

Derwent
Top 100
Global
Innovator
2020

GridSol CARE

Smart LV Solution



LS ELECTRIC

Reliability

- Power facility preventive and diagnostic services
- Ethernet network dualization
- Temperature monitoring and fire prevention
- Improved measurement accuracy

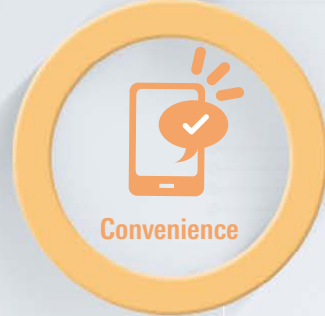


Reliability

Smart HV Solution
PDPS

GridSol CARE

Digital power facility integrated management service



Convenience

Convenience

- Latest on-site management technology
- Real-time remote monitoring
- Real-time alarm service
- Integrated operation of existing systems



Smart LV Solution

GridSol CARE is LS ELECTRIC's digital power facility integrated management service
Provides energy management, facility operation efficiency, and maintenance convenience through smart switchboard and separate operation software, and also connects to SCADA and ultra high voltage diagnosis.
We provide customized integration services.

Smart MV Solution



Efficiency

Efficiency

- Energy information visualization
- Energy demand trend analysis
- Energy consumption prediction
- Provides periodic energy reports

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GridSol CARE

Smart LV Solution

Smart LV Solution is LS ELECTRIC's unique smart switchboard solution that enhances measuring and monitoring by integrating IoT and digital technologies.



Reliability – Prevent accidents in power facilities and reduce losses

- Remote monitoring and control of all circuit breakers from ACB to MCB
- Provides enhanced self-diagnostics in devices.
 - Contact life, number of opening/closing, temperature status, relay operation, battery, wiring status, memory, time, etc.
- Provides diagnostic and forecast services for power facilities.
 - Operation time, circuit breaker operation time, electrical/mechanical operation number, trip number, etc.
- Fire can be prevented through temperature monitoring.
 - TRIO : Temperature monitoring function for high-risk points.
 - Thermal CAM : Temperature monitoring function for hazardous areas and areas of interest.
- Improved measurement accuracy of Smart circuit breaker (STU, ETU models) (Class 1.0)
- Improved network stability by implementing Rapid Spanning Tree Protocol (RSTP).

Convenience – Increased maintenance convenience and reduced commissioning time

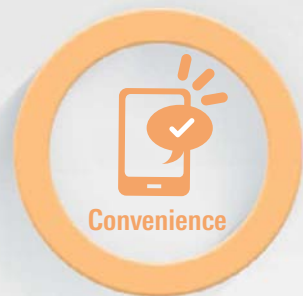
- Auto discovery, Auto time sync
 - Provides automatic search and time synchronization for smart circuit breakers and instruments.
- Real-time monitoring of systems and devices
- On-site/remote monitoring of power facilities

| Line up function | Function | Remark |
|----------------------------|--|-------------------|
| Monitoring S/W (Cloud) | Cloud monitoring | Selection options |
| GridSol CARE Operation S/W | Remote monitoring and control | |
| Maintenance S/W | Project management, testing | |
| Panel HMI (3.5 inch) | On-site monitoring | |
| Panel HMI (7.0 inch) | On-site monitoring and control | |
| Smart Viewer (Mobile App.) | BLE : On-site monitoring | |
| | NFC : Checks the state just before power failure | |

- Convenient F/W update function
 - Smart ACB, Smart MCCB : F/W update available in live or no power
 - Communication device : Remote F/W update
- Provides real-time alarm service when problems occur in systems and devices.
 - Push alarm (Mobile App.), SMS, E-mail
 - Provides information on event type, time of occurrence, and location of power facilities

Efficiency – Reduced energy consumption and cost

- Visualizes and provides data to intuitively understand energy information.
 - Graph (3D, bar, circle, strip, line, etc.), table
- Real-time information on energy can be checked by category.
 - Energy information : Power consumption, power demand, power quality, device information, peak, etc.
 - Category : Location, use, day, month, year, time zone, etc
- Provides real-time energy demand trend and analysis information.
- Provide regular reports for efficient energy management.
 - Project status, communication status, alarm/event, energy usage, system/device diagnostic information, etc.



| | Line-up | Main functions |
|-----------------------------|-------------------------------------|--|
| Upper system | GridSol CARE Monitoring S/W (Cloud) | <ul style="list-style-type: none"> • Provides LV panel monitoring function (anytime, anywhere) by managing data through the cloud server • Provides real-time energy information such as device status, power consumption, quality, demand, and peak • Provides E-mail, SMS functions (Events, reports) |
| | GridSol CARE Operation S/W | <ul style="list-style-type: none"> • Provides monitoring and control of LV panel by managing data through local server • Provides real-time energy information such as device status, power consumption, quality, demand, and peak |
| | GridSol CARE Maintenance S/W | <ul style="list-style-type: none"> • Provides project engineering, device setting and control functions • Relay setting and relay testing (Automatic generation of result reports) |
| | Panel HMI (3.5 inch) | <ul style="list-style-type: none"> • 3.5 inch TFT Color LCD • Real-time monitoring and IO control of connected devices (Up to 8 devices can be connected) |
| | Panel HMI (7.0 inch) | <ul style="list-style-type: none"> • 7.0 inch TFT Color LCD • Provides detailed information such as device status, communication status, hierarchical information, control, and events |
| | Smart Viewer (Mobile App.) | <ul style="list-style-type: none"> • Smart circuit breaker on-site monitoring (BLE) and immediately before event check (NFC) • Provides push alarm function |
| Communication device | Data Logger | <ul style="list-style-type: none"> • GridSol CARE Monitoring S/W access and data transmission • Includes gateway function |
| | Gateway | <ul style="list-style-type: none"> • Auto discovery, auto time sync • Provides Rapid Spanning Tree Protocol (RSTP) function • Provides infrared camera monitoring and web service support |
| | Ethernet Converter (RSTP) | <ul style="list-style-type: none"> • Provides E-mail and push alarm function • Provides RSTP (Rapid Spanning Tree Protocol) function |
| | E COLLECTOR | <ul style="list-style-type: none"> • Collects electricity measurement data of small sensing module (E TAG) by wireless communication • Fast registration and Web service support through auto discovery function |
| Accessory device | M LINK | <ul style="list-style-type: none"> • MCB/MCCB On/off/trip status monitoring and on/off control • Number of contacts: DI 6 points, DO 4 points, AI 1 point |
| | TRIO | <ul style="list-style-type: none"> • ACB temperature monitoring (7-Segment) • ACB On/off control and contact monitoring |
| | Thermal CAM | <ul style="list-style-type: none"> • Real-time temperature change monitoring and alarm of facilities and devices installed on site |
| | T Connection Module | <ul style="list-style-type: none"> • Provides RS-485 Multi-Drop connection convenience • Provides termination processing function |
| | DC Power Module | <ul style="list-style-type: none"> • DC 24V output • 5 types according to input and output specifications |
| | i-Tester | <ul style="list-style-type: none"> • Saves current relay test and test history results (Used for test result report) |
| | Portable Battery & Trip Module | <ul style="list-style-type: none"> • Supplies DC power to Smart MCCB • Checks Smart MCCB trip operation |
| | Circuit breaker | Smart ACB |
| Smart MCCB | | <ul style="list-style-type: none"> • Susol MCCB applied with ETU (Electronic Trip Unit) • Equipped with IoT function and upgraded measurement accuracy, measurement items, relay function |
| MCB | | <ul style="list-style-type: none"> • BK63H Series and RCBO |
| Measurement device | GIMAC1000 | <ul style="list-style-type: none"> • Provides voltage, current, power and power measurement and power quality analysis functions • Provides Rapid Spanning Tree Protocol (RSTP) function |
| | GIMAC-B | <ul style="list-style-type: none"> • Provides various measurement/power quality monitoring functions • Dualization function through RS-485, Ethernet |
| | E TAG | <ul style="list-style-type: none"> • Tag type small sensing module for measuring electricity (Voltage/current/power/power factor/frequency) • Supports wireless communication to simplify wiring within the panel (Interface with E COLLECTOR and wireless communication) |
| | DMPi | <ul style="list-style-type: none"> • Current measurement and protection • Provides various returns (Manual/auto/electrical return) functions |
| | MMP | <ul style="list-style-type: none"> • Measurement of current, voltage and power and protection of power factor • Applies various motor starting methods with one model |
| | Energy Meter | <ul style="list-style-type: none"> • Single-phase/3-phase power measurement device (Din-rail mounting structure for panel installation) • Measurement accuracy of active power: Class 1.0 |

GridSol CARE

Smart LV Solution

Smart LV Solution is LS ELECTRIC's unique smart switchboard solution that enhances measuring and monitoring by integrating IoT and digital technologies.

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Reliability



Convenience



Efficiency



GIMAC1000

Panel HMI (7.0 inch)

Panel HMI (3.5 inch)



Smart ACB



Smart MCCB

DMPI

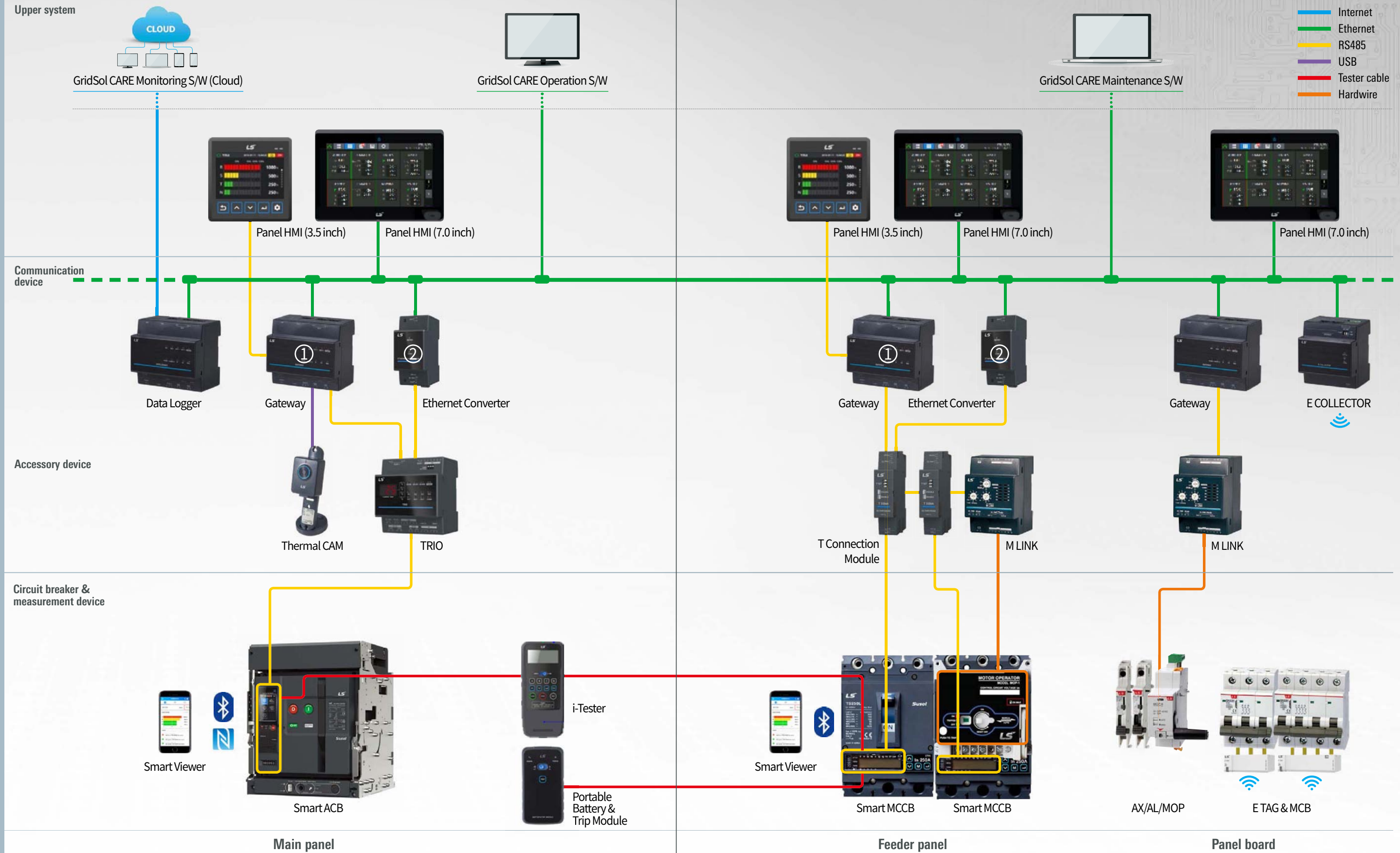
MMP

GridSol CARE



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| | | |
| Circuit breaker | Smart ACB | <ul style="list-style-type: none"> Susol & Metasol ACB applied with Smart Trip Unit (STU) Equipped with IoT function and upgraded measurement accuracy, measurement items, relay function |
| | Smart MCCB | <ul style="list-style-type: none"> Susol MCCB applied with ETU (Electronic Trip Unit) Equipped with IoT function and upgraded measurement accuracy, measurement items, relay function |
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ACB/MCCB/MCB panel configuration



Smart Air Circuit Breakers

Smart ACB is a large-capacity breaking, multifunctional device. It is a Susol/Metasol ACB applied with a digital trip relay STU (Smart Trip Unit) with built-in IoT communication function for measurement, analysis, diagnosis and Smart LV implementation other than relay.



Smart ACB

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Family

As the world's best large-capacity breaking, multifunctional device, Susol ACB Series can apply digital trip relay STU (Smart Trip Unit) with built-in IoT communication function for measurement, analysis, diagnosis, and Smart LV implementation other than relay. It is suitable for important facilities, since the Arc Cover for securing Arc Space Zero performance is installed.

Full line-up & Compact

Up to 6300A, Susol ACB provides fully lined-up 3 frame. For each frame, there is just one size, which is smaller and more compact. It makes it possible for you to design the optimized volume panel.

85kA

100kA

150kA

AH-06~20D

| | |
|----|--------|
| 06 | 630AF |
| 08 | 800AF |
| 10 | 1000AF |
| 13 | 1250AF |
| 16 | 1600AF |
| 20 | 2000AF |

Icu=Ics=85kA/500Vac
W=334(3p), 419(4p)mm

AH-06~40E

| | | | |
|----|--------|----|--------|
| 06 | 630AF | 20 | 2000AF |
| 08 | 800AF | 25 | 2500AF |
| 10 | 1000AF | 32 | 3200AF |
| 13 | 1250AF | 40 | 4000AF |
| 16 | 1600AF | | |

Icu=Ics=100kA/500Vac
W=412(3p), 527(4p)mm

AH-40~63G

| | |
|----|--------|
| 40 | 4000AF |
| 50 | 5000AF |
| 63 | 6300AF |

Icu=Ics=150kA/500Vac
W=785(3p), 1015(4p)mm

- The highest breaking capacity: 150kA (6300AF at 500Vac)
- 3 ampere frame sizes: 2000/4000/6300AF
- N phase current conducting capacity: 100%



Family

As a large-capacity breaking, multifunctional device, Metasol ACB Series is able to apply digital trip relay STU (Smart Trip Unit) with built-in IoT communication function for measurement, analysis, diagnosis, and Smart LV implementation other than relay. It is a highly customized device that maximizes the range of device selection by size and rating by diversifying small and medium capacity (less than 3200AF) models and various deployments of large capacity (more than 4000AF) models.

Full line-up & Compact

Up to 6300A, Metasol ACB provides fully lined-up 4 frame. For each frame, there is just one size, which is smaller and more compact. It makes it possible for you to design the optimized volume panel.

70kA (65kA)

85kA (70kA)

100kA

120kA

AN-06~16D

| | |
|----|--------|
| 06 | 630AF |
| 08 | 800AF |
| 10 | 1000AF |
| 13 | 1250AF |
| 16 | 1600AF |

Icu=Ics=65kA/500Vac
W=334(3p), 419(4p)mm

AS-06~20D

| | |
|----|--------|
| 06 | 630AF |
| 08 | 800AF |
| 10 | 1000AF |
| 13 | 1250AF |
| 16 | 1600AF |
| 20 | 2000AF |

Icu=Ics=70kA/500Vac
W=334(3p), 419(4p)mm

AN-20~32E

| | |
|----|--------|
| 20 | 2000AF |
| 25 | 2500AF |
| 32 | 3200AF |

Icu=Ics=70kA/500Vac
W=412(3p), 527(4p)mm

AS-20~40E

| | |
|----|--------|
| 20 | 2000AF |
| 25 | 2500AF |
| 32 | 3200AF |
| 40 | 4000AF |

Icu=Ics=85kA/500Vac
W=412(3p), 527(4p)mm

AS-50F

| | |
|----|--------|
| 40 | 4000AF |
| 50 | 5000AF |

Icu=Ics=100kA/500Vac
W=629(3p), 799(4p)mm

AS-40~63G

| | |
|----|--------|
| 40 | 4000AF |
| 50 | 5000AF |
| 63 | 6300AF |

Icu=Ics=120kA/500Vac
W=785(3p), 1015(4p)mm

- The highest breaking capacity: 150kA (6300AF at 500Vac)
- 4 ampere frame sizes: 2000/4000/5000/6300AF
- N phase current conducting capacity: 100

Smart Trip Unit (Trip Relay)

It is a smart trip unit that provides the world's highest level of measurement accuracy, relay function, and IoT communication function, and is a relay interlocked with the mechanism (low voltage circuit breaker body). It expands and improves the ACB's breaking performance (high-speed short-circuit breaking characteristic) and increases the ACB life (increasing marking capacity).



Smart Trip Unit

N type



A type



P type



S type



- Secures relay operation safety through the instrument-level measurement accuracy (current/voltage 0.5%, power class 1.0)
- Prevention of mis-trip through powerful self-diagnosis functions such as CT disconnection check, contact wear rate, internal temperature monitoring, and quick response through alarm
- Secures Smart Panel Solution through **ICT convergence technology** (Service is accessible anytime, anywhere)
- Speedily changes the relay setting value when changing from commercial power to power generation according to S type relay setting Group A/B (A→B)
- Power supply for checking and setting internal data of STU (N/A/P/S) at a short distance through **USB communication**

Serializes STU's trip relay by function

The trip relay series for each use and function are maximized and the user's convenience is maximized by easy attachment and detachment.



N type

- Device operation through self-power
- Current relay function
- Supports **USB communication**



P type

- Device operation through self-power
- Device operation via AC or DC
- Current/voltage/frequency/power relay function
- 3.5" Graphic Display
- DO output
- Supports USB communication
- Supports RS485 communication



A type

- Device operation through self-power
- Device operation via AC or DC
- Current relay function
- Segment LCD Display
- DO output
- Supports USB communication
- Supports RS485 communication



S type

- Device operation through self-power
- Device operation via AC or DC
- Current/voltage/frequency/power relay function
- 3.5" Graphic Display
- DO output
- Relay setting to group A/B
- Supports short-range USB communication
- Supports RS485 communication
- Supports NFC/BLE communication

ACB with STU (Smart Trip Unit) Features

Upgraded performance compared to existing OCR

Improved measurement accuracy

| Type | Susol ACB OCR P/S | Smart Trip Unit (STU) | | | |
|----------------------|-------------------|---|---------------------------------|-----------------|---|
| | | N | A | P | S |
| Measurement accuracy | Current | 6% | 0.5% | 0.5% | |
| | Voltage | 3% | — | 0.5% | |
| | Power | 10% | — | Class 1.0 | |
| | Frequency | 0.05 Hz (50, 60 Hz device classification) | 50, 60 Hz device classification | 0.1% (10~200Hz) | |

• Measurement accuracy through calibration using voltage, current, and power reference
(Current/Voltage : 0.5%, Power : Class 1.0) Satisfaction

• Improved resolution using 16bit ADC converter

Measurement items & relay function extension

1. Based on S type, equipped with a total of 29 types and 58 relay functions
2. Relay setting grouping and change function (Gtoup A/B)
: Relay group setting is changed quickly in parallel feeding situation where relay setting needs to be changed. (Group A → B)
3. ERMS (Energy Reduction Management System) function
: As a function to sensitively change the relay setting for the safety of a field electrical engineer, it is a safety related function required by the American market (L/S1/S2/IG//LN)
4. ZSI (Zone Select Interlock) function
: A function to operate the upstream circuit breaker closest to the accident point first by using ZSI Input DI and ZSI Output DO
5. Start-up function
: Prevents malfunction of relay element by in-rush current generated when starting motor and Transformers
6. Stores 255 system events, 127 fault events and 6 accident waves
: Trip Wave saves 4 cycles before an accident + 4 cycles after an accident

Safe self-diagnosis function

Quick maintenance by adding powerful self-diagnosis function to prevent mis-trip and through alarm

| | N type | A type | P type | S type |
|---------------------|---|--|---|--------|
| LED | RUN/AL LED flashing (Red ↔ Blue flashing) | | | |
| LCD | | Displays the corresponding segment or error number | Can be checked on the self-diagnosis screen | |
| Self-diagnosis List | <ul style="list-style-type: none"> • Contact Wear Alarm : Occurs when the contact wear rate is over 80% • Electrical Open Count Over Alarm : Occurs when the electrical open count exceeds 80% of the allowable electrical open count • Mechanical Open Count Over Alarm : Occurs when the mechanical open count exceeds 80% of the allowable mechanical open count • CT disconnection error : Occurs when CT disconnection occurs (monitoring for each phase), breaks relay function related to disconnection such as G, UP, IU, etc. • Over Heat Error : Occurs when CPU internal temperature N/A type exceeds 100°C and P/S type exceeds 115°C. • MTD Fail : Occurs when STU is not assembled with MTD or trip coil disconnection occurs (wiring check) • Battery Low Alarm : Occurs when the internal battery is not inserted or when the battery voltage is low • Rating Plug Unattached or Error : Occurs when rating plug is not assembled or when there is rating plug error • Ampere Frame Error : Occurs when the value of rating plug is not within 45%-100% of AF • Factory Cfg Error : Occurs when the factory mode setting is entered incorrectly • Device Type Error : Occurs when the rating plug information and CT information are different • RTC Error : Occurs when an error occurs in the internal RTC information • Memory Error : Occurs when corruption occurs in the redundant internal settings stored in the internal non-volatile memory | | | |

Increased user convenience

Uninterrupted device update & non-powered device setting

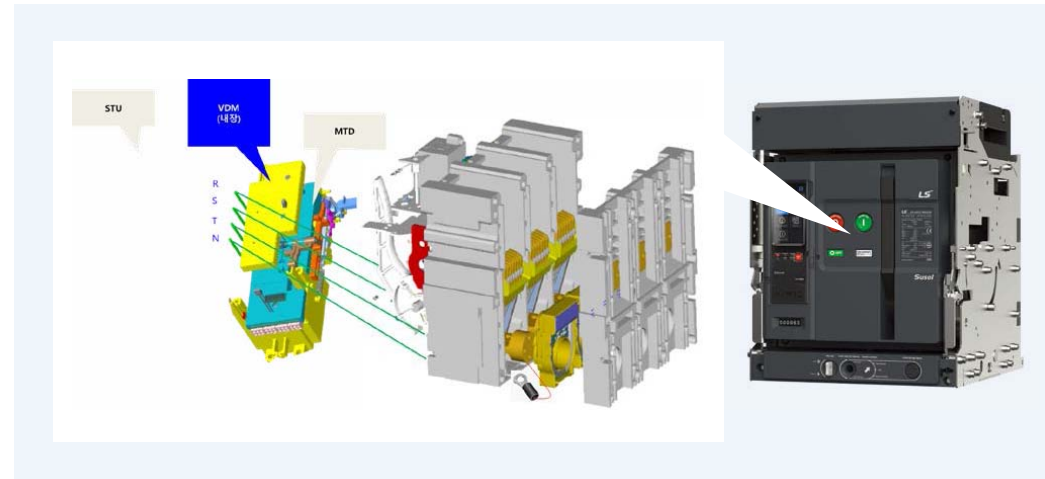
- By using USB interface, STU Program update is possible without a power outage in the live state, and STU can be set and updated even when the power is not supplied.



Uninterrupted device update & non-powered device setting

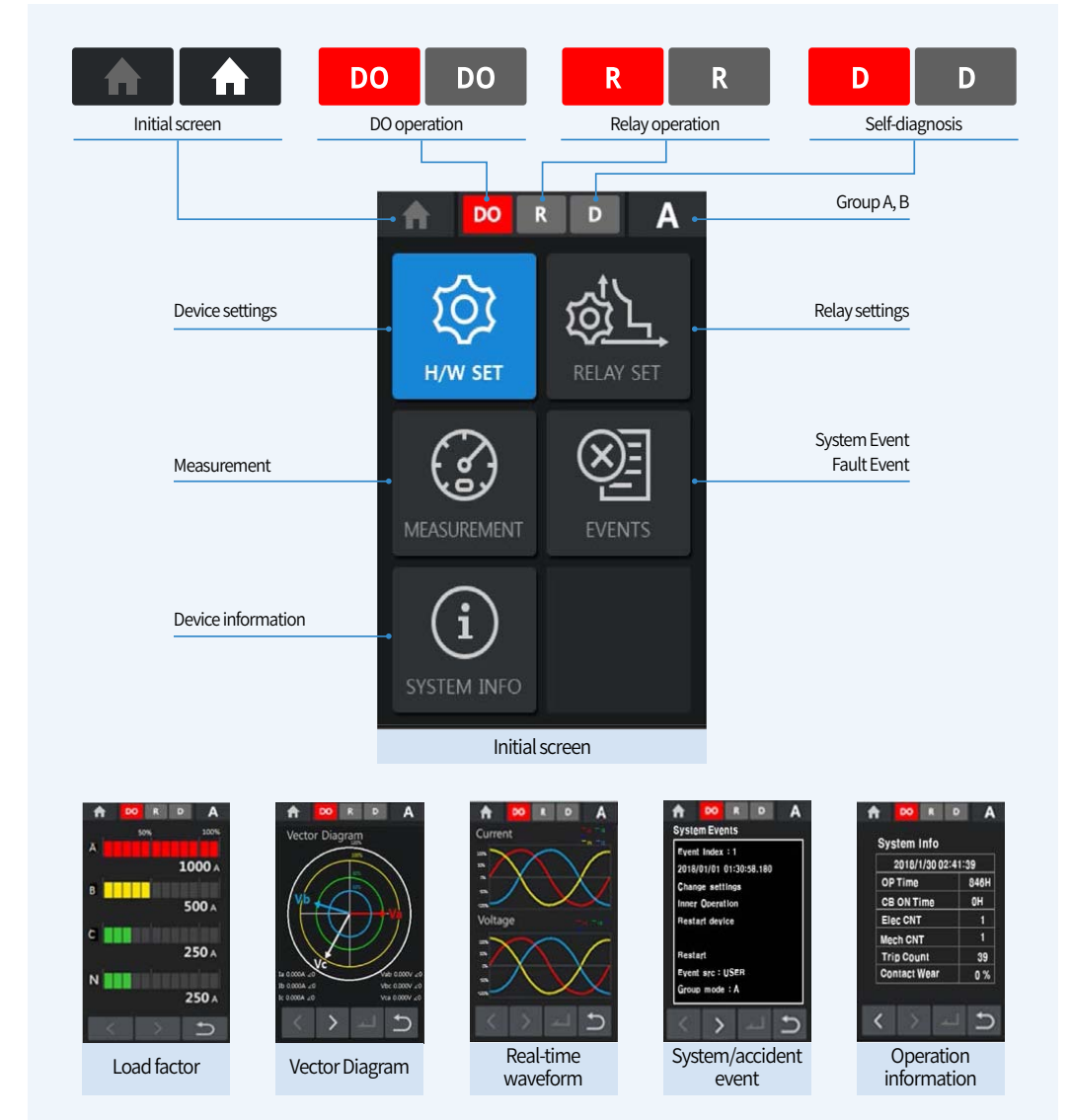
Built-in VDM and frequency tracking technology

- With a built-in VDM for voltage measurement, it can save the installation space of the distribution panel. It is also equipped with frequency tracking technology that maintains measurement and relay accuracy even at variable frequencies from 10 Hz to 200 Hz (Able to respond to renewable energy markets such as wind power and waterpower).



3.5" Touch Graphic LCB applied

- By applying Color Graphic LCD & Touch panel in P and S types, it improves the convenience and visibility of device use.



