Top 100
Global
Innovator
for 10 years

GridSol CARE

SMART AND WIDE AREA DIAGNOSIS SYSTEM

LS ELECTRIC

LS ELECTRIC's Compact Smart Diagnosis System is the optimal solution to improve system reliability by monitoring and diagnosing in advance key component defects that may occur during operation of power facilities, accidental failures due to system environment, or switchgear failure factors due to natural deterioration.

With uninterrupted maintenance due to non-perforated installation, real-time facility monitoring of outdated distribution-class power facilities in operation is possible, enabling stable facility operation 24 hours a day, 365 days a year and increasing productivity.

With the establishment of a web-based wide area monitoring system, it is possible to monitor domestic and overseas business sites in an integrated way.

GridSol CARE

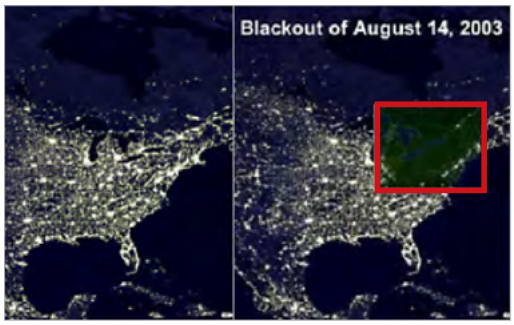
Smart & Wide Area Diagnosis System

Contents

Importance of power facility management

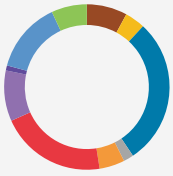
Production & operation loss costs are increasing every year, directly or indirectly,
due to the increase in accidents caused by the shortage of distribution-class power facility
maintenance and inspection personnel, insufficient analysis technology, and aging facilities

Importance of power facility management



As the amount of damage expected in the event of a power facility accident due to an increase in facility capacity due to mass production is considerable, it is essential to manage power facilities 24 hours a day, 365 days a year.
Recently, the number of accidents involving deterioration of insulation due to aging of equipment is increasing, and the potential history of accidents is also high.
Power facility diagnosis system is essential for stable facility operation and productivity expansion.

Ignition factor/Electrical factor/ Number of fires analysis



Division	No. of fires	Ratio
Overload/Over current	736	8%
Short circuit, ground fault	339	4%
unconfirmed	2761	29%
Partial disconnection	196	2%
Short circuit (Crimping or damage)	448	5%
Short circuit (Insulation deterioration)	2031	21%
Short circuit (Poor contact)	969	10%
Layer short	102	1%
Short circuit by tracking	1359	14%
Others (Electrical factors)	693	7%
Total	9634	100%

Ref) National Fire Agency

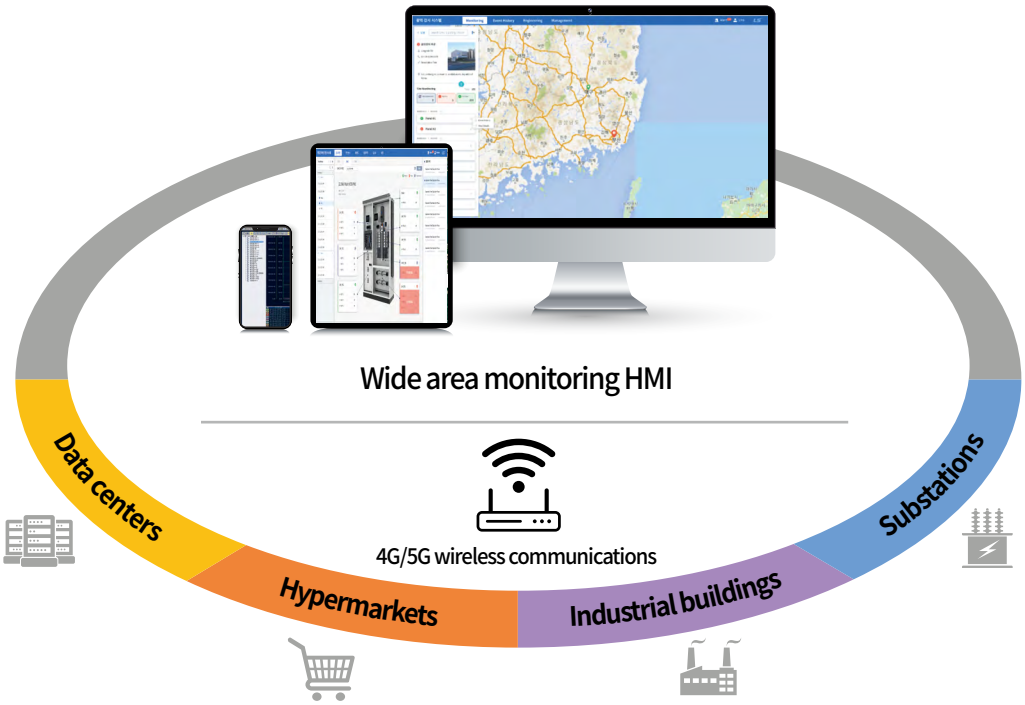
Analysis of the period of occurrence of electric fires in general consumers

Division	Ratio
less than 5 years	10%
More than 5 years and less than 10 years	11%
More than 10 years and less than 15 years	12%
More than 15 years and less than 20 years	15%
More than 20 years and less than 30 years	35%
More than 30 years	17%
Total	100%

