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LEADING THE RECYCLING ECONOMY,
INNOVATIVE ENERGY-SAVING EMISSION REDUCTION!



Oldlang Smart Electrical

TELECOM TOWER SITE SOLUTION

Catalogue
2021



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Innovative Energy-Saving Emission Reduction
Leading The Recycling Economy

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About Oldlang Smart Electrical

Oldlang Smart Technology Co.,Ltd. is a modern technology enterprise, committed to innovating energy conservation and emission reduction and leading the circular economy. The products focus on the original, low carbon, energy saving, collecting data, remote control and other functions are the characteristics of Oldlang's Smart electrical products. To enable users to use energy safely, reliably and efficiently is the value idea of Oldlang Smart Electrical. Therefore, the intelligent energy management is not only the inevitable development of the times, but also the direction of the development of the intelligent electrical of Oldlang's. Oldlang Smart Electrical provide wisdom into the city, the intelligent household practical products, improve people's life, improve the earth's environment, insist on sustainable development has always been the belief of Oldlang Smart Electrical.

In Oldlang smart electrical, we are always advocating:

INNOVATIVE ENERGY-SAVING EMISSION REDUCTION  LEADING THE RECYCLING ECONOMY!





Concept Introduction

From the connected device to edge control, device management software, APP and application solutions on following domains : Telecom, Grid, Buidling, Plant and industry, Oldlang oers the complete smart IoT electrical solution and delivers enhanced value around safety, reliability, operational ecency, sustainability , and connectivity to our customers.



IoT Electrical Solution:
Connected Products Edge Control Device Management Application Solution & Service

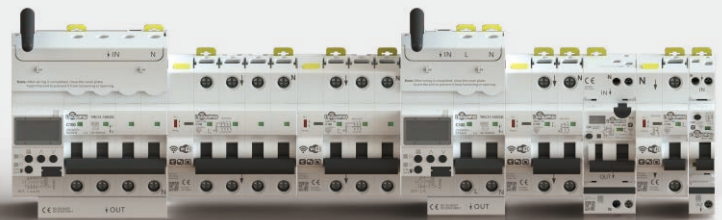
Smart Hardware Device

All the electrical device connected by RS485 and Modbus RTU protocol: Remote Control Device with Breaker, Multi-Channel Meter, Smart Breaker, Smart Recloser, Surge Protector.



Data Acquisition Device

Data acquisition, edge control and electrical parameter computing. Realize protocol conversion and Network interconnection. Interface port: GSM/GPRS, Ethernet Lan(RJ45), WiFi, LoRa, RS485 Communication Protocol: Modbus RTU, MQTT, UDP



Application Solution

Customize software, solve practical problems, oer the whole solutions and service according to the customers's demand from dierent industries through data acquisition of device management platform and data analysis.



Device Management Software

Mornitor all the electrical parameter in real-time, make edge control, and realize remote device operation and maintaineance, electrical safety supervision and power consumption management of all the sites in APP or Web software.

Functions

Efficient management

Based on the features of online & offline connection between device and software, Human-Device interaction, our Smart power solution can improve the operation & maintenance of electrical equipment and lower its cost as well. Based on data acquisition and edge control, the solution makes the electrical safety supervision and power management.

- Energy Efficiency Management
- Operation & Maintenance Management
- Event report

Smart Interconnection

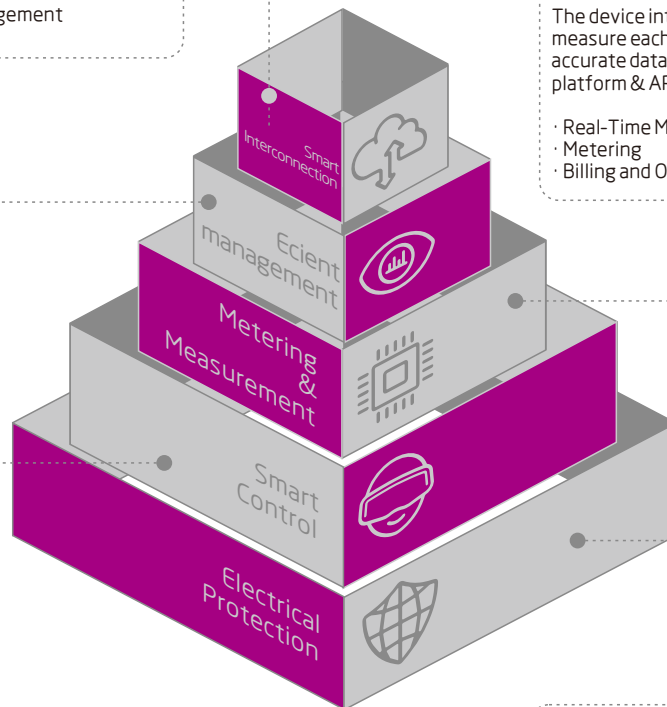
All the devices integrate interface port RS485 and communication protocol of Modbus RTU. The smart gateway has both downlink communication to connect all the devices by RS485 and uplink communication to connect software platform through wireless communication and MQTT protocol.

- Wired communication: RS485, Ethernet
- Wireless communication: GPRS 2G/3G/4G, NB-IoT, WiFi, LoRa
- Communication Protocol: Modbus RTU, MQTT

Metering & Measurement

The device integrates CT sensor to meter and measure each load precisely, then provide the accurate data for in device management software platform & APP and local display.

- Real-Time Monitoring
- Metering
- Billing and Online Payment



Smart Control

The device integrates remote control mechanism to realize the remote control function of device or the associated device through APP or software platform.

- Remote ON/OFF
- Remote Lock/Unlock
- Timer Control/Scheduled Control
- Other Scene Control

Electrical Protection

The device integrates full electrical protection in one and realize pre-alarm, alarm of electrical fault for electrical safety supervision through software and app. And the electrical parameter can be setup in through software and app.

- Full Electrical Protection
- Pre-alarm & Alarm
- Electrical Parameter Setting



Telecom Industry Introduction

Since 2019, 5G business emerge and expand sharply. More than 6 millions of 5G telecom tower sites will be built in China in the next 7 years and it initiates the new era of internet of Everything and 5G network of high speed and low delay.

The energy consumption of 5G twice more than of the one of 2G, 3G, and 4G equipment and the telecom operators have big pressures on the electricity cost. Reducing electricity cost become the most important task. In order to realize this task, the telecom operator have the following requirement:

1. Power-up or power-down of new and indoor 5G tower sites at the scheduled time.
2. Making specific scenario to save energy based on the business coverage and business difference on time of telecom tower sites.
3. Power-up or power-down of the whole tower site or different tower cells on scheduled time and

Therefore, it is very important to realize smart management on the telecom tower site. In order to push the 5G business development, Oldlang is offering the smart electric distribution solutions of telecom tower site for Tower company or different telecom operators such as differentiated power backup solution, energy consumption management solution and on-site power distribution unit resource.



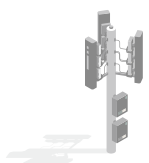
5G internet

Telecom Tower Site Introduction

Challenge of 5G Tower Site Construction



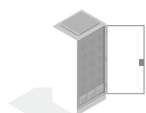
The power consumption of 5G equipment is 2-3 times than the one of 2G, 3G, 4G. The traditional tower site only make the measurement on the different operators, so it can't accurately measure different equipment (2G, 3G, 4G, 5G), so it can't make the energy efficiency management of the equipment. After the 5G business is undertaken, the original 2G, 3G and 4G backup power service of tower sharing station cannot be guaranteed, resulting in the shortage of backup power capacity of the base station, and shorten the life of the old tower site. Therefore, it is vital important to make energy management on 5G equipment and the whole tower site.



For shared tower sites, with the increasing demand for differentiated power generation services of various operators, there is a dispute of power generation among various telecom operators. Some operators would like to choose customized power generation and other special scenario requirements.



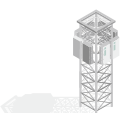
Some operators will delay the electricity bill payment, the telecom shared tower company can not stop the tower service and have no way to deal with the delay of electricity bill payment.



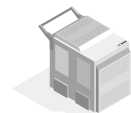
When lightning occurs, many telecom electrical equipment will trip and need long time and many labour costs to make maintenance, which will cause communication accidents.



If there is no local security lock in the device, there will be security risks in operation and maintenance.



Some telecom operators will add the loads privately without permission of the telecom tower company, which results in billing disputes among different operators, so it must be solved by a smart management system of telecom tower sites.



For 5G tower sites, the capacity of small oil engines is insufficient, and it is difficult to transport large oil engines as well.

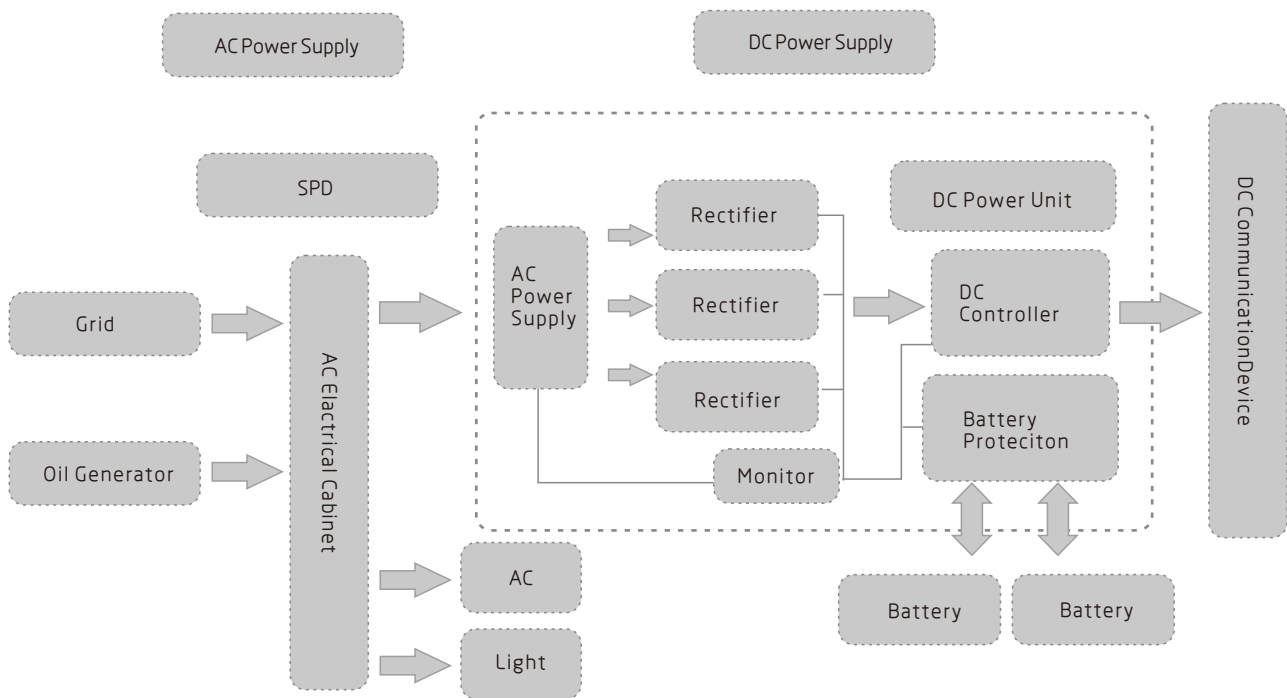


The traditional tower site has no monitoring of electrical safety, real-time monitoring of electrical equipment, and no early warning and alarm for electrical faults. Therefore, the operation and maintenance is very high, but the efficiency is low.