Built-in IoT function

- It is possible to check and share device information on a smartphone by interworking with a mobile App. through BLE and NFC communication.

| Type | Specifications |
|------|--|
| NFC | (1) Collects STU last trip information through smart phone in non-powered state (2) Communication distance : 10mm or less |
| BLE | (1) All information of the device can be accessed through the smart phone while the power is supplied. (2) Communication distance : within 4m |


Model selecting guide

Susol ACB model numbering (Product selection)

Body and accessories


| | | | | | |
|-----------|--|--|-----------------------|---|--|
| AH | 10 | D | 3 | 10 | A |
| Type | Ampere Frame | Frame sizes & phase array | No. of pole | Rated current (CT Spec.) | Connections |
| Susol ACB | 06 630AF 08 800AF 10 1000AF 13 1250AF 16 1600AF 20 2000AF | 630 ~ 2000AF D 3P/4P Standard ABC (N) W 630~2000AF 4P Inverse type (N) ABC | 3 3P(D) 4 4P(D, W) | 00 Without STU & CT 02 200A 04 400A 06 630A 08 800A 10 1000A 13 1250A 16 1600A 20 2000A | Draw-out type A Automatic connection Fixed type H Horizontal type V Vertical type Mixed type M Horizontal Vertical Mixed type N Vertical Horizontal P Front type |

**2000AF only offers with vertical type mounting terminals(Busbar).*



| | | |
|---|-----------------------|--|
| E | 3 | 00 |
| Frame sizes & phase array | No. of pole | Rated current (CT Spec.) |
| 630 ~ 4000AF E 3P/4P Standard ABC (N) X 630 ~ 4000AF 4P Reverse phase type(N) ABC | 3 3P(E) 4 4P(E, X) | 00 No STU & CT 06 630A 08 800A 10 1000A 13 1250A 16 1600A 20 2000A 25 2500A 32 3200A 40 4000A |

**4000AF only offers with vertical type mounting terminals(Busbar).*



| | | |
|---|-----------------------|--|
| G | 3 | 00 |
| Frame sizes & phase array | No. of pole | Rated current (CT Spec.) |
| 4000/5000/6300AF G 3P/4P Standard ABC (N) Z 4000/5000/6300AF 4P Reverse phase type(N) ABC | 3 3P(G) 4 4P(G, Z) | 00 No STU & CT 40 4000A 50 5000A 63 6300A |

Note 1) AH-20D, AH-40E types are equipped with vertical-only terminals.
In case of F/Y/G/Z Frame size, front type & mixed type connection is not available.
2) In case of DH type Switch Disconnector, the rated current (CT Spec.) will be applied 00
3) DN models are selectable up to 3200AF and DS models up to 4000AF.

| | | | | | | |
|---|---|---|---|------------------|---|-----------|
| M1 | D1 | D1 | AX | SS1 | U1 | AL |
| Motor rated voltage | Closing coil rated voltage | Shunt coil rated voltage | Aux.contact & charging types | STU | UVT coil rated voltage | |
| MA Without Motor M1 AC/DC 100V ~ 130V M2 AC/DC 200V ~ 250V M3 DC 125V M4 DC 24V ~ 30V M5 DC 48V ~ 60V M6 AC 380V ~ 415V M7 AC 440V ~ 480V M8 AC 48V | D0 Without Closing coil D1 AC/DC 100V ~ 130V D2 AC/DC 200V ~ 250V D3 DC 125V D4 DC 24V ~ 30V D5 DC 48V ~ 60V D6 AC 380V ~ 480V D7 AC 48V | D0 Without Shunt coil D1 AC/DC 100V ~ 130V D2 AC/DC 200V ~ 250V D3 DC 125V D4 DC 24V ~ 30V D5 DC 48V ~ 60V D6 AC 380V ~ 480V D7 AC 48V | AX Standard type OFF - Charge 3a3b AC Standard type ON - Charge 3a3b BX Standard type OFF - Charge 5a5b BC Standard type ON - Charge 5a5b HX High capacity OFF - Charge 5a5b HC High capacity ON - Charge 5a5b CC Standard type ON - Charge 6a6b JC High capacity ON - Charge 6a6b GX High capacity OFF - Charge 3a3b GC High capacity ON - Charge 3a3b TX TCS OFF - Charge 4a4b TC TCS ON - Charge 5a5b | Refer to page 27 | U0 Without UVT coil U1 AC/DC 100V ~ 130V U2 AC/DC 200V ~ 250V U3 DC 125V U4 DC 24V ~ 30V U5 DC 48V ~ 60V U6 AC 380V ~ 480V U7 AC 48V | |

** UVT Delay module is available over AC / DC 48V*

| Option | | |
|--------|--|--|
| Option | Type name | Option description |
| AL | AL1 + MRB | |
| A1 | AL1 + MRB + RES(AC110~130V) *AC only | |
| A2 | AL1 + AL2 + MRB | |
| A3 | AL1 + MRB + RES(AC/DC 110~125V) *DC only | |
| A4 | AL1 + MRB + RES(AC/DC 200~250V) *AC only | |
| A5 | AL1 + MRB + AUTO RESET | |
| A6 | AL1 + AL2 + MRB + AUTO RESET | |
| A7 | AL1 + MRB + RES(AC/DC 110~125V) + AUTO RESET *DC전용 | |
| A8 | AL1 + MRB + RES(AC/DC 200~250V) + AUTO RESET *AC전용 | |
| A9 | AL1 + MRB + RES(AC/DC 110~130V) + AUTO RESET *AC전용 | |
| Y2 | AL1 + AL2 + MRB(2b contact) | |
| Y6 | AL1 + AL2 + MRB + AUTO RESET(2b contact) | |
| Z2 | AL1 + AL2 + MRB(1a1b contact) | |
| Z6 | AL1 + AL2 + MRB + AUTO RESET(1a1b contact) | |
| C | C | Counter |
| S | CS2 | Charge switch communication |
| B | B | On/Off Button lock |
| M | MI | Mechanical interlock |
| D | DI or MOC | Door Interlock or MOC (Mechanism operated cell switch) |
| K | K1 | Key Lock |
| K2 | K2 | Key Interlock Set |
| K3 | K3 | Key Lock Double |
| R | RCS | Ready to Close switch |
| T | TM | Temperature Monitoring |
| H1 | SHT2 | AC/DC 100~130V |
| H2 | SHT2 | AC/DC 200~250V |
| H3 | SHT2 | DC 125V |
| H4 | SHT2 | DC 24~30V |
| H5 | SHT2 | DC 48~60V |
| H6 | SHT2 | AC 380~480V |
| H7 | SHT2 | AC 48V |

Note 1)

Note 1) It is a double shunt coil and not applicable when using UVT

Model selecting guide

Metasol ACB model numbering (Product selection)

Body and accessories

| AS | 10 | D | 3 | 10 | J |
|-----------------------|--------------|---------------------------|-------------|-----------------------------|------------------------|
| Type | Ampere Frame | Frame sizes & phase array | No. of pole | Rated current ** (CT Spec.) | Connections |
| Metasol ACB | 06 630AF | D 630~2000AF | 3 3P(D) | 00 Without OCR & CT | Draw-out type |
| AN Standard type | 08 800AF | D 3P/4P | 4 4P(D, W) | 02 200A | J Manual connection |
| AS High breaking type | 10 1000AF | Standard ABC (N) | | 04 400A | A Automatic connection |
| DN / DS | 13 1250AF | W 630~2000AF 4P | | 06 630A | Fixed type |
| Switch Disconnecter | 16 1600AF | Inverse type (N) ABC | | 08 800A | H Horizontal type |
| | 20 2000AF | | | 10 1000A | V Vertical type |
| | | | | 13 1250A | Mixed type |
| | | | | 16 1600A | M Horizontal |
| | | | | 20 2000A | V Vertical |
| | | | | | Mixed type |
| | | | | | N Vertical |
| | | | | | Horizontal |
| | | | | | P Front type |
| | 20 2000AF | E 2000 ~ 4000AF | 3 3P (E) | 00 Without OCR & CT | |
| | 25 2500AF | 3P/4P | 4 4P (E, X) | 06 630A | |
| | 32 3200AF | Standard ABC (N) | | 08 800A | |
| | 40 4000AF | X 2000 ~ 4000AF 4P | | 10 1000A | |
| | | Inverse type (N) ABC | | 13 1250A | |
| | | | | 16 1600A | |
| | | | | 20 2000A | |
| | | | | 25 2500A | |
| | | | | 32 3200A | |
| | | | | 40 4000A | |
| | 40 4000AF | F 4000/5000AF | 3 3P (F) | 00 Without OCR & CT | |
| | 50 5000AF | 3P/4P | 4 4P (F, Y) | 40 4000A | |
| | | Standard ABC (N) | | 50 5000A | |
| | | Y 4000/5000AF | | | |
| | | 4P | | | |
| | | Reverse phase type(N) ABC | | | |
| | 40 4000AF | G 4000/5000/6300AF | 3 3P (G) | 00 Without OCR & CT | |
| | 50 5000AF | 3P/4P | 4 4P (G, Z) | 40 4000A | |
| | 63 6300AF | Standard ABC (N) | | 50 5000A | |
| | | Z 4000/5000/6300AF | | 63 6300A | |
| | | 4P | | | |
| | | Reverse phase type(N) ABC | | | |

* AN type : 630 ~ 1600AF, 2000 ~ 3200AF
AS type : 630 ~ 2000AF, 2000 ~ 4000AF, 4000 ~ 5000AF, 4000 ~ 6300AF

** AN type is available up to rated current 1600A when 630~1600AF is selected and rated current is available up to 3200A when 2000 ~ 3200AF is selected.

Note 1) D Frame 2000AF and E Frame 4000AF are vertical type only. F and G Frames are not applicable to flat type and flat mix type.

2) For DN/DS models, only the rated current (CT Spec.) "00" is applied.

3) DN models can be selected up to 3200AF and DS models up to 4000AF.

| M1 | D1 | D1 | AX | SS1 | U1 | AL |
|----------------------|----------------------------|--------------------------|------------------------------------|------------------|------------------------|----|
| Motor rated voltage | Closing coil rated voltage | Shunt coil rated voltage | Aux.contact & charging types | STU | UVT coil rated voltage | |
| MA Without Motor | D0 Without Closing coil | D0 Without Shunt coil | AX Standard type OFF - Charge 3a3b | Refer to page 27 | U0 Without UVT coil | |
| M1 AC/DC 100V ~ 130V | D1 AC/DC 100V ~ 130V | D1 AC/DC 100V ~ 130V | AC Standard type ON - Charge 3a3b | | U1 AC/DC 100V ~ 130V | |
| M2 AC/DC 200V ~ 250V | D2 AC/DC 200V ~ 250V | D2 AC/DC 200V ~ 250V | BX Standard type OFF - Charge 5a5b | | U2 AC/DC 200V ~ 250V | |
| M3 DC 125V | D3 DC 125V | D3 DC 125V | BC Standard type ON - Charge 5a5b | | U3 DC 125V | |
| M4 DC 24V ~ 30V | D4 DC 24V ~ 30V | D4 DC 24V ~ 30V | HX High capacity OFF - Charge 5a5b | | U4 DC 24V ~ 30V | |
| M5 DC 48V ~ 60V | D5 DC 48V ~ 60V | D5 DC 48V ~ 60V | HC High capacity ON - Charge 5a5b | | U5 DC 48V ~ 60V | |
| M6 AC 380V ~ 415V | D6 AC 380V ~ 480V | D6 AC 380V~480V | CC Standard type ON - Charge 6a6b | | U6 AC 380V ~ 480V | |
| M7 AC 440V ~ 480V | D7 AC 48V | D7 AC 48V | JC High capacity ON - Charge 6a6b | | U7 AC 48V | |
| M8 AC 48V | | | GX High capacity OFF - Charge 3a3b | | | |
| | | | GC High capacity ON - Charge 3a3b | | | |
| | | | TX TCS OFF - Charge 4a4b | | | |
| | | | TC TCS ON - Charge 5a5b | | | |

* UVT Delay module is available over AC / DC 48V

| Option | | |
|---------------------|---|--|
| Symbol | Model | Option description |
| AL | AL1 + MRB | |
| A1 | AL1 + MRB + RES(AC110~130V) *AC only | |
| A2 | AL1 + AL2 + MRB | |
| A3 | AL1 + MRB + RES(AC/DC 110~125V) *DC only | |
| A4 | AL1 + MRB + RES(AC/DC 200~250V) *AC only | |
| A5 | AL1 + MRB + AUTO RESET | |
| A6 | AL1 + AL2 + MRB + AUTO RESET | |
| A7 | AL1 + MRB + RES(AC/DC 110~125V) + AUTO RESET *DC only | |
| A8 | AL1 + MRB + RES(AC/DC 200~250V) + AUTO RESET *AC only | |
| A9 | AL1 + MRB + RES(AC/DC 110~130V) + AUTO RESET *AC only | |
| Y2 | AL1 + AL2 + MRB(2b contact) | |
| Y6 | AL1 + AL2 + MRB + AUTO RESET(2b contact) | |
| Z2 | AL1 + AL2 + MRB(1a1b contact) | |
| Z6 | AL1 + AL2 + MRB + AUTO RESET(1a1b contact) | |
| C | C | Counter |
| S ^{Note1)} | CS2 | Charge switch communication |
| B | B | On/Off Button lock |
| M ^{Note2)} | MI | Mechanical interlock |
| D | DI or MOC | Door Interlock or MOC (Mechanism operated cell switch) |
| K | K1 | Key Lock |
| K2 | K2 | Key Interlock Set |
| K3 | K3 | Key Lock Double |
| R | RCS | Ready to Close switch |
| T ^{Note3)} | TM | Temperature Monitoring |
| H1 | SHT2 | AC/DC 100 ~ 130V |
| H2 | SHT2 | AC/DC 200 ~ 250V |
| H3 | SHT2 | DC 125V |
| H4 | SHT2 | DC 24 ~ 30V |
| H5 | SHT2 | DC 48 ~ 60V |
| H6 | SHT2 | AC 380 ~ 480V |
| H7 | SHT2 | AC 48V |

Note4)

Note 1), 2), 3) AN Type not applicable

4) Double shunt coil, not applicable when using UVT

Model selecting guide

Susol ACB Cradle model numbering (Product selection)

Cradle

| | | | | | | |
|---------------|--|--------------|---|---|---|--|
| AL | H16D | 3 | A | H | E | S |
| Type | Rated current and frame | No. of pole | Terminal connections | Connections | Safety shutter | Arc cover (Zero Arc Space) <small>note</small> |
| LS ACB Cradle | H06~16D AH - 06 ~ 16D H20D AH - 20D H06~32E AH - 06 ~ 32E H40E AH - 40E H40~50G AH - 40 ~ 50G H63G AH - 63G | 3 3P 4 4P | A Automatic connection J Manual connection | H Horizontal type (H20D inapplicable) V Vertical type M Mixed type Line: Horizontal Load: Vertical (H20D inapplicable) N Mixed type Line: Vertical Load: Horizontal (H20D inapplicable) P Front type (20D, 40E, 50FG, 63G inapplicable) | E Without safety shutter F With safety shutter | S With ARC Cover |

*D Frame 2000AF and E Frame 4000AF are vertical type only.

Note) Susol ACB is supplied as an arc cover standard.

Metasol ACB Cradle model numbering (Product selection)

Cradle

| | | | | | | |
|--------------------|---|--------------|--|--|---|---|
| AL | N16D | 3 | J | H | E | N |
| Type | Rated current and frame | No. of pole | Terminal connections | Connections | Safety shutter | Arc cover (Zero Arc Space) |
| Metasol ACB Cradle | N06~16D AN - 06 ~ 16D S06~16D AS - 06 ~ 16D S20D AS - 20D N20~25E AN - 20 ~ 25E N32E AN - 32E S20~25E AS - 20 ~ 25E S32E AS - 32E S40E AS - 40E S40~50F AS - 40 ~ 50F S40~50G AS - 40 ~ 50G S63G AS - 63G | 3 3P 4 4P | J Without manual access A With automatic connection | H Horizontal type (20D inapplicable) V Vertical type M Mixed type Line: Horizontal Load: Vertical (20D inapplicable) N Mixed type Line: Vertical Load: Horizontal (20D inapplicable) P Front type (20D, 40E, 50FG, 63G inapplicable) | E Without safety shutter F With safety shutter | N Without ARC Cover S With ARC Cover |

*D Frame 2000AF and E Frame 4000AF are vertical type only.

Smart Trip Unit model numbering (Product selection)

N type



| | | |
|----------|---|--|
| N | G | G |
| STU TYPE | Communication & short circuit detection | Control power & frequency |
| N Normal | H No communication + ground fault (Residual earth fault protection) | 0 No control power, 60 Hz 5 No control power, 50 Hz |

Accident indication can be confirmed only by LED

A type



| | | |
|--|---|--|
| A | G | D |
| STU TYPE | Communication & earth leakage detection | Control power & frequency |
| A Ammeter | H No communication + ground fault (Residual earth fault protection) U No communication + earth leakage detection (Earth leakage protection) F No communication + exterior CT ground fault W No communication + PTA | 0 No control power, 60 Hz 1 AC/DC 110V ~ 220V, 60Hz 5 No control power, 50 Hz 6 AC/DC 110V~220V, 50Hz |
| <small>*Communication is impossible without control power (AD0, AJ0, AY0, AO0, AB0, AD5, AJ5, AY5, AO5, AB5 cannot be implemented)</small> | | |
| <small>*There is no L, S, I, G output contact, without control power, (only OCR LED can be checked) - No output contact for AH0, AH5, AM0, AM5, AF5, AW0, AW5</small> | | |
| D No communication + ground fault (Residual earth fault protection) J Communication + earth leakage detection (Earth leakage protection) Y Communication + exterior CT ground fault O Communication + NCT can be used B Communication + PTA V No communication + PTA (Ship) | | |

P type



| | | |
|---------------|---|--|
| P | S | 0 |
| STU TYPE | Communication + Gext, relay element other than NCT | Control power & frequency |
| P Power meter | S Communication + Gext, relay element other than NCT J Communication + earth leakage detection (Earth leakage protection) Y Communication + exterior CT ground fault O Communication + NCT can be used | 1 AC/DC 110V ~ 220V, 60Hz 6 AC/DC 110V ~ 220V, 50Hz |

S type



| | | |
|-----------------|---|--|
| S | S | 0 |
| OCR TYPE | Communication + Gext, relay element other than NCT | Control power & frequency |
| S Supreme meter | S Communication + Gext, relay element other than NCT J Communication + earth leakage detection (Earth leakage protection) Y Communication + exterior CT ground fault O Communication + NCT can be used | 1 AC/DC 110V ~ 220V, 60Hz 6 AC/DC 110V ~ 220V, 50Hz |

Rated specifications

Susol ACB



| Frame | | AH - D | | | | | | AH - E | | | | | | | | | AH - G | | | | | | | | | |
|---|------------------------------|---|--------------------------|-----------------------------|-----------|----------|----------|---------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|------------------------------------|----------|----------|-------|--------|---------|---------|----------|--|--|
| Type | | AH - 06D | AH - 08D | AH - 10D | AH - 13D | AH - 16D | AH - 20D | AH - 06E | AH - 08E | AH - 10E | AH - 13E | AH - 16E | AH - 20E | AH - 25E | AH - 32E | AH - 40E | AH - 40G | AH - 50G | AH - 63G | | | | | | | |
| Ampere frame | (AF) | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 4000 | 5000 | 6300 | | | | | | | |
| Rated current (I _n max) | (A) | 200 | 400 | 630 | 630 | 800 | 1000 | 400 | 400 | 630 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2000 | 2500 | 3200 | | | | | | | |
| | | 400 | 630 | 800 | 800 | 1000 | 1250 | 630 | 630 | 800 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 4000 | | | | | | | |
| | | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 800 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 4000 | 5000 | 6300 | | | | | | | |
| Rated operational voltage (U _e) | (V) | 690 | | | | | | 690 | | | | | | | | | 690 | | | | | | | | | |
| Rated insulation voltage (U _i) | (V) | 1000 | | | | | | 1000 | | | | | | | | | 1000 | | | | | | | | | |
| Frequency | (Hz) | 50/60 | | | | | | 50/60 | | | | | | | | | 50/60 | | | | | | | | | |
| Number of poles | (P) | 3/4 | | | | | | 3/4 | | | | | | | | | 3/4 | | | | | | | | | |
| Setting current * | (A) | Control trip relay (... × I _n max) | | | | | | 0.4 ~ 1.0 | | | | | | | | | 0.4 ~ 1.0 | | | | | | | | | |
| N pole rated current | (A) | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 4000 | 5000 | 6300 | | | | | | | |
| Rated breaking current (I _{cu}) (Sym) | (kA) | IEC 60947-2 KSC 4620 | AC | 690V / 600V / 550V *** | | | | 65 | | | | 85 | | | | 100 | | | | | | | | | | |
| | | | | 500V / 480V / 460V | | | | 85 | | | | 100 | | | | 150 | | | | | | | | | | |
| | | | | 415V / 380V / 230V / 220V | | | | 85 | | | | 100 | | | | 150 | | | | | | | | | | |
| Rated service breaking capacity (I _{cs}) | (kA) | ...% × I _{cu} | | | | 100 | | | | 100 | | | | 100 | | | | | | | | | | | | |
| Rated input current (I _{cm}) (peak) | (kA) | IEC 60947-2 KSC 4620 | AC | 690V / 600V / 550V *** | | | | 143 | | | | 187 | | | | 220 | | | | | | | | | | |
| | | | | 500V / 480V / 460V | | | | 187 | | | | 220 | | | | 330 | | | | | | | | | | |
| | | | | 415V / 380V / 230V / 220V | | | | 187 | | | | 220 | | | | 330 | | | | | | | | | | |
| Rated short-time current (I _{cw}) | (kA) | | | 1 second | | | | 65 | | | | 85 | | | | 100 | | | | | | | | | | |
| | | | | 2 seconds | | | | 60 | | | | 75 | | | | 85 | | | | | | | | | | |
| | | | | 3 seconds | | | | 50 | | | | 65 | | | | 75 | | | | | | | | | | |
| Rated impulse withstand voltage (U _{imp}) | (kV) | 12 | | | | | | 12 | | | | | | | | | 12 | | | | | | | | | |
| Operating time (t) | (ms) | | | Total cut-off time, maximum | | | | 40 | | | | 40 | | | | 40 | | | | | | | | | | |
| | | | | Input time | | | | 80 | | | | 80 | | | | 80 | | | | | | | | | | |
| Life cycle | ACB | (time) | Mechanical | | 20000 | | | | | | 15000 | | | | | | | | | 10000 | | | | | | |
| | | | Electrical | | 5000 | | | | | | 5000 | | | | | | | | | 2000 | | | | | | |
| Weight (3P/4P) | (kg) | Draw-out type | Body + cradle | Electric charging method | | 63/74 | | | | 70/85 | | | | 87/103 | | | | 107/139 | | | | 181/223 | | 186/230 | | |
| | | | | Manual charging method | | 61/72 | | | | 68/83 | | | | 85/101 | | | | 102/145 | | | | 179/221 | | 184/228 | | |
| | | Fixed type | Electric charging method | | 29/32 | | | | 33/40 | | | | 44/55 | | | | 65/85 | | | | 97/117 | | 102/124 | | | |
| | | | Manual charging method | | 34/44 | | | | 38/47 | | | | 44/55 | | | | 61/81 | | | | 98/123 | | 103/130 | | | |
| Connections ** | Fixed type/ Draw-out type | Horizontal type | | ● | ● | ● | ● | ● | — | ● | ● | ● | ● | ● | ● | ● | — | ○ | ○ | ○ | | | | | | |
| | | Vertical type | | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | | | | | | |
| | | Flat surface type | | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | | | | | | |
| | | Mix type | | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | | | | | | |
| External dimensions | Withdrawal type | (mm) | H : 430 (460), D : 375 | | W (3P/4P) | | | | 334/419 | | | | | | 412/527 | | | | | | | | | 785/1015 | | |
| | Stationary type | (mm) | H : 300, D : 295 | | W (3P/4P) | | | | 300/385 | | | | | | 378/493 | | | | | | | | | 751/981 | | |
| Certificate & Approval | | KS / KEMA / KERI / GOST / CCC | | | | | | KS / KEMA / KERI / GOST / KEPIC / CCC | | | | | | | | | KS / KEMA / KERI / GOST / CCC | | | | | | | | | |
| Certificate & Approval | | LR, ABS, DNV, KR, BV, GL, RINA, NK | | | | | | LR, ABS, DNV, KR, BV, GL, RINA, NK | | | | | | | | | LR, ABS, DNV, KR, BV, GL, RINA, NK | | | | | | | | | |

*Refer to detailed STU rating ●: Standard ○: Option
 ***Acquired KSC 4620 rated voltage is 690/600V, and low rated use voltage is KS certified with 600V breaking capacity (Reason: Refer to the classification of KSC 4620 audit criteria certification)
 ** Life time is the lifespan, not the warranty life, and is charged for maintenance. If an abnormality occurs in the accessory device during use, it can be replaced and used.
 Quality Assurance : Based on IEC60947-2 number of opening and closing times within the warranty period
 ※ D Frame 2000AF and E Frame 4000AF are available in vertical type only.

※ Although reverse connection to the power supply and load side is possible, use it as a normal connection for maintenance, inspection, and safety.
 ※ The neutral pole of the 4-pole type is broke by pre-input.
 ※ Rated current brackets are rated for ACB for nuclear power plants.
 1) Test specifications : KEPIC EED 1200/END 1100 / END 2000 2) Nuclear power plant electrical class : Class 1E, Quality class : Q 3) Rated : AC 508V, 100KA, 800/1600/2000/3200A

Rated specifications



Metasol ACB

| Frame | | AN - D | | | | | AS - D | | | | | | | | | | AS - E | | | | AS - F | | AS - G | | | |
|--|--------------------|-----------------------------------|---------------|---------------------------|----------|----------|------------------------------------|----------|----------|----------|----------|------------------------------------|----------------------------------|----------|----------|----------|------------------------------------|----------|-----------|----------|----------|------|---------|---|---------|--|
| Type | | AN - 06D | AN - 08D | AN - 10D | AN - 13D | AN - 16D | AS - 06D | AS - 08D | AS - 10D | AS - 13D | AS - 16D | AS - 20D | AS - 20E | AS - 25E | AS - 32E | AS - 40E | AS - 40F | AS - 50F | AS - 40G | AS - 50G | AS - 63G | | | | | |
| Ampere frame | (AF) | 630 | 800 | 1000 | 1250 | 1600 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 2000 | 2500 | 3200 | 4000 | 4000 | 5000 | 4000 | 5000 | 6300 | | | | | |
| Rated current (In max) | (A) | 200 | 400 | 630 | 630 | 800 | 200 | 400 | 630 | 630 | 800 | 1000 | 400, 630, | 1250 | 1600 | 2000 | 2000 | 2500 | 2000 | 2500 | 3200 | 3200 | | | | |
| | | 400 | 630 | 800 | 800 | 1000 | 400 | 630 | 800 | 800 | 1000 | 1250 | 800, 1000, | 1600 | 2000 | 2500 | 2500 | 3200 | 3200 | 3200 | 4000 | 4000 | | | | |
| | | 630 | 800 | 1000 | 1250 | 1600 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 1250, 1600, | 2000 | 2500 | 3200 | 3200 | 4000 | 4000 | 5000 | 5000 | 6300 | | | | |
| Rated operational voltage (Ue) | (V) | 690 | | | | | 690 | | | | | 690 | | | | | 690 | | 690 | | | | | | | |
| Rated insulation voltage (Ui) | (V) | 1000 | | | | | 1000 | | | | | 1000 | | | | | 1000 | | 1000 | | | | | | | |
| Frequency | (Hz) | 50/60 | | | | | 50/60 | | | | | 50/60 | | | | | 50/60 | | 50/60 | | | | | | | |
| Number of poles | (P) | 3/4 | | | | | 3/4 | | | | | 3/4 | | | | | 3/4 | | 3/4 | | | | | | | |
| Setting current * | (A) | Control trip relay (... × In max) | | | | | 0.4 ~ 1.0 | | | | | 0.4 ~ 1.0 | | | | | 0.4 ~ 1.0 | | 0.4 ~ 1.0 | | | | | | | |
| N pole rated current | (A) | 630 | 800 | 1000 | 1250 | 1600 | 630 | 800 | 1000 | 1250 | 1600 | 2000 | 630, 800, 1000, 1250, 1600, 2000 | 2500 | 3200 | 4000 | 4000 | 5000 | 4000 | 5000 | 6300 | | | | | |
| Rated breaking current (Icu) | (kA) | IEC 60947-2 KSC 4620 | AC | 690V / 600V / 550V *** | | 50 | 65 | | | | | 85 | | | | | 85 | | 100 | | | | | | | |
| | | | | 500V / 480V / 460V | | 65 | 70 | | | | | 85 | | | | | 100 | | 120 | | | | | | | |
| | | | | 415V / 380V / 230V / 220V | | 65 | 70 | | | | | 85 | | | | | 100 | | 120 | | | | | | | |
| Rated service breaking capacity (Ics) | (kA) | ...% × Icu | | 100 | 100 | | | | | 100 | | | | | 100 | | 100 | | | | | | | | | |
| Rated input current (Icm) (peak) | (kA) | IEC 60947-2 KSC 4620 | AC | 690V / 600V / 550V *** | | 105 | 143 | | | | | 187 | | | | | 187 | | 220 | | | | | | | |
| | | | | 500V / 480V / 460V | | 143 | 154 | | | | | 187 | | | | | 220 | | 264 | | | | | | | |
| | | | | 415V / 380V / 230V / 220V | | 143 | 154 | | | | | 187 | | | | | 220 | | 264 | | | | | | | |
| Rated short-time current (Icw) | (kA) | 1 second | | 50 | 65 | | | | | 85 | | | | | 85 | | 100 | | | | | | | | | |
| | | 2 seconds | | 42 | 50 | | | | | 75 | | | | | 75 | | 85 | | | | | | | | | |
| | | 3 seconds | | 36 | 42 | | | | | 65 | | | | | 65 | | 75 | | | | | | | | | |
| Rated impulse withstand voltage (Uimp) | (kV) | 12 | | | | | 12 | | | | | 12 | | | | | 12 | | 12 | | | | | | | |
| Operating time (t) | (ms) | Total cut-off time, maximum | | 40 | 40 | | | | | 40 | | | | | 40 | | 40 | | | | | | | | | |
| | | Input time | | 80 | 80 | | | | | 80 | | | | | 80 | | 80 | | | | | | | | | |
| Life cycle | ACB (time) | Mechanical | | 20000 | | | | | 20000 | | | | | 15000 | | | | | 10000 | | 10000 | | | | | |
| | | Electrical | | 5000 | | | | | 5000 | | | | | 5000 | | | | | 2000 | | 2000 | | | | | |
| Weight (3P/4P) | (kg) | Draw-out type | Body + cradle | Electric charging method | | 63/74 | 63/74 | | | | | 70/85 | | | | | 87/103 | | 107/139 | | 145/173 | | 181/223 | | 186/230 | |
| | | | | Manual charging method | | 61/72 | 61/72 | | | | | 63/83 | | | | | 85/101 | | 102/145 | | 143/171 | | 179/221 | | 184/228 | |
| | | Fixed type | Cradle | Electric charging method | | 29/32 | 29/32 | | | | | 33/40 | | | | | 44/50 | | 65/85 | | 78/90 | | 97/117 | | 102/124 | |
| | | | | Manual charging method | | 34/44 | 34/44 | | | | | 38/47 | | | | | 44/55 | | 61/81 | | 76/94 | | 98/123 | | 103/130 | |
| Connections ** | | Fixed type/ Draw-out type | | Horizontal type | | ● | ● | ● | ● | ● | ● | — | ● | ● | ● | — | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| | | | | Vertical type | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | | |
| | | | | Flat surface type | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | — | — | — | — | — | — | — | |
| | | | | Mix type | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | — | — | — | — | — | — | — | |
| External dimensions | Draw-out type (mm) | H : 430 (460), D : 375 | W (3P/4P) | | | | | 334/419 | | | | | 412/527 | | | | | 629/799 | | 785/1015 | | | | | | |
| | Fixed type (mm) | H : 300, D : 295 | W (3P/4P) | | | | | 300/385 | | | | | 378/493 | | | | | 597/767 | | 751/981 | | | | | | |
| Certificate & Approval | | KEMA / KERI / KS / GOST | | | | | KEMA / KERI / KS / GOST | | | | | KEMA / KERI / KS / GOST | | | | | KEMA / KERI / KS / GOST / KEPIC | | | | | | | | | |
| Marine classification | | — | | | | | LR, ABS, DNV, KR, BV, GL, RINA, NK | | | | | LR, ABS, DNV, KR, BV, GL, RINA, NK | | | | | LR, ABS, DNV, KR, BV, GL, RINA, NK | | | | | | | | | |

*Refer to detailed STU rating **●: Standard ○: Option
 ***Acquired KSC 4620 rated voltage is 690/600V, and low rated use voltage is KS certified with 600V breaking capacity (Reason: Refer to the classification of KSC 4620 audit criteria certification)
 ※ Life time is the lifespan, not the warranty life, and is charged for maintenance. If an abnormality occurs in the accessory device during use, it can be replaced and used.
 Quality Assurance : Based on IEC60947-2 number of opening and closing times within the warranty period ※ D Frame 2000AF and E Frame 4000AF are available in vertical type only.

