



F01T300

Product Description

Issue 03
Date 2018-08-22

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About This Document

Intended Audience

The F01T300 cabinet provides a medium-capacity outdoor solution.





This document describes the features, structure, configurations, specifications, environmental requirements, and standards compliance of the F01T300 cabinet.


This document is intended for:

- Network planning engineers
- Installation and commissioning engineers
- Field maintenance engineers
- Network monitoring engineers
- System maintenance engineers
- Data configuration engineers
- Application developers

Symbol Conventions

The symbols that may be found in this document are defined as follows:

Symbol	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
 NOTE	Indicates important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue 03 (2018-08-22)

Compared with issue 02 (2017-12-15), this issue has the following updates:

Added the power meter box.

Modified the heat dissipation requirements of the F01T300 cabinet.

Issue 02 (2017-12-15)

Compared with issue 01 (2017-04-30), this issue has the following updates:

Added the description of the Li-ion battery and high temperature battery.

Added the power distribution principles and monitoring principles for the Li-ion battery (optional configuration).

Issue 01 (2017-04-30)

This is the first release.

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1 Cabinet Applications

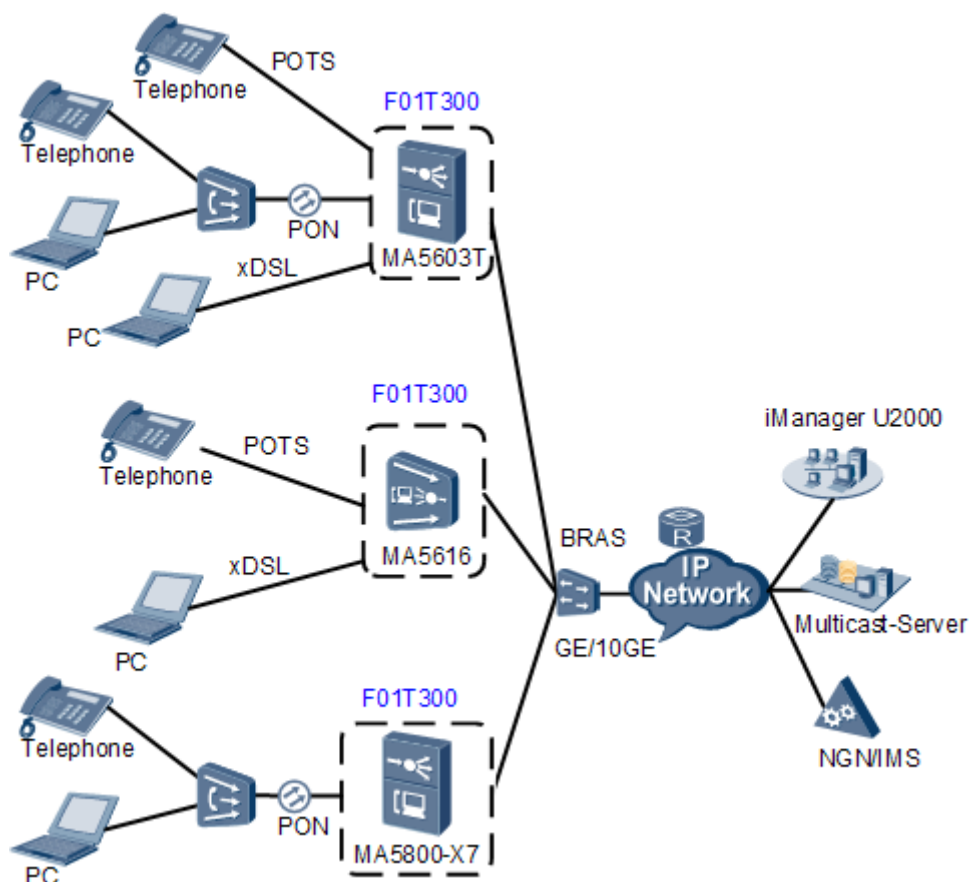
The F01T300 cabinet can be configured with MA5800-X7, MA5603T and MA5616 service units. It can be configured with different built-in service boards to provide GPON, POTS, xDSL, vectoring, SuperVector and GE (P2P) services.

Product Positioning

- The F01T300 cabinet applies to global markets except North America. It provides the battery backup or remote power for areas with unstable mains supply.
- The F01T300 cabinet is a sealed cabinet and mainly applies to outdoor scenarios. For example, it can be deployed in residential communities, urban streets, and village fields.
- The F01T300 cabinet provides an outdoor medium-capacity solution, supporting maximum of 384 channel copper service, 192 PON ports or 336 GE (P2P) ports.

Figure 1-1 shows the positions of the F01T300 cabinet in the overall network solution.

Figure 1-1 Application of the F01T300 cabinet in the overall network solution



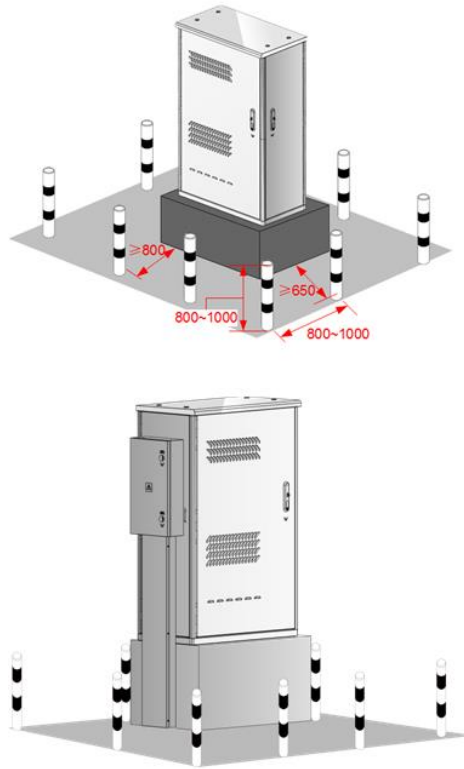
Cabinet Installation

The F01T300 cabinet can be installed on a concrete pedestal or an elevated platform. The cabinet is configured with lifting rings. Therefore, it can be hoisted in a safe and reliable way, and installed easily.

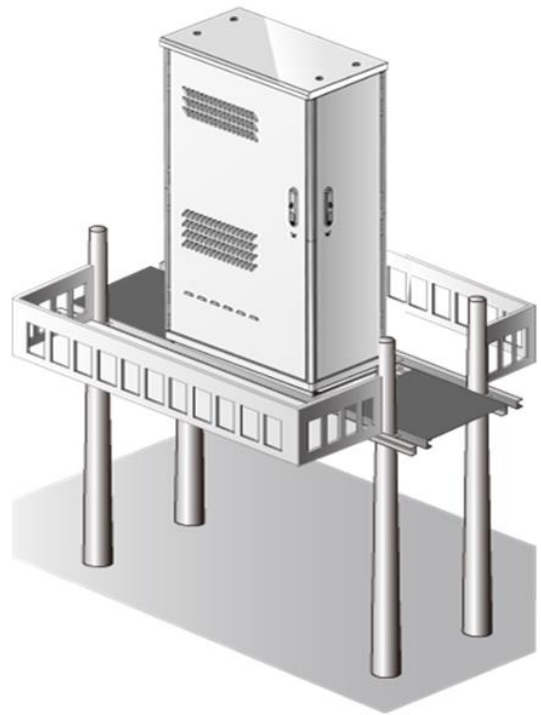
Figure 1-2 shows the F01T300 cabinet installed on a concrete pedestal and an elevated platform.

Figure 1-2 F01T300 cabinet installed on a concrete pedestal and an elevated platform.

Installation on a concrete pedestal



Installation on an elevated platform



2 Cabinet Feature

The F01T300 cabinet is a front-access sealed cabinet for outdoor applications, effectively ensuring reliable running of the service units inside.

High Security

- Prominent performance in electromagnetic compatibility (EMC) and anti-attack
- IP55 enclosed-type design effectively isolates external harmful dust or gases that may cause corrosion.
- Level-based maintenance by isolating the equipment compartment from the cable distribution compartment (these two compartments have different door locks and support external locks to provide better security)
- Excellent performance in anti-theft by fastening bolts at the bottom inside the cabinet
- Provides a maximum of 40 kA surge protection capability for more secure outdoor use.
- Prominent performance in heat dissipation, and can run in the high temperature areas (50 °C + solar radiation).
- The battery anti-theft component (optional) prevents batteries from being damaged and being stolen, prolonging the battery lifetime and installation reliability.

Convenient Maintenance

- Components inside the equipment compartment of the F01T300 cabinet are front-serviceable.
- The built-in main distribution frame (MDF) in the cable distribution compartment of the F01T300 cabinet supports wire seating from the front side. The built-in optical distribution frame (ODF) supports pre-deployment of device-side optical ports and fibers, user-side external optical cable splicing, and device-side and user-side (internal and external) fiber patching.
- The F01T300 cabinet provides a portable illuminator, facilitating nighttime maintenance.
- The AC maintenance socket inside the F01T300 cabinet supplies power to an external maintenance terminal. The folder on the cabinet door can be unfolded to function as a console, onto which the maintenance terminal can be placed for onsite maintenance.
- The F01T300 cabinet supports shell replacement without service interruption.

Intelligent Monitoring

- Supports monitoring on the cabinet and internal components by using the EMU and U2000.

- Supports remote electronic door lock management to improve site security and reduce site maintenance costs.

One-stop delivery

- The F01T300 cabinet is integrated with service, power supply, monitoring, temperature control, and cable distribution units. This design minimizes the installation costs and space. The F01T300 cabinet can be installed quickly onsite to satisfy the demand for quick deployment.
- The sealed design protects the F01T300 cabinet against dust, moisture, and rain, and ensures reliable running in harsh environment.
- Supports both remote power supply and AC power supply (generator interface reserved).
- The battery power backup or remote power supply ensures the normal running of the F01T300 cabinets used in areas with unstable mains supply.

Simple Evolution

- Supports copper wires, fibers, and the hybrid configuration of copper wires and fibers to facilitate future network evolution.
- Supports extended modular design for space expansion, meeting service expansion requirements. Also, it supports top box or side-by-side cabinet installation for service configuration expansion, prolonging backup duration.

3 Appearance and Structure

The F01T300 cabinet consists of the equipment compartment, cable distribution compartment, and battery compartment.

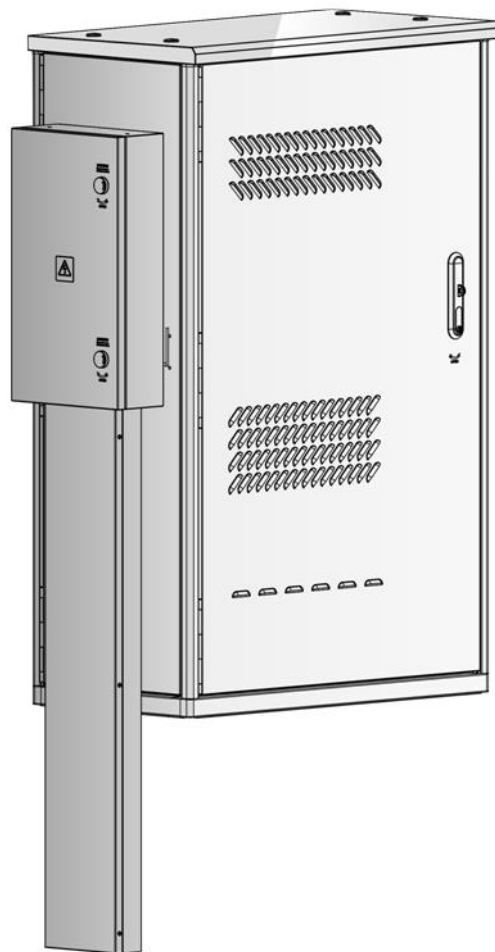
Appearance

The surface of the F01T300 cabinet adopts the outdoor powder coating technique, well protecting the cabinet against corrosion. The coating color code is RAL7035.

Figure 3-1 Appearance of the F01T300 cabinet



With power meter box



Structure

Three compartments (equipment compartment, cable distribution compartment, and battery compartment) are assembled into the F01T300 cabinet.

The F01T300 cabinet has a frame structure and is made of extruded aluminum profile. This allows the cabinet to support flexible upgrade and expansion of functional modules without site relocation.

Figure 3-2 Structure of the F01T300 cabinet (configured with MA5603T and an ETP4830 power system)

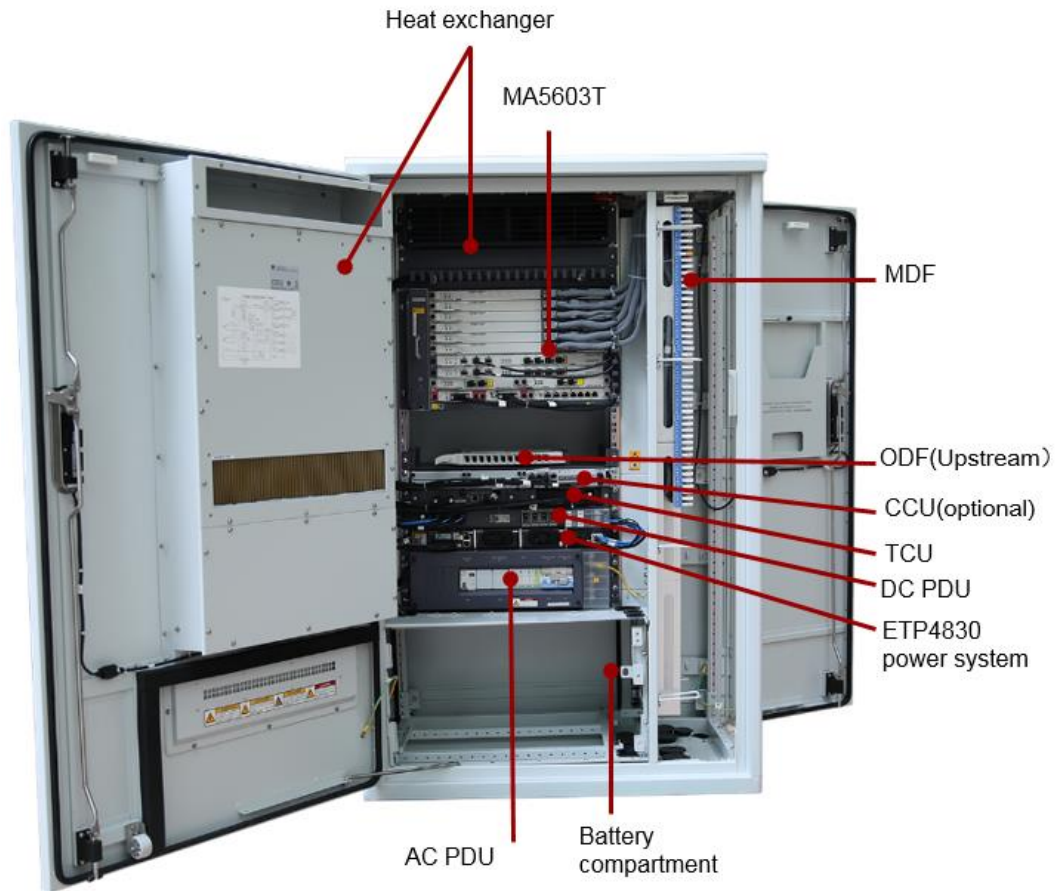


Figure 3-3 Structure of the F01T300 cabinet (configured with MA5603T and an ETP4890 power system)

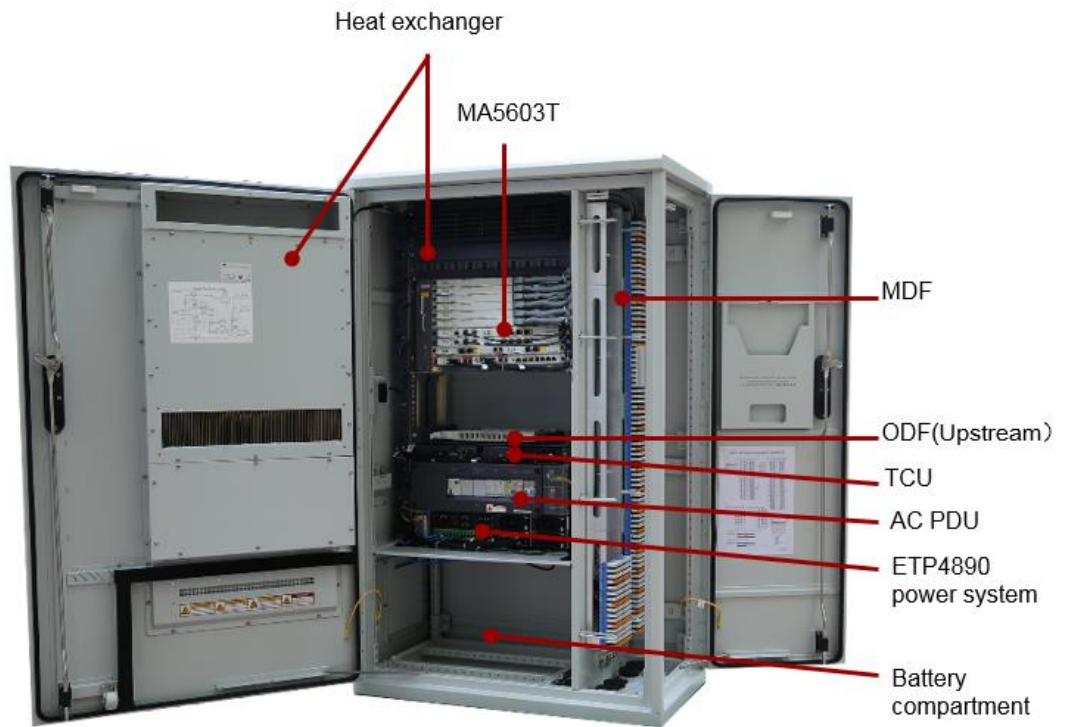


Figure 3-4 Structure of the F01T300 cabinet (configured with MA5800-X7 and an ETP4890 power system)

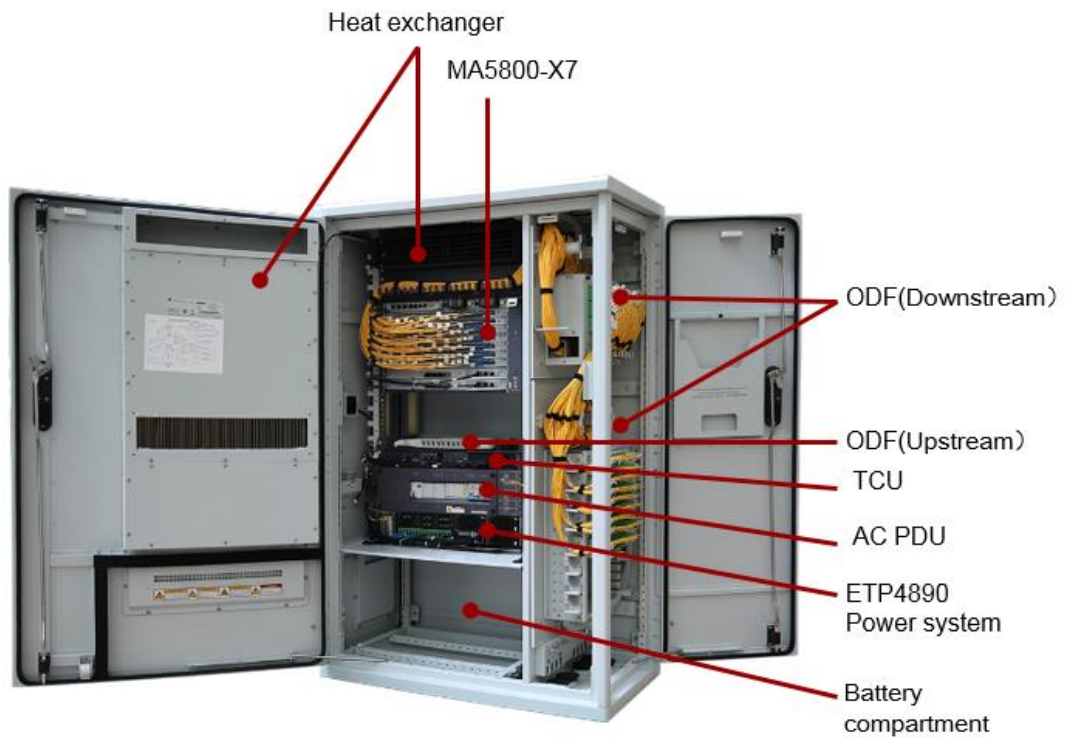


Figure 3-5 Structure of the F01T300 cabinet (configured with MA5616 and an ETP4830 power system)

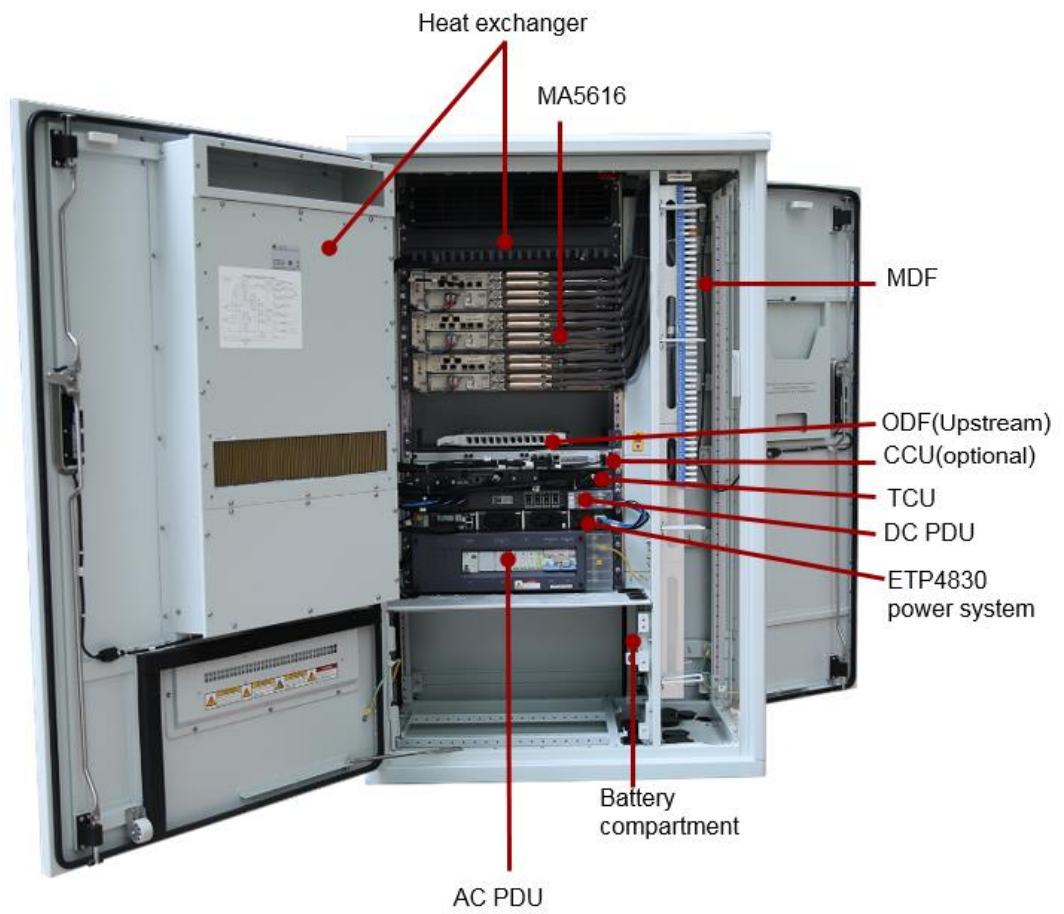


Figure 3-6 Structure of the F01T300 cabinet (configured with MA5616 and an ETP4890 power system)

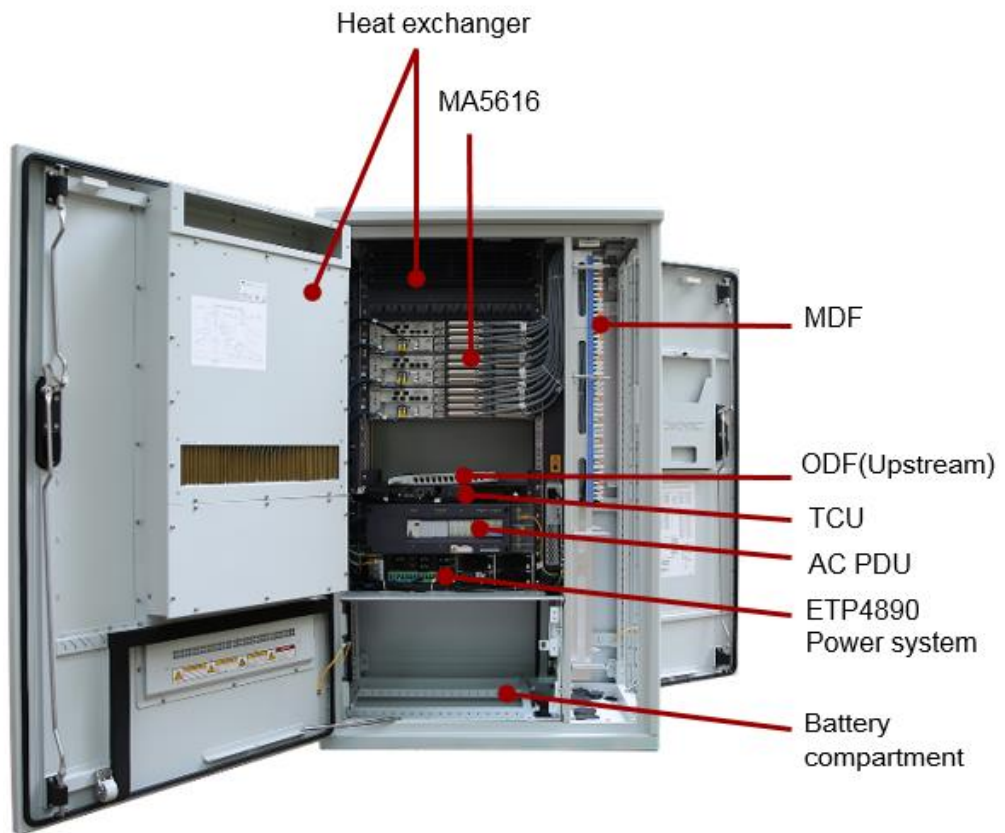


Figure 3-7 Structure of the F01T300 cabinet (configured with MA5616 and remote power system)

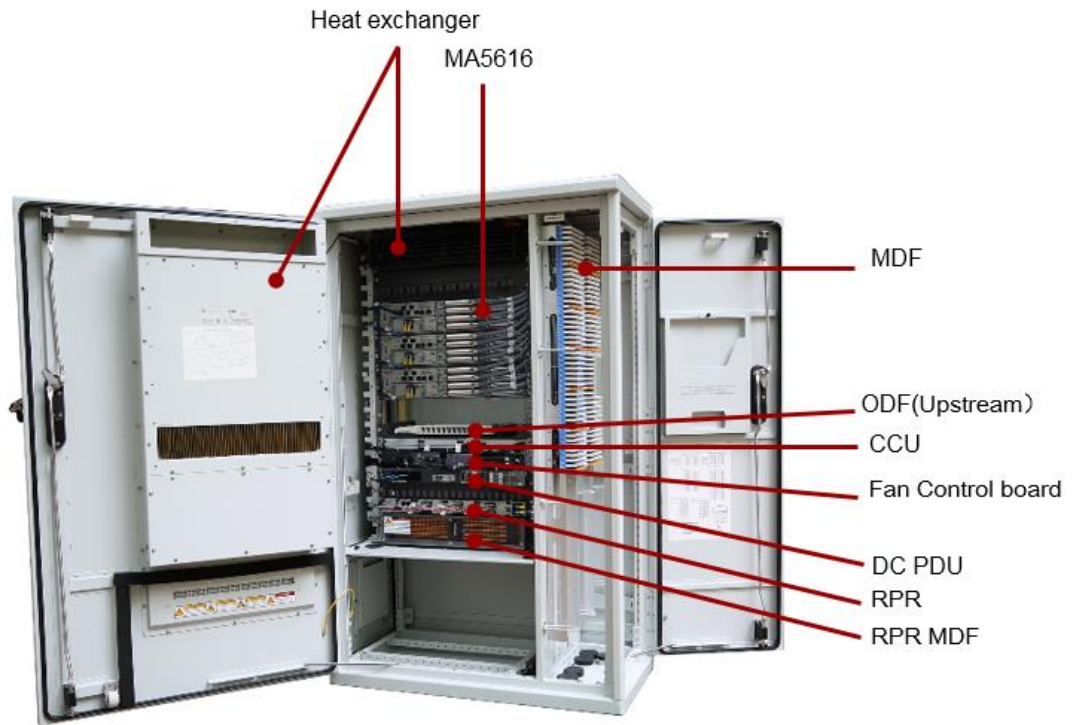
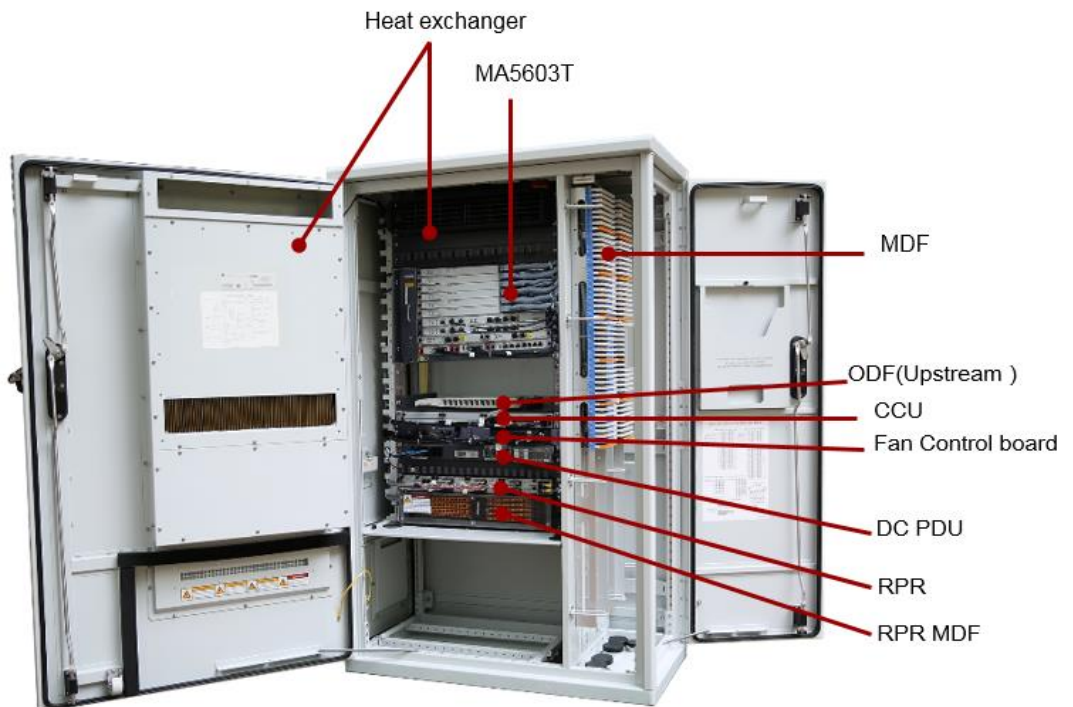


Figure 3-8 Structure of the F01T300 cabinet (configured with MA5603T and remote power system)



Door Lock

By default, the F01T300 cabinet is configured with an HW-2802 door lock (HW-2801 lock cylinder + HW-2802 lock body). Alternatively, the F01T300 cabinet can be configured with an electronic door lock to provide better protection for devices inside the cabinet.