Telecom Site Introduction

Electrical Distribution System Introduction of Telecom Tower

The power system of telecom tower site consists of AC electrical distribution, Switching Power supply, Battery and it includes AC power supply and DC power supply system. AC power supply consists of Grid Power, Generator Power, Arrester and AC electrical distribution Cabinet system. DC power supply consists of power set (including AC power unit, Monitor, rectifier and DC power Unit) and Battery.



General Introduction

With the development of 5G business, the power consumption of tower site is increasing sharply. It is very important to realize smart electrical supervision and power energy management of telecom tower site. In order to support the development of 5G business, our telecom tower site solution can meet the demand of differentiated power backup and energy consumption management of different operators and different equipment of existing base stations, and the on-site resource management requirements of power unit.

Smart Electric Distribution System Solution includes

1. Multi-channel meter device can make accurate metering and precise management on the each load of AC electrical system and realize auto-transfer between grid power and generation power;
2. Remote controller with breaker can realize the smart and remote control of telecom equipment according to the power backup requirement of different telecom equipment and control requirement;
3. The DC metering module can measure the energy consumption of each equipment of different operators and realize energy management.
4. Our device can be connected to FSU of customers' and all the data can be transmitted to the software platform of customer. We also offer the development of the customized software platform and transfer all the data to customized software platform through the data acquisition.

Advantages

High Safety, Reliability and Stability
Reliable and fast transferring management system of grid power and oil generation power; 5G independent power generation management; Remote and local lock and unlock function of device to assure the safety of operation and maintenance; On-site maintenance, manual control mode, remote control mode all assure safe, stable and reliable operation of telecom tower site.

Modularization

The smart power unit can be customized according to requirement of different telecom site.

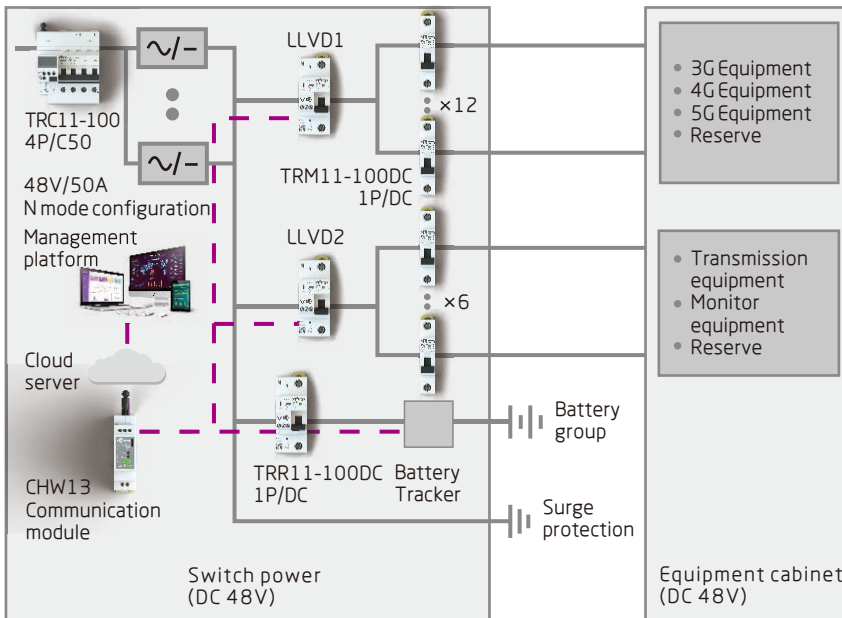
High Performance

The solution realize independent control and metering on each load, which can make smart energy efficiency management and smart control management on telecom tower site.

Cloud Software Platform

We develop the special software platform to realize the smart electrical distribution management, power management and 5G differentiated power backup management for telecom operator or telecom tower company. The software system can improve the safety and reliability of the operation and maintenance of telecom tower site and, reduce the operation cost by 30%. The distribution resource system planning, operation and maintenance realize the system process management, rapid fault response, and improve operation and maintenance management of telecom tower site.

Macro site Solution 1: LLVD & BLVD



Load type: comprehensive load 2G / 3G / 4G mixed type
 Number of users: 2-3
 Power loads: $\geq 200A$
 No. of LLVD sub-load loads: 9
 No. of BLVD sub-load loads: 6

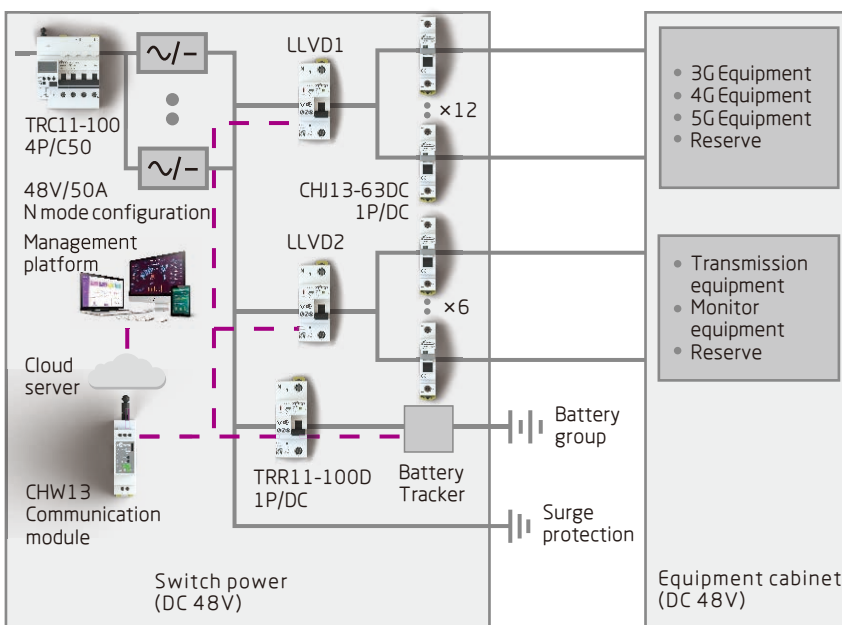
When grid power is off, the battery pack begins to discharge and continues to power supply the main equipments of the station (BTS / NodeB / eNodeB), transmission equipment, etc., to make sure the station is powered under normal operation.

When the battery voltage drops set voltage value of LLVD, the control module will disconnect BTS / NodeB / eNodeB, data equipments and other power supply, the main equipments of the station are out of service, only power supply of transmission equipment is guaranteed.

Smart power distribution unit sets LLVD and BLVD according to the voltage and time.

Control module: TRC11-100, TRR11-100D,
 TRM11-100DC.
 Metering module: TRC11-100.
 Communication module: CHW13.

Macro site Solution 2: LLVD & BLVD (with metering sub-load)



Load type: comprehensive load 2G / 3G / 4G mixed type
 Number of users: 2-3
 Power loads: $\geq 200A$
 No. of LLVD sub-load loads: 9
 No. of BLVD sub-load loads: 6

When grid power is o, the battery pack begins to discharge and continues to power supply the main equipments of the station (BTS / NodeB / eNodeB), transmission equipment, etc., to make sure the station is powered under normal operation.

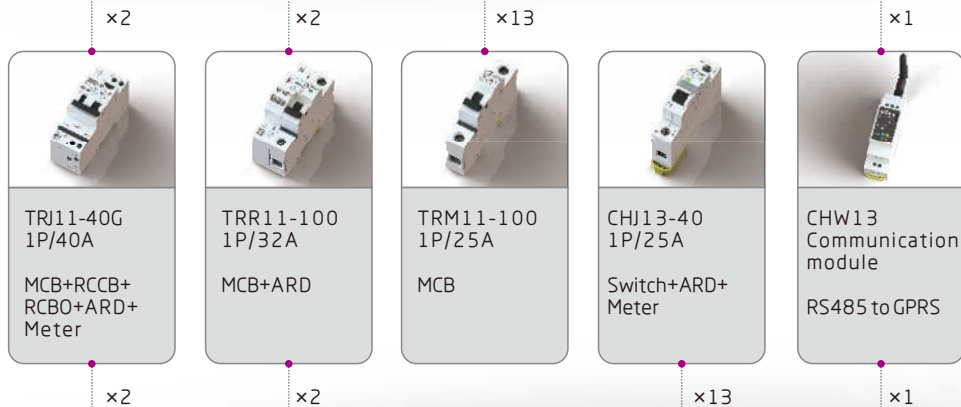
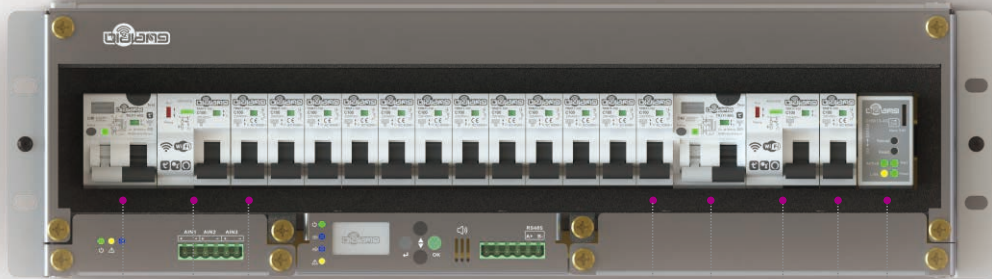
When the battery voltage drops to set voltage value of LLVD, the control module will disconnect BTS / NodeB / eNodeB, data equipments and other power supply, the main equipments of the station are out of service, only power supply of transmission equipment is guaranteed.

Smart power distribution unit sets LLVD and BLVD according to the voltage and time.

Control module: TRC11-100, TRR11-100D, CHJ13-63DC.
 Metering module: TRC11-100, CHJ13-63DC.
 Communication module: CHW13.



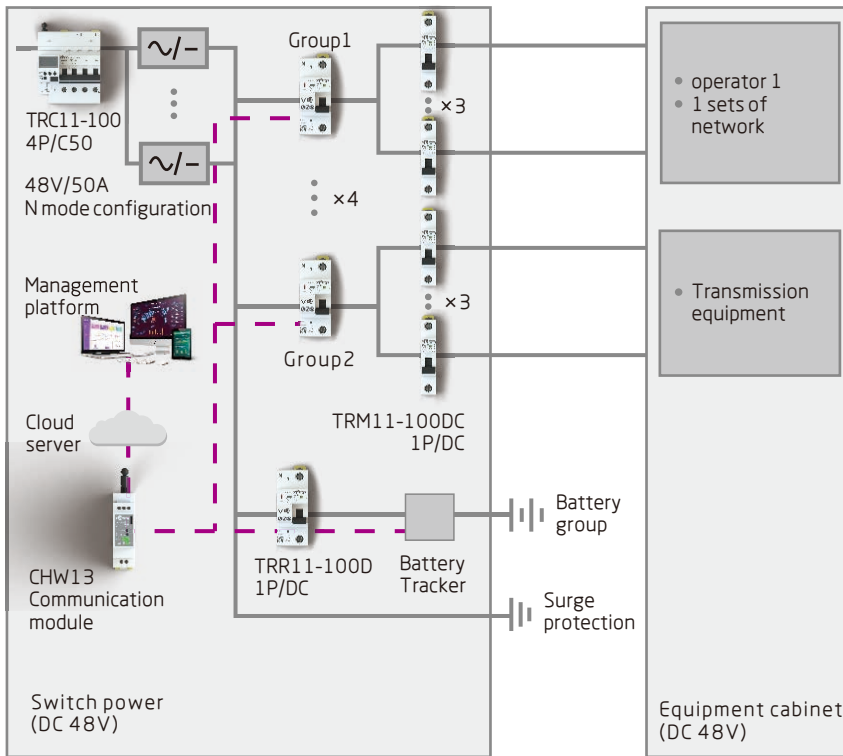
Macro site Solution 1
LLVD & BLVD



Macro site Solution 2
LLVD & BLVD (with metering sub-load)

MCB: Miniature circuit breaker/Short circuit protection and Over current protection/IEC 60898-1 or IEC 60947-1. **RCCB:** Residual current operated circuit-breakers/Shock protection and leakage protection/IEC 61008-1. **RCBO:** Residual current operated circuit-breakers with integral over current protection/Short circuit protection and Over current protection and Shock protection and leakage protection/IEC 61009-1. **ARD:** Automatic reclosing devices/Automatic ON or OFF circuit breaker/IEC 50557. **Meter:** Electric meter function/Metering quantity and acquisition voltage, current, power, frequency and other parameters. **Communication Module:** The circuit breaker is converted to Ethernet or WiFi or GPRS or 4G or Bluetooth or other communication modes through RS485 communication, and the network is connected and the data is exchanged.

