New name of the Electrical-equipment
VIDER
Value Provider

# Surge Protective Device

## General Catalog

### Lightning Protective Device for Low-Voltage Use

Total Solution containing Consulting
Analysis/Implementation of Protection against Lightning

VITZRO EM

# Contents



# Create Better Life

## To the Light of Technology, To the Light of Value and To the Light of Reliability VITZRO EM, in company with the customers

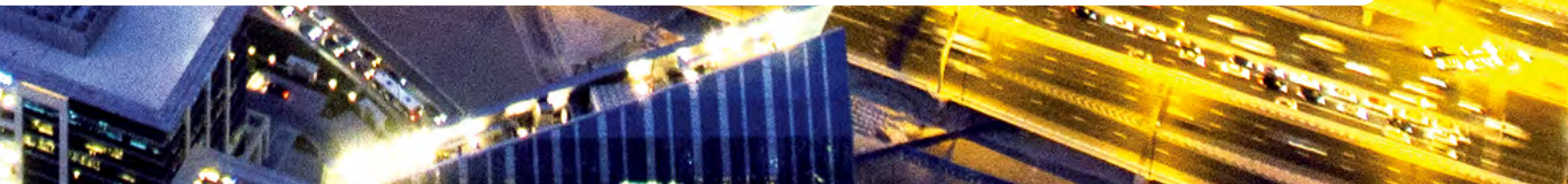
VITZRO EM is a leading company in the electric equipment field, developing an advanced technology, to provide more satisfaction and more advantages for you. Based on a great, expert knowledge and technology on heavy electric equipment, electric power equipment and aerospace field, VITZRO EM creates a new value to propose a new standard that will change the future.

# A Bright Future, VITZRO EM

A company that customers love more than ever for we give you a larger value.
Find a bigger world along with VITZRO EM!

## A company that believes in faith and creativity as the optimal value

VITZRO EM has developed into a manufacturer of MV equipment, LV equipment, protective equipment and relays in the domestic electric equipment business with the company vision, 'Faith' and 'Creativity.' Based on the 'Faith', we think of our customers and with 'Creativity', we provide a new value. VITZRO EM will provide the new value for the convenience of customers. Basically, high-quality electric equipment and services will be provided and we will endeavor to meet the requirements of customers through our humane and sensible attitudes. Our company represents the electric equipment, yet we are the company of humans. Our company thinks of customers first by providing and enabling the use of convenient and stable equipment.
VITZRO EM is the new value to pursue.



# Technology Integrated Global Group

## The History of VITZRO EM is the History of Technology.

VITZRO EM was founded in 1955, at the embryonic stage of domestic electric power industry and as we continue our tradition and history for over half a century, we constantly challenged and leapt forward, leading the future with the reputation of Korea's best technology company.

**2009** K-STAR Plasma facing component manufacture & assembly

**1999** Designated as Top 50 companies for competitive quality(at present VITZRO EM)

**2006** Awarded prize for USD 10million tower of export

**1955** Establishment for Gwang Myung electric machinery(at present VITZRO EM)

## 1955 ~ 1988 _ History of Technology, Open Up New Vistas

Kwangmyung Electric Co. was founded in 1955 and started as a neutral electricity manufacturer in January, 1968 and moved the plant to Seongsu-dong in April, 1972. The company prepared a foundation as a technology company through a technical tie-up with AICHI Company and VSS & ATS of Japan in April, 1981 and a technical cooperation with MEIDENSHA Company of Japan and a contract was concluded on Korean retail stores (V.I) in December of the same year. VCB 7.2kV-Class Type Test (localization) was completed in July, 1982 and VCB 25.8kV-Class MCSG 2 Type and 7.2kV Type Tests were completed in September of the following year. We were designated as an electric parts and materials development company (Ministry of Commerce, Industry and Energy) for Type1 other than a vacuum contact in July, 1986 and established a technical cooperation with LINDSEY Company, USA on Polymer Concrete in December of the following year. In addition, 4 types of ACB were developed in June, 1988 and successfully localized them (KEMA Authentication, Netherlands).

## 1989 ~ 1999 _ Opportunity, Challenge and Remarkable Leap

The company name was changed to Kwangmyung Electric Generation Co. in June, 1989 and an affiliated technology lab was founded in December of the same year. We obtained KS marks for VCB 7.2kB, 8kA and 12.5kA in 1990 (Industrial Advancement Administration) and passed the development test for ACB 2 Types (KERI) in 1991 and for outdoor VCB and Gas Insulated Load Break Switch (PGS) (CESI, Italy) in 1993. We acquired the KS mark for Gas Insulated Load Break Switch (PGS for manufacturing) in 1995 and were awarded with the first Export Award (KEMC). We began exporting ATS to GENERAC.CORP, USA in 1995 and obtained KSA-QA ISO9001 certificate. We moved the office to Seoul in August, 1996 (Neung-dong, Gwangjin-gu, Seoul) and successfully developed Manual/ Motorized ASS 25.8kV 200A in December. Also, VCB development test was completed in 1997 (POWER TECH, CANADA), developed L/A 5kA in 1998 (Polymer Rubber Type), developed VCB 25.8kV, 31.5kA, 38kA and 40kA and acquired BVQ1 ISO 9001 certificate. A joint company with China was founded in 1998 and we were awarded IR52 Jang Young Shil Award in February of the following year (Maeil Business Newspaper) and selected as one of the 50 firms with qualitative competitiveness in 1999 which displayed our technical skills and quality that we strengthened for years.

## 2000 ~ 2016 _ VITZRO, Stepping Forward to the World

The company name was changed to VITZRO EM Co. in 2000. We laid a foundation for a rapid growth by developing VCB 12kV 1250A 25kA/15kV 1200A 25kA and registering in KOSDAQ stock market. A new plant was constructed in July of the following year (located in Seonggok-dong, Ansan, Gyeonggi Province) and we were designated as a promising small business (Gyeonggi Province Office), an electric parts and materials development company and INNO BIZ company (Joint Korean Economic Newspaper/Small and Medium Business Administration). We sped up on development of new technology and products and developed Cable Termination kits, Insulation Cover, Feed-type ASS (auto & manual), Outdoor VCB Bushing (Polymer Type) and Processed Gas Insulated Load Break Switch in 2002, VCB for nuclear power, ACB for nuclear power (508V 30/50/65kA), Current Limit Power Fuse and so forth in 2003. We were also awarded with various certificates and awards that prove our quality and technology such as a reliability certificate on Processed Gas Insulated Load Break Switch (PGS) in 2004 (R Mark, Korean Agency for Technology and Standards), a Certificate of Quality & Environment System and Aerospace Quality System (ISO 9001 & AS9100, ISO 14001) and a grand prize at the 1st Logo & Symbol Mark Contest (Ministry of Commerce, Industry and Energy Award). We obtained GD mark in 2005 and finally got a 1,000 ten million dollar-export prize in November, 2006, confirming the remarkable growth of VITZRO EM.

## 2017 _ VITZRO EM New Subsidiary

In July 2017, VITZRO EM starts its electric-power equipment business through physical division. Through product development using VI technology, we plans to grow into a only one of electrical equipment industry, VITZRO EM has a vision to become a global leader based on its technical superiority and business expertise.

Best products of electric equipment field including LV and HV from designing, manufacturing, installing and diagnosing the equipment to composing the power system, it is based on the accumulated, global standard technology and continuous R&D.

## LV Equipment

### Air Circuit Breakers

- ANSI C37.13/EED1200 Certification for Nuclear Power
- Adopted multifunction digital trip relay
- KS, KERI, IEC Certification
- Compact, lightweight
- Standard Specification: IEC 60947-2
- Implementing remote monitoring and control communication

### Molded Case Circuit Breakers

- UL Certification, Max. 800AF
- Max. 1200AF, fully equipped with all series 3/4P
- MCCB / ELCB same frame
- Realization of various auxiliary devices
- Compatible installation of new and old products

### Earth Leakage Circuit Breakers

- Standardized main sizes, easy manufacturing of panel
- Composed of max. 225AF, 2/3/4P
- MCCB / ELCB same frame
- Compatible installation of new and old products
- Adjustable sensitivity current, Max. 500mA

### Miniature Circuit Breakers

- Minimum size, easy to apply panel board
- Increase of breaking capacity (5kA at AC 220V)
- Equipped with leakage display button


### Auto Transfer Switches

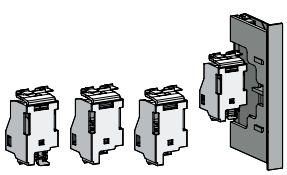
- UL1008 Certification, KERI Type Test completed
- Maximum short circuit capacity in the country
- Optimal form that enables installation of 600mm-panel board for all types
- Ensure stability through separately sealed structure for each phase

### Magnetic Contact

- Improved Quality and Decreased Noise
- Convenient and Safe structure
- Enhanced safety by adopting Transparent Safety Cover

### Thermal Overload Relay

- Direct connection to a magnetic contactor
- Finger proof cover can be installed
- Separation of power/operation part



### Auxiliaries

- Standardized auxiliaries, easier to apply
- AL, AX, UVT, Shunt - various auxiliaries

## MV Equipment

### Vacuum Circuit Breakers

- Rated breaking time of all types - 3 cycle
- Nuclear power certification ANSI C37.06 / EED1100
- Developed the first domestic Embedded VCB
- Passed KERI, KEMA, CESI development test
- Standard Specification: IEC 62271-100 [M2, E2, C2 Class]

### Load Break Switch/Auto Section Switch

- Maximum fuse combined capacity in the country–Max. 100A
- LA & PF external combination structure
- Easy to design single-body panel through optimal form design
- Standard Specification: IEC 62271-105, IEC 60265-1, KEMC1126
- Compatible structure for LBS and ASS

### Vacuum Contact Switches

- Rated breaking time 6.3kA(16.4kA peak)
- Minimize switch surge through optimal VI design
- Standard Specification: IEC 60470, IEC 60282-1
- Realization of mechanical interlock between VCSs or with other devices

### Vacuum Interrupter/Embedded Pole

- Maintain high-vacuum state through automation process
- Compact and lightweight, durable design
- Collect and store all manufacturing information
- Excellent mechanical strength and degasing
- High-speed breaking and short arcing time

### Main Circuit Breaker for Rolling Stock/ Vacuum Train Breaker(MCB/VTB)

- The sole main circuit breaker for rolling stock in the country
- Excellent seismic performance
- Detection of operating pressure and auto trip function
- Stable breaking feature (AC, DC line)

### Gas Insulated Load Break Switch(GLBS)

- Division of lines and tapped line applied
- 3 position function(ON, OFF, Earth)
- Increase safety with hot-line display
- Certificate on reliability by KATS
- Low pressure display and lock function

### Vacuum Transfer Switches

- The one and only Medium Voltage Transfer Switch in Korea
- Electrical & Mechanical Interlock available.
- Economical optimization (Two sides of panels and two pieces of VCBs are not necessary.)
- Minimized outside dimension which can be possible with multistage loading.

### Current Limit Power Fuse

- Optimal current limit feature
- Protection through full back-up with high breaking capacity
- Maximum striker motional energy in the country
- Simplified with 4 types of fuse forms
- Protect transformers, motors, Capacitor and wires

## IED & Controller

### Digital Protection Relay VIPAM

- System protection required, relay element provided
- Store history of faults(trouble) and wave form
- Provide analysis function through PC interlocking
- RS422/485 communication support
- English/Korean language support

### Digital Control Meter VIMAC, VIDER

- Power quality analysis and breaker control
- Automatic power factor control (APFC), harmonic analysis

## Protective Device

### Lightning Arrester/Surge Absorber(LA/SA)

- Optimal motion of Gapless type
- Scatter prevention when explodes using a polymer LA
- Can be used outdoors using a polysil SA
- Fire prevention due to nonflammable material

### Surge Protective Device

- IEC and KS standard certification
- Built-in fuse with disconnecting device function
- Excellent TOV failure feature
- Operation status display lamp (LED Lamp)
- Easy to install using a Plug In type

VITZRO EM

# We Create the Next Value

## By the light of technology, value and confidence, Together with customers, we are VITZRO EM

Leading the pleasant and affluent field of electric power equipment with state-of-the-art technology, VITZRO EM is creating new value in order to offer greater customer satisfaction with greater business value as well as present new standards, while making a difference for a better future, based on thorough knowledge and skills in the fields of heavy electric equipment, power electronics and aerospace.