HW-2802 Door Lock

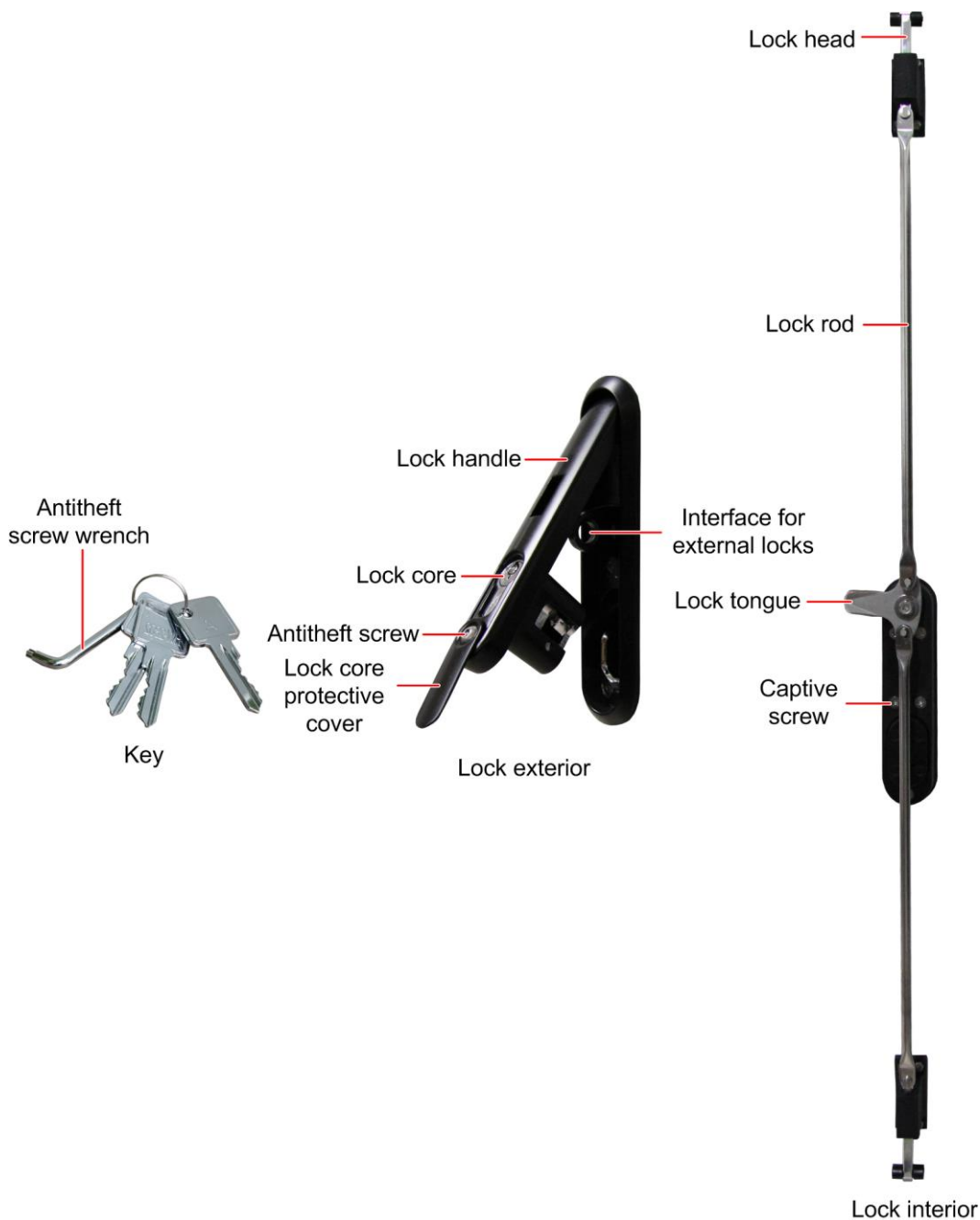
The F01T300 cabinet is configured with HW-2802 door locks (specifically, HW-2802A for the equipment compartment and HW-2802B for the cable distribution compartment). These locks are configured with different keys, meeting customer demands for level-based maintenance.

The HW-2802 door lock has the following features:

- Supports internal installation and removal. Bolts are fastened inside the cabinet and no part is exposed outside.
- Provides a three-point (upper head, lower head, and tongue) structure to protect against prying from the side cover.
- Provides an interface for an external lock, which ensures better theft-resistance.
- Provides a European-standard cylinder lock that is easy to replace and complies with the DIN 18252 (a German industrial standard).
- Complies with IPX5 defined in the IEC 529 standard "Degrees of protection provided by enclosures (IP code)."
- Complies with theft-resistance rating three in anti-of the DD ENV 1627-1999 and LPS1175 Issue 5.2 Security Rating 2 and SEAP Class 1.
- Provides a protective cover for the lock cylinder, protecting the lock cylinder from being blocked by foreign objects. The protective cover provides reliable protection, convenient rotation, and anti-freezing function.
- Provides corrosion protection and complies with IEC 68-2-52. It passes the 10-day test Kb (salt mist, cyclic). In each round of test, salt and mist are sprayed on the lock for two hours and then the lock is placed in a hot and humid environment for 20 to 22 hours. This test is repeatedly performed for 10 rounds (10 consecutive days).
- Supports at least 5000 locking cycles.

Figure 3-9 shows the appearance of the HW-2802 door lock.

Figure 3-9 Appearance of the HW-2802 door lock



(Optional) Electronic Door Lock

The electronic door lock with a CCU provides site security management:

- Near-end unlocking by using a card and remote unlocking on the NMS
- Door status detection or moving object detection associated with an audio alarm
- Retrievable unlocking records
- Real-time unlocking event reporting
- Report export from the NMS

The preceding management can be implemented at a basis of a site, engineer, or compartment door, effectively preventing internal thefts.

The electronic door lock is compatible with the HW-2802 door lock. Figure 3-10 shows the appearance of the electronic door lock. For details, see [Intelligent Site Product Description](#).

Figure 3-10 Appearance of the electronic door lock



Table 3-1 describes indicators of an electronic door lock.

Table 3-1 Indicators of an electronic door lock

Indicator	Status	Status Description
Green	Off	The lock is locked.
	Steady on	The lock is unlocked and the lock handle is lifted.
	Blinks slowly at 0.5 Hz	The lock is unlocked and the lock handle is not lifted.
	Blinks quickly at 4 Hz	Software loading is in process. During this loading, the lock cannot be performed.
Red	Off	The lock is normal.
	Steady on	Undefined.
	Blinks slowly at 0.5 Hz	The access card is not authenticated.
	Blinks quickly at 4 Hz	The association structure of the lock is faulty.

 **NOTE**

When the lock is powered on or reset for self-check, the indicators (red and green) are on for 0.25s.

Table 3-2 describes specifications of an electronic door lock.

Table 3-2 Specifications of an electronic door lock

Item	Standard
Operating environment	ETSI300 019-1-4 CLASS4.1E Operating temperature: -40 °C to +65 °C (without solar radiation) Relative humidity: 5% to 100% RH
Storage temperature	ETSI 300 019-1-1 CLASS 1.2 Storage temperature: -40 °C to +70 °C Relative humidity: 5% to 100% RH
Transportation conditions	ETSI 300 019-2-2 CLASS 2.3 Transportation temperature: -40 °C to +70 °C Relative humidity: 5% to 100% RH
Operating altitude	-60 m to +4000 m
IP protection level	Degrees of protection provided by enclosures(IP code): IP55 (If the lock is installed on the cabinet door, the external jetting complies with IPX5 and internal complies with IPX1.)
Anti-theft capability	LPS1175 Issue5.2 Security rating2
Anti-freezing capability	3R in UL-50 34
Flame-retardant rating	UL94-V0
Environment protection	RoHS and WEEE
Safety	IEC/EN/UL 60950-1 Information technology equipment-Safety-Part 1: General Requirements GR1089 and GR63

(Optional) Battery Anti-theft Component

The battery anti-theft component prevents batteries from being damaged and being stolen, prolonging the battery lifetime and installation reliability.

Figure 3-11 Battery anti-theft component



4 Cabinet Configurations



NOTE

When the AC power supply and electronic door locks are used in F01T300 cabinet, and you need to select CCU, the CCU will occupy the 1U installation space.

4.1 F01T300 Cabinet Configured with MA5603T (MSAN)

This topic describes the layout of the F01T300 cabinet configured with MA5603T (MSAN).

Figure 4-1 Layout of the F01T300 cabinet (providing only copper access and configured with an ETP4830 power system)

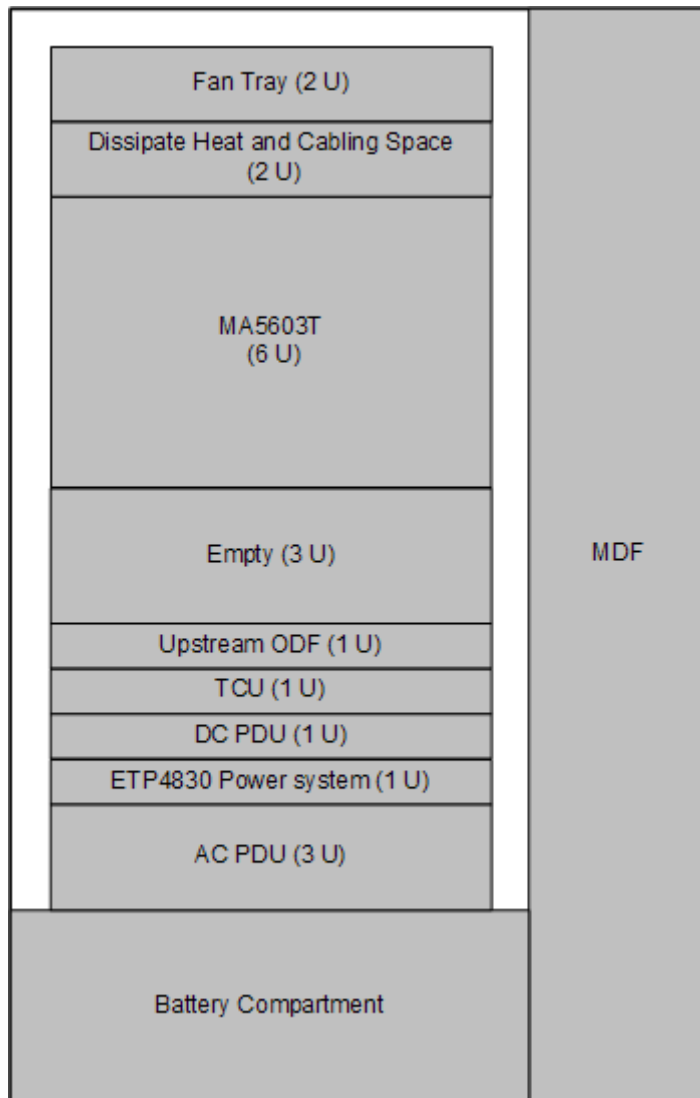


Figure 4-2 Layout of the F01T300 cabinet (providing only copper access and configured with an ETP4890 power system)

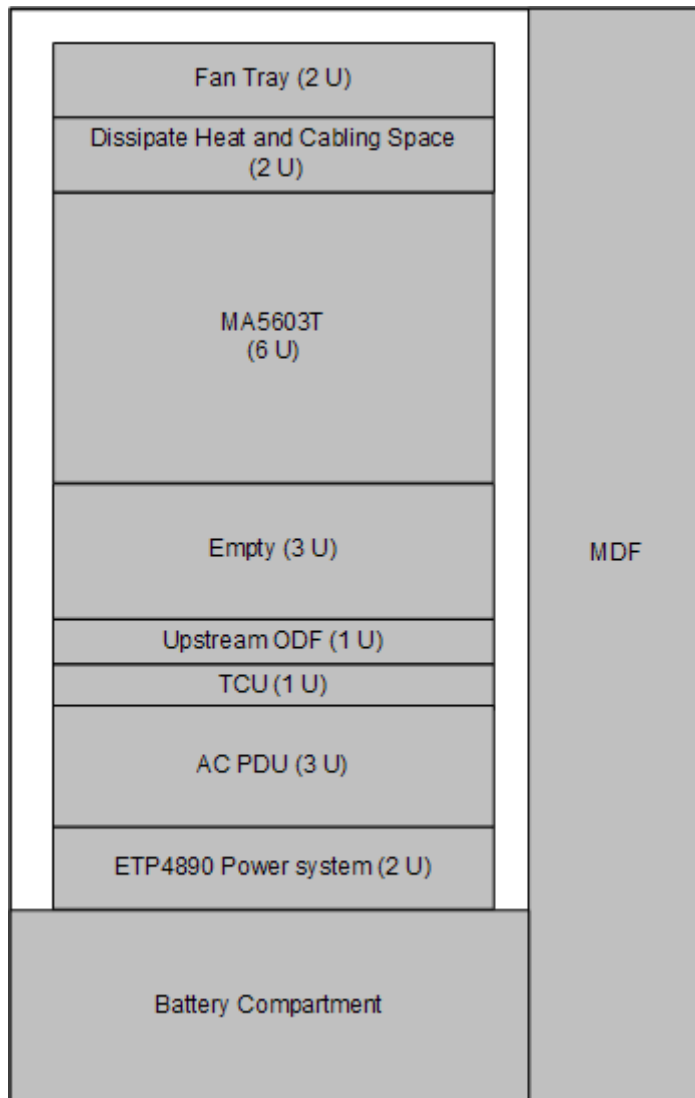


Figure 4-3 Layout of the F01T300 cabinet (providing integrated fiber and copper access and configured with an ETP4830 power system)

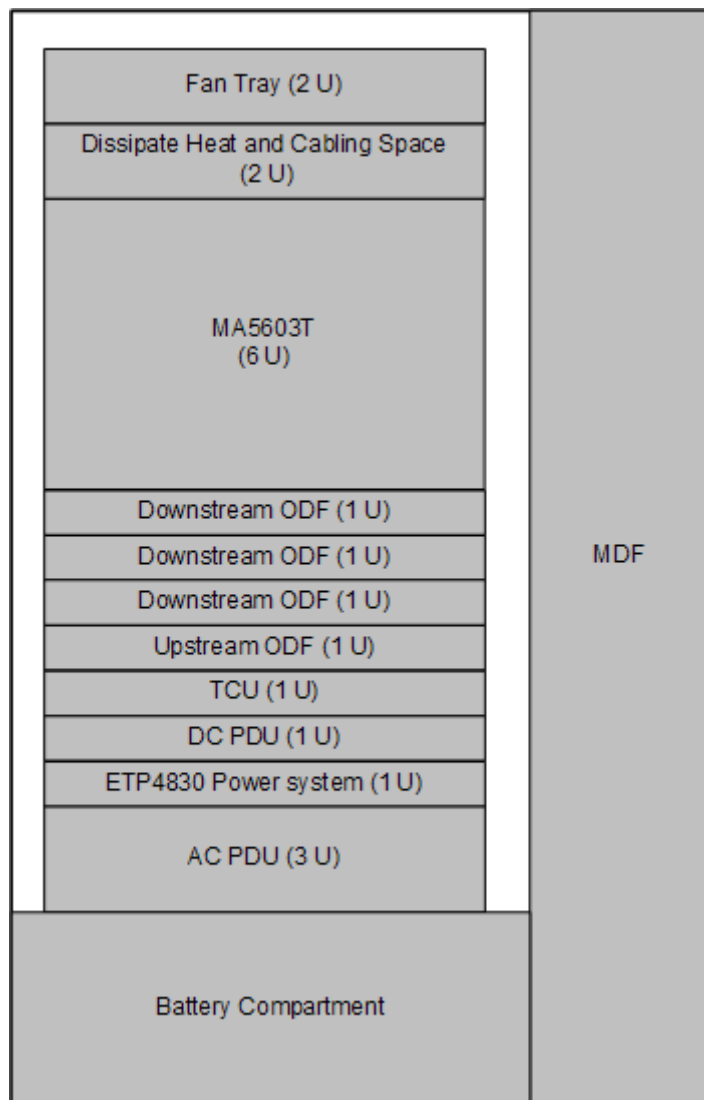


Figure 4-4 Layout of the F01T300 cabinet (providing integrated fiber and copper access and configured with an ETP4890 power system)

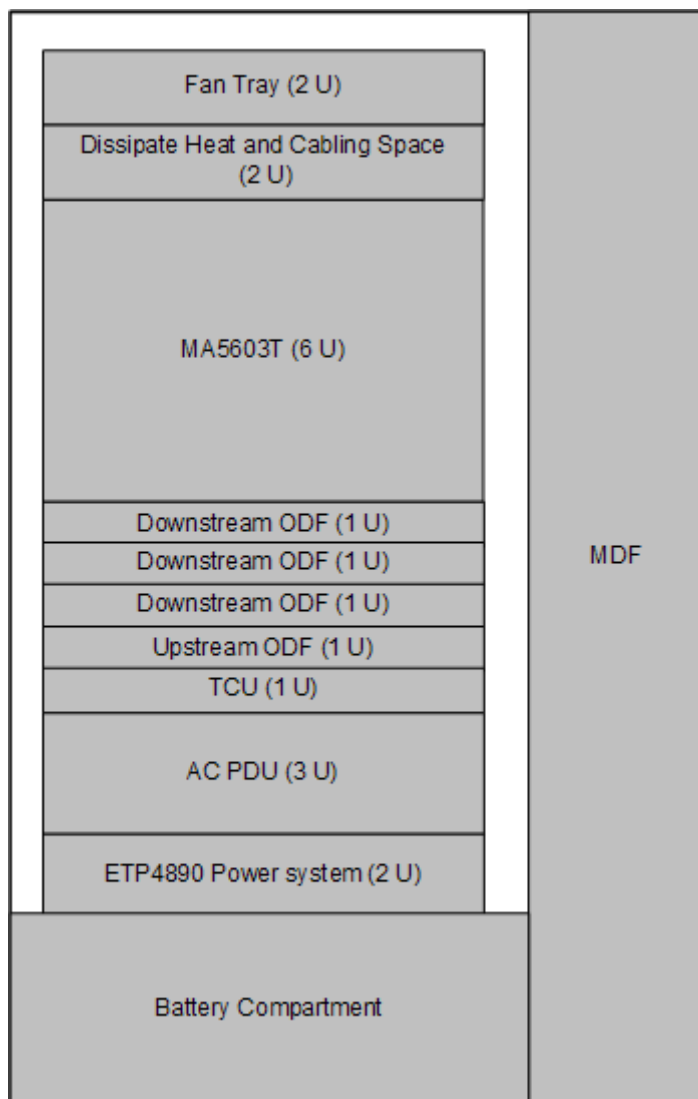


Figure 4-5 Layout of the F01T300 cabinet (providing only copper access and configured with an RPS system)

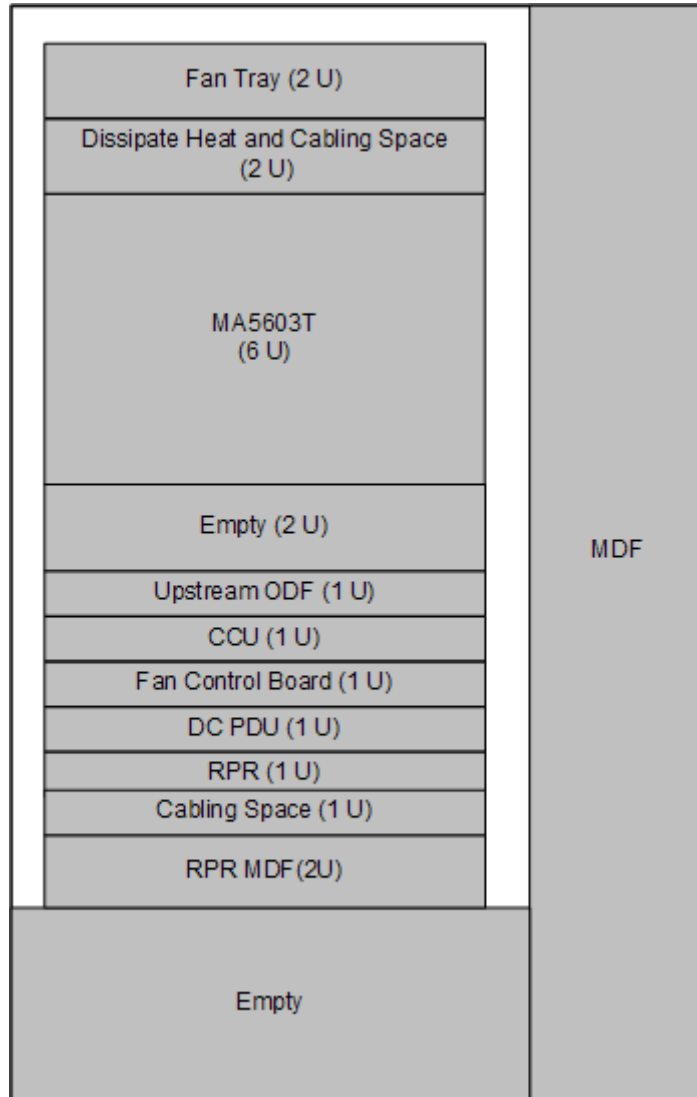
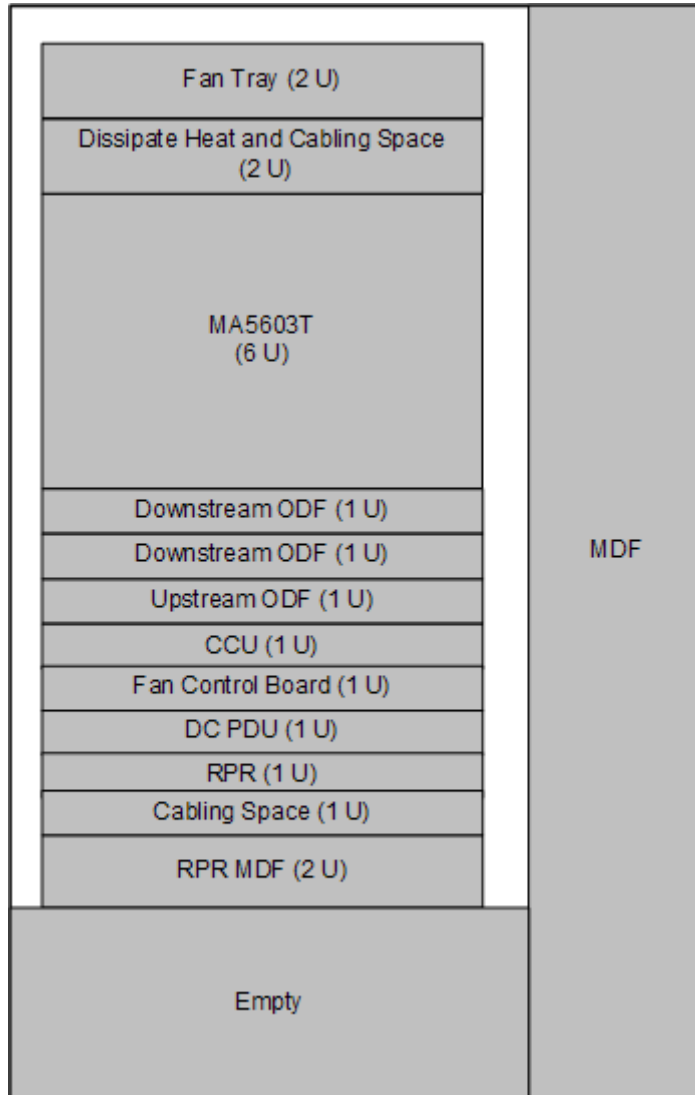


Figure 4-6 Layout of the F01T300 cabinet (providing integrated fiber and copper access and configured with an RPS system)



4.2 F01T300 Cabinet Configured with MA5603T (OLT)

This topic provides the layout of the F01T300 cabinet configured with MA5603T (OLT).

Figure 4-7 Layout of the F01T300 cabinet configured with MA5603T (providing only PON access and configured with an ETP4890 power system)

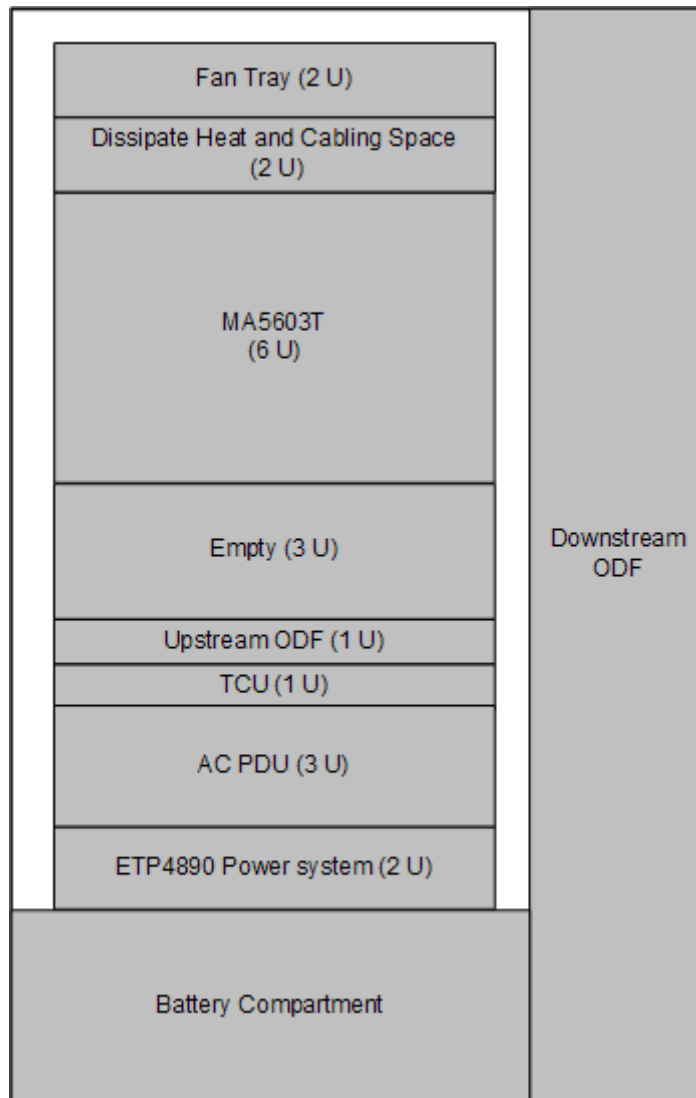
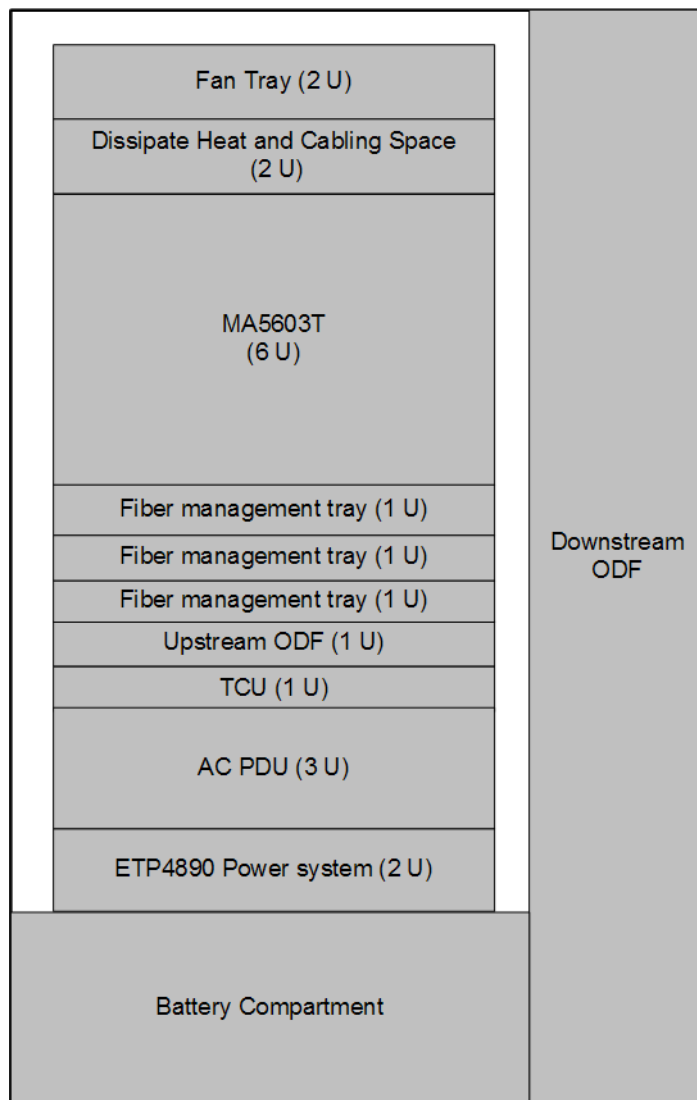


Figure 4-8 Layout of the F01T300 cabinet configured with MA5603T (providing only P2P access and configured with an ETP4890 power system)



4.3 F01T300 Cabinet Configured with MA5800-X7 (OLT)

This topic provides the layout of the F01T300 cabinet configured with MA5800-X7 (OLT).

Figure 4-9 Layout of the F01T300 cabinet configured with MA5800-X7 (providing only PON access and configured with an ETP4890 power system)

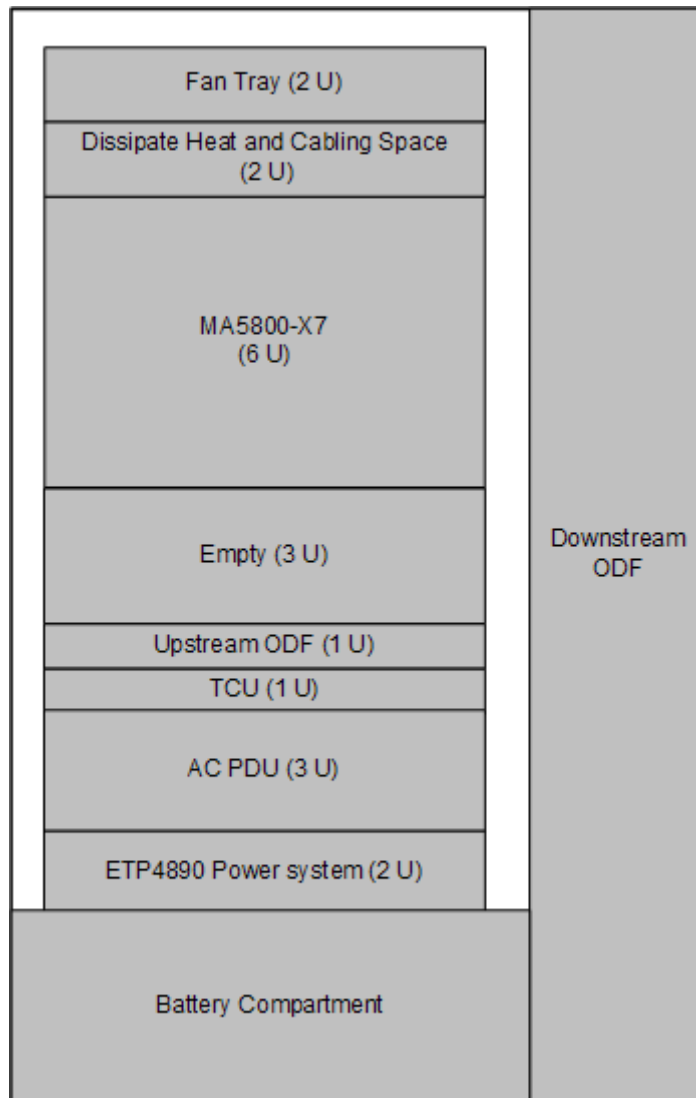
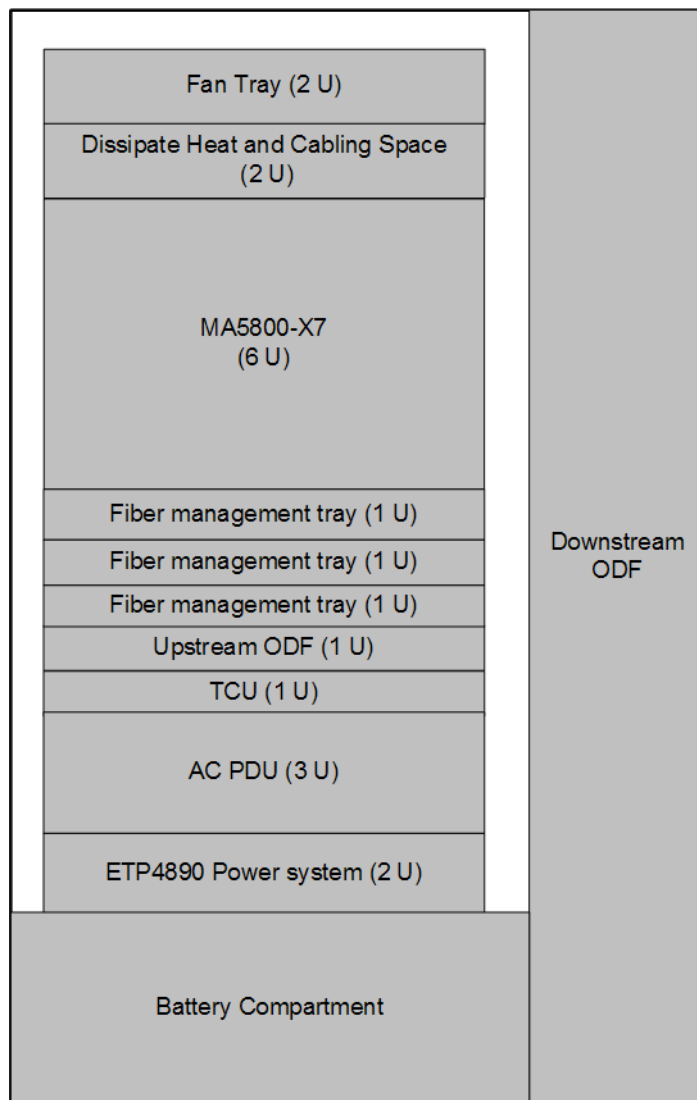


Figure 4-10 Layout of the F01T300 cabinet configured with MA5800-X7 (providing only P2P access and configured with an ETP4890 power system)



4.4 F01T300 Cabinet Configured with MA5616

This topic describes the layout of the F01T300 cabinet configured with MA5616.