Macro site Solution 3: Multi communication network / multi operator



Telecom Site Solution

Load type: comprehensive & operator 1 / operator 2 / operator 3

Number of networks / number of users: 2-3

Power loads: $\geq 200A$

4 groups of distribution circuits: 3 groups of network / operator load + 1 group of transmission equipment

According to voltage, time or active command, smart PDU can flexibly control, lock, and unlock different network devices (2G, 3G, 4G, 5G) / the loads of different telecom operators.

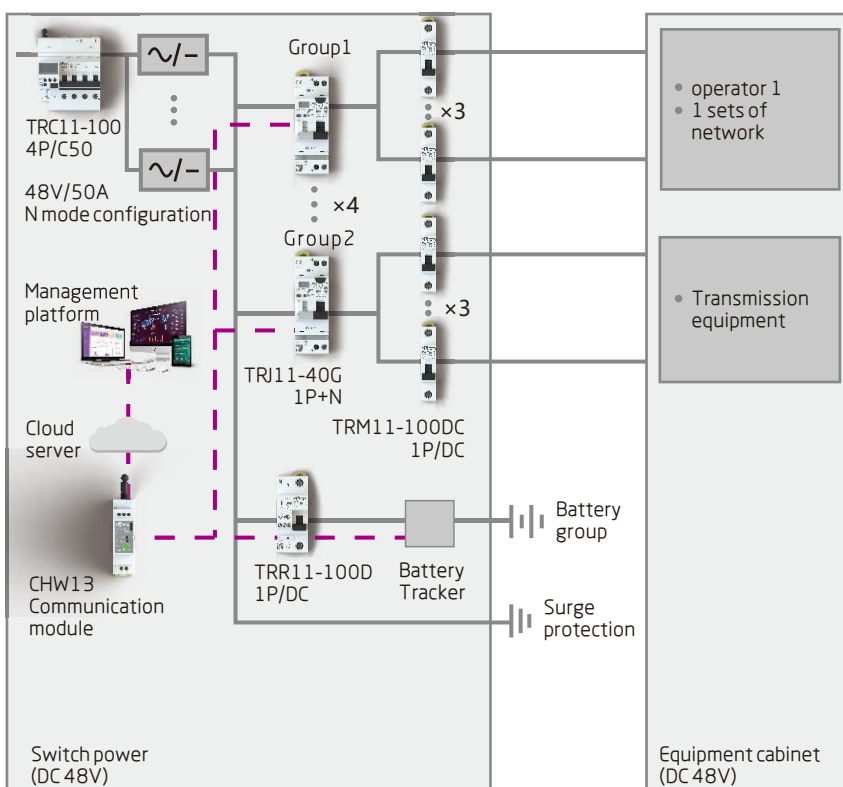
When grid power is 0, the battery pack begins to discharge and continue to supply the main equipments and transmission equipment, etc., to make sure the station is powered under normal operation.

When the battery voltage drops to a set value of control module, which is divided into essential and multiple classification electrical load. Sequentially to cut power supply of data equipments, the master station service, and ensure power supply only to transmission equipments.

Smart power distribution unit can set backup power according to the voltage and time.

Control module: TRC11-100, TRR11-100D, TRM11-100DC.
Metering module: TRC11-100.
Communication module: CHW13.

Macro site Solution 4: Multi communication network / multi operator (with metering sub-load)



Load type: comprehensive Load type: 2G/3G/4G

Load type: 2G / 3G / 4G & operator 1 / operator 2 / operator 3

Number of networks / number of users: 2-3

Power loads: $\geq 200A$

4 groups of distribution circuits: 3 groups of network / operator load + 1 group of transmission equipment

According to voltage, time or active command, smart PDU can flexibly control, lock, and unlock different network devices (2G, 3G, 4G, 5G) / the loads of different telecom operators.

When grid power is 0, the battery pack begins to discharge and continue to supply the main equipments and transmission equipment, etc., to make sure the station is powered under normal operation.

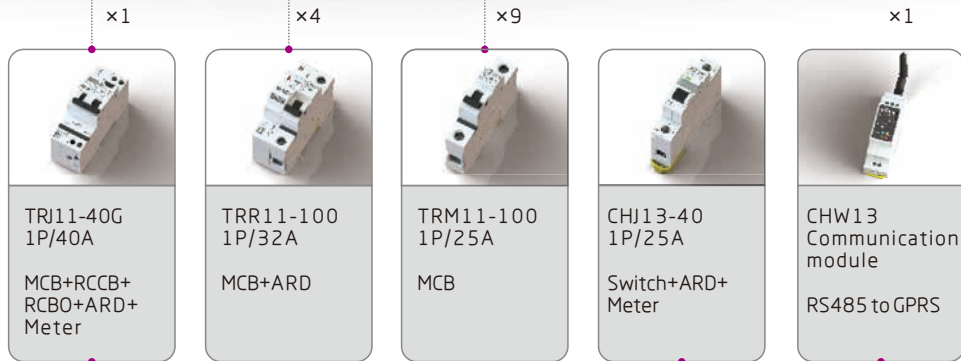
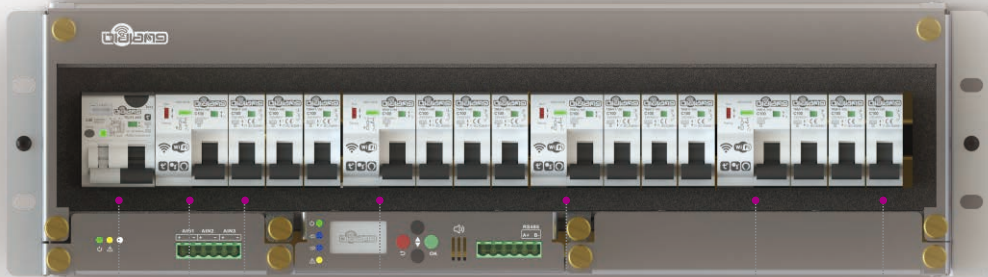
When the battery voltage drops to a set value of control module, which is divided into essential and unessential with multiple classification electrical load. Sequentially to cut power supply of data equipments, the master station service, and ensure power supply only to transmission equipments.

Smart power distribution unit can set backup power according to the voltage and time.

Control module: TRC11-100, TRR11-100D,, TRJ11-40G, TRM11-100DC.
Metering module: TRC11-100, TRJ11-40G.
Communication module: CHW13.



Macro site Solution 3:
Multi communication network / multi operator

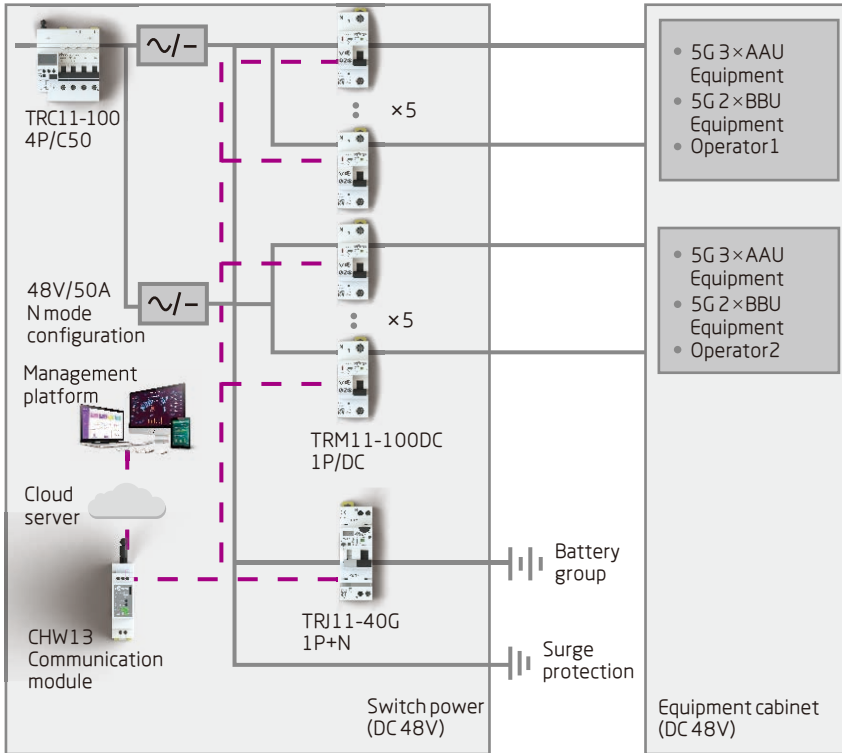


Macro site Solution 4:
Multi communication network / multi operator (with metering sub-load)

MCB: Miniature circuit breaker/Short circuit protection and Over current protection/IEC 60898-1 or IEC 60947-1. **RCCB:** Residual current operated circuit-breakers/Shock protection and leakage protection/IEC 61008-1. **RCBO:** Residual current operated circuit-breakers with integral over current protection/Short circuit protection and Over current protection and Shock protection and leakage protection/IEC 61009-1. **ARD:** Automatic reclosing devices/Automatic ON or OFF circuit breaker/IEC 50557. **Meter:** Electric meter function/Metering quantity and acquisition voltage, current, power, frequency and other parameters. **Communication Module:** The circuit breaker is converted to Ethernet or WiFi or GPRS or 4G or Bluetooth or other communication modes through RS485 communication, and the network is connected and the data is exchanged.