※ Although reverse connection to the power supply and load side is possible, use it as a normal connection for maintenance, inspection, and safety.
 ※ The neutral pole of the 4-pole type is broke by pre-input.
 ※ Rated current brackets are rated for ACB for nuclear power plants.
 1) Test specifications : KEPIC EED 1200/END 1100 / END 2000 2) Nuclear power plant electrical class : Class 1E, Quality class : Q 3) Rated : AC 508V, 100KA, 3200/4000A

Advanced Trip Relay!

With the world's best measurement accuracy and increased relay elements, the relay operation stability is enhanced, and the abnormal self-diagnosis function prevents mis-trips and ensures the stability of abnormal conditions through alarms.

NFC and Bluetooth built-in and Smart add-on modules can be configured. Monitoring and monitoring is possible through service access anytime, anywhere by securing a Smart LV solution through ICT convergence technology.

STU function-specific series



N type

- Device operation through self-power
- Current relay function
- Supports USB communication



A type

- Device operation through self-power
- Device operation via AC or DC
- Current relay function
- Segment LCD Display
- DO output
- Supports USB communication
- Supports RS485 communication



P type

- Device operation through self-power
- Device operation via AC or DC
- Current/voltage/frequency/power relay function
- 3.5" Graphic Display
- DO output
- Supports USB communication
- Supports RS485 communication



S type

- Device operation through self-power
- Device operation via AC or DC
- Current/voltage/frequency/power relay function
- 3.5" Graphic Display
- DO output
- Relay setting group A/B available
- Supports USB communication
- Supports RS485 communication
- NFC/BLE communication support



Types of STU

| | Type N | Type A | Type P | Type S |
|----------------------------------|---|--|--|--|
| Exterior | | | | |
| Current relay | • L (N), S, I, G, PTA | • L (N), S, I, G, PTA, Gext | • L (N), S, I, G, PTA, Gext • D, S (V), IU | • L (N), S1, S2, I, G, PTA, Gext • D, S (V) 1, S (V) 2 |
| Voltage relay | | | • UV, OV, RV, VU | • UV1, UV2, OV1, OV2, RV, VU |
| Frequency relay | | | • UF, OF, ROCOF | • UF1, UF2, OF1, OF2, ROCOF |
| Power relay | | | • RP, RQ, OP, OQ, UP | • RP, RQ1, RQ2, OP, OQ, UP |
| Group control | | | | • A, B (can be changed by communication) |
| Relay fine adjustment | | | • L, S, I Pickup current | |
| ERMS | | • Control by DI and communication | • Control by DI and communication | • Control by DI and communication |
| IDMTL support | • Supports L relay element Thermal and DT, SIT, VIT, EIT, EIT50 | • Supports L relay element Thermal and DT, SIT, VIT, EIT, EIT50 | • Supports L relay element Thermal and DT, SIT, VIT, EIT, EIT50 | • Supports L relay element Thermal and DT, SIT, VIT, EIT, EIT50 |
| Trip information maintenance LED | • L, S, I, G/PTA, SP | • L, S, I, G/Gext/PTA, SP | • L, S, I, G/Gext/PTA, SP | • L, S, I, G/Gext/PTA, SP |
| Screen | | • 32 accident events indicated [Accident phase/current/time] | • 127 accident events indicated [Accident phase/current/time] | • 127 accident events indicated [Accident phase/current/time] |
| Accident record | | | | |
| Memory | • 127 accident events indicated [Accident phase/current/time] | • 127 accident events indicated • 6 accident events indicated [Does not support Self-power] | • 127 accident events indicated • 6 accident events indicated [Does not support Self-power] | • 127 accident events indicated • 6 accident events indicated [Does not support Self-power] |

STU types and main functions

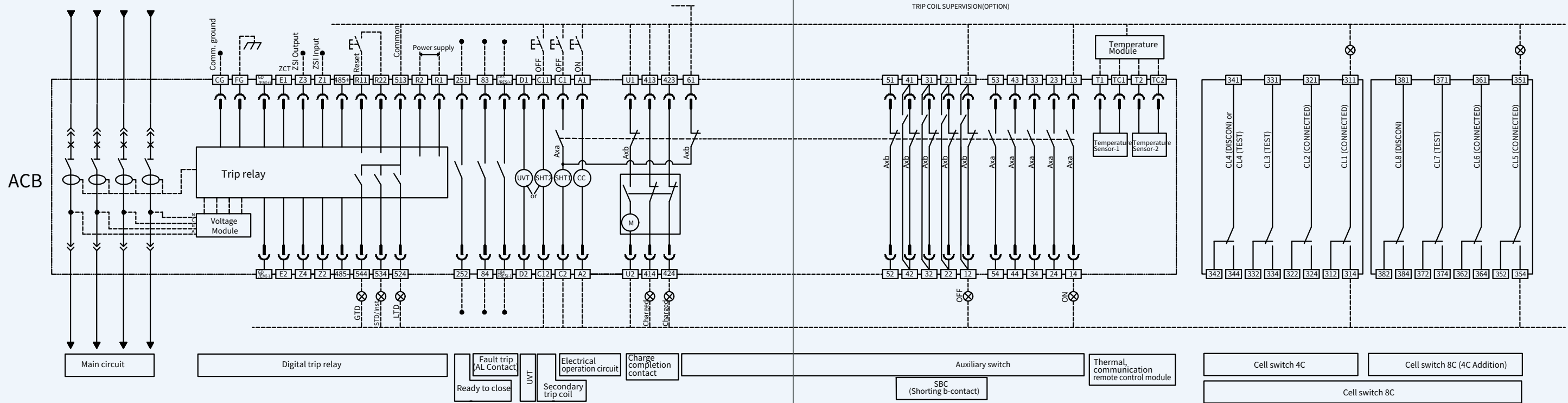
| | Type N | Type A | Type P | Type S |
|-----------------------------|---|--|--|--|
| Measurement function | <ul style="list-style-type: none"> • Current [R/S/T/N] • Current phase (A phase current standard) • Vector sum image current • Normal and reverse phase current • Current imbalance rate • Current demand before each phase | <ul style="list-style-type: none"> • Current [R/S/T/N] • External CT current • Current phase (Based on phase A current) • Vector sum image current • Normal and reverse phase current • Current imbalance rate • Current demand before each phase | <ul style="list-style-type: none"> • 3-phase phase voltage, line voltage • Current [R/S/T/N] • Frequency • External CT current • Voltage/current phase (Based on phase A voltage) • Total/each phase power [P, Q, S] • Total/each power factor • Positive/reverse, effective/invalid/apparent energy • Vector Sum image voltage • Vector sum image current • Normal and reverse phase voltage • Normal and reverse phase current • Voltage unbalance rate • Current imbalance rate • Current demand before each phase • Demand on the last apparent, reactive, or active power | <ul style="list-style-type: none"> • 3-phase phase voltage, line voltage • Current [R/S/T/N] • Frequency • External CT current • Voltage/current phase (Based on phase A voltage) • Total/each phase power [P, Q, S] • Total/each power factor • Positive/reverse, effective/invalid/apparent energy • Vector Sum image voltage • Vector sum image current • Normal and reverse phase voltage • Normal and reverse phase current • Voltage unbalance rate • Current imbalance rate • Current demand before each phase • Demand on the last apparent, reactive, or active power |
| Measurement accuracy | <p>Current 0.5%</p> <p>Voltage</p> <p>Power</p> <p>Frequency 50, 60 Hz device classification</p> | <p>0.5%</p> <p></p> <p></p> <p>50, 60 Hz device classification</p> | <p>0.5%</p> <p>class 1.0 (IEC 62053 - 21, 22)</p> <p>0.1% (10 ~ 200Hz)</p> | <p>0.5%</p> <p>class 1.0 (IEC 62053 - 21, 22)</p> <p>0.1% (10 ~ 200Hz)</p> |
| PQ function | <ul style="list-style-type: none"> • 63rd harmonic current • Current THD, TDD, K - Factor | <ul style="list-style-type: none"> • 63rd harmonic current • Current THD, TDD, K - Factor | <ul style="list-style-type: none"> • 63rd harmonic current • Voltage THD • Current THD, TDD, K - Factor | <ul style="list-style-type: none"> • 63rd harmonic current • Voltage THD • Current THD, TDD, K - Factor |
| Measurement record | <ul style="list-style-type: none"> • Max Current demand • Max I_o • Max I_n • Max internal temperature | <ul style="list-style-type: none"> • Max Current demand • Max I_o • Max Ext I_o • Max I_n • Max internal temperature | <ul style="list-style-type: none"> • Max Current demand • Max active/reactive/apparent power • Demand • Max active power • Max V_o • Max I_o • Max Ext I_o • Max I_n • Max internal temperature | <ul style="list-style-type: none"> • Max Current demand • Max active/reactive/apparent power • Demand • Max active power • Max V_o • Max I_o • Max Ext I_o • Max I_n • Max internal temperature |
| Real - time waveform | | <ul style="list-style-type: none"> • Can be checked by communication | <ul style="list-style-type: none"> • Can be checked by communication • Can be checked on the LCD screen | <ul style="list-style-type: none"> • Can be checked by communication • Can be checked on the LCD screen |

| | Type N | Type A | Type P | Type S |
|----------------------------|--|--|--|--|
| Communication | <ul style="list-style-type: none"> • USB [for on-site operator] (Communication type only) | <ul style="list-style-type: none"> • USB [for on-site operator] • RS485 / Modbus (Communication type only) | <ul style="list-style-type: none"> • USB [for on-site operator] • RS485 / Modbus | <ul style="list-style-type: none"> • USB [for on-site operator] • RS485 / Modbus • BLE • NFC |
| Power | <ul style="list-style-type: none"> • [Operation when 30% or more of rated current, based on single-phase load standard] | <ul style="list-style-type: none"> • [Operation when 30% or more of rated current, based on single-phase load standard] • AC/DC 88 ~ 264V • DC 24 ~ 48V(Future development) | <ul style="list-style-type: none"> • [Operation when 30% or more of rated current, based on single-phase load standard] • AC/DC 88 ~ 264V • DC 24 ~ 48V(Future development) | <ul style="list-style-type: none"> • [Operation when 30% or more of rated current, based on single-phase load standard] • AC/DC 88 ~ 264V • DC 24 ~ 48V(Future development) |
| Event record | <ul style="list-style-type: none"> • 255 device status changes [Details, status, date] | <ul style="list-style-type: none"> • 255 device status changes [Details, status, date] | <ul style="list-style-type: none"> • 255 device status changes [Details, status, date] | <ul style="list-style-type: none"> • 255 device status changes [Details, status, date] |
| Clock | <ul style="list-style-type: none"> • RTC built-in (Back up with battery) | <ul style="list-style-type: none"> • RTC built-in (Back up with battery) | <ul style="list-style-type: none"> • RTC built-in (Back up with battery) | <ul style="list-style-type: none"> • RTC built-in (Back up with battery) |
| Other LED | <ul style="list-style-type: none"> • Run, alarm, Self-diagnosis, comm. | <ul style="list-style-type: none"> • Run, alarm, Self-diagnosis, comm. | <ul style="list-style-type: none"> • Run, alarm, Self-diagnosis, comm. | <ul style="list-style-type: none"> • Run, alarm, Self-diagnosis, comm. |
| Operation button | <ul style="list-style-type: none"> • Reset button | <ul style="list-style-type: none"> • Reset/menu/tap/up/down/enter | <ul style="list-style-type: none"> • Reset button • LCD Touch | <ul style="list-style-type: none"> • Reset button • LCD Touch |
| LED | <ul style="list-style-type: none"> • RUN/AL LED flashing (Red ↔ Blue flashing) | <ul style="list-style-type: none"> • RUN/AL LED flashing (Red ↔ Blue flashing) | <ul style="list-style-type: none"> • RUN/AL LED flashing (Red ↔ Blue flashing) | <ul style="list-style-type: none"> • RUN/AL LED flashing (Red ↔ Blue flashing) |
| LCD | | <ul style="list-style-type: none"> • Displays the corresponding segment or error number on the LCD | <ul style="list-style-type: none"> • Can be checked on the LCD self-diagnosis screen | <ul style="list-style-type: none"> • Can be checked on the LCD self-diagnosis screen |
| Self-diagnosis List | <ul style="list-style-type: none"> • Battery Low Alarm : Occurs when the internal battery is not inserted or when the battery voltage is low • Rating Plug Unattached or Error : Occurs when rating plug is not assembled or when there is rating plug error • Ampere Frame Error : Occurs when the value of rating plug is not within 45%~100% of AF • MTD Fail : Occurs when STU is not assembled with MTD or trip coil disconnection occurs • Factory Cfg Error : Occurs when the factory mode setting is entered incorrectly • Device Type Error : Occurs when the rating plug information and CT information are different • Over Heat Error : Occurs when CPU internal temperature N/A type exceeds 100 degrees and P/S type exceeds 115 degrees • Contact Wear Alarm : Occurs when CPU internal temperature N/A type exceeds 100 degrees and P/S type exceeds 115 degrees • Electrical Open Count Over Alarm : Occurs when the electrical open count exceeds 80% of the allowable electrical open count • Mechanical Open Count Over Alarm : Occurs when the mechanical open count exceeds 80% of the allowable mechanical open count • RTC Error : Occurs when an error occurs in the internal RTC information • Memory Error : Occurs when corruption occurs in the redundant internal settings stored in the internal non-volatile memory • CT disconnection error : Occurs when CT disconnection occurs (monitoring by each phase) | | | |

Control circuit diagram

This diagram is based on "CONNECTED" position of a circuit breaker and Opening, Motor charging,

Releasing of locking plate should be normal condition.

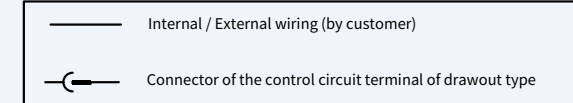


Terminal code description

| | | | | | |
|---------------|------------------------------|-----------|---|-------------------|----------------------|
| 13 14 ~ 63 64 | Auxiliary switch "NO" | D1 D2 | Voltage input terminal of UVT | Z1 Z2 | ZSI input |
| 11 12 ~ 61 62 | Auxiliary switch "NC" | 83 84 | Alarm1 "NO" | Z3 Z4 | ZSI output |
| 413 414 | Charged signal | 183 184 | Alarm2 "NO" | E1 E2 | ZCT |
| 423 424 | Charged signal communication | 251 252 | Ready to close switch | EP (EMO) EP (EMO) | Group DI or ERMS DI |
| U1 U2 | Motor charging | R1 R2 | Control Power | FG | Frame ground |
| A1 A2 | Closing coil | 513 ~ 544 | Alarm contact | CG | Communication Ground |
| C1 C2 | Shunt trip | R11 R22 | Alarm reset (Trip cause LED, Alarm contact) | TC1 TC2 ~ T1 T2 | Temperature module |
| C11 C12 | 2nd shunt trip | 485+ 485- | RS-485 communication | 311 ~ 344 | Position switch |
| | | | | 911 ~ 914 | EARTHING TRUCK |

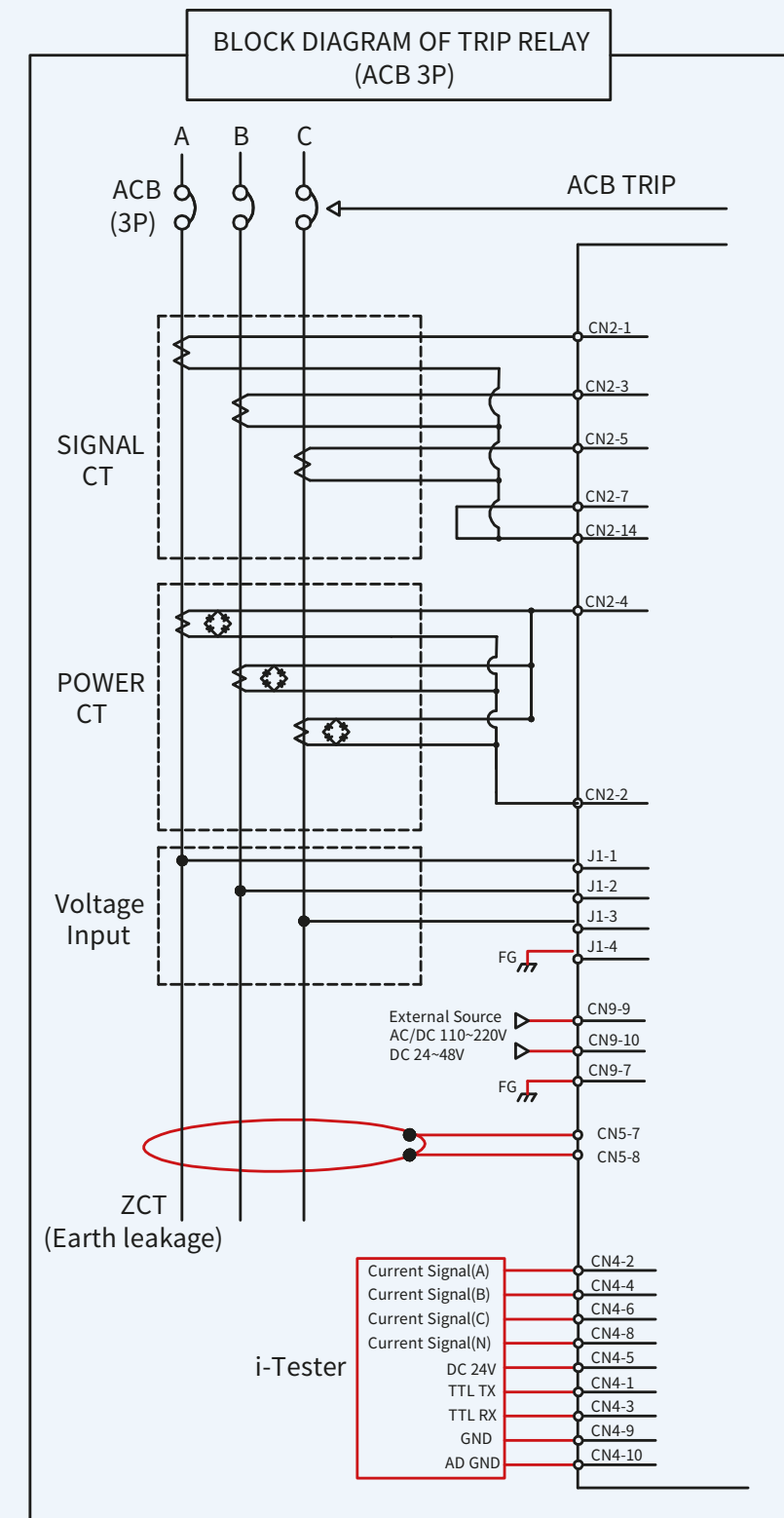
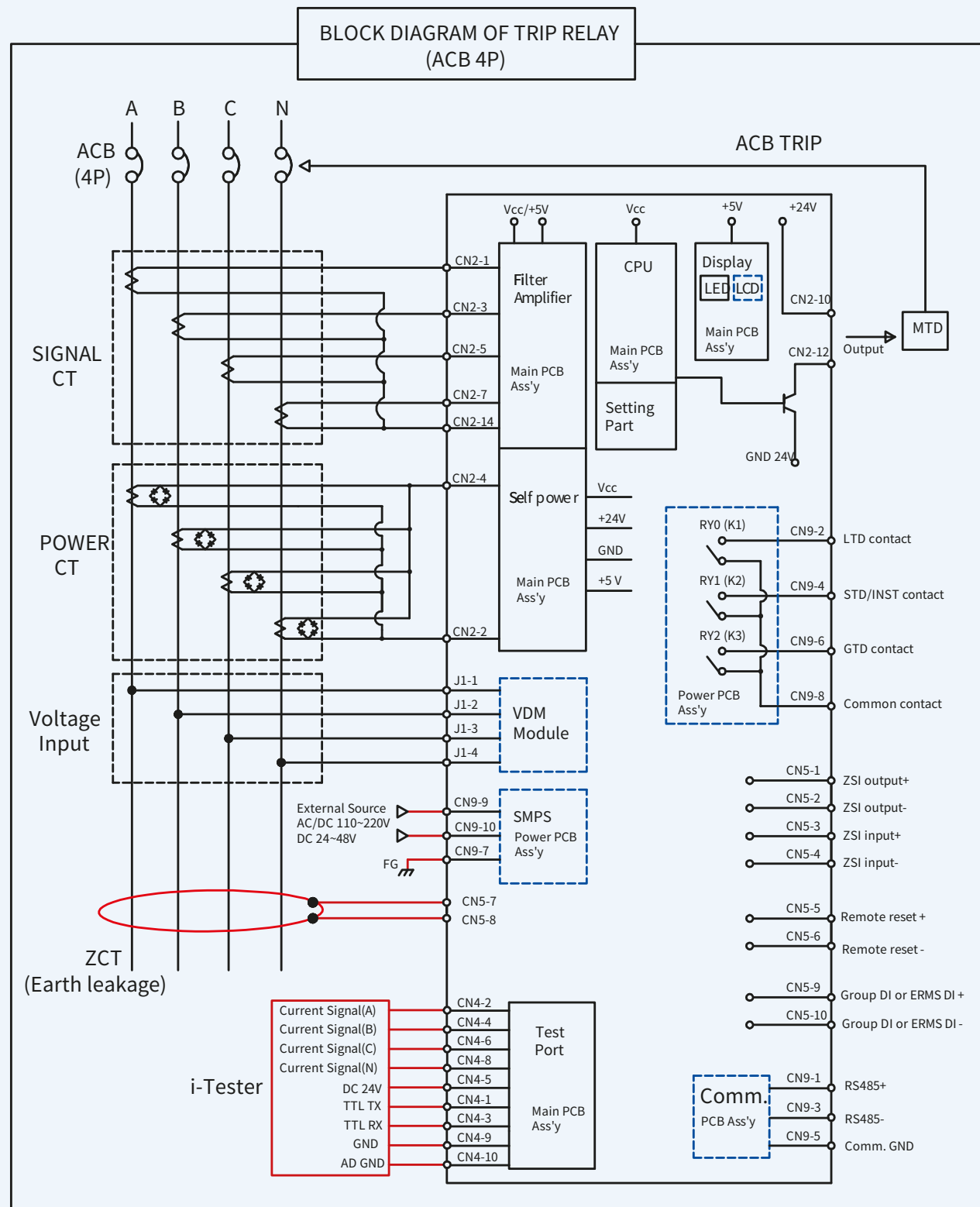
Accessory code description

| | |
|-----------|--------------------------------|
| Axa , Axb | Auxiliary switch |
| LTD | Long time delay trip indicator |
| STD/Inst | Short time delay/instantaneous |
| GTD | Ground fault trip indicator |
| CL1-CL4 | Cell switch |
| M | Motor |
| CC | Closing coil |
| SHT1 | Shunt tripping device 1 |
| SHT2 | Shunt tripping device 2 |
| UVT | UVT coil |



- Note) 1. The diagram is shown with circuit de-energized, all devices open, connected and charged and relays in normal position
- Relay is normal condition and charging type is "OFF-Charging"
 - The standard of auxiliary contact is 3a3b. The auxiliary switch in above diagram is composed of 5a5b. See 48 page for more detail on auxiliary switches.
 - Option
 - Ready to close contact, Trip alarm contact, UVT coil, Fully charged contact, secondary trip coil
 - Cell switch, Temperature module, Voltage module, Remote close-open module, ZCT, ZSI
 - Please consult us for the use of ZSI (Zone selective Interlocking).
 - Refer to the page 33 for the connection of Trip relay and the page 43 for UVT.
 - For connecting RS-485 verify if the polarity is correct
 - Contact configuration for Cell Switch can be changeable if necessary

System diagram



Note: 1. The red display part is for the option order and the user must wire directly.
2. The blue display part must be ordered according to the required specifications when ordering a trip relay.

Susol

Smart Molded Case Circuit Breakers

Susol Smart MCCB is developed by combining digital technology with LS ELECTRIC's power device technology accumulated over 40 years. The relay and measurement functions for line protection has been upgraded.

By using accessory devices for connectivity between low-voltage devices, it is possible to diagnose and maintain devices by collecting and analyzing data.



Susol Smart MCCB

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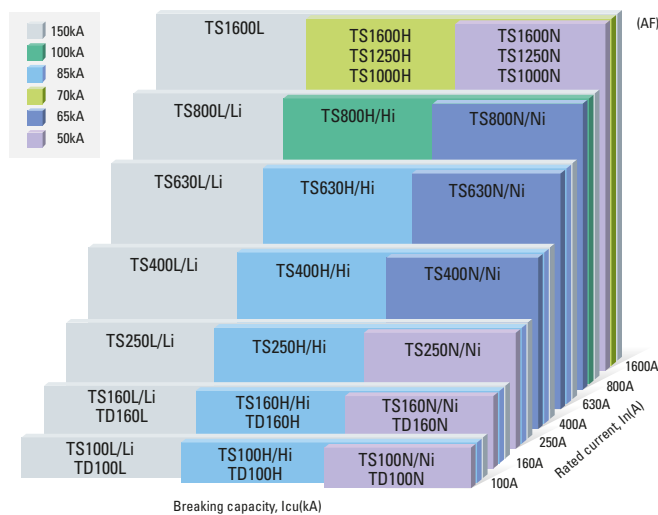
Super performance

The third breaking performance guarantees the original performance.

Icu 150kA
Ui 1000V
Uimp 8kV

Ics=100% Icu : 50, 65, 85, 100, 150kA at 415Vac

5 Frames



TD100/160

Rated current : 16~160A
Icu : 50kA (N), 85kA (H), 150kA (L)
Ics = Icu
90 (W) × 140 (H) × 86mm (D)



TS100/160/250

Rated current : 40~250A
Icu : 50kA (N/Ni), 85kA (H/Hi), 150kA (L/Li)
Ics = Icu
105 (W) × 160 (H) × 86mm (D)



TS400/630

Rated current : 300~630A
Icu : 65kA (N/Ni), 85kA (H/Hi), 150kA (L/Li)
Ics = Icu
140 (W) × 260 (H) × 110mm (D)



TS800

Rated current : 700, 800A
Icu : 65kA (N/Ni), 100kA (H/Hi), 150kA (L/Li)
Ics = Icu
210 (W) × 320 (H) × 135mm (D)



TS1600

Rated current : 1000, 1250, 1600A
Icu : 50kA (N), 70kA (H), 150kA (L)
Ics = Icu
210 (W) × 327 (H) × 152.5mm (D)

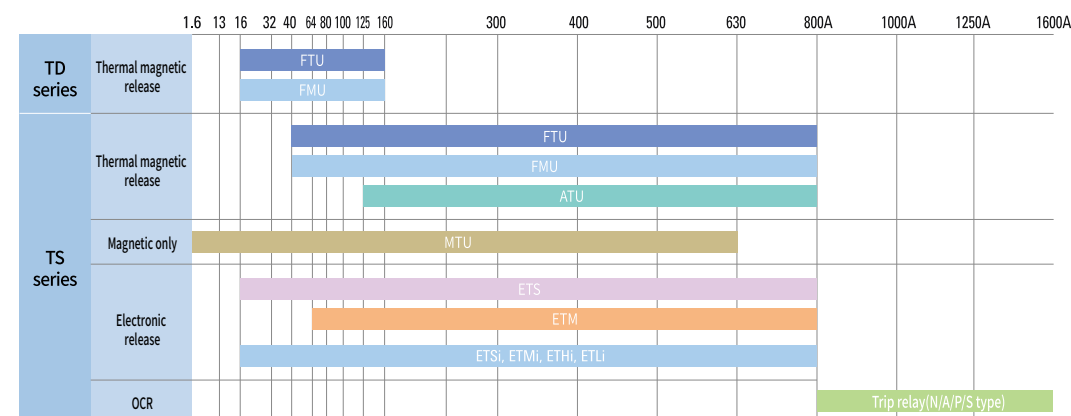


Susol Smart MCCB



Susol circuit breaker's Brain-Trip unit

The trip unit has the core function of monitoring the system and sending an interruption (trip) signal when an error occurs. The Susol circuit breaker have optional adjustable devices for each item as well as simple fixed trip devices. It provides the optimal solution for selection according to the type of load and operation coordination between upper and lower circuit breakers.