A maximum of three MA5616s can be configured in the F01T300 cabinet as required.

Figure 4-11 Layout of the F01T300 cabinet configured with MA5616 (configured with ETP4830 power system)

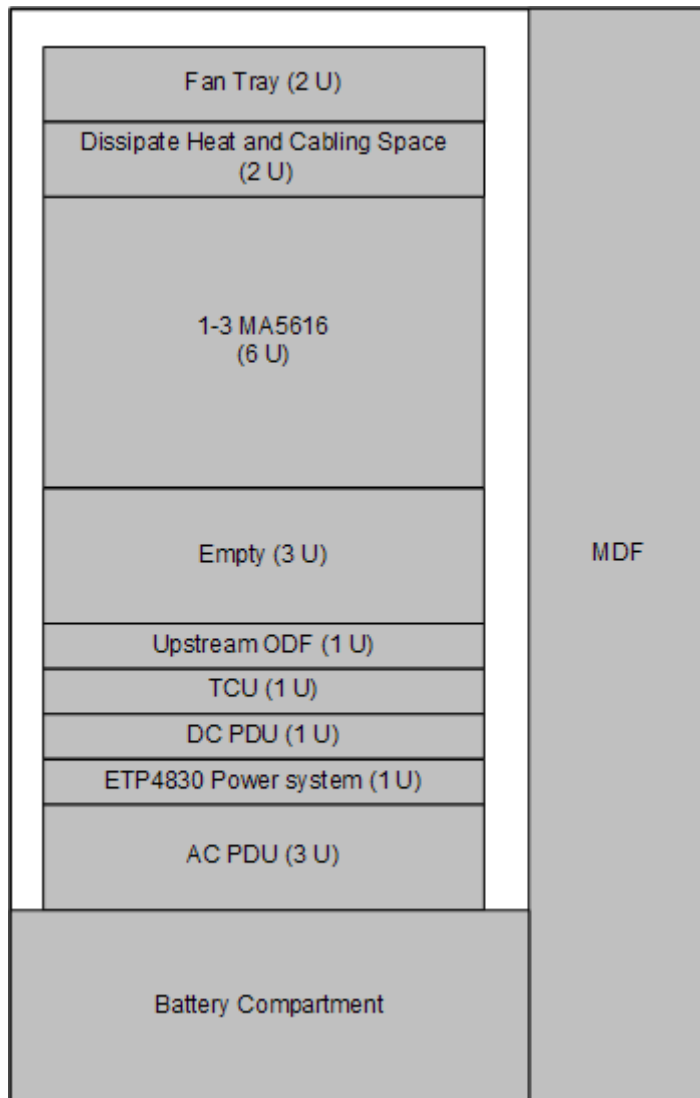


Figure 4-12 Layout of the F01T300 cabinet configured with MA5616 (configured with ETP4890 power system)

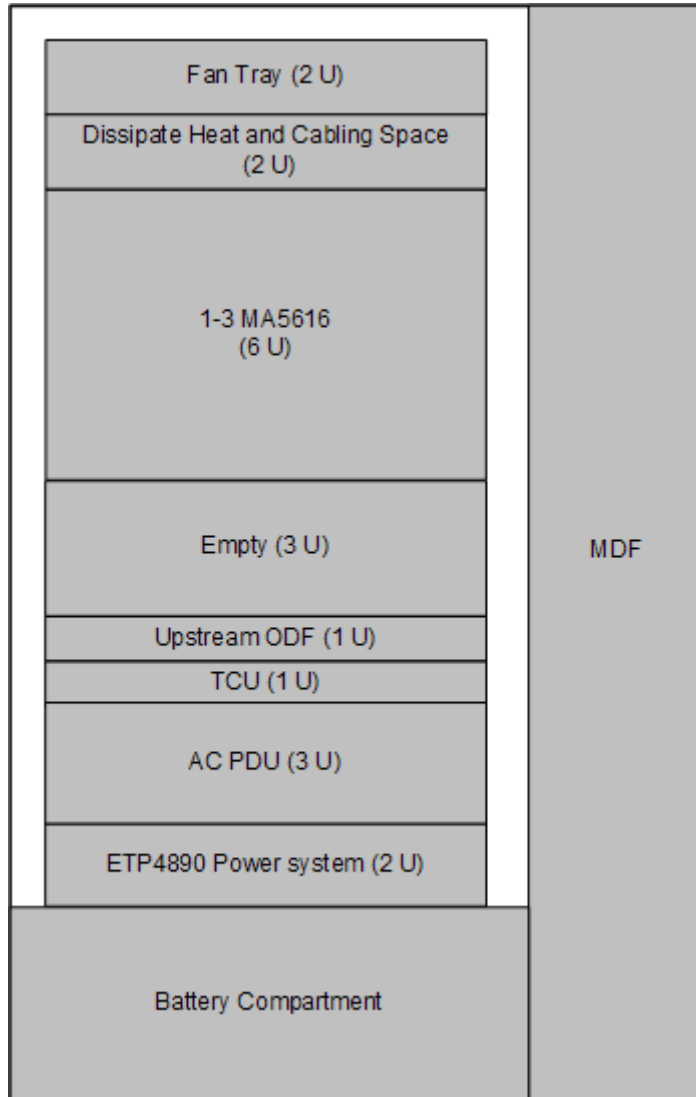
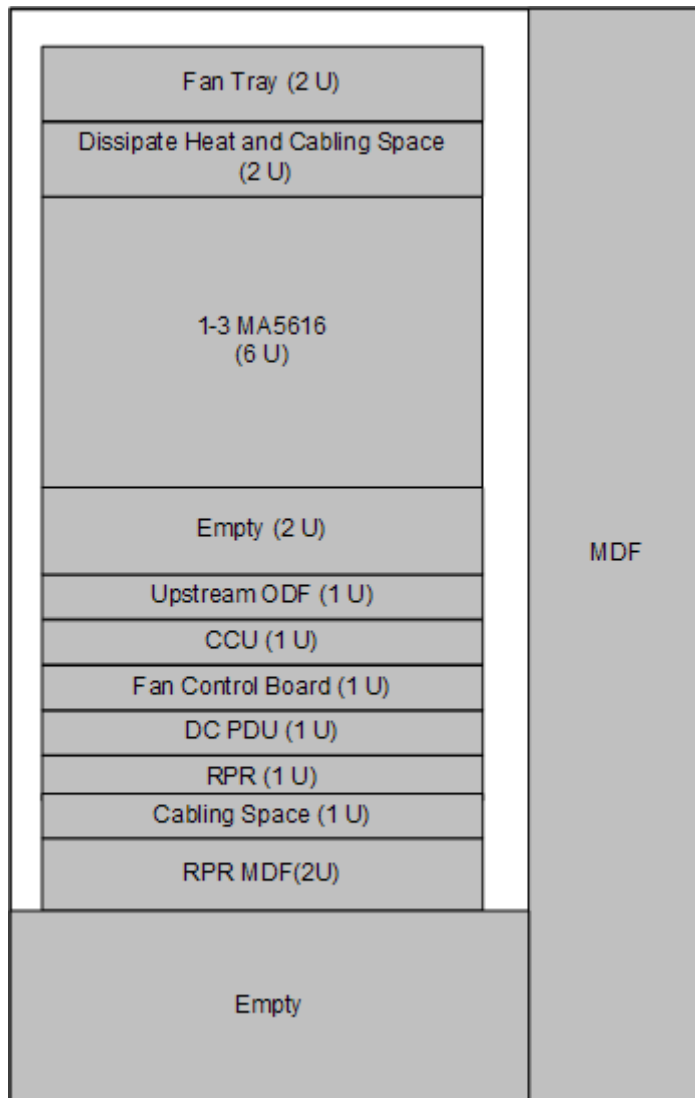


Figure 4-13 Layout of the F01T300 cabinet configured with MA5616 (configured with remote power system)



5 Power Supply System

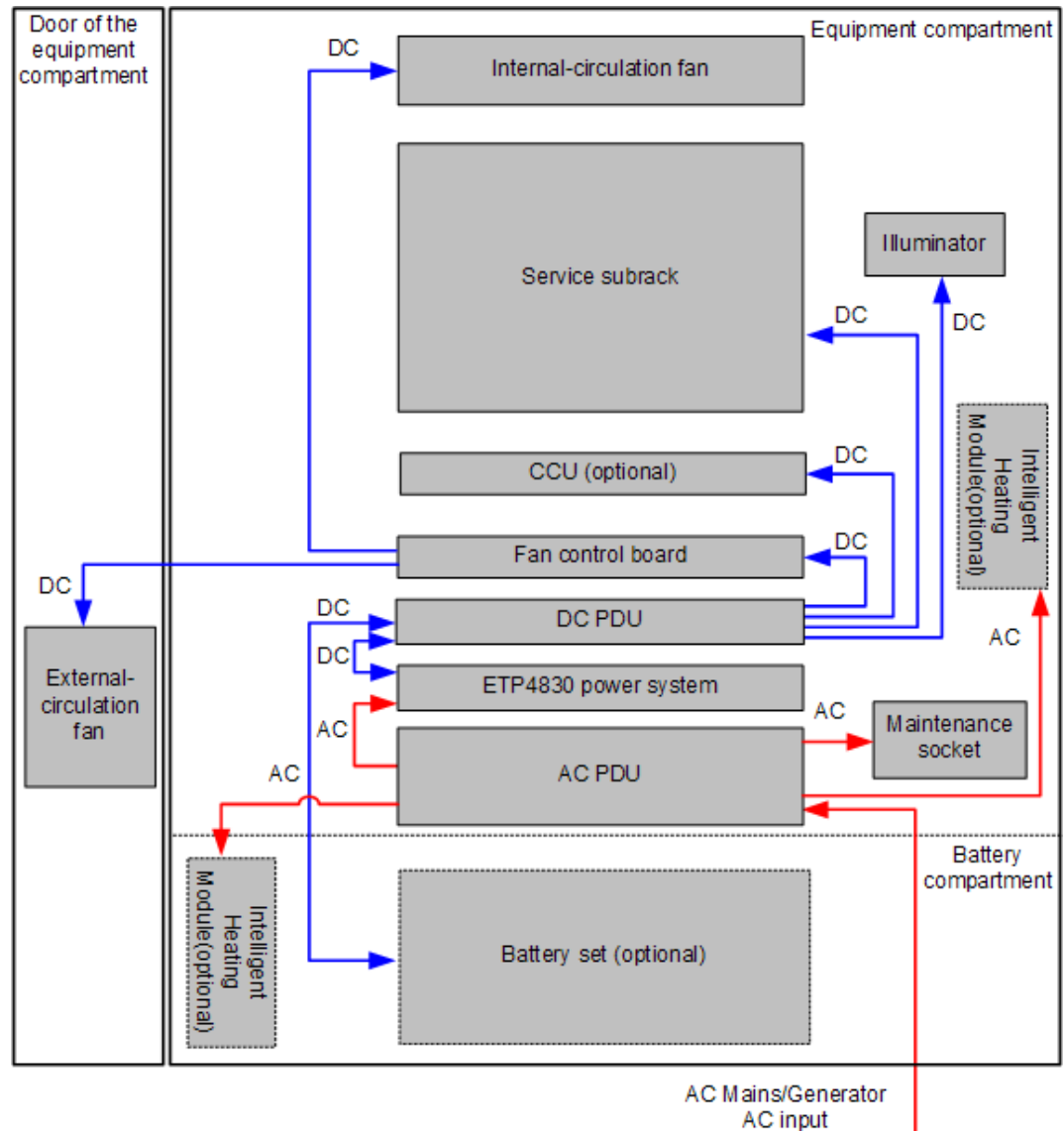
5.1 Power Distribution Principle

General Power Distribution (When an ETP4830 Power System and Batteries Are Used)

The AC power cable is led into the cabinet from the bottom of the battery compartment, and then connected to the mains AC circuit breaker or diesel generator AC circuit breaker inside the AC PDU. The AC PDU divides the power supply into the following channels:

- One channel supplies power to the maintenance socket.
- One channel supplies power to intelligent heating modules of the battery compartment.
- One channel supplies power to intelligent heating modules of the equipment compartment.
- One channel after being converted to DC power supply by the ETP4830 power system, supplies power to the service unit, fan control board, and illuminator through the DC PDU. The ETP4830 power system also provides 1 output for the DC PDU for connecting to a battery set. In this way, the ETP4830 power system is able to manage the battery set.

Figure 5-1 General power distribution of the F01T300 cabinet (configured with an ETP4830 power system and batteries)



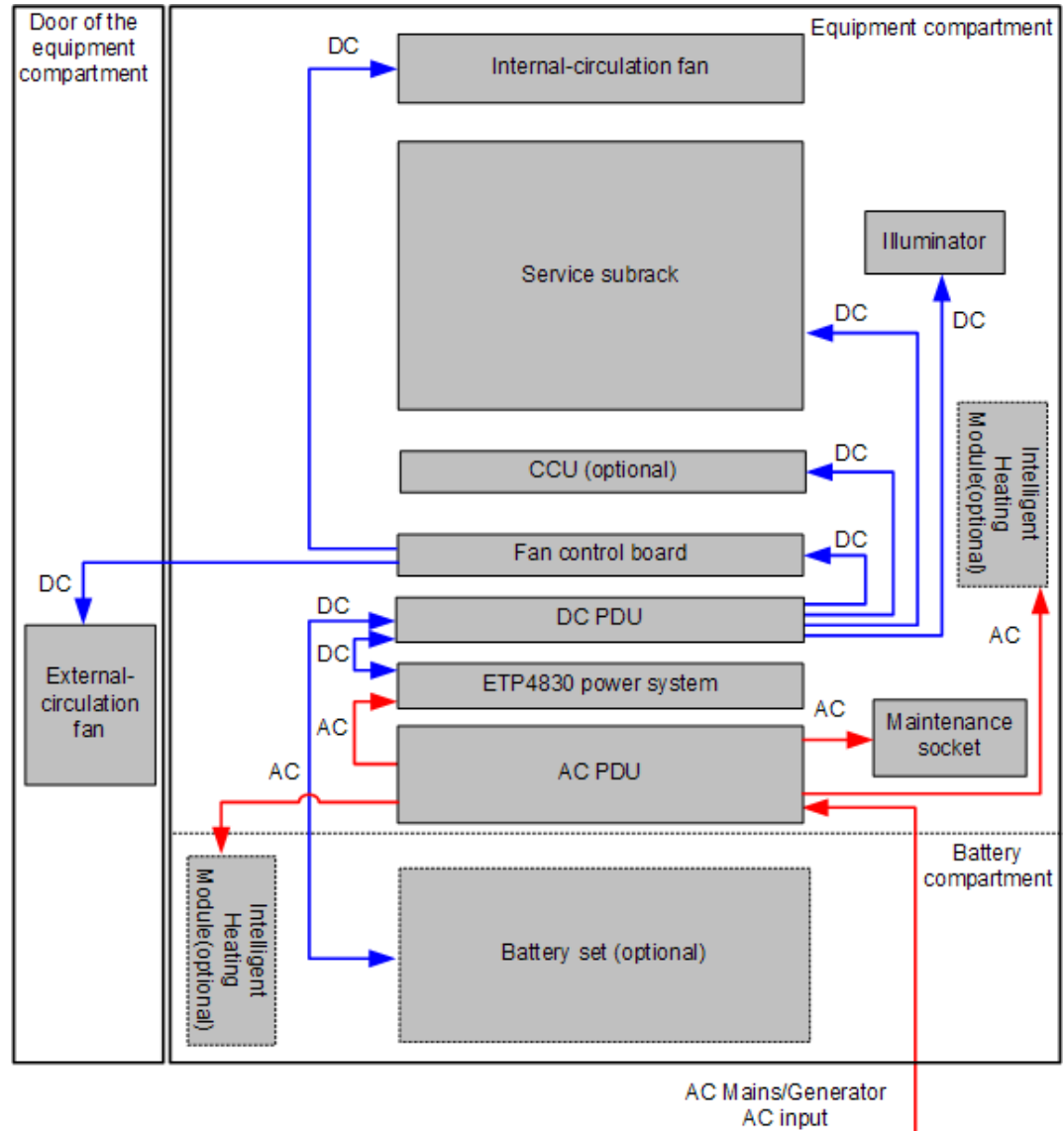
General Power Distribution (When an ETP4890 Power System and Batteries Are Used)

The AC power cable is led into the cabinet from the bottom of the battery compartment, and then connected to the mains AC circuit breaker or diesel generator AC circuit breaker inside the AC PDU. The AC PDU divides the power supply into the following channels:

- One channel supplies power to the maintenance socket.
- One channel supplies power to intelligent heating modules of the battery compartment.
- One channel supplies power to intelligent heating modules of the equipment compartment.
- One channel after being converted to DC power supply by the ETP4890 power system, supplies power to the service unit, fan control board, and illuminator. The ETP4890

power system also provides 1 output for connecting to a battery set. In this way, the ETP4890 power system is able to manage the battery set.

Figure 5-2 General power distribution of the F01T300 cabinet (configured with an ETP4890 power system and batteries)



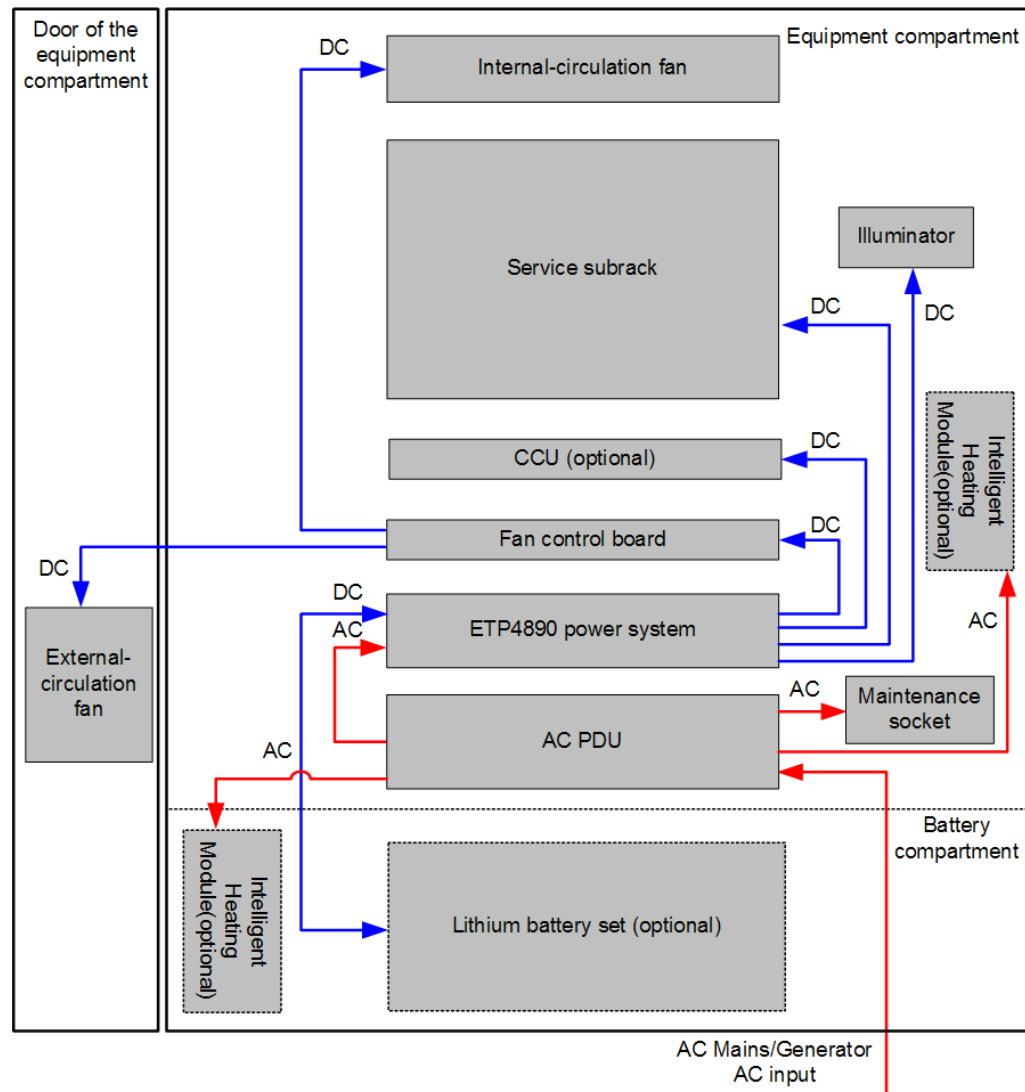
General Power Distribution (When an ETP4890 Power System and Li-ion Batteries Are Used)

The AC power cable is led into the cabinet from the bottom of the battery compartment, and then connected to the mains AC circuit breaker or diesel generator AC circuit breaker inside the AC PDU. The AC PDU divides the power supply into the following channels:

- One channel supplies power to the maintenance socket.
- One channel supplies power to intelligent heating modules of the battery compartment.

- One channel supplies power to intelligent heating modules of the equipment compartment.
- One channel after being converted to DC power supply by the ETP4890 power system, supplies power to the service unit, fan control board, and illuminator. The ETP4890 power system also provides 1 output for connecting to 1 or 2 Li-ion battery sets. In this way, the ETP4890 power system is able to manage the Li-ion battery sets.

Figure 5-3 General power distribution of the F01T300 cabinet (configured with an ETP4890 power system and Li-ion batteries)

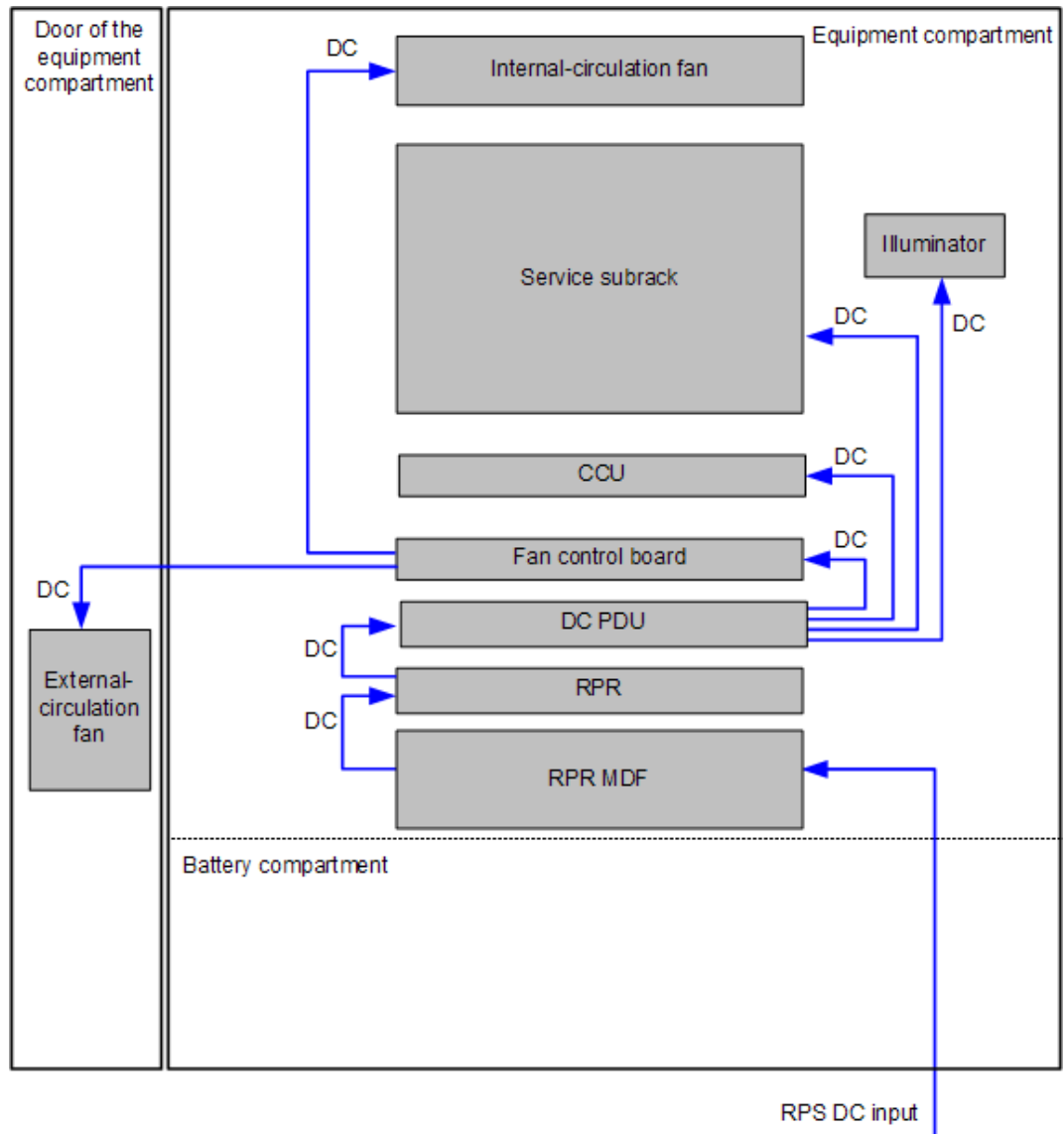


Power Distribution Principle (When an RPR Is Used)

High-voltage DC power flows into the cabinet from the bottom of the main distribution frame (MDF) and is fed to the RPR MDF terminal block and then to the RPR. High-voltage DC converted to -53.5 V DC power supply by the RPR, supplies power to the DC PDU. The DC PDU divides the input power into the following channels.

- One channel supplies power to the service device.
- One channel supplies power to the illuminator.
- One channel supplies power to the fans for the internal and external cycles through the temperature control board.
- One channel supplies power to the CCU.

Figure 5-4 General power distribution of the F01T300 cabinet (Configured with an RPR)



5.2 ETP4830 Power System

An AC-powered cabinet uses the ETP4830 power system to convert the AC power to the DC power for power distribution. The small and modular ETP4830 power system supports easy installation and maintenance, effective LCD interface management, and excellent security specifications design. The power system supports a maximum of 30 A output current.

Function

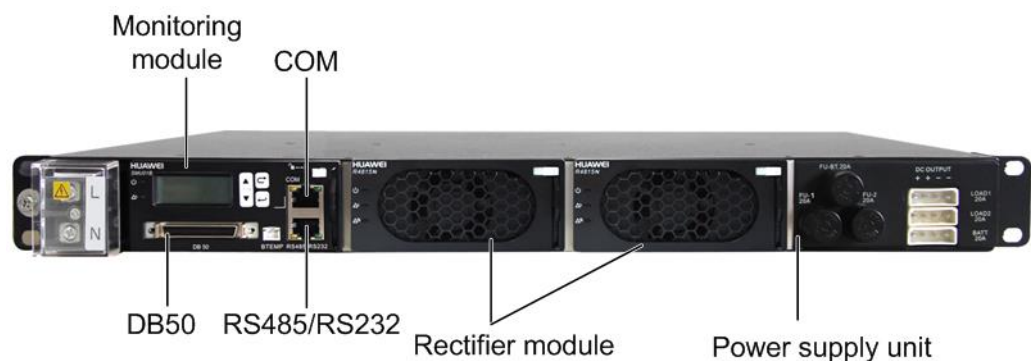
The ETP4830 power system supports the following functions:

- Converts AC input to DC inputs and provides the DC inputs for communication devices.
- Communicates with the upper device using a COM or an RS485/RS232 serial port; sends control signals based on the values of monitored parameters or the control command sent by the upper device; detects power distribution parameters, power supply module parameters, and auxiliary digital parameters in real time.
- Connects to one group of lead acid batteries and uses a site monitoring unit (SMU) to manage the batteries. Manages battery charging and discharging, ensuring efficient battery usage.
- Connects to a sensor transfer box using a DB50 port, detecting analog parameters and digital parameters, and outputting control signals.
- Uses the SMU to monitor all running parameters for the ETP4830 power system in real time, determines the working status, and reports alarms in a timely manner.

Appearance

Figure 5-5 shows the appearance of the ETP4830 power system.

Figure 5-5 ETP4830 power system



Configuration

Table 5-1 describes the components of the ETP4830 power system.

Table 5-1 Component configuration of the ETP4830 power system

Component	Configuration
ETP4830-A1 AC and DC power distribution subrack	1
Monitoring module SMU01B	1
Power supply module R4815N1/R4815G1	1 to 2 (optional; by default, the R4815N1 is configured)

The ETP4830 power system can be configured with two power supply modules, which are connected in parallel for output.

Table 5-2 shows the mapping between the quantity of power supply modules in the ETP4830 power system and the maximum output current.

Table 5-2 Mapping between the quantity of power supply modules of the ETP4830 power system and the maximum output current

Quantity of Power Supply Modules	Maximum Output Current
1	15 A
2	30 A

Communication Ports on the SMU01B Monitoring Module

Table 5-3 describes the communication ports on the SMU01B monitoring module. A user can set the baud rate of the device using the LCD interface of the monitoring module. The baud rates 9600 bit/s and 19200 bit/s are automatically negotiated.

Table 5-3 Communication ports on the SMU01B monitoring module

Communication Port	Communication Mode	Communication Parameter	Description
COM	RS485/RS232	Baud rate: 19200 bit/s or 9600 bit/s	Used as a serial port, communicating with the upper device
RS485/RS232	RS485/RS232	Baud rate: 19200 bit/s or 9600 bit/s	Used as a serial port, supporting the northbound/southbound communications

Indicators

Table 5-4 describes the indicators on the R4815N1 power supply module.

Table 5-4 Indicators on the R4815N1 power supply module

Indicator	Color	Status	Description
Power indicator	Green	Steady on	Normal
		Off	There is no AC input.
		Blinking at a frequency of 0.5 Hz	There is AC input, and the power supply module is in the manual query

Indicator	Color	Status	Description
			state.
		Blinking at a frequency of 4 Hz	Data is being loaded online.
Alarm indicator	Yellow	Steady on	A protection mechanism is triggered. After the fault is rectified, the PSU can be restored.
		Blinking	Communication between the PSU and the SMU is interrupted.
		Off	Normal
Fault indicator	Red	Steady on	An unrecoverable fault occurs.
		Off	Normal
		Blinking	The power supply module equipped with the EMU does not match the actual power supply module.

Table 5-5 describes the indicators on the SMU01B monitoring module.

Table 5-5 Indicators on the SMU01B monitoring module

Indicator	Color	Status	Description
RUN	Green	Off	The monitoring module is faulty or there is no DC power input.
		Blinking at a frequency of 0.5 Hz	The monitoring module is working properly and communicating with the upper device properly.
		Blinking at a frequency of 4 Hz	The monitoring module works properly but does not communicate with the upper device properly.

Indicator	Color	Status	Description
ALM	Red	Off	The system does not generate any urgent or critical alarms.
		Steady on	The system generates urgent or critical alarms.

Input Terminal

The ETP4830 power system supports one 110 V AC or 220 V AC input and connects to an AC input cable. Figure 5-6 shows the input terminals in the ETP4830 power system.