VITZRO EM

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Surge Protective Device General Catalog



# Surge Protective Device

General Catalog

# D1 Surge Protective Device

Products Guide

## CONTENTS



# Surge Protective Device Classification

SPD

## For Power Supply

**V B – 40 K 3 C**

| Company | |
|---|---|
| V | VITZRO |

| Series Type | |
|---|---|
| B | Box Type |
| D | DIN Type |

| Withstand | |
|---|---|
| 40 | 40kA |
| 80 | 80kA |
| 120 | 120kA |
| 160 | 160kA |

| Withstand Type | |
|---|---|
| K | kA |

| Pole | |
|---|---|
| 2 | 2P |
| 3 | 4P |
| 3-3W | 3P |

| Counter Type | |
|---|---|
| C | Counter Type |
| - | N/A |

**V E – 40 K – 2P**

| Company | |
|---|---|
| V | VITZRO |

| Series Type | |
|---|---|
| E | Economic |

| Withstand | |
|---|---|
| 40 | Imax 40kA |
| 80 | Imax 80kA |
| 120 | Imax 120kA |
| 160 | Iimp 12.5kA |

| Withstand Type | |
|---|---|
| K | kA |

| Pole/Solar |
|---|
| 2P |
| 3P |
| 4P |
| 13(Solar) |

## For Communication/Signal

**V S – 24B(D)**

| Company | |
|---|---|
| V | VITZRO |

| Series Type | |
|---|---|
| S | Signal Type |

| Operating Voltage(DC) | |
|---|---|
| 12 | 12V |
| 24 | 24V |
| 48 | 48V |
| 130 | 130V |

# Product certification and performance test inspection



## Securing reliability for performance and safety!

VITZRO EM SPD products are SPD for power supply, communication or signal which have acquired KERI certification according to the latest KS and international standards (KS C IEC 61643-11, KS C IEC 61643-21)

KS C IEC61643-11

VS-24/48B CB

VS-24B/VS-48B CE

VE-40K CE

VE-40K13 CE

CERTIFICATION

KAS 지식경제부 기술표준원 한국제품인정기구 Korea Accreditation System

SINCERT

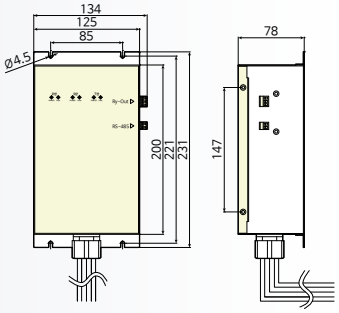
한국전기연구원 KOREA ELECERTECHNOLOGY RESEARCHINSTITUTE KERI

# VB-160K3-K

KS Mark Certified Product

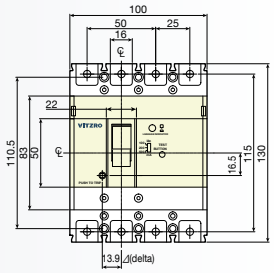
**VB-160K3-K**

## External Dimensions




**VDC-104**

## External Dimensions




## Features

- KS Certificated Product(Product to satisfy specification of LH construction)
- Excellent TOV (Temporary Over Voltage) fault characteristics
- Checking of power status and functional loss of surge protective device via LED
- MOV Fault Alarm function
- RS-485 Communication function
- Single MOV type high surge energy treatment
- Internal heat explosion protection circuit

## Box Type Rated Specifications

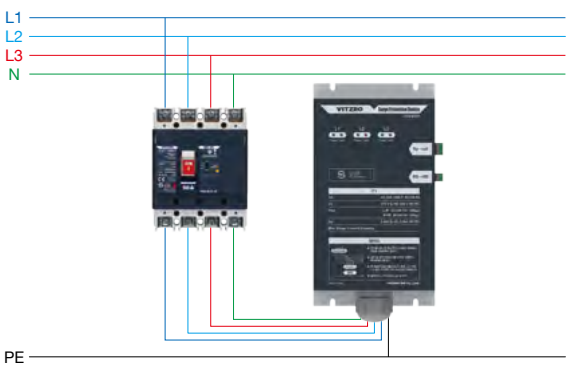
| Section | Unit | VITZROEM Co., Ltd. | |
|---|---|---|---|
| Model | | VB-160K3-K | |
| Application standard | KS | KS C IEC 61643-11 | |
| Operating Voltage | V | 220~500VAC | |
| Maximum Continuous Voltage(Uc) | V | 275V(L-N), 255V(N-PE) | |
| Impulse Discharge Current(Iimp) | kA | L-N | 12.5kA(10/350μs) |
| | | N-PE | 50kA(10/350μs) |
| Maximum Discharge Current(Imax) | kA | 120/160kA(8/20μs) | |
| Voltage Protection Level (Up) | kV | L-N | ≤2.0kV |
| | | N-PE | ≤2.5kV |
| SPD Separator | | Thermal & Short Circuit Fuse Type | |
| Product Dimensions | mm | 125×231×78mm | |
| Operating Temperature | ℃ | -30℃~80℃ | |
| Mounting Type | | Parallel / Wall type | |
| Installation System | | CT2(TT/TN) | |
| Installation Place | | Indoor Type | |

* The operating voltage not to exceed the maximum continuous voltage when 3 phase 3 wire⊿(delta) connection is used.

## Rated Specifications on SPD Exclusive External Separator

| Section | Unit | VDC-104 |
|---|---|---|
| Application standard | KS | KS C IEC 61643-11, KS C IEC 60947-2 |
| Test Class | | Class I |
| Pole | P | 3P+N |
| Rating Voltage | VAC | 220/380 |
| Surge Impulse | kA | Class I(10/350us), L-N:12.5kA, N-PE:50kA |
| Short circuit current | kA | 25kA |
| SPD a short circuit current | mA | 500mA |
| Operating Speed | s | 0.03s |

## Specifications



# VB-80K3-K

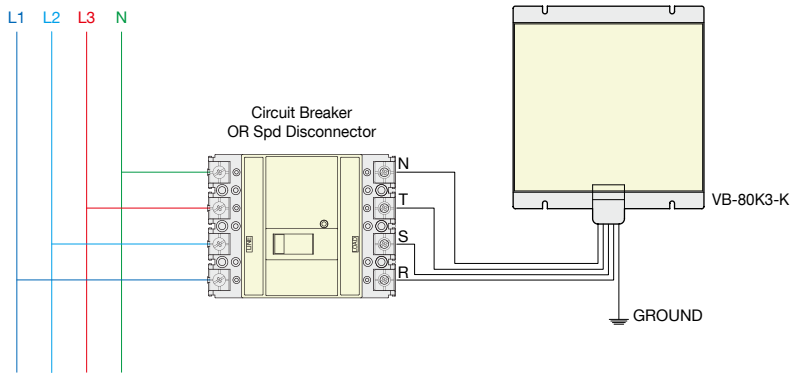
## Features

- LED operating status display
- RS-485 Communication Counter
- Mov Fault Alarm(Option)
- Surge Counter(Option)

## Specifications

| Manufacturer | VITZROEM Co., Ltd. |
|---|---|
| Model | VB-80K3-K |
| Application standard | KS C EIC 61643-11 |
| Rating Voltage(Un) | 400/230V, 50/60Hz |
| Maximum Continuous Voltage(Uc) | L-N:320V, N-PE:255V |
| Discharge Current(In) | test Class II , 40kA |
| Voltage Protection Level(Up) | 3kV(L-N, N-PE) |
| Operating Time(tA) | 25ns |
| Port | One port |
| Mounting Type | Screw Attachment Method |
| Separator Operation Identification | The red LED lights up when the internal separator starts operating. |
| Show Replacement | Replace the SPD when the red LED on the front lights up. |
| Installation System | CT2(TN, TT) |
| Operating Temperature | -40℃ ~ +70℃ |
| Operating Humidity | 5% ~ 100% |
| Follow Current Interrupting Rating (Ifi) | 100A |
| Leakage Current (IPE) | 10mA |
| Protection Mode | L-N, N-PE |
| Test Class | Class Ⅰ |
| IP Protection Class | IP20 |
| Installation Place | To be installed indoor (within the distribution box) |

## Specifications

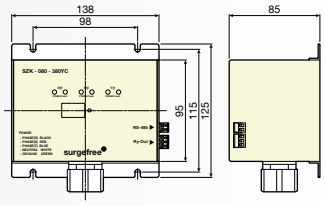



## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Water treatment facility main power supply

VB-80K3-K


### External Dimensions

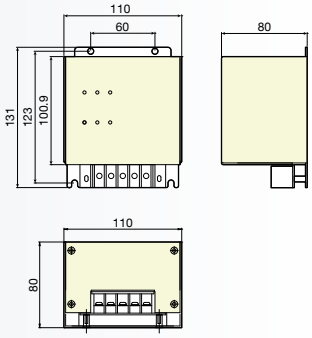


# VB-40K3-K

KS Mark Certified Product

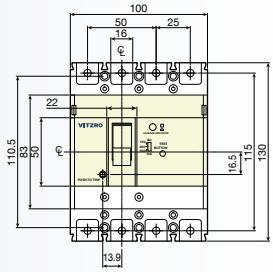
VB-40K3-K


## External Dimensions




VDC-54


## External Dimensions




## Features

- KS Certificated Product(Product to satisfy specification of LH construction)
- Excellent TOV (Temporary Over Voltage) fault characteristics
- Checking of power status and functional loss of surge protective device via LED
- Single MOV type high surge energy treatment
- Internal heat explosion protection circuit

## Box Type Rated Specifications

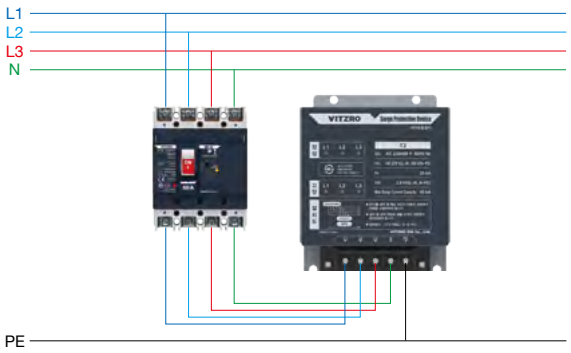
| Section | Unit | VITZROEM Co., Ltd. | |
|---|---|---|---|
| Model | | VB-40K3-K | |
| Application standard | KS | KS C IEC 61643-11 | |
| Operating Voltage | V | 220~500VAC | |
| Maximum Continuous Voltage(Uc) | V | L-N | 275VAC |
| | | N-PE | 255VAC |
| Nominal Discharge Current(In) | kA | L-N, N-PE | 20kA(8/20㎲) |
| Maximum Discharge Current(Imax) | kA | 40kA(8/20㎲) | |
| Voltage Protection Level | kV | L-N, N-PE | ≤2.0KV |
| SPD Separator | | Thermal & Short Circuit Fuse Type | |
| Product Dimensions | mm | 110×131×80mm | |
| Operating Temperature Scope | ℃ | -5℃~40℃ | |
| Mounting Type | | Parallel / Wall type | |
| Installation System | | CT2(TT/TN) | |
| Installation Place | | Indoor Type | |

* The operating voltage not to exceed the maximum continuous voltage when 3 phase 3 wire⊿(delta) connection is used.

## Rated Specifications on SPD Exclusive External Separator

| Section | Unit | VDC-54 |
|---|---|---|
| Application standard | KS | KS C IEC 61643-11, KS C IEC 60947-2 |
| Test Class | | Class II |
| Pole | P | 3P+N |
| Rating Voltage | VAC | 220/380 |
| Surge Impulse | kA | Class II(8/20us), L-N/N-PE:20kA |
| Short circuit current | kA | 10kA |
| SPD a short circuit current | mA | 500mA |
| Operating Speed | s | 0.03s |

## Specifications



# SPD for Power Supply | Class I | Din-Rail Type LD-22EFSK for Protection Against Direct Lightning

KS C IEC 61643-11 KS-certified product
KSA KSciec 61643-11

## LD-22EFSK

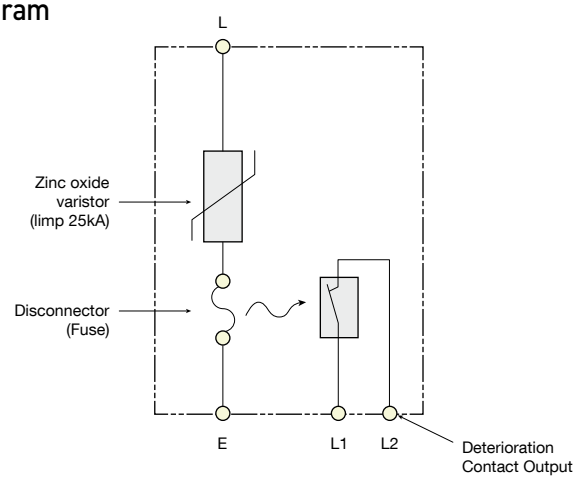
## Features

- KS C IEC 61643-11 KS-certified product
- Inductor for SPD coordinated protection not required
- Single MOV type high surge energy treatment and for protection against direct lightning
- Low protection voltage (Up=1,300V)
- DIN Rail type (power circuit parallel connection and simple installation)
- Surge noise cut and follow current interruption
- Terminal cover for electric shock protection and supervisory control node
- Disconnecting device function with built-in fuse

## Specifications

| Manufacturer | VITZROEM Co., Ltd. |
|---|---|
| Model | LD-22EFSK |
| Installation Place | Indoor |
| Mounting Type | Parallel / 35mm Din Rail |
| Short Circuit Current Rating | 25kA |
| External Separator Rating (Recommendation) | MCCB 100AF, 100kA |
| Separator Operation Identi cation | Projecting of red pin in case of deterioration |
| Operating Voltage (AC Nominal Voltage) | Below 274 VAC (Phase voltage) |
| Maximum Continuous Voltage (Uc) | 274V |
| Operating Current and Frequency | AC 50/60Hz |
| Product Dimensions | 84mm×102mm×33mm(1 pole) |
| Wire Range | 6mm$^2$~25mm$^2$ |
| Test Class | Class |
| Nominal Discharge Current (In) | 25kA |
| Impulse Current (limp) | 25kA |
| Voltage Protection Level (Up) | 1300V(L-E) or below |
| IP Protection Class | IP20 |
| Operating Temperature/Humidity Range | -40~60℃/30~90%RH |
| Certi cation | KS |

