



ON-LINE LIGHTNING  
PROTECTION MONITORING  
SYSTEM BROCHURE



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SINOPEC SAFETY ENGINEERING INSTITUTE  
XIAMEN TAIHANG TECHNOLOGY CO.,LTD

# TAIHANG GUARANTEES SAFETY

Founded in 2004, XIAMEN TAIHANG TECHNOLOGY CO.,LTD possess more than 1100 square meter national accredited laboratory. XIAMEN TAIHANG is engaged in the manufacturing, R&D on lightning protection and EMP protection product, providing lightning protection system and lightning warning system according to customer's practical demand. SPD special external disconnecter invented by XIAMEN TAIHANG has solved worldwide SPD fire problem and attracted IEC attention. Cooperating with SINOPEC to set up "Joint Lightning Warning R&D center" guarantees TAIHANG's strong R&D capability. Lightning protection system and lightning warning system invented by TAIHANG provides high level and high quality lightning protection on electrical, transportation, infrastructure.etc.



## ■ OUR CERTIFICATE

CE、CQC、CCC

TEST REPORTS FROM SHANGHAI LIGHTNING PROTECTION CENTER.



## ■ OUR CORE TECHNOLOGY

Sensing technology, as our core technology is composed of sensor module, smart calculation. We achieve product independent R&D, system sense, management and cloud service.

## ■ OWNS CHINA NATIONAL CNAS LABORATORY

Possessing more than 1100 square meter China CNAS laboratory with sophisticated testing equipments, XIAMEN TAIHANG pays attention to product quality to meet international standards, which makes its R&D capability, manufacturing capability and testing capability in the leading position in China.

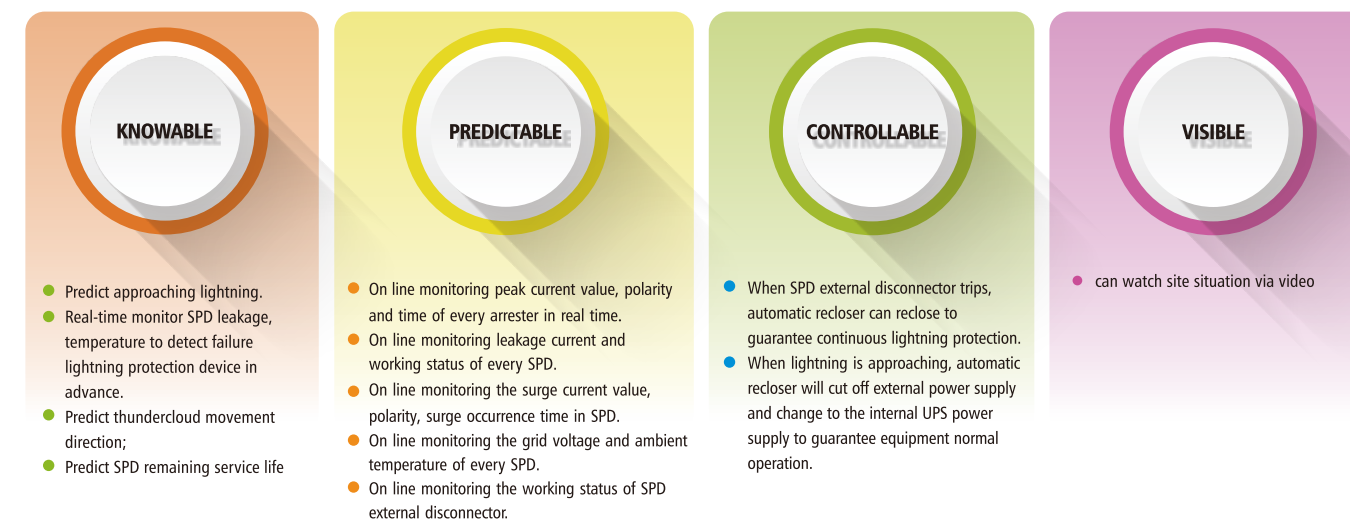


## ■ JOINT R&D CENTER WAS FOUNDED BY SINOPEC SAFETY ENGINEERING INSTITUTE AND XIAMEN TAIHANG TECHNOLOGY CO.,LTD

# SYSTEM ADVANTAGES

Based on continuous technical innovation over the years, continuous industry experience accumulation, Xiamen Taihang lightning protection monitoring system has gained an important breakthrough in the lightning protection field.

Xiamen Taihang lightning protection monitoring system makes system can be knowledgable, measurable, controllable through the enhanced RS485 (TD490 two-way communication) bus to transmit data to the centralized controller. The centralized controller is used as a sub-station to detect local devices operating status. Through the Internet, the data from sub-station will be sent to monitoring and management platform of management center to achieve "centralized management, decentralized control" management. The safety, intelligence and network of lightning protection will be increased through real-time detecting SPD micro-level leakage, lightning impact current intensity monitoring, SPD degradation progress, device service life and device failure warning.



### 1) LEADING CORE TECHNOLOGY

For power SPD, independent CT sensor is equipped with pole SPD. Pure resistance current can reach 1μA level. using reverse insertion technology and sophisticated mathematical model to extract real leakage current and record lightning peak current, polarity, times and time.

### 2) DEGRADATION ALARM

High sensitive CT sensor will test every SPD working status. When SPD degradation level reaches to the default value, it will give out alarm; when SPD trips and fail, switch quantity contact of power lightning protection module will send out a switch quantity signal to alarm

### 3 ) MONITORING LIGHTNING PROTECTION MODULE STATUS ON THE REAL TIME TO CHECK WHETHER IT IS NORMAL OR ABNORMAL.

### 4) MONITORING SPD EXTERNAL DISCONNECTOR

SPD external disconnector is the important device in the lightning protection. Lightning protection efficiency can be guaranteed by detecting SPD external disconnector status.

### 5) MORE OPTIMIZED AND FLEXIBLE NETWORK STRUCTURE

Communication and network system adopts enhanced RS485 (TD490 bidirection communication) bus + ethernet. it support GPRS wireless communication to make internet stability, transmission rate, wiring and scalability flexibility increases.

