%~85% (No dew condensation)		
	Cooling Type			Natural Air Cooling(No FAN)		
	Voltage Resistance			Complying with IEC-62040-1		
Appearance	Size	WxDxH	[mm]	500×600×985	500×800×1,365	500×800×1,665
	Weight		[kg]	120 / 130	250	350
	Terminal Screw Size			M8		
HMI	H/W Specification			7" TFT/LCD Touch Screen, Built-in RTC (keeping time information for 3 years)		
	Sag Event Information			Sag event(time, sag voltage, sag duration) record, grid voltage, current, energy, frequency, Operation history		
Communication	DATA Communication			Ethernet Modbus TCP/IP		
	Monitoring			Sag-VIEWER, Up to 500 connections		
	Information			Sag history report such as occurrence time, duration, voltage waveform, compensation output waveform, sag history statistical report, grid voltage, current, wattage, frequency, operation history, XML support		
	Sag Waveform			Max. from 2cycles before the event to 260ms after the event ends. 84 cycles (at 60 Hz)		
Certification				CE (K5476/L13,TUV)		

Note) Above specification may change accoding to the circumstances of the manufacturer.

LSTSP-3WV050	LSTSP-3WV100	LSTSP-3WV150	LSTSP-3WV200	
3-Phase 208V±10% / 220V±10% / 380V±10% / 440V±10%				
50/60Hz±5Hz, Auto Detection				
139A/131A/76A/66A	278A/262A/152A/131A	417A/394A/228A/197A	208V(556A) / 220V(525A) (MBP 포함)	380V(304A) / 440V(263A) (MBP 포함)
3-Phase 208V / 220V / 380V / 440V, 50/60Hz				
Same as AC Input				
5 times of Rated Output Current Complying with the Thyristor Characteristics				
Complying with the Normal Input				
3-Phase(Sine Wave) 208V±5% / 220V±5% / 380V±5% / 440V±5%				
50/60Hz ±0.1Hz				
139A/131A/76A/66A	278A/262A/152A/131A	417A/394A/228A/197A	208V(556A) / 220V(525A)	380V(304A) / 440V(263A)
1.2 times of Rated Current				
0.8				
50/60Hz±0.1Hz				
Sinusoidal Wave				
Less than 3% (In the load with the 100% power factor)				
Rated Voltage based 10.0% - 90.0% (default: 85%)				
Compensation based Voltage and 1.0% ~ 5.0% range of Rated Voltage (default: 3%)				
0.8ms detection, 1.2ms inverter reaction (<2ms)				
1 sec				
Continuous compensation in the interval of 10 seconds at 100% load 1 second power interruption. (Can be adjusted by the HMI settings) Up to 3 time continuous compensation without charge at 0.1 second				
Threshold, By-Pass Switching by Internal SCR (Standard), Automatic Switching by ETS(Emergency Transfer Switch) (Option)				
At Over voltage, Over current, System Fault				
250VAC(120VA) / 220VDC(60W) / Relay a, b Contact				
Indoor Use Only (Customization Required for Outdoor Use)				
'0°C ~ 40°C				
15%~85% (No dew condensation)				
Natural Air Cooling(No FAN)	FAN Cooling			
Complying with IEC-62040-1				
500×800×1,665	1,000×600×1,940	1,600×900×2,000	2,700×900×2,000	1,600×900×2,000
410	650	1,200	1,600	1,300
M8	M10	M12		
7" TFT/LCD Touch Screen, Built-in RTC (keeping time information for 3 years)				
Sag event(time, sag voltage, sag duration) record, grid voltage, current, energy, frequency, Operation history				
Ethernet Modbus TCP/IP				
Sag-VIEWER, Up to 500 connections				
Sag history report such as occurrence time, duration, voltage waveform, compensation output waveform, sag history statistical report, grid voltage, current, wattage, frequency, operation history, XML support				
Max. from 2cycles before the event to 260ms after the event ends. 84 cycles (at 60 Hz)				
CE (K5476/L13,TUV)				

Model list

The ETS refers to the switch that automatically switches over to another input power source in backup when there is a problem with a power source. By using a semi-conductor switch, the system operates without any momentary interruptions through a fast switch-over speed of 2ms or less.



LSETS Single phase

Type			LSETS-1□005□	LSETS-1□010□	LSETS-1□020□	LSETS-1□030□	LSETS-1□050□	LSETS-1□100□
Capacity		[kVA]	0.5	1	2	3	5	10
Cooling type			Air cooling					
Noise			45dB MAX					
Temperature and Humidity			0~40도, 10~90%RH, Non Condensing					
Input	Voltage		110/208/220					
	Frequency		50/60Hz					
	Phase		1P 2W					
	THD Limit		20%					
Output	Voltage		110/220					
	Frequency		50/60Hz					
	Phase		1P 2W					
	THD Limit		20%					
	Transition time		Within 2ms					
	Efficiency		98% (100% linear load)					
Size	Wall Mount	W×H×D [mm]	191×220×89.6	320×280×100			-	
	Stand		-	320×100×280			430×120×310	

LSETS 3-phase

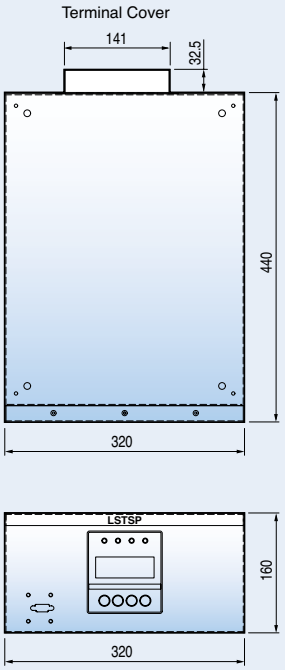
Type			LSETS-3□□005	LSETS-3□□010	LSETS-1□020□	LSETS-1□030□	LSETS-1□050□
Capacity		[kVA]	5	10	20	30	50
Cooling type			Air cooling				
Noise			45dB MAX				
Temperature and Humidity			0~40도, 10~90%RH, Non Condensing				
Input	Voltage		208V/220V/380V/440V				
	Frequency		50/60Hz				
	Phase		3P 3W / 3P 4W				
	THD Limit		20%				
Output	Voltage		110/220				
	Frequency		50/60Hz				
	Phase		3P 3W / 3P 4W				
	THD Limit		20%				
	Transition time		Within 2ms				
	Efficiency		98% (100% linear load)				
Size	Wall Mount	W×H×D [mm]	-	-		-	
	Stand		430×120×310	500×180×510		500×220×510	