Figure 5-6 Input terminals in the ETP4830 power system



Output Terminal

The ETP4830 power system supports three output terminals. The two pins on the left of the output terminal are the output positive pole and the two pins on the right of the output terminal are the output negative pole.

Figure 5-7 shows the output terminals in the ETP4830 power system.

Figure 5-7 Output terminals in the ETP4830 power system



Figure 5-8 shows the output branch fuse in the ETP4830 power system.

Figure 5-8 Output branch fuse in the ETP4830 power system



Table 5-6 shows the mapping between the fuses of the output tributaries and the load tributaries.

Table 5-6 Mapping between the fuses of the output tributaries and the load tributaries

Fuse of the Output Tributary	Load Tributary
FU-1 (20 A)	LOAD1 (20 A)
FU-2 (20 A)	LOAD2 (20 A)
FU-BT (20 A)	BATT (20 A), used for connecting to batteries

Specifications

Table 5-7 lists the specifications of the ETP4830 power system.

Table 5-7 Specifications of the ETP4830 power system

Parameter Class	Parameter	Description
Conditions	Operating environment temperature	-40 °C to +70 °C NOTE The power system can work at a temperature of 70 °C for 8 hours.
	Operating environment humidity	5% to 95% (no condensation)
	Altitude	0 m to 4000 m (Note that in the range of 2000 m to 4000 m, the operating temperature decreases by 1 °C when the altitude increases by 200 m.)
AC input	Mode	mono-phase
	Voltage	85 V AC to 300 V AC (rated value: 220 V)
	Frequency	45 Hz to 66 Hz (rated value: 50 Hz)
	Power factor	≥ 0.99 in the case of a rated load
	Power supply module peak efficiency	<ul style="list-style-type: none"> R4815N1: 94% R4815G1: 96%
DC output	Voltage	-42 V to -58 V
	Default voltage	-53.5 V
	Maximum power	<ul style="list-style-type: none"> R4815N1: R481N1: 2000 W (input voltage: 176 V AC to 300 V AC; if the temperature is higher than 55 °C, power decreases linearly); 1000 W (input voltage: 85 V AC to 175 V AC; if the temperature is higher than 55 °C, power decreases linearly) R4815G1: 1740 W (input voltage: 176 V AC to 300 V AC; if the temperature is higher than 55 °C, power decreases linearly); 870 W (input voltage: 85 V AC to 175 V AC; if the temperature is higher than 55 °C, power decreases linearly) NOTE Maximum output power of the system = Number of the configured power supply modules x Output power of each power supply module
	Regulated voltage	≤ ±0.6%

Parameter Class	Parameter	Description
	precision	
	Peak noise voltage	≤ 200 mV (0 MHz to 20 MHz)
Structure	Dimensions (H x W x D) without brackets	43.6 mm x 442 mm x 255 mm
	Weight	≤ 8 kg (including modules)
	Protection class	IP20
	Installation mode	Installed in an IEC cabinet or an ETSI cabinet with brackets
	Maintenance mode	Front access
	Cooling method	Forced air cooling, with the built-in fan in the power supply module

5.3 ETP4890 Power System

An AC-powered cabinet uses the ETP4890 power system to convert the AC power to the DC power for power distribution. The small and modular ETP4890 power system supports easy installation and maintenance and effective LCD interface management. The power system supports a maximum of 90 A output current.

Function

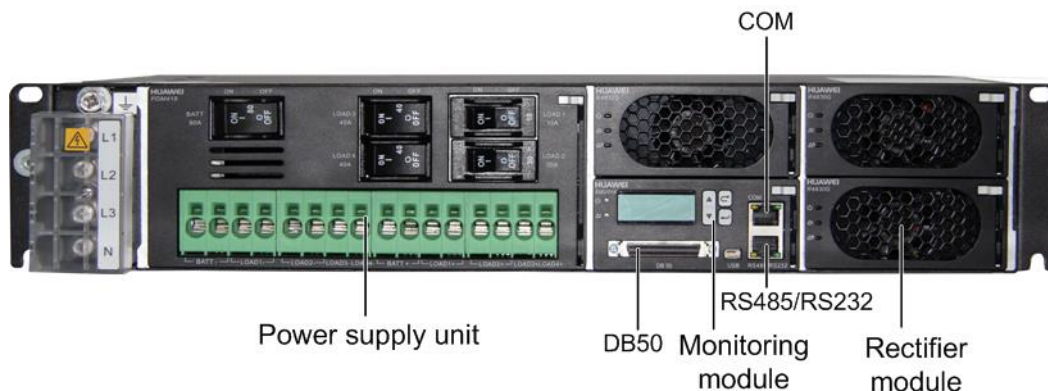
The ETP4890 power system supports the following functions:

- Converts AC power to DC power and provides the DC power for communication devices.
- Communicates with the upper device using a COM or an RS485/RS232 serial port; sends control signals based on the values of monitored parameters or the control command sent by the upper device; detects power distribution parameters, power supply module parameters, and auxiliary digital parameters in real time.
- Connects to one to two groups of lead acid batteries and uses a monitoring module to manage the batteries; provides complete management for battery charging and discharging, ensuring efficient battery usage.
- Connects to a sensor transfer box using a DB50 port, detecting analog parameters and digital parameters, and outputting control signals.
- Uses a monitoring module to monitor all running parameters for the ETP4890 power system in real time; determines the working status; reports alarms in a timely manner.
- Clearly displays the monitoring and alarm information on the liquid crystal display (LCD) of the monitoring module; allows operations such as parameter setting on the LCD of the monitoring module.

Appearance

Figure 5-9 shows the appearance of the ETP4890 power system.

Figure 5-9 ETP4890 power system



Configuration

Table 5-8 lists the components of the ETP4890 power system.

Table 5-8 Component configuration of the ETP4890 power system

Component	Quantity
AC and DC power distribution subrack	1
Monitoring module	1
Power supply module R4830N1/R4830G1	1 to 3 (optional; by default, the R4830N1 is configured)

The ETP4890 power system can be configured with three power supply modules, which are connected in parallel for output.

Table 5-9 shows the mapping between the quantity of power supply modules in the ETP4890 power system and the maximum output current.

Table 5-9 Mapping between the quantity of power supply modules of the ETP4890 power system and the maximum output current

Quantity of Power Supply Modules	Maximum Output Current
1	<ul style="list-style-type: none"> 30 A (at 55 °C) 25 A (at 60 °C)
2	<ul style="list-style-type: none"> 60 A (at 55 °C) 50 A (at 60 °C)
3	<ul style="list-style-type: none"> 90 A (at 55 °C)

Quantity of Power Supply Modules	Maximum Output Current
	<ul style="list-style-type: none"> 75 A (at 60 °C)

Communication Ports on the Monitoring Module

Table 5-10 lists the communication ports on the monitoring module. A user can set the baud rate of the device using the LCD interface of the monitoring module.

Table 5-10 Communication ports on the monitoring module

Communication Port	Communication Mode	Communication Parameter	Description
COM	RS485/RS232	Baud rate: 9600 bit/s or 19200 bit/s	Used as a serial port, communicating with the upper device
RS485/RS232	RS485/RS232	Baud rate: 9600 bit/s or 19200 bit/s	Used as a serial port, supporting the northbound/southbound communications



NOTE

By default, the ETP4890 power system is equipped with a monitoring module, which is capable of the inband management (SMU01B). The COM port cannot be used as a network port.

Indicators

Table 5-11 lists the indicators on the power supply module of the ETP4890 power system.

Table 5-11 Indicators on the power supply module of the ETP4890 power system

Indicator	Color	Status	Description
Power indicator	Green	Steady on	Normal
		Blinking at a frequency of 0.5 Hz	There is AC input, and the power supply module is in the manual query state.
		Blinking at a frequency of 4 Hz	Data is being loaded online.
		Off	There is no AC input.
Alarm indicator	Yellow	Steady on	A protection mechanism is triggered. After the fault is rectified, the

Indicator	Color	Status	Description
			power supply module can be restored to the normal state.
		Blinking	Communication between the power supply module and the site monitoring module is interrupted.
		Off	Normal
Fault indicator	Red	Steady on	An unrecoverable fault occurs.
		Blinking	The power supply module equipped with the EMU does not match the actual power supply module.
		Off	Normal

Table 5-12 lists the indicators on the monitoring module.

Table 5-12 Indicators on the monitoring module

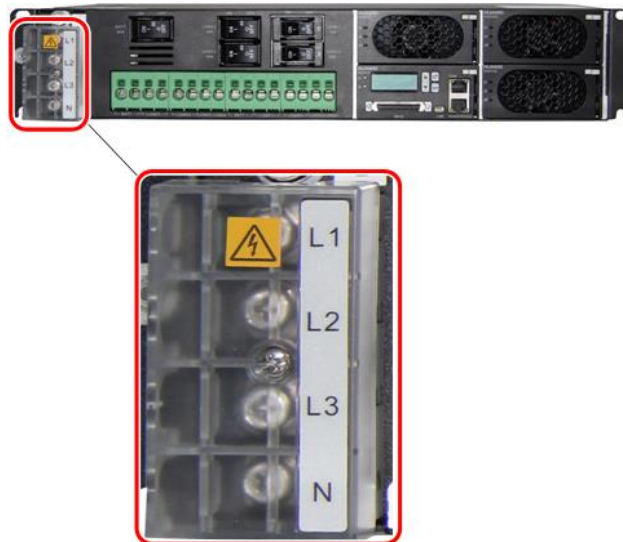
Indicator	Color	Status	Description
RUN	Green	Off	The monitoring module is faulty or there is no DC power input.
		Blinking at a frequency of 0.5 Hz	The monitoring module is working properly and communicating with the upper device properly.
		Blinking at a frequency of 4 Hz	The monitoring module works properly but does not communicate with the upper device properly.
ALM	Red	Off	The system does not generate any critical alarms.

Indicator	Color	Status	Description
		Steady on	The system generates critical alarms.

Input Terminal

The ETP4890 power system supports one 220 V AC or 110 V AC dual live wires input. Figure 5-10 shows the input terminals in the ETP4890 power system.

Figure 5-10 Input terminals in the ETP4890 power system



Output Terminal

The ETP4890 power system supports eight groups of output terminals. The left-side eight output terminals are negative and the right-side eight output terminals are positive.

Figure 5-11 shows the output terminals in the ETP4890 power system.

Figure 5-11 Output terminals in the ETP4890 power system

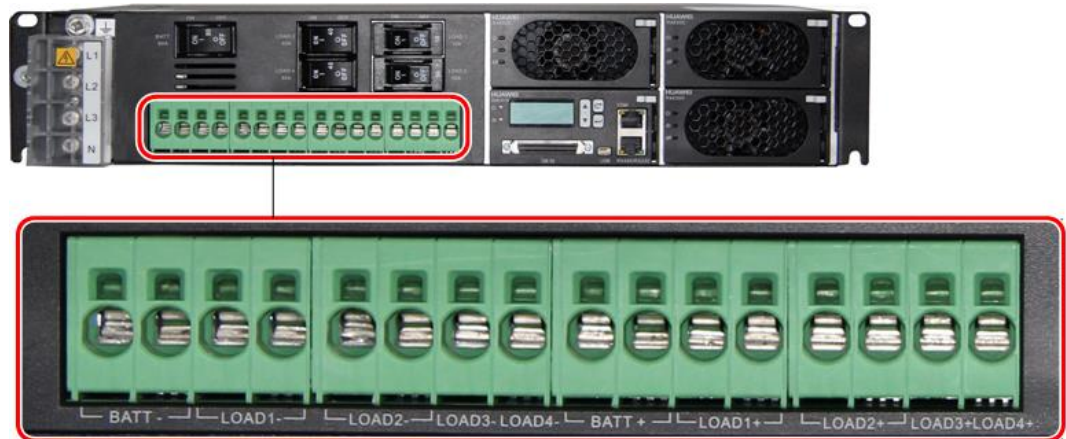


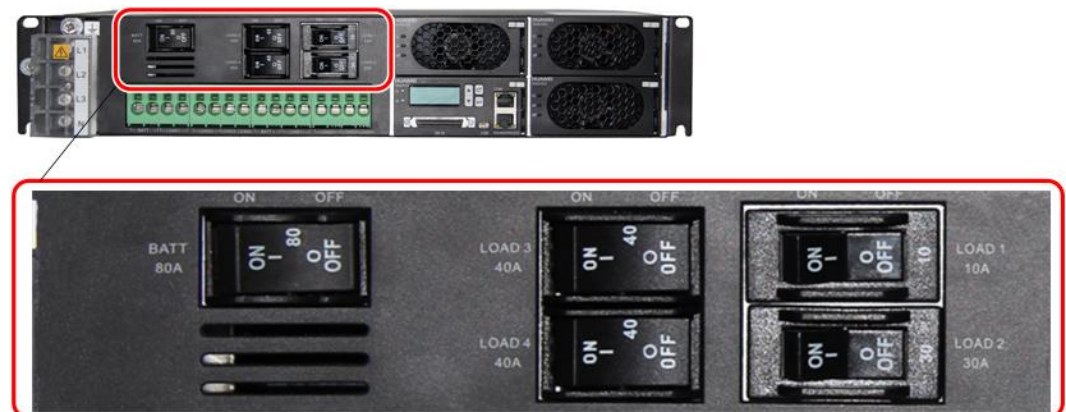
Table 5-13 lists the cable connections of the output terminals.

Table 5-13 Cable connections of the output terminals

Port	Load Tributary	Circuit Breaker
LOAD1	Illuminator	10 A
LOAD2	Electronic door lock monitor system/Battery monitor management system	30 A
LOAD3	Service subrack	40 A
LOAD4	Service subrack/Reserved	40 A
BATT	Batteries	80 A

Figure 5-12 shows the output branch circuit breaker in the ETP4890 system.

Figure 5-12 Output branch circuit breaker in the ETP4890 system



Specifications

Table 5-14 lists the specifications of the ETP4890 power system.

Table 5-14 Specifications of the ETP4890 power system

Parameter Class	Parameter	Description
Environment conditions	Operating temperature	-40 °C to +70 °C NOTE The power system can work at a temperature of 70 °C for 8 hours.
	Operating humidity	5% to 95% (no condensation)
	Altitude	0 m to 4000 m (Note that in the range of 2000 m to 4000 m, the operating temperature decreases by 1 °C when the altitude increases by 200 m.)
AC input	Mode	mono-phase, dual-live wire
	Voltage	85 V AC to 300 V AC (rated value: 110 V/220 V)
	Frequency	45 Hz to 66 Hz (rated value: 50 Hz)
	Power factor	≥ 0.99 in the case of a rated load
	Power supply module peak efficiency	<ul style="list-style-type: none"> R4830N1: 94% R4830G1: 96%
DC output	Voltage	-42 V to -58 V
	Default voltage	-53.5 V
	Maximum power	<ul style="list-style-type: none"> R4830N1: 4815 W (input voltage: 176 V AC to 300 V AC; if the temperature is higher than 55 °C, power decreases linearly); 2407.5 W (input voltage: 85 V AC to 175 V AC; if the temperature is higher than 55 °C, power decreases linearly) R4830G1: 4800 W (input voltage: 176 V AC to 300 V AC; if the temperature is higher than 55 °C, power decreases linearly); 2400 W (input voltage: 85 V AC to 175 V AC; if the temperature is higher than 55 °C, power decreases linearly) NOTE Maximum output power of the system = Number of the configured power supply modules x Output power of each power supply module
	Regulated voltage precision	≤ ±0.6%

Parameter Class	Parameter	Description
	Peak noise voltage	≤ 200 mV (0 MHz to 20 MHz)
Structure	Dimensions (H x W x D) without brackets	86.1 mm x 442 mm x 255 mm
	Weight	≤ 10 kg (including three 30 A power supply modules and one SMU01B monitoring module)
	Protection class	IP20
	Installation mode	Installed in an IEC cabinet or an ETSI cabinet with brackets
	Maintenance mode	Front access
	Cooling method	Air cooling, with the built-in fan in the power supply module

5.4 RPR006 Remote Side Power System (RFT-V)

A remote power supply (RPS) system consists of the remote side power system (RPR) and central office (CO) remote power system. The RPR006 serves as the RPS remote side. It converts the high-voltage DC current from the RPS CO end into -53.5 V DC output. The RPR006 uses a modular design to achieve convenient installation and maintenance. It provides solid security protection. The maximum output power of the RPR006 is 1800 W.

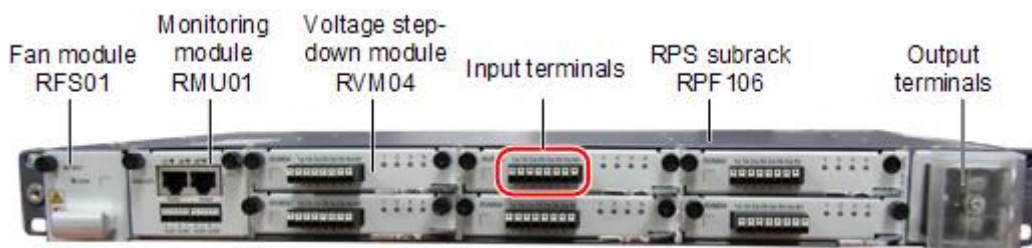
Function

- The RPR006 is equipped with six voltage step-down modules. Each module provides four independent channels, and has input terminals and status indicators on its front panel.
- The RPR006 provides protection against input under-voltage, input over-voltage, output short-circuit, over-current, and over-temperature.
- The RPR006 has a built-in monitoring module. This module communicates with the control board through an RS485 serial port and then the control board interacts with the NMS. In this way, the NMS can query the status and alarm information about the RPR006. The built-in monitoring module provides four dry contact alarm outputs.
- The RPR006 has a built-in fan module to intelligently adjust fan speed.

Appearance

Figure 5-13 shows the appearance of the RPR006.

Figure 5-13 RPR006



Component Configuration

Table 5-15 lists the components of the RPR006.

Table 5-15 Components of the RPR006

Component	Specifications
RPS subrack RPF106 (including a monitoring module RMU01 and a fan module RFS01)	1
Voltage step-down module RVM04	1–6



NOTE

An RPR006 supports a maximum of 6 voltage step-down modules. All these voltage step-down modules are connected in parallel.

Table 5-16 lists the mapping between the voltage step-down module quantity and maximum output power.

Table 5-16 Mapping between the voltage step-down module quantity and maximum output power

Number of Voltage Step-Down Modules	Maximum Output Power
1	300 W
2	600 W
3	900 W
4	1200 W
5	1500 W
6	1800 W



NOTE

The actual output power depends on the specifications, number, and length of wire pairs between the RPS CO end and RPS remote end.

Port Definition of the RMU01 Monitoring Module

Table 5-17 lists the communication port definition of the RMU01 monitoring module.

Table 5-17 Port definition of the RMU01 monitoring module

Communication Port	Communication Mode	Communication Parameter	Remarks
RS485 1	RS485	Baud rate: 19200 bit/s or 115200 bit/s	This port is used as a serial port. It communicates with the control board or is cascaded with another monitoring module CMU01.
RS485 2	RS485	Baud rate: 19200 bit/s or 115200 bit/s	This port is used as a serial port. It communicates with the control board or is cascaded with another monitoring module CMU01.

Indicator Description

Table 5-18 describes the indicators of the RVM04 voltage step-down module.

Table 5-18 Indicators of the RVM04 voltage step-down module

Color	Status	Description
Green	Steady on	The channel works normally. Number of illuminated indicators: equals the number of working channels
	Blinking at 2 Hz	A software upgrade is in progress. If four indicators blink at the same time, the entire voltage step-down module is being upgraded.
Yellow	Steady on	The channel is being protected against input over-voltage, input under-voltage, or over-temperature. Number of illuminated indicators: equals the number of channels that are being protected against input over-voltage, input under-voltage, or over-temperature

Color	Status	Description
	Blinking at 0.5 Hz	The voltage step-down module fails to communicate with the monitoring module. If four indicators blink at the same time, the entire voltage step-down module encounters a communication failure.
Red	Steady on	The channel is faulty. Number of illuminated indicators: equals the number of faulty channels



NOTE

If a channel does not receive any DC power input, the corresponding indicator is off.

Table 5-19 describes the indicators on the RMU01 monitoring module.

Table 5-19 Indicators on the RMU01 monitoring module

Name	Color	Status	Description
Running indicator	Green	Off	The monitoring module is faulty or does not receive any power input.
		Blinking at 0.5 Hz	The monitoring module works normally and communicates with the control board.
		Blinking at 4 Hz	The monitoring module works normally but fails to communicate with the control board.
Minor alarm indicator	Yellow	Off	No minor alarm is generated.
		Steady on	A minor alarm is generated.
Critical alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

Input and Output Terminals

An RPR006 supports a maximum of 24 power input channels. Each voltage step-down module supports four power input channels. The input terminals reside on the front panel of each voltage step-down module.

An RPR006 provides a power output channel, and the output terminal resides on the right part of the front panel of the RPS subrack.

Technical Specifications

Table 5-20 lists the technical specifications of the RPR006.

Table 5-20 Technical specifications of the RPR006

Category	Parameter	Description
Environmental requirements	Working temperature	-40 °C to +70 °C NOTE The RPR006 can work at 70 °C for consecutive 8 hours.
	Working humidity	5%95%; no condensation
	Altitude	0-4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1 °C for each additional 200 m.
Input	Input standard	RFT-V
	Input voltage	190 V DC to 380 V DC (If the input voltage range is 190 V DC to 320 V DC, the output power is derated.)
	Number of input channels	24
	Maximum efficiency of a voltage step-down module	If the load of the voltage step-down module is 100%, its maximum efficiency is greater than 92%. If the load of the voltage step-down module is 50%, its maximum efficiency is greater than 90%.
Output	Output voltage range	-52 V DC to -56 V DC
	Typical output voltage	-53.5 V DC
	Maximum output power	1800 W (The maximum output power of a voltage step-down module is 300 W.) NOTE The actual output power depends on the specifications, number, and length of wire pairs between the RPS CO end and RPS remote end.
Structure	Dimensions (H x W x D)	43.6 mm x 442 mm x 255 mm (without mounting ears)
	Weight	≤ 8 kg (in full configuration)
	Protection rating	IP20
	Installation mode	The RPR006 can be installed in an IEC or ETSI cabinet.
	Maintenance mode	Front access
	Cooling mode	Air cooling through the built-in fan module

5.5 (Optional) Batteries

The F01T300 cabinet uses a set (four batteries per set) of 50 Ah or 100 Ah batteries as the backup power. These batteries are connected in series to form a battery set.



NOTICE

Configure the battery parameters before powering on or powering off the battery.

The battery used as the backup power of the device refers to the battery whose power can be restored through charging after the battery is discharged. The battery can be charged in two modes: equalized charging and floating charging. The meanings of the two modes are as follows:

- **Equalized charging:** A charging method with a higher voltage used to balance the battery voltage and capacity and also be used to renew the capacity rapidly.
- **Floating charging:** A method of maintaining a battery in a charged condition by continuous, long-term, constant voltage charging, at a level sufficient to balance battery self-discharge.



NOTE

The battery appearance, dimensions, and weight provided in this topic are for reference only, which may differ from the actual delivered battery.

50 Ah Battery

Figure 5-14 shows the appearance of the 50 Ah battery.

Figure 5-14 Appearance of the 50 Ah battery



Table 5-21 lists the specifications of the 50 Ah battery.

Table 5-21 Specifications of the 50 Ah battery

Item	Specification
Voltage of a single battery	12 V
Equalized charging voltage of the battery group	56.5 V
Floating charging voltage of the battery group	53.5 V
Dimensions (W x D x H)	105 mm x 390 mm x 200 mm
Weight of a single battery	21 kg

100 Ah Battery

Figure 5-15 shows the appearance of the 100 Ah battery.

Figure 5-15 Appearance of the 100 Ah battery



Table 5-22 lists the specifications of the 100 Ah battery.

Table 5-22 Specifications of the 100 Ah battery

Item	Specification
Voltage of a single battery	12 V
Equalized charging voltage of the battery group	56.5 V
Floating charging voltage of the battery group	53.5 V
Dimensions (W x D x H)	110 mm x 395 mm x 286 mm
Weight of a single battery	33.5 kg

5.6 TCB-B High temperature Battery

TCB-B (Temperature cycle battery B series) is specially designed temperature cycle battery, TCB-B has excellent temperature standby performance up to recommended operating

temperature is 15~45 °C, due to special anti-corrosion grid and active material with special additives.

40 Ah High temperature Battery

Figure 5-16 shows the appearance of the 40 Ah high temperature battery.

Figure 5-16 Appearance of the 40 Ah high temperature battery

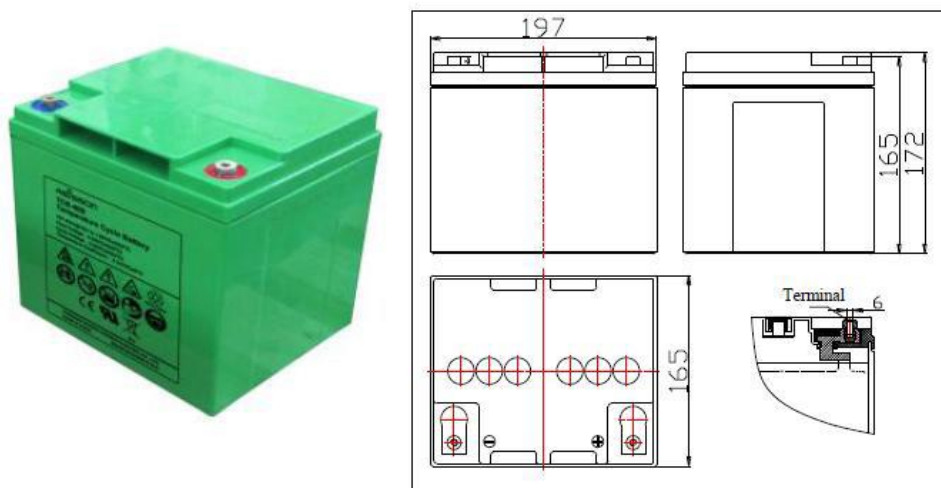


Table 5-23 lists the specifications of the 40 Ah high temperature battery.

Table 5-23 Specifications of the 40 Ah high temperature battery

Item	Specification
Voltage of a single battery	12 V
Impedance (mΩ)	8 mΩ
High temperature alarm point	55 °C
High temperature protection point	58 °C
Operating temperature	15 °C~45 °C
Max Dimensions (W x D x H)	165 mm x 197 mm x 173 mm
Weight of a single battery	13.8 kg

100 Ah High temperature Battery

Figure 5-17 shows the appearance of the 100 Ah high temperature battery.

Figure 5-17 Appearance of the 100 Ah high temperature battery

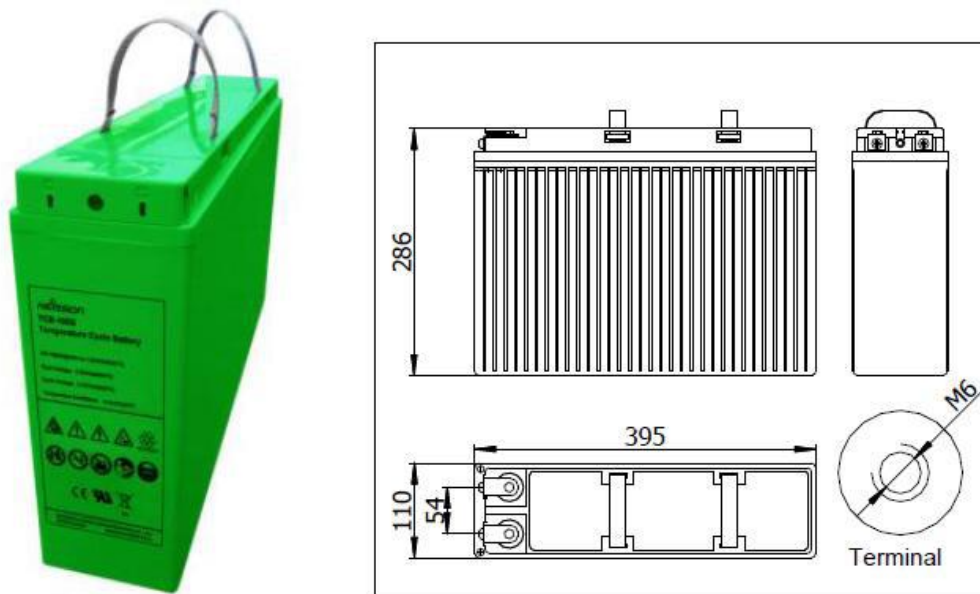


Table 5-24 lists the specifications of the 100 Ah high temperature battery.

Table 5-24 Specifications of the 100 Ah high temperature battery

Item	Specification
Voltage of a single battery	12 V
Impedance (mΩ)	4.3 mΩ
High temperature alarm point	55 °C
High temperature protection point	58 °C
Operating temperature	15 °C~45 °C
Max Dimensions (W x D x H)	110 mm x 395 mm x 286 mm
Weight of a single battery	31.5 kg

150 Ah High temperature Battery

Figure 5-18 shows the appearance of the 150 Ah high temperature battery.

Figure 5-18 Appearance of the 150 Ah high temperature battery

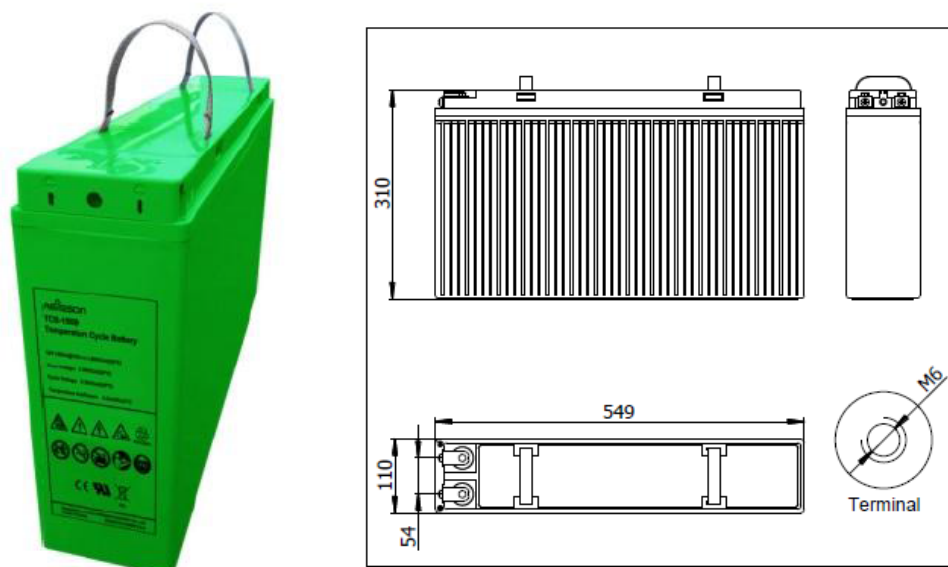


Table 5-25 lists the specifications of the 150 Ah high temperature battery.

Table 5-25 Specifications of the 150 Ah high temperature battery

Item	Specification
Voltage of a single battery	12 V
Impedance (mΩ)	4.15 mΩ
High temperature alarm point	55 °C
High temperature protection point	58 °C
Operating temperature	15 °C~45 °C
Max Dimensions (W x D x H)	110 mm x 549 mm x 310 mm
Weight of a single battery	49 kg

5.7 TCB-C High temperature Battery

TCB-C (Temperature cycle battery C series) is specially designed temperature cycle battery. TCB-C has excellent temperature cycle performance up to recommended operating temperature is 15–45 °C.

100 Ah High temperature Battery

Figure 5-19 shows the appearance of the 100 Ah high temperature battery.

Figure 5-19 Appearance of the 100 Ah high temperature battery



Table 5-26 lists the specifications of the 100 Ah high temperature battery.

Table 5-26 Specifications of the 100 Ah high temperature battery

Item	Specification
Voltage of a single battery	12 V
Impedance (mΩ)	5.4 mΩ
High temperature alarm point	55 °C
High temperature protection point	58 °C
Operating temperature	15 °C~45 °C
Max Dimensions (W x D x H)	125 mm x 400 mm x 286 mm
Weight of a single battery	36 kg

150 Ah High temperature Battery

Figure 5-20 shows the appearance of the 150 Ah high temperature battery.

Figure 5-20 Appearance of the 150 Ah high temperature battery



Table 5-27 lists the specifications of the 150 Ah high temperature battery.