Macro site Solution 5: 5G tower site Solution

Telecom Site Solution



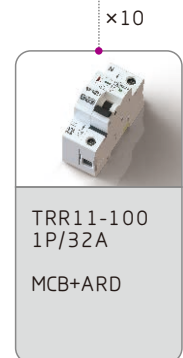
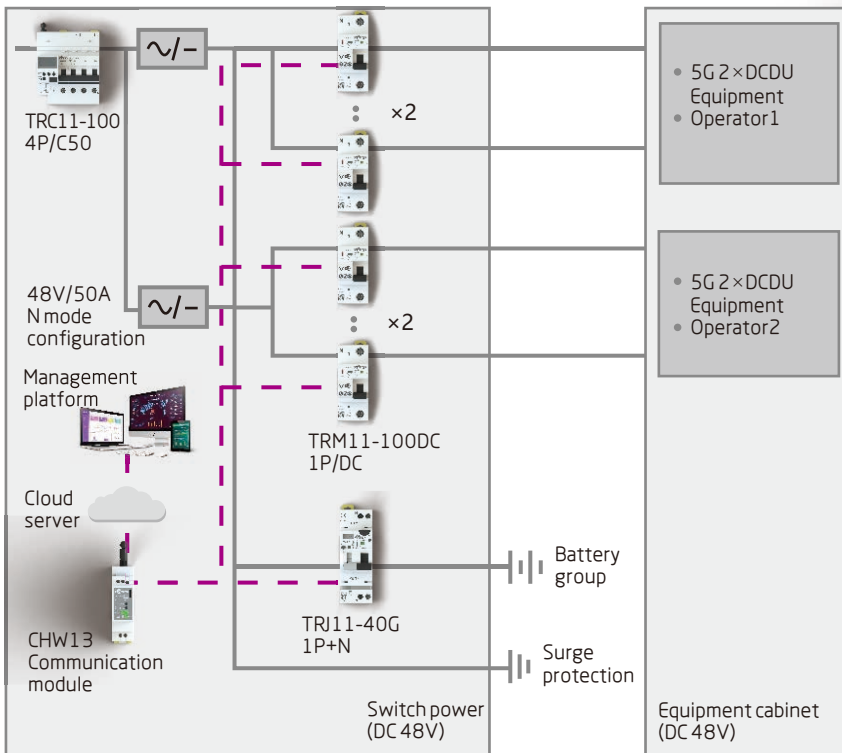
Load type: 5G 3×AAU + 2×BBU & 5G DCDU
 Number of networks / operators: 2
 Power loads: ≥200A
 2 sets of distribution circuits: 2 sets of 5G network / 2 sets of BBU

According to voltage, time, or active command, smart PDU can flexibly control different operators / different load, to open and close, lock and unlock load.

The smart PDU can set backup power according to its voltage and time.

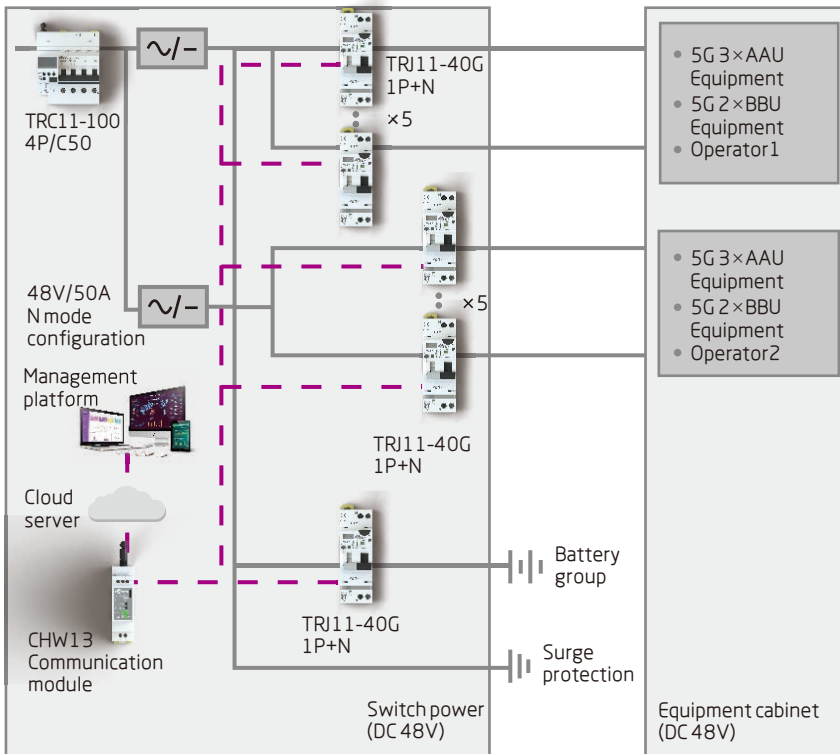
Control module: TRC11-100, TRR11-100D, TRJ11-40G.
 Metering module: TRC11-100, TRJ11-40G.
 Communication module: CHW13.

Configuration 1



Configuration 2

Macro site Solution 6: 5G tower site Solution (with metering sub-load)



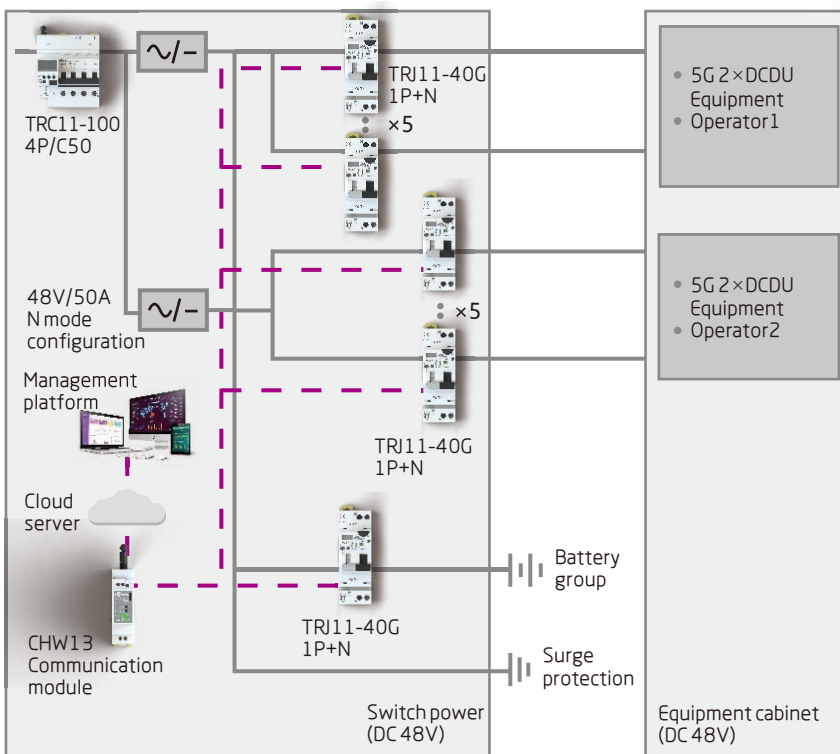
Load type: 5G 3×AAU + 2×BBU & 5G DCDU
 Number of networks / operators: 2
 Power loads: ≥200A
 2 sets of distribution circuits: 2 sets of 5G network / 2 sets of BBU

According to voltage, time, or active command, smart PDU can flexibly control different operators / different load, to open and close, lock and unlock load.

The smart PDU can set backup power according to its voltage and time.

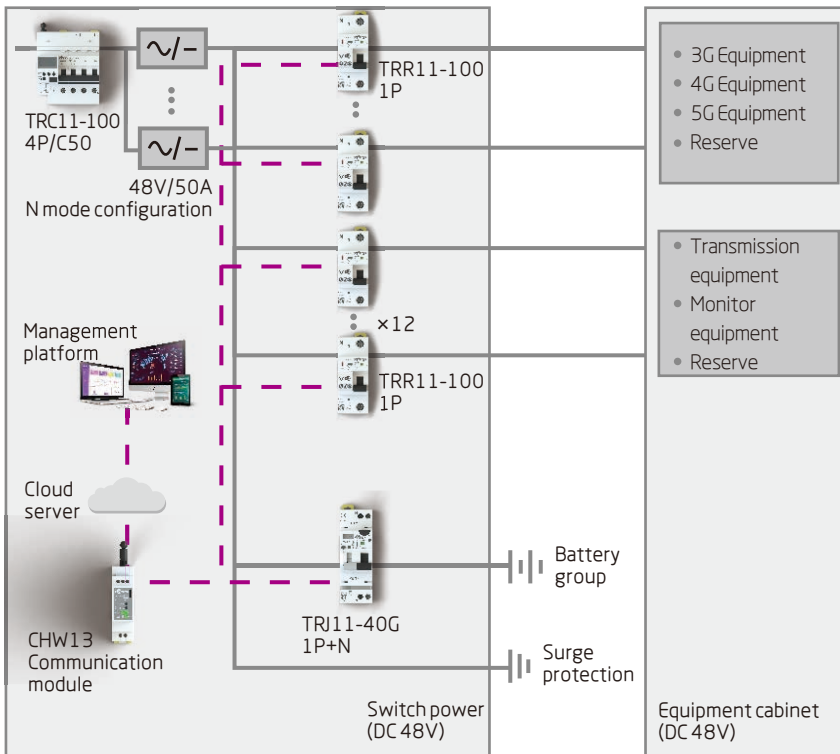
Control module: TRC11-100, TRJ11-40G.
 Metering module: TRC11-100, TRJ11-40G.
 Communication module: CHW13.

Configuration 1



Configuration 2

Macro site Solution 7: Multi communication network (5G) / operators



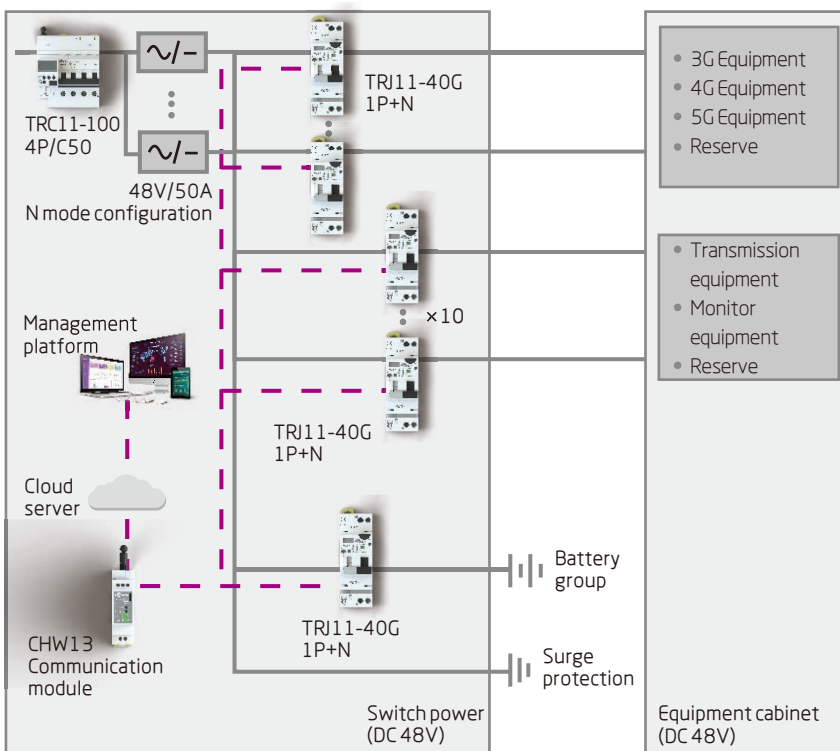
Load type: 2G / 3G / 4G / 5G & operator 1 / operator 2 / operator 3
 Number of networks / number of operators: 2-3
 Power loads: $\geq 200A$
 4 groups of distribution circuits: 3 sets of network / operator load + 1 set of transmission equipment

According to voltage, time, or active command, smart PDU can flexibly control different operators / different load, to open and close, lock and unlock load.