Dimension

Single Phase
TSP Stand type

LSTSP-1V010 S

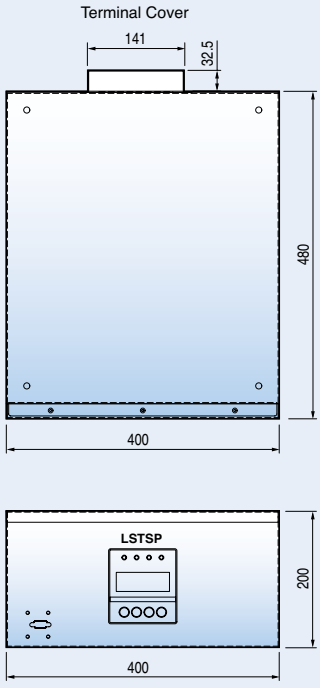
(mm)



LSTSP-1V010 S : 25kg

LSTSP-1V020 S | LSTSP-1V030 S

(mm)



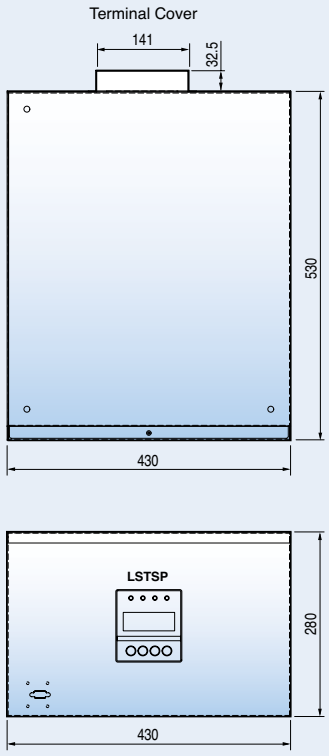
LSTSP-1V020 S : 30kg
LSTSP-1V030 S : 36kg

Dimension

LSTSP-1V050 S | LSTSP-1V100 S

Single Phase
TSP Stand type

(mm)



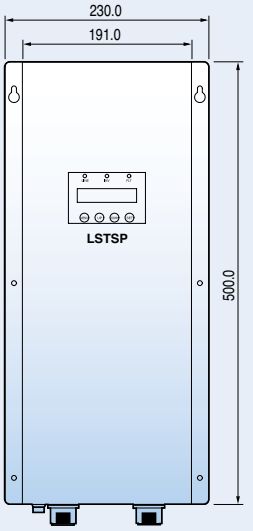
LSTSP-1V050 S : 40kg
LSTSP-1V100 S : 48kg

Dimension

Single Phase
TSP Wall Mount type

LSTSP-1V003 W

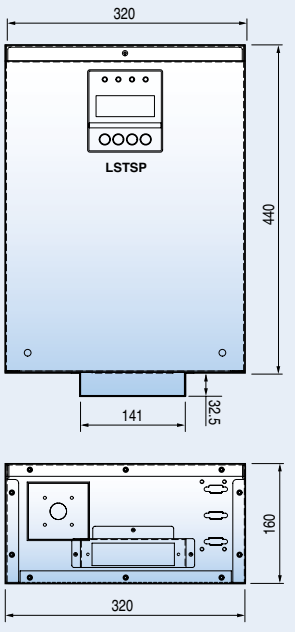
(mm)

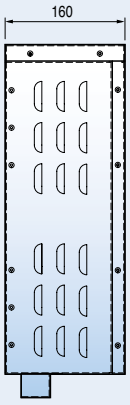


LSTSP-1V003 W : 18kg

LSTSP-1V010 W

(mm)





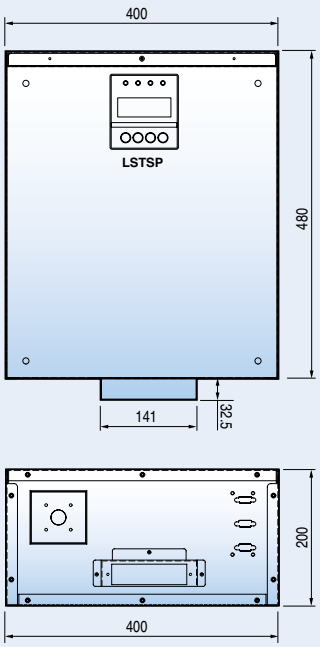
LSTSP-1V010 W : 25kg

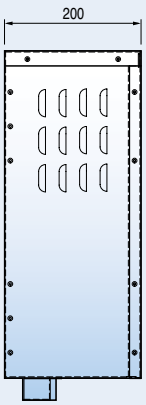
Dimension

LSTSP-1V020 W | LSTSP-1V030 W

Single Phase
TSP Wall Mount type

(mm)





LSTSP-1V020 W : 30kg
LSTSP-1V030 W : 36kg

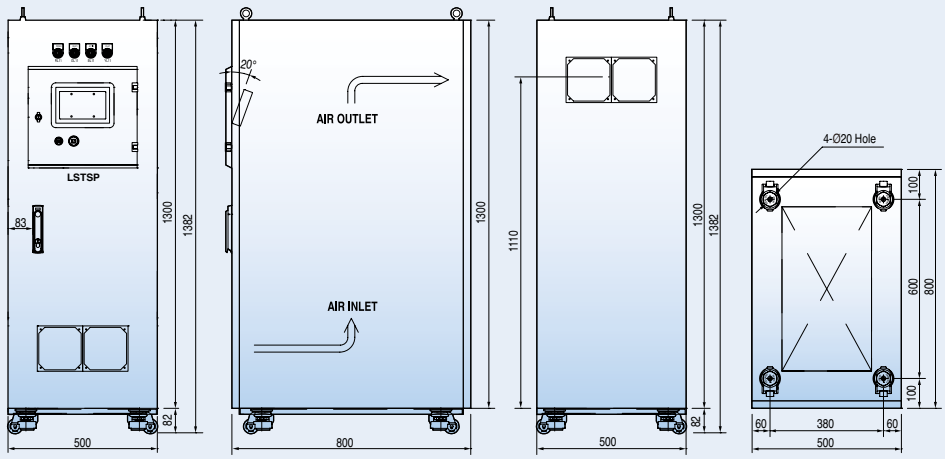
Dimension

Three Phase TSP

LSTSP-3WV010 LSTSP-3WV020

(mm)