Optimal Solution-Trip unit

| Type | TD Seris | TS Series | | |
|-------------------------|--------------------|--------------------|---------------------------|--------------------------------|
| | | | | |
| Rated current | 16 ~ 160A | 40 ~ 800A | 40 ~ 800A | 800 ~ 1600A |
| Thermal electronic type | FMU FTU | FMU FTU ATU | - | DSU |
| Magnetic only | - | MTU <i>Note 1)</i> | - | - |
| Trip unit | Electronic release | - | ETS ETM <i>Note 2)</i> | ETSi ETMi ETHi ETLi |
| | Switch | DSU | DSU | - |
| OCR | - | - | - | N type A type P type S type |

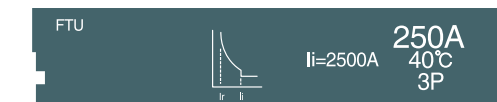
Note 1) 1.6-630A Note 2) 64-800A

100~800AF

For line and device protection

1. Thermal magnetic trip units

- FTU : Fixed thermal, fixed magnetic trip unit
- FMU : Adjustable thermal, fixed magnetic trip unit
- ATU : Adjustable thermal, adjustable magnetic trip unit



For motor protection

MTU : Magnetic only trip unit



2. Electronic trip units

- ETS/ ETSi : Standard
- ETM/ ETMi : Multi-Function
- ETHi : High-Performance
- ETLi : Limited-Performance



For switch disconnector

DSU : Disconnecting switch unit



1000~1600AF trip relay (OCR)

| N type | A type | P type | S type |
|--------------|--------------|------------------|-----------------------------|
| | | | |
| Regular type | Ammeter type | Power meter type | High performance meter type |

Susol Smart MCCB

Susol Smart MCCB was developed by integrating digital technology based on power device technology accumulated over 40 years. Relay and measurement functions for line protection have been upgraded, and by using accessory devices for connectivity between low-voltage devices, data can be collected and analyzed to diagnose and maintain devices. LS ELECTRIC takes the lead for a smart future with energy digitalization.



Susol Smart MCCB



Susol Circuit Breaker + Digital Technology



Applicable field

The movement for energy digitalization is taking place in various fields. Susol Smart MCCB can be applied to areas such as renewable energy, buildings, industry, and EV charging infrastructure linked to low pressure, in order to safely protect the line with LSIG relay function.



Renewable energy generation



Infrastructure



Residential/Commercial



Industrial



EV charging infrastructure

Susol MCCB and Susol Smart MCCB device specifications

Common specifications

- Breaking capacity and exterior size
- Insulation voltage upgrade : 750V → 1000V
- Compatible with existing accessories

Susol Smart MCCB features

- Fine relay function that can be finely adjusted : LSIG (Long time protection against overload, Short circuit protection, Instantaneous protection, Earth fault protection)
- Upgraded measurement accuracy : Current Class 1, Voltage ± 0.5%, Power and Power Class 2
- Device diagnosis and maintenance
- Dark gray exterior color with new PI



Electronic trip device specification comparison

| Type | Susol MCCB | | Susol Smart MCCB | | | |
|-------------------------|---|-----------|------------------|------|------|------|
| | ETS | ETM | ETSi | ETMi | ETHi | ETLi |
| Frame size | 250/630/800AF | 630/800AF | 250/630/800AF | | | |
| Line protection | Long time, short circuit, instantaneous | ■ | ■ | ■ | ■ | ■ |
| | Ground fault | | Option | ■ | ■ | ■ |
| Measurement information | Current | - | ■ | ■ | ■ | ■ |
| | Voltage, frequency, power factor, power quantity, power quality, etc. | - | - | - | ■ | ■ |
| Device operation | System event, fault event (Up to 50) | - | One | - | ■ | ■ |
| | Operating time, mechanical frequency, electrical frequency, trip frequency, load usage rate | - | - | - | ■ | ■ |
| | Contact wear rate | - | - | - | ■ | ■ |
| Communication | RS485 | - | ■ | - | ■ | ■ |
| | Mobile communication | - | - | - | - | ■ |

•ETS/ETSi: Standard

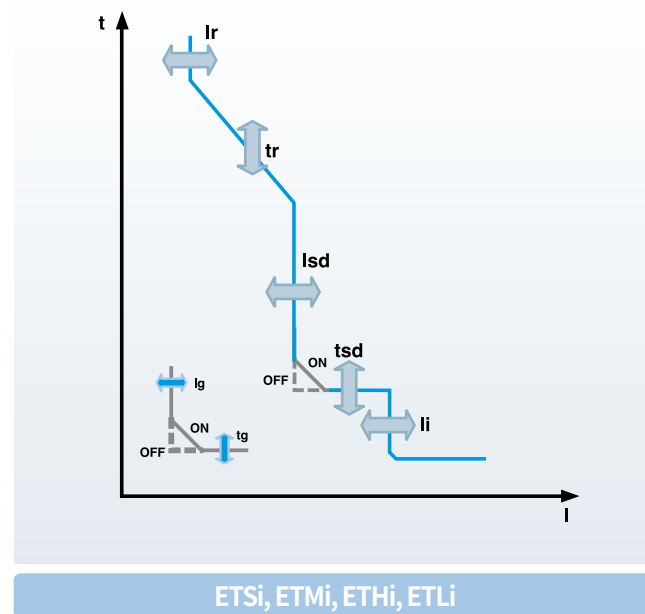
•ETM/ETMi: Multi-Function

•ETHi: High-Performance

•ETLi: Limited-Performance

Smart MCCB (Trip unit : ETSi, ETMi, ETHi, ETLi) Model numbering (Product selection)

| | | | | | | |
|---------------------------------------|-------------|---------------------|----------------------|-------------------------------|----------------|--|
| TS 250 | Ni | ETHi | 630A | 3P | - | AX |
| Basic format/ Ampere frame | Type | | Rated current | Number of poles | Plug-in | - Standard AX Accessories |
| TS | 100 | Ni Normal | 630A | 3P 3-pole | - Standard | - Standard AX Accessories |
| | 160 | Hi High | | 4P L 4-pole N-A-B-C (N-R-S-T) | P Plug-in | |
| | 250 | Li Limited | | 4P R 4-pole A-B-C-N (R-S-T-N) | | |
| | 400 | | | | | |
| | 630 | | | | | |
| 800 | | | | | | |
| Trip Unit (ETU) | | | | | | |
| | ETSi | Standard | | | | |
| | ETMi | Multi-Function | | | | |
| | ETHi | High-performance | | | | |
| | ETLi | Limited-performance | | | | |



New standard for low voltage circuit breakers

Susol Smart MCCB

Susol Smart MCCB is developed by combining digital technology with LS ELECTRIC's power device technology accumulated over 40 years. The relay and measurement functions for line protection has been upgraded. By using accessory devices for connectivity between low-voltage devices, it is possible to diagnose and maintain devices by collecting and analyzing data.



External structure and notation



- Rated frequency
- Utilization category
- Standard
- Certification mark
- Symbol indicating suitability for isolation as defined by IEC60947-2

- Circuit breaker model (Type/Model)**
 - TS: TS series
 - 250: Frame size
 - Ni: Normal (Standard)
 - Hi: High
 - Li: Limited
- Circuit breaker performance**
 - Ui: Rated insulation voltage
 - Uimp: Impulse withstand voltage
 - Ue: Rated operational voltage
 - Icu: Ultimate breaking capacity
 - Ics: Service breaking capacity

| | 250AF | 630AF | 800AF |
|----|-------------------------------|-------------------------|-------------------|
| Ni | TS100Ni TS160Ni TS250Ni | TS400Ni TS630Ni - | TS800Ni - - |
| Hi | TS100Hi TS160Hi TS250Hi | TS400Hi TS630Hi - | TS800Hi - - |
| Li | TS100Li TS160Li TS250Li | TS400Li TS630Li - | TS800Li - - |

| | | | |
|----|-------|-------|-------|
| Ni | 50kA | 65kA | 65kA |
| Hi | 85kA | 85kA | 100kA |
| Li | 150kA | 150kA | 150kA |



- Alarm Indication LED
- Test terminal
- Overcurrent indication LED
- Unlock Key

- Company logo
- Upstream connections
- Attachment Hole
- Indication of closed (I/ON) position
- Indication of closed (I/ON) position
- Operation handle
- Indication of open (O/OFF) position
- Trip test button
- Trip device type
- Rating of trip unit
- Trip unit operation button
- Attachment hole
- Downstream connections

CB Test certificate by UL
 · Ref.Certificate No. : DK-85164-UL
 · Standard No. IEC60947-2

Ref. Certif. No.
DK-85164-UL

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE)
CB SCHEME

CB TEST CERTIFICATE

Product: Moulded-Case Circuit Breaker

Name and address of the applicant: LSIS CO LTD, 127 LS-ro Dongan-gu, Anyang-si, 14119 Gyeonggi-do Korea

Name and address of the manufacturer: LSIS CO LTD, 127 LS-ro Dongan-gu, Anyang-si, 14119 Gyeonggi-do Korea

Name and address of the factory: LSIS CO LTD, 95 Baekbong-ro Heungdeok-gu, Cheongju-si, 361-720 Chungcheongbuk-do Korea

Additional information (if necessary may also be reported on page 2): Additional information on page 2

A sample of the product was tested and found to be in conformity with: IEC 60947-1:2007/AMD1:2010, IEC 60947-1:2007/AMD2:2014, IEC 60947-1:2007, IEC 60947-2:2018

As shown in the Test Report Ref. No. which forms part of this Certificate: 4788765951 issued on 2019-06-21

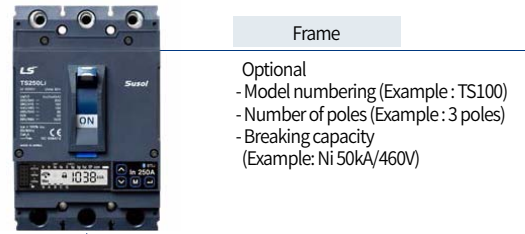
This CB Test Certificate is issued by the National Certification Body

UL (USA), 333 Prigden Rd S. 60602, Northbrook, USA
 UL (Denmark), Borsvang SA DK-2750 Ballerup, DENMARK
 UL (JPN), Marumori Trust Tower Main Building 9F, 1-4-3 Marumori, Chiyoda-ku, Tokyo 100-0005, JAPAN
 UL (CAN), 7 Underhill Road, Toronto, M1S 5B8 Ontario, CANADA

Date: 2019-06-28
 Signature: Jan-Erik Storgaard
 Jan-Erik Storgaard

Susol Smart MCCB

When selecting a device, Susol Smart MCCB selects the type and rating of the main body and trip device, respectively.



Frame
Optional
- Model numbering (Example: TS100)
- Number of poles (Example: 3 poles)
- Breaking capacity (Example: Ni 50kA/460V)

Frame

| Model | TS100 | | | TS160 | | | TS250 | | | TS400 | | | TS630 | | | TS800 | | | | |
|-----------------------------|---------------|-----|-----|-------|-----|-----|-------|-----|-----|-------|-----|-----|-------|-----|-----|-------|-----|-----|-----|----|
| Frame size [AF] | 100 | | | 160 | | | 250 | | | 400 | | | 630 | | | 800 | | | | |
| Number of poles [Pole] | 3, 4 | | | 3, 4 | | | 3, 4 | | | 3, 4 | | | 3, 4 | | | 3, 4 | | | | |
| Rated breaking current, Icu | Type | Ni | Hi | Li | Ni | Hi | Li | Ni | Hi | Li | Ni | Hi | Li | Ni | Hi | Li | Ni | Hi | Li | |
| | 220/240V [kA] | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 | |
| | 380/415V [kA] | 50 | 85 | 150 | 50 | 85 | 150 | 50 | 85 | 150 | 65 | 85 | 150 | 65 | 85 | 150 | 65 | 100 | 150 | |
| | 440/460V [kA] | 50 | 70 | 130 | 50 | 70 | 130 | 50 | 70 | 130 | 65 | 85 | 130 | 65 | 85 | 130 | 65 | 100 | 130 | |
| | 480/500V [kA] | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 85 | 100 | |
| 525V [kA] | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 |
| 660/690V [kA] | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 35 | 10 | 20 | 35 | 10 | 20 | 35 | 10 | 20 | 35 |

Electronic trip unit

Trip Unit

L: Long time protection against overload
S: Short circuit protection
I: Instantaneous protection
G: Earth fault protection

Optional
- Trip Unit type (Example: ETSi)
- Rated current (Example: 100A)

ETSi (basic type)
LSIG relay, current measurement



ETMi (Multi - function)
LSIG relay, current measurement, communication function



ETHi (High - Performance)
LSIG relay, current/voltage/power measurement,



LSIG relay, current/voltage/power measurement, communication function, mobile communication



Trip Unit

| Rated current | In | 40, 100 | 40, 100, 160 | 40, 100, 160, 250 | 250, 400 | 250, 400, 630 | 630, 800 |
|---|-----------------|---|--------------|-------------------|---|---------------|----------|
| Overload protection setting current (Long time) | I _r | 0.4 × I _n ~ 1.0 × I _n (1A unit) | | | 0.4 × I _n ~ 1.0 × I _n (1A unit) | | |
| Tripping time (Long time) | t _r | 0.5, 1, 2, 4, 8, 16 (second) | | | 0.5, 1, 2, 4, 8, 16 (second) | | |
| Short circuit protection setting current | I _{sd} | 1.5 ~ 10 × I _r (0.5 unit) | | | 1.5 ~ 10 × I _r (0.5 unit) | | |
| Tripping time (Short circuit) | t _{sd} | I ² t Off: 0, 0.1, 0.2, 0.3, 0.4 (second) I ² t On: 0.1, 0.2, 0.3, 0.4 (second) | | | I ² t Off: 0, 0.1, 0.2, 0.3, 0.4 (second) I ² t On: 0.1, 0.2, 0.3, 0.4 (second) | | |
| Instantaneous protection setting current | I _i | 40~160A: 1.5 ~ 15 × I _n (0.5 unit) 250~400A: 1.5 ~ 12 × I _n (0.5 unit) 630~800A: 1.5 ~ 11 × I _n (0.5 unit) | | | 40~160A: 1.5 ~ 15 × I _n (0.5 unit) 250~400A: 1.5 ~ 12 × I _n (0.5 unit) 630~800A: 1.5 ~ 11 × I _n (0.5 unit) | | |
| Earth fault protection setting current | I _g | 40A: 0.45 ~ 1.0 × I _n (0.05 unit) 100A: 0.35 ~ 1.0 × I _n (0.05 unit) 160A: 0.25 ~ 1.0 × I _n (0.05 unit) I _n > 160A: 0.2 ~ 1.0 × I _n (0.05 unit) | | | 40A: 0.45 ~ 1.0 × I _n (0.05 unit) 100A: 0.35 ~ 1.0 × I _n (0.05 unit) 160A: 0.25 ~ 1.0 × I _n (0.05 unit) I _n > 160A: 0.2 ~ 1.0 × I _n (0.05 unit) | | |
| Tripping time (Earth fault) | t _g | I ² t Off: 0, 0.1, 0.2, 0.3, 0.4 (second) I ² t On: 0.1, 0.2, 0.3, 0.4 (second) | | | I ² t Off: 0, 0.1, 0.2, 0.3, 0.4 (second) I ² t On: 0.1, 0.2, 0.3, 0.4 (second) | | |
| Additional functions | | Selective protection (ZSI) | | | Selective protection (ZSI) | | |

Susol Smart MCCB



| Type | | TS100 | | | TS160 | | | TS250 | | | TS400 | | | TS630 | | | TS800 | | | | | |
|---|------------|------------------|----------------|-----|--------------|----------------|-----|-------------------|----------------|----|----------|-------------------|-----|---------------|-------------------|-----|----------|-----------------|-----|-----|-----|-----|
| Frame size | [AF] | 100 | | | 160 | | | 250 | | | 400 | | | 630 | | | 800 | | | | | |
| Rated current, I _n | [A] | 40, 100 | | | 40, 100, 160 | | | 40, 100, 160, 250 | | | 250, 400 | | | 250, 400, 630 | | | 630, 800 | | | | | |
| No. of poles | | 3, 4 | | | 3, 4 | | | 3, 4 | | | 3, 4 | | | 3, 4 | | | 3, 4 | | | | | |
| Rated operational voltage, U _e [AC] | [V] | 690 | | | 690 | | | 690 | | | 690 | | | 690 | | | 690 | | | | | |
| Rated impulse withstand voltage, U _{imp} | [kV] | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | | 8 | | | | | |
| Rated insulation voltage, U _i | [V] | 1000 | | | 1000 | | | 1000 | | | 1000 | | | 1000 | | | 1000 | | | | | |
| Rated ultimate short-circuit breaking capacity, I _{cu} | AC 50/60Hz | | Ni | Hi | Li | Ni | Hi | Li | | Ni | Hi | Li | Ni | Hi | Li | Ni | Hi | Li | Ni | Hi | Li | |
| | | 220/240V | [kA] | 100 | 120 | 200 | 100 | 120 | 200 | | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 |
| | | 380/415V | [kA] | 50 | 85 | 150 | 50 | 85 | 150 | | 50 | 85 | 150 | 65 | 85 | 150 | 65 | 85 | 150 | 65 | 100 | 150 |
| | | 440/460V | [kA] | 50 | 70 | 130 | 50 | 70 | 130 | | 50 | 70 | 130 | 65 | 85 | 130 | 65 | 85 | 130 | 65 | 100 | 130 |
| | | 480/500V | [kA] | 42 | 65 | 85 | 42 | 65 | 85 | | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 85 | 100 |
| | | 525V | [kA] | 22 | 35 | 50 | 22 | 35 | 50 | | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 |
| Rated service breaking capacity, I _{cs} | AC 50/60Hz | 220/240V | [kA] | 100 | 120 | 200 | 100 | 120 | 200 | | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 | 100 | 120 | 200 |
| | | 380/415V | [kA] | 50 | 85 | 150 | 50 | 85 | 150 | | 50 | 85 | 150 | 65 | 85 | 150 | 65 | 85 | 150 | 65 | 100 | 150 |
| | | 440/460V | [kA] | 50 | 70 | 130 | 50 | 70 | 130 | | 50 | 70 | 130 | 65 | 85 | 130 | 65 | 85 | 130 | 65 | 100 | 130 |
| | | 480/500V | [kA] | 42 | 65 | 85 | 42 | 65 | 85 | | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 65 | 85 | 42 | 85 | 100 |
| | | 525V | [kA] | 22 | 35 | 50 | 22 | 35 | 50 | | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 | 22 | 35 | 50 |
| | | 660/690V | [kA] | 5 | 5 | 5 | 5 | 5 | 5 | | 5 | 5 | 5 | 10 | 12 | 12 | 10 | 12 | 12 | 10 | 20 | 20 |
| Rated short-circuit making capacity, I _{cm} | AC 50/60Hz | 220/240V | [kA] | 220 | 265 | 440 | 220 | 264 | 440 | | 220 | 264 | 440 | 220 | 264 | 440 | 220 | 264 | 440 | 220 | 264 | 440 |
| | | 380/415V | [kA] | 105 | 187 | 330 | 105 | 187 | 330 | | 105 | 187 | 330 | 143 | 187 | 330 | 143 | 187 | 330 | 143 | 220 | 330 |
| | | 440/460V | [kA] | 105 | 154 | 286 | 105 | 154 | 286 | | 105 | 154 | 286 | 143 | 187 | 286 | 143 | 187 | 286 | 143 | 220 | 286 |
| | | 480/500V | [kA] | 88 | 143 | 187 | 88 | 143 | 187 | | 88 | 143 | 187 | 88 | 143 | 187 | 88 | 143 | 187 | 88 | 187 | 220 |
| | | 525V | [kA] | 46 | 74 | 105 | 46 | 74 | 105 | | 46 | 74 | 105 | 46 | 74 | 105 | 46 | 74 | 105 | 46 | 74 | 105 |
| | | 660/690V | [kA] | 17 | 17 | 17 | 17 | 17 | 17 | | 17 | 17 | 17 | 17 | 40 | 74 | 17 | 40 | 74 | 17 | 40 | 74 |
| Category of utilization | | A | | | A | | | A | | | A | | | A | | | A | | | | | |
| Isolation behavior | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | | |
| Trip unit (release) : Electronics | ETSi | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | | |
| | ETMi | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | | |
| | ETHi | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | | |
| | ETLi | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | | |
| Connection | fixed | front-connection | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | |
| | | rear-connection | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | |
| | plug-in | front-connection | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | |
| | | rear-connection | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | ■ | | | | |
| Basic dimensions, W × H × D (front-connection) | 3-pole | [mm] | 105 × 160 × 86 | | | 105 × 160 × 86 | | | 105 × 160 × 86 | | | 140 × 260 × 110 | | | 140 × 260 × 110 | | | 210 × 320 × 135 | | | | |
| | 4-pole | [mm] | 140 × 160 × 86 | | | 140 × 160 × 86 | | | 140 × 160 × 86 | | | 186.5 × 260 × 110 | | | 186.5 × 260 × 110 | | | 280 × 320 × 135 | | | | |

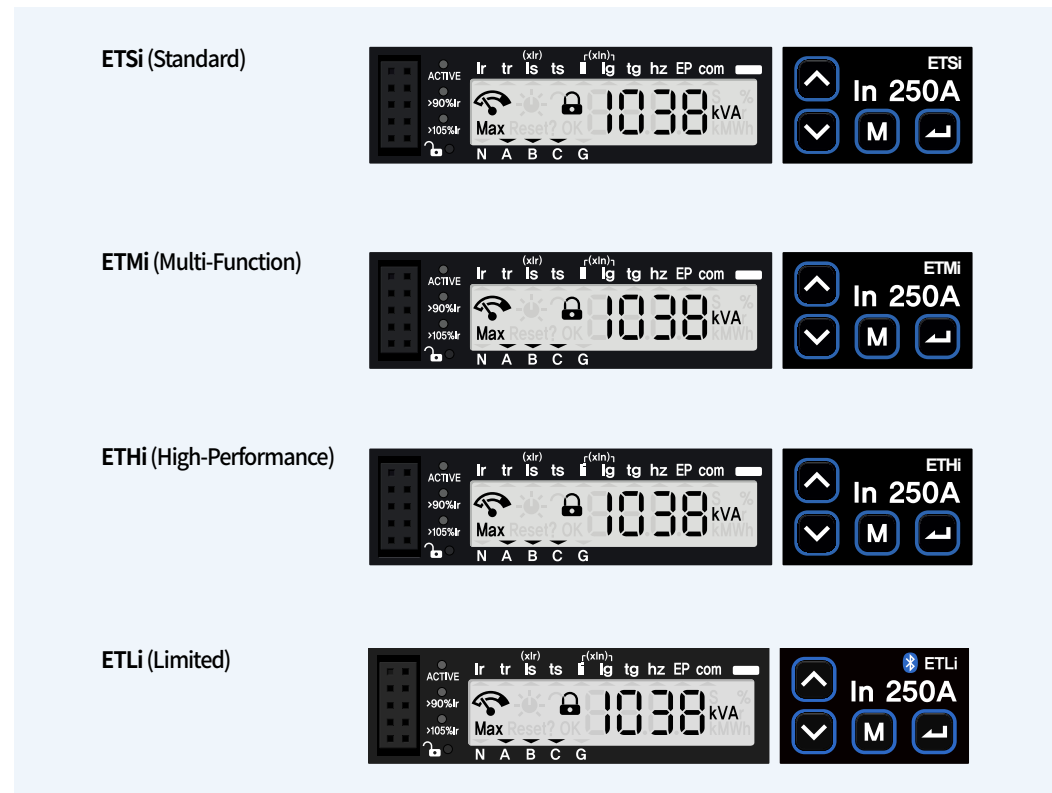
Smart Trip Unit - ETSi, ETMi, ETHi, ETLi (Electronic)

Trip Unit exterior



Trip Unit type

ETU of Susol Smart MCCB is equipped with basic type (ETSi) that performs current measurement for each AF and rated current, and advanced type (ETMi) trip unit with communication function, a high-end (ETHi) trip unit that performs voltage measurement in communication functions, and various electronic trip units capable of mobile (BLE) communication (ETLi).



Trip Unit Rated current

| AF | Rated current250 |
|-------|-----------------------|
| 100AF | 40A, 100A |
| 160AF | 40A, 100A, 160A |
| 250AF | 40A, 100A, 160A, 250A |
| 400AF | 250A, 400A |
| 630AF | 250A, 400A, 630A |
| 800AF | 630A, 800A |

Trip Unit features

| ETU | ETSi | ETMi | ETHi | ETLi |
|-----------------|---|------|------|------|
| Relay (setting) | | | | |
| | <ul style="list-style-type: none"> Long time Short circuit Instantaneous Ground fault | | | |
| Button | ● | ● | ● | ● |
| LCD | ● | ● | ● | ● |
| Status LED | ● | ● | ● | ● |
| Test Port | ● | ● | ● | ● |
| Measurement | Current | ● | ● | ● |
| | Power | - | - | ● |
| Communication | RS485 | - | ● | ● |
| | BLE | - | - | ● |

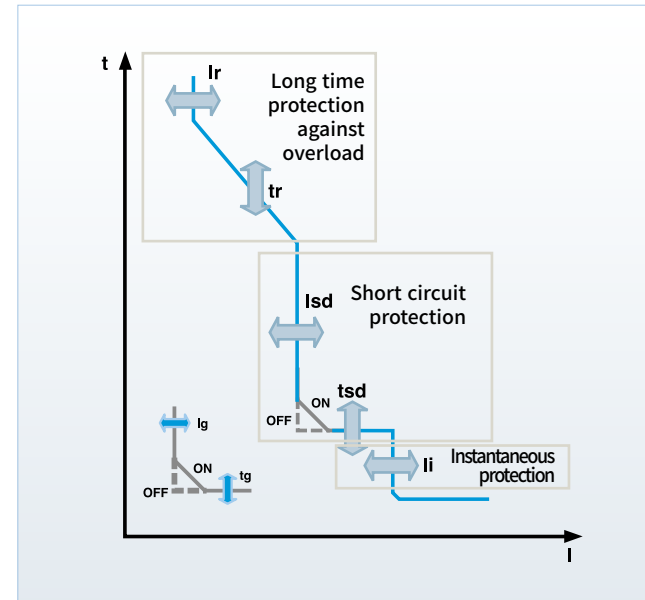
Smart Trip Unit - ETSi, ETMi, ETHi, ETLi (Electronic)

Overcurrent protection relay

Smart MCCB's ETU basically performs relay operation function for long time, short time, instantaneous and ground fault, and provides an alarm indicating LED related to overcurrent display.
Relay item setting for relay operation can be set by using the button on the front of ETU.
To change the relay action setting, press the 'unlock' button, change the setting in the 'unlock' state (🔓), and after completing the setting, press the 'unlock' button to switch to the 'lock' state (🔒).
During the setting change, if there is no button input for more than 1 minute, the device automatically switches to the 'lock' state (🔒).

| Type | ETSi | ETMi | ETHi | ETLi |
|---------------|------------------------------|------|------|------|
| Relay setting | Ir, tr, Isd, tsd, li, Ig, tg | ● | ● | ● |

Characteristic curve



- 1) Long time overcurrent relay (Long time protection) : Performs caloric relay and the operating current (Ir) and operating time (tr) can be set.
- 2) Short time overcurrent relay (Short time protection) : The operating current (Isd) and operating time (tsd) can be set.
- 3) Instantaneous overcurrent relay : The operating current (li) can be set.
- 4) Ground fault relay (Ground fault protection) : You can set whether to use ground fault relay, operating current (Ig) and operating time (tg).
- 5) N - phase protection relay : N-phase protection relay can be set for a 4-wire type instrument.
 - Off : No protection
 - 100% : N-phase protection for $100\% \times I_r$
 - 50% : Perform N-phase protection for $50\% \times I_r$
 - ON : Performs N-phase protection for $160\% \times I_r$ when I_r setting is set to ' $<0.63 \times I_n$ ' (Used for load usage conditions that contain a lot of harmonics)
- 6) ZSI (Zone Selective Interlocking) : Breaks the protected area selectively.

*It is necessary to set the relay so that the circuit breaker does not malfunction due to inrush current. (In case of motor or capacitor load, inrush current of several times the rated current may occur.)