Table 5-27 Specifications of the 150 Ah high temperature battery

Item	Specification
Voltage of a single battery	12 V
Impedance (mΩ)	5.1 mΩ
High temperature alarm point	55 °C
High temperature protection point	58 °C
Operating temperature	15 °C~45 °C
Max Dimensions (W x D x H)	125 mm x 552 mm x 310 mm
Weight of a single battery	56 kg

5.8 ESM-4850A2 / ESM-4875A1 Li-ion Battery (Optional)

The Li-ion battery consists of the battery block, energy storage management unit (ESMU), power terminals, signal terminals, and mechanical parts.

Function

The Li-ion battery performs the following functions:

- Status monitoring: Monitors the cell voltage, current, and temperature as well as the Li-ion battery voltage.
- Alarm: Generates an alarm if overvoltage, under voltage, overcurrent, high temperature, or low temperature occurs.
- Information reporting: Supports northbound CAN and Modbus communication; reports all alarms and status data over CAN or Modbus ports.

Appearance

Figure 5-21 shows the appearance of the Li-ion battery.

Figure 5-21 Appearance of the Li-ion battery



Table 5-28 lists the specifications of the ESM-4850A2 Li-ion battery.

Table 5-28 Specifications of the ESM-4850A2 Li-ion battery

Item	Specification
Nominal Voltage	48 Vdc
Nominal Charging Voltage	53.5 Vdc
Max. Charging / Discharging Current Limited	50A / 50A @35 ℃
Cycle Life	4500 cycles @ 0.5C, 85% DOD, 35 ℃
Nominal Capacity	50 Ah @ 0.2C, 35 ℃ (2400 Wh @ 0.2C, 35 ℃)
Dimension (W x D x H)	442 mm x 396 mm x 130 mm (without mounting ear)
Weight	Approx. 38 kg
Self-Discharge @ 25 ℃	Less than 5% after 90 days storage
Communication Interface	CAN/RS485; 2 dry contacts
Max. Quantity of Parallel Connection	CAN: 32; RS485: 8
Max. load power supported in parallel	15kW

Item	Specification
Certification	CE, UN38.3
Design Life	15 years

Table 5-29 lists the specifications of the ESM-4875A1 Li-ion battery.

Table 5-29 Specifications of the ESM-4875A1 Li-ion battery

Item	Specification
Nominal Voltage	48 Vdc
Nominal Charging Voltage	53.5 Vdc
Max. Charging / Discharging Current Limited	50A / 50A @35 ℃
Cycle Life	3000 cycles @ 0.5C, 85% DOD, 35 ℃
Nominal Capacity	75 Ah @ 0.2C, 35 ℃ (3600 Wh @ 0.2C, 35 ℃)
Dimension (W x D x H)	442 mm x 396 mm x 130 mm (without mounting ear)
Weight	Approx. 41 kg
Self-Discharge @ 25 ℃	Less than 5% after 90 days storage
Communication Interface	CAN/RS485; 2 dry contacts
Max. Quantity of Parallel Connection	CAN: 32; RS485: 8
Max. load power supported in parallel	15kW
Certification	CE, UN38.3
Design Life	15 years

Panel and Ports

Figure 5-22 shows the panel of the Li-ion battery.

Figure 5-22 Panel of the Li-ion battery

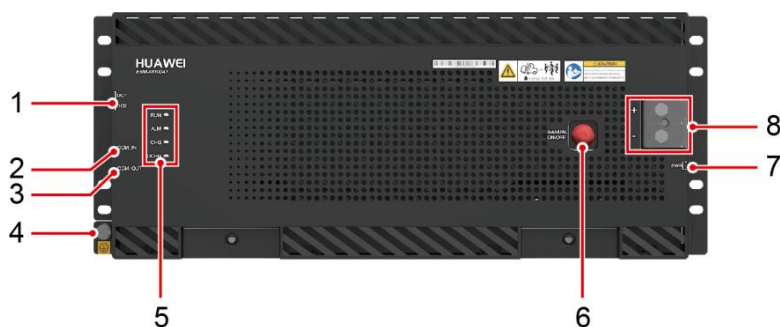


Table 5-30 describes the panel port definitions.

Table 5-30 Panel port definitions

No.	Silk Screen	Name	Function
1	DO1 DO2	ESM alarm output	Alarm output dry contact
2	COM_IN	Communications port	It is used for information reporting and communication cascading. It uses the RJ45 terminal and provides 250 A surge protection.
3	COM_OUT	Communications port	
4	GND	Protective ground	M6 screw
5	RUN	Communication and running indicator	For details about the appearances of the LED indicators, see Figure 5-24. For details about the functions of the LED indicators, see Table 5-32.
	ALM	Alarm indicator	
	CHG	Charge indicator	
	DCHG	Discharge indicator	
6	MANUAL ON/OFF	Manual power-on/off button	It is a contact button used for performing manual power-on and power-off during maintenance. It is a contact button.
7	PWR	ESMU port for connecting to an external power source	It is used to connect to a 43.2–58 V power source. When it is connected to such a power source, the Li-ion battery can be activated.
8	+	Positive battery terminal	Positive and negative terminals of the Li-ion battery. They can be secured using M6 screws and proper OT terminals at a torque of 4 Nm. The recommended cross-sectional area of the cable is 16 mm ² . When the ambient temperature is lower than 45 °C, the cross-sectional area of the cable can be smaller but must be greater than or equal to 10 mm ² .
	-	Negative battery terminal	

Figure 5-23 shows the pins in an RJ45 terminal.

Figure 5-23 Pins in an RJ45 terminal

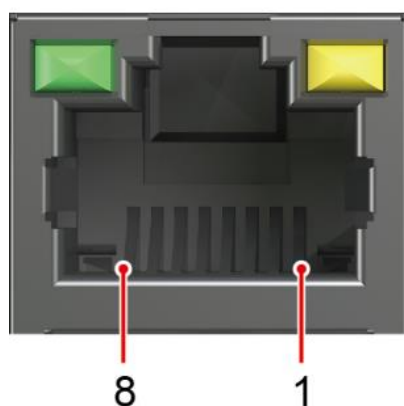


Table 5-31 describes the port pin in an RJ45 terminal definitions.

Table 5-31 Port pin in an RJ45 terminal definitions

RJ45 Pin	Signal	Meaning	Description
1	RS485 T+	RS485 transmission +	They (except NC) are connected to RS485 ports and comply with the Modbus protocol.
2	RS485 T-	RS485 transmission -	
3	NC	Reserved	
4	RS485 R+	RS485 reception +	
5	RS485 R-	RS485 reception -	
6	NC	Reserved	-
7	CANH	CAN communication +	They are connected to the external alarm ports of the SMU01B, and are used for data communication between battery groups when batteries are connected in parallel.
8	CANL	CAN communication -	

LED Indicators

Figure 5-24 shows the LED indicators of the Li-ion battery.

Figure 5-24 LED indicators of the Li-ion battery



Table 5-32 describes the LED indicators definitions.

Table 5-32 LED indicators definitions

Identifier	Meaning	Color	Description
RUN	Communication and running indicator	Green	Steady on: Communication is normal (including board startup, self-check, firmware upgrading, and power-on without upgrading firmware; excluding hibernation when the power terminals or PWR port are energized) Off: The Li-ion battery is hibernating. Blinking at long intervals: The LCD user interface (LUI) is querying data. Blinking at short intervals: Communication is disconnected.
ALM	Fault indicator	Red	Steady on: There is a fault or major alarm. Off: There is no fault or major alarm. When the Li-ion battery is in hibernation mode, the indicator is off except for reverse connection protection.
CHG	Charge indicator	Green	Off: The Li-ion battery is open-circuited or discharging. Steady on: The Li-ion battery is being charged.
DCHG	Discharge indicator	Green	Off: The Li-ion battery is open-circuited or being charged. Steady on: The Li-ion battery is discharging.

 **NOTE**

- Major alarm: The Li-ion battery needs to be maintained immediately.
- Minor alarm: The Li-ion battery does not require maintenance, but provides a reminder for remote maintenance personnel.
- Blinking at long intervals: on for 1s and then off for 1s.
- Blinking at short intervals: on for 0.125s and then off for 0.125s.
- All indicators are blinking: The Li-ion battery has entered the maintenance mode.
- In hibernation mode, all indicators except the one for protection for reversed connection are off.

Activation

A Li-ion battery can be activated in the following modes. After being activated, the Li-ion battery status changes from the hibernation mode to the offline mode.

- Activation through the PWR terminal: Connect a 43.2–58 V DC power source whose voltage lasts for 5s or longer to the PWR terminal on the Li-ion battery panel.
- Activation through the **MANUAL ON/OFF** button: Hold down the **MANUAL ON/OFF** button on the Li-ion battery panel for a time longer than or equal to 5s but shorter than 15s.
- Activation through the power port: Connect a 43.2–58 V DC power source whose voltage lasts for 5s or longer to the power port on the front panel.



NOTE

- The **MANUAL ON/OFF** button is a contact button. The interval between 2 button operations must be longer than 0.5s. Otherwise, the latter operation is invalid.
- If the battery is forcibly powered off in charging, discharging, or offline mode by pressing the **MANUAL ON/OFF** button, you need to hold down the activation button to activate the Li-ion battery again.

5.9 AC PDU

An AC power distribution unit (PDU) is used in an AC-powered cabinet. The PDU draws in power from the AC mains supply or a diesel generator for AC power distribution and power supply protection.

Function

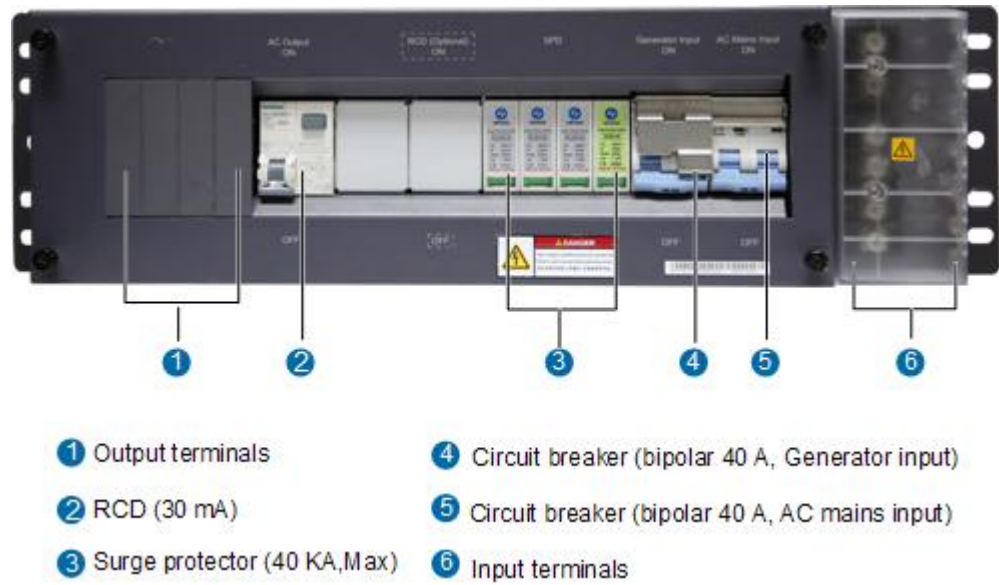
The AC PDU has the following functions:

- Provides one AC input and four AC outputs.
- Supports a maximum 40 kA surge protector and provides a dry contact port for remote alarming.
- Provides comprehensive and reliable grounding system and protection circuit, ensuring power supply reliability and device safety for the communications system.

Appearance

Figure 5-25 shows the appearance of the AC PDU.

Figure 5-25 Appearance of the 3 U AC PDU



Configuration

The AC PDU consists of the circuit breaker, surge protector, decoupling coil, and residual current device (RCD). Table 5-33 describes the configuration of these components.

Table 5-33 Configuration of components in the AC PDU

Component	Configuration
Circuit breaker (bipolar 40 A, AC mains input)	Mandatory
Circuit breaker (bipolar 40 A, generator input)	Mandatory
Surge protector (maximum 40 kA)	Mandatory
RCD (100 mA)	A 100 mA RCD is not configured by default, unless otherwise required. If a 100 mA RCD is not configured, insert a filler panel into the slot for the RCD.
RCD (30 mA)	Mandatory

Input Terminal

Figure 5-26 shows the input terminals of the AC PDU.

Figure 5-26 Input terminals of the AC PDU



The input terminals of the AC PDU are connected as follows:

- AC Mains Input terminals L(L1), N(L2), and PE of the PDU are connected to lines L, N, and PE of an AC power cable for leading in the mains input (220 V AC).
- AC Mains Input terminals L(L1), N(L2), and N of the PDU are connected to lines L1, L2, and N of an AC power cable for leading in the mains input (110 V AC dual live wires).
- Generator Input terminals L(L1), N(L2), and PE of the PDU are connected to lines L, N, and PE of an AC power cable for leading in the diesel generator input (220 V AC).
- Generator Input terminals L(L1), N(L2), and N of the PDU are connected to lines L1, L2, and N of an AC power cable for leading in the diesel generator input (110 V AC dual live wires).

Output Terminal

Figure 5-27 shows the output terminals of the AC PDU.

Figure 5-27 Output terminals of the AC PDU



The output terminals of the 3 U AC PDU are connected as follows:

- Output1 connected to the maintenance socket, intelligent heating modules of the battery compartment (optional), and intelligent heating modules of the equipment compartment (optional).
- Output2 connected to the ETP4830 or ETP 4890 power system
- SPD ALARM connected to the signal transfer box

Surge Protector

The AC PDU uses a maximum 40 kA surge protector, protecting the power system and the powered devices from the surge voltage caused by lightning strikes.

Table 5-34 lists the specifications of the surge protector.

Table 5-34 Specifications of the surge protector

Parameter	Specification
Nominal voltage	220 V AC or 110 V AC dual live wires
Maximum continuous operating voltage (U_c)	385 V AC
Maximum discharge current (I_{max})	40 kA (8/20 μ s)
Nominal discharge current (I_n)	20 kA (8/20 μ s)
Protection level (U_p)	1.5 kV
Local alarm window indication	<ul style="list-style-type: none"> • Green: The surge protector is

Parameter	Specification
	functioning properly. <ul style="list-style-type: none"> Red: The surge protector is faulty and needs to be replaced immediately.
Dimensions (H x W x D)	72 mm x 90 mm x 65 mm

Specifications

Table 5-35 lists the specifications of the AC PDU.

Table 5-35 Specifications of the AC PDU

Item	Specification
Rated voltage	220 V AC or 110 V AC dual live wires
Maximum output current	40 A
Number of outputs	4
Dimensions (W x D x H)	442 mm x 264.2 mm x 130 mm

5.10 DPD50-3-5S DC PDU

The DPD50-3-5S DC power distribution unit (PDU) works with the ETP4830 power system for DC power distribution.

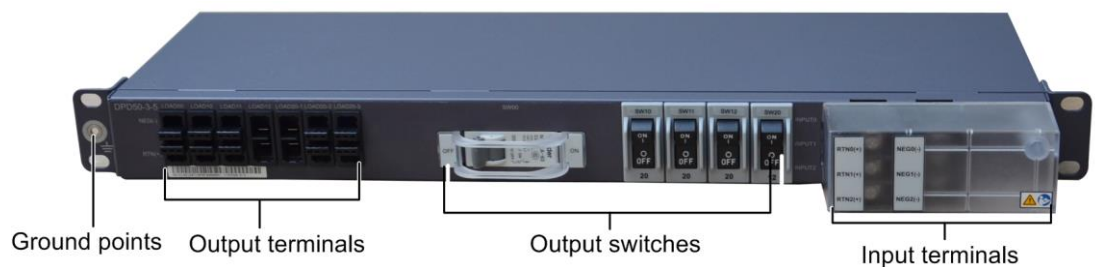
Function

The DPD50-3-5S DC PDU leads in three DC inputs from the ETP4830 power system and provides five DC outputs, each output controlled by a separate switch.

Appearance

Figure 5-28 shows the appearance of the DPD50-3-5S DC PDU.

Figure 5-28 Appearance of the DPD50-3-5S DC PDU





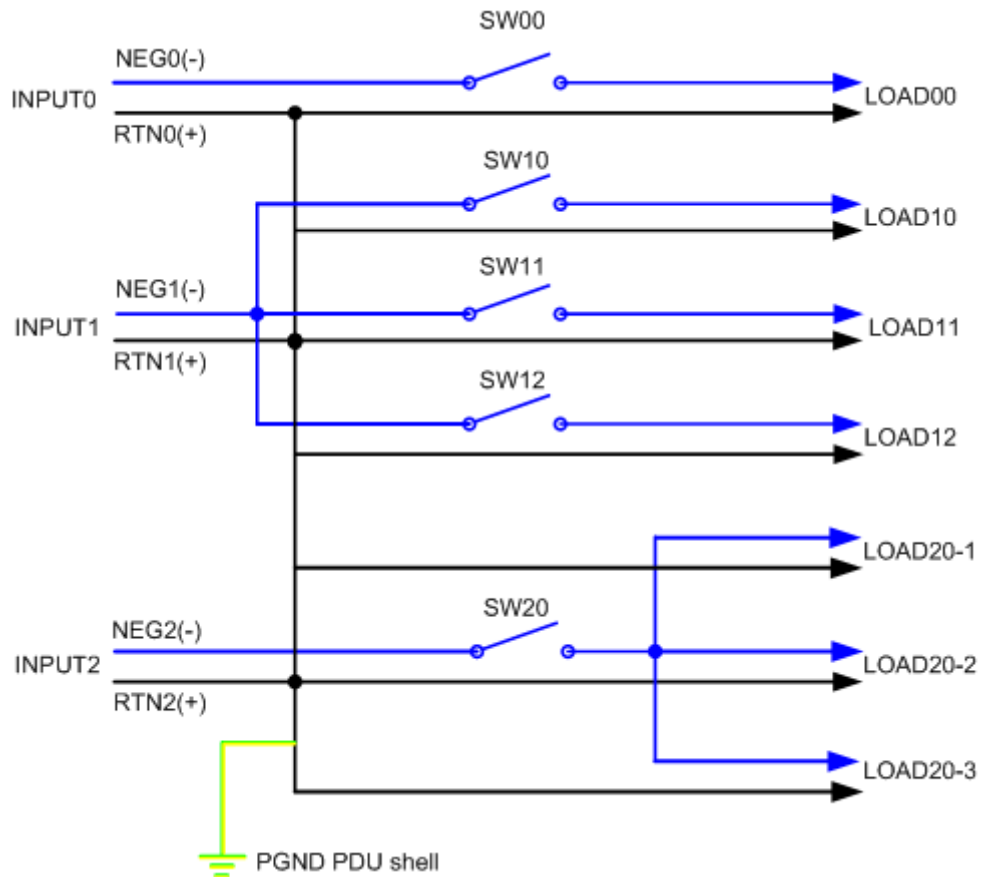
NOTE

In Figure 5-28, the plug-and-play connector connects to the DC power cable. The connector must be purchased separately and work with a DC PDU.

Working Principle

Figure 5-29 illustrates the working principle of the DPD50-3-5S DC PDU.

Figure 5-29 Working principle of the DPD50-3-5S DC PDU



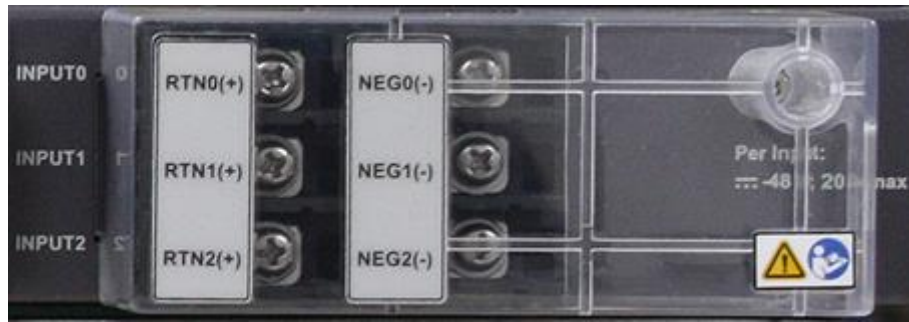
NOTE

The DPD50-3-5S DC PDU provides five DC outputs: LOAD00, LOAD10, LOAD11, LOAD12, and LOAD20, among which LOAD20 is subdivided into three tributaries (LOAD20-1, LOAD20-2, and LOAD20-3) for connecting to more loads.

Input Terminal

Figure 5-30 shows the input terminals of the DPD50-3-5S DC PDU.

Figure 5-30 Input terminals of the DPD50-3-5S DC PDU



The input terminals of the DPD50-3-5S DC PDU are connected to the ETP4830 power system as follows:

- INPUT0 connected to the BATT output port of the power system
- INPUT1 connected to the LOAD2 output port of the power system
- INPUT2 connected to the LOAD1 output port of the power system

Output Terminal

Figure 5-31 shows the output terminals of the DPD50-3-5S DC PDU.

Figure 5-31 Output terminals of the DPD50-3-5S DC PDU



Output Switch

Figure 5-32 shows the output switches of the DPD50-3-5S DC PDU.

Figure 5-32 Output switches of the DPD50-3-5S DC PDU



Table 5-36 describes the mapping between the output switches and the loads.

Table 5-36 Mapping between the output switches and the loads

Output Switch	Load	Output Current
SW00 (20 A)	LOAD00	20 A
SW10 (20 A)	LOAD10	20 A
SW11 (20 A)	LOAD11	20 A
SW12 (20 A)	LOAD12	20 A
SW20 (12 A)	LOAD20 (LOAD20-1, LOAD20-2, and LOAD20-3)	12 A



NOTE

- LOAD00 connects to the battery.
- LOAD10, LOAD11, LOAD12, LOAD20-1, LOAD20-2, and LOAD20-3 connect to different loads of the power supply system.

Specifications

Table 5-37 lists the specifications of the DPD50-3-5S DC PDU.

Table 5-37 Specifications of the DPD50-3-5S DC PDU

Parameter	Specification
Rated voltage	-48 V DC
Maximum input current	<ul style="list-style-type: none"> • Input0: 20 A • Input1: 20 A • Input2: 20 A
Number of outputs	5
Dimensions (W x D x H)	442 mm x 220 mm x 42 mm

5.11 Maintenance Socket

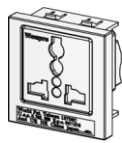
The maintenance socket is used to supply power to the external device during field maintenance.

Appearance

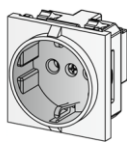
There are two types of maintenance sockets: European standard sockets and universal sockets. You can select one type based on your requirements.

Figure 5-33 shows the appearance of the maintenance socket.

Figure 5-33 Appearance of the maintenance socket



Universal
socket



European
standard socket

Specifications

Table 5-38 lists the specifications of the maintenance socket.

Table 5-38 Specifications of the maintenance socket

Item	Specification
Output voltage	200 V AC to 240 V AC
Maximum current carrying capability	3 A

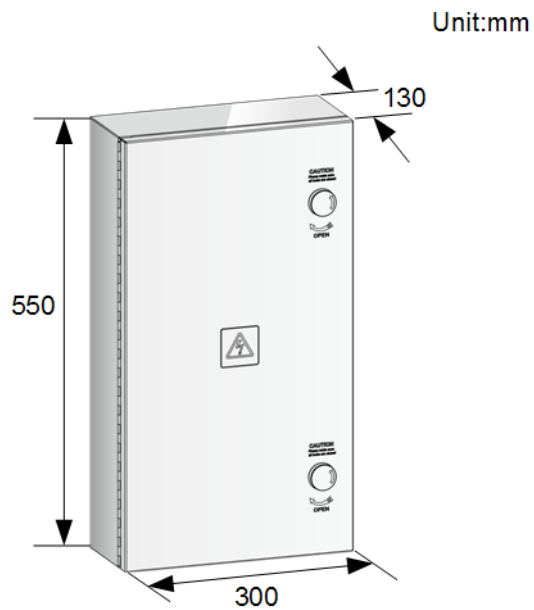
5.12 Power Meter Box (optional)

The power meter box is on the left side of the cabinet. It is used to house a power meter and is configured with a separate door lock.

Appearance

Figure 5-34 shows the appearance of the power meter box.

Figure 5-34 Appearance of the power meter box

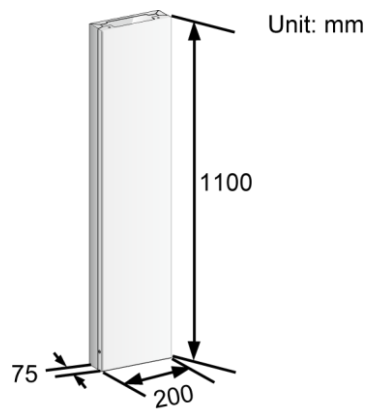


Internal dimensions

Internal dimensions (H x W x D) of the power meter box: 515 mm x 255 mm x 105 mm.

Figure 5-35 shows the appearance of the cable trough.

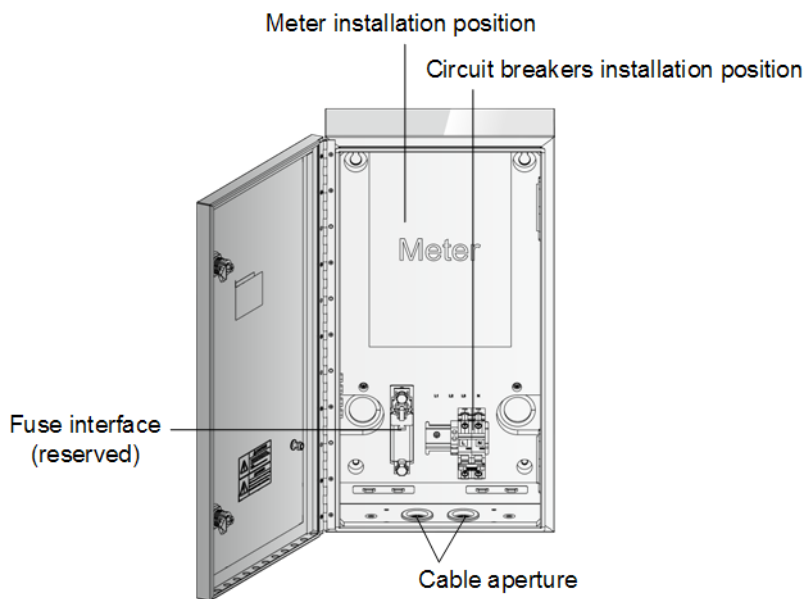
Figure 5-35 Appearance of the cable trough



Structure

Figure 5-36 shows the structure of the power meter box.

Figure 5-36 Structure of the power meter box



Requirements

Table 5-39 lists the requirements for a power meter.

Table 5-39 Requirements for a power meter

Item	Value
Maximum dimensions (H x W x D) of the power meter	290 mm x 180 mm x 100 mm
Maximum operating temperature	> 65 °C
Power consumption	< 1 W

6 Monitoring System

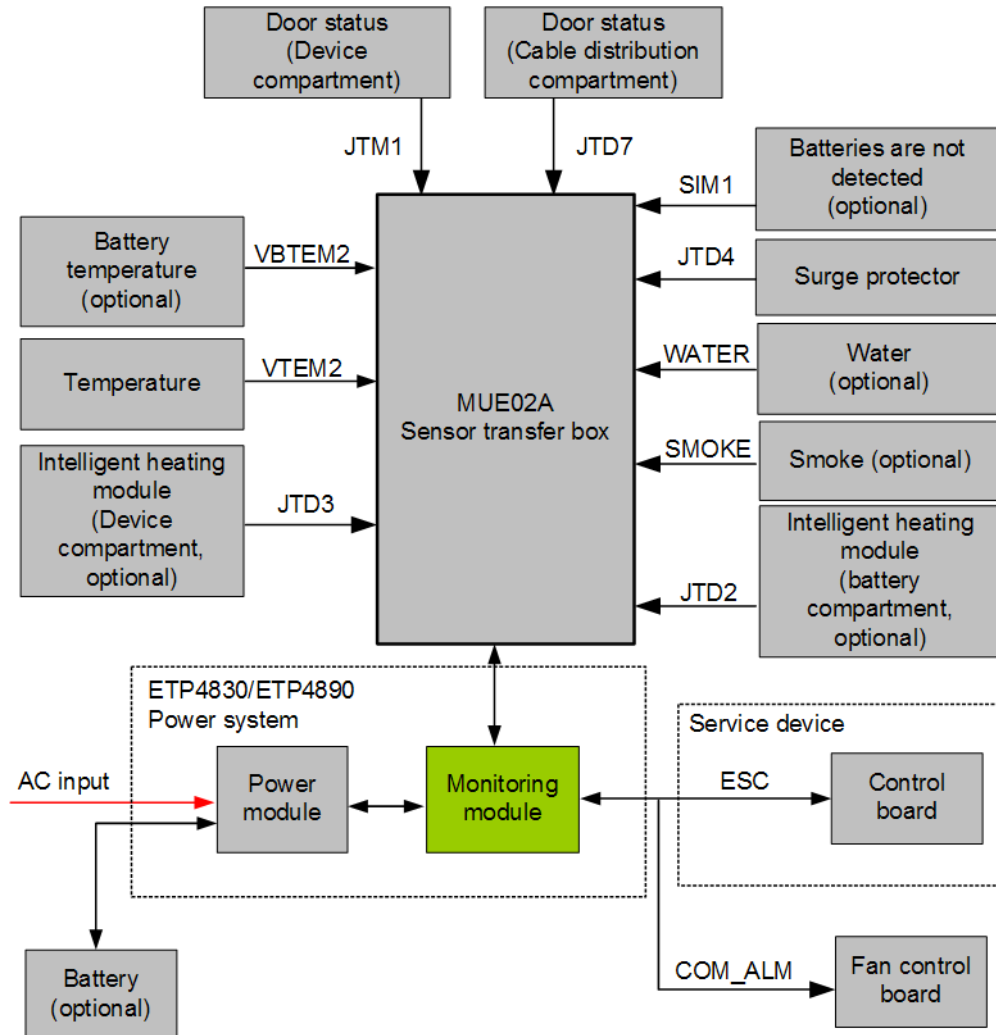
6.1 Monitoring Principle

When the ETP4830 or ETP4890 power system is configured, the signal transfer box collects the information about monitored parameters and the power monitoring module processes and reports the parameters to the service device. In this way, the F01T300 cabinet monitors the environment, power units, and other main components inside the cabinet. When the electronic door lock is optional, you need to select the CCU to monitor it.

When the Remote side power system (RPR) is configured, the CCU reports the monitored parameters to the service device. In this way, the F01T300 cabinet monitors the environment, power units, and other main components inside the cabinet.