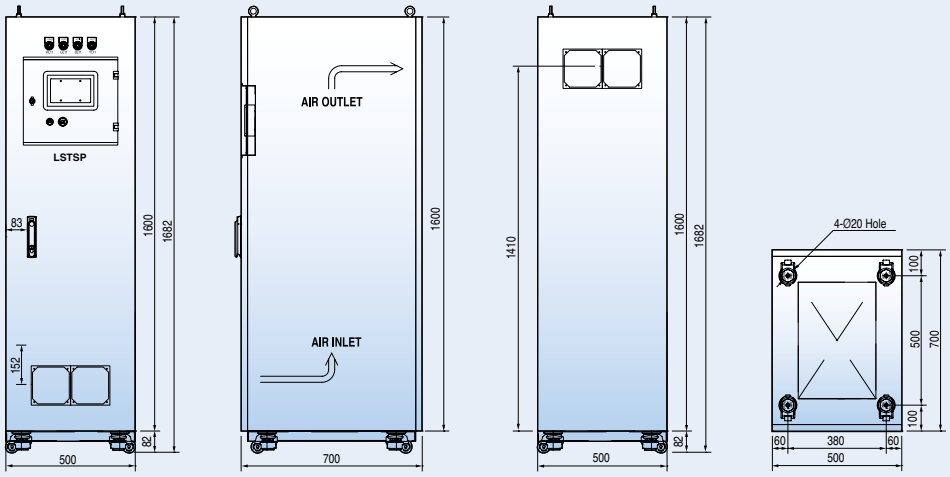
LSTSP-3WV010 : 220kg
LSTSP-3WV020 : 250kg



LSTSP-3WV030 LSTSP-3WV050

(mm)

LSTSP-3WV030 : 350kg
LSTSP-3WV050 : 410kg

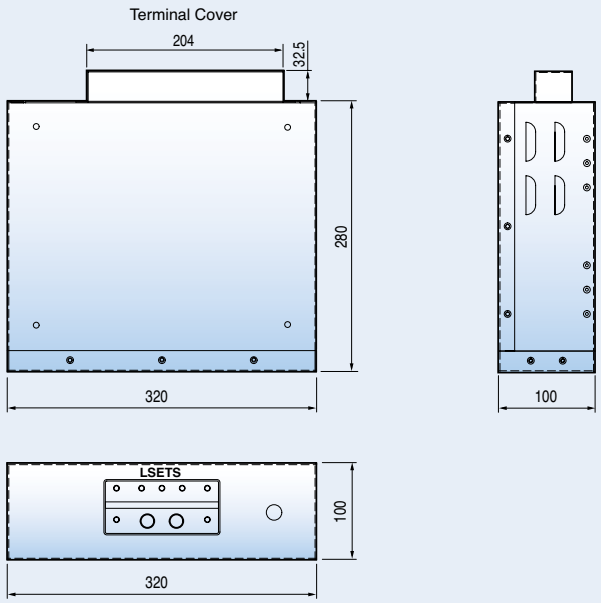


Dimension

Single Phase
ETS Stand type

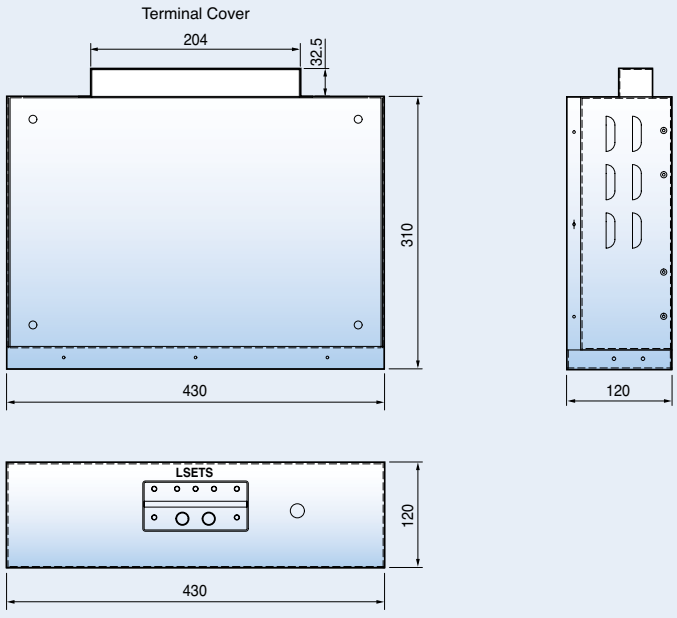
LSETS-1V030 S

(mm)



LSETS-1V100 S

(mm)