### 6) XIAMEN TAIHANG INTELLIGENT ON-LINE LIGHTNING PROTECTION MONITORING MANAGEMENT SOFTWARE

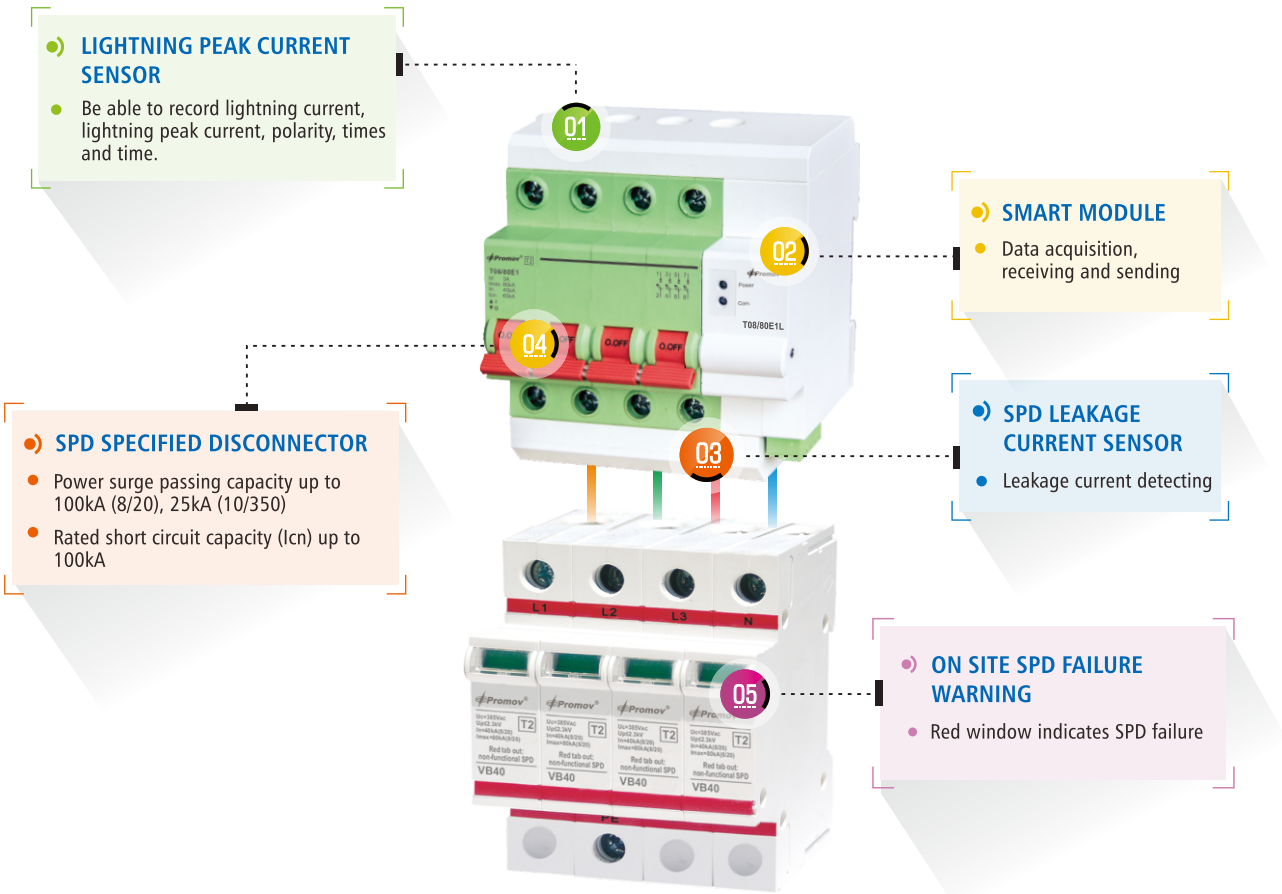
- Powerful software control platform, personalized interface design, real-time monitoring of the overall operation of the lightning protection system (including SPD, SSD, intelligent automatic recloser, grounding, lightning peak information and other operating status and parameters.
- It can realize equipment failure, life cycle monitoring and environmental abnormal alarm with red light alarm and abnormal record function.
- Powerful data processing ability to achieve historical event record, storage, query, statistics with chart curve analysis statistical function.
- Generate reports, generate and output run logs, fault records, and maintenance records.
- All-round, multi-level, security, efficient management of the whole system.



CORE TECHNOLOGY

1) ON-LINE LIGHTNING PROTECTION MONITORING SYSTEM

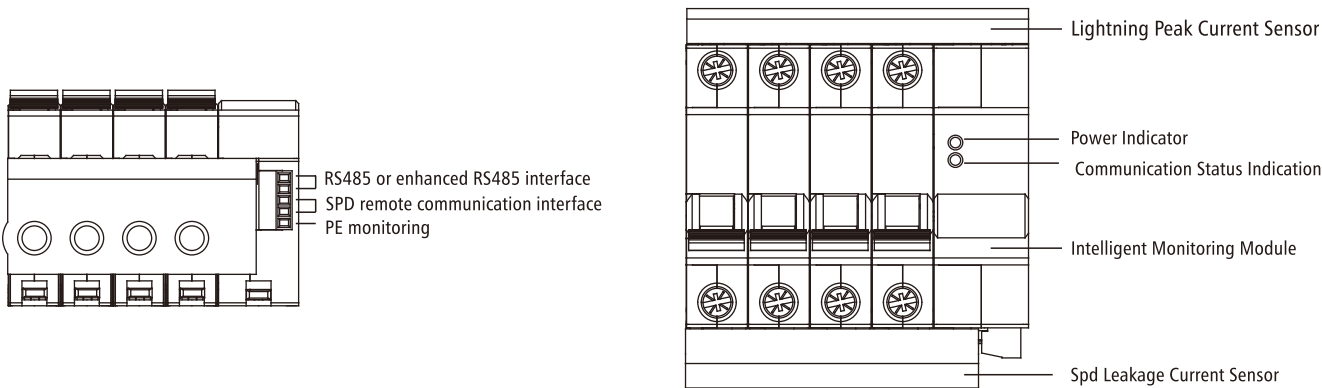
Based on the first-generation product, the online monitoring system for lightning protection is a new product equipped with surge protector. Besides the online monitoring of the tripping state, grounding state, lightning intensity, lightning occurrence time and deterioration trend of the surge protector, it also monitors the remaining life of SSD, tripping state of SSD, power grid voltage and other parameters. It can automatically collect data and realize flexible networking and autonomous alarm function through RS485 communication