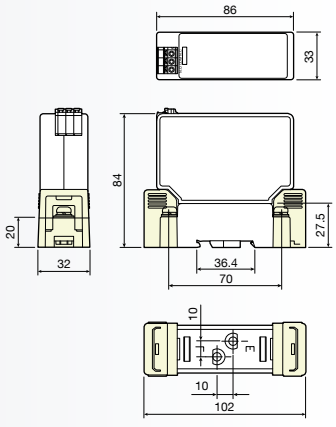
## Circuit Diagram




## Applications

- Protection of power sources exposed directly or indirectly to direct lightning outside a building
- Switchboard installed rooftop or outdoor (panel board, power panel, common board, etc.)
- Base stations in mountainous areas, gas pipes or water pipes
- Aircraft warning lights, outdoor lamps and surveillance cameras

### External Dimensions



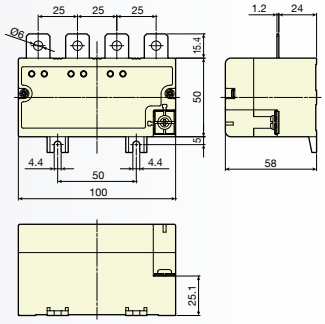
# VD-40K3-D

## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Measuring instruments, house panel board
- CCTV power line, water treatment facility main power supply

VD-40K3-D


### External Dimensions



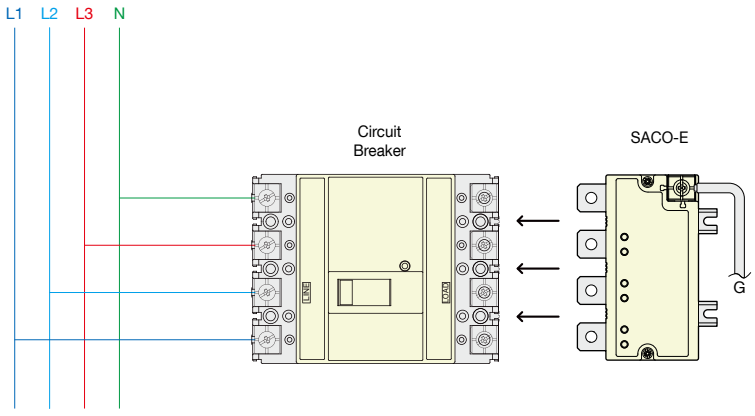

## Features

- LED operating status display
- No additional connecting cable required for installation

## Specifications

| Manufacturer | VITZROEM Co., Ltd. |
|---|---|
| Model | VD-40K3-D |
| Application standard | KS C EIC 61643-11 |
| Rating Voltage(Un) | 400/230V(L-L/L-N) |
| Maximum Continuous Voltage(Uc) | L-N:320V, N-PE:255V |
| Discharge Current(In) | test Class II , 200kA |
| Voltage Protection Level(Up) | 2kV(L-N, N-PE) |
| Operating Time(tA) | < 25ns |
| Port | One port |
| Mounting Type | Screw Attachment Method |
| Separator Operation Identi cation | The red LED lights up when the internal separator starts operating. |
| Installation Place | 3phase 4wire 50/100AF Breaker Load Side |
| Installation System | CT2(TN, TT) |
| Operating Temperature | -40℃ ~ +70℃ |
| Operating Humidity | 5% ~ 95% |
| Follow Current Interrupting Rating(Ifi) | 100A |
| Leakage Current (IPE) | 1mA |
| Temporary Over-Voltage (TOV) | Replace the SPD when the red LED on the front lights up. |
| Protection Mode | L-N, N-PE |
| Test Class | CLASS II/III |
| IP Protection Class | IP20 |
| Installation Place | To be installed indoor (within the distribution box) |

## Specifications



KS C IEC 61643-11 KS-certified product
KSA KSciec 61643-11

# VD-40K2 | VD-40K3

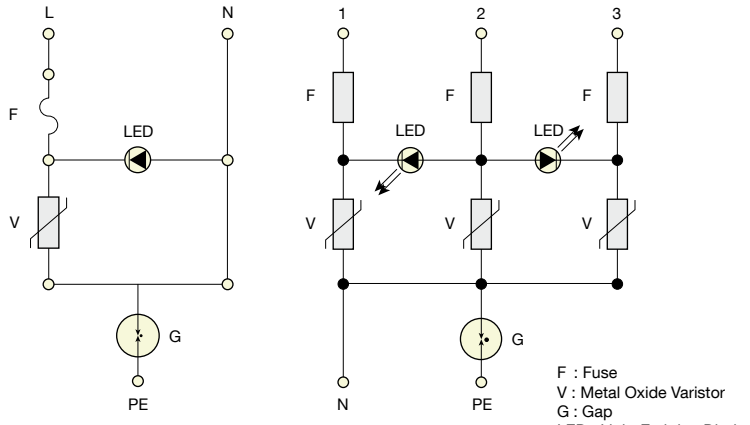
## Features

- KS C IEC 61643-11 KS-certified product
- Single MOV type high surge energy treatment
- Low protection voltage (Up=1,800V)
- DIN Rail type (power circuit parallel connection and simple installation)
- Surge noise cut and follow current interruption
- SPD status display (LED lamp)
- Full-mode protection (common mode and differential mode)

## Specifications

| Manufacturer | VITZROEM Co., Ltd. | |
|---|---|---|
| Model | VD-40K2 | VD-40K3 |
| Installation Place | Indoor | |
| Mounting Type | Parallel / 35 mm Din Rail | |
| Short Circuit Current Rating | 25kA | |
| External Separator Rating (Recommendation) | MCCB 50AF, 50kA | |
| Separator Operation Identification | Lamp On in Normal Operation<br>Lamp Off in Abnormal Operation | |
| Operating Voltage (AC Nominal Voltage) | 220V | 220/380V |
| Maximum Continuous Voltage (Uc) | 275V | 275V |
| Operating Current and Frequency | AC 50/60Hz | |
| Product Dimensions | 50mm×96mm×65mm | 75mm×96mm×65mm |
| Wire Range | 4mm²~16mm² | |
| Test Class | Class II | |
| Nominal Discharge Current (In) | 20kA | |
| Maximum Discharge Current (Imax) | 40kA | |
| Voltage Protection Level (Up) | 1800V or below (L-PE, L-N, N-PE) | |
| IP Protection Class | IP20 | |
| Operating Temperature/Humidity Range | -20~50℃/30~90%RH | |
| Certification | KS | |

## Circuit Diagram

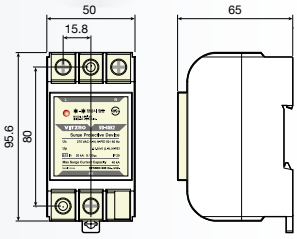



## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Measuring instruments, house panel board
- CCTV power line, water treatment facility main power supply

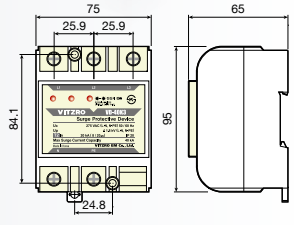
VD-40K2


### External Dimensions




VD-40K3


### External Dimensions



# VE-SERIES

## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc.
- IED&Relay Power Protection

VE-40K 2P

VE-40K 3P

VE-40K 4P

VE-160K 4P

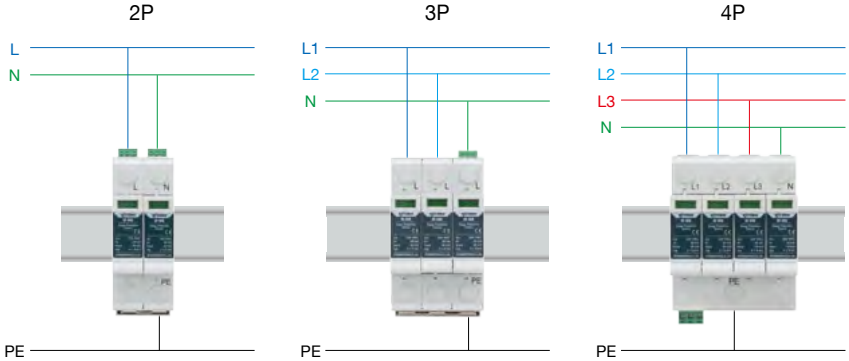
## Features

- KS C IEC 61643-11 KS-certified product
- Single MOV type high surge energy treatment
- Low protection voltage (Up=1,500V)
- DIN Rail type (power circuit parallel connection and simple installation)
- Surge noise cut and follow current interruption
- SPD operation status display

## Specifications

| Section | | Unit | VE-40K | VE-80K | VE-120K | VE-160K |
|---|---|---|---|---|---|---|
| Application standard | | KS | KS C IEC 61643-11 | | | |
| Mounting Type | | | Parallel/35mm Din Rail Mounting | | | |
| SPD Class | | | Class II | | | Class I |
| Pole | | P | 2P, 3P, 4P | | | |
| Maximum Continuous Voltage(Uc) | | VAC | 320VAC | | | |
| Nominal Discharge Current(In) | | kA | 20 | 40 | 60 | - |
| Maximum Discharge Current(Imax) | | kA | 40 | 80 | 120 | 160 |
| Impulse Discharge Current (Iimp) | | kA | - | - | - | 12.5 |
| Limit voltage(Up) | | kV | 1.5 | 2.2 | 2.4 | 2.5 |
| IP Protection Class | | IP | IP20(Indoor) | | | |
| SPD operation status display | | | Red after an abnormal accident | | | |
| Wire Range | | $mm^2$ | 4~16 | | | 6~16 |
| Size(W×H×D) | 2P | mm | 36×90×65 | 36×90×65 | 54×90×62 | 72×90×67 |
| | 3P | mm | 54×90×65 | 54×90×65 | 81×90×62 | 108×90×67 |
| | 4P | mm | 72×90×65 | 72×90×65 | 108×90×62 | 144×90×67 |
| Operating Temperature | | | -40~70℃ | | | |
| Response Time | | ns | 25 | | | |
| Certification | | | CE | - | - | - |

## Connection Diagram



# VE-40K13 (Solar)

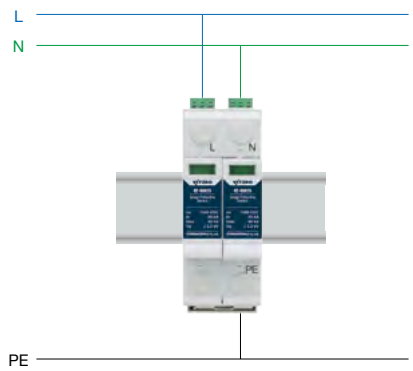
## Features

- KS C IEC 61643-11 KS-certified product
- Single MOV type high surge energy treatment
- Low protection voltage (Up=1,500V)
- DIN Rail type (power circuit parallel connection and simple installation)
- Surge noise cut and follow current interruption
- Terminal cover for electric shock protection and supervisory control node
- SPD operation status display

## Specifications

| Manufacturer | VITZROEM Co., Ltd. |
|---|---|
| Model | VE-40K13 |
| Installation Place | Solar |
| Mounting Type | Parallel / 35 mm Din Rail |
| Internal Separator Operation Method | Thermal Type |
| Maximum Continuous Voltage(Uc) | DC 1000V |
| Product Dimensions | 36×90×65mm |
| Terminal Marking | On the Product (1, 2, PE) |
| Wire Range | 4mm²~16mm² |
| Test Class | Class |
| Nominal Discharge Current(In) | 20kA |
| Maximum Discharge Current(Imax) | 40kA |
| Voltage Protection Level (Up) | 2200V or below |
| IP Protection Class | IP20 |
| Operating Temperature/Humidity Range | -20~50℃/30~90%RH |
| Certification | CE |

## Connection Diagram

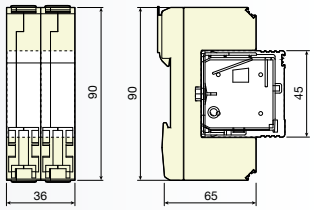



## Applications

- Protection of solar power generation facilities
- Protection of power equipment from indirect or induced lightning inside a building
- Low-tension switchboard, control panel
- Safety control center, supervisory control center, computer room, etc
- Water treatment facility main power supply, etc

VE-40K13


### External Dimensions



# VB-40K2 | VB-80K2 | VB-120K2 (1-Phase General Type)

## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Water treatment facility main power supply, etc.