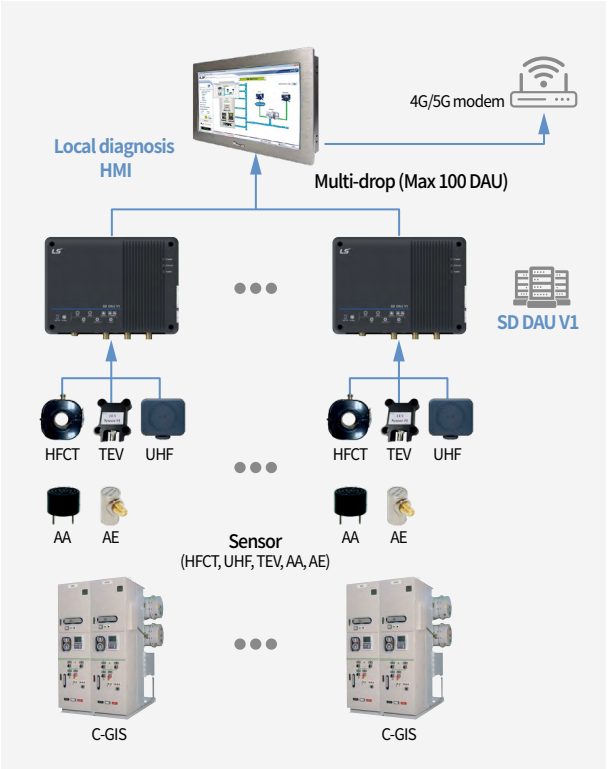
Ref) Korea Electrical Safety Corporation

System overview

It is possible to monitor and diagnose power facility failure factors due to accidental failure or natural deterioration due to major component defects/system environment that may occur during operation of power facilities and web-based for monitoring multiple local substations/buildings.
It is the optimal solution to improve system reliability by building a wide area monitoring solution.

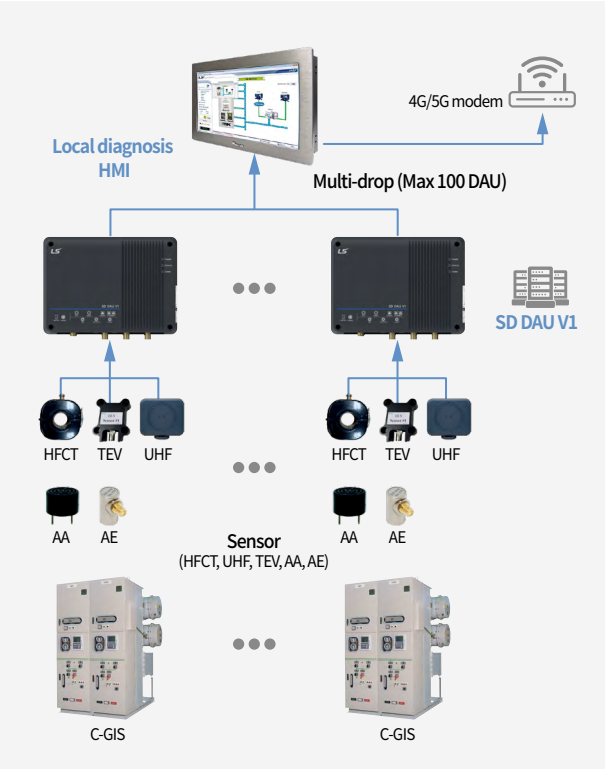


Substation



Max 200S/S

Substation



Effects & applications

GridSol CARE Smart & Wide Area Diagnosis System Effects

GridSol CARE

- Compared to the existing LS DAU V3 30MSPS
- Based on Nessus' own analysis
- Expanded PD diagnostic sensor (2 types → 5 types)
- Transmission and distribution integrated operation HMI possible
- Integrated monitoring of up to 200 customer sites by providing Web Dashboard function
- Non-perforated installation / uninterruptible maintenance possible

Applications

Data Centers

Data Center Electrical Room

Hypermarkets

Industrial Buildings

Hypermarkets, Department stores, Commercial buildings, Distribution center, Factory, etc. Indoor electrical room

Substations

Large-capacity substation / unmanned substation, etc.

System scalability

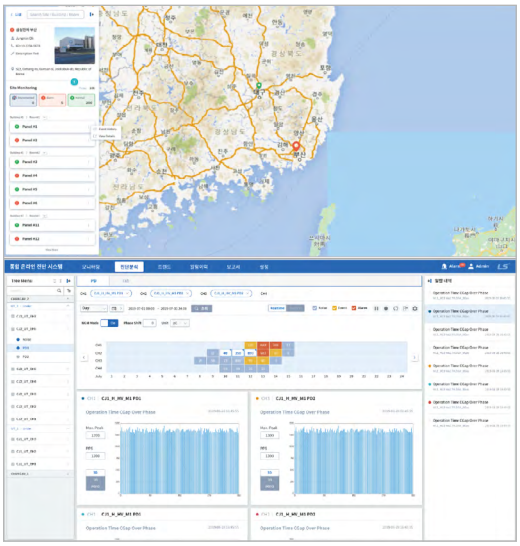
It is a system that enables stable facility operation through real-time status monitoring and analysis of power facilities that are operated 24 hours a day, 365 days a year, and it can be linked to facility asset management such as the remaining facility life.