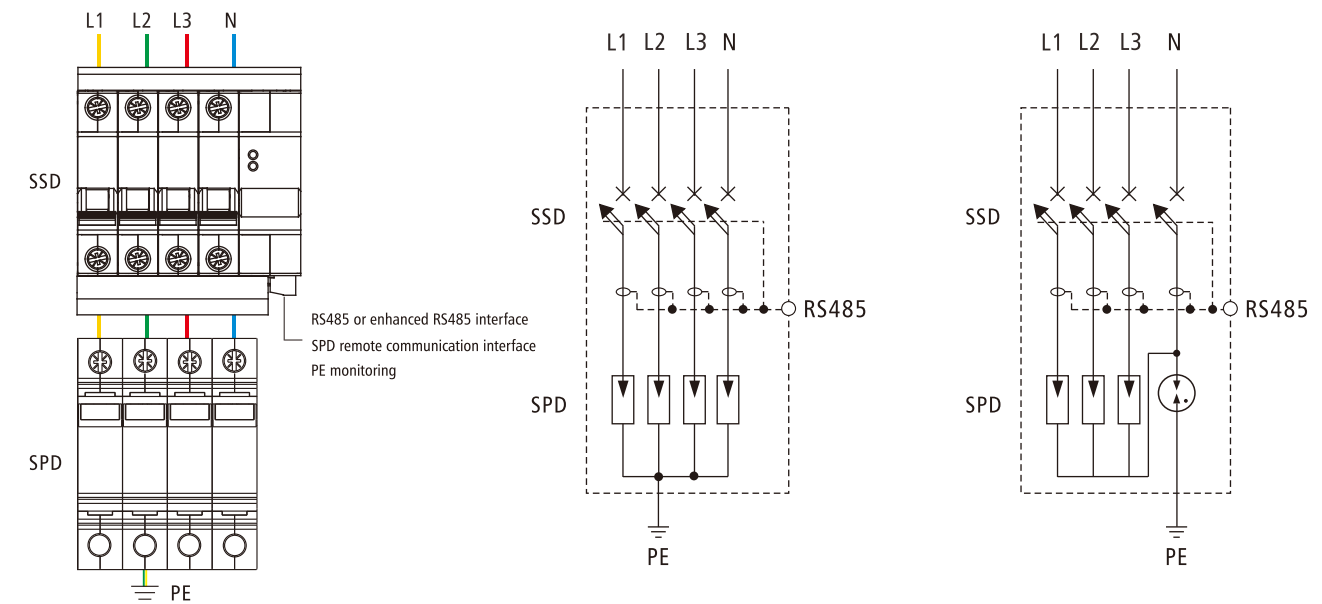
CHARACTERISTICS:

- ◆ Leading core monitoring technology, each pole with an independent CT sensor, and pure resistance current detection resolution up to  $1\mu A$
- ◆ The real leakage current is extracted by cross reverse superposition technique and precise mathematical model
- ◆ SPD and SSD lifetime monitoring, failure alarm
- ◆ Built-in sensor to detect lightning intensity (peak current), time and frequency
- ◆ Monitor the current working status of the surge protection module
- ◆ Power grid operating voltage monitoring to achieve overvoltage and voltage dip alarm
- ◆ Ambient temperature monitoring, temperature abnormal alarm
- ◆ SPD grounding status monitoring and abnormal grounding alarm
- ◆ Flexible networking for network monitoring with alarm within seconds

Interface Explain:



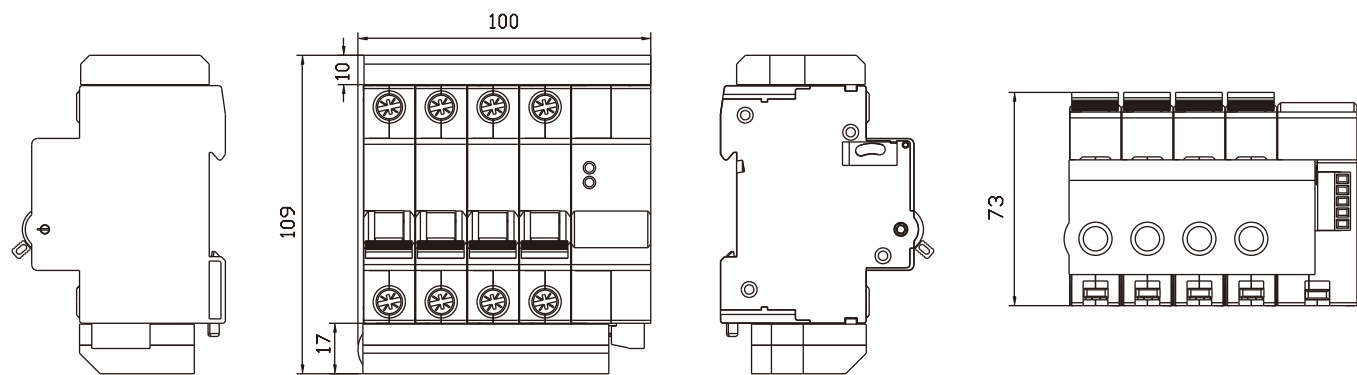
Installation:



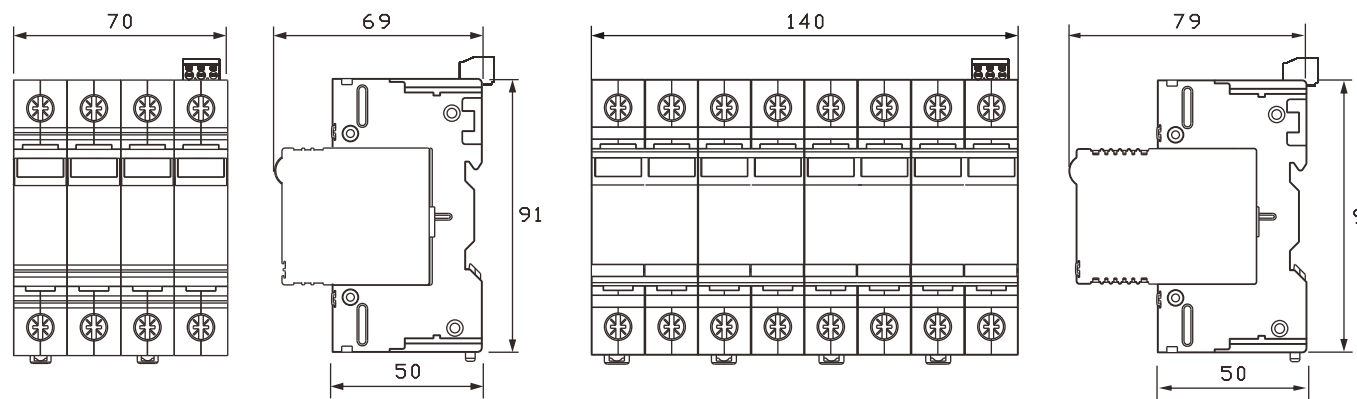
Module Explain:

|               |                                  |                               |                            |                                                                                |                                               |
|---------------|----------------------------------|-------------------------------|----------------------------|--------------------------------------------------------------------------------|-----------------------------------------------|
|               |                                  |                               |                            |                                                                                |                                               |
| Encode        | 1                                | 2                             | 3                          | 4                                                                              | 5                                             |
| Name          | lightning peak current sensor    | Intelligent monitoring module | SPD leakage current sensor | SPD specified disconnecter(SSD)                                                | SPD                                           |
| configuration | See rapid selection for details. |                               |                            | See technical parameter table of SPD intelligent monitoring device for details | See SPD technical parameter table for details |

Installation Size:



Installation size of SPD intelligent monitoring device



SPD installation size

2) CENTRALIZED CONTROLLER(GATEWAY)

Acquisition terminal controller information processor system.