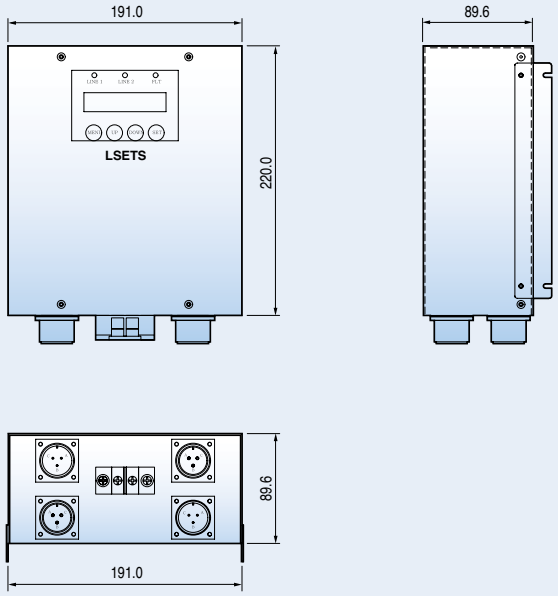


Dimension

Single Phase
ETS Wall Mount type

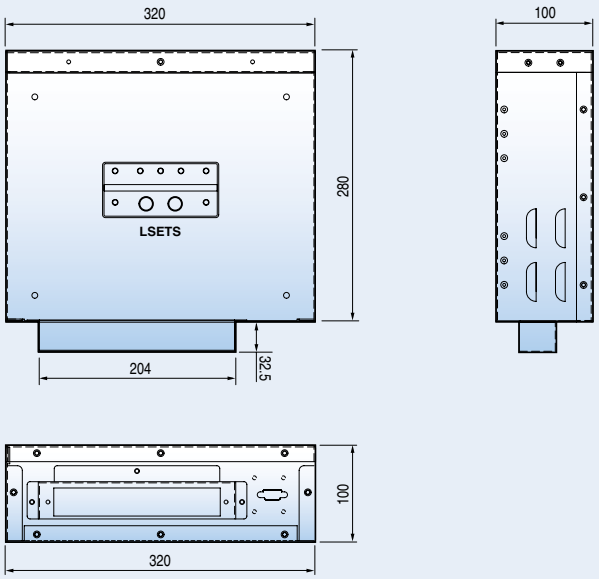
LSETS-1V003 W

(mm)



LSETS-1V030 W

(mm)

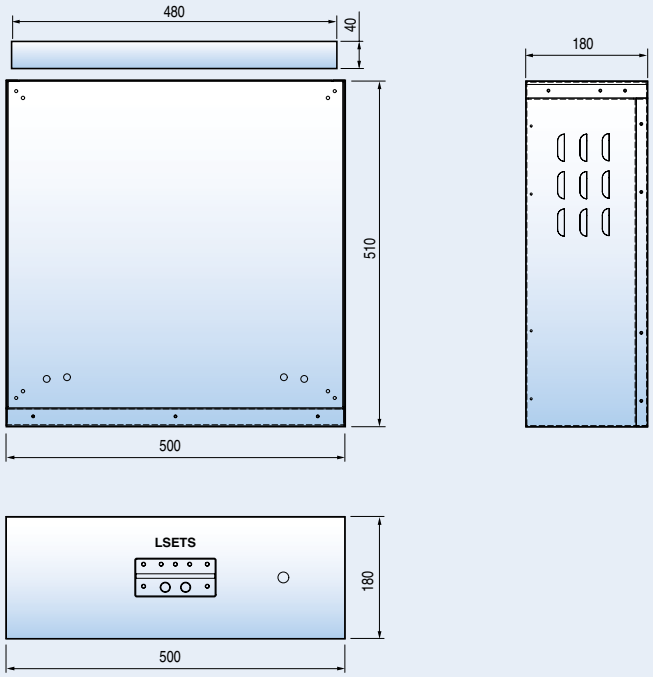


Dimension

Three Phase ETS

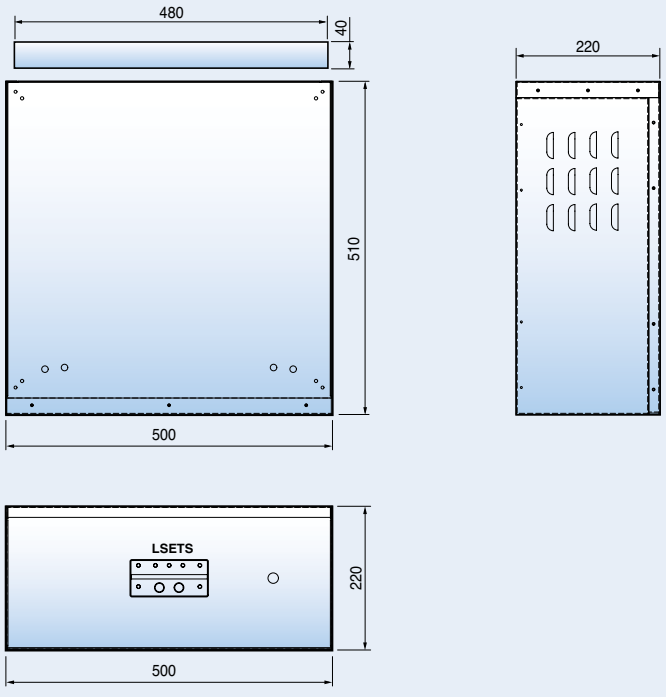
LSETS-3WV200

(mm)



LSETS-3WV500

(mm)