System line-up

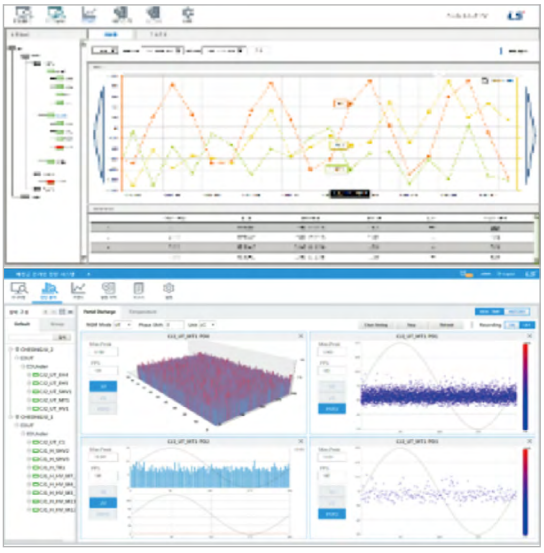
Specification

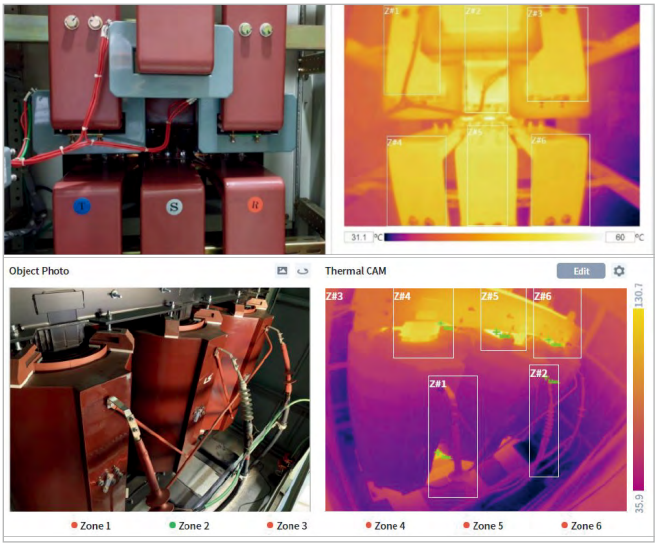
Model		SD DAU V1
Dimension (W/H/D)		220×160×60 mm
PD sensor		CH1(UHF), CH2(HFCT/TEV), CH3(AE/AA) UHF 1Ch, HFCT/TEV 1Ch, AA/AE 1Ch
IR sensor		Wireless temperature sensor can be replaced
Thermal imaging sensor		X (Thermal imaging camera ↔ HMI direct linkage possible)
Communication / Protocol		RS-232, 485, Ethernet / DNP 3.0
Type of occupancy		Switchgear, Mold TR, C-GIS, SIS
Indicator		Status LED
Noise sensor- DAU cover quantity		One DAU can be covered with one noise sensor
Maintenance	Installation structure	Can be installed without drilling (Easy to attach to existing power facilities)
	Local diagnosis	X
	Web browser	O (Increase visibility by applying web-based graphic view)
	Mobile	O
	Max connections available DAU	CMD : 100 DAU can be connected with 1 workstation CMS : Wide area monitoring _ Max DAU 500EA / Site 200 (PNL simultaneous monitoring and management)

Integration HMI

HMI	

SD DAU V2	SD DAU V3
190×225×116 mm	200×225×100.5 mm
CH1~4(UHF/HFCT)	CH1~4(UHF/HFCT)
Single : -10°C~+200°C / 24ea applicable)	Single : -10°C~+200°C / 24ea applicable)
X (Thermal imaging camera ↔ HMI direct linkage possible)	Thermal imaging (320X240) : -10°C~+150°C / CH1~4
RS-485, Ethernet / MODBUS TCP-IP	USB, RS-485, Ethernet / DNP 3.0
Switchgear, Mold TR	Switchgear, Mold TR
Mono Graphic LCD	7 inch Touch Color LCD
One DAU can be covered with one noise sensor	10 DAU can be covered with one noise sensor
Drilling required	Drilling required (Separation of inner case and outer case, Maintenance possible without opening & closing the door)
X	PD Trend Monitoring Temperature Monitoring (IR, Thermal imaging)
O (Increase visibility by applying web-based graphic view)	O (Increase visibility by applying web-based graphic view)
O	O
150 DAU can be connected with 1 workstation	250 DAU can be connected with 1 workstation





Features

SD-DAU-V1 DAU (Data acquisition unit)

Compact application

- Establishment of compactness to expand the application of existing power equipment
  - Size(220 X 160 X 60) minimization
  - 50% reduction compared to the SD DAU V3

Increased maintenance convenience and reduced equipment downtime

- Non-perforated installation and uninterrupted maintenance possible by applying magnetic Switchgear fixed type

Increased analysis reliability by improving PD measurement performance

- Increased Sampling Increases Analytical Reliability (100MSPS measurement)
  - PD signal pattern analysis result can be output as *PRPS, *PRPD, Waveform

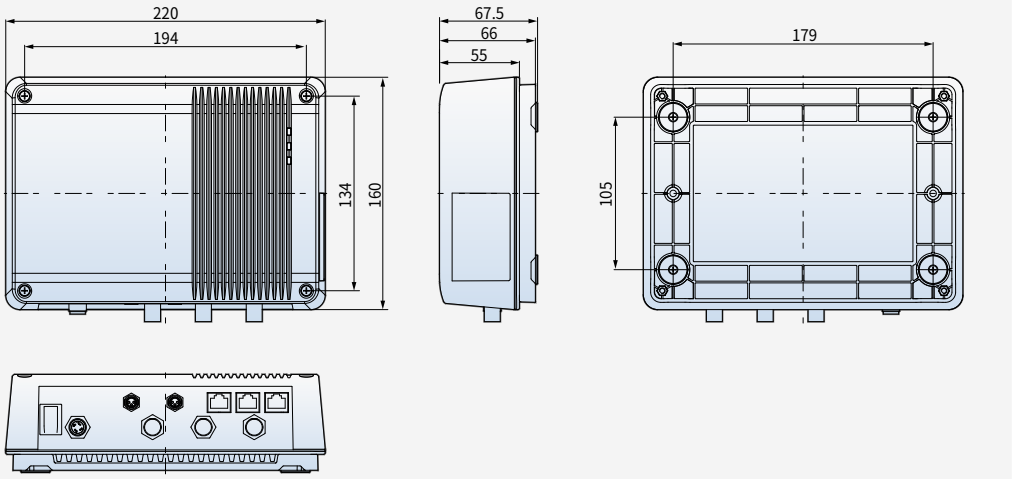
AA /AE / TEV sensor

- Analysis reliability by various diagnostic items
  - Linked to 5 types of PD sensors (UHF/ HFCT/ TEV/ AA/ AE)