VB-40K2


VB-80K2


VB-120K2


## Features

- KS C IEC 61643-11 KS-certified product
- Checking of power status and functional loss of surge protective device via LED
- Low protection voltage using high performance MOV deviceFeaturesDimensionsModel

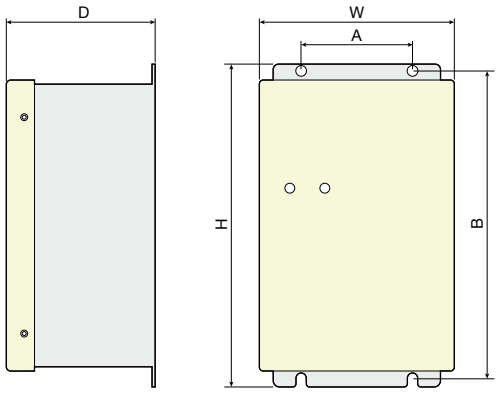
## Specifications

| Manufacturer | VITZROEM Co., Ltd. | | |
|---|---|---|---|
| Model | VB-40K2 | VB-80K2 | VB-120K2 |
| Connection Method | 1Ø2W+G | | |
| Mounting Type | Mount Type | | |
| Separator Operation Identification | LED Lamp On (Normal: Green, Abnormal/Failure: Red) | | |
| Operating Voltage (AC Nominal Voltage) | 220V | | |
| Maximum Continuous Voltage (Uc) | AC 275V | | |
| Operating Temperature | -30~+80℃ | | |
| Operating Current and Frequency | AC 50/60Hz | | |
| Nominal Discharge Current (In) | 20kA | 40kA | 60kA |
| Maximum Discharge Current (Imax) | 40kA | 80kA | 120kA |
| Voltage Protection Level (Up) | 2.0kV | 2.5kV | 2.5kV |
| Test Class | Class II | | |
| IP Protection Class | IP20 | | |

## Dimensions

| Model No. | W | H | D | A | B |
|---|---|---|---|---|---|
| VB-40K2 | 67 | 123 | 90 | 40 | 114 |
| VB-80K2 | 105 | 154 | 80 | 60 | 146 |
| VB-120K2 | 105 | 174 | 80 | 60 | 166 |

## External Dimensions



# (3-Phase General Type) VB-40K3/40K-3W | VB-80K3/80K3-3W | VB-120K3

## Features

- KS C IEC 61643-11 KS-certified product
- Checking of power status and functional loss of surge protective device via LED
- Low protection voltage using high performance MOV deviceFeaturesDimensionsModel

## Specifications

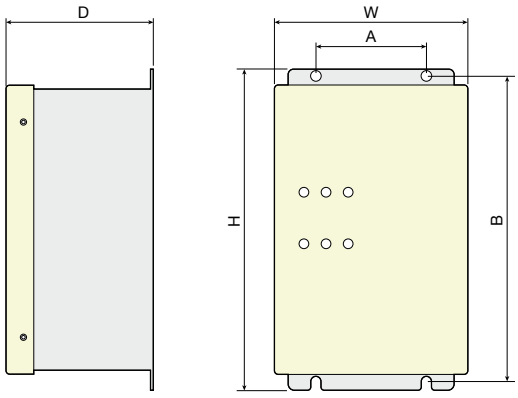
| Manufacturer | VITZROEM Co., Ltd. | | |
|---|---|---|---|
| Model | VB-40K3/40K3-3W | VB-80K3/80K3-3W | VB-120K3 |
| Connection Method | 3Ø4W+G | | |
| Mounting Type | Mount Type | | |
| Separator Operation Identification | LED Lamp On (Normal: Green, Abnormal/Failure: Red) | | |
| Operating Voltage (AC Nominal Voltage) | 220~500V | | |
| Maximum Continuous Voltage (Uc) | AC 275V | | |
| Operating Temperature | -30~+80℃ | | |
| Operating Current and Frequency | AC 50/60Hz | | |
| Nominal Discharge Current (In) | 20kA | 40kA | 60kA |
| Maximum Discharge Current (Imax) | 40kA | 80kA | 120kA |
| Voltage Protection Level (Up) | 2.0kV | 2.5kV | 2.5kV |
| Test Class | Class II | | |
| IP Protection Class | IP20 | | |

* The operating voltage not to exceed the maximum continuous voltage when 3 phase 3 wire⊿(delta) connection is used.

## Dimensions

| Model No. | W | H | D | A | B |
|---|---|---|---|---|---|
| VB-40K3 | 110 | 131 | 80 | 60 | 123 |
| VB-40K3-3W | 113 | 125 | 80 | 60 | 116.5 |
| VB-80K3 | 105 | 174 | 80 | 60 | 166 |
| VB-80K3-3W | 105 | 174 | 80 | 60 | 166 |
| VB-120K3 | 148 | 207 | 80 | 90 | 199 |

## External Dimensions




## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Water treatment facility main power supply, etc.

VB-40K3/40K3-3W

VB-80K3/80K3-3W

VB-120K3

# VB-40K2C | VB-80K2C | VB-120K2C (1-Phase Counter Type)

## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Water treatment facility main power supply, etc.

VB-40K2C


VB-80K2C


VB-120K2C


## Features

- KS C IEC 61643-11 KS-certified product
- Built-in counter to detect surge inflow
- Checking of power status and functional loss of surge protective device via LED
- Low protection voltage using high performance MOV device

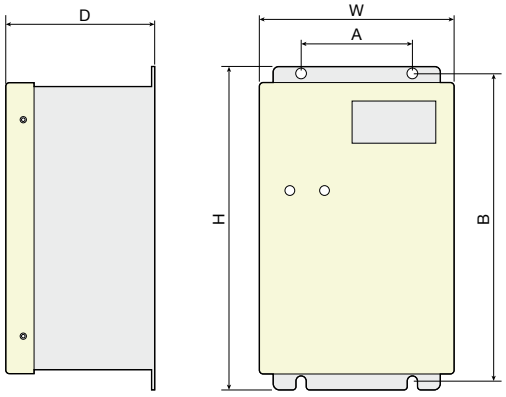
## Specifications

| Manufacturer | VITZROEM Co., Ltd. | | |
|---|---|---|---|
| Model | VB-40K2C | VB-80K2C | VB-120K2C |
| Connection Method | 1Ø2W+G | | |
| Mounting Type | Mount Type | | |
| Separator Operation Identification | LED Lamp On (Normal: Green, Abnormal/Failure: Red) | | |
| Operating Voltage (AC Nominal Voltage) | 220V | | |
| Maximum Continuous Voltage (Uc) | AC 275V | | |
| Operating Temperature | -25~+70℃ | | |
| Operating Current and Frequency | AC 50/60Hz | | |
| Nominal Discharge Current (In) | 20kA | 40kA | 60kA |
| Maximum Discharge Current (Imax) | 40kA | 80kA | 120kA |
| Voltage Protection Level (Up) | 2.0kV | 2.5kV | 2.5kV |
| Test Class | Class II | | |
| IP Protection Class | IP20 | | |

## Dimensions

| Model No. | W | H | D | A | B |
|---|---|---|---|---|---|
| VB-40K2C | 105 | 154 | 80 | 60 | 146 |
| VB-80K2C | 105 | 174 | 80 | 60 | 166 |
| VB-120K2C | 148 | 207 | 80 | 90 | 199 |

## External Dimensions



# (3-Phase Counter Type) VB-40K3C | VB-80K3C | VB-120K3C



## Features

- KS C IEC 61643-11 KS-certified product
- Built-in counter to detect surge inflow
- Checking of power status and functional loss of surge protective device via LED
- Low protection voltage using high performance MOV device

## Specifications

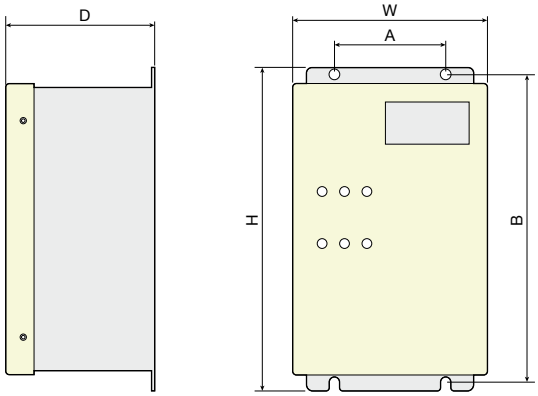
| Manufacturer | VITZROEM Co., Ltd. | | |
|---|---|---|---|
| Model | VB-40K3C | VB-80K3C | VB-120K3C |
| Connection Method | 3Ø4W+G | | |
| Mounting Type | Mount Type | | |
| Separator Operation Identification | LED Lamp On (Normal: Green, Abnormal/Failure: Red) | | |
| Operating Voltage (AC Nominal Voltage) | 220~500V | | |
| Maximum Continuous Voltage (Uc) | AC 275V | | |
| Operating Temperature | -25~+70℃ | | |
| Operating Current and Frequency | AC 50/60Hz | | |
| Nominal Discharge Current (In) | 20kA | 40kA | 60kA |
| Maximum Discharge Current (Imax) | 40kA | 80kA | 120kA |
| Voltage Protection Level (Up) | 2.0kV | 2.5kV | 2.5kV |
| Test Class | Class II | | |
| IP Protection Class | IP20 | | |

* The operating voltage not to exceed the maximum continuous voltage when 3 phase 3 wire⊿(delta) connection is used.

## Dimensions

| Model No. | W | H | D | A | B |
|---|---|---|---|---|---|
| VB-40K3C | 105 | 174 | 80 | 60 | 166 |
| VB-80K3C | 148 | 207 | 80 | 90 | 199 |
| VB-120K3C | 148 | 248 | 80 | 90 | 235 |

## External Dimensions




## Applications

- Protection of power supply devices from indirect lightning or induced lightning inside a building
- Incoming and distributing boards for industrial use, large-capacity UPS
- Safety control center, supervisory control center, computer room, etc
- Water treatment facility main power supply, etc.

VB-40K3C


VB-80K3C


VB-120K3C

# Class SPD

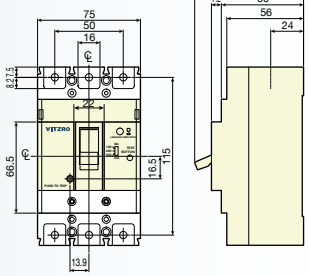
KS Mark Certified Product

## Applications

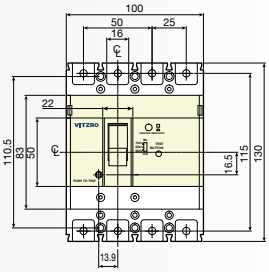
- Fully responsive to products installed in SPD for power supply
- All locations where SPD products are installed


## External Dimensions

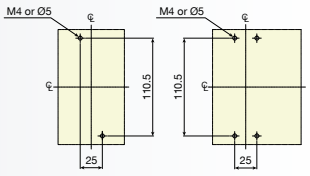
2, 3Pole



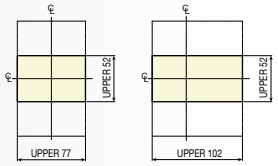

4Pole




Mounting Dimensions




Pannel Cover Cutting Dimensions



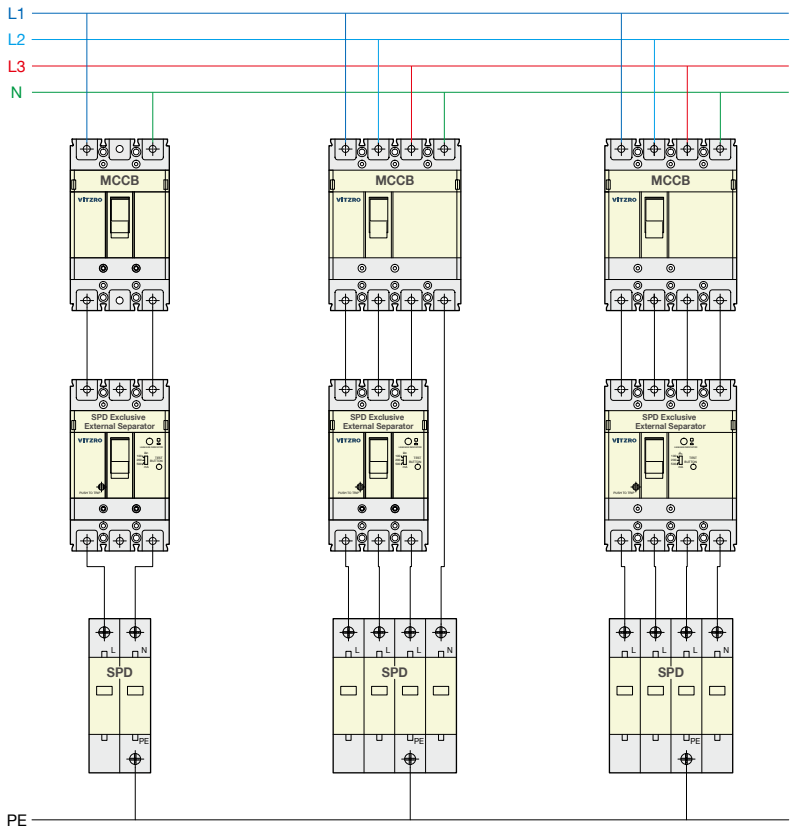

## Features

- Compliant with LH specifications
- Impulse section operation
- Circuit separated (within 0.03 sec) in the event of SPD thermal runaway
- Easy to maintain SPD
- Possible to change SPD leakage sensitivity current (100/200/500mA)