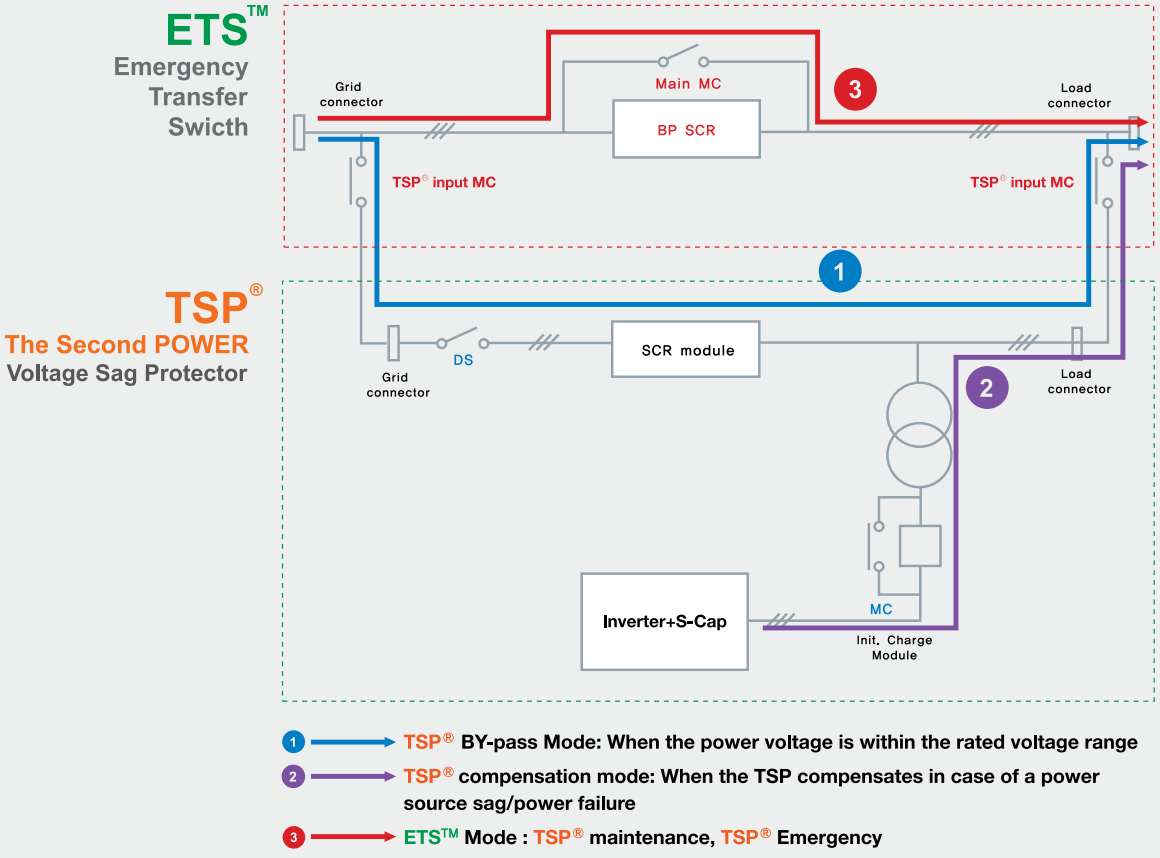
The interlocking of TSP and ETS

The ETS is a type of equipment that is intended to ensure voltage sag compensation during inspection, replacement, and other maintenance or trouble with the TSP.

❶ TSP® **By-pass Mode** : When the system voltage is normal - monitors the input power source voltage

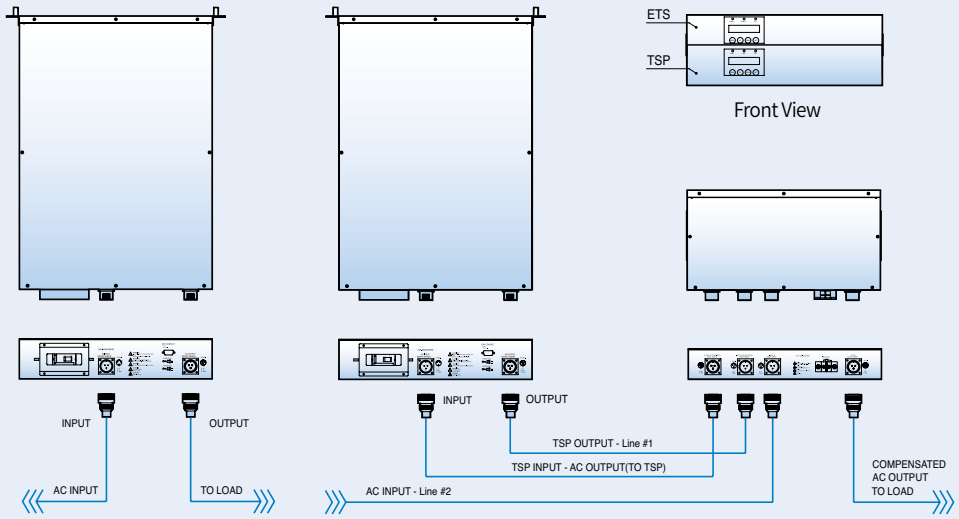
❷ TSP® **compensation Mode** : System voltage sag/ power failure
- SCR module OFF
- The voltage is compensated by the inverter
- When the system voltage is normal, the system returns to its own power source.

❸ ETS™ **Mode** : TSP® when the TSP® has a trouble
- TSP® output ceased & ETS™'s BP SCR ON & Main MC ON
- ETS™ output MC OFF
- TSP® When the TSP® works normally, the system returns to its normal power source automatically.