Relay specification table

| Protection | Item | Setting range | | | | | | | Remark | |
|--|--|---|--------------------------|--|------|--------------------------|------|----------------|---------------------------|----------------------------|
| Long time (overload) | Operating current (Ir) | Rated current | Min ($0.4 \times I_n$) | | | Max ($1.0 \times I_n$) | | | | 1A unit adjustment |
| | | 40A | 16A | | | 40A | | | | |
| | | 100A | 40A | | | 100A | | | | |
| | | 160A | 64A | | | 160A | | | | |
| | | 250A | 100A | | | 250A | | | | |
| | | 400A | 160A | | | 400A | | | | |
| | | 630A | 252A | | | 630A | | | | |
| | 800A | 320A | | | 800A | | | | | |
| Operating time (tr) error range : $\pm 20\%$ | Operation time | Setting | 0.5 | 1 | 2 | 4 | 8 | 16 | Unit : seconds | |
| | | $1.5 \times I_r$ | 11 | 22 | 45 | 90 | 180 | 360 | | |
| | | $6 \times I_r$ | 0.5 | 1 | 2 | 4 | 8 | 16 | | |
| Operating current (Isd) error range : $\pm 10\%$ | Operation time | $7.2 \times I_r$ | 0.35 | 0.7 | 1.4 | 2.8 | 5.5 | 11 | 0.5 times unit adjustment | |
| | | $1.5 \times I_r \sim 10 \times I_r$ (18 steps) | | | | | | | | |
| | | Setting | I^2t_{Off} | 0 | 0.1 | 0.2 | 0.3 | 0.4 | | |
| Short circuit | Operating time (tr) error range : $\pm 20\%$ | I^2t_{On} | - | 0.1 | 0.2 | 0.3 | 0.4 | Unit : seconds | | |
| | | I^2t_{Off} | Non - operation | 0.02 | 0.08 | 0.14 | 0.24 | | 0.35 | |
| | | Maximum operation | 0.08 | 0.14 | 0.24 | 0.35 | 0.50 | | | |
| Instantaneous | Operating current (Isd) error range : $\pm 15\%$ | Setting | Rated current | Range | | | | | | 0.5 times unit adjustment |
| | | | 40A ~ 160A | $1.5 \times I_n \sim 15 \times I_n$ (28 steps) | | | | | | |
| | | | 250A ~ 400A | $1.5 \times I_n \sim 12 \times I_n$ (22 steps) | | | | | | |
| | | | 630A ~ 800A | $1.5 \times I_n \sim 11 \times I_n$ (20 steps) | | | | | | |
| Non - operation time : 10ms, Maximum operating time : 60ms | | | | | | | | | | |
| Earth fault | Operating current (Isd) error range : $\pm 10\%$ | Setting | Rated current | Range | | | | | | 0.05 times unit adjustment |
| | | | 40A | $0.45 \times I_n \sim 1.0 \times I_n$ (12 steps) | | | | | | |
| | | | 100A | $0.35 \times I_n \sim 1.0 \times I_n$ (14 steps) | | | | | | |
| | | | 160A | $0.25 \times I_n \sim 1.0 \times I_n$ (16 steps) | | | | | | |
| | $I_n > 160A$ | $0.2 \times I_n \sim 1.0 \times I_n$ (17 steps) | | | | | | | | |
| Operating time (tr) error range : $\pm 25\%$ | Setting | I^2t_{Off} | 0 | 0.1 | 0.2 | 0.3 | 0.4 | Unit : seconds | | |
| | | I^2t_{On} | - | 0.1 | 0.2 | 0.3 | 0.4 | | | |
| | | I^2t_{Off} | Non - operation | 0.02 | 0.08 | 0.14 | 0.24 | | 0.35 | |
| Operation time | Maximum operation | I^2t_{Off} | 0.08 | 0.14 | 0.24 | 0.35 | 0.50 | | | |

Smart Trip Unit - ETSi, ETMi, ETHi, ETLi (Electronic)

Measurement specification table

| Type | ETU Type | | | | Display | |
|---|--|------|------|------|------------------------------|-----------|
| | ETSi | ETMi | ETHi | ETLi | ETU | 3.5" HMI |
| Current | Each phase current (Ia, Ib, Ic, In) | ● | ● | ● | ● | ● |
| | Maximum current (Imax of Ia, Ib, Ic, In) | ● | ● | ● | ● | ● |
| | Ground fault current (Ig) | ● | ● | ● | ● | ● |
| | Maximum ground fault current (Imax of Ig) | ● | ● | ● | ● | ● |
| | Average current : Iavg = (Ia + Ib + Ic)/3 | ● | ● | ● | ● | ● |
| Unbalance rate : Iunbal(%) = (Imax - Iavg)/Iavg | ● | ● | ● | ● | ● | |
| Voltage | Phase voltage (Va, Vb, Vc)/Line voltage (Vab, Vbc, Vca) | | | ● | ● | ● |
| | Average voltage : Vavg = (Va(Vab) + Vb(Vbc) + Vc(Vca))/3 | | | ● | ● | ● |
| | Unbalance rate : Vunbal(%) = (Vmax - Vavg)/Vavg | | | ● | ● | ● |
| Frequency | Hz | | | ● | ● | ● |
| Power | Active, Reactive, Apparent Power (total, for each phase) | | | ● | ▲ (Total) | ▲ (Total) |
| | Power factor | | | ● | ● | ▲ (Total) |
| Power quantity | Forward/reverse valid and invalid, apparent power quantity | | | ● | ▲ (Forward Yes/No, Apparent) | ● |
| Demand (Previous, Max) | Current (Ia, Ib, Ic) | ● | ● | ● | | ▲ (Max) |
| | Electric power (effective, invalid, apparent) | | | ● | ● | ▲ (Max) |
| Power Quality | THDV : Total Harmonic Distortion V | | | ● | ● | ● |
| | THDI : Total Harmonic Distortion I | ● | ● | ● | | ● |

Measurement accuracy

- Reference standards : IEC 61557-12
- Current : Three phase equilibrium (0.2 ~ 0.4In : ± 1.5%, 0.4 ~ 1.2In : ± 1.0%), single phase (0.2 ~ 1.2In : ± 2.0%)
- Voltage : ± 0.5%
- Power and power quantity : Class 2

| Type | Error range | Error | |
|-------------------|------------------|-----------|-------|
| Power/Electricity | PF 1.0 | 0.2~0.4In | ±2.5% |
| | | 0.4~1.2In | ±2.0% |
| | PF 0.5 PF 0.8 | 0.4~0.8In | ±2.5% |
| | | 0.8~1.2In | ±2.0% |

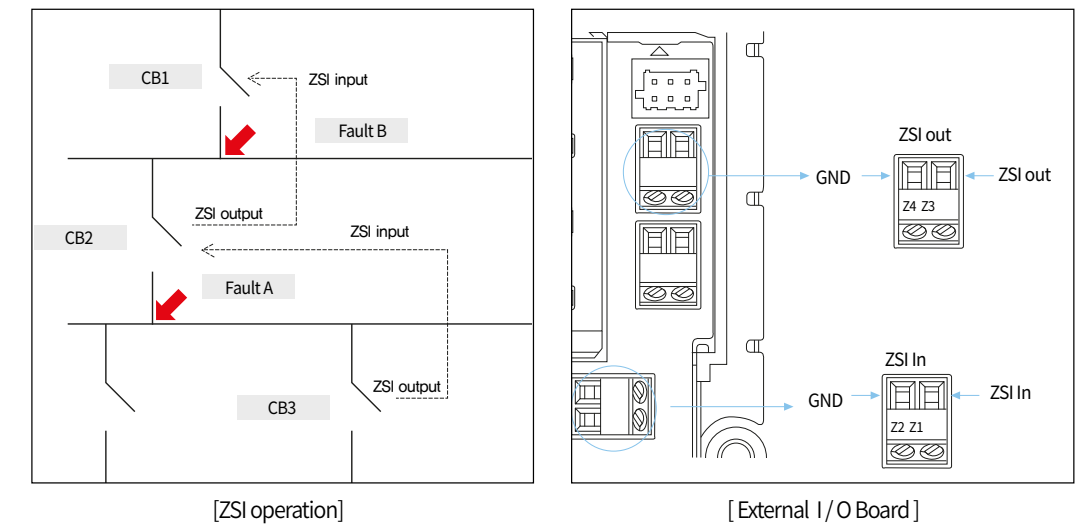
*Note : Refer to the current measurement value of the LCD, etc. for poor internal current conduction (defect).

ZSI function

The ZSI function is used to minimize the impact that MCCB and other electrical devices receive under accident conditions by reducing the delay time that the device eliminates the failure.

- 1) While a short time or ground fault occurs in a system where ZSI is set, the device at the point of failure generates a ZSI signal output to suppress the operation of the host device.
- 2) The MCCB at the point of failure is performed immediately and with minimum operating time without time delay to eliminate the fault.
- 3) The upper circuit breaker that receives the ZSI input signal operates according to the short time or ground operation delay time set for protection coordination on the system, but the upper circuit breaker that does not receive the ZSI input signal from the lower circuit breaker performs immediately without time delay in minimal operating time.

For normal ZSI operation, the operation time must be set properly for protection coordination so that the lower unit operates before the upper unit in case of short time relay/ground fault.



※ Whether or not to use the ZSI function can be set in the ZSI PIN connection status and relay setting mode.
(ZSI used: ZSI pin removed, ZSI not used: ZSI pin fastened)
-When ZSI is set to enable, ZSI function operates.
-ZSI input signal is input to External I/O Board input terminal.

Smart Trip Unit - ETSi, ETMi, ETHi, ETLi (Electronic)

Diagnosis and maintenance

Smart MCCB's ETU can save various operation contents such as device operation and setting change. It can also check its contents through communication and HMI.

Record

1) System events

- Possible up to 50 records including the event type and time
- If the number exceeds
- 50, the oldest event is deleted sequentially (Roll-Over)

2) Fault event

- When an accident occurs due to relay operation, up to 50 records including the type and time of occurrence is possible
- If the number exceeds · 50, the oldest event is deleted sequentially (Roll-Over)
- Accident waveform record: Records up to 2 accident waveforms (current and voltage waveform, 8 cycles)

3) Max. Demand and Max. Power value

- Records occurrence value and occurrence time

4) Device operation

- Operation/circuit breaker on (input) hour
- Circuit breaker/trip operation count
- Contact wear rate (%) : Wear rate according to the number of electrical openings and closings of the main body
- Load Profile : Hours of use according to the load used (hour)
Classified into 4 levels (0~49% In, 50~79% In, 80~89% In, > 90% In)

Device management

ETU with communication function can obtain device information using communication.

- Communication related items (Communication address, speed etc.)
- Manufacturer
- Serial number
- Firmware version
- Model name, etc.

Characteristic

| Type | ETU Type | | | | Display | |
|----------------------|---|------|------|------|---------|----------------------|
| | ETSi | ETMi | ETHi | ETLi | ETU | 3.5" HMI |
| Event record | System | ● | ● | ● | — | ● |
| | Fault | — | ● | ● | ● | — |
| Maximum value record | Demand (Occurrence value and time) | — | ● | ● | ● | — |
| | Active/reactive/apparent power | — | — | ● | ● | — |
| | Power (Occurrence value and time) | — | — | ● | ● | ▲ (Occurrence value) |
| Device operation | Operating time (hour) | — | ● | ● | ● | — |
| | Circuit breaker on time (hour) | — | ● | ● | ● | — |
| | Circuit breaker mechanical and electrical operation frequency (number of times) | — | ● | ● | ● | — |
| | Circuit breaker electrical operation frequency (number of times) | — | ● | ● | ● | — |
| | Trip count (number of times) | — | ● | ● | ● | — |
| | Contact wear rate (%) | — | — | ● | ● | — |
| | Load profile | — | ● | ● | ● | — |

Communication

RS485 communication

- 1) Communication method : Modbus RTU
 - 2) Communication speed : 9,600, 19,200, 38,400 bps
 - 3) Communication distance : up to 5m (between devices), maximum number of connections is 16
 - 4) DC 24V power supplied from outside
 - 5) Slave address : 1 ~ 247
 - 6) Transmission information : device status and measured values, setting information, record data, etc.
- ※Communication is possible only when there is an external power supply (DC 24).

Tester Port communication

- 1) External power supply (DC 12V) input
- 2) Connected devices : i-Tester, IPBM
: Relay test current signal input

BLE Communications

- 1) Distance possible for communication : 4m (Open space standard)
 - 2) Transmission information : Device status and measured values, setting information, record data, etc.
- ※Communication is possible only when there is an external power supply (DC 24).

*When power is supplied to the device again, the device time is reset to 1 : 01 : 01 on January 1, 2018.

Miniature Circuit Breakers

It satisfies IEC60947-2 and IEC60898-1 at the same time and can be applied to various industrial sites and residential spaces. It provides optimal solution through power measurement, on/off control, and wireless communication functions by using accessory devices for connectivity between low-voltage devices.



E TAG & MCB

- 1. E TAG / E COLLECTOR 66
- 2. Miniature Circuit Breakers – Ultra-small breaker (BK63H) 68
- 3. Miniature Circuit Breakers – Earth leakage breaker (RCBO) ... 69

Miniature Circuit Breakers



E COLLECTOR



E TAG

E TAG / E COLLECTOR

It is a device that performs power monitoring in a low voltage panel.
E TAG (Small sensing module) wirelessly transmits the measured power information to the E COLLECTOR.
E COLLECTOR provides power information to customers.

Features

- **Power monitoring at the extreme end load**
: Measurement of voltage/current/power, power quantity
- **Miniaturization design (suitable for panel)**
: E TAG - tag structure (Installable form in MCB)
: E COLLECTOR - Din Rail mounting structure
- **Wireless communication**
: Minimizes installation space and provides installation convenience
- **Easy to collect power information**
: One-gate information collection and operation in Smart LV panel

Specification (E COLLECTOR)

| Type | Details |
|---------------------------------|---|
| Model name | IWM - ET - F24 |
| Rated voltage | AC 110/220V, 50/60Hz |
| Number of connections for E TAG | 20 or less recommended (up to 40) |
| LED | 3 (Status, RF, Communication) |
| Protocol | Modbus RTU, Modbus TCP |
| Communication method | RS485, Ethernet, Wireless communication |
| Convergence time | Within 10 seconds |
| Mounting method | DIN-Rail |
| Size | 72 (W) × 81 (H) × 65 (D), unit : mm |
| Weight | Approximately 200 g |
| Power Consumption | 5W or less |
| Use temperature | -25 ~ +60 °C |
| Storage temperature | -40 ~ +80 °C |

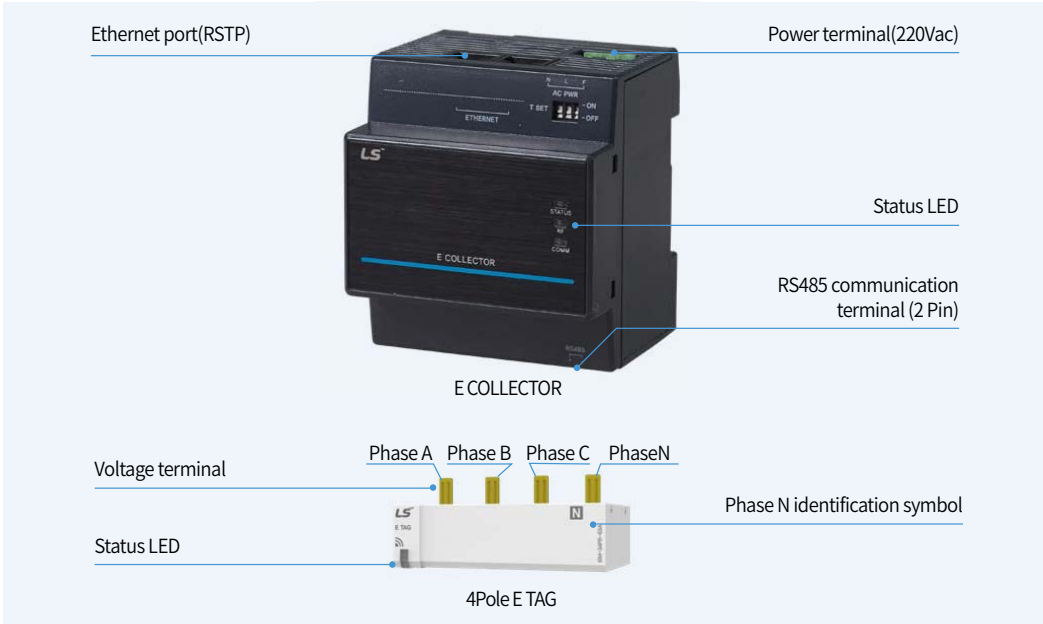
Wireless communication specifications

| Type | Details | Remark |
|---------------------------|---------------------|---|
| Wireless standard | IEEE 802.15.4 | |
| Wireless output | 0 dBm or less | |
| Frequency band | 2.405MHz ~ 20480MHz | |
| Maximum number of sensors | 40ea | Wireless communication cycle -20 or less : 5 seconds -21 or more : 10 seconds |

Specification (E TAG)

| Type | 1Pole | 2Pole | 3Pole | 4Pole | |
|----------------------|--|--------------------|--------------------|-------------------|-------------------------|
| Model name | 32A | ISM - 11PB - 32A | ISM - 12PB - 32A | ISM - 33PB - 32A | ISM - 34PB - 32A |
| | 63A | ISM - 11PB - 63A | ISM - 12PB - 63A | ISM - 33PB - 63A | ISM - 34PB - 63A |
| Number of poles | 1P + N | 1P + N | 3P | 3P + N | |
| Rated voltage | 220V | 220V | 380V | 220V/380V | |
| Rated current | 32/ 64A | | | | |
| Rated frequency | 60Hz | | | | |
| Measurement factor | Current | ● | ● | ● | ● |
| | Voltage | ● Phase voltage | ● Phase voltage | ● Line voltage | ● Phase/line voltage |
| | Power(quantity), power factor | ● | ● | ● | ● |
| Communication method | Wireless communication, 2.4GHz | | | | |
| Combination method | Bottom attach | | | | |
| Power consumption | 2W or less | | | | |
| Use temperature | -25 ~ +60 °C (Standard operating temperature : +23 °C) | | | | |
| Storage temperature | -40 ~ +80 °C | | | | |
| Humidity | Within 85% RH, no condensation | | | | |

Exterior description



Example of device usage

It is installed on the load side of the circuit breaker (MCB) to measure load power and provides power information wirelessly to the E COLLECTOR. E COLLECTOR provides the collected power information to customers through wired communication (RS485, Ethernet).



Miniature Circuit Breakers

Ultra-small circuit breaker (BK63H)



- Number of poles : 1P, 2P, 3P, 4P
- Rated current : 1 ~ 63A
- Rated breaking capacity : 10kA
- Instantaneous trip characteristics : B, C, D
- Protection function : Overload and short circuit current
- Status display and dual terminal application
- Accessories : AX, AL, SHT, UVT, OVT

Specification



On/Off status display

| Type | | BK63H | | |
|------------------------------------|--|--------------|----------|------------|
| Frame size | 63AF | | | |
| Number of poles | 1P, 2P, 3P, 4P | | | |
| Rated current, In | 1, 2, 3, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63A | | | |
| Rated breaking current | Applicable standards | Voltage | 1P | 2P, 3P, 4P |
| | IEC 60947-2, Icu | AC 415V | - | 10kA |
| | | AC 240V | 10kA | - |
| | | Ics (= %Icu) | 75% | 75% |
| IEC 60898 | AC 240/415V | 10kA | 10kA | |
| Rated voltage | AC | 240V | 240/415V | |
| | DC | 60V | 125V | |
| Rated insulation voltage (Ui) | AC 500V | | | |
| Rated impulse voltage (Uimp) | AC 6kV | | | |
| Rated frequency | 50/60 Hz | | | |
| Instantaneous trip characteristics | B (4In), C (7.5In), D (12In) | | | |
| Protection function | Overload, short circuit current | | | |
| Endurance life | Electrical | 10,000 times | | |
| | Mechanical | 20,000 times | | |
| Protection grade | IP20 | | | |
| Wire dimension and torque | 18-4 AWG (0.75 ~ 25mm ²) 20 Kgf.cm | | | |
| Installation method | Using 35mm DIN rail | | | |
| Terminal structure | Lug/Screw dual structure | | | |
| Over current trip method | Thermal - Magnetic | | | |
| Ambient temperature | -25 ~ +55 °C (use) | | | |
| Certification status | CE, Safety certification (KC), SEMKO CB Classification : ABS, BV, DNV, GL, KR, LR, RINA | | | |

Earth leakage circuit breaker (RKJ-b)



Earth leakage circuit breaker with overcurrent protection

- Number of poles : 1P+N, 2P
- Rated current : 1 ~ 63A
- Rated breaking capacity : 10kA
- Instantaneous trip characteristics : B, C, D
- Operation Type : AC, A type selectable
- Certification Acquisition
 - IEC61009 (SEMKO CB)
 - KC Safety Certification (1P+N, 2P)
 - Electromagnetic compatibility certification (1P+N, 2P)

Specification

| Type | | RCBO |
|------------------------------------|---|--------------------|
| Model name | RKJ - b | |
| Rated voltage | 230Vac | |
| Rated current | 1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63A | |
| Number of poles | 1P+N, 2P | |
| Breaking capacity | 10kA | |
| Operate type | A/AC | |
| Earth leakage sensitivity current | Operating (I Δ n) mA | 30, 100, 300mA |
| | Non-Operating (I Δ no) mA | 0.5I Δ n |
| Instantaneous trip characteristics | B, C, D | |
| Breaking time | ≤0.1sec | |
| Trip type | Ground fault | Electro - magnetic |
| | Overcurrent | Thermal - magnetic |
| Life span | Electrical (times) | 4,000 |
| | Mechanical (times) | 10,000 |
| Certification | IEC61009, SEMKO CB, KC (1P+N, 2P) | |
| Size (width) | 53.6mm/1P+N | |
| Terminal | Lug type (cable up to 25mm ²) | |
| Installation method | Using 35mm DIN rail | |

Smart LV Solution accessory device

The accessories of Smart LV Solution consist of devices with the latest IoT technology.

Each device performs functions of measurement, diagnosis, communication, control, monitoring and test to change the distribution panel and switchboard smartly.



Smart LV Solution Accessory device

| | |
|---|----|
| 1. Gateway / Data Logger | 72 |
| 2. Ethernet Converter | 74 |
| 3. TRIO | 76 |
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| 5. M LINK | 80 |
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| 9. Portable Battery & Trip Module | 86 |
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| 11. Smart accessories | 89 |
| 12. Sample composition | 90 |

Gateway / Data Logger



Gateway and Data Logger are communication devices of Smart LV Solution. Gateway plays the role of transmitting data of serially connected RS485 communication devices to a local area network (LAN) communication using TCP/IP. The Data Logger includes all of the roles of the gateway and transmits data to the cloud connected by a wide area network (WAN). Gateway and Data Logger provide their own web pages. Through this, the setting and status monitoring service of the connected device can be used.

Features

| Type | Data Logger web page | Gateway web page |
|----------------------------|--|---|
| Settings screen | Device information can be checked and name and location information can be changed. Provides web page links for connected Data Logger and Gateway. | Device information can be checked and name and location information can be changed. |
| Thermal imaging monitoring | - | Provides thermal image monitoring device status, event, and trend information |
| RS485 (Channel1 & 2) | Displays the name and status of the device connected to the RS458 channel (provides detailed information when the device name is clicked) | |
| Auto search | Provides ping function to check cloud connection Provides RSTP LAN connection device search and status information Provides RS485 automatic search function HMI connection function | Provides RS485 automatic search function HMI connection function |
| General settings | Provides network, system and status information | |
| Monitoring dashboard | Provides main status information of the connected devices (provides detailed information when the device name is clicked) | |

Specification

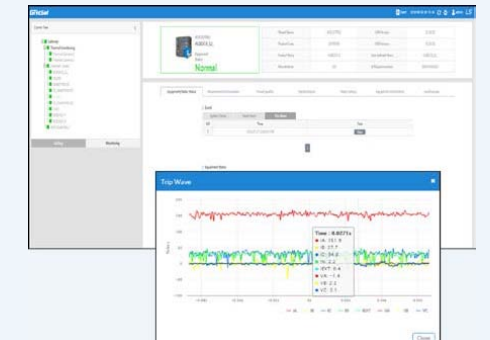
| Type | Details | Remark |
|----------------------------|---|---|
| Rated voltage | DC24V (±15%) For IPM6P - AC240V/DC24V60W only | IEC60038 standard |
| Power consumption | 11W or less | |
| Communication network type | 1 × RJ12 : RS485, Modbus RTU (16 ea) 1 × Terminal : RS485, Modbus RTU (16 ea) 2 × RJ45 : Ethernet Modbus TCP RSTP (100 ea → 100 Client) 1 × RJ45 : Ethernet TCP/IP 1 × WiFi (Data Logger option, AP function) | Ethernet port includes router function. In case of E TAG, 20 per channel through E COLLECTOR |
| External interface | 1 × Digital input(DI) 1 × Digital output(DO) 2 × USB Type A port(Host) 1 × USB Mini B port(Device) | |
| Memory | RAM : 256MB / Flash : 8GBit | 15-minute unit/7 days' worth of storage |
| Size | 90 (W) × 81 (H) × 65 (D), unit : mm | |
| Weight | 500g or less | |
| Web service | Device setting web page and basic monitoring web page | |
| Button | 1 × Push Button Factory reset : Button input 5 seconds or more Soft Reset : Within 5 seconds of button input | |
| Switch | 2 × Dip Switch/RS-485 communication termination setting | |
| Battery | 0.1F Supper CAP applied (72 hours backup possible) | |
| Use temperature | -25 ~ +70 ° C/WiFi communication option (0 ~ +50 ° C) | |
| Storage temperature | -40 ~ +85 ° C/WiFi communication option (-20 ~ +80 ° C) | |
| Ambient humidity | Within 95% RH, no condensation | |

Web service

- Provides device registration and monitoring functions
- Provides remote firmware upgrade function
- Provides wave viewer function

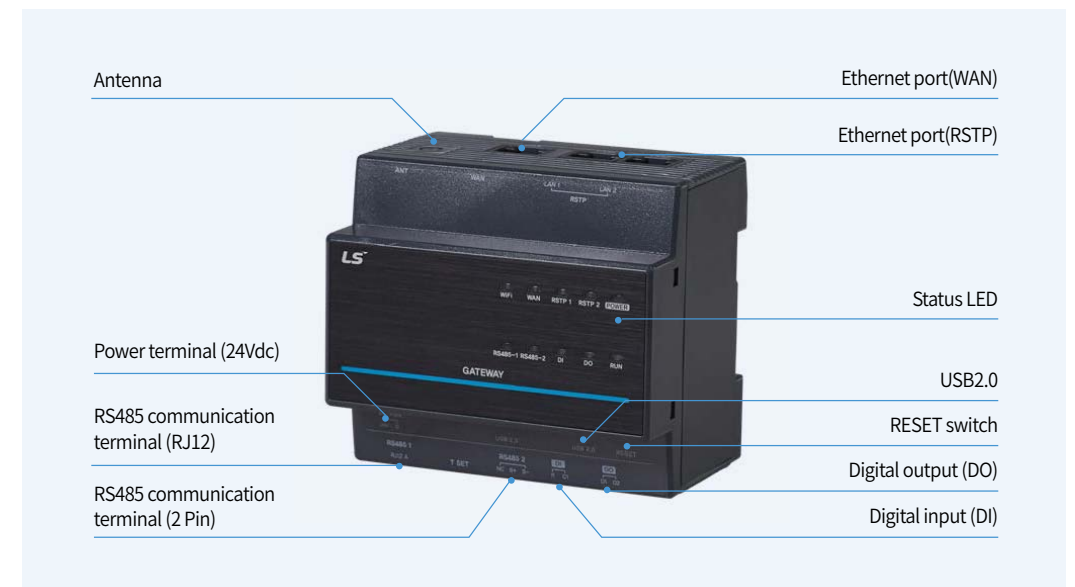


ACB voltage, current waveform



Trip wave

Exterior description



Target device

| | |
|--------------------|--|
| Circuit breaker | Susol ACB STU, Metasol ACB STU, Susol Smart MCCB |
| Measurement device | GIMAC1000, GIMAC-B, E TAG, MMP, DMPi, Energy Meter |
| Accessory device | M LINK, TRIO, Thermal CAM |



Ethernet Converter

This device is installed on a low-voltage panel or distribution panel to collect data from serially connected RS485 communication devices and transmit it to a local area network (LAN) communication using TCP/IP. Control/status data and measurement values can be acquired by connecting to smart devices.

Features

This module converts RS485 communication to Ethernet. By supporting a Ring network, it improves the reliability of communication. In case of an accident, it has functions of event push alarm (Mobile App.) and e-mail transmission to 5 registered users.