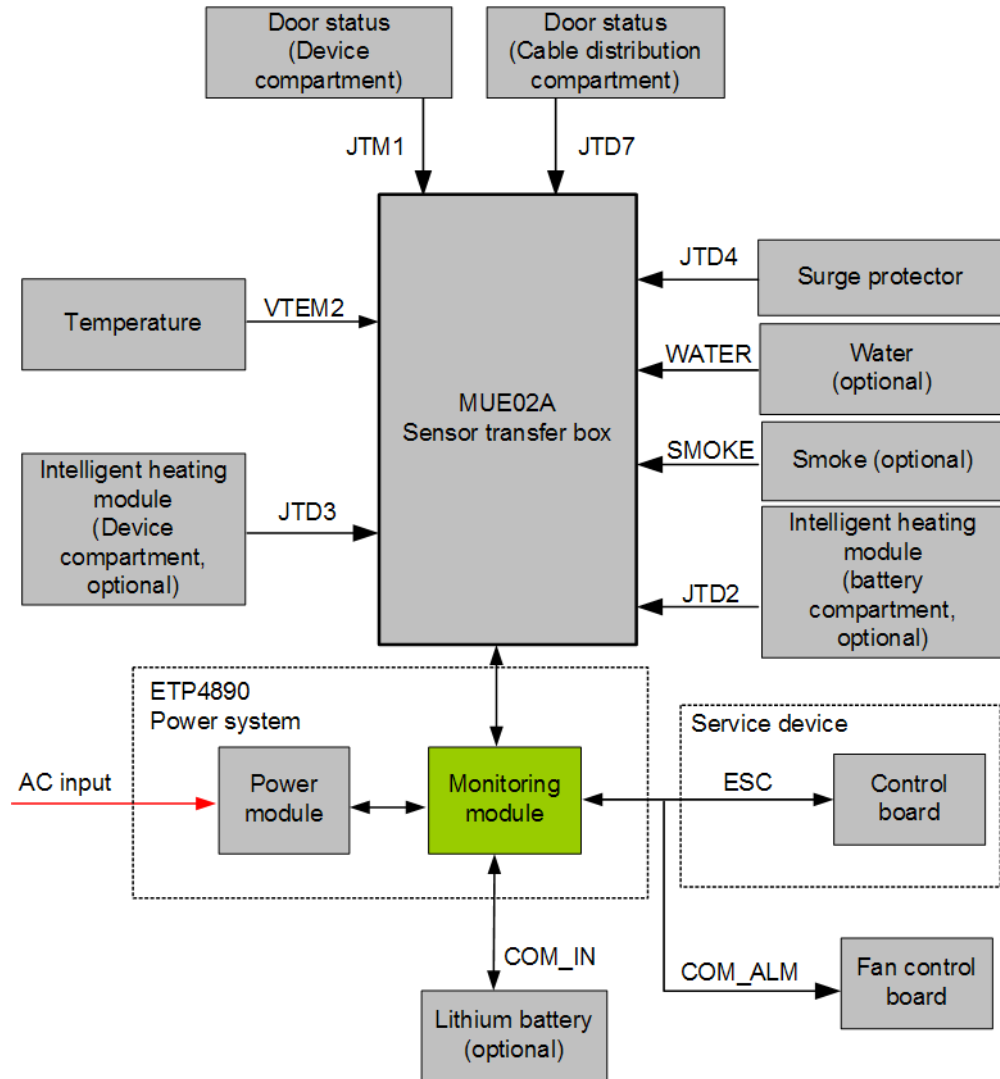
Monitoring Principle (When AC Power Supply and Battery and HW-2802 Door Lock Are Used)

Figure 6-1 Monitoring principle of the F01T300 cabinet (AC Power supply + Battery + HW-2802 door lock)



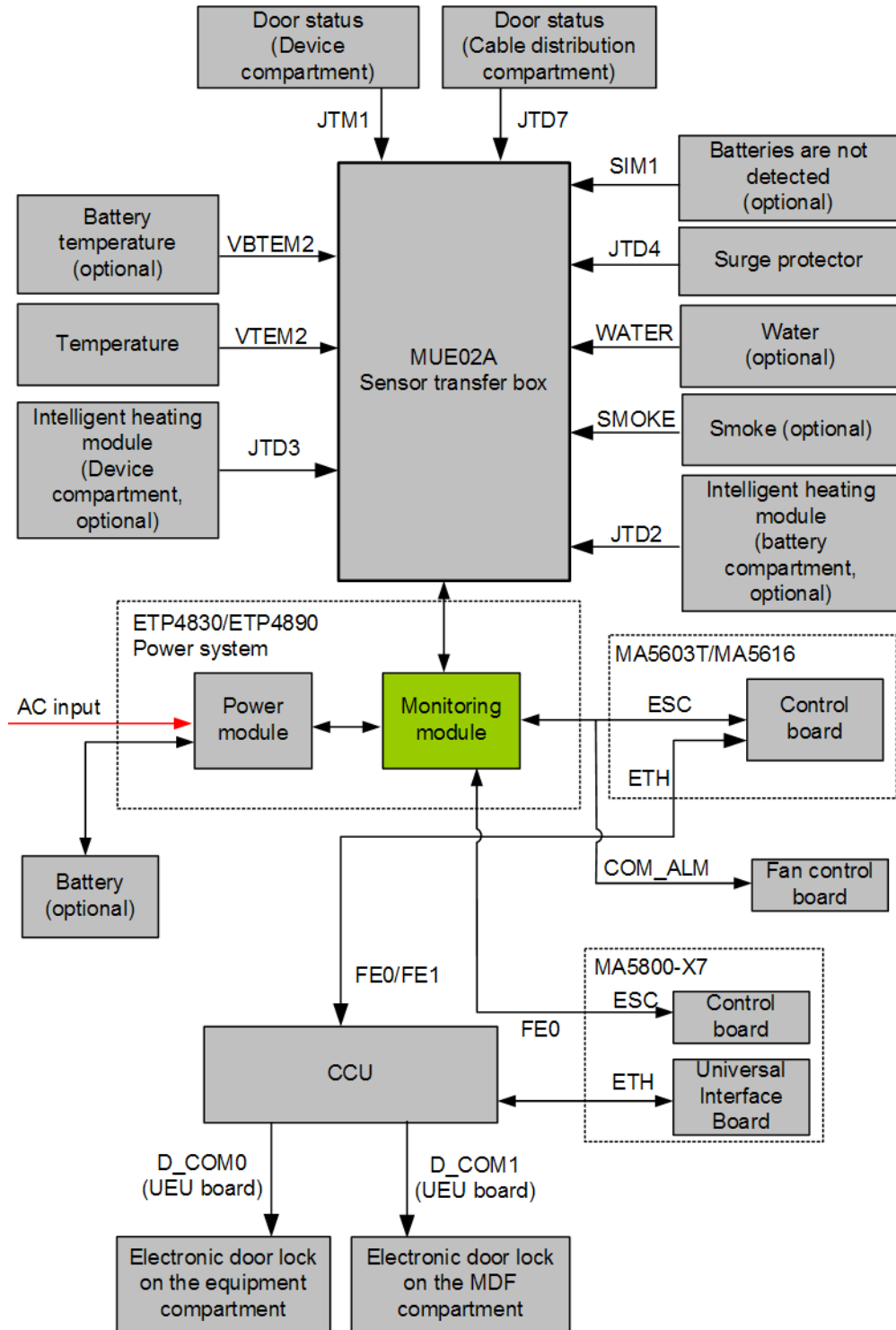
Monitoring Principle (When AC Power Supply and Li-ion Battery and HW-2802 Door Lock Are Used)

Figure 6-2 Monitoring principle of the F01T300 cabinet (AC Power supply + Li-ion Battery + HW-2802 door lock)



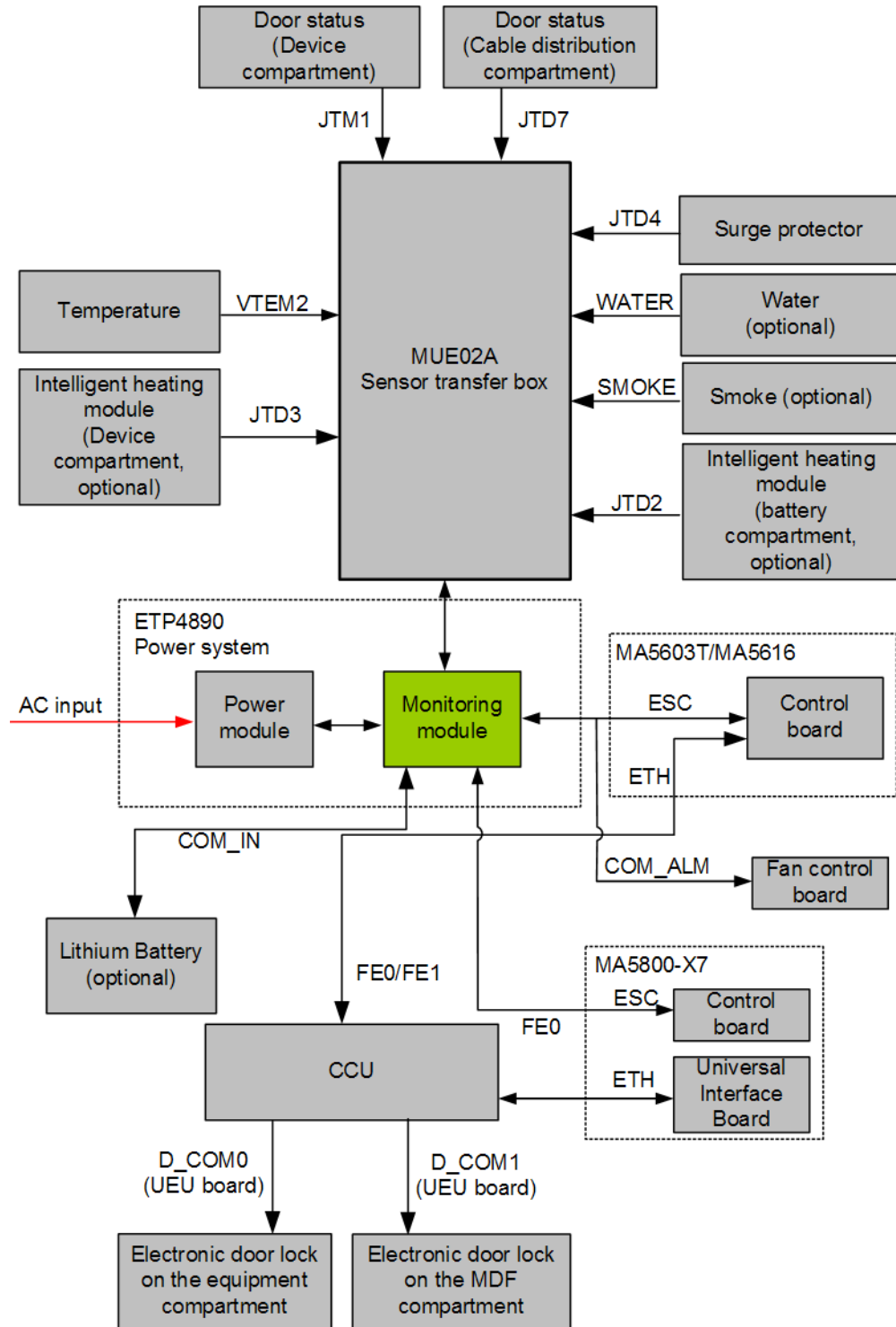
Monitoring Principle (When AC Power Supply and Battery and Electronic Door Lock Are Used)

Figure 6-3 Monitoring principle of the F01T300 cabinet (AC Power supply + Battery + Electronic door lock)



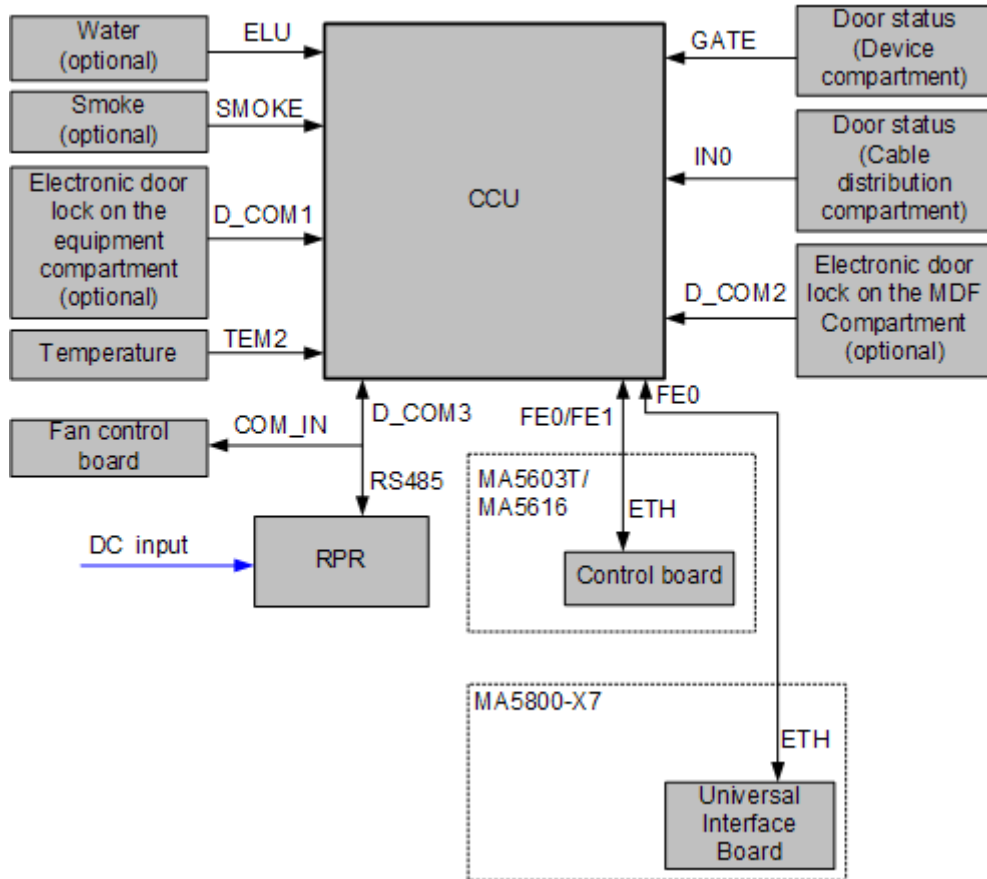
Monitoring Principle (When AC Power Supply and Li-ion Battery and Electronic Door Lock Are Used)

Figure 6-4 Monitoring principle of the F01T300 cabinet (AC Power supply + Li-ion Battery + Electronic door lock)



Monitoring Principle (When a Remote Side Power System Is Used)

Figure 6-5 Monitoring principle of the F01T300 cabinet



6.2 CCU

This topic describes the appearance and features of the CCU.

The CCU is used to monitor electronic door locks. Figure 6-6 shows the appearance of the CCU. For details, see [Intelligent Site Product Description](#).

Figure 6-6 Appearance of the CCU



6.3 MUE02A Sensor Transfer Box

The sensor transfer box provides various sensor ports to connect the external sensors to monitoring module, collecting signals from the sensors and forwarding the signals to the monitoring module.

Appearance

Figure 6-7 shows the appearance of the MUE02A sensor transfer box.

Figure 6-7 Appearance of the MUE02A sensor transfer box



Sensor Port

Figure 6-8 and Table 6-1 describe the sensor ports on the MUE02A sensor transfer box.

Figure 6-8 Sensor ports of the MUE02A sensor transfer box

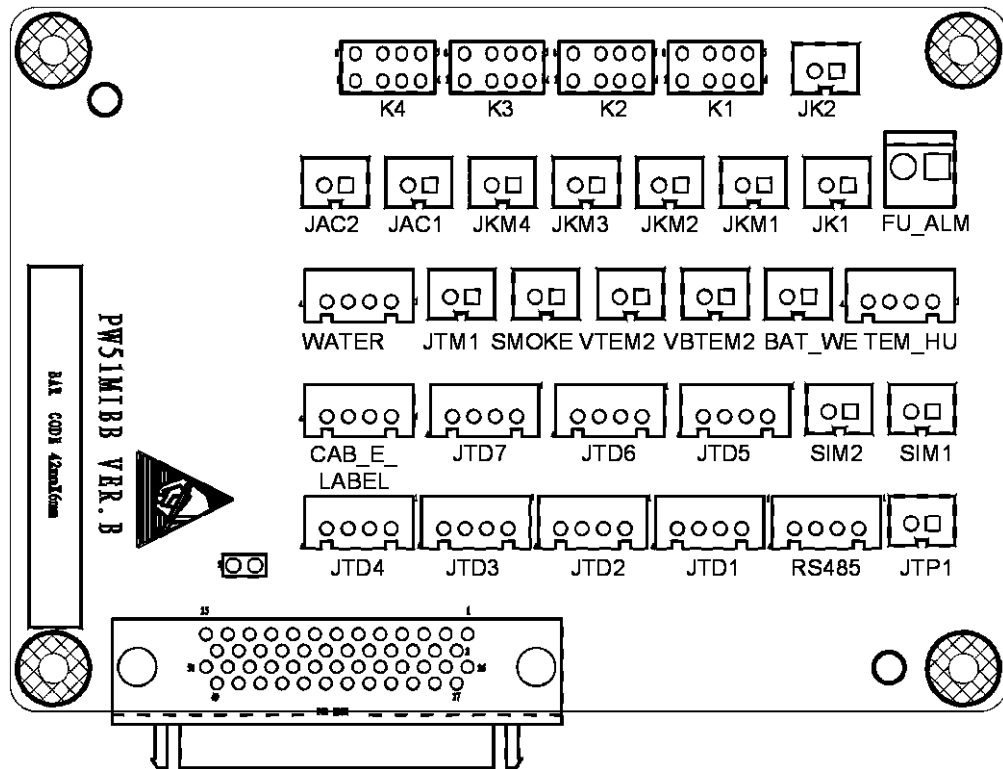


Table 6-1 Pin function of the sensor ports

Silk Screen	Signal Port	Pin Function
SIM1/SIM2	Port for detecting voltages	<ul style="list-style-type: none"> Pin 1 is for the signal cable. Pin 2 is reserved.
FU_ALM	Port for detecting battery fuses	<ul style="list-style-type: none"> Pin 1 is for the signal cable. Pin 2 is reserved.
TEM_HU	Port for detecting temperature and humidity 1	<ul style="list-style-type: none"> Pin 1 and pin 3 are for +12 V power supply. Pin 2 is for the temperature signal cable. Pin 4 is for the humidity signal cable.
BAT_WE	Port for detecting battery temperature 1	<ul style="list-style-type: none"> Pin 1 is for the +12 V power supply. Pin 2 is for the signal cable.
VBTEM2	Port for detecting battery temperature 2	<ul style="list-style-type: none"> Pin 1 is for the +12 V power supply. Pin 2 is for the signal cable.
VTEM2	Port for detecting temperature 2	<ul style="list-style-type: none"> Pin 1 is for the +12 V power

Silk Screen	Signal Port	Pin Function
		supply. <ul style="list-style-type: none"> Pin 2 is for the signal cable.
JTD1-JTD7	Port for digital parameter input	<ul style="list-style-type: none"> Pin 1 and pin 2 are for +12 V power supply. Pin 3 is for the signal cable. Pin 4 is for grounding.
SMOKE	Smoke sensor port	<ul style="list-style-type: none"> Pin 1 is for the signal cable. Pin 2 is for +24 V power supply.
WATER	Water sensor port	<ul style="list-style-type: none"> Pin 1 is for +12 V power supply. Pin 2 is for the signal cable. Pin 3 is for grounding.
JTM1	Door status sensor port	<ul style="list-style-type: none"> Pin 1 is for the signal cable. Pin 2 is for +12 V power supply.
JTP1	Sensor port on the MDF	<ul style="list-style-type: none"> Pin 1 is for the signal cable. Pin 2 is reserved.
JK1/JK2	Alarm dry contact output port	The maximum voltage is 60 V DC and the maximum load current is 500 mA.
JAC1/JAC2	Alarm dry contact output port	The maximum voltage is 60 V DC and the maximum load current is 500 mA.
JKM1-JKM4	Alarm dry contact output port	The maximum voltage is 60 V DC and the maximum load current is 500 mA.
CAB_E-LABEL	Cabinet electronic label port	<ul style="list-style-type: none"> Pin 1 is for +5 V power supply. Pin 2 is for the clock cable. Pin 3 is for the digital cable. Pin 4 is for grounding.

Parameter

Table 6-2 lists the specifications of the MUE02A sensor transfer box.

Table 6-2 Specifications of the MUE02A sensor transfer box

Parameter	Specifications
-----------	----------------

Parameter	Specifications
Dimensions (H x W x D)	31 mm x 140 mm x 96 mm

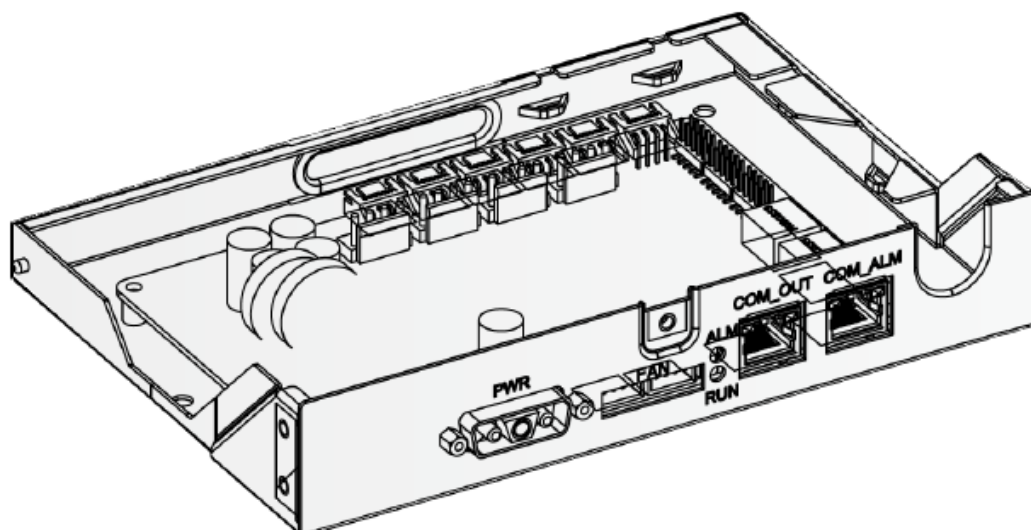
6.4 Fan Control Board

The fan control board inside the cabinet controls and monitors internal and external circulating fans, and adjusts their speeds based on the temperature detected by the external temperature sensor.

FCB Appearance

Figure 6-9 shows the FCB appearance.

Figure 6-9 FCB appearance



Performance

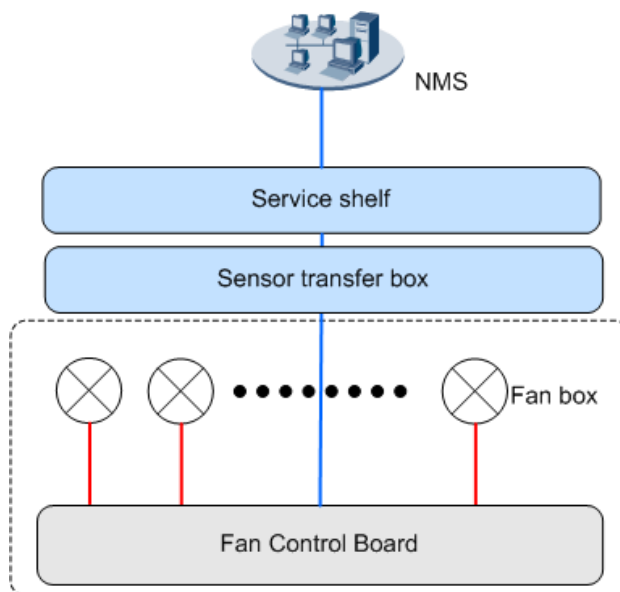
Performance	Description
Power supply input and load	The power supply input ranges from -36 V to +60 V. The power provides reverse polarity protection and supports soft startup. It also supports a maximum load of 500 W.
Fan control	The FCB provides six 48 V fan interfaces with each producing independent PWM signals. Each fan supports 100 W or 150 W.
Temperature monitoring	The FCB monitors the temperature ranging from -45 °C (-49 °F) to +70 °C (+158 °F) with ±1 °C precision. The FCB provides a temperature sensor and can connect to two outside temperature sensors.
Communication	The FCB has an RS485 monostable multivibrator. The host can

Performance	Description
	communicate with two FCBs using the RS485 cascading interfaces.
Alarm output	The FCB supports the output of dry contact alarms.
Indicator status	The FCB provides a red indicator and a green indicator to indicate the operating status.
Control mode	Fans can be controlled by a host or the FCB.

Principles

Figure 6-10 shows the FCB operating principles.

Figure 6-10 FCB operating principles



Indicator Description

Figure 6-11 FCB panel

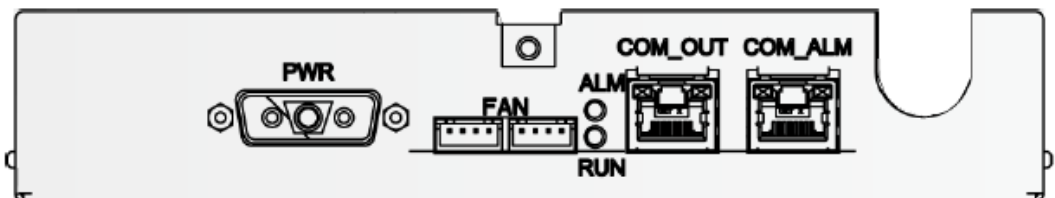


Table 6-3 Description of the indicators on the FCB

Indicator	Label	Color	Status	Description
Operating status indicator	RUN	Green	Steady on	The FCB is powered on but no programs are running.
			Blinks at 0.5 Hz	The FCB is running properly.
			1s on and 1s off	
			Blinks at 4 Hz	Links connecting to the serial interface fail or the FCB is not registered.
			0.125s on and 0.125s off	
			Steady off	The FCB is not powered on.
Alarm indicator	ALM	Red	Steady on	The FCB or hardware module is faulty and needs to be returned to R&D engineers for analysis.
			Blinks at 0.5 Hz	An alarm is generated but whether the FCB needs to be returned cannot be determined.
			1s on and 1s off	
			Steady off	No alarm is generated.

Parameters

Table 6-4 lists the FCB parameters.

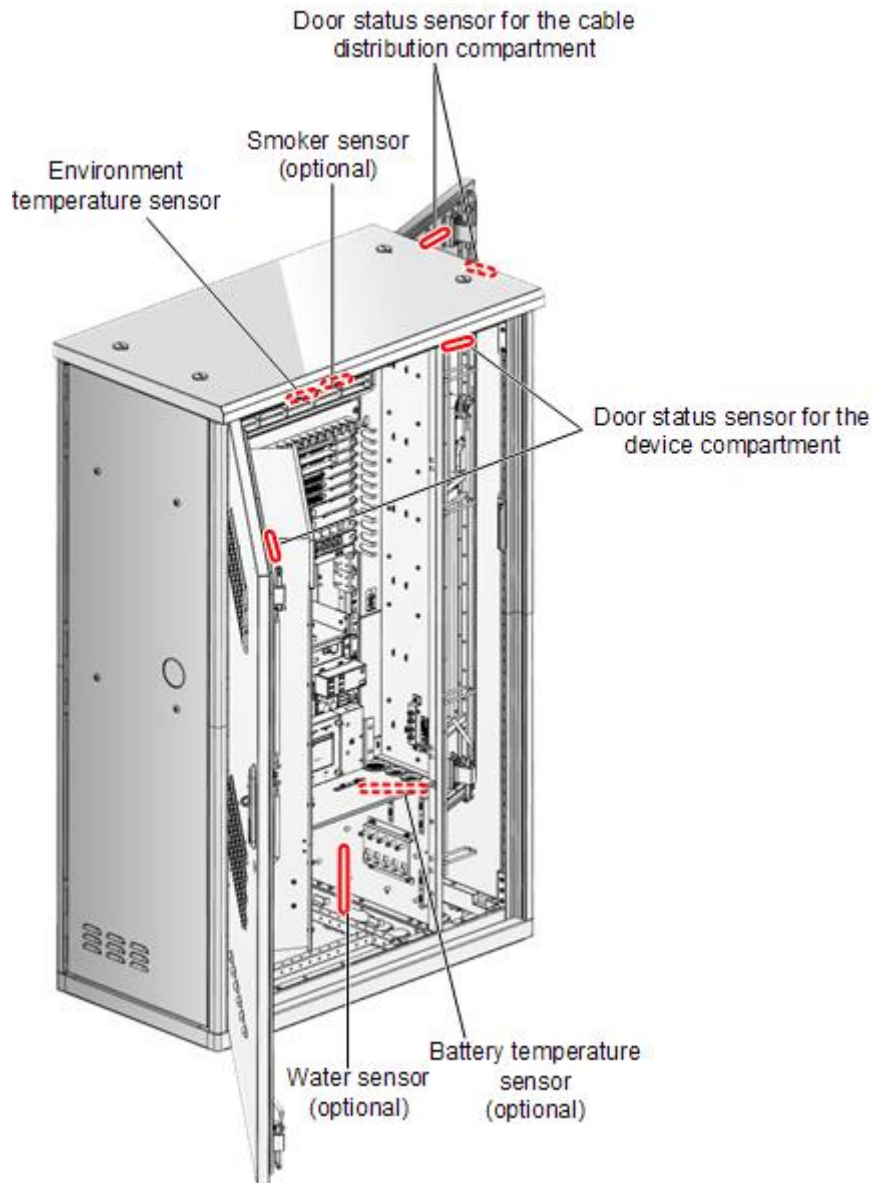
Table 6-4 FCB parameters

Item	Specifications
Dimensions (H x W x D)	155 mm x 105 mm x 10 mm

6.5 Sensor

The following figure shows positions of sensors inside the F01T300 cabinet.

Figure 6-12 Installation positions of sensors



6.5.2 Door Status Sensor

The door status sensor monitors the status of the cabinet door.

Appearance

The door status sensor uses a magnetic switch as the probe. The magnetic switch consists of two built-in parts. The reeds of the magnetic switch are attracted together through electromagnetic interaction. The output signals are dry-contact output signals without polarity.

Figure 6-13 shows the appearance of the door status sensor.

Figure 6-13 Appearance of the door status sensor



Technical Specifications

Table 6-5 describes the technical specifications of the door status sensor.

Table 6-5 Technical specifications of the door status sensor

Parameter	Value
Power supply voltage	12 V DC
Switch status	Off
Node capacity	Bearable voltage: 150 V DC
	Bearable current: 0.5 A
Impedance	0.3 ohm
Output signal type	Dry contact

6.5.3 (Optional) Battery Temperature Sensor (NTC Type)

The battery temperature sensor (NTC type) samples the ambient temperature of the battery set to monitor the temperature of the battery in real time, and is used for float charging temperature compensation, over temperature alarming, and protection for the battery.

Appearance

The battery temperature sensor (NTC type) integrates with a negative temperature coefficient (NTC) temperature sensor, and outputs resistance analog parameters. To sample the ambient temperature of the battery set, install the temperature probe of the battery temperature sensor (NTC type) at a position that best represents the temperature of the battery set. Do not connect the temperature probe to other exothermic devices.

Figure 6-14 shows the appearance of the battery temperature sensor (NTC type).

Figure 6-14 Appearance of the battery temperature sensor (NTC type)



Technical Specifications

Table 6-6 lists the technical specifications of the battery temperature sensor (NTC type).

Table 6-6 Technical specifications of the battery temperature sensor (NTC type)

Parameter	Value
Nominal resistance	10 kilohms \pm 1% (at 25 °C)
Temperature measurement range	-40 °C to +80 °C
Precision of temperature measurement	\pm 1 °C (at 25 °C)
Signal output	190.25 kilohms to 1.663 kilohms

6.5.4 Environment Temperature Sensor (NTC Type)

The environment temperature sensor (NTC type) samples the ambient temperature of the device in a cabinet to monitor the temperature of the device in real time, and it is used for over temperature alarming.

Appearance

The environment temperature sensor (NTC type) integrates with a negative temperature coefficient (NTC) temperature sensor, and outputs resistance analog parameters. To sample the ambient temperature of the device in a cabinet, install the temperature probe of the environment temperature sensor (NTC type) at a position that best represents the temperature of the cabinet. Do not connect the temperature probe to other exothermic devices.

Figure 6-15 shows the appearance of the environment temperature sensor (NTC type).

Figure 6-15 Appearance of the environment temperature sensor (NTC type)



Technical Specifications

Table 6-7 shows the technical specifications of the environment temperature sensor (NTC type).

Table 6-7 Technical specifications of the environment temperature sensor (NTC type)

Parameter	Value
Nominal resistance	10 kilohms $\pm 1\%$ (at 25 °C)
Temperature measurement range	-40 °C to +80 °C
Precision of temperature measurement	± 1 °C (at 25 °C)
Signal output	190.25 kilohms to 1.663 kilohms

6.5.5 (Optional) Smoke Sensor

The smoke sensor is used to detect the smoke generated by the fire to prompt the fire in advance.

Appearance

The smoke sensor is sensitive to the white smoke that is generated in burning. The smoke sensor can warn the fire effectively.

Figure 6-16 shows the smoke sensor.

Figure 6-16 Smoke sensor



Principles

The red LED turns steady on when the probe detects the alarm state. When the system is reset, or it is powered off and again powered on, the sensor restores to the state without alarms. At this time, the red LED blinks normally, as shown in Table 6-8.

Table 6-8 Description of the LED on the probe

LED	Status	Meaning
Red LED	Steady on	The probe is in the alarming state.
	Blinking	The probe is in the non-alarming state.

Technical Specifications

Table 6-9 describes the technical specifications of the smoke sensor.