The smart PDU can set backup power according to its voltage and time.

Control module: TRC11-100, TRR11-100D, TRJ11-40G.
 Metering module: TRC11-100, TRJ11-40G.
 Communication module: CHW13.

Macro site Solution 8: Multi communication network (5G) / multi operator (with metering sub-load)



Load type: 2G / 3G / 4G / 5G & operator 1 / operator 2 / operator 3
 Number of networks / number of operators: 2-3
 Power loads: $\geq 200A$
 4 groups of distribution circuits: 3 sets of network / operator load + 1 set of transmission equipment

According to voltage, time or active command, smart PDU can flexibly control, lock, and unlock different network elements / different operations.

When grid power is 0, the battery pack begins to discharge and continue to supply the main equipments of 2G/3G/4G to make sure the station is powered under normal operation.

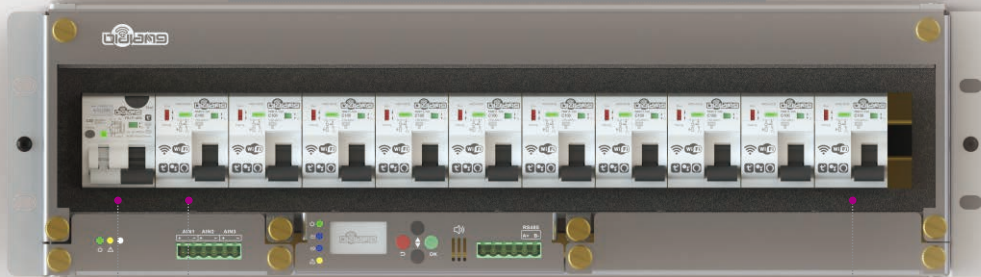
When the battery voltage drops to a set value of control module, which is divided into essential or secondary importance with multiple classification electrical load. Sequentially to cut power supply of data equipments, the master station service, and ensure power supply only to transmission equipments.

Smart power distribution unit can set backup power according to the voltage and time.

Control module: TRC11-100, TRJ11-40G.
 Metering module: TRC11-100, TRJ11-40G.
 Communication module: CHW13.

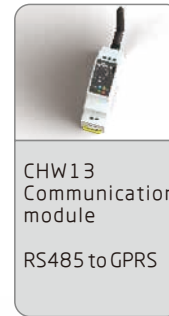


Macro site Solution 7:
Multi communication network (5G) / operators



x1

x10

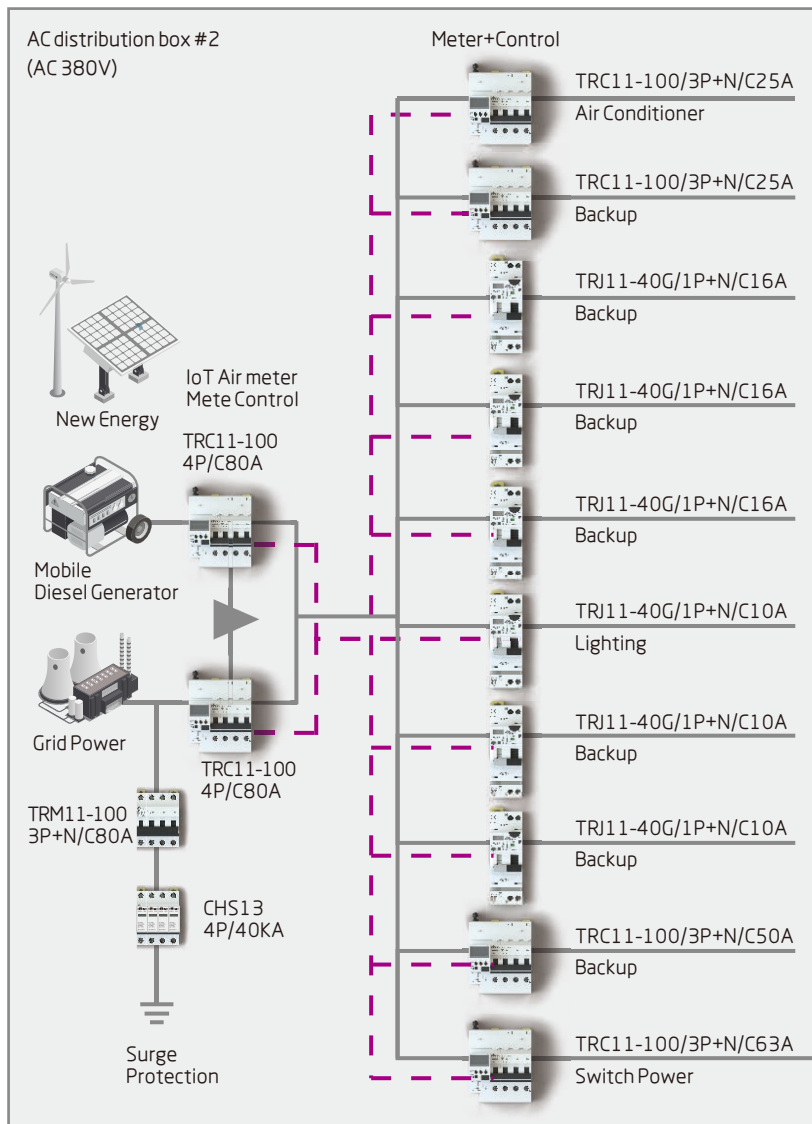


x4



Macro site Solution 8:
Multi communication network (5G) / multi operator (with metering sub-load)

MCB: Miniature circuit breaker/Short circuit protection and Over current protection/IEC 60898-1 or IEC 60947-1. **RCCB:** Residual current operated circuit-breakers/Shock protection and leakage protection/IEC 61008-1. **RCBO:** Residual current operated circuit-breakers with integral over current protection/Short circuit protection and Over current protection and Shock protection and leakage protection/IEC 61009-1. **ARD:** Automatic reclosing devices/Automatic ON or OFF circuit breaker/IEC 50557. **Meter:** Electric meter function/Metering quantity and acquisition voltage, current, power, frequency and other parameters. **Communication Module:** The circuit breaker is converted to Ethernet or WiFi or GPRS or 4G or Bluetooth or other communication modes through RS485 communication, and the network is connected and the data is exchanged.



AC electrical distribution solution

AC main input: grid power/generator
Capacity: 63A / 80A
AC sub-load output: switch power/air conditioner / lighting/socket / others

AC power distribution unit:

Input grid power or generator power, will distribute the AC power to the switching power supply rectifier module.

It contains a surge protector as the secondary lightning protection of the station power system.

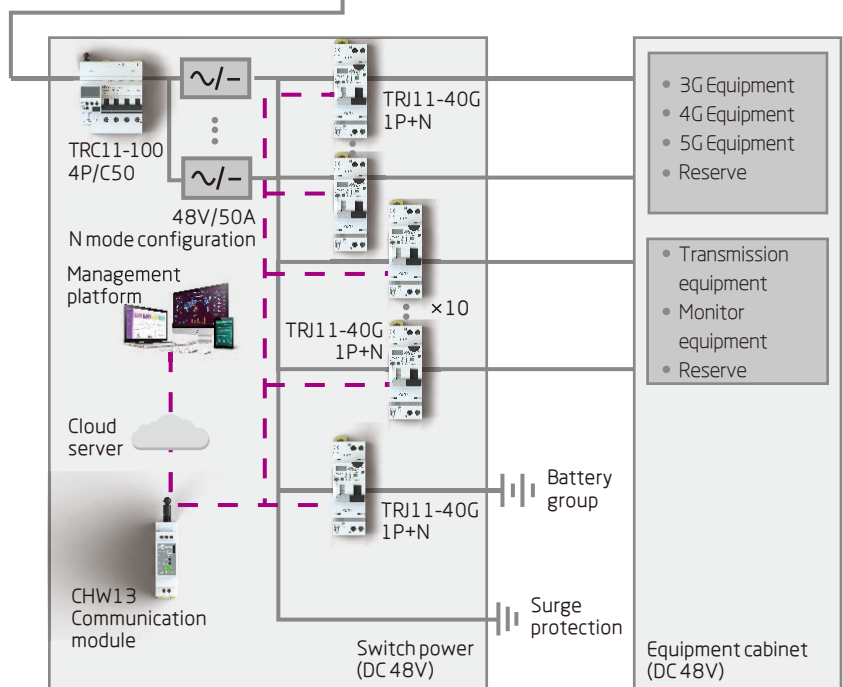
AC power supply system operation mode:

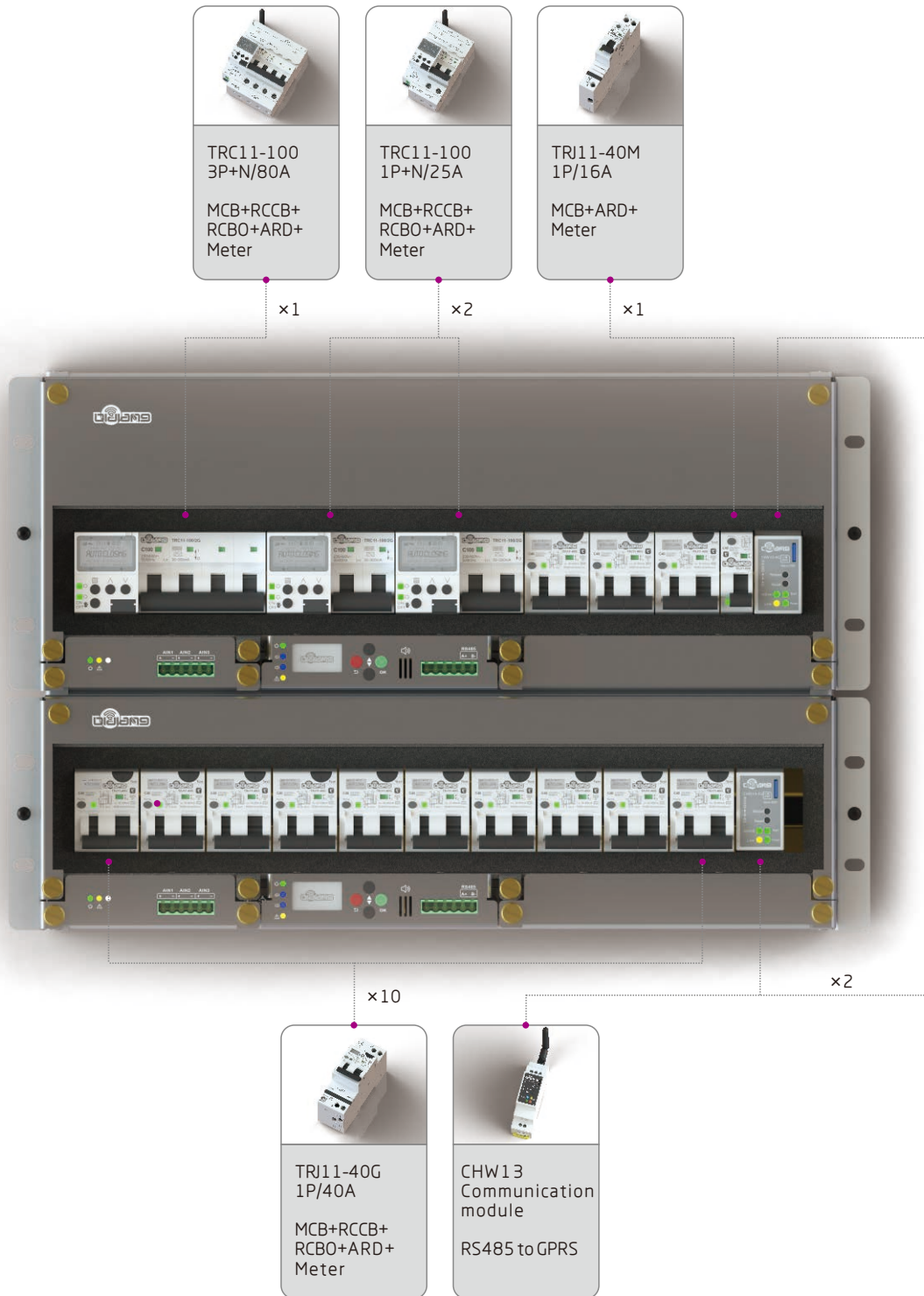
1. When the grid power is normal, the grid power supply;
2. After the grid power outage, when the mobile generator does not arrive at the station, the communication equipment in the station is powered by the battery discharge;
3. The mobile diesel generator arrives at the station and waits for the generator to start. The generator power the station;
4. The station is powered by grid, when it recovers.