The centralized controller is the heart of Xiamen Taihang on-line lightning protection monitoring system, which achieve system acquisition, centralized control of information input and output , remote control and other functions. Summarized information and data will be transmitted to the terminal upper computer via TCP/IP or 4G.

Character:

- Managing multi-circuit device
- Stong anti-inteference ability ( max. transmisson length: 1000m)
- Master-slave communication with quick data tansmission
- Report actively in the real-time

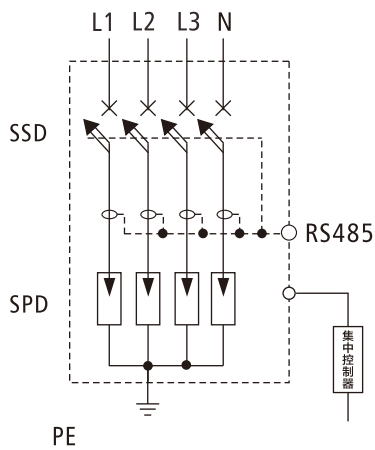
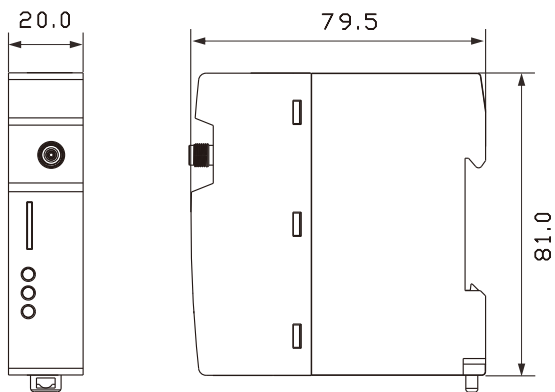


specifications:

| name                  | Centralized controller                                                                                                                                             |                    | Repeaters          |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| Model                 | TZ1                                                                                                                                                                | TZ2                | T0                 |
| operating voltage     | 12VDC                                                                                                                                                              | 12VDC              | 12VDC              |
| communication mode    | TCP/IP                                                                                                                                                             | 4G                 | RS485              |
| transmission distance | within 100 meter wire                                                                                                                                              | unlimited distance | within 1000 meters |
| Remarks               | It carries 30 SPD intelligent monitoring devices within 1000 meters, and can extend the communication distance by adding Repeaters to ensure communication quality |                    |                    |

Installation size(mm) :

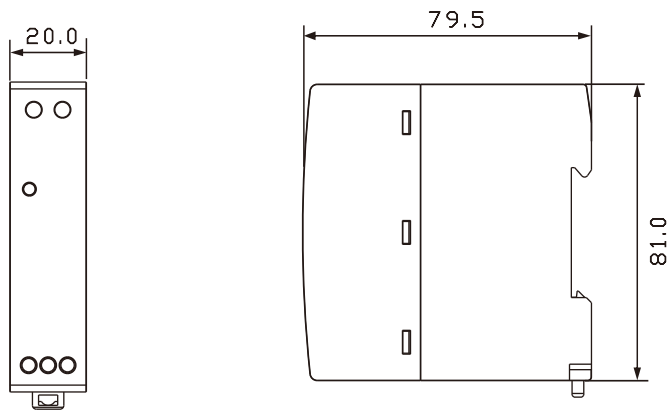
Application:



3) SWITCHING POWER SUPPLY

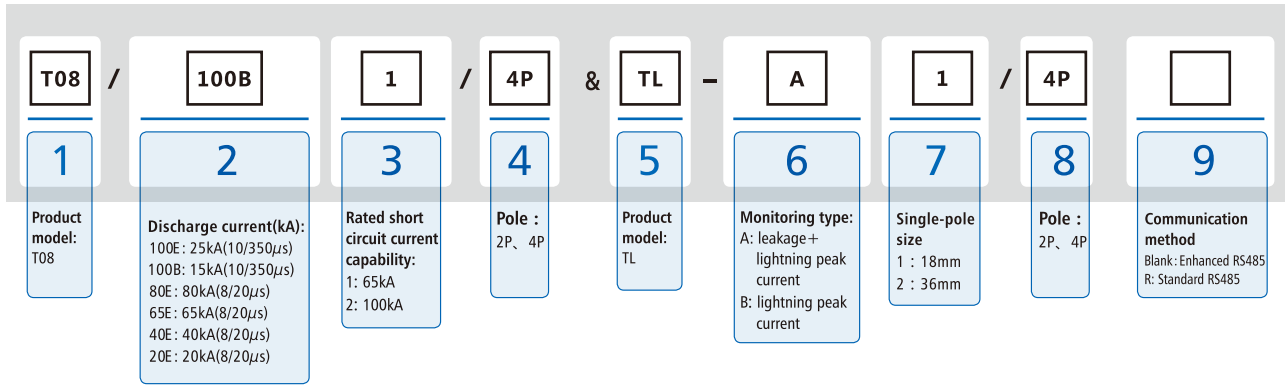
Specifications

| Model          | TH-220/1203 |
|----------------|-------------|
| Input voltage  | 220VAC      |
| Output voltage | 12VDC       |
| Rated current  | 3A          |

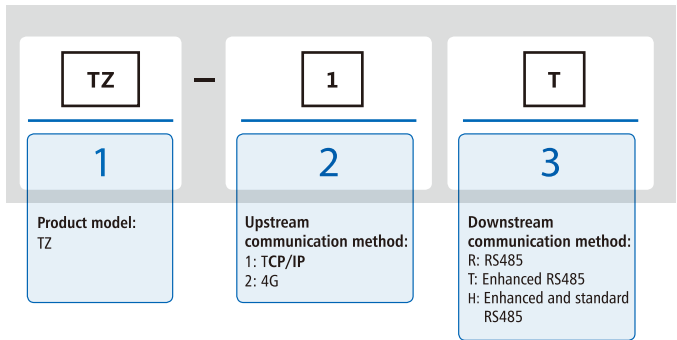


RAPID SELECTION

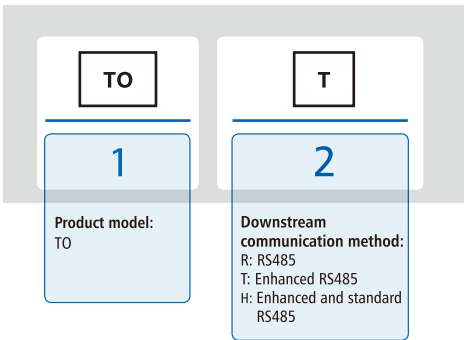
The Model Interpretation of the SSD Combination SPD Intelligent Monitoring Device.