## Specifications

| Section | Unit | VDC-104 | VDC-54 |
|---|---|---|---|
| Application standard | KS | KS C IEC 61643-11, KS C IEC 60947-2 | |
| Test Class | | Class I | Class II |
| Pole | P | 2P, 3P, 4P | |
| Rating Voltage | VAC | 220/380 | |
| Surge Impulse | kA | Class I(10/350us)<br>L-N : 12.5kA<br>N-PE : 50kA | Class II(8/20us)<br>L-N/N-PE : 20kA |
| Short circuit current | kA | 25kA | 10kA |
| SPD a short circuit current | mA | 100/200/500mA | |
| Operating Speed | s | 0.03s | |

## Connection Diagram



# VS-SERIES

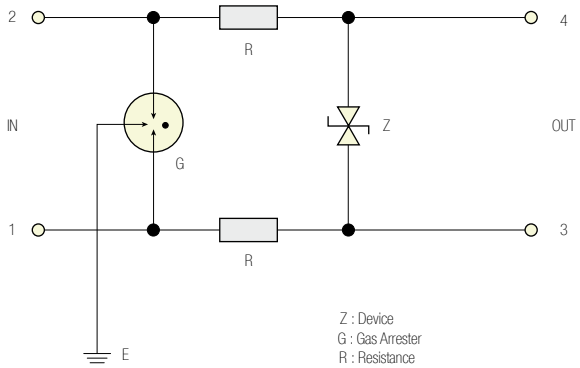
## Features

- KS C IEC 61643-21-certified product (C2 : 8/20us-5kA, D1 : 10/350us-2.5kA)
- Easy installation and maintenance with plug-in type
- Status-indicating LED lamp (separate power source required)
- Compact design facilitating installation in limited space
- Potential difference elimination
- Din Rail and mount available for easier installation
- Response speed of 10ns or below
- Joint grounding with power line
- Overload failure mode (Mode 2)
- Circuit maintenance type or circuit disconnecting type in failure
- KS C IEC 61643-21 CB Certification

## Specifications

| Section | Unit | VS-12B | VS-24B | VS-48B | VS-130D |
|---|---|---|---|---|---|
| Application standard | KS | KS C IEC 61643-21 | | | |
| Operating Voltage | VDC | 12 | 24 | 48 | 130 |
| Maximum Continuous Voltage (Uc) | VDC | 13 | 25.2 | 52 | 170 |
| Nominal Discharge Current(In) | kA | 10kA(1 time 25kA) | | | |
| Voltage Protection Level (Up) | V | 45 | 60 | 115 | 400 |
| Product Dimensions | mm | 19.5×107×80.4 | | | |
| Mounting Type | | Series type, 35mm Din rail | | | |
| Structure | | Plug in type | | | |
| CB/CE Certification | | X | ○ | ○ | X |

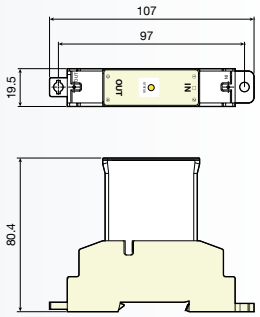
## Circuit Diagram




## Applications

- For various signal circuits and telephone lines
- Measuring instruments and control equipment
- For control power of control equipment
- CCTV modem, fire alarm, various sensors and power generation facilities


### External Dimensions



# D2 Surge Protective Device

Technical Data

## CONTENTS



# Technical Data on Surge Protective Device (SPD)

## What is a surge?

Surges are a form of electrical lesion that flows in through a power supply line or a communication line in the form of voltage impulses in the event of lightning, startup of heavy equipment startup or electrical accidents.
In most cases, despite some differences depending on the occurrence environment, surges involve an extremely small amount of energy that flows into a system and then disappears in an extremely short moment of less than 1/1,000,000 seconds, but at this time, the voltage and the current soar up to 6,000V and 3,000A respectively, inflicting critical damage on or causing malfunction of electrical, electronic and communication equipment.

## Damages Caused by Surges

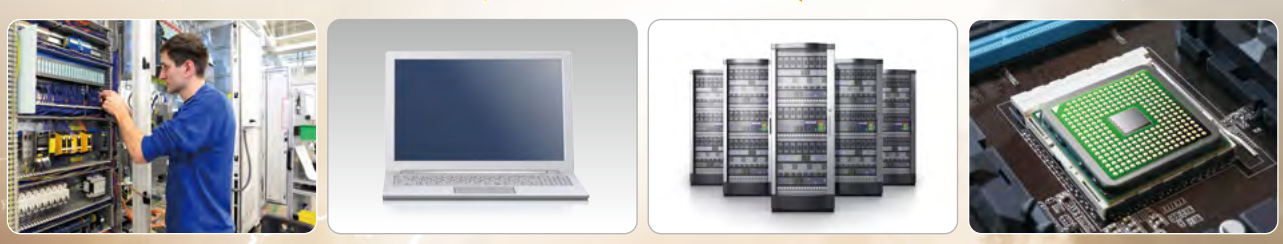
- Damage on I/O card, network LAN card and IC chip of communication equipment
- Damage on semiconductor components of computers and control equipment
- Loss of data caused by damage or malfunction of network and communication equipment
- Paralysis of communication and computing businesses due to the aforementioned damages, delay in work processing, and enormous temporal and financial loss due to maintenance of expensive equipment

## Necessity of Surge Protective Device

Most modern electrical, electronic and communication equipment contain very-large-scale integration (VLSI) IC chips with extremely low surge withstand, which means they are susceptible to damages from surges. As the sensitivity of these systems is constantly increasing with the development of semiconductor technology, damage caused by surges is also perpetually increasing. Moreover, the recent abnormal climate conditions being observed worldwide see an increasing trend in the occurrence of lightning and thus the number of failures and malfunctions of critical equipment such as electrical and electronic equipment is also significantly increasing.

The best way to protect cutting-edge equipment from damages caused by surges is to install a surge protective device suitable for each application. Based on its knowhow and R&D activities, VITZRO EM offers a wide range of surge protective devices and solutions to prevent damages caused by lightning.

**Occurrence of huge surges**



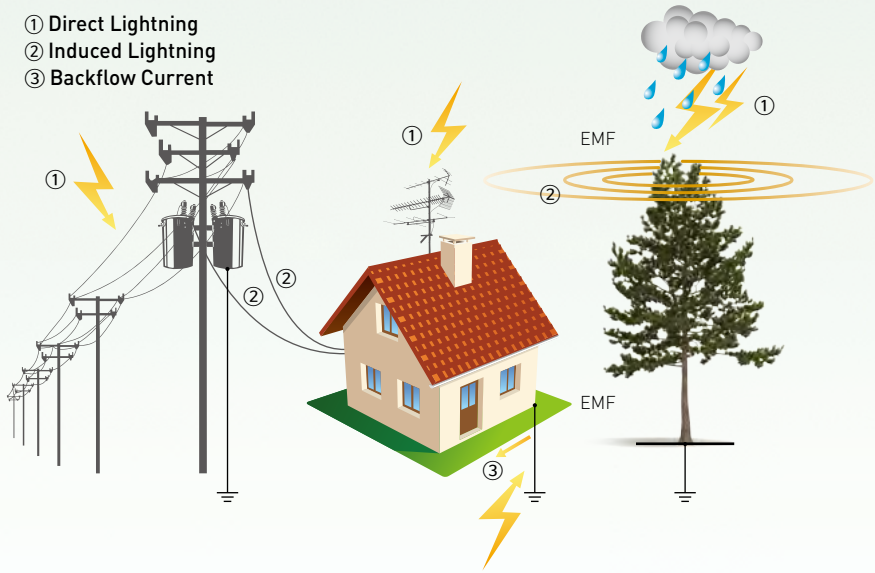
Damage to communication equipment | Damage to computers | Damage to network servers | Damage to semiconductor equipment

**Perfect prevention of lightning damage using surge protective device**
**Emphasis on the importance of SPD products**

# Technical Data on Surge Protective Device (SPD)



## Surges caused by lightning are divided into three types.




Types of Surges caused by Lightning

### Surges caused by Direct Lightning

With regards to direct lightning, most currents from lightning discharges penetrate through the human body, buildings and trees. As it is voltage that occurs when lightning strikes a lightning rod, antenna or pylon, the potential difference caused by grounding resistance and lightning current imposes damage on power lines, communication lines, machines and equipment.

### Surges caused by Induced lightning

When lightning occurs near a building, distribution line, communication line or signal line, surges occur due to electronic coupling. Despite some differences depending on the distance from lightning, area of lightning and current value, this voltage ranges from several kV to tens of KV according to measurement by low-voltage distribution line or telephone line. It may affect areas hundreds of meters away. This causes damage on devices susceptible to surges, such as fax machines, computers, communication devices, signal devices and control devices.

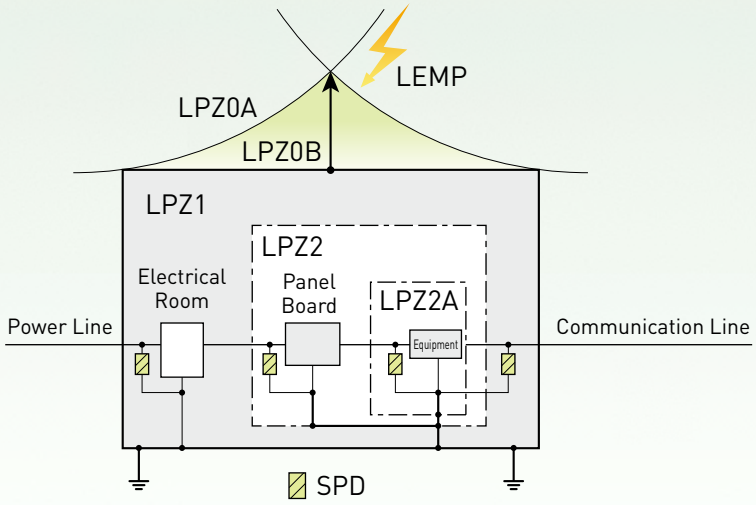
### Surges caused by Backflow Current

When lightning strikes a building or a lightning rod and the ground resistance is not sufficiently low enough, some of the lightning current may flow back to the power supply due to a potential difference between the distribution line, communication line and supply power and the ground. This causes huge damage on service entrances or internal equipment.

# Technical Data on Surge Protective Device (SPD)

## Protection Zone Setting

To design reasonable and economical protective systems for internal equipment, the concept of a lightning protection zone (LPZ) that classifies protection spaces with different electrical-magnetic conditions has been introduced to define the extent of protection. In other words, protection is reinforced by classifying zones according to lightning invasion area, such as internal shield room, panel board or computer room, and metal control board. To protect systems or related equipment from incoming surges, it is necessary to select SPD suitable for specific circuits and install it in a proper location.




**Lightning Protection Zone**

## Examples of Equipment by LPZ

| LPZ | Overview | Target Equipment |
|---|---|---|
| LPZ0A | A zone where lightning current is likely to flow as it is located outside a building and exposed to direct lightning | Outdoor lamp, surveillance camera, etc |
| LPZ0B | A zone outside a building, not exposed to direct lightning, where EMP is not attenuated. | Rooftop cubicle, outdoor unit of air conditioner, sailing obstruction light, antenna, etc. |
| LPZ1 | A zone inside a building, not exposed to direct lightning, where currents flowing through conductive parts are reduced compared to zone 0B. | Equipment in lead-in areas inside a building: power substation, MDF, telephone exchange |
| LPZ2 (Divided into LPZ2A,LPZ2B, etc.) | Subsequent attenuation zone : Subsequent attenuation zone is required when it is necessary to further reduce currents and/or EMF. | Safety control center, supervisory control center, computer room, etc. |

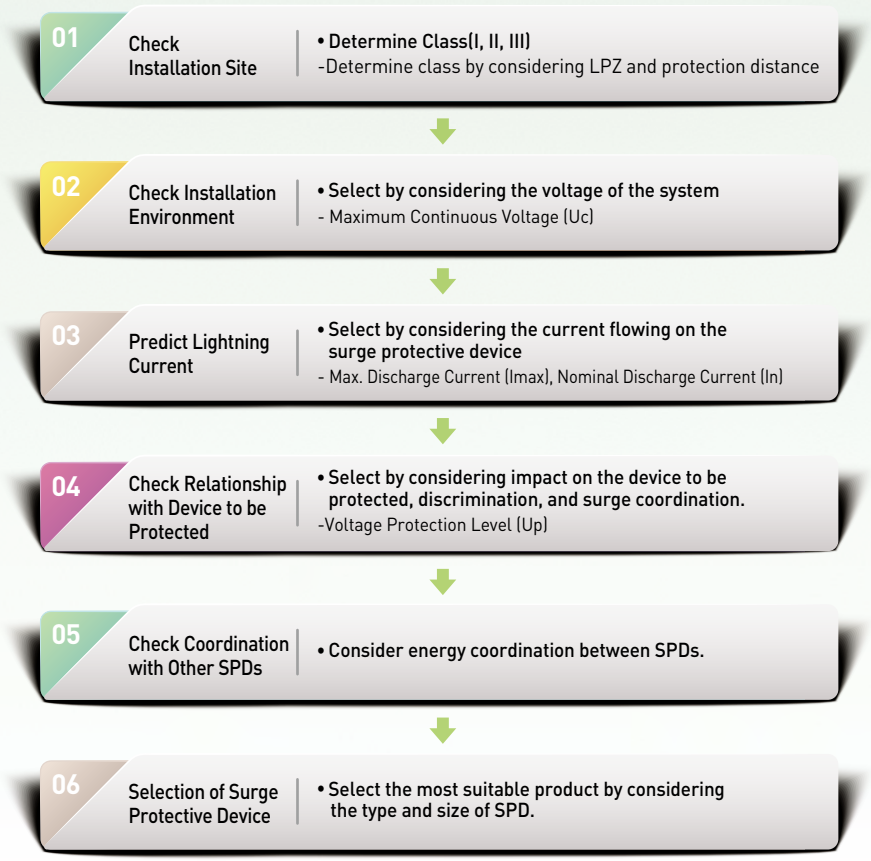
※ LPZ : Lightning Protection Zone
※ LEMP : Lightning Electro Magnetic Pulse

# Technical Data on Surge Protective Device (SPD)

## Selection of Surge Protective Device

As shown below, a suitable surge protective device can be selected in accordance with the flowchart of selection procedure. A surge protective device should be selected taking into account operating power supply, lightning discharge, surges from an increase in ground power supply, and overcurrent risk.