Specification

Item		Contents
Power	Input rating	AC 110~220V
	Power consumption	27.5W
PD detect (3Ch)	Port 1 (UHF)	Frequency band : 300~1800MHz Sampling : 100MSPS
	Port 2 (HFCT / TEV)	Frequency band : 2~80MHz Sampling : 30MSPS
	Port 3 (AA / AE)	Frequency band : 20kHz~150MHz Sampling : 30MSPS
Temp detect	RTD port	Contact type temperature sensor connected
	RS-485 port	Expandable sensors
Communi-cation	Ethernet	1Gbps Ethernet (2 port)
	Console	RS-242C
SW	Signal processing	PD pulse waveform / UT sound file
	Protocol	DNP 3.0
Fixed method		Bracket installation method (Magnet and bolt fixation)
IP level		IP 53

Dimensions



Applicable equipment

25.8 kV 25 kA 630_2000 A 60 Hz DAIS

36kV_C-GIS

CMD (Condition Monitoring & Diagnostic System)

It is a local operating system that monitors and diagnoses the sensor data collected from the diagnostic DAU using an AI-based diagnostic algorithm.

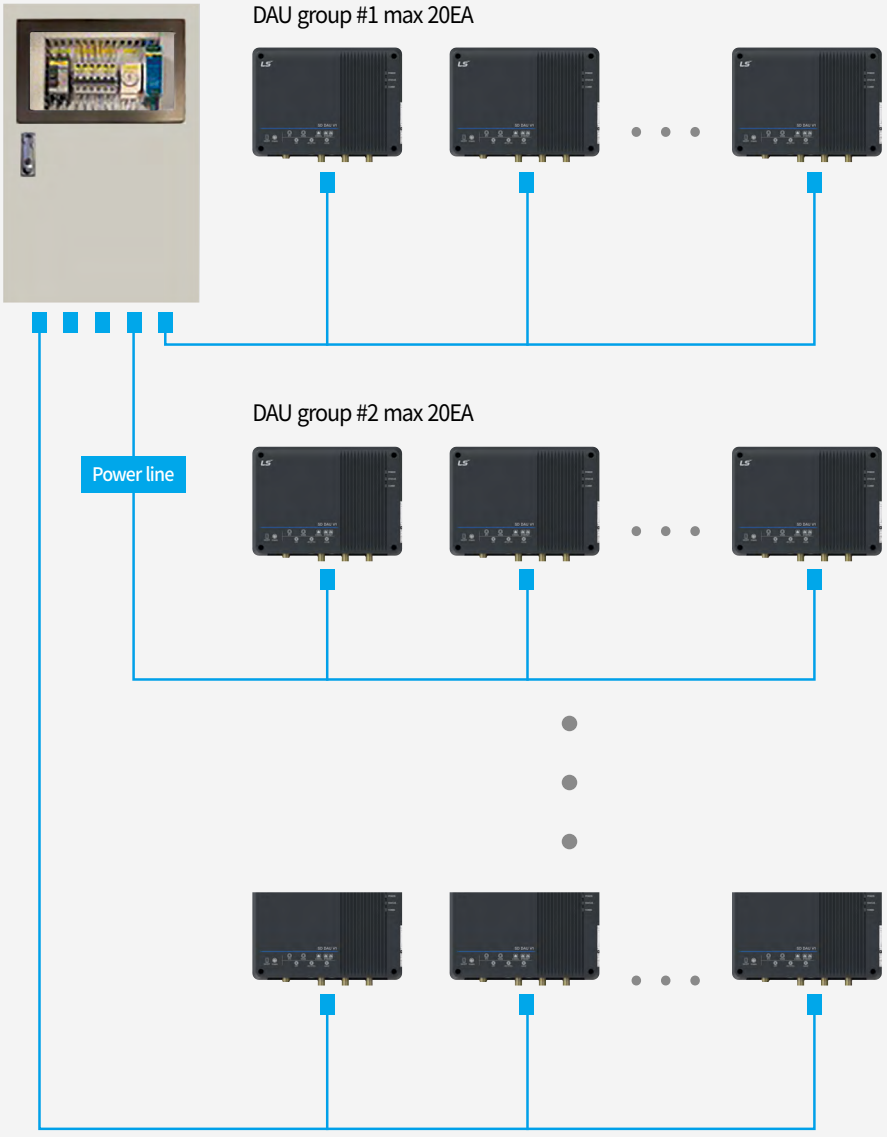
System scalability

- It provides high system scalability as it can be linked with all LS Electric's diagnostic DAU (transmission class to distribution class).