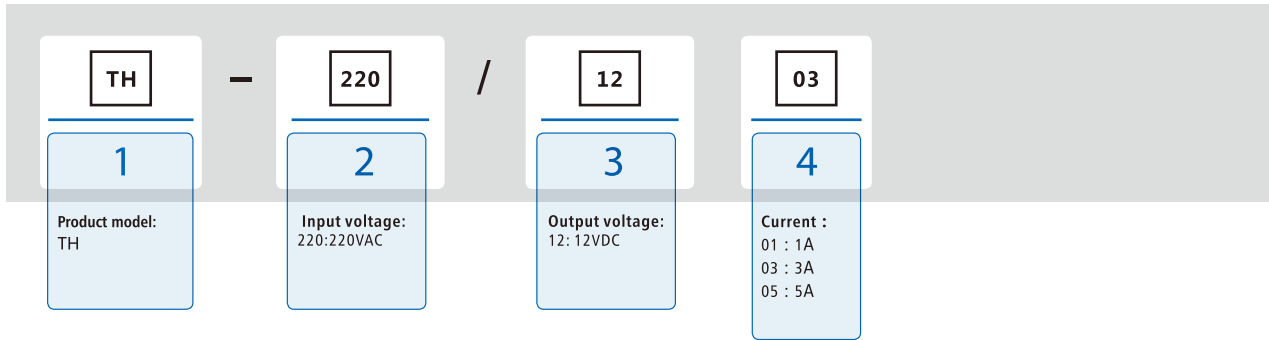
Centralized Controller Model Explain



Repeaters Model Explain



Switching Power Supply Model Explain



SPECIFICATIONS

Intelligent Monitoring Module Specifications

|                                             | TL-A1                                    | TL-A2                                    |
|---------------------------------------------|------------------------------------------|------------------------------------------|
| Size                                        |                                          |                                          |
| Single-pole                                 | 18mm                                     | 36mm                                     |
| Power Supply                                |                                          |                                          |
| Voltage                                     | 230VAC                                   | 230VAC                                   |
| Frequency                                   | 50/60Hz                                  | 50/60Hz                                  |
| Power Consumption                           | 5W max                                   | 5W max                                   |
| Surge Current Measure                       |                                          |                                          |
| Surge Peak Current Range                    | ≤ 80kA                                   | ≤ 120kA                                  |
| Error                                       | ≤± (standard value*15%+0.8kA)            | ≤± (standard value*15%+0.8kA)            |
| Surge Triggering Value                      | 1kA                                      | 1kA                                      |
| Lightning Record                            | Times: 1-9999, lightning occurrence time | Times: 1-9999, lightning occurrence time |
| Pure Resistance Leakage Current Measurement |                                          |                                          |
| Pure Resistance Leakage Current Range       | 1μA~500μA                                | 1μA~500μA                                |
| Error                                       | ≤ ± (standard value*10%+2μA)             | ≤ ± (standard value*10%+2μA)             |
| Protection Level                            | IP20                                     | IP20                                     |
| Environment                                 |                                          |                                          |
| Installation Site                           | Indoors                                  | Indoors                                  |
| Operating Temperature                       | -25℃~70℃                                 | -25℃~70℃                                 |
| Storage Temperature                         | -40℃~85℃                                 | -40℃~85℃                                 |
| Humidity                                    | 5%~95%                                   | 5%~95%                                   |
| Altitude                                    | ≤ 2000m                                  | ≤ 2000m                                  |
| Function                                    |                                          |                                          |
| Monitor SPD Remaining Lifetime              |                                          |                                          |
| Monitor SPD Working Status                  |                                          |                                          |
| Monitor SPD Pure Resistance Leakage Current |                                          |                                          |
| Monitor SPD Surge Current                   |                                          |                                          |
| Monitor SPD Grounding Status                |                                          |                                          |
| Communication                               |                                          |                                          |
| Communication Protocol                      | Modbus RTU                               | Modbus RTU                               |
| Hardware Interface                          | RS485 or Enhanced RS485                  | RS485 or Enhanced RS485                  |
| Standard                                    |                                          |                                          |
| Product Standard                            | NB/T 10284-2019<br>GB/T 18802.11-2020    | NB/T 10284-2019<br>GB/T 18802.11-2020    |
| Emc                                         | IEC 61000-6-2<br>IEC 61000-6-3           | IEC 61000-6-2<br>IEC 61000-6-3           |