Functions and features

1. When grid power outage, PDU provides AI output to DC backup power system;
2. When diesel generator starts, PDU provides AI output to DC backup power system;
3. Realize the statistics of the diesel generator power record, time, and kWh;
4. 4 sets of tariff settings inside the meter circuit breaker, which can be used to cut peaks and fill valleys and cooperate with the battery backup system to achieve different power supply strategies and reduce base station electricity costs.
5. Meter circuit breakers will trip when voltage loss and ensure the safe operation of grid power and diesel generators;
6. Internal tripping and safety lock to ensure safe operation on site and prevent misoperation;
7. Analysis of data statistics and electricity theft events;

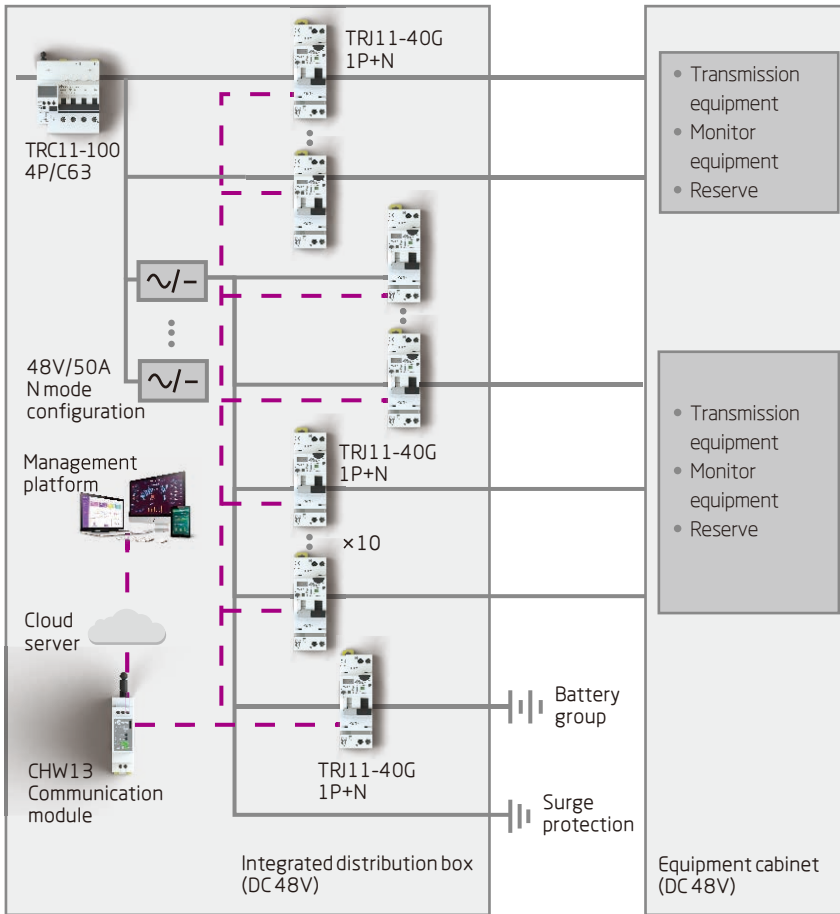
Control module: TRC11-100, TRR11-100D, TRJ11-40G.
Metering module: TRC11-100, TRJ11-40G.
Communication module: CHW13.





MCB: Miniature circuit breaker/Short circuit protection and Over current protection/IEC 60898-1 or IEC 60947-1. **RCCB:** Residual current operated circuit-breakers/Shock protection and leakage protection/IEC 61008-1. **RCBO:** Residual current operated circuit-breakers with integral over current protection/Short circuit protection and Over current protection and Shock protection and leakage protection/IEC 61009-1. **ARD:** Automatic reclosing devices/Automatic ON or OFF circuit breaker/IEC 50557. **Meter:** Electric meter function/Metering quantity and acquisition voltage, current, power, frequency and other parameters. **Communication Module:** The circuit breaker is converted to Ethernet or WiFi or GPRS or 4G or Bluetooth or other communication modes through RS485 communication, and the network is connected and the data is exchanged.

Radio remote site solution



Load type: 2G / 3G / 4G / 5G & operator 1 / operator 2 / operator 3
 Number of networks / number of operators: 2-3
 Power loads: ≥200A
 4 groups of distribution circuits: 3 sets of network / operator load + 1 set of transmission equipment

Remote station has both DC and AC loads, and different types of metering and control equipments are used according to the actual site to meet the needs of remote monitoring.

Control module: TRC11-100, TRJ11-40G.
 Metering module: TRC11-100, TRJ11-40G.
 Communication module: CHW13.

LOAD TYPE: OMB HARDWARE

Select different power configurations (AC / DC) depending on the type of field device.

According to the load equipment of different power supply types of different operators, the electric energy situation of equipment load can be counted and the energy consumption analysis can be provided.

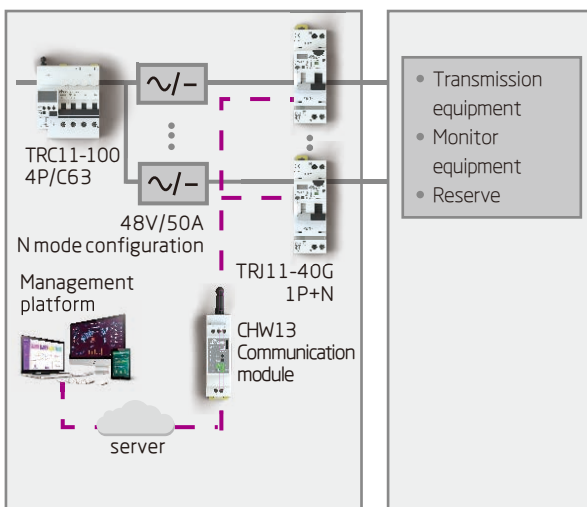
According to the voltage, time or active command, it can flexibly control the power on and off control, lock and unlock control of each load of different operators / different network elements.

When the net is idle, it can be turned off at a fixed time or set in a scenario.

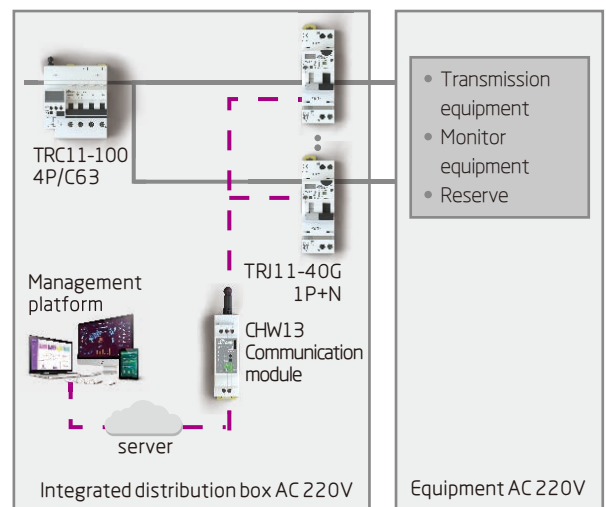
The distribution unit sets the standby power according to the voltage and time.

Control module: TRC11-100, TRJ11-40G.
 Metering module: TRC11-100, TRJ11-40G.
 Communication module: CHW13.

Indoor sub-site solution



Configuration 1



Configuration 2



Functions and Features of Site Solution

Pre-warning and alarm of faults

- It supports pre-warning and alarm of over-voltage, under-voltage, over-current, or even over-temperature, phase loss, phase imbalance, etc., to ensure safe electricity;
- The parameters of pre-warning and alarm can be set either locally or remotely by platform.

Smart interconnection

- It supports the access of analog signal mains and diesel generators to provide supportive signals for differentiated backup power system;
- The system reserves RS485 terminals, which can be connected to FSU, or wireless gateway communication module;
- Standard B terminal protocol.

Efficient management

- Local management, or platform may monitor equipments, whenever and wherever, through communication gateway or FSU;
- Interactive experience and e-workflow, will improve the efficiency of operation and maintenance, and reduce the cost of operation and maintenance;
- Based on daily data analysis of the tower business, to improve the company management.

Remote management of equipments

- Support remote power on/o, lock and unlock of independent users and independent loads;
- Support to set operators business models through customized software or FSU system;
- Help customers to efficiently manage equipment, greatly save electricity bill and cut labor cost;

Auto transfer between grid power and diesel generator

- Support the control and management of grid power and diesel generators;
- Support the metering of grid power and diesel generator.

Local maintenance mode

- Local maintenance mode, the equipment is automatically locked to ensure maintenance personnel safety;
- Local maintenance mode, the platform monitors the operation mode and status of the equipment through the local gateway module and FSU.

The accurate metering of each loads and separate operators

- Support measurement and metering multi-user, multi-device, multi-load;
- The measurement accuracy is 0.5%, and the metering accuracy is 1%;
- The platform may monitor the measurement parameters and energy consumption equipments through local gateway module and FSU;
- Independent metering module can be easily added or reduced according to the loads on site.

Differentiated backup power

- It supports to achieve differentiated power backup by variables such as timer, time duration, voltage, kWh, and duty free time, for multiple users or multiple equipments;
- It supports parameter settings through local LCD screen, remote platform and FSU;
- It supports up to 14 loads of differentiated power backup settings.

The independent power generation of 5G equipments

- It supports independent power generation for multiple users or multiple 5G equipments;
- It solves the problem of insufficient capacity of small oil machines and difficult to move large diesel generator;
- Optional power generation available and flexible configuration supportive.

Instantaneous fault automatic res

- The main line and sub lines have auto reclosing function, that can be automatically reset when instantaneous fault trip caused by lightning;
- Reclosing program can be set on demand.

Value of telecom site solution

Equipment operation and maintenance management

- Lean management of equipment assets to facilitate operation and maintenance;
- System safety assessment, providing preventive maintenance guidance and methods;
- Timely and professional fault recovery guidance, reducing the technical level requirements of operation and maintenance personnel;
- Providing sustainable services to ensure sustainable power supply, and safety.