User operational convenience

- Providing monitoring, trend, alarm management, report, facility management, Email/SMS transmission function
- Providing a guide to the cause of the occurrence and actions by providing a diagnostic report for alarms
  - Easy to manage the entire site by providing regular reports (daily, monthly)

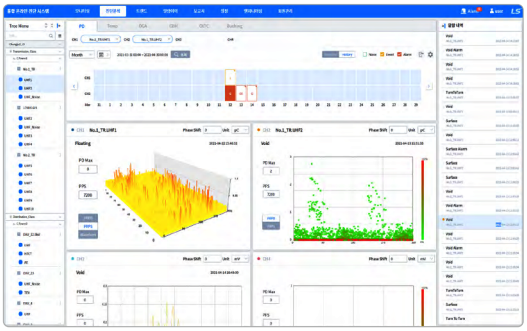
CMD PNL outside (DAU max 100EA)



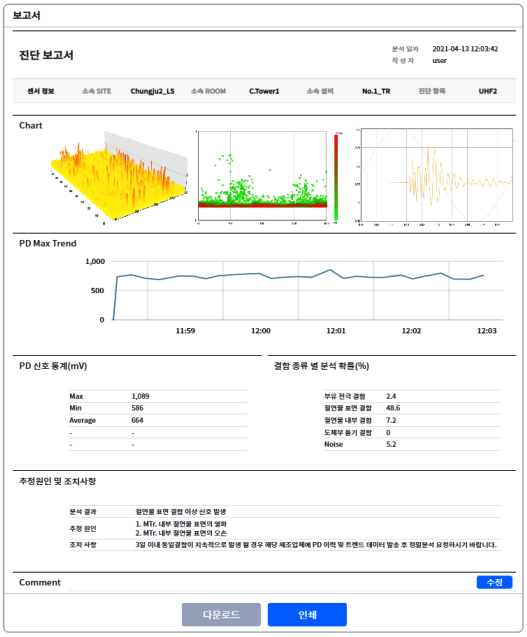
Specification

Item	Function
System	• SDDAU maximum number of connected 100 units/System • 5 simultaneous connection clients • Protocol: DNP3.0
Supported language	Korean, English, Chinese
Diagnostic items	• Partial Discharge • Temperature
PD analysis function	• PD PRPS, PRPS analysis function • PD pulse waveform analysis function • PD ultrasonic analysis function
Temperature analysis	Phase temperature difference (R/S/T), hot spot, temperature change amount
Monitoring and detailed monitoring HMI	• Diagnostic item alarm integrated management function • Real-time inquiry function for power facility diagnosis items
Trend	Real-time trend output and history management
Alarm history and reports	• Alarm history management (System status, Diagnostic analysis) • Inquiry/diagnostic analysis by item and Excel extraction function • Daily and monthly reports
Set-up and engineering	• Site, DAU, Alarm, System related setting function • Matching function (DAU and power facility diagnosis items)
JISP	OPC-UA, Modbus, DNP linkage function

PD analysis



Report



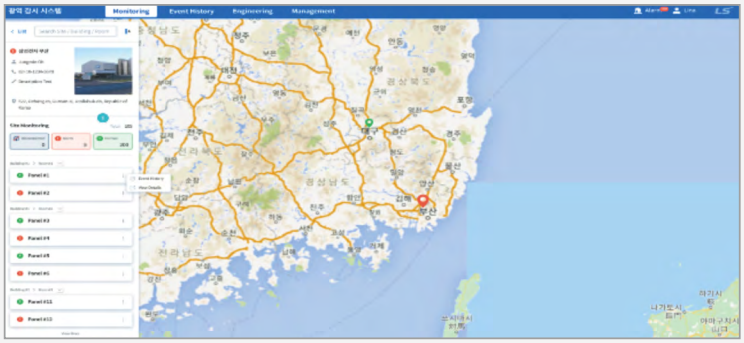
CMS (Centralised Management System)

It is a central operating system that can monitor up to 200 substations by linking with diagnostic CMD and monitoring integrated facilities at domestic/overseas sites.

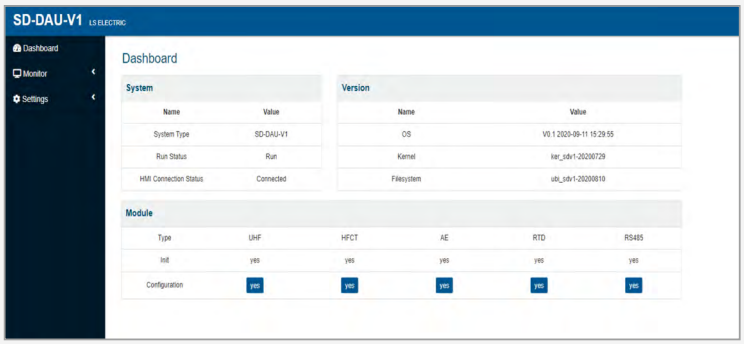
User operational convenience

- Providing monitoring, trend, alarm management, report, facility management, Email/SMS transmission function
- Providing a guide to the cause of the occurrence and countermeasures by providing a diagnostic report for alarms
  - Easy management of the entire site by providing regular (Daily, monthly) reports
- Display substation status information in Map UI, provide location information and search function