### Selection Procedure




## Things to Consider when Selecting SPD

### 1. Classification of SPD by Installation Site

- Class I: To be installed in areas where lightning damage is huge as lightning current is directly spread.
- Class II: To be installed in areas where relatively small damage from lightning is expected, such as switchboards and industrial panel boards.
- Class III: To be installed in areas with small damage from lightning, such as indoor outlets and home panel boards

### 2 Installation Location

- Install SPD as near to the machine as possible in order to be protected.
- The length of the connection conductor (ground line) of SPD should be as short as possible.
- Install SPD as near to the device or circuit breaker as possible.

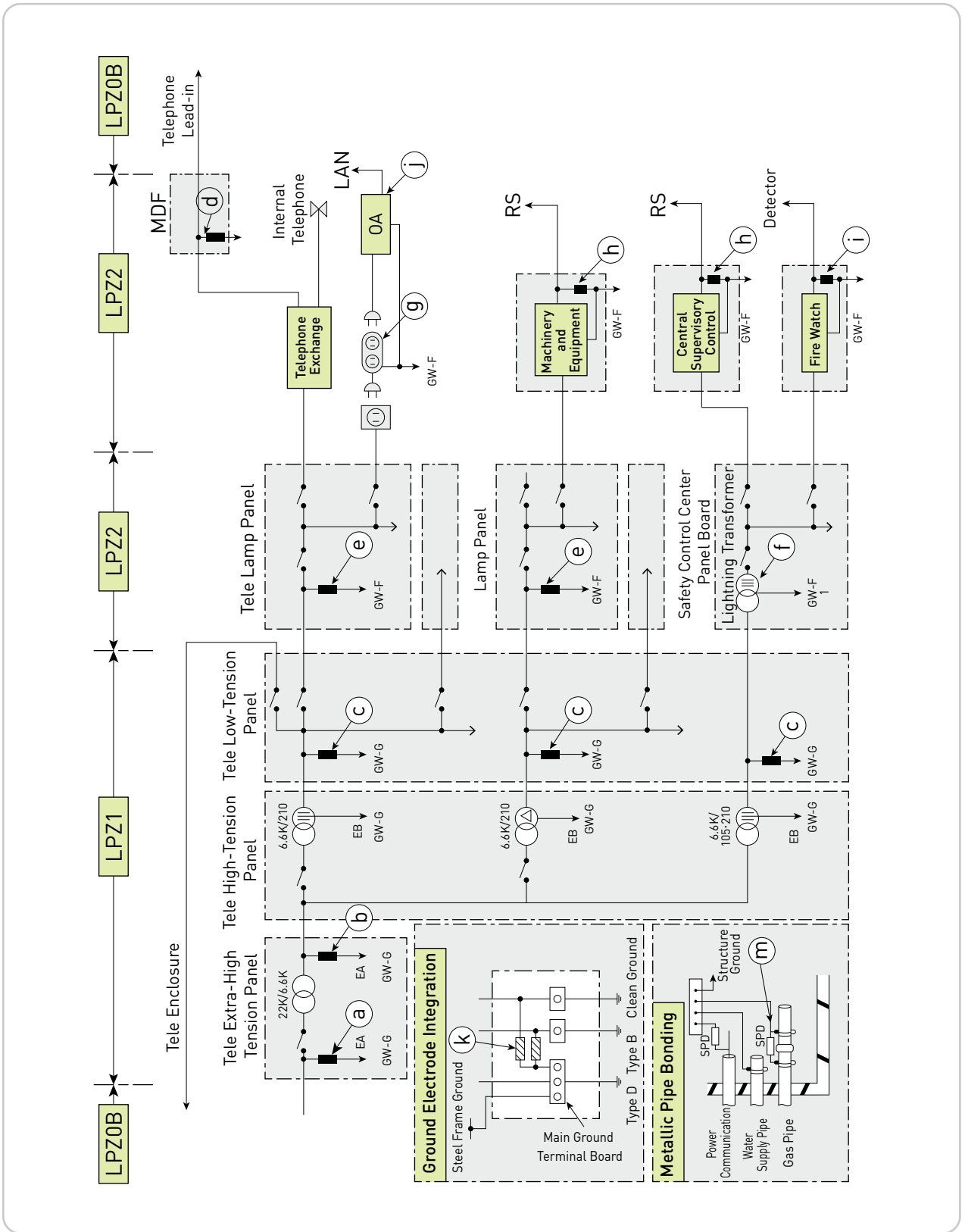
# Technical Data on Surge Protective Device (SPD)

## Surge Protective Device Selector

| LPZ | SPD Installation Location | Detailed Location | Installation Location | Protection Performance | SPD Symbol |
|---|---|---|---|---|---|
| LPZ0B → LPZ1 | Power Line Inlet | Extra-high Tension Lead-in Wire | Electrical Room | Arrester for Extra-High Tension | a |
| | | High Tension Lead-in Wire | Electrical Room | Zinc Oxide Arrester 8.4kV (2.5kV or 5kA) | b |
| | Power Supply Unit to External Equipment | Low-Voltage Lead-in Wire for External Structure | Switch Board | 25kA (10/350μs) × 3 (Class I Specimen) | c (For External Structure) |
| | Outside Line Point of Penetration for Communication | Telephone · Communication · Data (Metal) Lead-in Wire, TV Antenna, Surveillance Camera | MDF, etc. | 5kA(10/350μs) DI Class SPD for Communication | d |
| | Protection of Extraneous Conductive Part | Absorption Service Pipe, Gas Service Pipe, Drain Pipe | | Complete Connection Required. (SPD connection for insulation) | m |
| | Equipotential of Single-acting Grounding Electrode | D(Structure)-B, D-Clean, D-Reserve of Main Ground Terminal Box | Main Ground Terminal Box | 25kA (10/350μs) SPD (Class I Specimen) | k |
| LPZ1 → LPZ2 | Protection of Rooftop Equipment | Power Transformer Supplying Power to Rooftop Panel Board | Lamp Panel, Power Panel, Light Electrical Equipment | 25kA (10/350μs) SPD (Class I Specimen) 5kA (10/350μs) DI-Class SPD for Communication | e (Rooftop) |
| | Installed Directly under the Secondary Side of Transformer to Protect Voltage Line System | Lamp Panel, Power Panel and Light Electrical Equipment Signal Line Installed Rooftop | Switch board | 25kA (10/350μs) SPD (Class I Specimen) | c (Top floor) |
| | Installed at the Primary Side of Main/Branch Circuit Breaker of Panel Board and Power Panel to Protect Branch Circuits | Panel Board, Power Panel, Common Panel | Panel Board | 20kA Class II SPD | e (Each floor) |
| | Installed at the Main Power Supply of the Supervisory Control Center of Safety Control Center to Protect Important Facilities. | Panel Board for Safety Control Center | Lamp Panel, Power Panel | 20kA Class II SPD (Lightning Transformer for High-Tension Protection) | f |
| | Installed at the Primary Side of the Power Supply of Critical Equipment for Protection. | The Power Pack of Critical Equipment | Outlet | SPD-equipped Outlet 10kA or above Class III SPD | g |
| | Installed near the Power Supply of Critical Equipment for Protection. | Signal Lines of Safety Control Center, Telephone, Communication, and CATV, and Especially of Light Electrical Equipment installed on Top Floor | Near Equipment | Residual Voltage 200V Max. Discharge Current 5kA Category Class C SPD | j, h, i |
| LPZ2 → LPZ3 | Depending on the Surge Withstand of the Protection Equipment Itself | Built-in | | Surge Current5kA (8/20μs) Withstand Voltage Category IIAC2000V or above (Install outside if the equipment has no countermeasures.) | |

「Reference」 Outflow of Lightning Current through Power Service Entrance and Selection (Calculation Method)

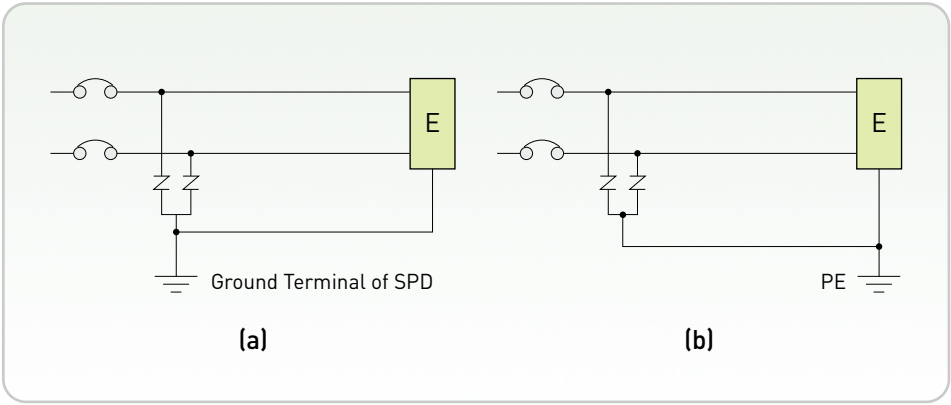
# Technical Data on Surge Protective Device (SPD)



# Technical Data on Surge Protective Device (SPD)

## Ground Wire Connection

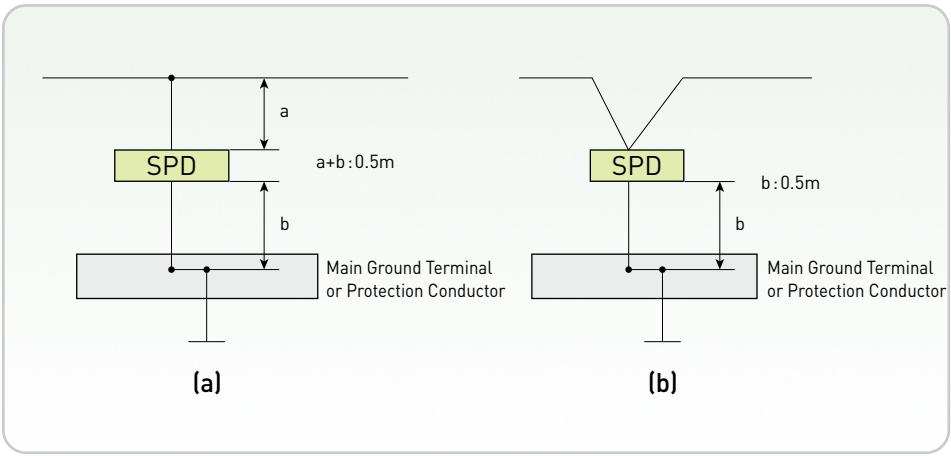
The wiring method with higher protection effect is to connect the ground (PE) of the equipment to the ground terminal of SPD (See Fig. (a)).
However, the wiring method with lower protection effect is to connect the ground terminal of SPD to the ground side of the PE terminal.(See Fig. (b)).
This is because voltage drop occurs due to the lead wire between the ground terminal and the PE terminal, resulting in the increase in the protection level of the protection device.




## Connection of SPD and Ground Terminal

For optimal surge protection, the connection conductor of SPD should be as short as possible (0.5m or below is preferable).

1. The longer the connection conductor of SPD, the lower the effect of surge protection. Connecting the conductor coming into the SPD and the one going out of it in the form of letter V is a valid grounding method with no reduction in the effect of SPD.
2. A connection conductor means a conductor from phase conductor to SPD and a conductor from SPD to main ground terminal or protection conductor. The wiring length of SPD of not greater than 0.5m is recommended. (See Fig. (a)). If the length exceeds 0.5m, it is recommended to use the layout shown in Fig. (b).



# Technical Data on Surge Protective Device (SPD)

## Terms related to Surge Protective Device

### SPD (Surge Protective Device)
A device used to restrict temporary overvoltage and classify surge currents.
This device contains at least one non-linear device.