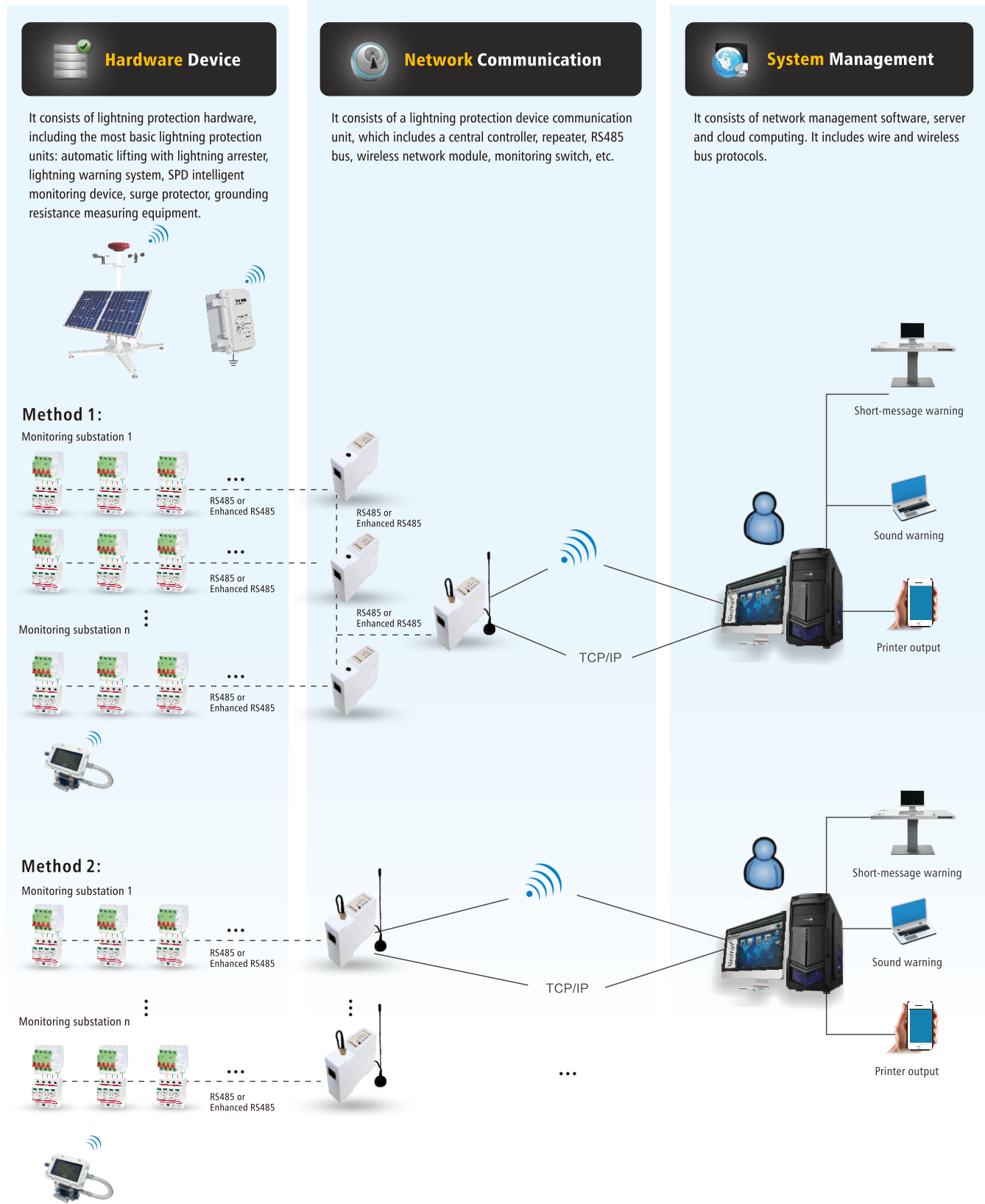
SSD Specifications

| Intelligent spd monitoring model                    | T08/20E1                                                 | T08/40E1 | T08/80E1 | T08/100B1      | T08/100E1      |
|-----------------------------------------------------|----------------------------------------------------------|----------|----------|----------------|----------------|
| Rated service short-circuit breaking capacity (Icn) | 65kA                                                     | 65kA     | 65kA     | 65kA           | 65kA           |
| Nominal discharge current (In)                      | 10kA                                                     | 20kA     | 40kA     | 60kA           | 80kA           |
| Impulse discharge current (Iimp)                    | /                                                        | /        | /        | 15kA(10/350μs) | 25kA(10/350μs) |
| Rated operating voltage (Ue)                        | 1P、2P：AC230V/240V 50/60Hz      3P、4P：AC230V/400V 50/60Hz |          |          |                |                |
| Rated insulation voltage (Ui)                       | AC500V                                                   |          |          |                |                |
| Min. delay action current (Id)                      | 3A                                                       |          |          |                |                |
| Min. Instantaneous action current (Ii)              | 5A                                                       |          |          |                |                |
| Tripped status                                      | Tripped status                                           |          |          |                |                |
| Tmechanical life                                    | >1000 times                                              |          |          |                |                |
| The minimum area of connecting cables               | M6/2.5N.m                                                |          |          |                |                |
| The maximum area of connecting cables               | 2.5 ~ 25mm²                                              |          |          |                |                |
| Working environment                                 | temperature:-25℃ ~ +70℃    relative humidity: 5%~95%RH   |          |          |                |                |
| Wiring screw                                        | IP20                                                     |          |          |                |                |
| Rail installation                                   | EN 60715 ( 35mm )                                        |          |          |                |                |
| matched SPD model                                   | VD10R                                                    | VC20R    | VB40R    | VA60R/VA150BR  | VA150AR        |

SPD Specifications

| Model                                                     | VD10R                      | VC20R                      | VB40R                       | VA60R                       | VA150AR                    |
|-----------------------------------------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|
| Max. Continuous Operating Voltage <b>Uc</b>               | 320VAC                     | 385VAC                     | 385VAC                      | 385VAC                      | 385VAC                     |
| Leakage current <b>Iie</b>                                | L-N: ≤20μA @75%U1mA        |                            |                             |                             |                            |
| Voltage Protection Level <b>Up</b>                        | ≤1.2kV                     | ≤1.8kV                     | ≤2.1kV                      | ≤2.3kV                      | ≤1.5kV                     |
| Nominal Discharge Current (8/20μs) <b>In</b>              | 10kA                       | 20kA                       | 40kA                        | 60kA                        | 20kA                       |
| Maximum Discharge Current (8/20μs) <b>I<sub>max</sub></b> | 20kA                       | 40kA                       | 80kA                        | 100kA                       | /                          |
| Impulse Current (10/350μs) <b>Iimp</b>                    | /                          | /                          | /                           | /                           | 20kA                       |
| In Accordance with IEC61643-11                            | Type 2                     | Type 2                     | Type 2                      | Type 2                      | Type 1                     |
| Response Time <b>Ta</b>                                   | < 25ns                     | < 25ns                     | < 25ns                      | < 25ns                      | < 25ns                     |
| Leakage current                                           | < 20μA                     | < 20μA                     | < 20μA                      | < 20μA                      | < 80μA                     |
| Operating Temperature Range <b>Tu</b>                     | -40℃ ~ 80℃                 | -40℃ ~ 80℃                 | -40℃ ~ 80℃                  | -40℃ ~ 80℃                  | -40℃ ~ 80℃                 |
| Remote communication model                                | R                          | R                          | RO    RC                    | RO    RC                    | R                          |
| Remote communication status                               | Normally on & normally off | Normally on & normally off | Normally on    normally off | Normally on    normally off | normally on & normally off |
| Min. Wiring                                               | 4mm² flexible cable        | 6mm² flexible cable        | 10mm² flexible cable        | 10mm² flexible cable        | 16mm² flexible cable       |
| Max. Wiring                                               | 25mm² flexible cable       | 25mm² flexible cable       | 25mm² flexible cable        | 25mm² flexible cable        | 2x25mm² flexible cable     |
| Enclosure Protection Level                                | Ip20                       |                            |                             |                             |                            |
| Max. Current in Remote Signal Contact (AC)                | 0.2A/125VAC                |                            |                             |                             |                            |
| Max. Current in Remote Signal Contact (DC)                | 0.5A/48VDC                 |                            |                             |                             |                            |
| Screw                                                     | M6/M2                      |                            |                             |                             |                            |
| Screw Torque                                              | 3.5N.m/0.4N.m              |                            |                             |                             |                            |
| Rail Type                                                 | EN 60715 ( 35mm )          |                            |                             |                             |                            |