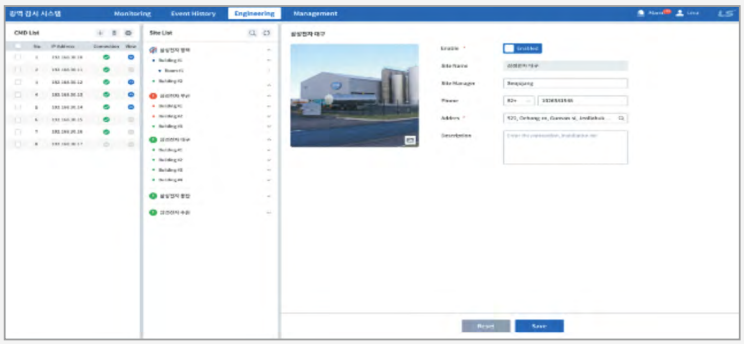
Monitoring



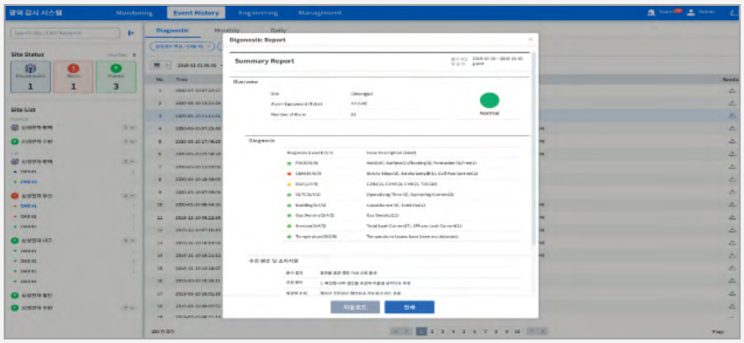
Web dashboard



Site management



Substation summary report



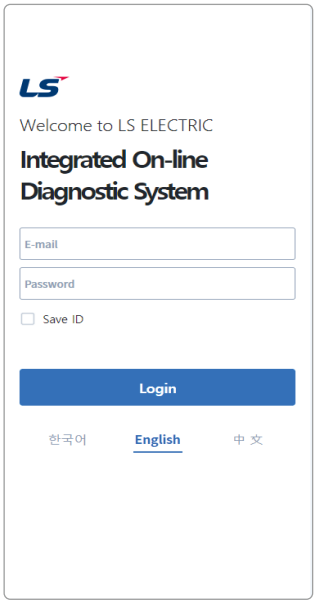
Mobile HMI

Real-time facility status monitoring is possible anytime, anywhere by implementing a mobile web-based monitoring service

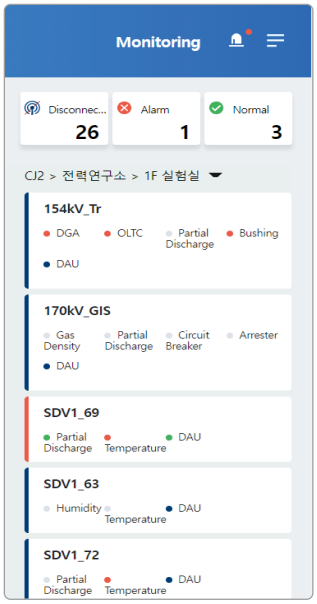
User operational convenience

- Providing monitoring, trend, alarm management, report, facility management, Email/SMS transmission function
- Providing a guide to the cause of the occurrence and countermeasures by providing a diagnostic report for alarms
  - Easy management of the entire site by providing regular (Daily, monthly) reports
- Display substation status information in Map UI, provide location information and search function