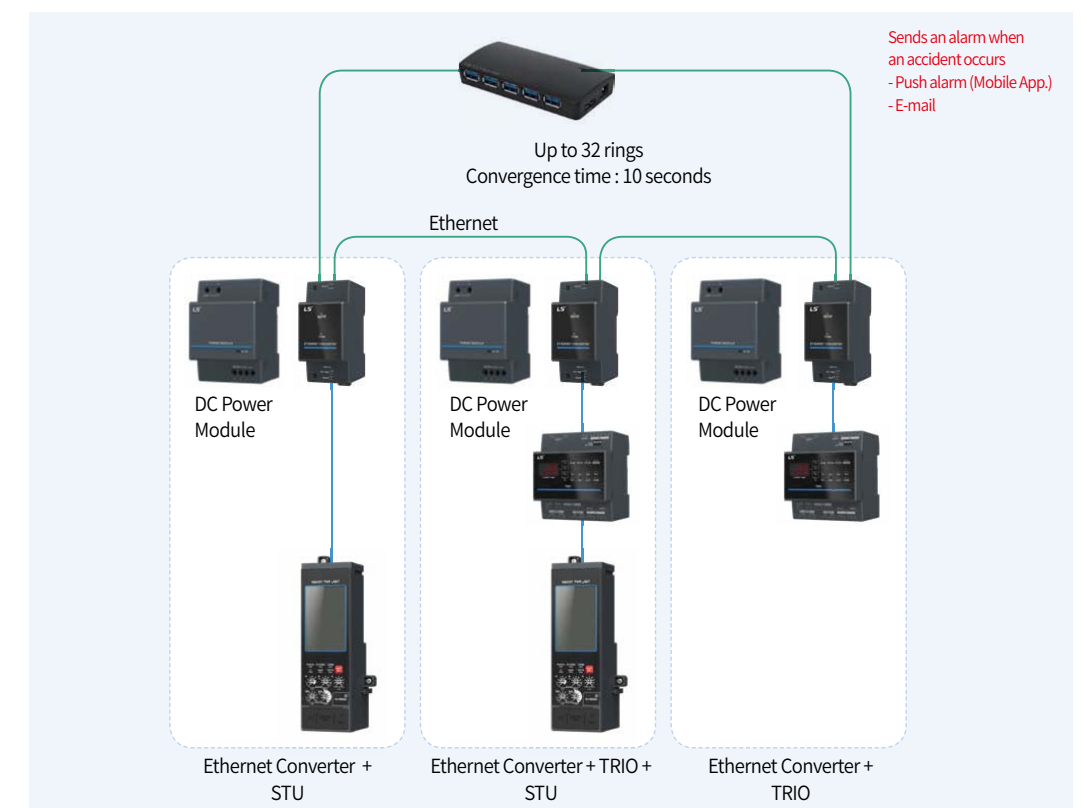
Specification

| Type | Details |
|---------------------------------|---|
| Model name | Ethernet Converter |
| Rated voltage | DC24V (±10%) |
| Power consumption | 1W or less |
| Function | <ul style="list-style-type: none"> • 1 PORT RS-485 (Modbus/RTU) communication support • 2 PORT Ethernet (Modbus/TCP) communication support • RSTP support • Up to 8 Modbus Masters can be connected simultaneously • Push alarm and E-mail transmission when an event occurs |
| LED | Power LED Comm. LED |
| Protocol | Modbus RTU, Modbus TCP |
| Communication method | RS485 to Ethernet |
| Port specification | RJ45, 2Port |
| Ethernet communication speed | 10/100Mbps |
| Ethernet communication distance | Ethernet: up to 100m (single line), up to 50m (stranded line) |
| Type of dualization | RSTP (Rapid Spanning Tree Protocol) |
| Size | 36 (W) × 81 (H) × 65 (D), unit : mm |
| Use temperature | -25 °C ~ +60 °C |
| Storage temperature | -30 °C ~ +70 °C |
| Ambient humidity | Within 85% RH, no condensation |

Exterior description



Device usage example



Target device

| | |
|------------------|--|
| Circuit breaker | Susol ACB STU, Metasol ACB STU, Susol Smart MCCB |
| Accessory device | M LINK, TRIO |



TRIO

This device is installed on a low-pressure panel or distribution panel to monitor ACB status, remotely open and close operation control, and measure temperature. DI/DO expansion is possible by linking with communication with STU.

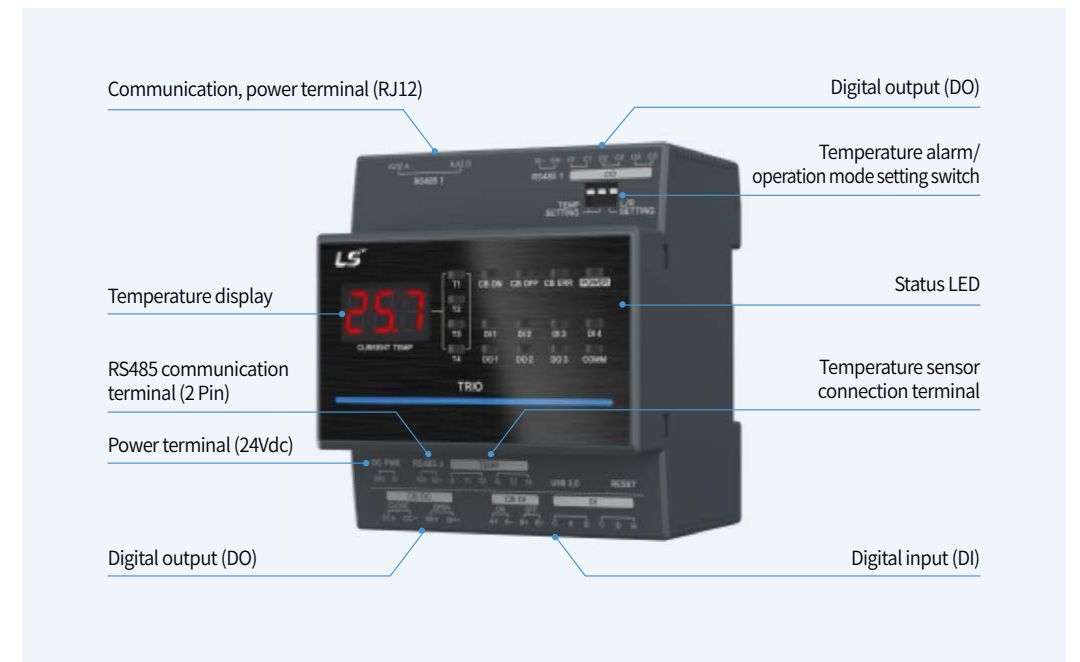
Features

TRIO module can monitor temperature by attaching a separate temperature sensor, and it has built-in DI/DO expansion function, so it can monitor and control the circuit breaker. Compared to the existing TRIO, the number of DI/DO contacts has increased, and the temperature display has been improved to 7-Segment level.

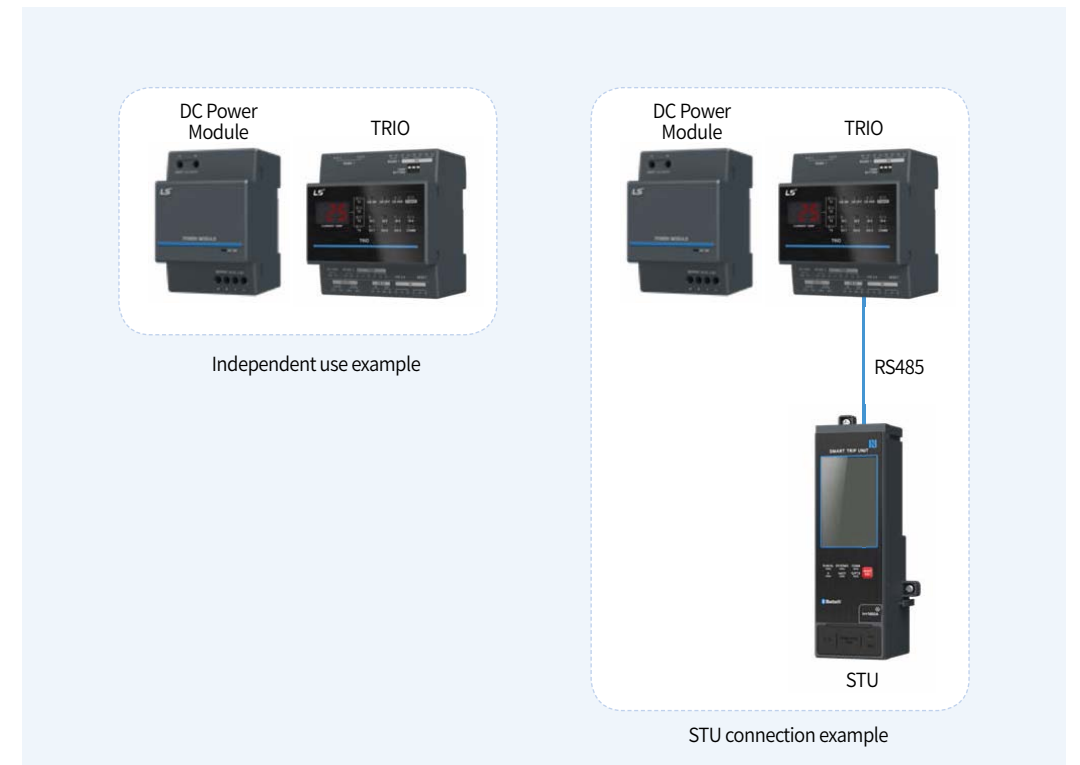
Specifications

| Type | Details | Remark |
|----------------------|--|--|
| Model name | TRIO | |
| Rated voltage | DC24V (±10%) | 21.6~26.4Vdc |
| Power consumption | 6W or less | |
| Temperature sensor | 4EA | Measurement range : 0~150 °C Error range : ± 3 °C for contact, 5 °C for non-contact Alarm temperature : 55 °C, 65 °C, 70 °C, 80 °C Digital output connection possible Temperature sensor sold separately |
| DI | General : 4EA CB : 2EA | Cradle status contact monitoring and spring charge status monitoring are possible |
| DO | General : 3EA CB : 2EA | LATCH, 500ms can be set (CB control possible) |
| LED | Power LED Comm. LED 3 CB LEDs 4 DI LEDs 3 DO LEDs 4 temperature sensor LEDs | Temperature display 7-Segment 99 °C or less : Display to 1 decimal place 100 °C or more : 1-digit display |
| Protocol | Modbus RTU | |
| Communication method | RS485 | STU connection possible |
| Installation type | DIN-Rail, Screw | |
| Size | 72 (W) × 81 (H) × 65 (D), unit : mm | |
| Use temperature | -25 °C ~ +60 °C | |
| Storage temperature | -30 °C ~ +70 °C | |
| Ambient humidity | Within 85% RH, no condensation | |

Exterior description



Device usage example



Target device

Circuit breaker Susol ACB STU, Metasol ACB STU

※Can be used alone



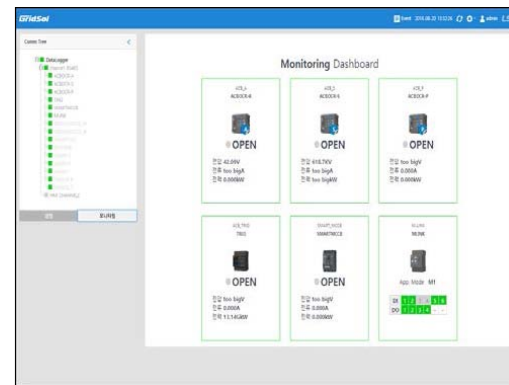
Thermal CAM

This device is a device that performs the function of monitoring the temperature inside/outside the smart switchboard. It is connected to the gateway through a USB cable, and can be installed and used at a user's desired location.

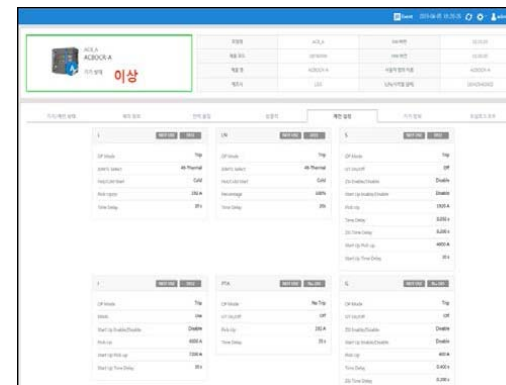
Features

It is connected to the gateway to monitor communication device information on the Web, and it is a solution to check the thermal image information.

- Provides convenient web service to monitor the status of various device



Dashboard screen



Check the setting status of device

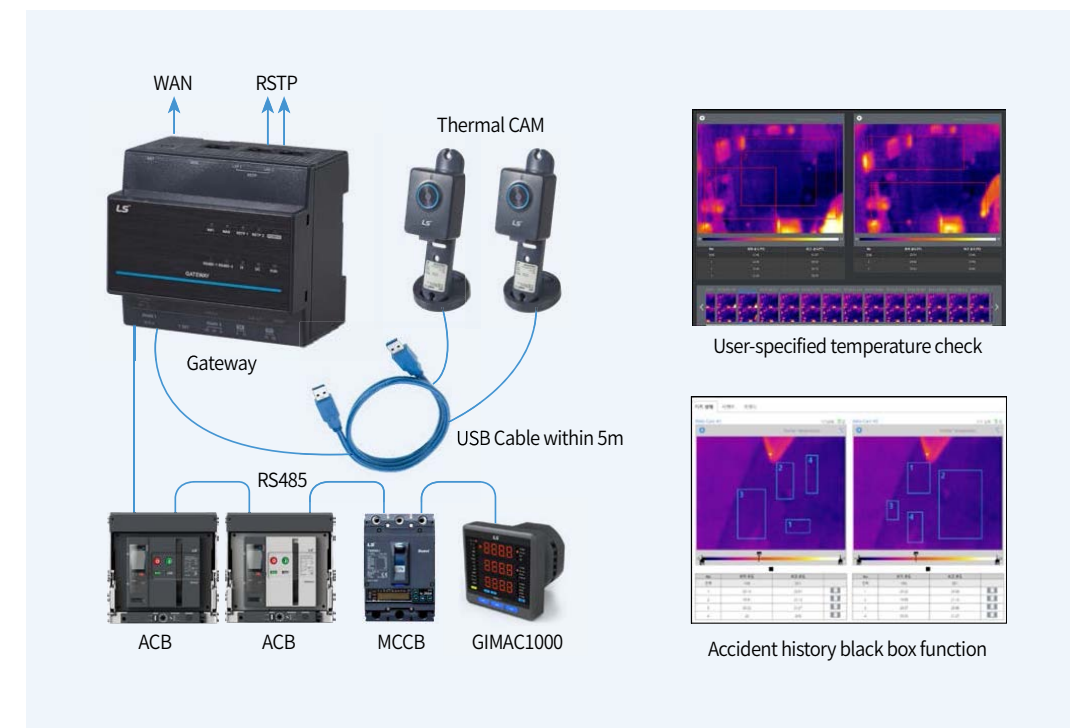
Specification

| Type | Details |
|------------------------|---|
| Model name | THCAM - 5Vdc - USB - P0080 |
| Rated voltage | 5V (USB Cable) |
| Power consumption | 2W or less |
| Resolution | 80 × 60 pixels, 51° (horizontal angle) × 66° (diagonal) |
| Temperature | Operation : 0 °C ~ +70 °C Target : 0 °C ~ +150 °C |
| Accuracy | 0 ~ +100 °C : ±2 °C +100 ~ +150 °C : ±2 % |
| Operating S/W | Internet Explorer/Chrome |
| Temperature monitoring | 4 ranges and alarm temperature settings |
| Size | 29 (W) × 73(H) × 53 (D), unit : mm |
| Use temperature | 0 °C ~ +70 °C |
| Storage temperature | -40 °C ~ +70 °C |
| Ambient humidity | Within 85% RH, no condensation |

Exterior description



Device usage example



Target device

Common device



M LINK

It is a digital input/output and communication module for monitoring the status of on-site contacts, remote control of on-site contacts, and measuring on-site analog values on the low-voltage panel monitoring and control system.

Features

| Type | | Details | |
|-----------------------|-------------|---|--|
| Model name | | ILM - DC24V - DI6/DO4 | |
| Rated voltage | | DC24V (±10%) | |
| Power consumption | | 1.3W or less | |
| Function | | Monitoring function : DI contact monitoring | |
| | | Control function : DO contact control | |
| | | Analog input value measurement : AI contact input value measurement | |
| | | Communication function : RS485 (Modbus) | |
| Input/output contacts | DI | Number of contacts | 6 (6 DI, COM.4) Note] COM contacts are the same in electrical circuit |
| | | Connection method | Hardwired, pluggable |
| | | Contact method | Dry contact |
| | DO | Number of contacts | 4 (4 DO, 2 Com.) |
| | | Connection method | Hardwired, pluggable |
| | | Rated voltage/current | 250Vac/3A, 30Vdc/3A |
| | AI | Contact method | Non-Latch, A contact (Normal Open) |
| | | Number of contacts | 1 (AI +, AI -) |
| | | Connection method | Hardwired, pluggable |
| | Input range | DC 4-20mA | |
| Protocol | | Modbus RTU | |
| Communication method | | RS485 | |
| Size | | 54 (W) × 81 (H) × 65 (D), uni t: mm | |
| Use temperature | | -25 ~ +60 °C | |
| Storage temperature | | -40 ~ +80 °C | |
| Ambient humidity | | Within 85% RH, no condensation | |

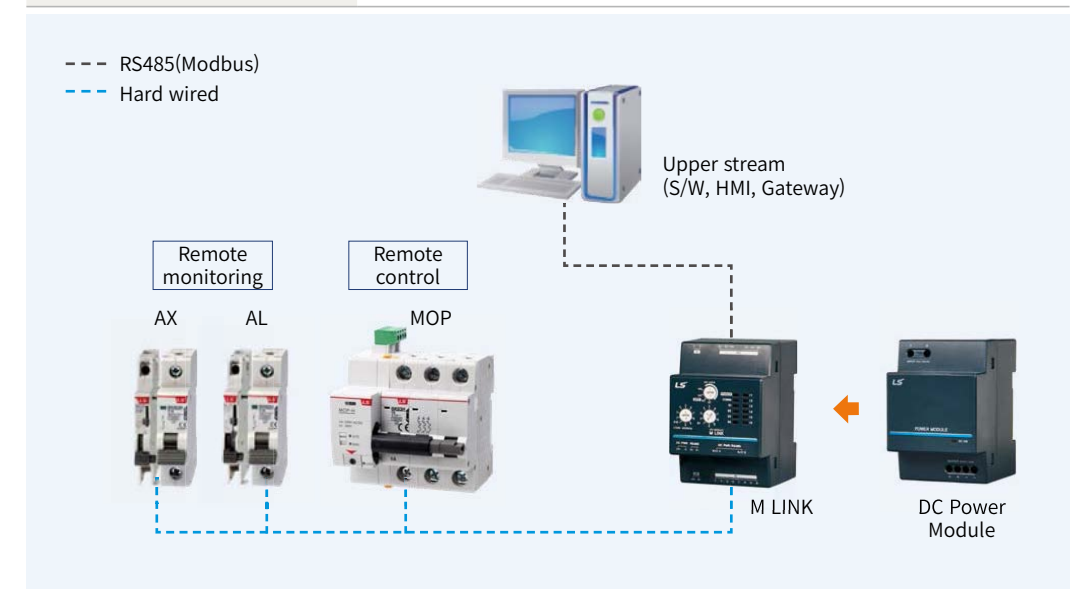
Exterior description



Device usage example

It can be used a digital input/output (DI/DO) communication module for on/off/trip status monitoring and on/off control of the Circuit breaker (MCB/MCCB). It also provides DI/DO operation function according to the operation mode (M1~M4, DO LOCK) for user convenience.

| Operation mode | Function and usage |
|----------------|--|
| M1 | General DI/DO operation |
| M2 | Remote circuit breaker control |
| M3 | Remote/on-site circuit breaker control |
| M4 | On-site load control (DI/DO linkage control) |
| DO Lock | General DI operation (DO cannot be controlled) |



Target device

Common device



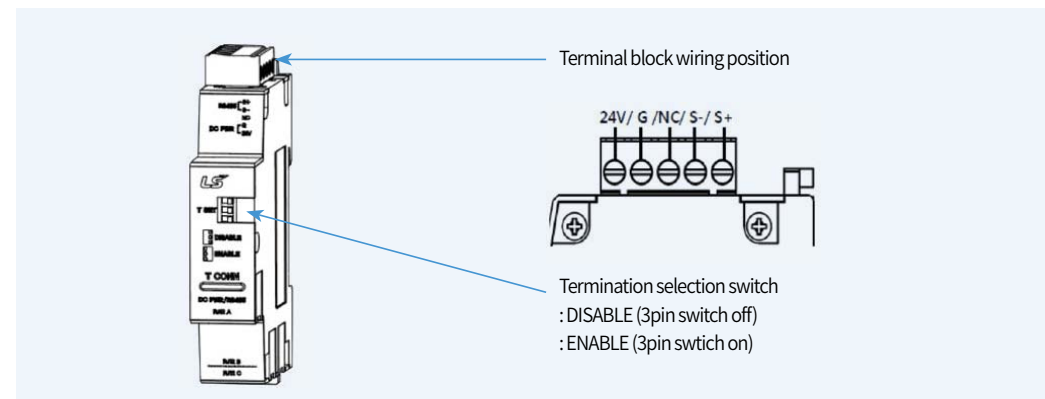
T Connection Module

T Connection Module is a branch module that can provide convenience when connecting multiple RS485 communication devices through multi-drop communication. It also provides termination processing when the device is located at the end.

Specification

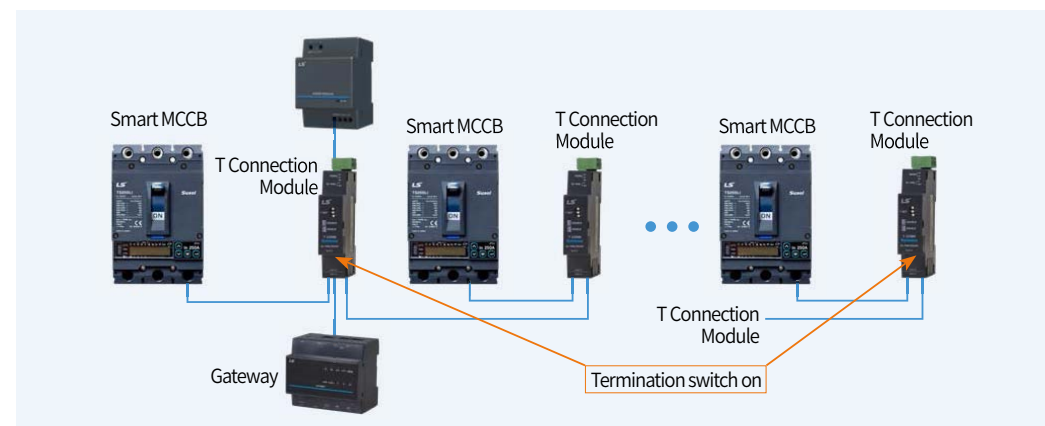
| Type | Details |
|-----------------|---|
| Model name | ITCM |
| Rated voltage | DC24V (±10%) |
| Basic function | Multi-drop connection |
| | Termination Selection |
| Mounting method | DIN-Rail, Screw (Screw not supplied) |
| Size | 17.8 (W) × 81 (H) × 65.6 (D), unit : mm |

Exterior description



Device usage example

When you wish to connect n number of devices excluding the upper system, you can conveniently configure them using n number of ITCM. Stable RS485 multi-drop is possible by deadening.



Target device

Common device

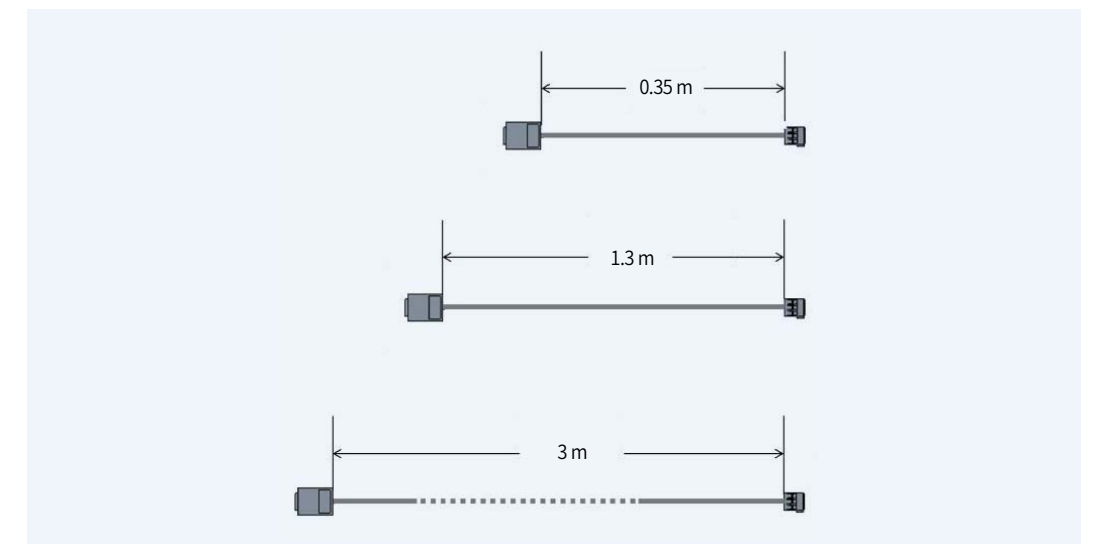
Communication / power connection cable

This is a communication / power connection cable used to connect Smart MCCB, T Connection Module and Panel Display (3.5 inch), etc.
There are three types : 0.35m, 1.3m, and 3m in length.

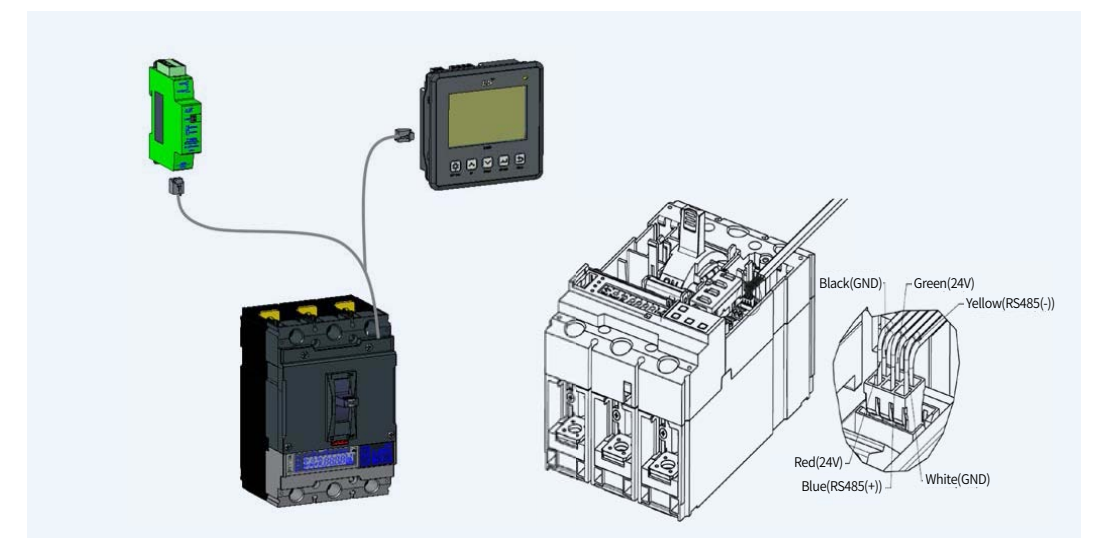
Specification

| Type | 0.35m | 1.3m | 3m |
|----------------|----------------------------------|------------|------------|
| Model name | EXIO L350 | EXIO L1300 | EXIO L3000 |
| Basic function | Communication / power connection | | |

Exterior description



Device usage example



Target device

Exclusive cable for Smart MCCB



i-Tester

The i-Tester (Intelligent Tester) is an accessory to test-drive ACB/MCCB. As a stand-alone type, it not only performs various relay tests such as manual/auto/user tests, but also has various functions such as self-calibration function, device information setting, relay setting, and device status checking. In addition, it supports 256 × 128 graphic LCD and supports not only English but also Chinese and Russian languages. It has the function to output the test and test results in the same way using the upper Manager S/W.

Features

- **Calibration function**
: The calibration function of i-Tester is used to calibrates the error using the output value set in i-Tester and the measurement current data.
- **Device H/W setting function**
: It consists of the part to set the system configuration and time of the device and the part to set the language and time of the i-Tester itself.
- **Relay setting function**
: It consists of the part to check the current relay element of the device and the part to set the relay.
- **Relay test**
: As a part for testing the relay, it is composed of manual/automatic/user tests so that various relay tests can be conducted.
- **Control function**
: It provides a function to clear or reset the device data and to control DO and CB.
- **System information**
: It consists of the device information, relay status, and tester system information.
- **Test history**
: It consists of a part to check the test history stored in i-Tester and a part to delete the saved history information.

Specification

| Type | Details |
|--------------------|--|
| Model name | IPOT |
| Rated voltage | DC24V adapter, 9V alkaline battery 3EA, USB or rechargeable battery (10000mAH or more) |
| HMI | Graphic LCD module (256 × 128 Graphic LCD) |
| Supported language | English, Chinese, Russian |
| Key functions | <ul style="list-style-type: none"> • Device information checking function (information, DI, DO, self-diagnosis) • Relay and H/W information setting function • Device control and reset function • Relay test function <ul style="list-style-type: none"> - Manual/auto/user test function • Test history storage (up to 255) and output (PDF) function |
| LCD composition | Navigation TREE configuration for all |
| Size | 98 (W) × 210.5 (H) × 43.5 (D), unit : mm |

Exterior description



Device usage example



Target device

| | |
|-----------------|--|
| Circuit breaker | Smart ACB (STU), Susol/Metasol ACB (OCR), Smart MCCB, TS1600 |
|-----------------|--|



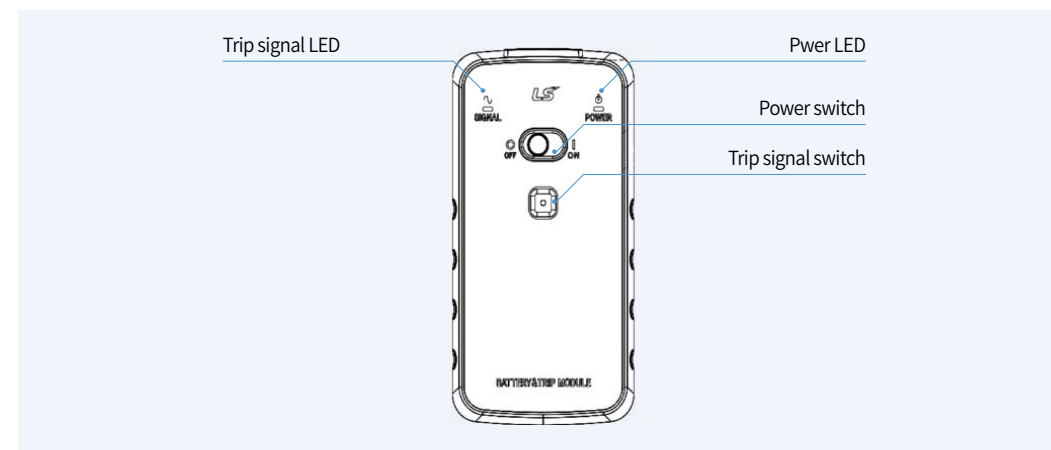
Portable Battery & Trip Module

It is a portable battery module that can power the Smart MCCB and test the trip function. The user can change and check the settings by applying power to the Smart MCCB while carrying this device, and easily check the trip function, which is the most important function.