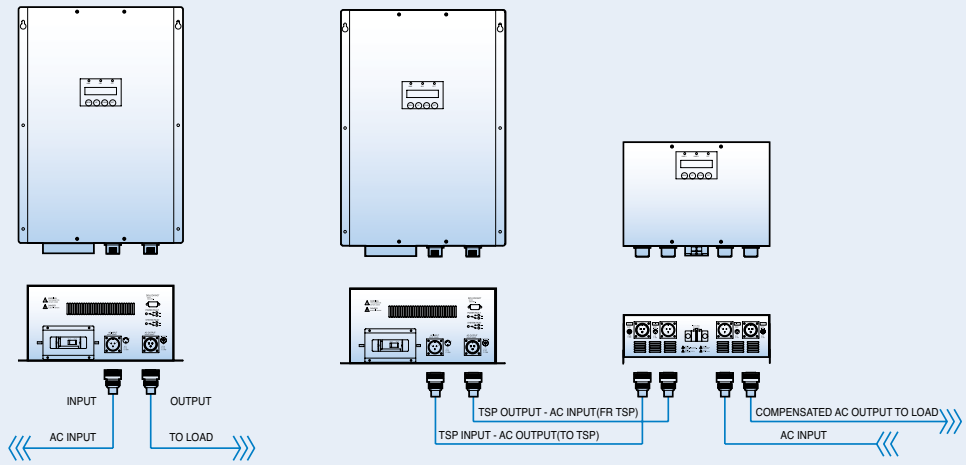


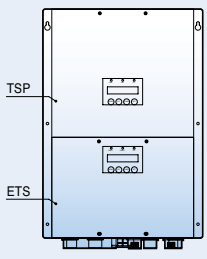
The wiring between the TSP and ETS

Connection Wiring Diagram



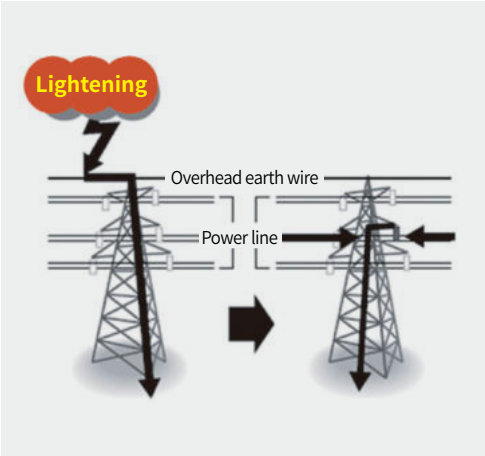
Wiring Diagram Schematic





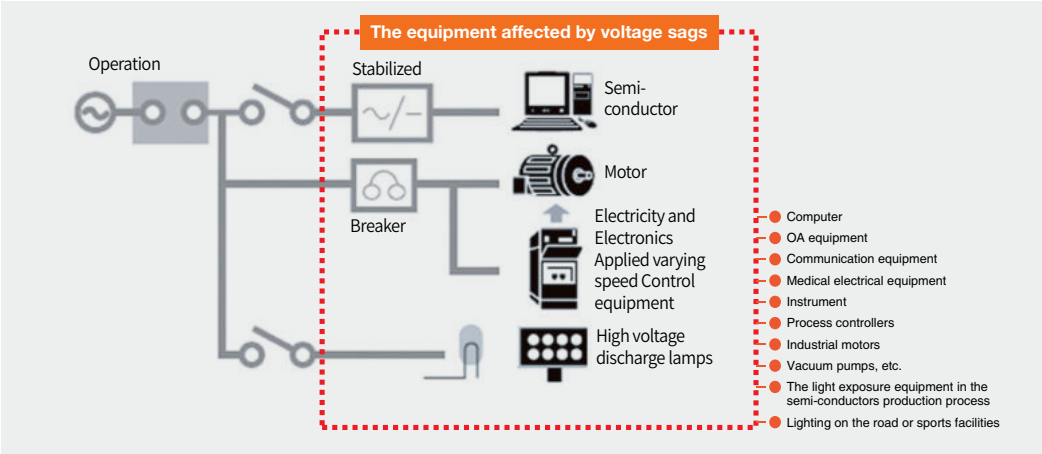
Technical information

What is a voltage sag?



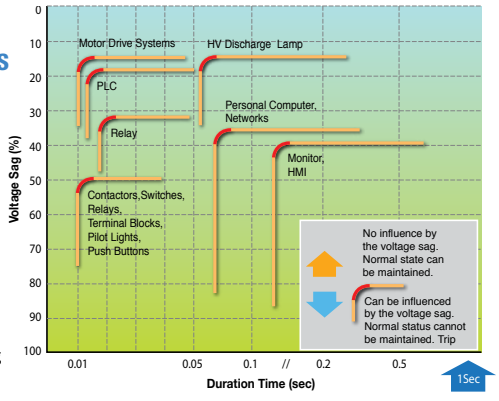
If there is an overcurrent on the distribution or grid line due to lightening, strong wind, or heavy snow, the insulation between the steel tower and the power line is broken, resulting in a massive amount of current flowing from the power line to the ground through the steel tower. In such a case, a wide spread voltage decrease happens. The protective relay on the re-closer in the system detects the locations of the troubles and exclude them from within the power transfer system. In such a case, the voltage is decreased over the period of 300ms to several seconds during which the trouble is detected and isolated, the voltage is decreased. The voltage sag (blinking of the power) is mainly caused by thunder strikes, and, in most cases, the duration is within 300ms.

However, even for a blink of an eye, such a failure can affect automated equipment gravely.



- Malfunction or interruption of the computers or control equipment
- Interruption with the operation of the powered equipment, such as the motor
- Prolonged production loss due to re-initiation of the equipment, such as the vacuum equipment
- Defective products due to the interruption with the production line

Voltage sag capacity properties of the automation elements



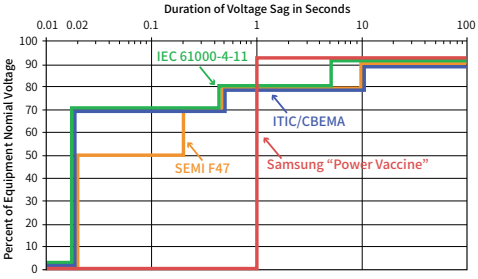
Note)
1. Voltage sag capacity properties of the automation elements: Source IEEE std. @@@@Average
2. Classification of the 3-phase sag compensation performance standard

In the case of inverters, PLCs, or other motor drive products, a 15% voltage sag of 0.05 may cause the equipment to trip. For the monitors or the HMI systems, a 40% voltage sag of 0.5 seconds may cause an interruption with normal operations. As such, most of the equipment will stop working when there is an even short voltage sag, that lasts less than a second, to cause damages by malfunctions with the equipment.

However, the LSTSP ensures that the powered equipment operates normally when a 100% voltage sag lasts event for a full second.