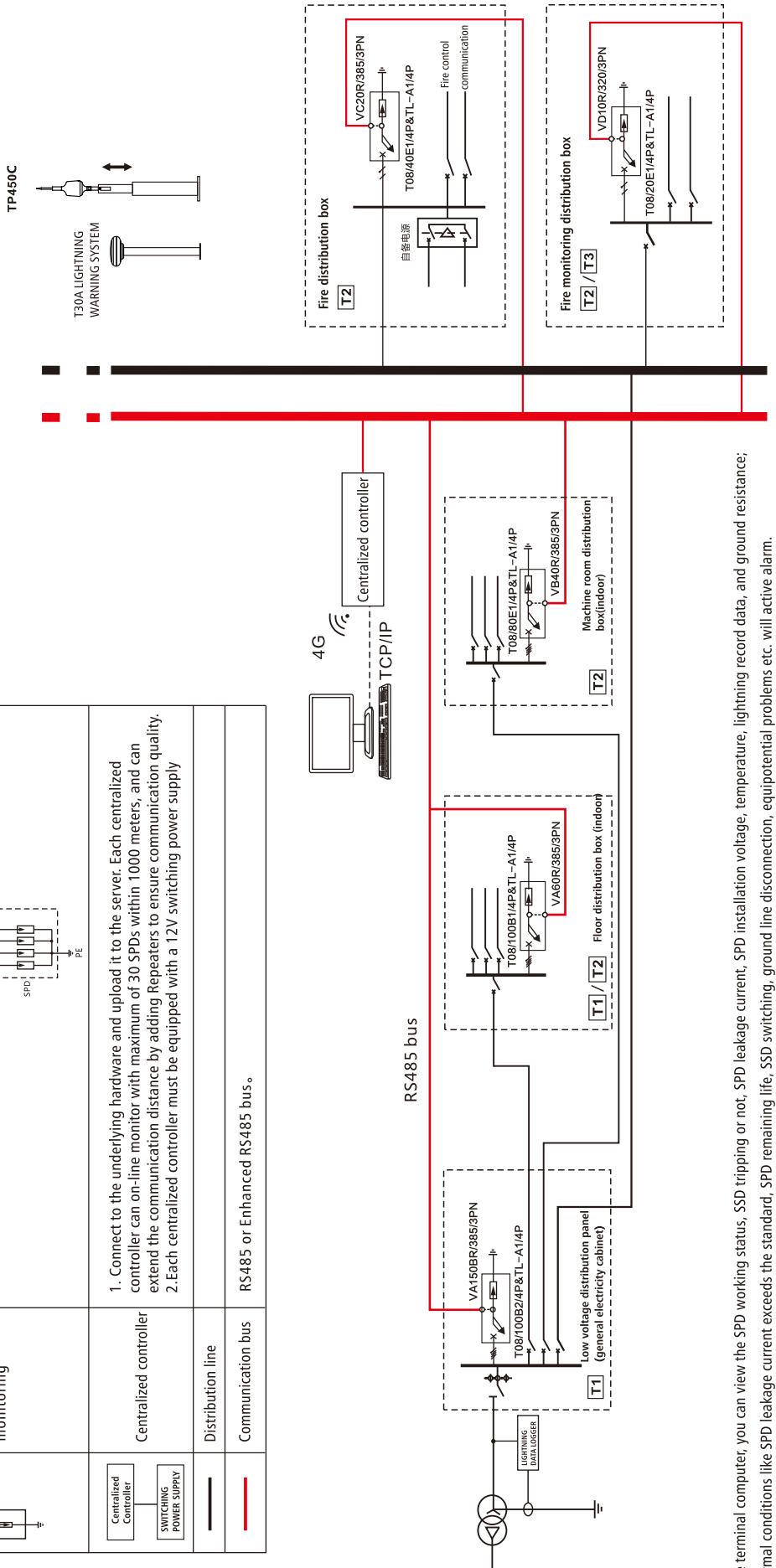
SYSTEM STRUCTURE



DESIGN LEGEND

LIGHTNING PROTECTION SYSTEM DESIGN

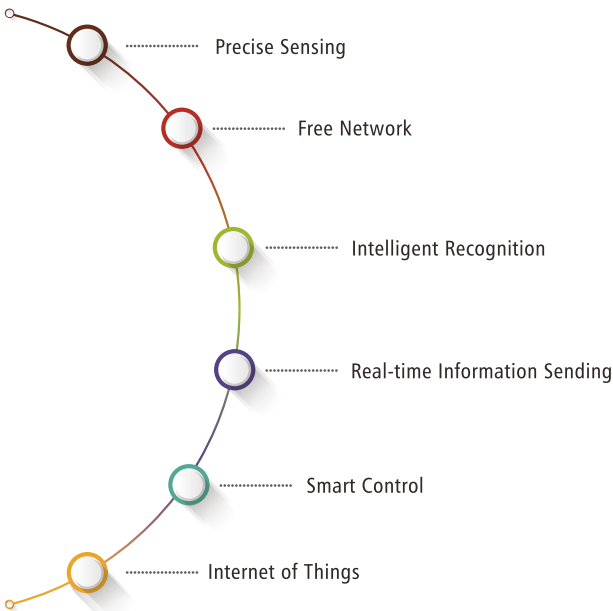
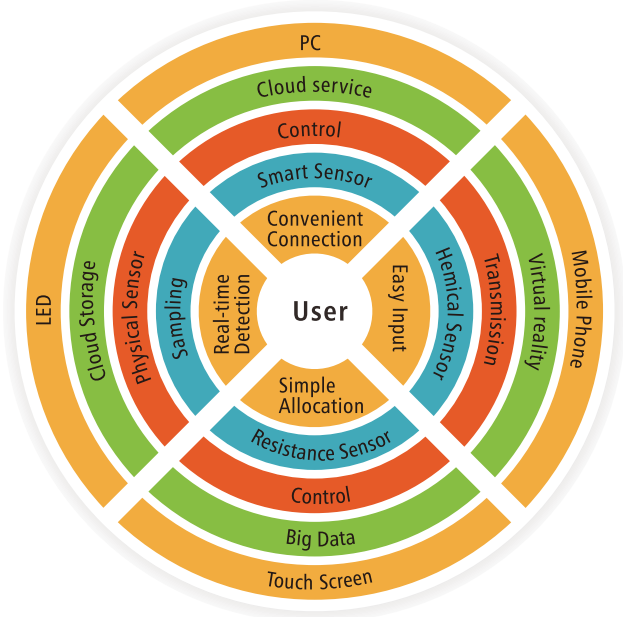
| LEGEND | NAME                    | FUNCTIONS                                                                                                                                                                                                                                                                                                                                         |
|--------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | SSPD on-line monitoring | 1、It consist of intelligent monitoring module, SSD and SPD.<br>                                                                                                                                                                                                                                                                                   |
|        | Centralized controller  | 1. Connect to the underlying hardware and upload it to the server. Each centralized controller can on-line monitor with maximum of 30 SPDs within 1000 meters, and can extend the communication distance by adding Repeaters to ensure communication quality.<br>2.Each centralized controller must be equipped with a 12V switching power supply |
|        | Distribution line       |                                                                                                                                                                                                                                                                                                                                                   |
|        | Communication bus       | RS485 or Enhanced RS485 bus。                                                                                                                                                                                                                                                                                                                      |