Specification

| Type | Details | | | | |
|--|--|--------------|--------------------------------------|-------------|--|
| Model name | IPBM | | | | |
| Target device | Smart MCCB | | | | |
| Input power | AA size serial battery 2EA (battery specification : DC1.5V) | | | | |
| Output | <table border="1"> <tr> <td>Power supply</td> <td>DC 12V (±5%)</td> </tr> <tr> <td>Trip signal</td> <td>AC 0.9V, 60Hz (±15%)</td> </tr> </table> | Power supply | DC 12V (±5%) | Trip signal | AC 0.9V, 60Hz (±15%) |
| Power supply | DC 12V (±5%) | | | | |
| Trip signal | AC 0.9V, 60Hz (±15%) | | | | |
| Device operating time (battery replacement time) | More than 8 hours of continuous use ※The usage time can be changed depending on the battery capacity | | | | |
| Switch | <table border="1"> <tr> <td>Power supply</td> <td>Slide switch, power supply On/Off</td> </tr> <tr> <td>Trip signal</td> <td>Tact switch, Trip signal On/Off</td> </tr> </table> | Power supply | Slide switch, power supply On/Off | Trip signal | Tact switch, Trip signal On/Off |
| Power supply | Slide switch, power supply On/Off | | | | |
| Trip signal | Tact switch, Trip signal On/Off | | | | |
| LED | <table border="1"> <tr> <td>Power supply</td> <td>Orange, DC 12V output status display</td> </tr> <tr> <td>Trip signal</td> <td>Green, AC 0.9V Trip signal output status display</td> </tr> </table> | Power supply | Orange, DC 12V output status display | Trip signal | Green, AC 0.9V Trip signal output status display |
| Power supply | Orange, DC 12V output status display | | | | |
| Trip signal | Green, AC 0.9V Trip signal output status display | | | | |
| Size | 72 (W) × 135 (H) × 34.5 (D), unit : mm | | | | |

Exterior description



Operation method

- 1) Check the power switch off status of the portable battery module.
※If the battery is connected while the power switch is on, an error may occur in the device.
- 2) Open the battery cover on the back and install 2EA of AA size batteries.
- 3) Close the battery cover and connect the tester cable.
- 4) Open the glass cover of Smart MCCB and connect the Tester cable to the TEST port.
※ If the direction of the tester cable does not match, an error may occur in the device.
※ If the Tester cable is connected while the power switch is on, an error may occur in the device.
- 5) Operate the power switch of the portable battery module to On.
- Check that the power is turned on to the Smart MCCB,
and check and operate the Smart MCCB settings using the Smart MCCB key.
- The Trip test of Smart MCCB can be performed using the Trip button of the portable battery module.
- 6) After using the portable battery module, operate the power switch to the Off status.



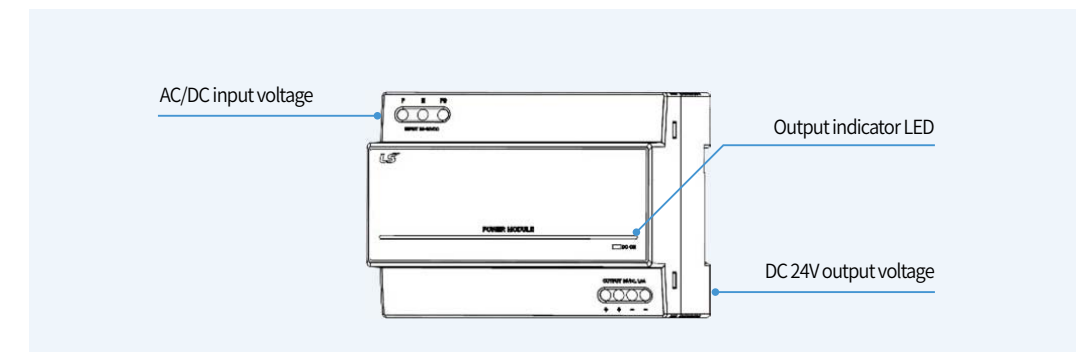
DC Power Module

The DC Power Module is a power supply device that supplies DC24V. It is composed of 5 types according to the rated voltage of the input.

Specification

| Type | Specification | | | | |
|---------------------|---------------------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| Model name | IPM3P - AC240V /DC24V12W | IPM6P - DC30V /DC24V24W | IPM6P - DC125V /DC24V24W | IPM6P - AC415V /DC24V24W | IPM6P - AC240V /DC24V60W |
| Rated voltage | 100 ~ 240Vac | 24 ~ 30Vdc | 48 ~ 125Vdc | 380 ~ 415Vac | 100 ~ 240Vac |
| Input range | 85 ~ 264Vac | 20 ~ 33Vdc | 40 ~ 138Vdc | 323 ~ 457Vac | 85 ~ 264Vac |
| Frequency | 50/60Hz | - | | 50/60Hz | |
| Output voltage | 24Vdc (±5%) | | | | |
| Output current | 0.5A | 1A | | 2.5A | |
| Size (mm) | 54 × 81 × 65 | 108 × 81 × 65 | | | |
| Use temperature | -25 ~ +60 °C | | | | |
| Storage temperature | -40 ~ +80 °C | -40 ~ +85 °C | | | |
| Mounting method | DIN-Rail, Screw (screws not included) | | | | |

Exterior description



Device combination

It can be used for the device that uses DC 24V as an input power supply and can be combined with Smart LV panel components. It can be combined with 12 ~ 60W DC Power Module.

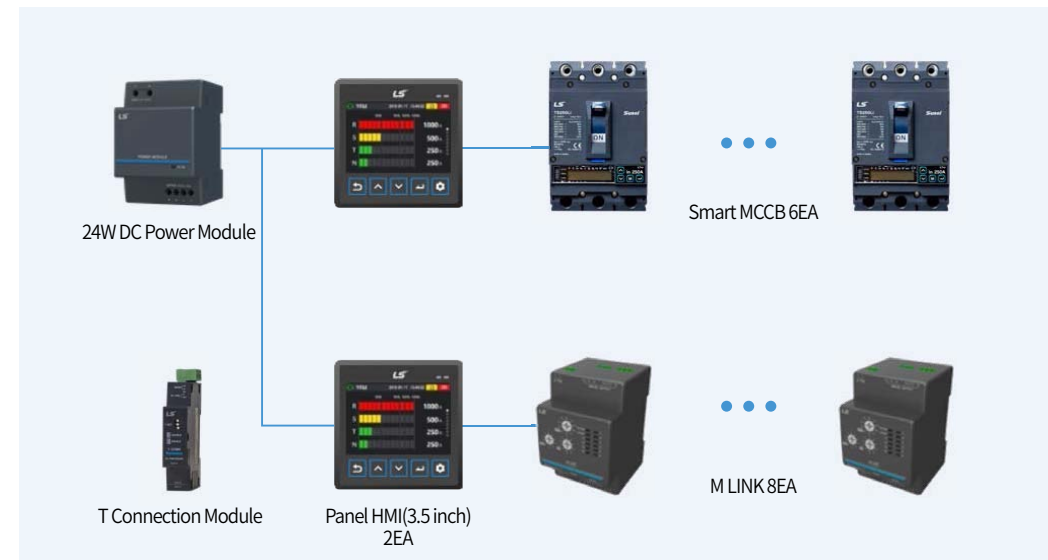


DC Power Module

Device usage example

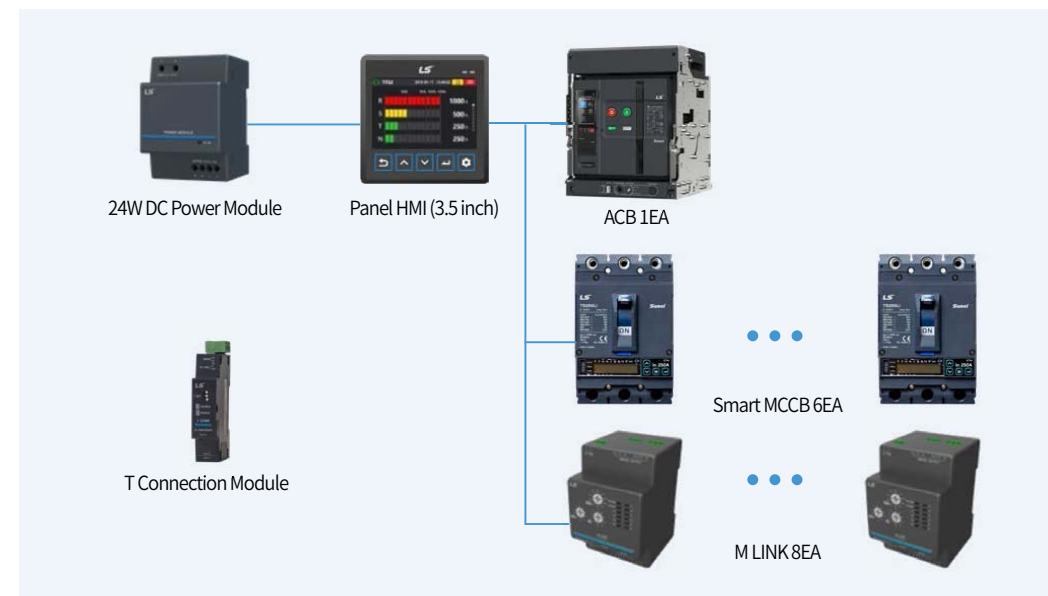
1) Composition of Smart MCCB + M LINK panel

- If Smart MCCB 6EA, M LINK 8EA and Panel HMI (3.5 inch) 2EA are connected to 24W DC Power Module ((6 × 1W) + (8 × 1.3W) + (2 × 3W)), it can be used stably.
- The T Connection Module is a necessity for device branching. The power consumption is close to zero.



2) Composition of ACB+Smart MCCB+M LINK panel

- If ACB 1EA, Smart MCCB 3EA, M LINK 4EA and Panel HMI (3.5 inch) 1EA are connected to 24W DC Power Module (5W + (3 × 1W) + (4 × 1.3W) + 3W), it can be used stably.
- The T Connection Module is a necessity for device branching. Power consumption is close to zero.



Target device

Common device

Composition of Smart accessory device

Device composition by application

| Accessory device | Function | Switchboard | | | | Distribution board | | | |
|--|----------|---------------------|----------------------------|--------------------------------|-------------------------------------|--------------------|----------------------------|--------------------------------|-------------------------------------|
| | | Energy monitoring | Circuit breaker monitoring | Circuit breaker remote control | Power facility preventive diagnosis | Energy monitoring | Circuit breaker monitoring | Circuit breaker remote control | Power facility preventive diagnosis |
| Gateway / Data Logger / Ethernet Converter ^{Note1)} | | ○ ^{Note3)} | ○ ^{Note3)} | ○ ^{Note3)} | ○ ^{Note3)} | | ○ ^{Note3)} | ○ ^{Note3)} | ○ ^{Note3)} |
| TRIO | | | | ○ ^{Note4)} | | | | | |
| Thermal CAM | | | | ○ | | | | | ○ |
| M LINK | | | ○ ^{Note5)} | ○ ^{Note5)} | | ○ | ○ | | |
| T Connection Module | | ○ ^{Note6)} | ○ ^{Note6)} | ○ ^{Note6)} | ○ ^{Note6)} | | | | |
| E TAG | | | | | ○ | | | | |
| E COLLECTOR | | | | | ○ | | | | |
| i-Tester / Portable Battery&Trip Module ^{Note2)} | | | | | ○ | | | | |
| DC Power Module | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ |

Note 1) Choose 1 from Gateway/Data Logger/Ethernet Converter

Note 2) Choose 1 from i-Tester/Portable Battery & Trip Module

Note 3) Gateway/Data Logger/Ethernet Converter is excluded from required installation devices when GridSol CARE host system is not used.

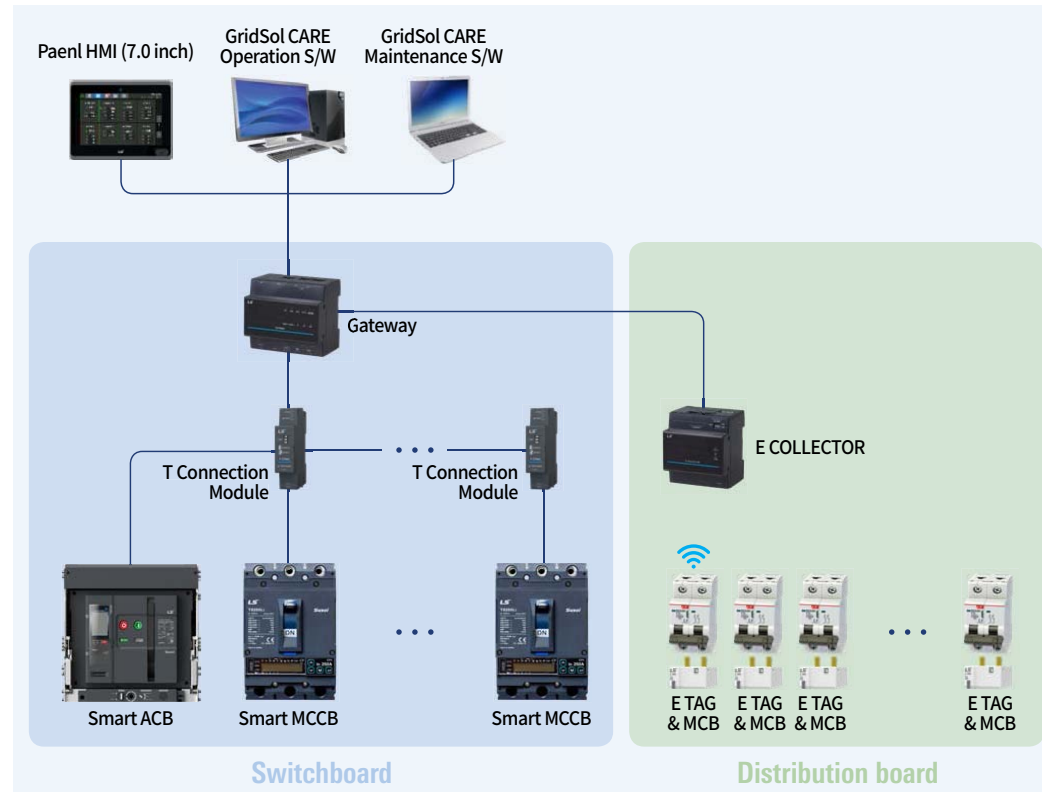
Note 4) TRIO is used with Smart ACB.

Note 5) M LINK is used with Smart MCCB.

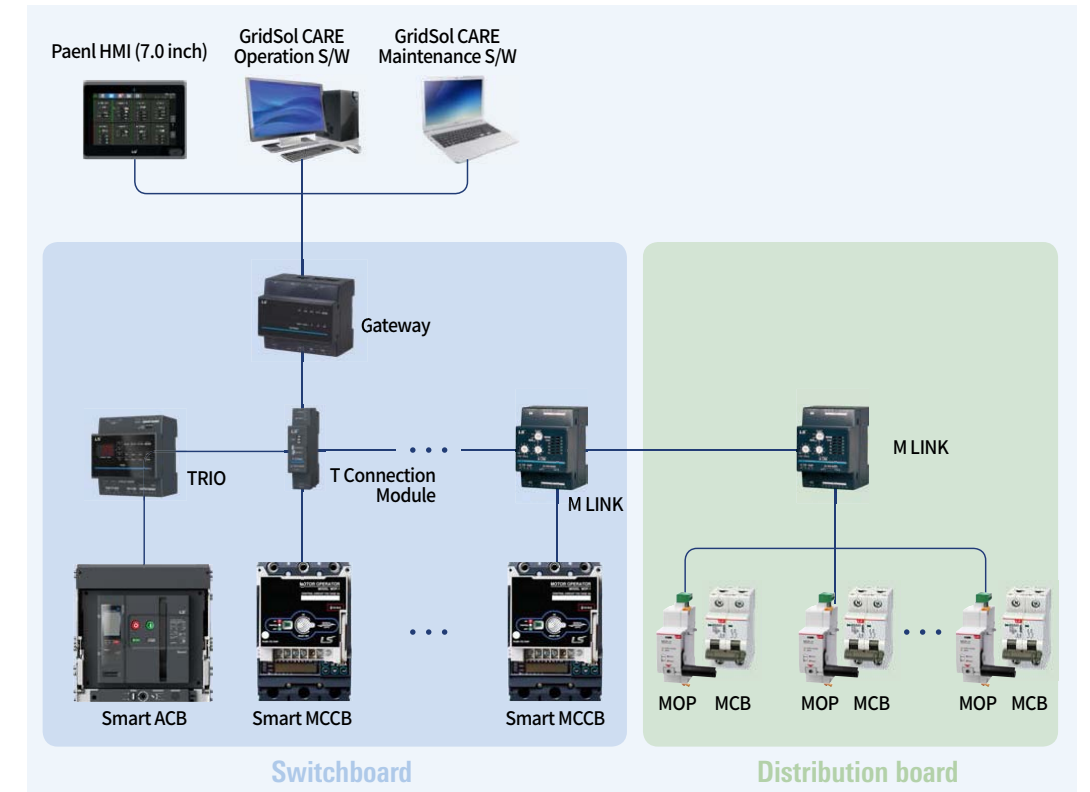
Note 6) This accessory is used when communication expansion is required.

Sample composition

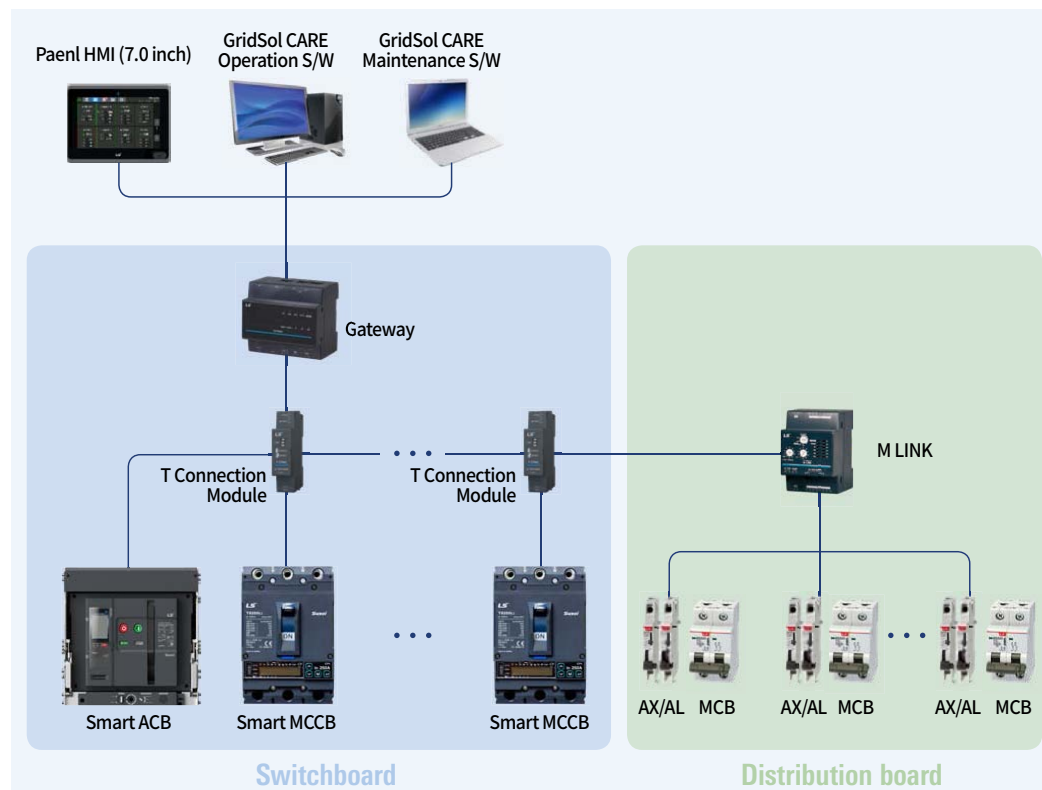
Sample 1
: Energy monitoring



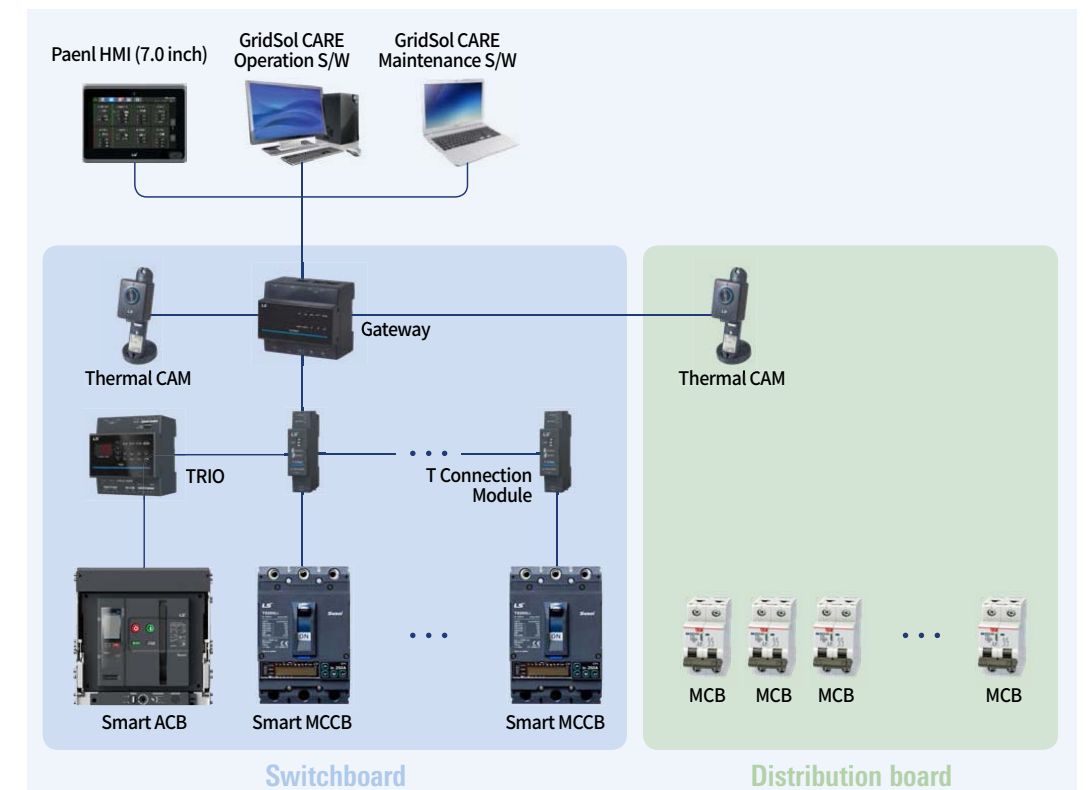
Sample 3
: Circuit breaker remote control



Sample 2
: Circuit breaker status monitoring



Sample 4
: Prevention and diagnosis of power facilities



Smart LV Solution upper system

Smart LV Solution upper system provides a variety of solutions for customers to conveniently manage their devices, systems, and energy information anytime, anywhere.

For convenience of on-site management, Panel HMI and Mobile App. are provided, and various S/W for remote monitoring/control is provided.



Smart LV Solution Upper system

| | |
|---|-----|
| 1. GridSol CARE Monitoring S/W (Cloud)..... | 94 |
| 2. GridSol CARE Operation S/W | 96 |
| 3. GridSol CARE Maintenance S/W | 98 |
| 4. Smart Viewer (Mobile App.) | 99 |
| 5. Panel HMI (7.0 inch) | 100 |
| 6. Panel HMI (3.5 inch) | 102 |

GridSol CARE Monitoring S/W (Cloud)

GridSol CARE Monitoring SW provides real-time remote monitoring function to safely manage power facilities anytime, anywhere, and to operate them efficiently. It also provides event notifications and monthly reports through e-mail and SMS services.

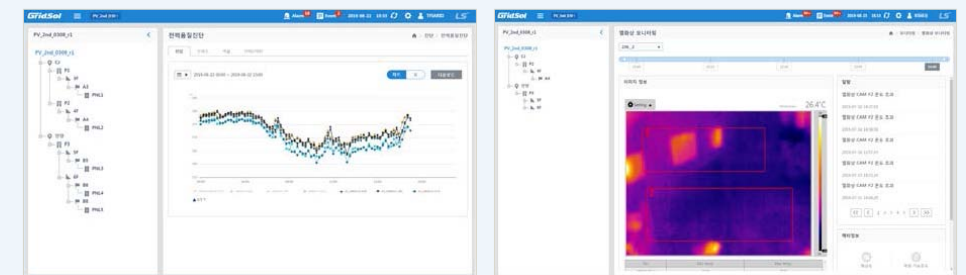


Features

- **Energy consumption monitoring by project and category (place, usage, day, time, etc.)**
: Voltage, current, power, power demand, etc.
- **Power quality information monitoring by project and category (place, panel, device, etc.)**
: Voltage, frequency, power factor, harmonics, etc.
- **Device self-diagnosis function**
: Memory, Setting time, contact life, number of opening/closing, temperature overheating, Wiring status, battery, relay operation, etc.
- **Device lifespan prediction function**
: Operating time, breaker On time, electrical/mechanical operation number, trip number, etc.
- **Temperature monitoring function**
: Real-time monitoring of a specific point is possible through TRIO
: Real-time monitoring of the area of interest is possible through Thermal CAM
- **When an event occurs, event recording and fault waveform data are provide**
: Point information, phase angle analysis, harmonic analysis, effective value chart, etc.
: E-mail, SMS transmission function support
- **Provide regular reports**
: Energy consumption, power demand, power quality, diagnosis, alarm/event, etc..
: E-mail transmission support for monthly reports

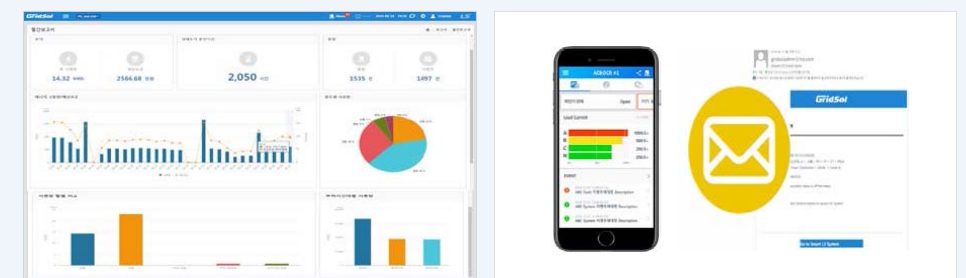
Screen composition

- **Dashboard**
: Energy consumption, estimated price, power quality, instantaneous power, weather information, project status are analyzed by category (location, use, time, day, week, month)
- **Monitoring & Control**
: System/device monitoring, Hierarchy data
- **Diagnostics**
: Energy diagnosis (total usage trend/comparison, usage/hourly usage)
: Power quality diagnosis (voltage, frequency, power factor, THD/TDD)
- **Event**
: Alarm, Event, Trip Wave
- **Customer support**
: Customer center, Download center
- **Report**
: Location, usage, usage by period, event, etc.
- **Common setting**
: Theme setting (White, Dark), Language setting (Korean, English, Chinese), Personal information (Personal information, Electric charges)



Power quality diagnosis

Thermal cam - track monitoring



Monthly report

Send event alarm

Target device

| | |
|----------------------|---|
| Communication device | Data Logger, Gateway, Ethernet Converter, E COLLECTOR |
| Accessory device | M LINK, TRIO, Thermal CAM |
| Circuit breaker | Susol ACB STU, Metasol ACB STU, Susol Smart MCCB |
| Measurement device | GIMAC1000, GIMAC-B, E TAG, MMP, DMPI, Energy Meter |

GridSol CARE Operation S/W

GridSol CARE Operation SW provides real-time remote monitoring and control functions to safely manage and efficiently operate power facilities connected to the same network

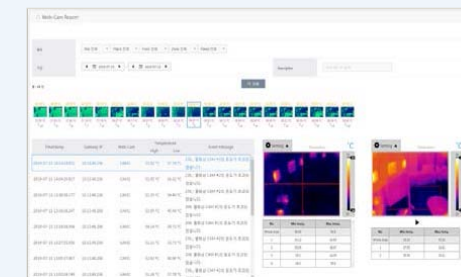


Features

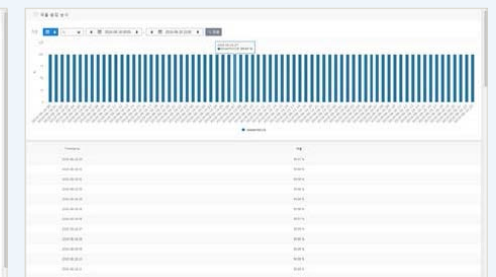
- **Monitoring energy usage by category (place, use, day of the week, time, etc.)**
: Voltage, current, power quantity, power demand, etc.
- **Monitoring power quality information by category (place, panel, device, etc.)**
: Voltage, frequency, power factor, harmonics, etc.
- **Device self-diagnosis function**
: Memory, Setting time, contact life, number of opening/closing, temperature overheating, Wiring status, battery, relay operation, etc.
- **Device lifespan prediction function**
: Operating time, breaker On time, electrical/mechanical operation number, trip number, etc.
- **Temperature monitoring function**
: Real-time monitoring of a specific point is possible through TRIO
: Real-time monitoring of the area of interest is possible through Thermal CAM
- **When an event occurs, event recording and fault waveform data are provided**
: Event occurrence point information, phase angle analysis, harmonic analysis, effective value chart, etc.
- **Provides regular reports**
: Energy consumption, power demand, power quality, diagnosis, alarm/event, etc.