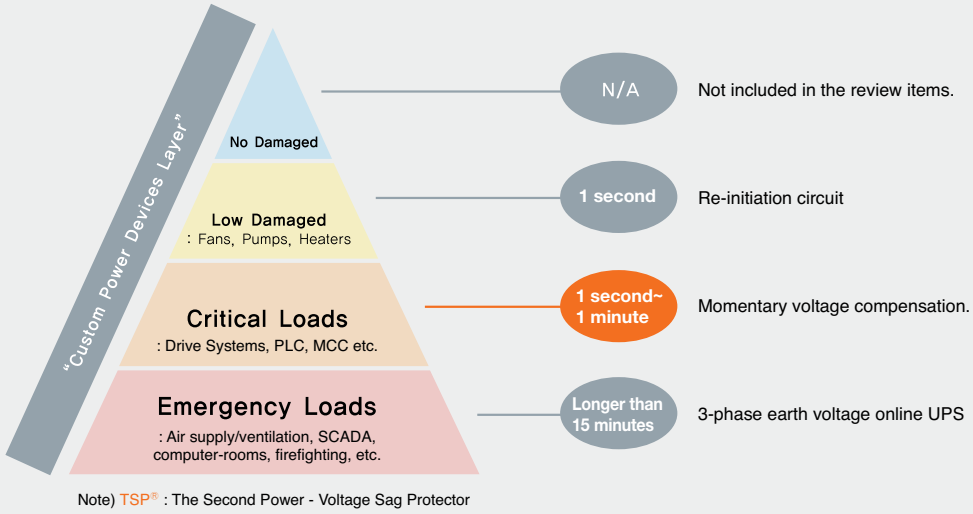
Technical information

Standard for the voltage sag compensation

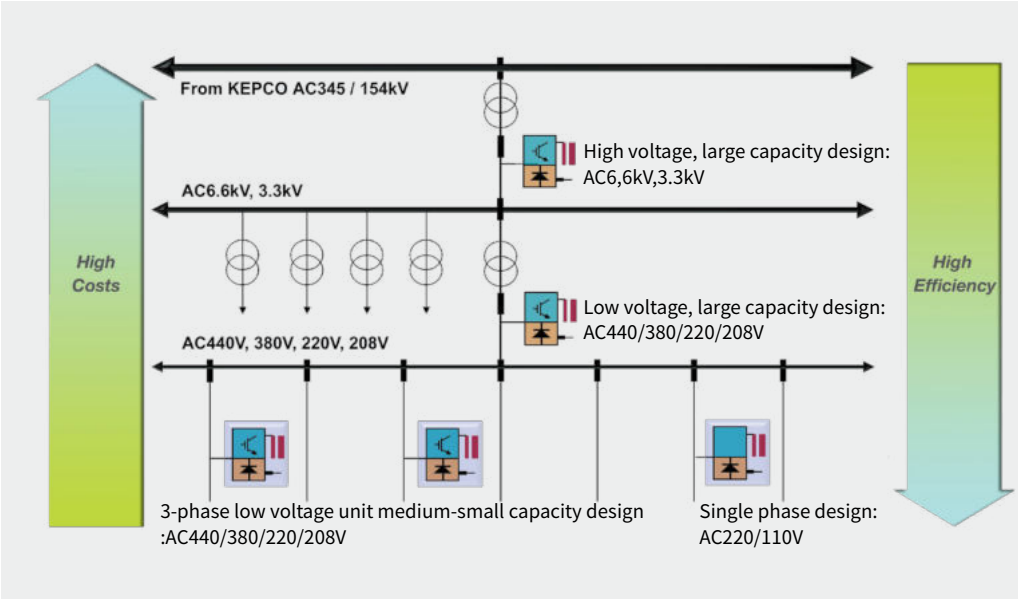


This graph shows the threshold points at which the voltage sag, caused by a system accident, trips sensitive equipment on the load point in terms of the intensity of the voltage sags and their durations. The TSP satisfies even the most severe "Power Vaccine" standard. Therefore, it keeps the equipment supplied with power even under a 100% voltage sag that lasts for a full second.

Classification by the TSP capacities based on the systems



Classification by the TSP capacities based on the systems



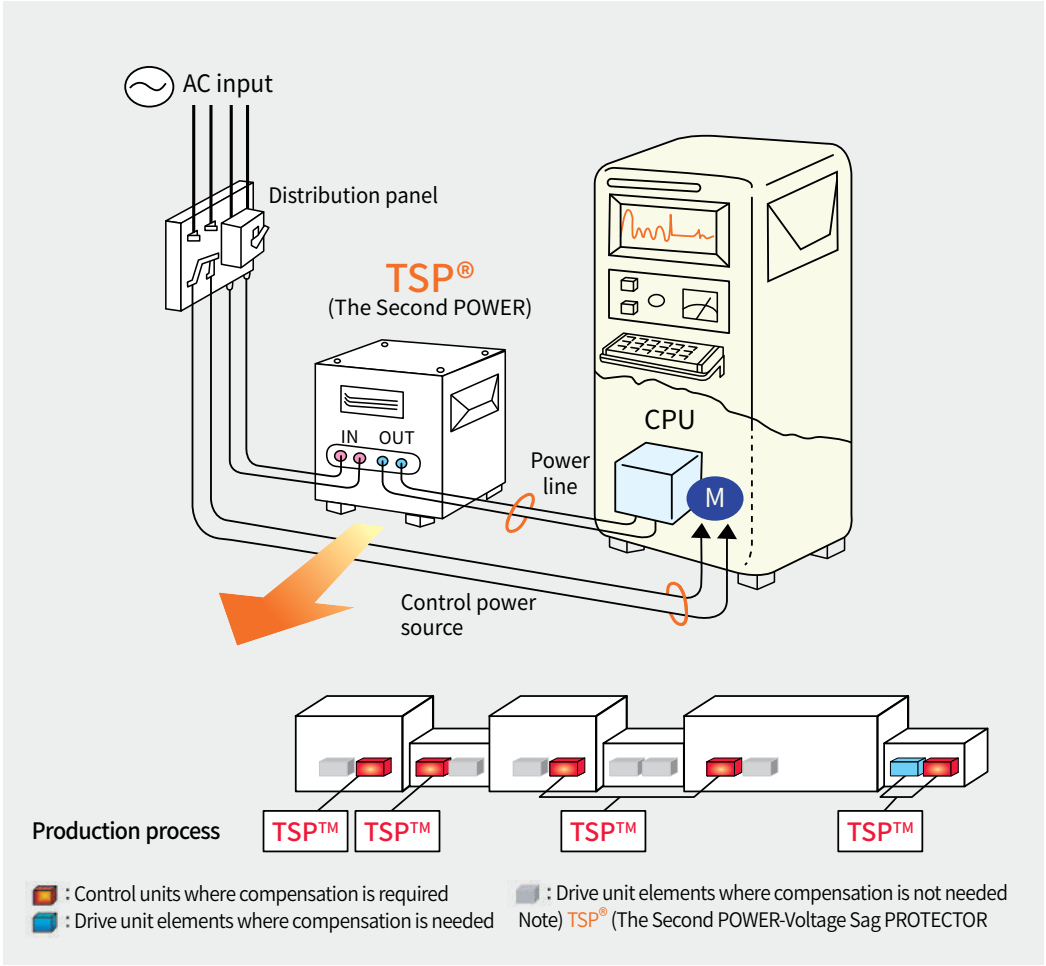
Distributed protection method

Optionally, install a full-second voltage sag compensation class TSP on a distribution panel or other places where a countermeasure against the voltage sag is needed.

Advantage of the distributed protection method

For each load, the TSP (The Second Power-Voltage Sag Protector) is installed in distribution system a better effect compared to accommodating one large unit of USP.