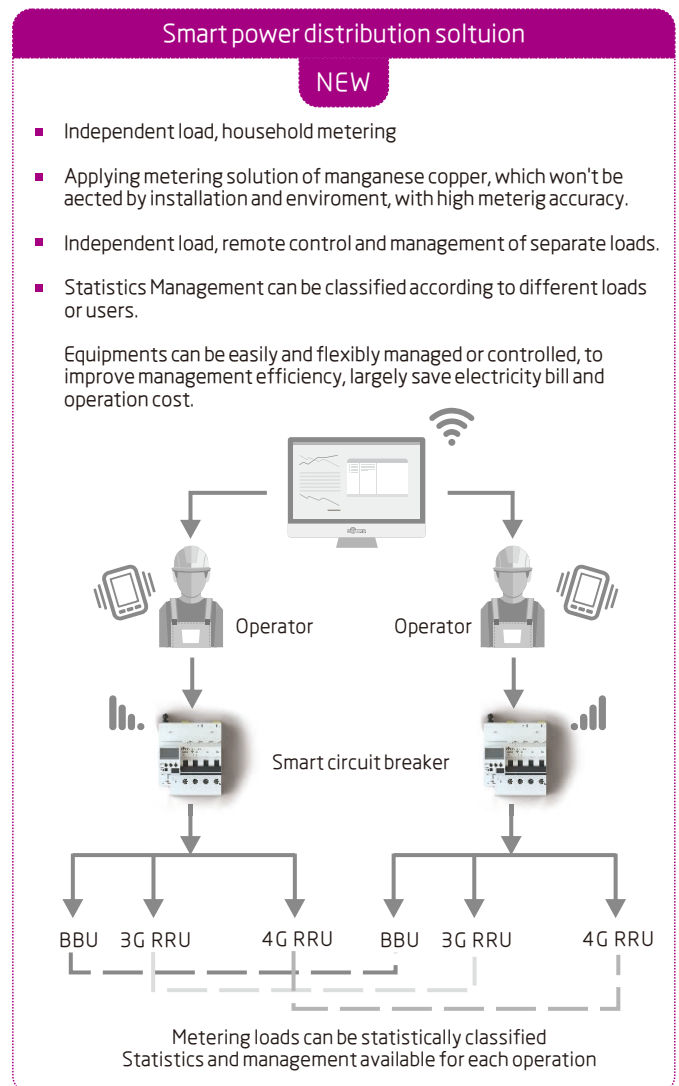
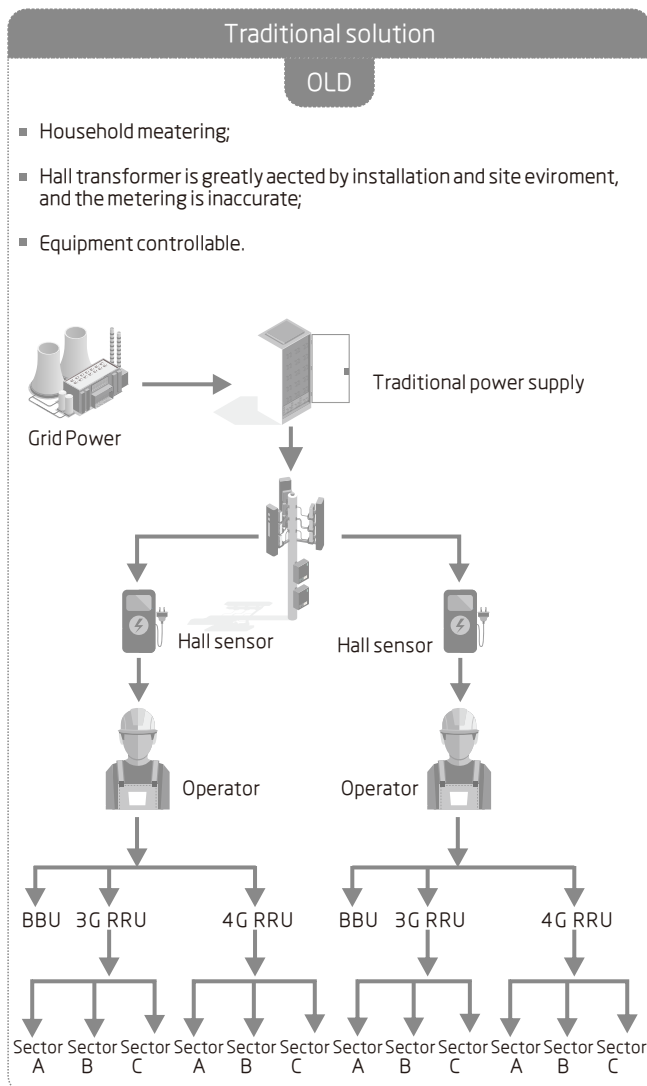
Energy efficiency management

- Design energy consumption data by each load, analyze the type and trend of energy consumption, and output reports;
- According to business features, to make energy saving plans, and combine the intelligent control procedures of equipments to finalize a complete set of energy efficiency management plan.

Safety supervision

- Real-time monitoring of equipment status and timely access to equipment failure alarm information;
- Full-featured electrical protection: overload, short circuit, overvoltage, undervoltage, phase loss, phase imbalance, and overtemperature;
- According to safety level notification, Operation and maintenance personnel MAY handle failure warning and alarm accordingly, to ensure equipment safe operation.

Accurate metering and efficient management of equipments in each load



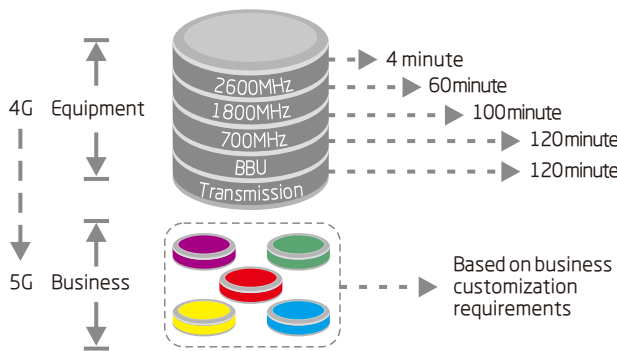
Differentiated backup power to improve battery efficiency

Primary and secondary power backup scheme (LLVD/BLVD)

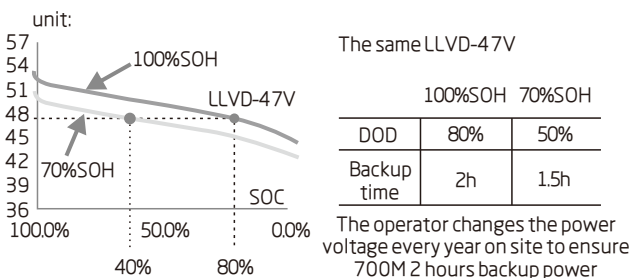
OLD

- According to different voltages, the device execute Load Low Voltage Disconnect (LLVD) and Battery Low Voltage Disconnect (BLVD);
- Load Low Voltage Disconnect (LLVD) all unessential loads. Battery Low Voltage Disconnect (BLVD) all loads;
- Battery State of Health (SOH) changes over time. The backup time duration is different against the same LLVD;
- To ensure the backup time of essential equipments, operators need to go to the site, every period of time (six months or a year), to check Load Low Voltage Disconnect (LLVD).

Sites evolving available, as backup power requirements are more complicated day by day



Traditional solution: Battery State of Health (SOH) changes
The backup time duration is different against the same LLVD



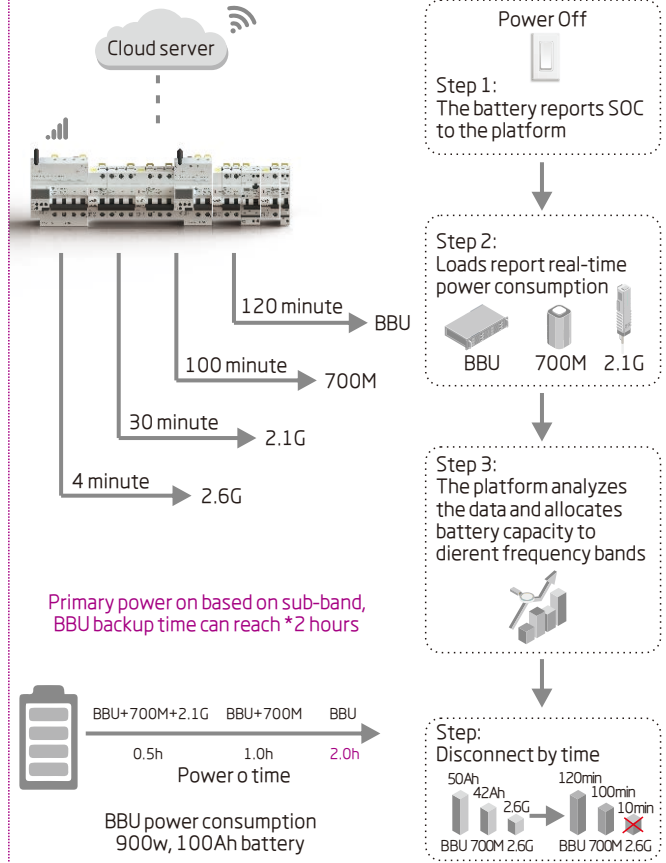
Differentiated backup power scheme

NEW

- Platform will monitor the battery key information, SOH (State of Health), SOC (State of Charge), voltage, in real time;
- Collect all loads power consumption in real time;
- From platform edge computing, users may distribute different backup power time for different equipments, according to its importance;
- Platform may further differentiate backup power time, according to voltage, needed time duration, duty-free time period, and make it smarter;
- Differentiated backup power may greatly improve battery efficiency and maximize battery capacity on key equipments, meanwhile, to achieve accurate metering;
- Differentiated backup power may avoid changing voltage on site, and greatly reduce maintenance cost.

No routine site adjustments

Circuit topology



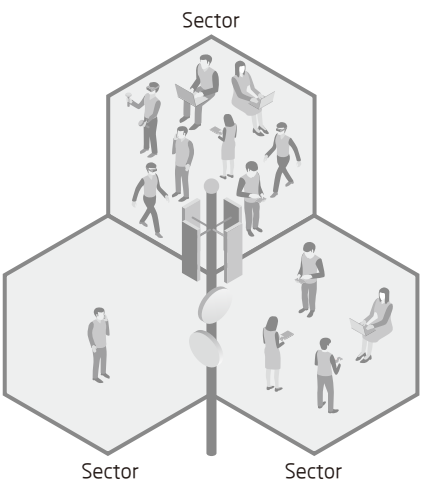
Primary power on based on sub-band,
BBU backup time can reach *2 hours

Power on and off according to business characteristics greatly save electricity and maintenance cost

Base station business features

OLD

- Different sites have different backup power priority, as different business required in different tim;
- Different sectors in same site, have different backup power priority, as business requirements are also different;
- 5G equipments requires huge power consumption, thus, energy saving is especially important, However, traditional solution can't control each equipments, and thus can't control equipments according to sites and sectors.