### Uc (Maximum Continuous Voltage)
The effective value or DC voltage of the maximum voltage that can be energized continuously to SPD.
Same as the rated voltage.

### Nominal Discharge Current (In)
The peak current of 8/20㎲ wave form that flows on SPD for power supply.

### Maximum Discharge Current (Imax)
The peak current of 8/20㎲ wave form that flows on SPD in Class II test of SPD for power supply.
Required to bear Imax at least once while Uc is energized in an operating duty test.

### Impulse Current (Iimp)
The peak current of 10/350㎲ wave form that flows on SPD in Class I test of SPD for power supply.

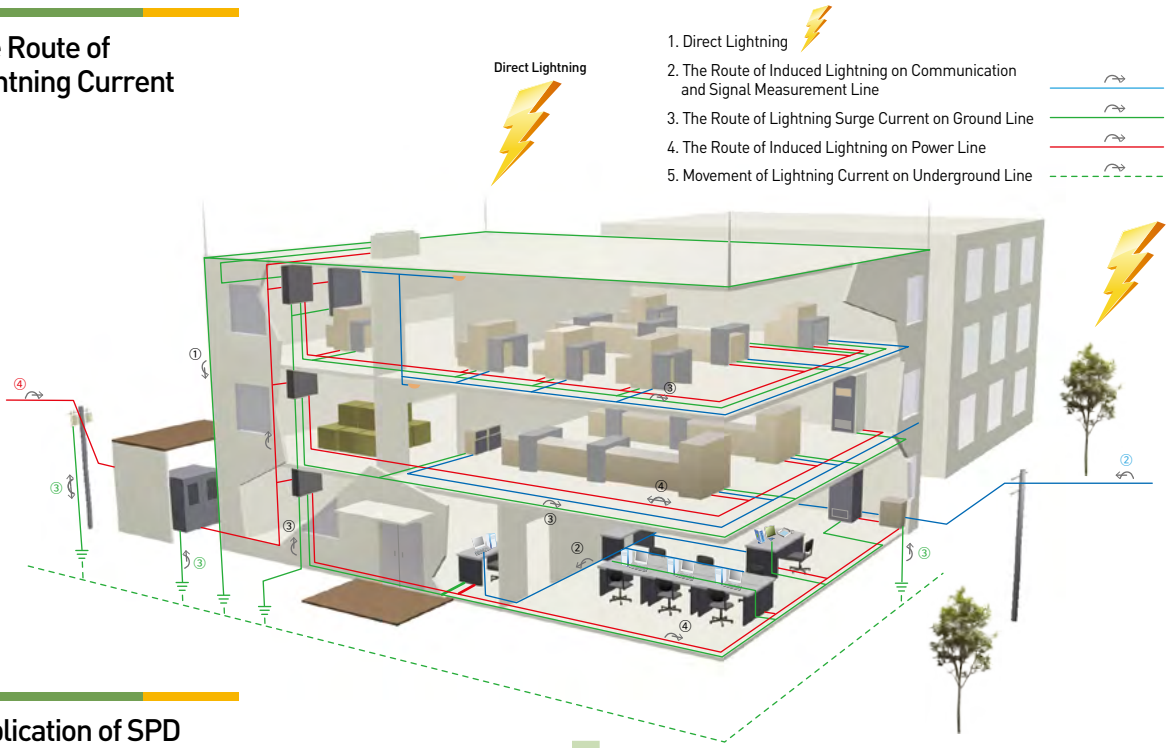
### Voltage Protection Level (Up)
The maximum value of residual voltage that occurs between the terminals of SPD.
In SPDs for power supply, the voltage that occurs when In is energized.
In SPDs for communication/signal, the maximum value of residual voltage that occurs when lightning impulse current is energized.

### Residual Voltage (Ures)
The peak value of voltage that occurs between the terminals of SPD when discharge current passes through

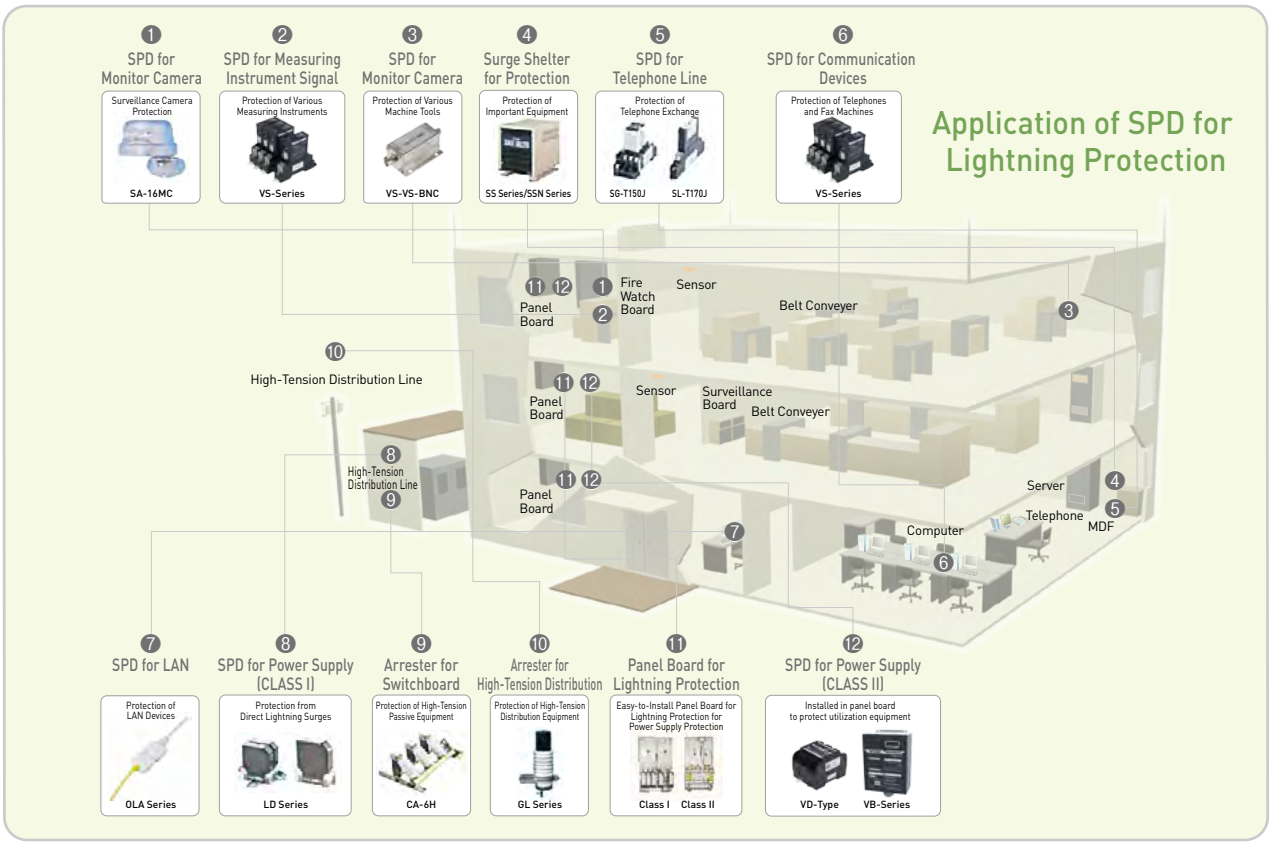
### Temporary Overvoltage (TOV)
The maximum effective value or DC voltage that exceeds Uc to bear overvoltage that is energized for a relatively long time due to ground fault or high-low voltage confusion in power system.