Note:  
1. On the terminal computer, you can view the SPD working status, SSD tripping or not, SPD leakage current, SPD installation voltage, temperature, lightning record data, and ground resistance;  
2. abnormal conditions like SPD leakage current exceeds the standard, SPD remaining life, SSD switching, ground line disconnection, equipotential problems etc. will active alarm.

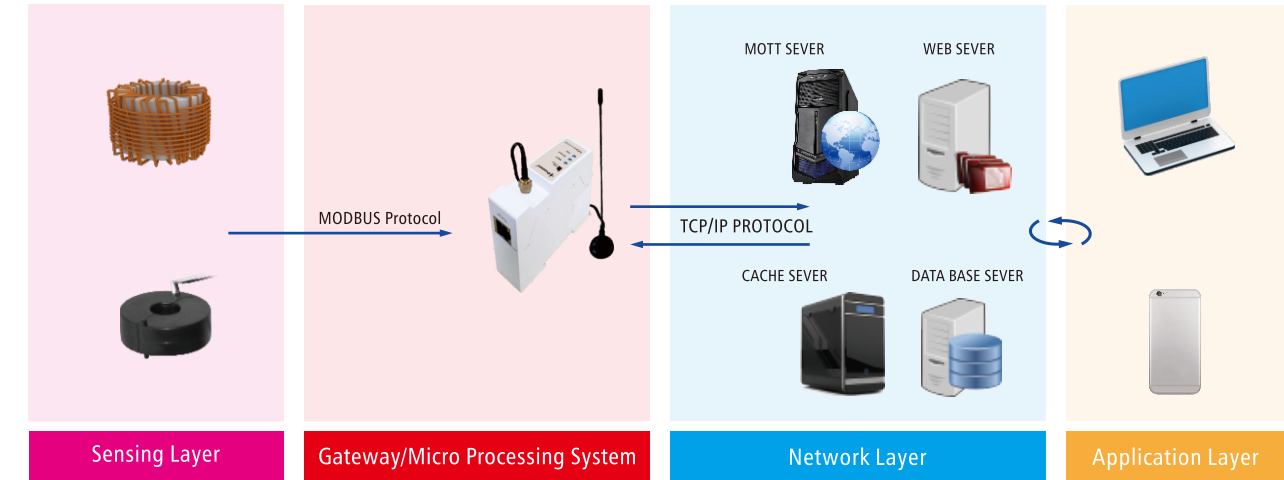
SOLUTION

Lightning protection system invented by TAIHANG has achieved precise sampling, smart allocation, intelligent recognition, automatic control and alarming when failure occurs.



Lightning protection system invented by TAIHANG adopts embedded computing, micro programming chip, sensor module and smart calculation to achieve multi channels recognition and control, reaching the goal of automatic analysis and decision-making of networked equipment.

The topology of smart on-line monitoring protection system



Providing safe, stable and controllable Things of Internet to cover the service life of equipment. No need to allocate in site. Be able to remotely operate and conduct batch management on the equipment layer, monitoring and maintenance.

# APPLICATION



## C CIVIL CONSTRUCTION

Shanghai Ping'An mansion.  
Shenzhen Ping'An mansion.  
Xiamen Twin Towers.  
Xiamen Convention Center.  
Guangzhou victory square.



## O OIL & CHEMICAL

SINOPEC (Rizhao city) oil transportation station.  
Erdos Shenhua group.  
SINOPEC (Maoming city) oil station.  
Shanghai Pak Shan Wan oil transportation station.  
Daxie Island oil deposit.  
CNOOC gas station ( Quanzhou, Fujian province).  
Cezi Island oil deposit (Zhoushan, Zhejiang province).  
Nanjing Shibuqiao oil deposit.  
Ningbo Lanshan oil transportation station.  
Hebei Cangzhou oil transportation station.  
Zhangzhou Gulei project.



## R TRANSPORTATION

Beijing Fengtai railway station.  
Fuzhou railway station.  
Wuhan No.3 metro line.  
Wuhan No.2 metro line.  
Ningbo No.2 metro line.  
Ningbo international airport.  
Hefei No.2 metro line.  
Xiamen bridges and tunnels.  
Xiamen Xiang'An international airport.  
Xiamen expressway.  
Xiamen Metro.  
Hebei Chengde expressway.  
Zhengzhou metro.



## W IMPORTANT AREA

Beijing Forbidden City.  
Yan'An pagoda.  
Western Royal Tombs of the Qing Dynasty.  
Hailongtun historical site.  
Yudu Army historical site.



## T TABACCO

Yunnan tobacco.



## S SCENIC AREA

Jiangxi lushan mountain.  
Zunyi scenic area in Guizhou.  
Jiangxi scenic area.  
Beijingqinglongxia great wall.  
Taihang scenic are.  
Hubei Wudang Mountain.  
Quanzhou Qiuqian Mountain.  
Anji Hello Kitty amusement park.  
Jiangxi wuyuan scenic area.



## W WIND TURBINE & PHOTOVOLTAIC

New energy.  
Guangxi Jinzishan wind power.  
Yantai wind power.  
Xiamen Qingyuan technology.