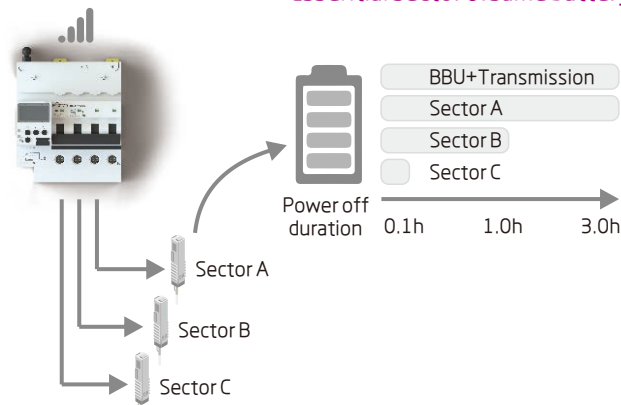


Smart solution

NEW

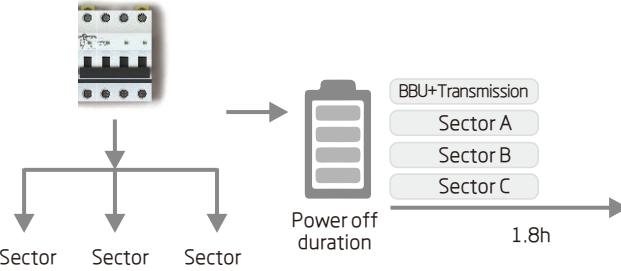
- According to different business requirements in sectors, trying to extend backup power time duration in essential sectors, as per power on in sectors;
- To power on/off different sites and sector, accordingly to different business quirements in different time, will greatly save electricity bill;
- Power on/off 5G each equipment independently.

Smart solution



**2X+Backup time
Essential sector & same battery**

Traditional solution



**Once battery is exhausted
all sectors will be powered off**



Differentiated Power Backup Solution of 5G Site 5G solution application case

Customer requirement

Customer wants real time review, on web, the capacity and status of device. It can remotely control each load, and regularly analyze the energy consumption of the operator and output electricity billing.

- Differentiated backup power services to different equipments in the base station, 5G on power in time;
- Different backup power demands in different operators;
- Independent metering;
- Independent electricity generation based on user's equipments;
- Independent control management and timely faults handling.



Smart PDU introduction

Support differentiated backup power for 5G users

1. Support two 5G users to power on according to time duration, and the time can be set through FSU/platform;
2. Each user supports 10 loads to meet the power distribution requirements of AAU and BBU

Support 5G user to meter energy by kWh

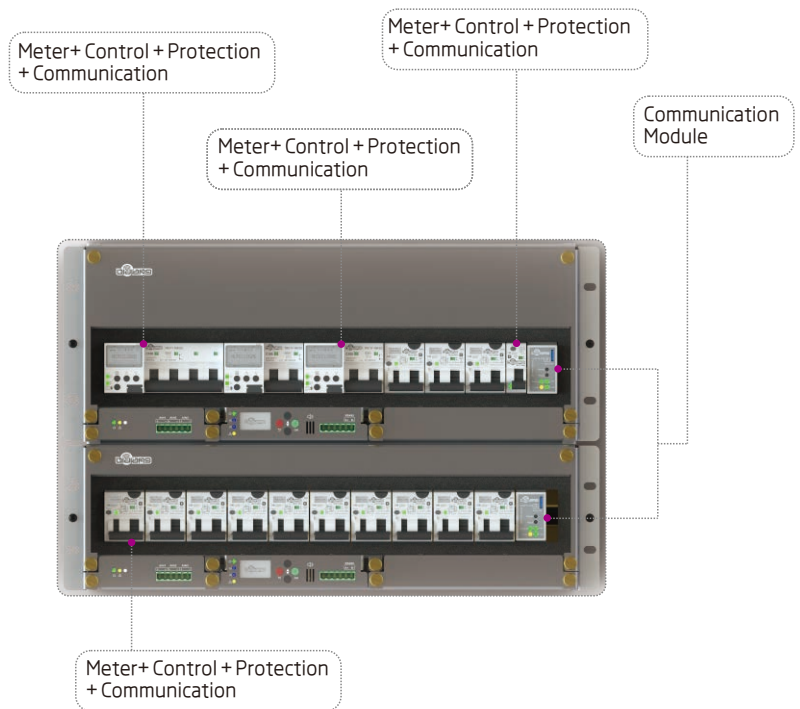
1. Support two 5G users the independent measurements of current, kWh and metering of all devices, and upload all data through the FSU or gateway;
2. High metering accuracy of 1%;
3. Use modular metering, it can add or reduce loads on demand, with simple wiring.

Support 5G equipments power generation on demand

1. Support two 5G users to generate power on demand;
2. Solve the problem of insufficient capacity of small diesel generator and difficult to move big diesel generator.
3. Optional power generation and support flexible configuration.

Support 5G equipments independent power-on/o control and automatic fault reset

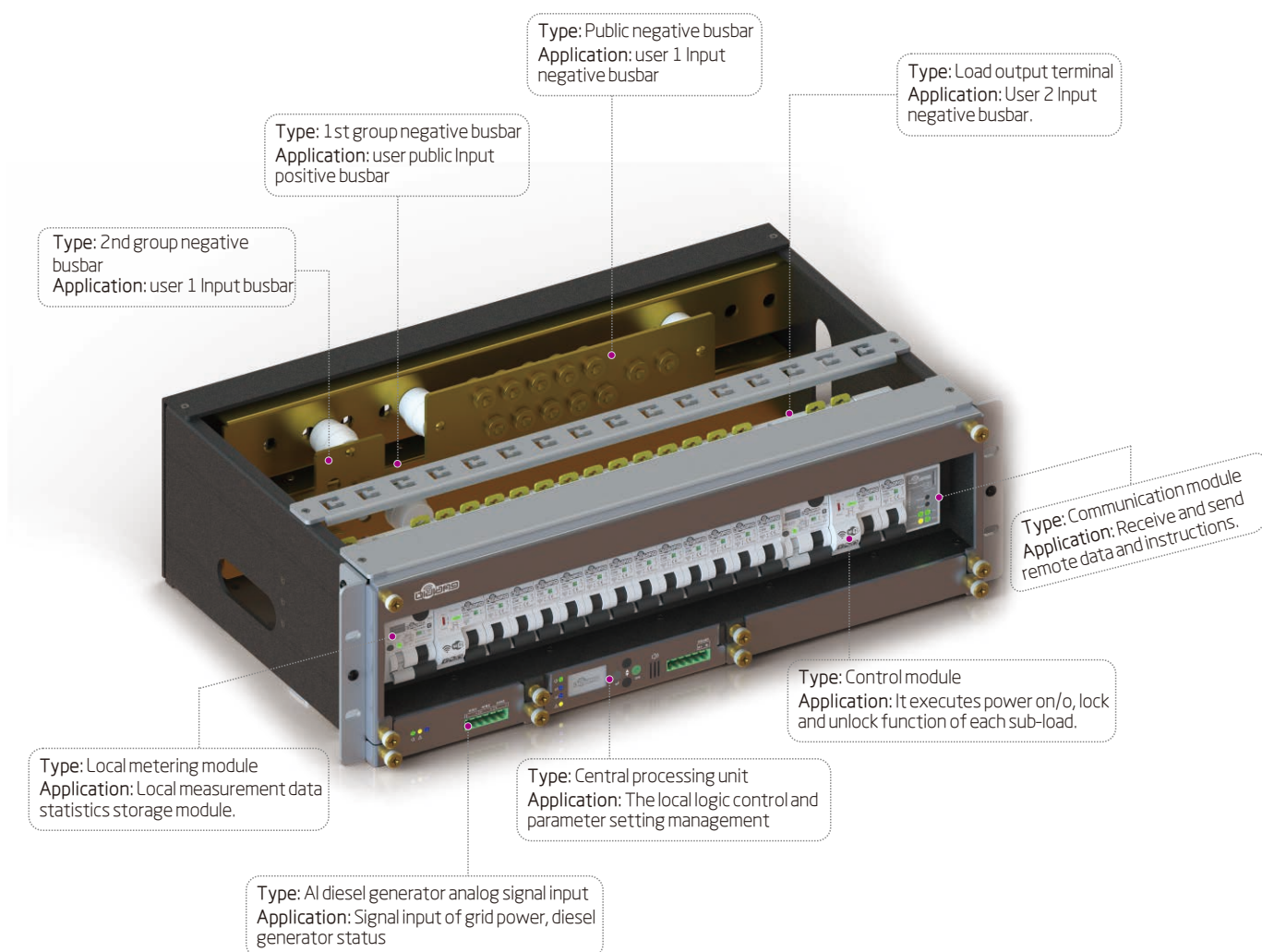
1. Support power-on/o, lock and unlock of 5G equipments of each load;
2. Instantaneous fault automatic reset to ensure the continuity of power supply.



- 3U high-density design, space saving, easy to install;
- Support equipment-level energy metering for 5G of two users;
- Support 5G of two users to power on according to time duration;
- Support 5G of two users to generate electricity on demand;
- Maximum output power 200A@53.5V.



Introduction of smart power distribution unit



Control function

- timer on-off
- time duration of backup power
- voltage of backup power
- power of backup power
- duty-free period of time

Meter function

- PDU owns various users metering and statistics
- PDU owns sub-load metering and statistics

Resource management

- System of power distribution load, remote capacity monitoring
- Connect PMS system, remotely organize power distribution resources

Auxiliary function

- PDU owns sensor of power on/o, diesel generator, and real time status of grid power or diesel generator
- DC generator optional
- RS485 / FSU / independent communication gateway, multi-mode management



Main Products

	<p>TRC11-100 ARD+MCB+RCCB+RCBO+Electric meter</p> <ul style="list-style-type: none"> Short circuit protection Overload protection Over-undervoltage protection Electric leakage protection Get an electric shock protection Time switch Automatic closing and disconnecting Electricity metering Electricity control The remote control Wireless communications RS485 GPRS, 4G Wifi Bluetooth Ethernet LoRa
	<p>TRJ11-40G ARD+MCB+RCCB+RCBO+Electric meter</p> <ul style="list-style-type: none"> Short circuit protection Overload protection Over-undervoltage protection Electric leakage protection Get an electric shock protection Time switch Automatic closing and disconnecting Electricity metering Electricity control The remote control Wireless communications RS485
	<p>TRR11-100DC ARD+MCB</p> <ul style="list-style-type: none"> Short circuit protection Overload protection Automatic closing and disconnecting Electricity control The remote control Wireless communications Wifi Bluetooth 1P, 1P+N, 2P, 3P, 3P+N, 4P 1~100A 48, 50, 70VDC 120~415VAC
	<p>TRM11-100DC MCB</p> <ul style="list-style-type: none"> Short circuit protection Overload protection 1P, 1P+N, 2P, 3P, 3P+N, 4P 1~100A 48, 50, 70VDC 120~415VAC
	<p>CHJ13-63MDC ARD+MCB+Switch+Relay+Electric meter</p> <ul style="list-style-type: none"> Short circuit protection Overload protection Time switch Automatic closing and disconnecting Electricity metering Electricity control The remote control Wireless communications RS485 1P 1~63A 48, 50, 70VDC 80~280VAC
	<p>CHJ13-63DC ARD+Switch+Relay+Electric meter</p> <ul style="list-style-type: none"> Overload protection Time switch Automatic closing and disconnecting Electricity metering Electricity control The remote control Wireless communications RS485 1P 1~63A 48, 50, 70VDC 80~280VAC
	<p>CHW13 Communication Module</p> <ul style="list-style-type: none"> RS485 to Ethernet RS485 to Wifi RS485 to GPRS RS485 to 4G RS485 to Bluetooth RS485 to LoRa Wan TICP MQTT AP 80~250VAC