Screen composition

- **Dashboard**
: Power consumption, power demand information, power device information, energy diagnosis information, energy prediction information, alarm/event, etc.
- **Monitoring & Control**
: System and device monitoring and control, Hierarchy data
- **Diagnostic management**
: Voltage PQ analysis, frequency PQ analysis, power factor PQ analysis, THD/TDD PQ analysis, total usage trend/comparison, demand diagnosis, etc.
- **History Management**
: Alarm, Event, Trip Wave
- **Report**
: Project, communication status, alarm/event, thermal image monitoring, statistics, diagnosis, system/device information, etc.
- **Common setting**
: Theme setting (White, Dark), Language setting (Korean, English, Chinese)



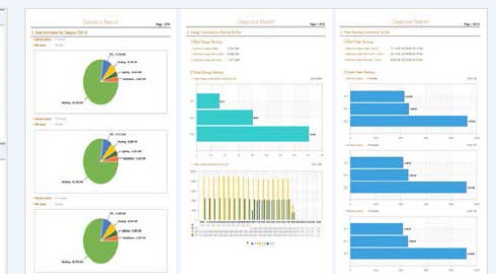
Real-time thermal imaging monitoring



Power factor trend information



Failure waveform analysis information



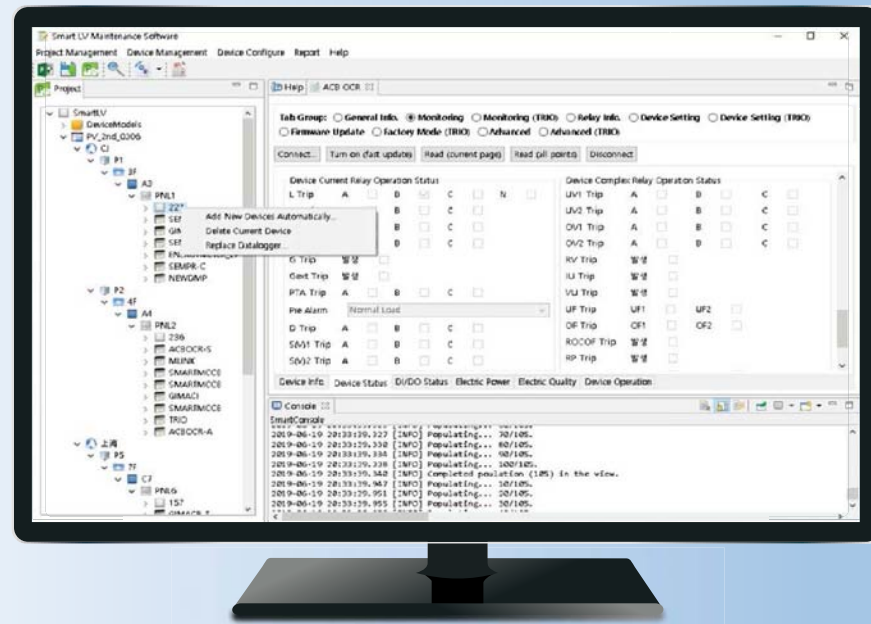
Regular report

Target device

| | |
|----------------------|---|
| Communication device | Data Logger, Gateway, Ethernet Converter, E COLLECTOR |
| Accessory device | M LINK, TRIO, Thermal CAM |
| Circuit breaker | Susol ACB STU, Metasol ACB STU, Susol Smart MCCB |
| Measurement device | GIMAC1000, GIMAC-B, E TAG, MMP, DMPI, Energy Meter |

GridSol CARE Maintenance S/W

GridSol CARE Maintenance SW provides project and device management, remote monitoring and control functions, and testing functions for relay elements for each device.



Smart Viewer (Mobile App.)

Smart Viewer (Mobile App.) provides monitoring function of devices installed on the panel through short-range wireless communication function.



Features

- **Project engineering function**
: Project creation, open, close, save, modify, remove, duplicate, user management, etc.
: Device information modeling and device data processing, replication, standard management by project
- **Device management, monitoring and control functions**
: Device search, device addition/deletion, representative device setting, purpose setting, etc.
: Data acquisition, firmware update, device setting, relay setting, control, etc.
- **Testing function for relay elements for each device**
: Available when using i-Tester
: Calibration, default test, manual test, scenario test
- **Report provided**
: Test result, project, communication status, data acquisition status, etc.

Target device

| | |
|----------------------|---|
| Communication device | Data Logger, Gateway, Ethernet Converter, E COLLECTOR |
| Accessory device | M LINK, TRIO, Thermal CAM |
| Circuit breaker | Susol ACB STU, Metasol ACB STU, Susol Smart MCCB |
| Measurement device | GIMAC1000, GIMAC-B, E TAG, MMP, DMPi, Energy Meter |

Features

- **Device and energy monitoring, failure analysis service**
· Communication method : BLE (Bluetooth Low Energy)
· Communication distance : Up to 4m
- **Event information of the device can be checked in the non-powered state.**
· Communication method : NFC (Near Field Communication)
· Communication distance : Up to 20mm
- **Provides Push Alarm function through GCM (Google Cloud Message) service**
: Push Alarm message transmission when an accident occurs
: Send accident information and location information
- **You can check the trip wave waveform stored in the device where the trip occurred.**
- **You can check the current and voltage waveforms of ACB.**
: STU S-type only.

Target device

| | |
|-----|---|
| BLE | Susol ACB STU (S-type), Metasol ACB STU (S-type), Susol Smart MCCB ETU (ETLi) |
| NFC | Susol ACB STU (S-type), Metasol ACB STU (S-type) |

Panel HMI (7.0 inch)



Specification

| Model name | Rated voltage | Power consumption | Temperature range | |
|------------|---------------|-------------------|-------------------|--------------|
| IHM32 | DC24V (±20%) | 23.0W or less | Operation | 0 ~ +50 °C |
| | | | Storage | -20 ~ +60 °C |

- Color TFT LCD (7.0" or more) + LED Backlight
- User operation : Touch pad
- Indication of device communication status
- Supports two languages (English and Chinese)
- Support upgrade function through USB port
- Sub-device connection through Ethernet communication
 - : Up to 32 sub-devices (up to 40 devices can be connected for E TAG)
 - : Up to 16 sub-devices can be selected and displayed (screen output)

Display screen

- **Dashboard**
 - Full information display : Displays communication status with Gateway, Panel name, and system date/time
 - Quick View : Displays representative information of the device selected for monitoring in the form of icons
 - Alarm : Displays the alarm information of the device selected for monitoring in the form of a list
 - Event : Displays the event information of the device selected for monitoring in the form of a list
 - Setting : Gateway IP for communication linkage, device selection for monitoring, user password, etc.
- **Device Details**
 - Monitoring : Displays device status, communication status, measurement data, operation time, DI/DO status
 - Control : Performs device On/Off control
 - Management : Display and reset history and count data information
 - Event : Displays incident event, device operation and abnormal event
 - View setting : Displays device setting value and relay element setting value
 - Device information display : Displays device-specific information such as device ID and device name

Target device

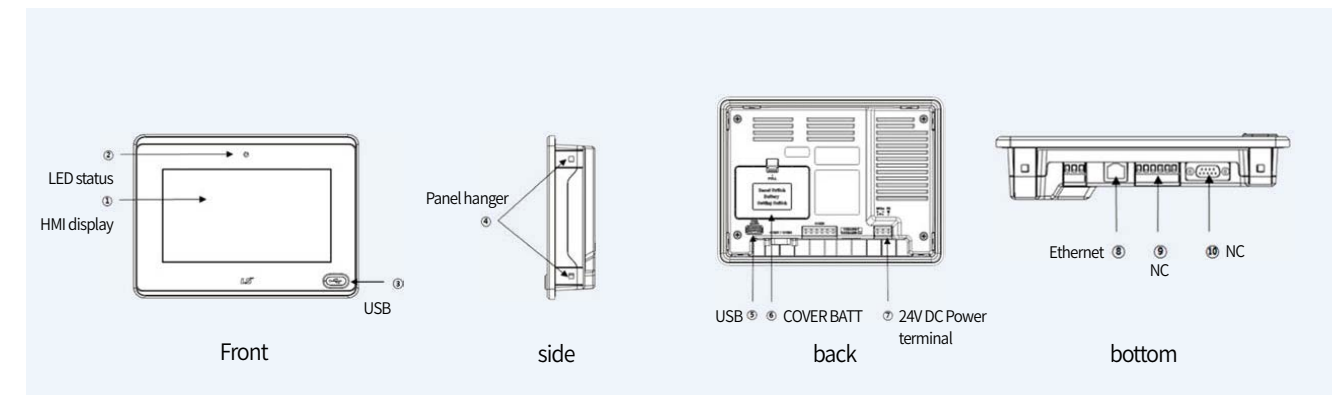
| | |
|----------------------|---|
| Communication device | Data Logger, Gateway, Ethernet Converter, E COLLECTOR |
| Accessory device | M LINK, TRIO, Thermal CAM |
| Circuit breaker | Susol ACB STU, Metasol ACB STU, Susol Smart MCCB |
| Measurement device | GIMAC1000, GIMAC-B, E TAG, MMP, DMPi, Energy Meter |

Screen description



| Quick View, View All | | Quick View, View divided | | Detailed screen of device | |
|----------------------|---|--------------------------|--|---------------------------|--|
| Display form | Description | Display form | Description | Display form | Description |
| ACB STU | Displays device communication status, device name, and device status | ACB STU | Displays device communication status, device name, device status, value of Vab, Tot P | Monitoring | Displays selected device monitoring data (Device status, communication status, measurement data, operation time, DI/DO status) |
| TRIO | Displays device communication status, device name, and analog input point (AI #1) value | TRIO | Displays device communication status, device name, and analog input point (AI # 1) value | Control | Control command (device On/Off) |
| MCCB | Displays device communication status, device name, and device status | MCCB | Displays device communication status, device name, device status, and values of Ia, Ib, and Ic | Management | Display and reset history and count data |
| M LINK | Displays device communication status, device name, DI/DO status | M LINK | Displays device communication status, device name, DI, DO, Mode status, control mode value | Event | Event and alarm list display |
| MMP | Displays device communication status, device name, and device status | MMP | Displays device communication status, device name, device status, and values of Ia, Ib, and Ic | Settings | Displays set value information, relay element set value |
| DMPi | Displays device communication status, device name, and measurement value | DMPi | Displays device communication status, device name, and values of Ia, Ib, and Ic | Device information | Displays device-specific information such as device ID and device name |
| | | | | Group | The category name of the individual information item |
| | | | | Label | Name of individual information item |

Exterior description



Panel HMI (3.5 inch)



Specification

| Model name | Rated voltage | Power consumption | Temperature range | |
|------------|---------------|-------------------|-------------------|--------------|
| | | | Operate | Store |
| IHM8 | DC24V (±20%) | 3.0W or less | -20 ~ +60 °C | -30 ~ +80 °C |

- Color TFT LCD (3.5" or more) + LED Backlight
- User operation : cancel, move (up), move (down), confirm, set
- Displays communication status LED
- Supports two languages (English and Chinese)
- Supports upgrade function through USB port (PC Manager connection)
- Sub-device connection through RS-485 communication
 - : Connects up to 8 sub-devices
 - : 9,600, 19,200, 38,400, 57,600bps support
- Fail safe and termination selection switch applied

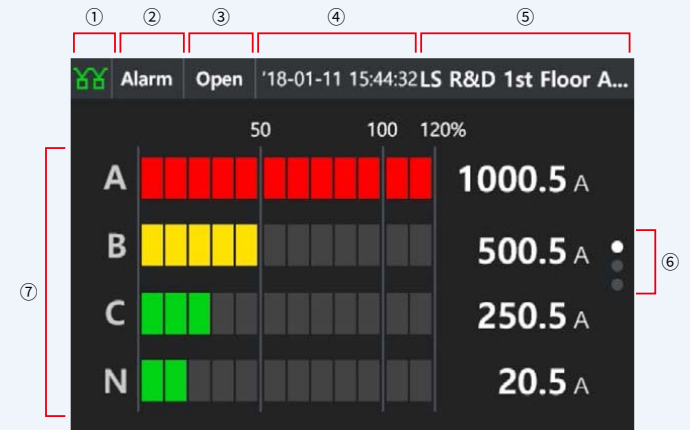
Display screen

- **Basic information of circuit breaker**
 - Number of poles, rated voltage, rated current, communication address, communication speed, control method
 - Manufacturer, model name, H/W version, S/W version, communication version, serial number
- **Current/Time of circuit breaker relay**
 - Long time delay, short time delay, instantaneous, ground fault
- **Measurement data of circuit breaker**
 - Voltage, current, active/reactive/apparent power for each phase
 - Energy : EP, EQ, rEP, rEQ, ES display
 - PQ (Power Quality) : Freq, PF, THD, TDD
 - Max Demand : Current value for each phase, active/reactive/apparent power
- **Breaker operation history**
 - Operating time, circuit breaker close time
 - Number of electrical operations, number of mechanical+electrical operations, number of trip operations
 - Contact consumption rate (0~100%)
- **Circuit breaker DI/DO status information and control**
- **History of events that occurred in the circuit breaker (save 20)**
- **Fault history of circuit breaker (save 20)**

Target device

| Type | Model name |
|------------|--------------------------------|
| Smart MCCB | Susol Smart MCCB |
| Smart ACB | Susol ACB STU, Metasol ACB STU |
| MCB | MCB Connected with M LINK |

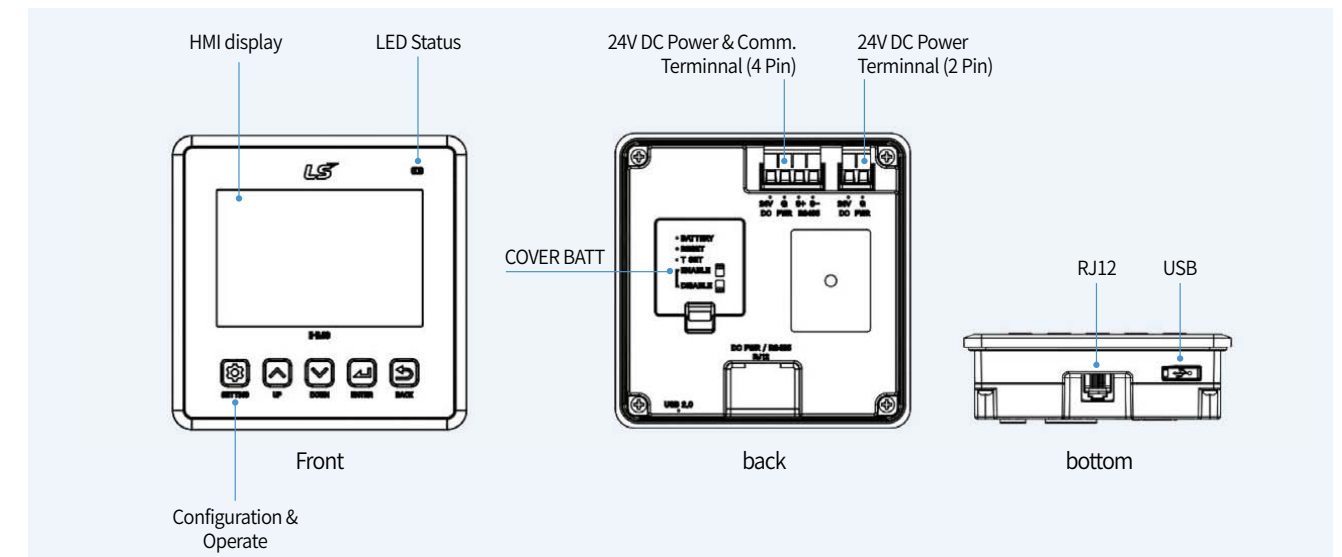
Screen description



- 1) **Communication connection status display** - 'Communication connected' or 'Communication not connected' is indicated by the RS485 communication icon.
- 2) **Alarm display** - If there is no alarm, it is shaded. When a new alarm is generated, 'Alarm' is displayed.
- 3) **Contact status display** - Displays the breaker's contact status ('Close', 'Open', 'Trip').
- 4) **Time display** - Displays the time (year-month-day hour : minute : second) of the connected device.
- 5) **Name display** - Displays the name of the connected device.
- 6) **Page display** - Displays the number of connected devices and brightly displays the order of the currently displayed screen.
- 7) **Load current display**
 - It is displayed as 'A/B/C' or 'A/B/C/N' depending on the load connection.
 - The size and color of the graph change depending on the load factor.
 - Displays the load current value.

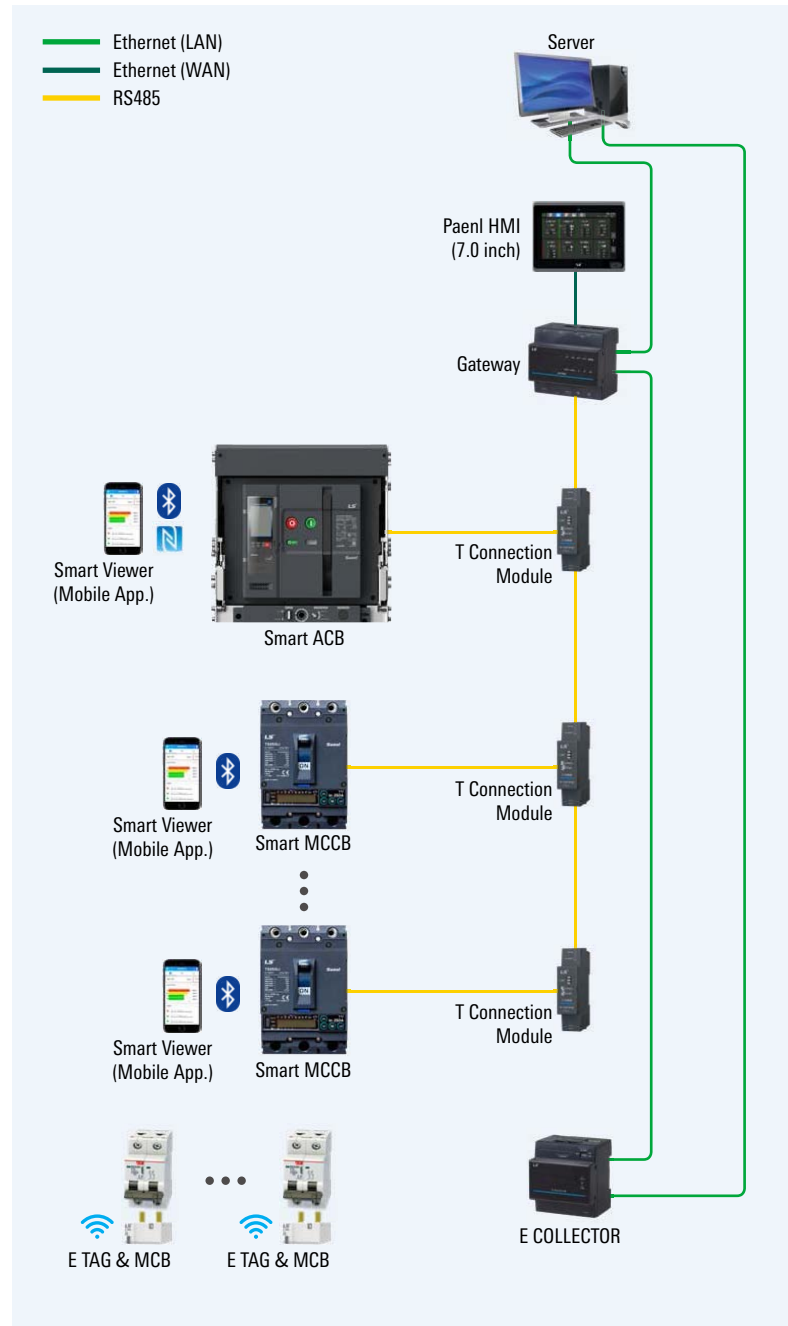
*The screen configuration of ACB and M LINK is different from that of MCCB, so please refer to the user manual.

Exterior description



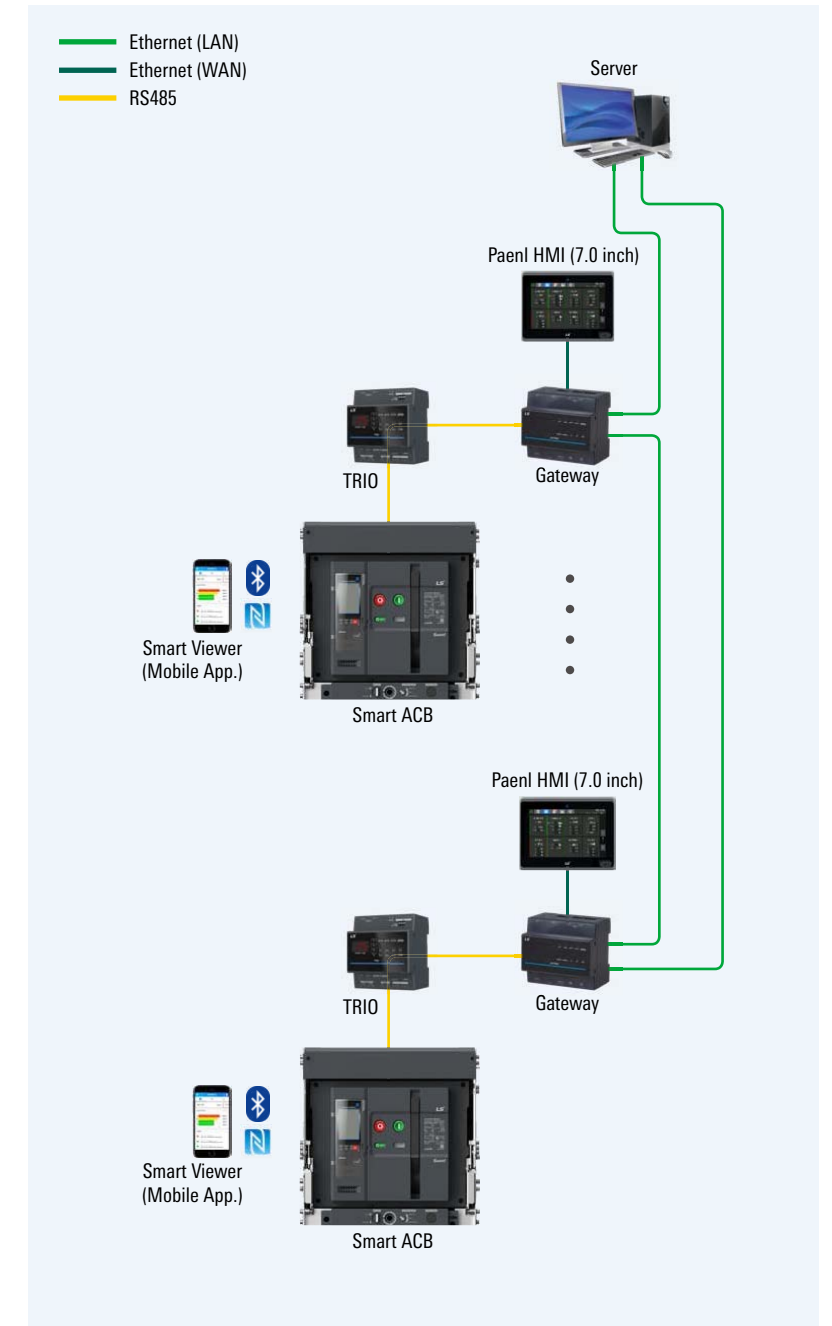
Seoul National University, College of Engineering, Building 135 (Sep. 2019)

- Installed GridSol CARE Smart LV panel in Building 135, College of Engineering in Seoul National University on September 2019.
- Upper system : GridSol CARE Operation S/W, Panel HMI (7.0 inch), Smart Viewer (Mobile App.)
- Circuit breaker : Smart ACB, Metasol MCCB
- Measurement device : GIMAC-II Plus
- Communication device : Gateway, E COLLECTOR
- Accessory device : Thermal CAM, TRIO, DC Power Module, T Connection Module



KT Yongsan IDC Center Project (Nov. 2019)

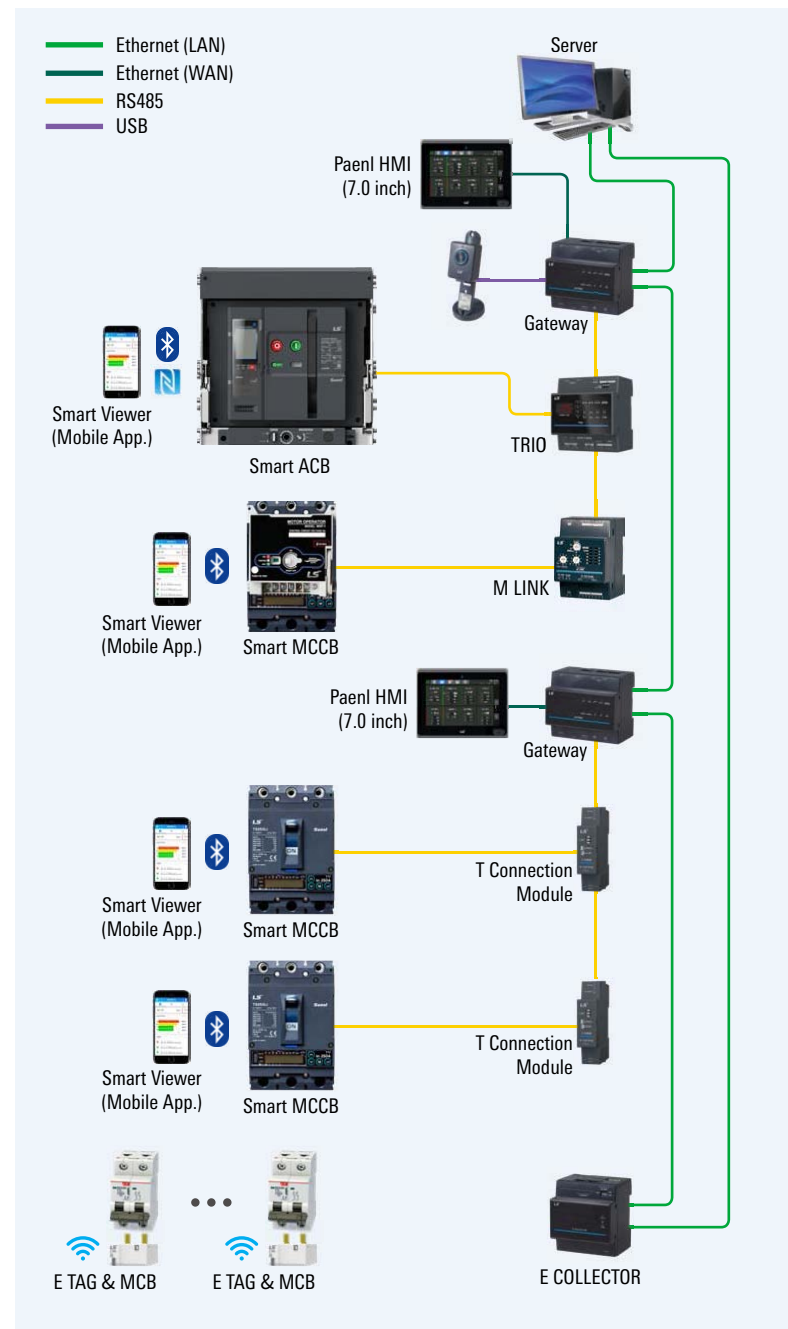
- Applied in IDC Center of KT Yongsan on November 2019
- With the addition of STU S Type's improved measurement accuracy (voltage/current : 0.5%) and the change function of A/B Group, TRIO and Panel HMI (7.0 inch) were used to configure the system without installing separate digital protection relay.
- Upper system : Server, Panel HMI (7.0 inch), Smart Viewer (Mobile App.)
- Circuit breaker : Smart ACB
- Communication device : Gateway
- Accessory device : TRIO, DC Power Module



Major Achievements

LS ELECTRIC Cheongju 1 Work Site FEMS Station (Apr. 2020)

- Installed 7 Gridsol CARE Smart LV Solution switchboards on FEMS Station of LS ELECTRIC Cheongju Work Site 1 on April 2020.
- Upper system : GridSol CARE Operation S/W, Panel HMI (7.0 inch), Smart Viewer (Mobile App.)
- Circuit breaker : Smart ACB, Smart MCCB
- Relay/Measurement device : XGIPAM, E TAG
- Communication device : Data Logger, Gateway, E COLLECTOR
- Accessory device : Thermal CAM, TRIO, M LINK, DC Power Module, T Connection Module





Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance. Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



- According to The WEEE Directive, please do not discard the device with your household waste.



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