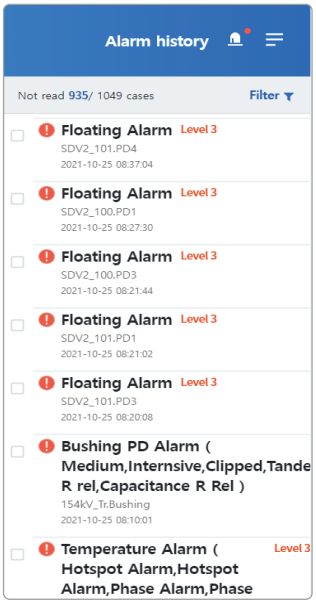
Mobile App



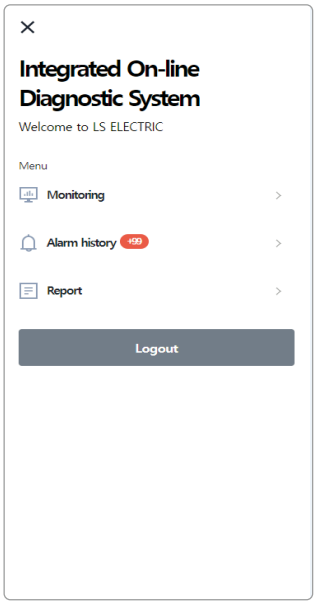
Log in



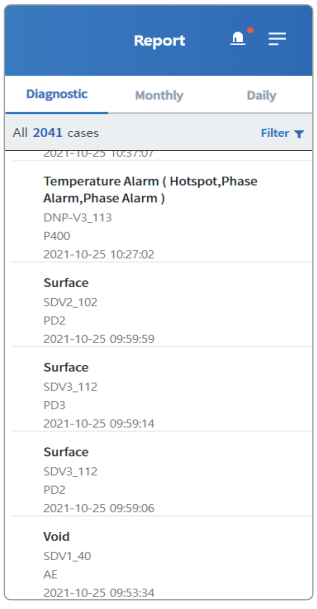
Full monitoring



Alarm history



Detailed



Report

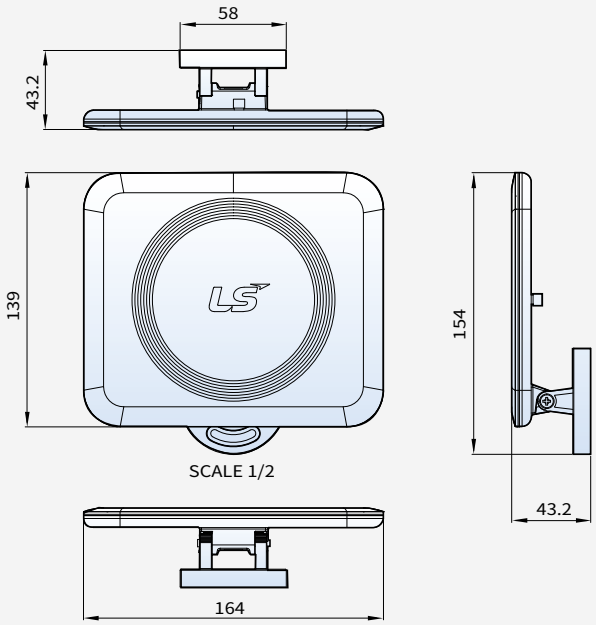
Applied sensor

UHF PD sensor

Specification

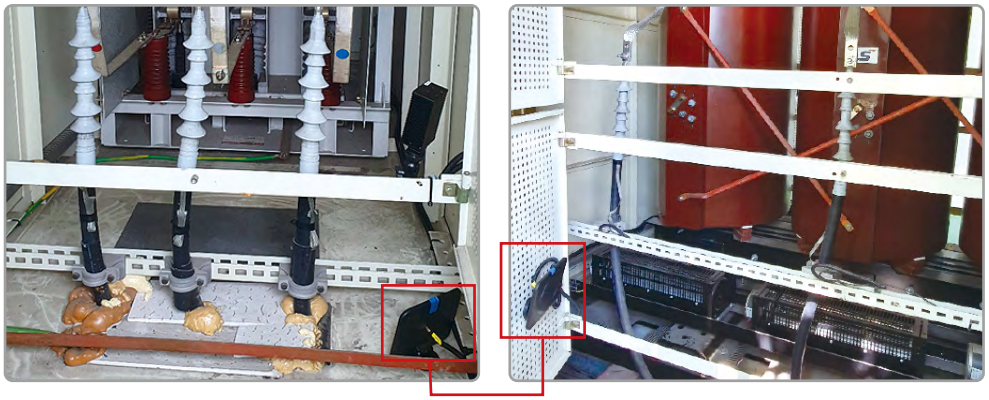
Item	Specification
Frequency band	300MHz ~ 800MHz
Minimum sensitivity	-5.0 [dBm]
Maximum sensitivity	-12.0 [dBm]
Antenna type	Modified bifin type
Connector type	SMA connector
Dimension	Width : 154mm / Height : 43mm / Length : 139mm
Characteristic	Ultra wide bandwidth

Dimensions



※ There is a strong magnet in the cradle, so it can be installed in a fixed or mobile type

Installation

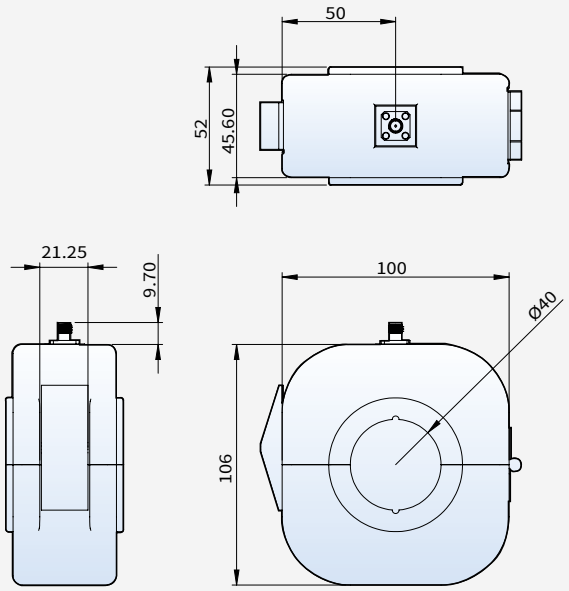


HFCT sensor

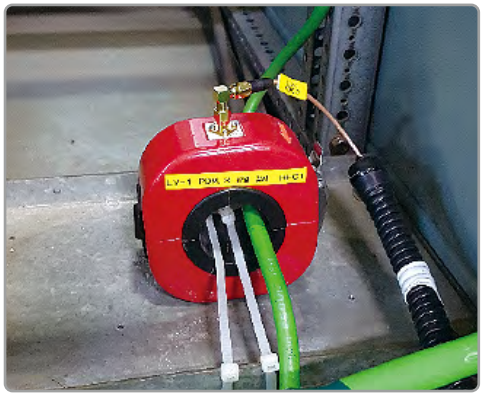
Specification

Item	Specification
Frequency band	1MHz ~ 200MHz
Minimum sensitivity	Over 5pC
Input impedance	50 Ω
Operating temperature	-10°C~85°C
Dimension	• Inner : Ø40 • Outer : 100mm(W) x 106mm(H) x 52mm(D)
Weight	0.8kg

Dimensions

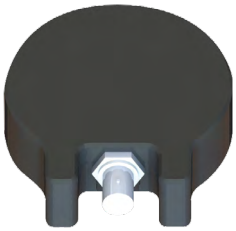


Installation



Applied sensor

TEV sensor

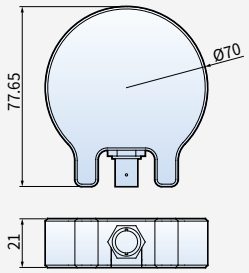


Specification

Item	Specification
Frequency band	1MHz ~ 100MHz
Minimum sensitivity	Over 5pC
Input impedance	50 Ω
Operating temperature	-10°C~85°C
Dimension	• Inner : Ø70 • Outer : 21mm(H) x 77.6mm(D)
Weight	0.9kg

* TEV (Transient Earth Vlotage) :
Measuring PD Signals Flowing on a Grounded Surface