Table 6-9 Technical specifications of the smoke sensor

Parameter	Value
Type	JTY-GD-S839
Power supply voltage	12 VDC/24 V DC \pm 5%
Output type	2-wire Boolean value type
Operating type	Optical or electrical smoke sensing type

6.5.6 (Optional) Water Sensor

The water sensor is used to monitor the liquid level change.

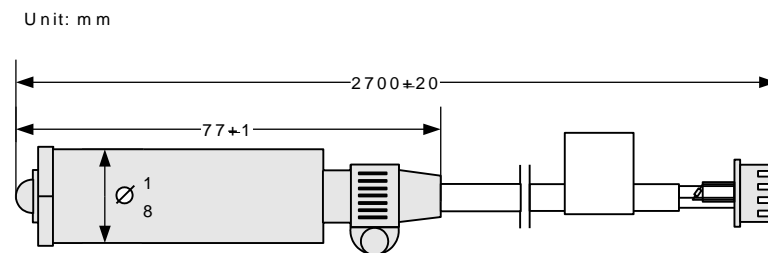
Appearance

The liquid-level sensor adopted by Huawei is a kind of plug-in spacing liquid-level sensor. This sensor is of the current-output type. When the sensor enters the liquid, the power supply forms an injection current to the signal end to monitor the liquid level change.

The solid-state liquid-level sensing head adopts the infrared photoelectricity theory. When the detected liquid contacts the sensing head, the light path is changed, and the infrared receiving point is in the stop state. In this way, the reverser is inverted, and outputs the low-level absorbing current.

Figure 6-17 shows the water sensor.

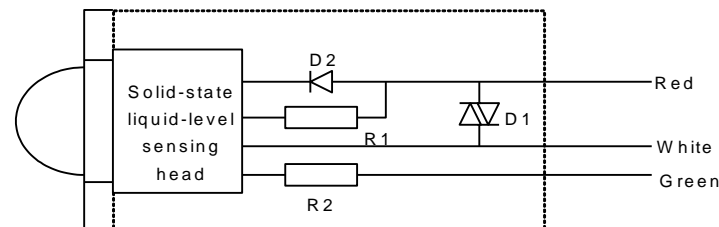
Figure 6-17 Water sensor



Principles

Figure 6-18 shows the electrical principles of the water sensor.

Figure 6-18 Electrical principles of the water sensor



The water sensor is a three-wire interface.

- Green wire: Output signal
- Red wire: +12 V
- White wire: GND

Technical Specifications

Table 6-10 describes the technical specifications of the water sensor.

Table 6-10 Technical specifications of the water sensor

Parameter	Value
-----------	-------

Parameter	Value
Type	YW517B
Power supply voltage	12 V DC \pm 5%
Output current when no liquid is detected	<80 μ A
Output current when the liquid is detected	10 mA to 15 mA
Output signal type	Current
Work temperature range	-20 $^{\circ}$ C to +70 $^{\circ}$ C



NOTE

The cable configured for the YW517B water sensor is 2.7 m long.

7 Temperature Control System

7.1 Temperature Control Principle

The F01T300 cabinet provides a built-in temperature control unit for heat dissipation and heating. The temperature control unit controls the temperature inside the cabinet within a proper range and ensures that the device inside the cabinet functions properly.

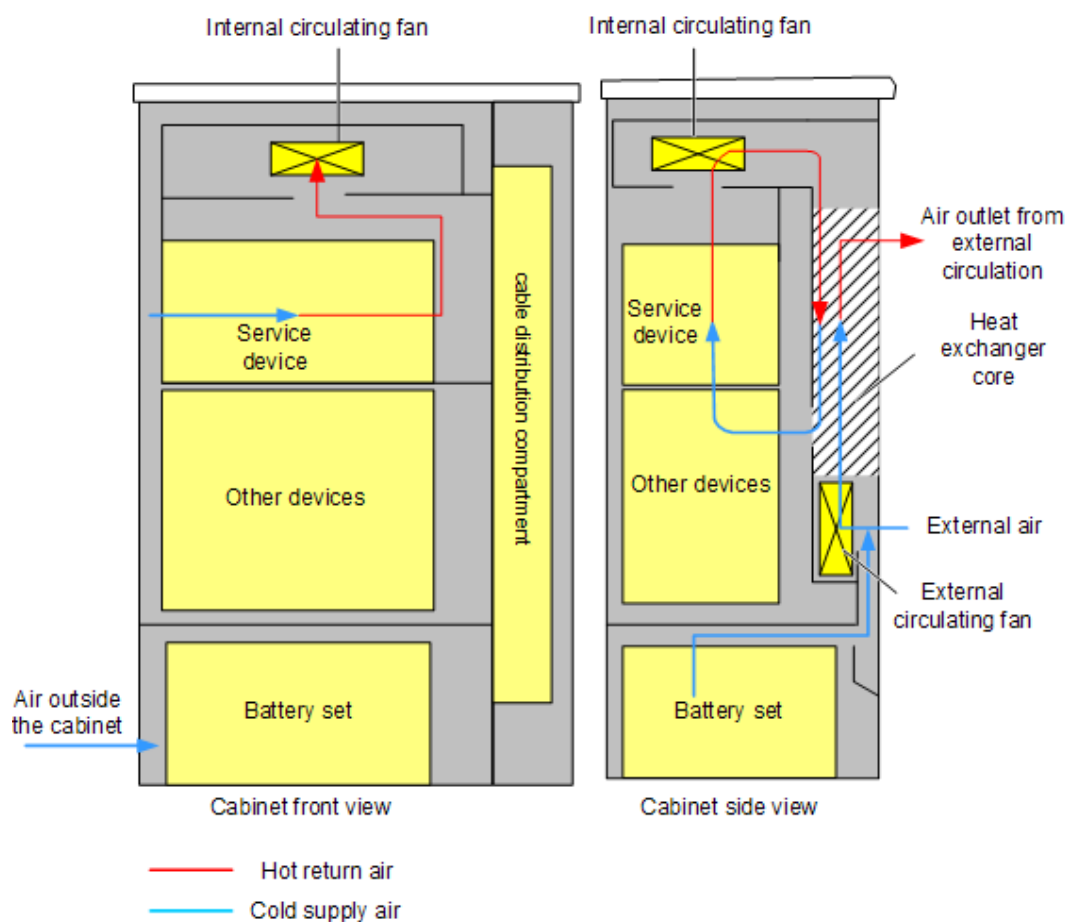
Heat Dissipation

The F01T300 cabinet uses a split type heat exchange structure and two fans for internal and external cycles to dissipate heat for the cabinet.

The heat dissipation system contains two independent air cycles (internal cycle and external cycle). Acentric fans for the internal and external cycles enable air convection for cooling the sealed area. Specifically, the air inside the sealed area is cooled through heat exchange with the air outside the cabinet, and heat is transferred through the heat exchange core.

Figure 7-1 illustrates the heat dissipation of the F01T300 cabinet.

Figure 7-1 Heat dissipation of the F01T300 cabinet



Heating

An intelligent heating module can be installed at the left side of the battery compartment or the right side of the equipment compartment. A fan in the heating module blows air to dissipate heat generated by the heating module. In this way, the battery compartment or equipment compartment is heated and the heat inside the compartment is balanced, ensuring optimal operating temperature for the battery set or all the devices.

7.2 Temperature Control Unit

The temperature control unit inside the F01T300 cabinet consists of two 175 mm cabinet fans and one HAU02A-01 intelligent heating module (optional).

- The F01T300 cabinet uses two 175 mm cabinet fans for internal air circulation and two for external air circulation, dissipating heat for the cabinet.
- The HAU02A-01 intelligent heating module is optional. One is mandatory for areas at battery temperatures lower than $-15\text{ }^{\circ}\text{C}$, and another is also mandatory for areas at equipment temperatures lower than $-25\text{ }^{\circ}\text{C}$.

7.2.1 175 mm Cabinet Fan

The temperature sensor on the cabinet fan detects the ambient temperature and automatically adjusts the fan speed to dissipate heat out of the cabinet.

Appearance

Figure 7-2 shows the appearance of the 175 mm cabinet fan.

Figure 7-2 Appearance of the 175 mm cabinet fan



Technical Specifications

Table 7-1 lists the technical specifications of the 175 mm cabinet fan.

Table 7-1 Technical specifications of the 175 mm cabinet fan

Item	Specification
Rated voltage	-48 VDC
Working voltage range	-36 V DC to -60 VDC
Maximum power consumption	98 W
Maximum rotation speed	4000 rpm
Operating life	70000 h (40 °C)
Rotation speed control mode	PWM (pulse width modulate) speed adjustment
Dimensions (diameter x height)	175 mm x 69 mm

7.2.2 (Optional) HAU03A-01 Intelligent Heating Module

As a temperature control device, an HAU03A-01 intelligent heating module enables equipment to function properly in a low-temperature environment.

Appearance

Figure 7-3 shows the appearance of the HAU03A-01 intelligent heating module.

Figure 7-3 Appearance of the HAU03A-01 Intelligent Heating Module



Specifications

Table 7-2 lists the specifications of the HAU03A-01 intelligent heating module.

Table 7-2 Specifications of the HAU03A-01 intelligent heating module

Parameter	Value
Rated voltage	220 V AC
Operation mode	When the detecting temperature is lower than 0 °C (± 3 °C), the intelligent heating module will start working. When the detecting temperature is higher than 15 °C (± 3 °C), the intelligent heating module will stop working.
Indicator status	<ul style="list-style-type: none"> RUN (green): steady on, indicates that it works normally. ALM (red): steady on, indicates that it generates the alarm.
Operating temperature range	-40 °C to +65 °C
Operating humidity range	5%-95% RH
Dimensions (H x W x D)	43.6 mm x 216 mm x 120 mm
Maximum power consumption	500 W

8 Cable Distribution System

8.1 Cable Distribution Principle

The F01T300 cabinet provides a built-in main distribution frame (MDF) and a built-in optical distribution frame (ODF) for service access and service upstream transmission.

Fiber Access

Figure 8-1 shows the cable distribution of the F01T300 cabinet when the cabinet provides fiber access.

Figure 8-1 Cable distribution of the F01T300 cabinet (only for PON access, default)

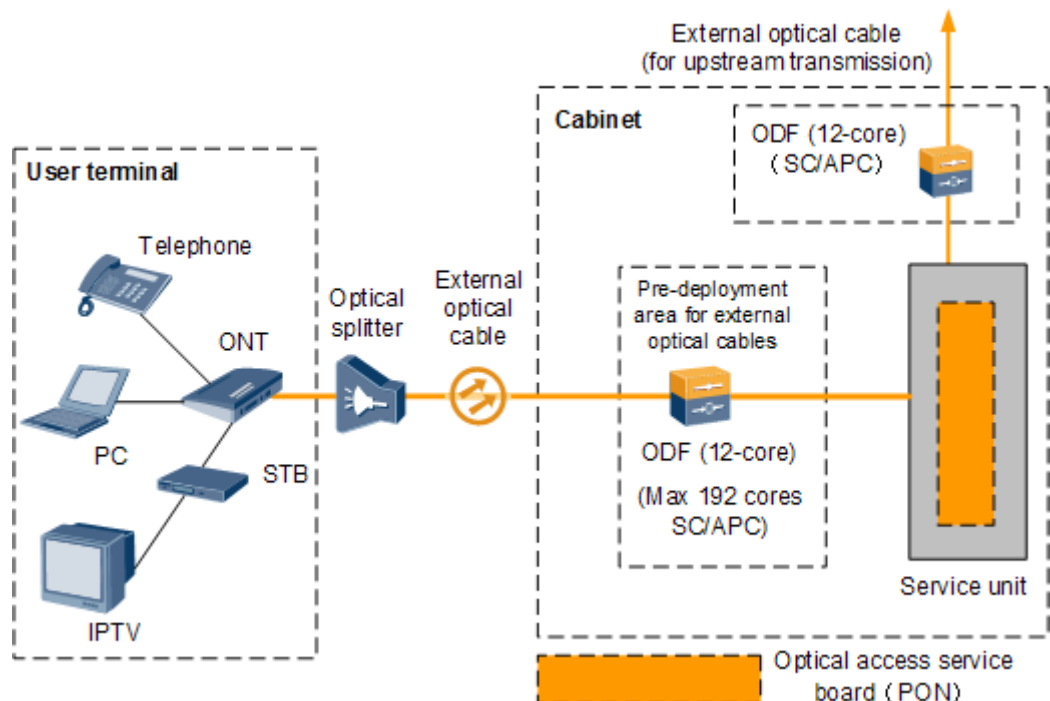


Figure 8-2 Cable distribution of the F01T300 cabinet (only for PON access; patch cord tray is optional)

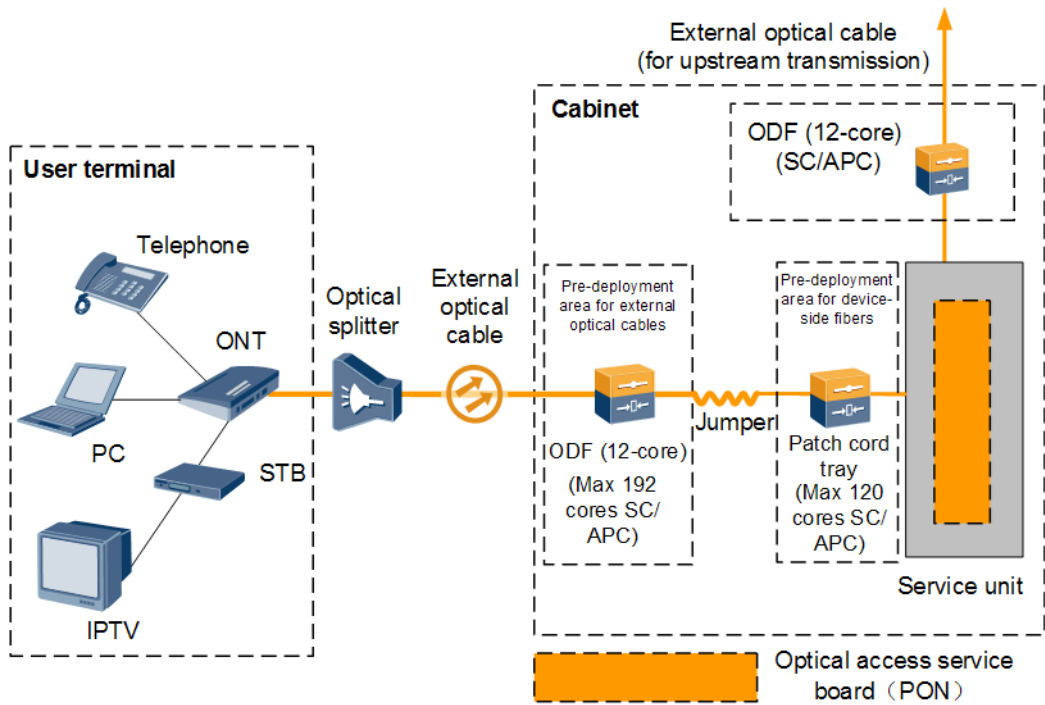
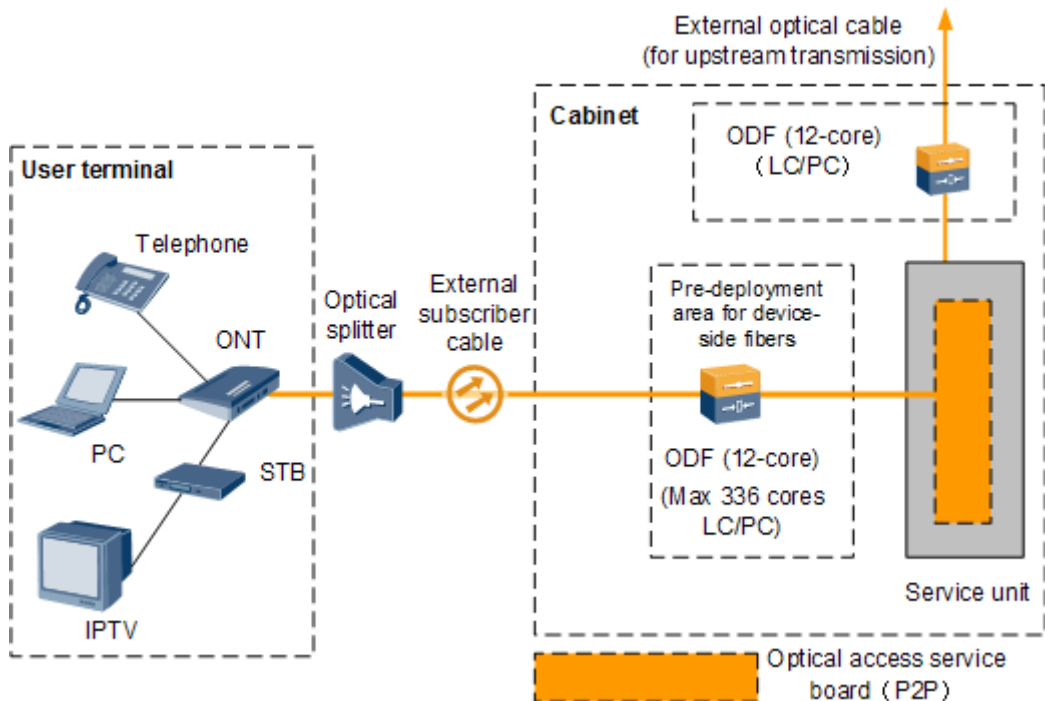


Figure 8-3 Cable distribution of the F01T300 cabinet (only for P2P access)



Copper Access

Figure 8-4, Figure 8-5, Figure 8-6, and Figure 8-7 show the cable distribution of the F01T300 cabinet when the cabinet provides copper access.

Figure 8-4 Cable distribution of the F01T300 cabinet (only for narrowband services)

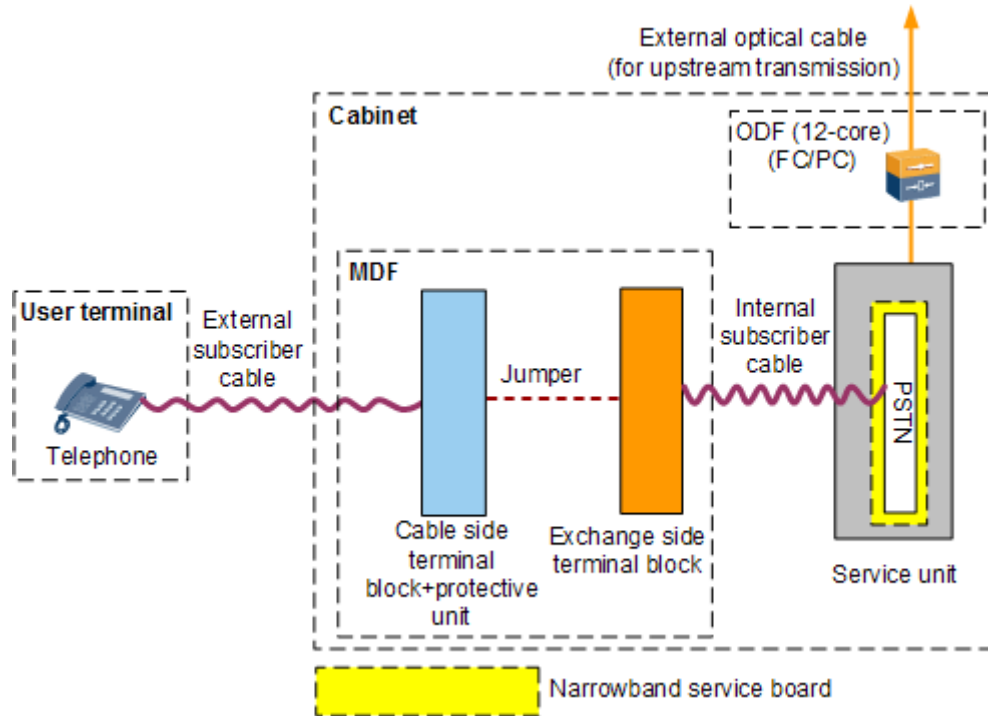


Figure 8-5 Cable distribution of the F01T300 cabinet (only for broadband services)

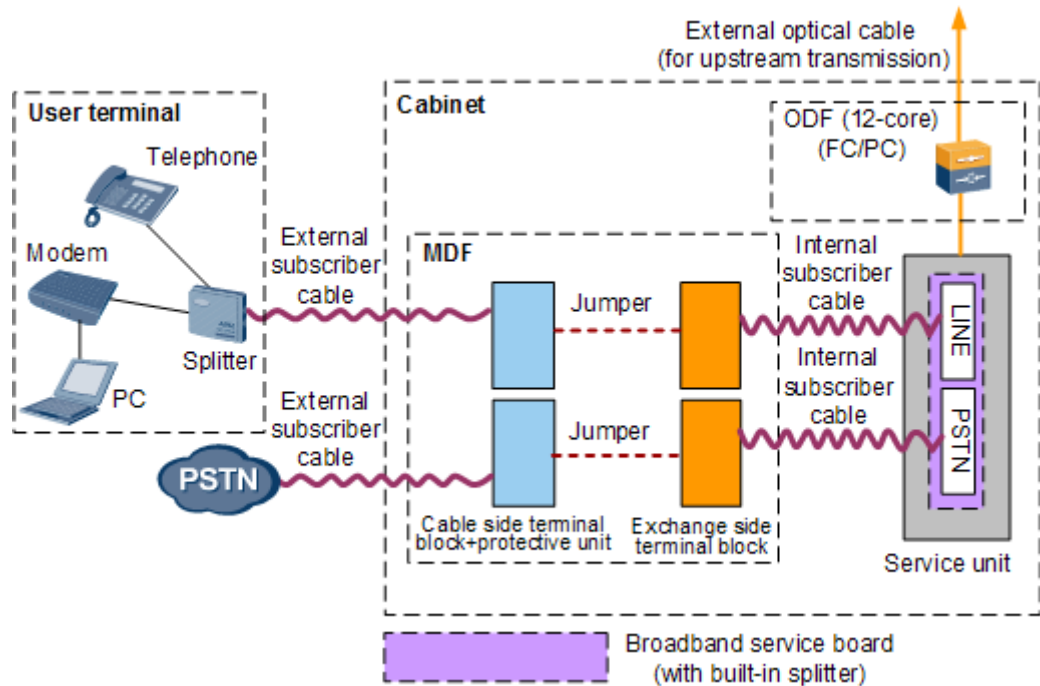


Figure 8-6 Cable distribution of the F01T300 cabinet (1:1 narrowband and broadband services)

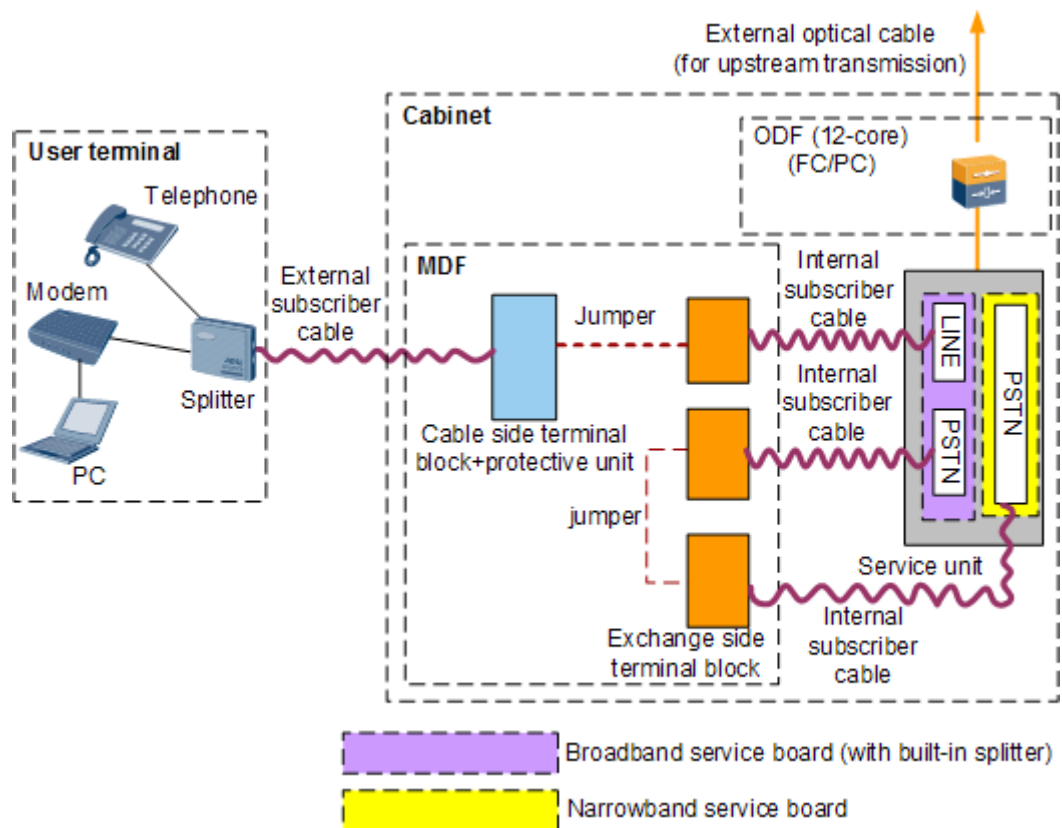
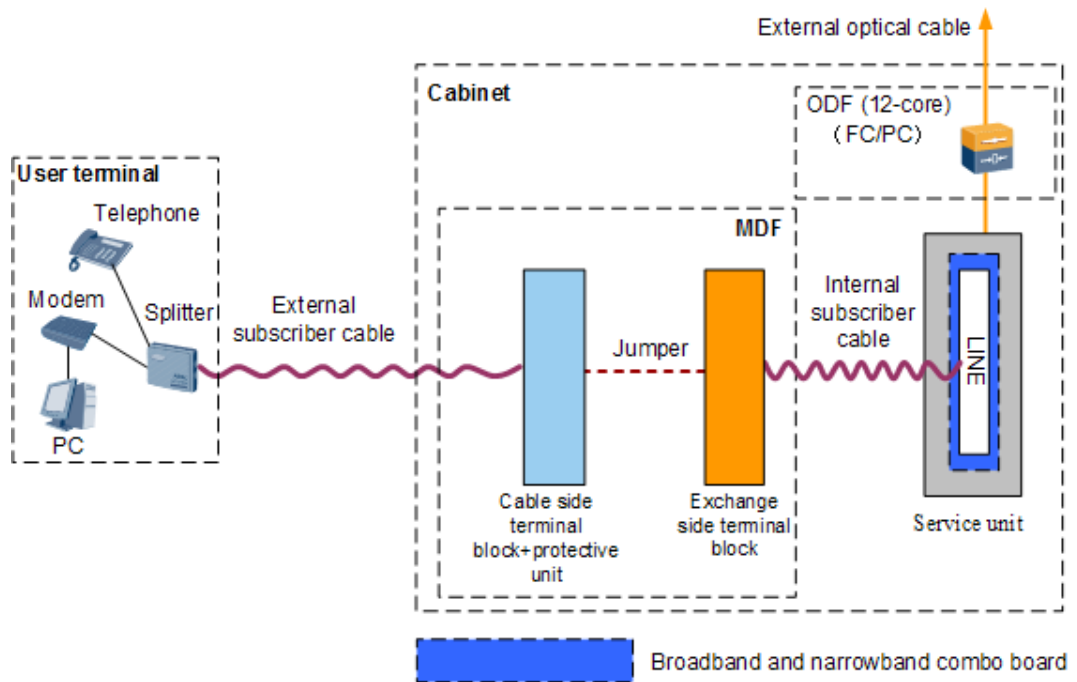


Figure 8-7 Cable distribution of the F01T300 cabinet (narrowband and broadband combo boards)



NOTE

- In Figure 8-5 and Figure 8-6, broadband service boards with built-in splitters are used as examples.
- The F01T300 cabinet can be flexibly configured to meet service requirements. When the number of narrowband ports exceeds the number of broadband ports, see Figure 8-4 for the cable distribution of excessive narrowband ports. When the number of broadband ports exceeds the number of narrowband ports, see Figure 8-5 for the cable distribution of excessive broadband ports.

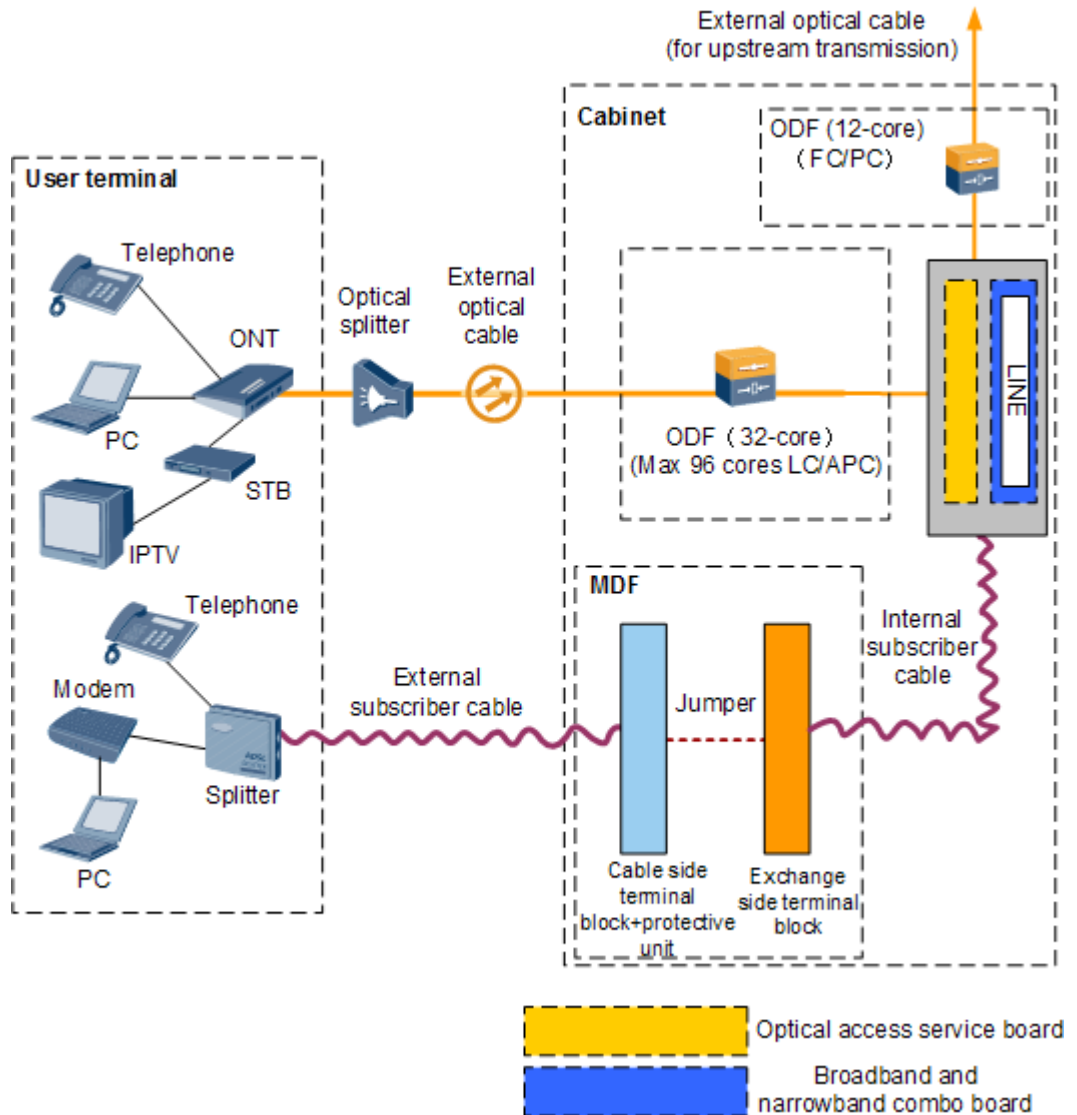
Integrated Fiber and Copper Access

NOTE

The following uses narrowband and broadband combo boards as examples for copper access to describe the cable distribution of the F01T300 cabinet that provides integrated fiber and copper access.

Figure 8-8 shows the cable distribution of the F01T300 cabinet when the cabinet provides integrated fiber and copper access.