1. Can be installed selectively where compensation is needed Optimal choices for the load capacity are available.
2. The entire system will stay alive even in case of an accident.
3. No separate, dedicated space is necessary.
4. No dedicated line installation to access the protective measures for the existing operating lines.
5. No additional installation works for moving along with the equipment, making it easier to be used elsewhere.



National grid transmission/transformation power failure alert website

You can access the voltage sag information in your area via on-line.
Please kindly make use of this handy service.
http://cyber.kepco.co.kr/kepco_new/elec_info/info/substation_tel.jsp

Precautions

① Avoid areas with water, oil, or dust. Keep out of direct sunlight.

② Avoid closed area or areas with higher temperature rise.

③ Avoid areas with vibration or significant shocks.

④ If the product appears to be damaged or does not work properly during a test run, do not install the product.

⑤ The voltage and frequency of the power source should be within the rated range.

⑥ The power cable should be fixed firmly and earthed safely.

⑦ Install after checking the input voltage.

⑧ Keep foreign objects out of the product unit

Warranty and customer service

Scope of warranty

- Under the condition that the product you purchased has been used in accordance with the manual we provided and maintained appropriately, we provide free repair services for our product if a breakdown of the product is found to be caused by the defective materials or workmanship.

Warranty period

- The warranty is valid for 18 months from the date of manufacture or one year from the date of purchase, whichever comes earlier.

Exceptions of the warranty

- Even during the validity of the warranty, we do not provide repair services for following cases;

① Malfunction caused by an unauthorized modification

② Damages to the product due to reckless use or faults of the user

③ Usage out of the designated applications

④ Damaged serial number

⑤ Consumable parts, such as a fuse

⑥ Troubles caused by inappropriate selections

⑦ Applying an overly high voltage out of the operation voltage range or malfunctions caused by a lightning strike or flooding

⑧ Malfunctions caused by natural disasters

⑨ Indirect costs other than the parts cost and the labor for a warranty repair service (i.e., the transportation, accommodation, losses due to down time, taxes and other charges, etc.)

Memo

FUTURING SMART ENERGY

We open up a brighter future through
efficient and convenient energy solutions.

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.

LS ELECTRIC

www.ls-electric.com

■ Headquaters

127, LS-ro(hogye-dong) Dongan-gu, Anyang-si, Gyeonggi-Do, 14119, Korea

■ Seoul Office

LS Yongsan Tower, 92, Hangang-daero, Yongsan-gu, Seoul, 04386, Korea
Tel: 82-2-2034-4916, 4684, 4429

■ Overseas Subsidiaries

- **LS ELECTRIC Japan Co., Ltd. (Tokyo, Japan)**
  Tel: 81-3-6268-8241 E-Mail: japan@ls-electric.com
- **LS ELECTRIC (Dalian) Co., Ltd. (Dalian, China)**
  Tel: 86-411-8730-5872 E-Mail: china.dalian@lselectric.com.cn
- **LS ELECTRIC (Wuxi) Co., Ltd. (Wuxi, China)**
  Tel: 86-510-6851-6666 E-Mail: china.wuxi@lselectric.com.cn
- **LS ELECTRIC Vietnam Co., Ltd. (Hanoi, Vietnam)**
  Tel: 84-93-631-4099 E-Mail: vietnam@ls-electric.com
  Tel: 84-28-3823-7890 E-Mail: vietnam@ls-electric.com
- **LS ELECTRIC Middle East FZE (Dubai, U.A.E.)**
  Tel: 971-4-886-5360 E-Mail: middleeast@ls-electric.com
- **LS ELECTRIC Europe B.V. (Hoofddorp, Netherlands)**
  Tel: 31-20-654-1424 E-Mail: europartner@ls-electric.com
- **LS ELECTRIC America Inc. (Chicago, USA)**
  Tel: 1-800-891-2941 E-Mail: sales.us@lselectricamerica.com
- **LS ENERGY SOLUTIONS LLC (Charlotte, USA)**
  Tel: 1-704-587-4051 E-Mail: cmfeldman@ls-es.com
- **LS ELECTRIC Turkey Co., Ltd. (Istanbul, Turkey)**
  Tel: 90-212-806-1252 E-Mail: turkey@ls-electric.com

■ Overseas Branches

- **LS ELECTRIC Tokyo Office (Japan)**
  Tel: 81-3-6268-8241 E-Mail: tokyo@ls-electric.com
- **LS ELECTRIC Beijing Office (China)**
  Tel: 86-10-5095-1631 E-Mail: china@lselectric.com.cn
- **LS ELECTRIC Shanghai Office (China)**
  Tel: 86-21-5237-9977 E-Mail: china@lselectric.com.cn
- **LS ELECTRIC Guangzhou Office (China)**
  Tel: 86-20-3818-2883 E-Mail: china@lselectric.com.cn
- **LS ELECTRIC Chengdu Office (China)**
  Tel: 86-28-8670-3201 E-Mail: china@lselectric.com.cn
- **LS ELECTRIC Qingdao Office (China)**
  Tel: 86-532-8501-2065 E-Mail: china@lselectric.com.cn
- **LS ELECTRIC Nanjing Office (China)**
  Tel: 86-25-8467-0005 E-Mail: china@lselectric.com.cn
- **LS ELECTRIC Bangkok Office (Thailand)**
  Tel: 66-90-950-9683 E-Mail: thailand@ls-electric.com
- **LS ELECTRIC Jakarta Office (Indonesia)**
  Tel: 62-21-2933-7614 E-Mail: indonesia@ls-electric.com
- **LS ELECTRIC Moscow Office (Russia)**
  Tel: 7-499-682-6130 E-Mail: info@lselectric-ru.com
- **LS ELECTRIC America Western Office (Irvine, USA)**
  Tel: 1-949-333-3140 E-Mail: america@ls-electric.com
- **LS ELECTRIC India Office (India)**
  Tel: 91-80-6142-9108 E-Mail: Info_india@ls-electric.com
- **LS ELECTRIC Singapore Office (Singapore)**
  Tel: 65-6958-8162 E-Mail: singapore@ls-electric.com

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Customer Center-Quick Responsive Service, Excellent technical support | **82-1644-5481**

2021. 06

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