# Case Studies of SPD Products

## The Route of Lightning Current

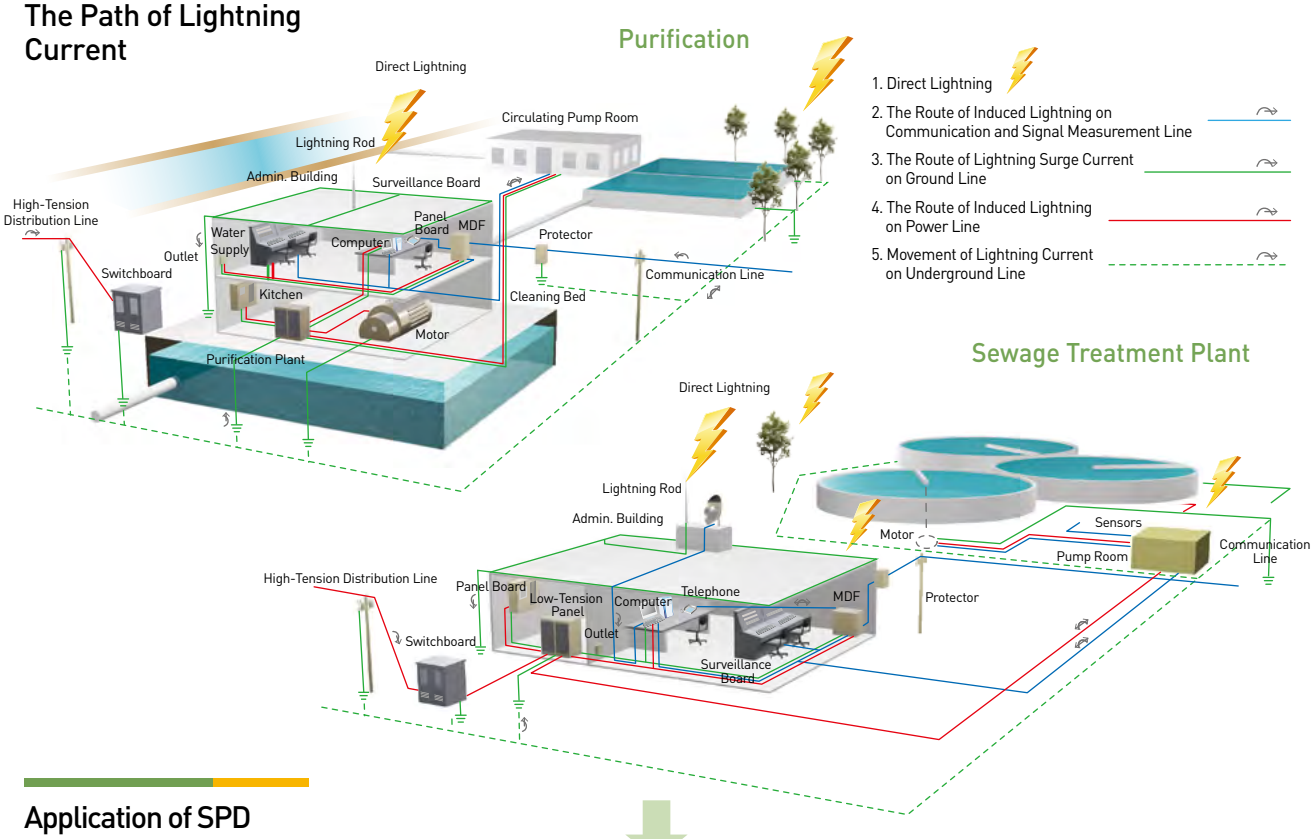



## Application of SPD Product

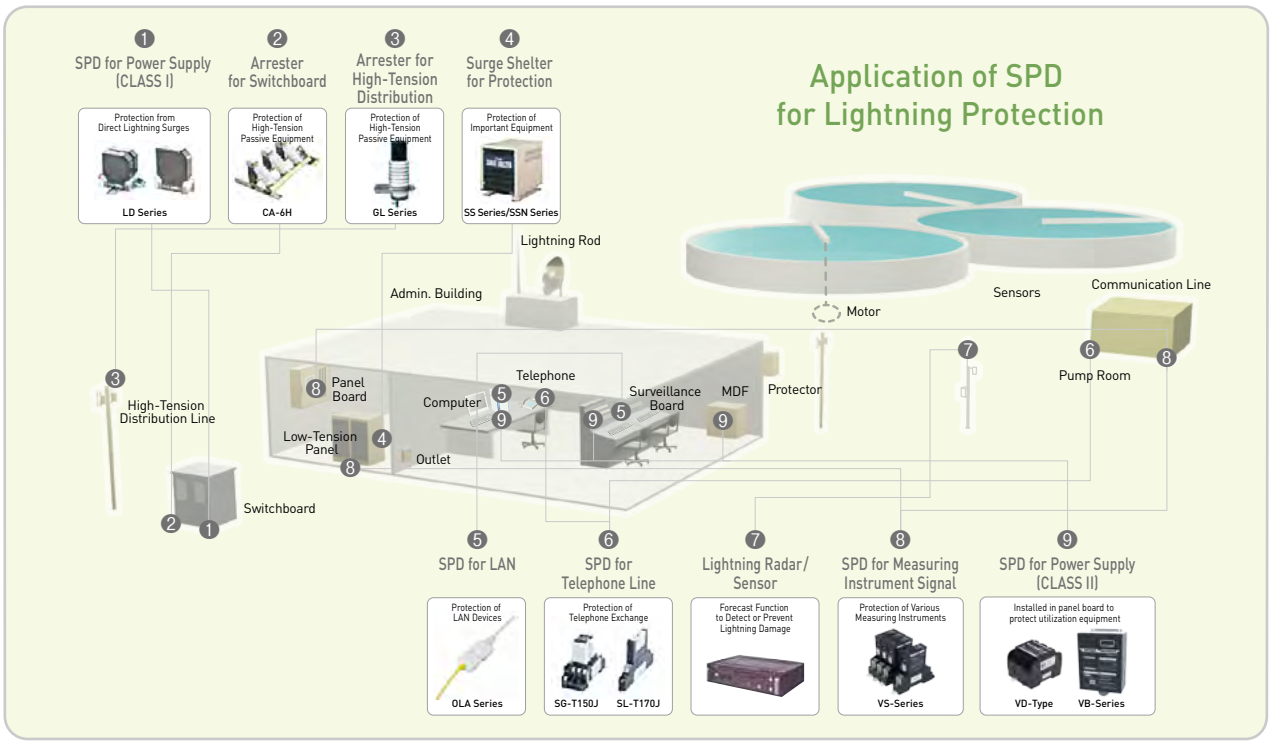


# Case Studies of SPD Products

## The Path of Lightning Current

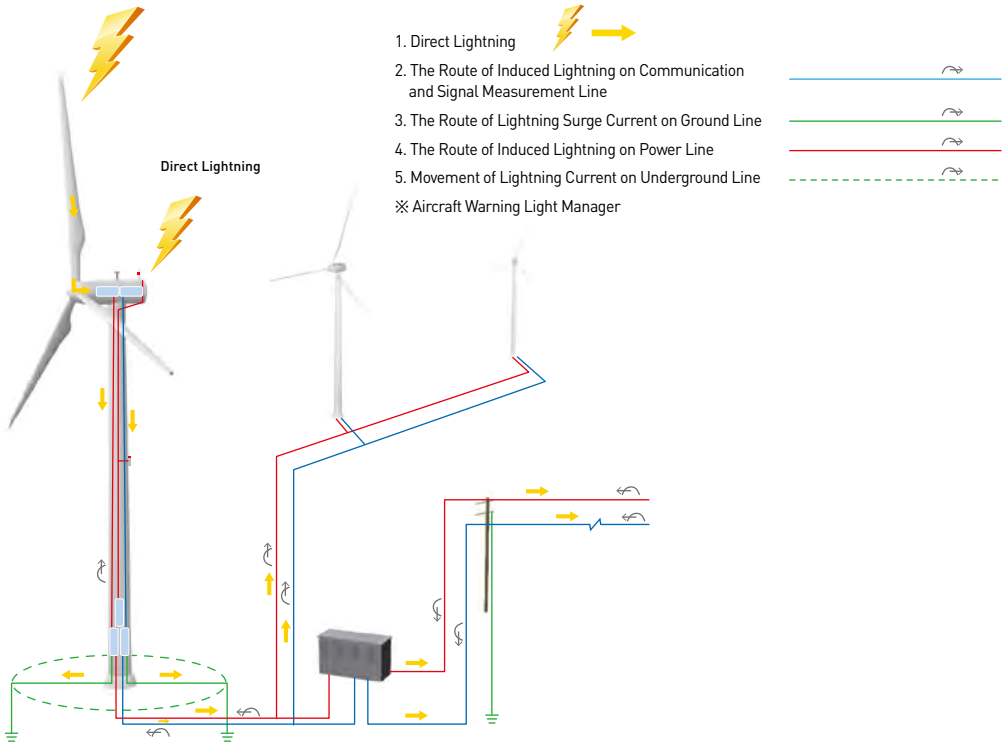



## Application of SPD Product

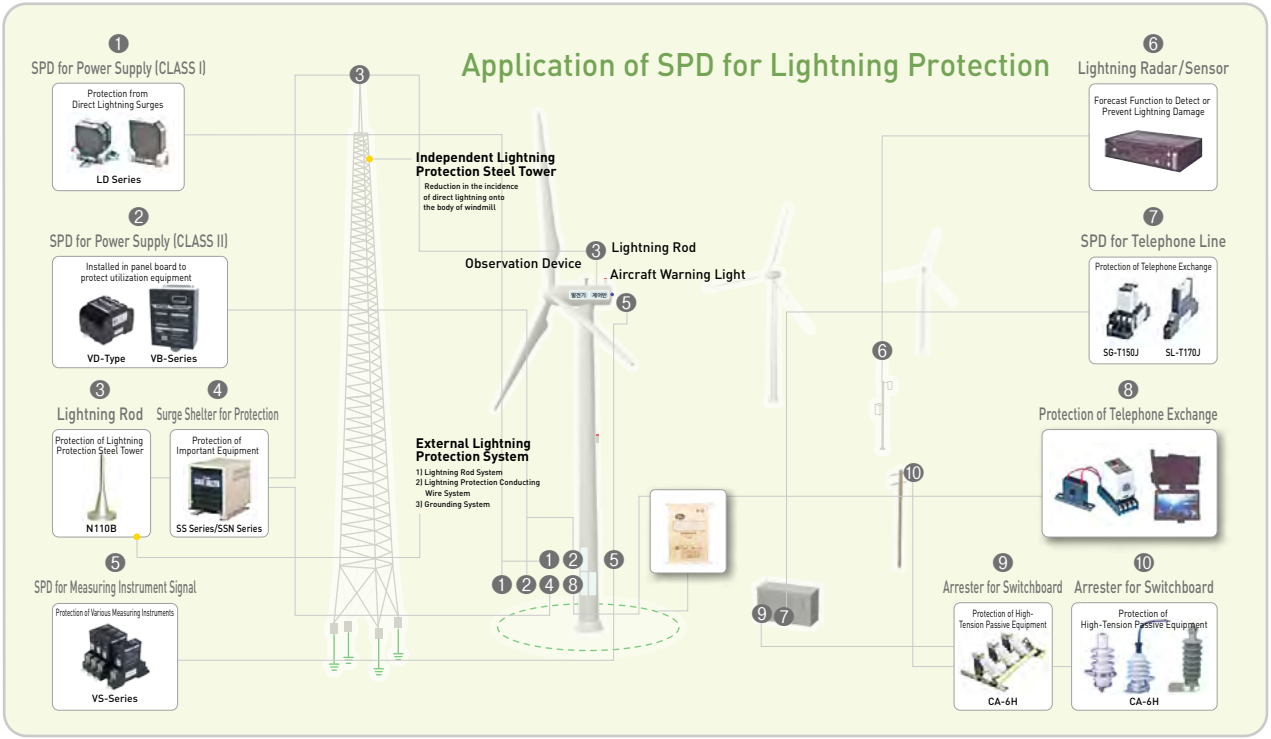


# Case Studies of SPD Products

## The Route of Lightning Current

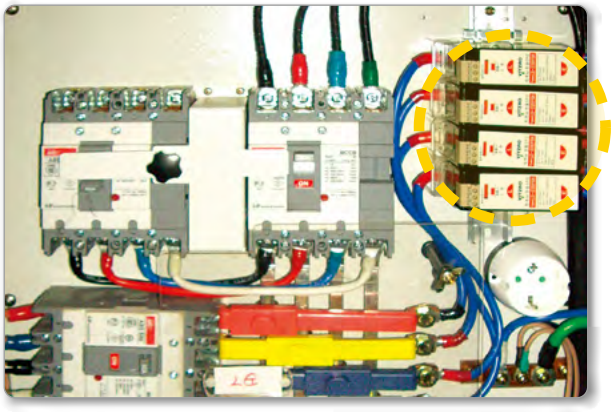



## Application of SPD Product



# SPD-Products Installed Site Examples

LG U+ Base Station Distribution Box

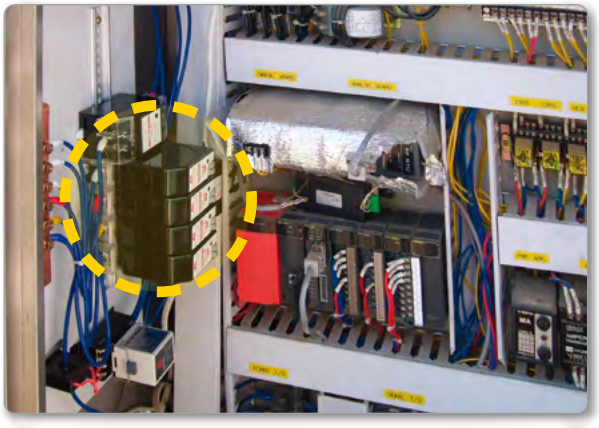


Highway Admin. Building

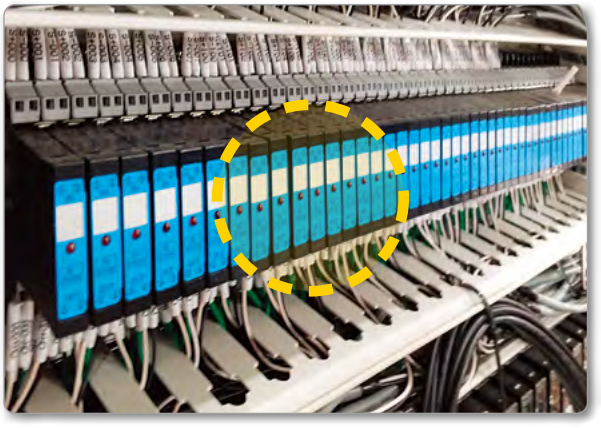
KEPCO Jeju Test Site


Outdoor Switchboard

Measuring/Control Panel



Water Treatment Control Panel



## Installation of SPD in LG Telecom Base Station, KT Base Station, Relay Station, City Gas Static Pressure Facility, and Deep Well

**SPD installation at over 200 base stations**

- KT/SKT/LGU (Annual contract 2012-2014)
- Annual occurrences of lightning damage to the above carriers' base stations during rainy weather
  ⋯› Zero lightning damage since SPD installation (3 years since installation).

# Damage from Lightning

(Fierce Lightning), Bronze Prize at a lightning photo contest

(Lightning Flashes), Grand Prix at a lightning photo contest

(Lightning Flashes), Grand Prix at a lightning photo contest

(Lightning), Academic Prize at a lightning photo contest

(Simultaneous Lightning), Silver Prize at a lightning photo contest

(Thundering Noise), Excellent Work Prize at a lightning photo contest

# Track Record of SPD Sales

한국전력공사
한국도로공사
대림산업 DAELIM
한국가스공사
서울특별시도시철도공사 Seoul Metropolitan Rapid Transit Corporation
posco 포스코건설
KORAIL 한국철도
DTRO 대구도시철도공사
Halla 주|한라
K water 한국수자원공사 Korea Water Resources Corporation
kr Clean & Green 한국농어촌공사
인천대교(주) Incheon Bridge Co., Ltd.
KNOC Korea National Oil Corporation 한국석유공사
Seoul Metro 서울메트로
SAMSUNG 삼성물산
Incheon Airport 인천국제공항공사
부산교통공사
주식회사 서해종합건설
KAC 한국공항공사
FOSTEC 포스텍
한화건설
인천항만공사
한국방송공사 Korean Broadcasting System
SK 건설
BPA | 부산항만공사
한국지역난방공사
동부건설
한국중부발전
한국전기연구원
쌍용건설
cwp 한국서부발전
LH 한국토지주택공사
DOOSAN 두산건설
KEPCO 한국남부발전
SH 서울특별시 에스에이치공사
kt olleh
EWP 한국동서발전
대우건설
LG
한국남동발전
HDC 현대산업개발
SK telecom

# VITZRO EM SPD Ranges

Possessing the first KS C IEC 61643-11 (TYPE TEST)-certified products in Korea, VITZRO EM produces products of superior quality and reliability. Our products provide excellence in quality with a quality assurance system established through KS certification as well as other domestic and international certifications.

VITZRO EM provides free after-sale service for all surge products that we produce. We are determined to go above and beyond customer satisfaction by offering better products and providing thorough follow-up service.

**01 Excellent Reliability**

**02 Superior Quality**

**03 High Level of Awareness**

**04 Thorough After-Sale Service**

VITZRO EM surge protective devices (SPDs) are designed and manufactured based on excellent device and lightning surge protection technologies of Otowa Electric of Japan.
We have achieved products of better quality and reliability since acquiring ISO 9001 Quality Management System certification. From perfect blocking of harmful voltages from multi-stage protection to the use of fire-free parts and materials, these SPD products are renowned for their technology and performance as well as complete adherence to safety.

VITZRO is a leading technology company playing a key technology role in the advanced systems industry as well as heavy electrical sector. Our extensive track record ranging from governmental agencies, military to state-run corporations, public offices, down to large companies and educational institutions and private sector proves that the technological power and awareness which we have built has enabled us to become an industry leader thanks to our relentless R&D efforts.

VITZRO EM

GLOBAL SERVICE SUPPORT BUSINESS


# Surge Protective Device General Catalog

VB-40/80/160 K3-K SERIES
LD-22EFSK
VD-40K3-D
VD-40K2/K3
VE-SERIES
VE-40K13
VB-40/80/120 K2 SERIES
VB-40/80/120 K3 SERIES
VB-40/80 K3-3W SERIES
VB-40/80/120 K2C SERIES
VB-40/80/120 K3C SERIES
CLASS SPD
VS-SERIES

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