Dimensions



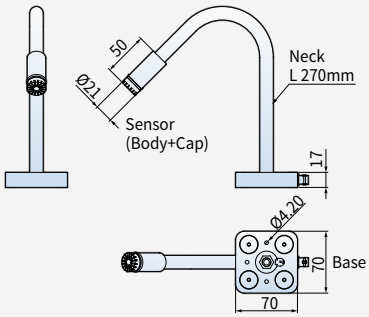
AA sensor

Specification

Item		Specification
Frequency band		40kHz
Receving sensitivity		-66dB Min
Distance of detection		0.3~15m
Operating temperature		-30°C~80°C
Dimension	Sensor (Body+Cap)	Ø21 / L50mm
	Neck length	270mm
	Base	70mm x 70mm x 17mm
Weight		0.4kg

※ AA (Airborne Acoustic) : Non-contact sensor, detection of sound or vibration wave in the ultrasonic field transmitted into the air (40Hz)

Dimensions



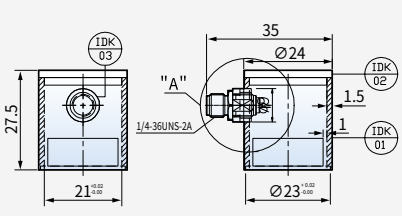
AE sensor

Specification

Item	Specification
Frequency band	60kHz
Electroacoustic transfer fact	62dB
Temperature range	-20°C~80°C
Dimension	24 mm x 27.5 mm (h)
Weight	0.5kg

※ AE (Acoustic Emission) : Contact sensor, detection of sound or vibration wave in the ultrasonic field transmitted over the surface of the enclosure of power equipment

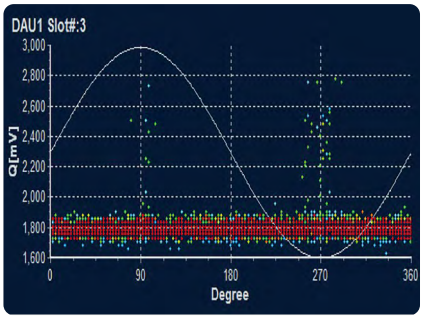
Dimensions



Pattern for each partial discharge defect

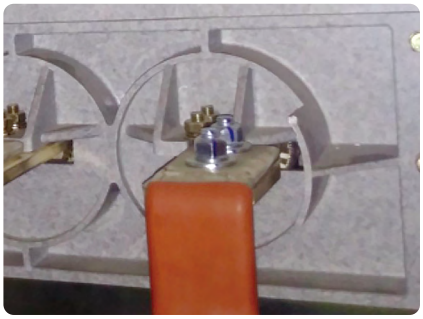
Protrusion

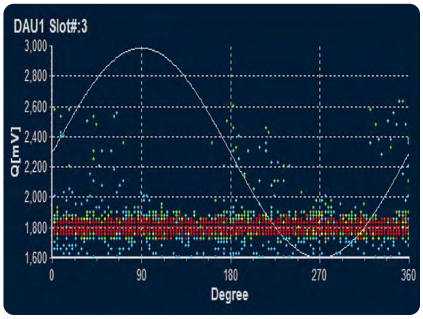
- Pattern form : Signal generation around 90 and 270 degrees
- Occurrence location : Poorly insulated cables, voids created by tightly adjacent cables, and protruding conductors



Floating

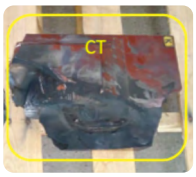
- Pattern form : Signals generated around 15-40 degrees, 60-70 degrees, 200-210 degrees, and 250 degrees
- Occurrence location : Loose bolts, foreign substances in floating state due to operator carelessness, conductor foreign substances inside CT or busbar insulation,, Conductor in ungrounded state

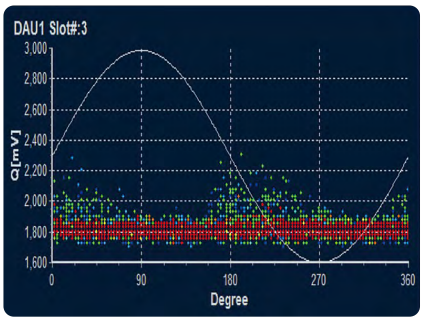




Void

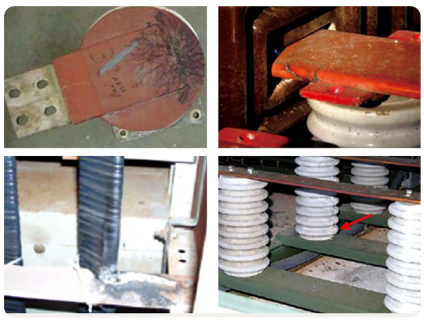
- Pattern form: Signals generated around 0-70 degrees, 175-230 degrees, and 360 degrees
- Occurrence locations: air gap between busbar and insulation, air gap between busbar and barrier, internal defect in CT insulation, cable insulation

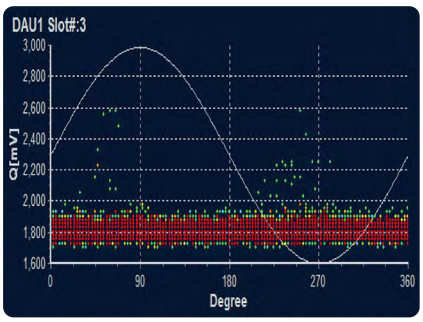




Surface

- Pattern form: Signals generated around 10-80 degrees 190-270 degrees
- Occurrence location: soiled/aged insulators (busbars, insulators, barriers)





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

■ Headquarter

LS-ro 127(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

•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

•LS ELECTRIC Italy office (Italy)
Tel: 39-030-8081-833 E-Mail: italia@ls-electric.com

Technical Question or After-sales Service

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

2022. 05

Specifications in this catalog are subject to change without notice due to continuous product development and improvement.