Figure 8-8 Cable distribution of the F01T300 cabinet (integrated fiber and copper access, MA5603T)

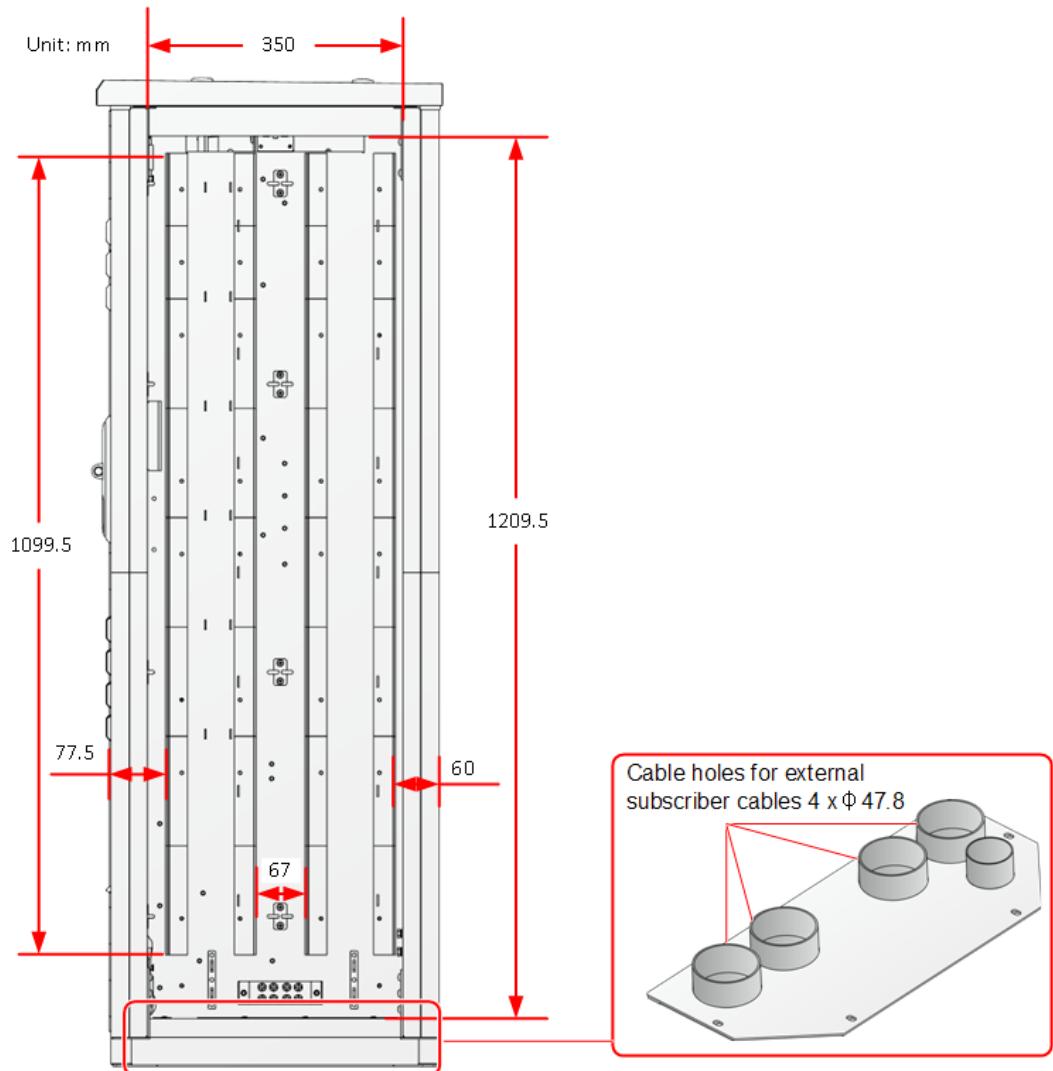


8.2 Cable Distribution Unit

When the F01T300 cabinet provides only copper access, it is equipped with a built-in main distribution frame (MDF). The MDF is used for connecting internal subscriber cables to external subscriber cables by patching cables between exchange-side terminal blocks and cable-side terminal blocks. The protective units on cable-side terminal blocks protect lines from overvoltage and over-current. The built-in integrated splicing and termination unit (12 cores; FC/PC type) connects device-side optical fibers to upstream optical cables.

Figure 8-9 shows the appearance of cable distribution compartment of the F01T300 cabinet when the cabinet provides copper access or integrated fiber and copper access.

Figure 8-9 Appearance of the cable distribution compartment (for copper access or integrated fiber and copper access)



Internal Subscriber Cable Harness

An internal subscriber cable harness consists of the connector, internal subscriber cable, and terminal block, and it connects a service board to the MDF.



NOTE

The configuration of internal subscriber cable harnesses depends on the board types of the device inside the cabinet. Before cabinet delivery, related internal subscriber cable harnesses are installed according to actual conditions.

When the F01T300 cabinet provides only fiber access, it is equipped with an optical distribution frame (ODF).

- For the PON service, the integrated splicing and termination unit (upstream: 12 cores, SC/APC type; downstream: 192 cores (maximum configuration), SC/APC type)

connects downstream optical cables to device-side optical fibers and connects device-side optical fibers to upstream optical cables.

- For the P2P service, the integrated splicing and termination unit (upstream: 12 cores, LC/PC type; downstream: 336 cores (maximum configuration), LC/PC type) connects downstream optical cables to device-side optical fibers and connects device-side optical fibers to upstream optical cables.

Figure 8-10 shows appearance of the cable distribution compartment of the F01T300 cabinet when the cabinet provides only fiber access.

Figure 8-10 Appearance of the cable distribution compartment (for PON access)

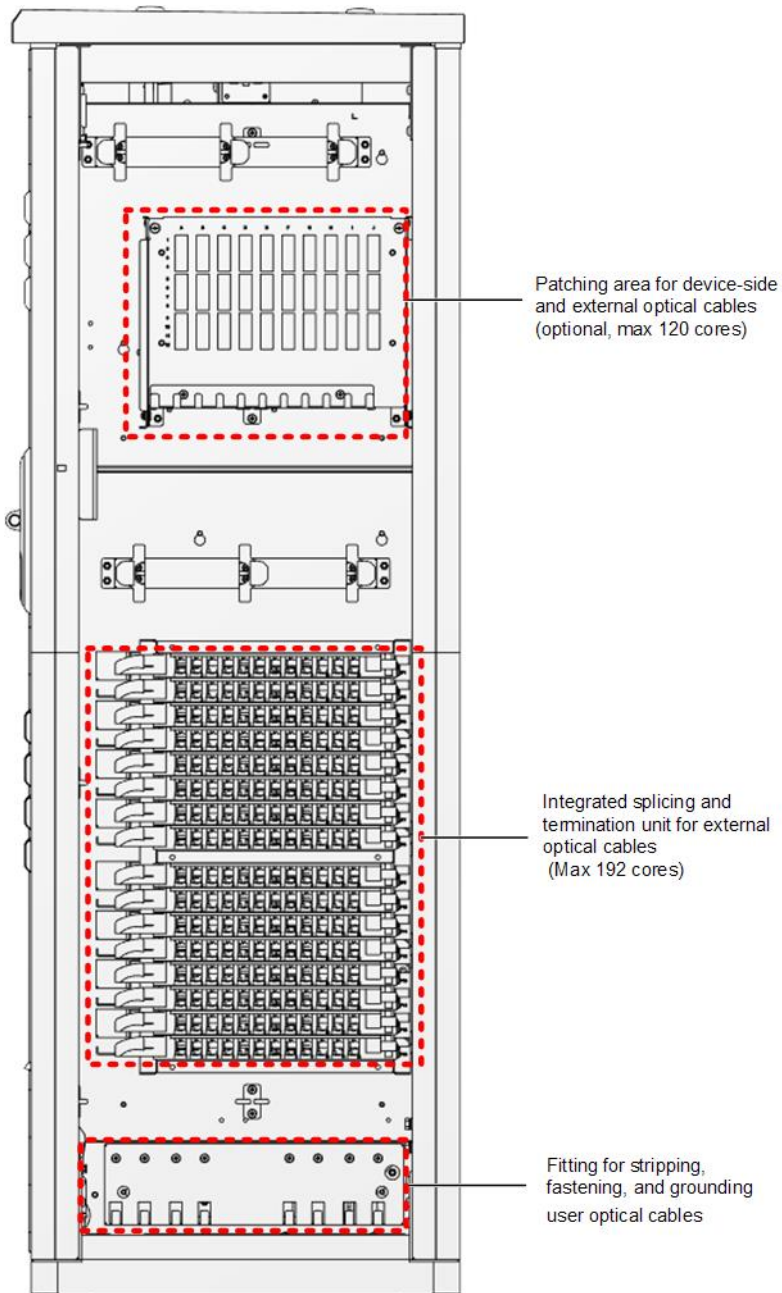
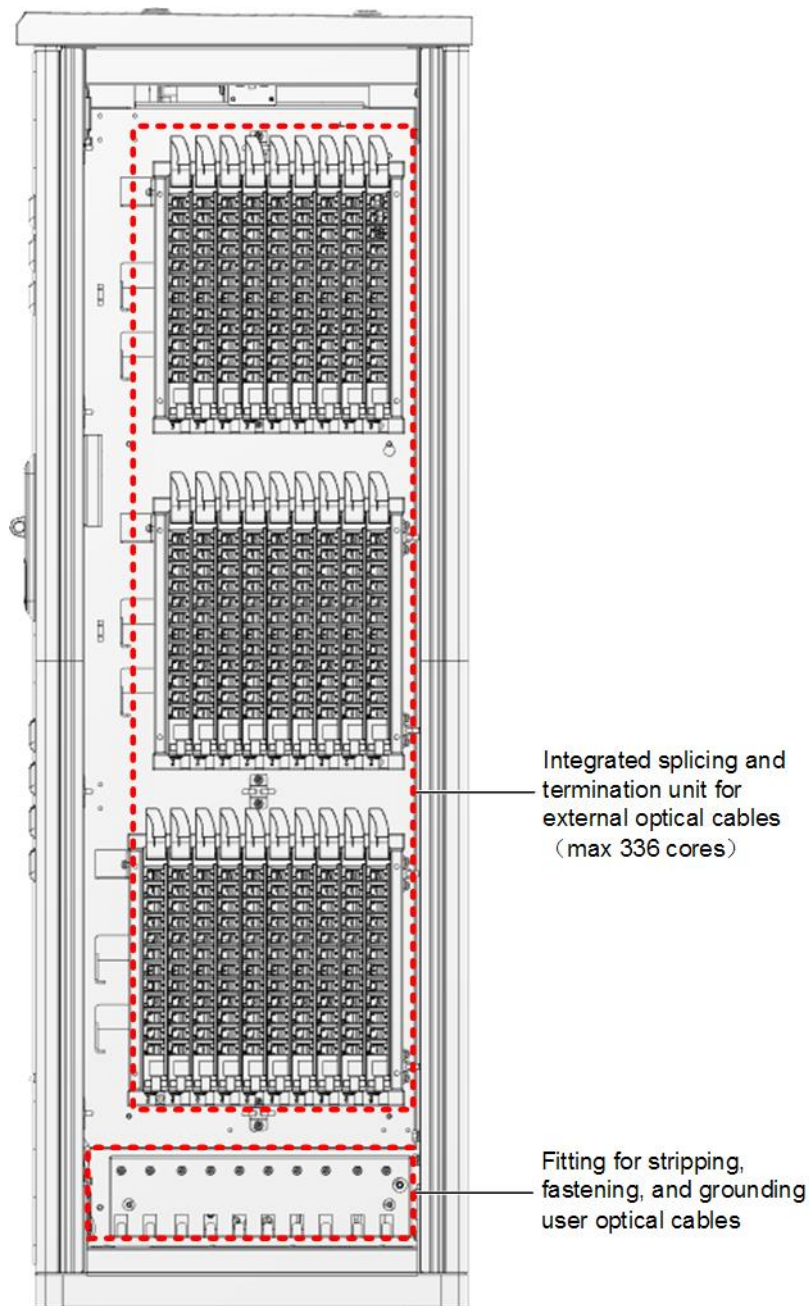


Figure 8-11 Appearance of the cable distribution compartment (for P2P access)



8.3 MDF

8.3.1 JPX658-STO-236X Exchange Side Terminal Block

The JPX658-STO-236X exchange side terminal blocks are installed to connect the cables on the MDF side and the jumper cables. The exchange side terminal blocks are also used for tests and open circuits.

Appearance

JPX658-STO-236X is a bar-type 16-pair exchange side terminal block. Its connecting clip contact (point) is always connected. Figure 8-12 shows the appearance of the JPX658-STO-236X exchange side terminal block.

Figure 8-12 Appearance of the JPX658-STO-236X exchange side terminal block



Specifications

Table 8-1 lists the specifications of the JPX658-STO-236X exchange side terminal block.

Table 8-1 Specifications of the JPX658-STO-236X exchange side terminal block

Item	Specification
Range of the clamping core	0.4 mm to 0.6 mm
Dimensions (width x depth x height)	150 mm x 59.8 mm x 13 mm

8.3.2 JPX658-FA8-239X Cable Side Terminal Block

The JPX658-FA8-239X cable side terminal blocks are installed to connect the external cables and jumper cables on the MDF. The protective unit installed in the cable side terminal block provides over-voltage and over-current protection, and generates alarms.

Appearance

JPX658-FA8-239X is a bar-type 10-pair cable side terminal block. Its connecting clip contact (point) is always disconnected. Figure 8-13 shows the appearance of the JPX658-FA8-239X cable side terminal block.

Figure 8-13 Appearance of the JPX658-FA8-239X cable side terminal block



Specifications

Table 8-2 lists the specifications of the JPX658-FA8-239X cable side terminal block.

Table 8-2 Specifications of the JPX658-FA8-239X cable side terminal block

Item	Specification
Range of the clamping core	0.4 mm to 0.6 mm
Dimensions (width x depth x height)	150 mm x 59.8 mm x 15 mm

8.3.3 JPX658-FA10-97 Protective Unit

The JPX658-FA10-97 (semiconductor discharge tube) protective unit is mainly used on the JPX658-FA8-239X cable side terminal block to provide over-voltage and over-current protection and the over-current alarming function.

Appearance

The structure of the JPX658-FA10-97 protective unit is designed to ensure that the protective unit is not inserted upside down. Figure 8-14 shows the appearance of the JPX658-FA10-97 protective unit.

Figure 8-14 Appearance of the JPX658-FA10-97 protective unit



Specifications

Table 8-3 lists the specifications of the JPX658-FA10-97 protective unit.

Table 8-3 Specifications of the JPX658-FA10-97 protective unit

Item	Specification	Standards Compliance
Over-voltage protection parts	Semiconductor discharge tube	ITU/T Rec. K.28
Over-current protection parts	Thermistor	ITU/T Rec. K.30
DC breakdown voltage	342 V to 460 V@100 V/s	-
Surge breakdown voltage	<ul style="list-style-type: none"> • ≤ 460 V@100 kV/s • ≤ 500 V@1 kV/μs 	-
Over-current action characteristic	<2s@500 mA to 150 mA	YD/T 694-2004
Failure alarm time	≤ 3 minutes@220 VAC, 50 Hz	YD/T 694-2004
Dimensions (width x depth x height)	11 mm x 45.5 mm x 7 mm	-

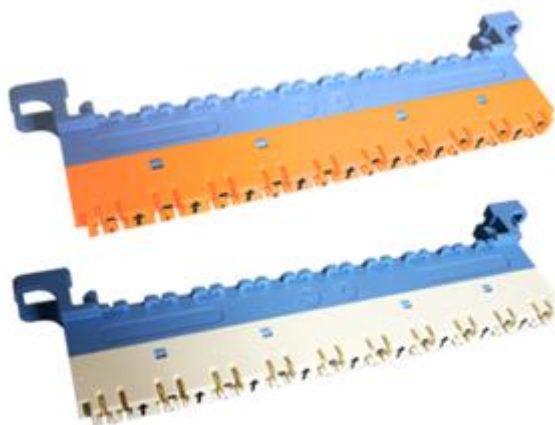
8.3.4 JPX658-BLK2-E10V Terminal Block

JPX658-BLK2-E10V is a three-in-one terminal block that can function as an exchange side terminal block, cable side terminal block, or broadband terminal block. When used independently, JPX658-BLK2-E10V functions as an exchange side terminal block. When working with a protective unit that provides surge/over-voltage protection, JPX658-BLK2-E10V functions as a cable side terminal block. It becomes a broadband terminal block when working with a splitter that separates broadband signals from narrowband signals.

Appearance

JPX658-BLK2-E10V is a 10-pair terminal block and its connecting clip contact (point) is always connected. Figure 8-15 shows the appearance of the JPX658-BLK2-E10V terminal block.

Figure 8-15 Appearance of the JPX658-BLK2-E10V terminal block



Specifications

Table 8-4 lists the specifications of the JPX658-BLK2-E10V terminal block.

Table 8-4 Specifications of the JPX658-BLK2-E10V terminal block

Parameter	Value
Diameter range of the clamping core	0.4 mm to 0.6 mm (insulation diameter \leq 1.4 mm)
Dimensions (H x W x D)	13 mm x 150 mm x 39.6 mm

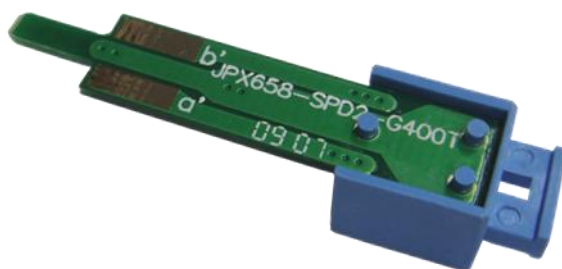
8.3.5 JPX658-SPD2-G400T Protective Unit

JPX658-SPD2-G400T, as a gas discharge tube (GDT) protective unit, is mainly used on a JPX658-BLK2-E10V terminal block to provide over-voltage protection.

Appearance

The JPX658-SPD2-G400T protective unit is able to protect itself against upside-down insertion. Figure 8-16 shows the appearance of the JPX658-SPD2-G400T protective unit.

Figure 8-16 Appearance of the JPX658-SPD2-G400T protective unit



Specifications

Table 8-5 lists the specifications of the JPX658-SPD2-G400T protective unit.

Table 8-5 Specifications of the JPX658-SPD2-G400T protective unit

Parameter	Value	Standards Compliance
Over-voltage protection component	GDT	ITU/T Rec. K.12
DC breakdown voltage	350-500 V@100 V/s	-
Insulation resistance	≥ 1000 megohms@100 V DC	YD/T 694-2004 5.4.4; 6.4.2
Capacitance to the ground	≤ 200 pF@1 MHz, 0.5 V	YD/T 694-2004 5.4.16; 6.28
Surge breakdown voltage	<ul style="list-style-type: none"> • ≤ 800 V@100 V/μs • ≤ 950 V@1000 V/μs 	-
AC discharge	5 times@ 5 A applications each line side, 3 min intervals, 50 Hz	YD/T 694-2004
Dimensions (H x W x D)	9.8 mm x 42.3 mm x 7.9 mm	-

8.3.6 JPX658-FA9-280J Protective Unit

The JPX658-FA9-280J protective unit is used on the JPX658-FA8-239X cable side terminal block. It protects the lower-layer switching devices from over-voltage.

Appearance

Figure 8-17 shows the appearance of the JPX658-FA9-280J protective unit.

Figure 8-17 Appearance of the JPX658-FA9-280J protective unit



Specifications

Table 8-6 lists the specifications of the JPX658-FA9-280J protective unit.

Table 8-6 Specifications of the JPX658-FA9-280J protective unit

Parameter	Value	Standards Compliance
Over-voltage protection component	GDT	ITU/T Rec. K.12
DC breakdown voltage	380-500 V@100 V/s	-
Insulation resistance	≥ 1000 megohms@100 V DC	YD/T 694-2004
Capacitance to the ground	≤ 200 pF@1 MHz	YD/T 694-2004
Surge breakdown voltage	<ul style="list-style-type: none"> • ≤ 800 V@100 V/μs • ≤ 950 V@1000 V/μs 	-
AC discharge	5 times@ 5 A applications each line side, 3 min intervals, 50 Hz	YD/T 694-2004
Dimensions (H x W x D)	11 mm x 45 mm x 7 mm	-

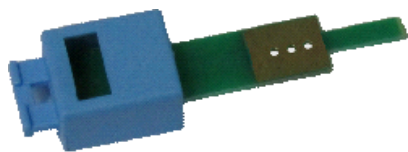
8.3.7 JPX658 Short-Circuit Plug

A JPX658 short-circuit plug is installed on the JPX658-BLK2-E10VH cable distribution module to short-circuit ports of external modules. It can short-circuit four slots on one port of the JPX658-BLK2-E10VH cable distribution module.

Appearance

Figure 8-18 shows the appearance of the JPX658 short-circuit plug.

Figure 8-18 Appearance of the JPX658 short-circuit plug



Specifications

Table 8-7 lists the specifications of the JPX658 short-circuit plug.

Table 8-7 Specifications of the JPX658 short-circuit plug

Parameter	Value	Standards Compliance
Insulation resistance	≥ 1000 megohms@100 V DC	YD 694-2004
Through-current capacity	0.3 A	-
Dimensions (H x W x D)	11.8 mm x 45.1 mm x 9.1 mm	-

8.4 ODF

8.4.1 12-core Integrated Splicing and Termination Tray (Upstream)

A 12-core integrated splicing and termination tray connects optical fibers to optical communication equipment.

The 12-core integrated splicing and termination tray provides the following functions:

- Secures and protects optical fibers.
- Protects peeled optical fibers.
- Distributes optical fibers.
- Adjusts optical fibers.
- Stores optical fibers.

Appearance

Figure 8-19 shows the appearance of the 12-core integrated splicing and termination tray.

Figure 8-19 Appearance of the 12-core integrated splicing and termination tray



Specifications

Table 8-8 lists the specifications of the 12-core integrated splicing and termination tray.

Table 8-8 Specifications of the 12-core integrated splicing and termination tray

Parameter	Value
Model	GPX147-FIM1101-12
Applicable adapter type	FC, SC, and ST (default configuration: four FC adapters)
Maximum line capacity	12 optical fibers
Dimensions (H x W x D)	25 mm x 232 mm x 200 mm

8.4.2 12-core Integrated Splicing and Termination Tray (Downstream)

A 12-core integrated splicing and termination tray connects optical fibers to optical communication equipment.

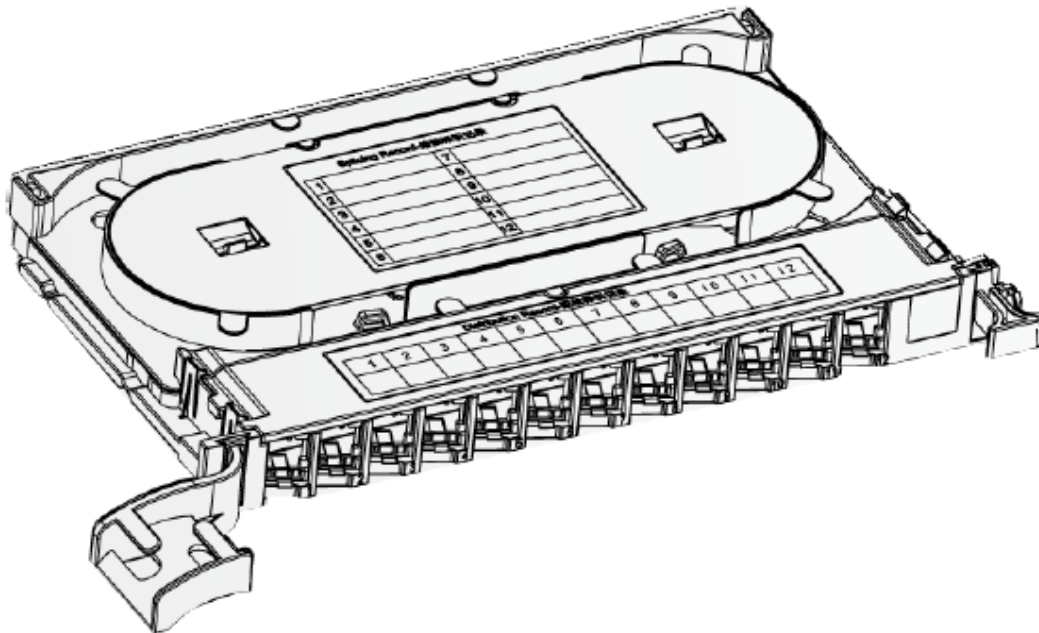
The 12-core integrated splicing and termination tray provides the following functions:

- Secures and protects optical fibers.
- Protects peeled optical fibers.
- Distributes optical fibers.
- Adjusts optical fibers.
- Stores optical fibers.

Appearance

Figure 8-20 shows the appearance of the 12-core integrated splicing and termination tray.

Figure 8-20 Appearance of the 12-core integrated splicing and termination tray



Specifications

Table 8-8 lists the specifications of the 12-core integrated splicing and termination tray.

Table 8-9 Specifications of the 12-core integrated splicing and termination tray

Parameter	Value
Model	GPX147-FIM2107-12-G
Applicable adapter type	PON access: SC/APC P2P access: LC/PC
Maximum line capacity	12 optical fibers
Dimensions (H x W x D)	<ul style="list-style-type: none"> 25 mm x 240 mm x 140 mm (without mounting ears) 25 mm x 300 mm x 189 mm (with mounting ears)

8.4.3 32-core Integrated Splicing and Termination Tray (Downstream)

A 32-core integrated splicing and termination tray connects optical fibers to optical communication equipment.

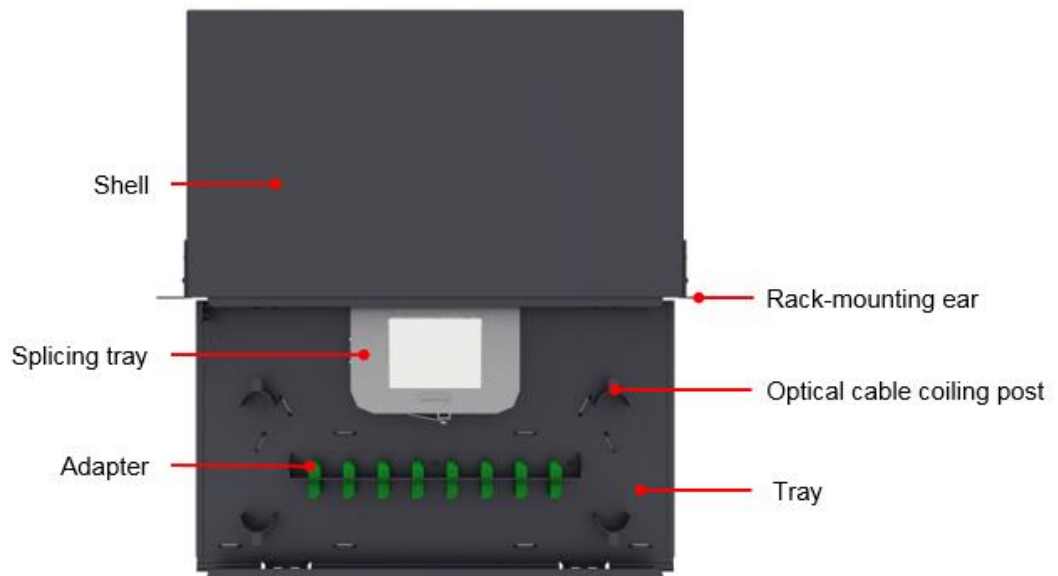
The 32-core integrated splicing and termination tray provides the following functions:

- Secures and protects optical fibers.
- Protects peeled optical fibers.
- Distributes optical fibers.
- Adjusts optical fibers.
- Stores optical fibers.

Appearance

Figure 8-21 shows the appearance of the 32-core integrated splicing and termination tray.

Figure 8-21 Appearance of the 32-core integrated splicing and termination tray



Specifications

Table 8-10 lists the specifications of the 32-core integrated splicing and termination tray.

Table 8-10 Specifications of the 32-core integrated splicing and termination tray

Parameter	Value
Model	GPX147-FIU2101-32-LC/APC
Applicable adapter type	LC/APC
Maximum line capacity	32 optical fibers

Parameter	Value
Dimensions (H x W x D)	43.6 mm x 430 mm x 260 mm (rack-mounting ears not included)

9 Specifications

This topic provides the dimensions, weight, and power consumption of the F01T300 cabinet.

Dimensions

Table 9-1 lists the dimensions of the F01T300 cabinet.

Table 9-1 Dimensions of the F01T300 cabinet

Item	Dimensions (W x D x H)
F01T300 cabinet	850 mm x 450 mm x 1350 mm
Equipment compartment	630 mm x 325 mm x 950 mm
Available space inside the equipment compartment	<ul style="list-style-type: none"> • Width: 19 inches • Depth: 315 mm • Height: 16 U
Available space inside the battery compartment	575 mm x 425 mm x 305 mm
Available space inside the cable distribution compartment	200 mm x 450 mm x 1300 mm
Terminal block	Height: 2 x 1100 mm



NOTE

In Table 9-1, 1 U = 44.45 mm and 1 inch = 25.4 mm.

Weight

Table 9-2 lists the weight of the F01T300 cabinet.

Table 9-2 Weight of the F01T300 cabinet

Item	Weight
Empty cabinet	125 kg

Item	Weight
Fully-loaded cabinet (excluding batteries)	185 kg
Fully-loaded cabinet (including batteries)	325 kg

Power Supply

Table 9-3 and Table 9-4 list the power supply mode and heat dissipation requirement.

Table 9-3 Power supply of an F01T300 cabinet configured with an ETP4830/ETP4890 power system

Item	Specifications
Power supply mode	AC power supply
Range of input voltage	200 V to 240 V
Rated input frequency	50 or 60 Hz
Maximum output current	21 A

Table 9-4 Power supply of an F01T300 cabinet configured with an RPS system

Item	Specifications
Power supply mode	Remote power supply
Range of input voltage	±190 V DC
Maximum output current	0.25 A per channel
Maximum available channel	24

Heat Dissipation

Table 9-5 lists the heat dissipation requirements of the F01T300 cabinet.

Table 9-5 Heat dissipation requirements of the F01T300 cabinet

Item	Value
Heat dissipation mode	Using the heat exchanger
Operating temperature	-33 °C to +45 °C (with solar radiation)
Maximum heat dissipation capability of the entire cabinet	<ul style="list-style-type: none"> 1500 W/45°C + 1120 W/m² (with solar radiation) 1000 W/50°C + 1120 W/m² (with solar radiation)

Power Consumption

Table 9-6 lists the power consumption parameters of an F01T300 cabinet.

Table 9-6 Power consumption parameters of the F01T300 cabinet

Item	Value	Power Supply Mode
Maximum power consumption of the intelligent heating modules in the battery compartment	500 W	AC power supply
Maximum power consumption of the intelligent heating modules in the equipment compartment	500 W	AC power supply
Maximum power consumption of the heat exchanger (including the internal and external circulation fans)	196 W	AC power supply or remote power supply
Power consumption of the illuminator	1.5 W	AC power supply or remote power supply
Maximum power consumption of CCU	10 W	AC power supply or remote power supply

10 Environmental Requirements

This topic describes the environmental requirements for the storage, transportation, and running of the cabinet.

Table 10-1 lists the environmental requirements for the storage, transportation, and running of the cabinet.

Table 10-1 Environmental requirements for the storage, transportation, and running of the cabinet

Environment	Item	Specification
Storage	Temperature	-45 °C to +70 °C
	Solar radiation intensity	≤ 1120 W/m ²
	Relative humidity	8% to 100%
	Atmospheric pressure	61 kPa to 106 kPa
Transportation	Temperature	-40 °C to +70 °C
	Solar radiation intensity	≤ 1120 W/m ²
	Relative humidity (without drastic variation in temperature)	95% (+45 °C)
	Relative humidity (with drastic variation in temperature: air/air)	95% (-40 °C to +30 °C)
	Atmospheric pressure	≥ 70 kPa
Running	Temperature	-33 °C to +45 °C (with solar radiation)
	Solar radiation intensity	≤ 1120 W/m ²
	Relative humidity	8% to 100%
	Atmospheric pressure	61 kPa to 106 kPa



NOTE

At an altitude from 0 m to 600 m, the running temperature of the device remains unchanged. At an altitude from 600 m to 4000 m, the running temperature of the device decreases by 1 °C as the altitude increases by 200 m, and the decreased temperature is rounded up.

11 Standards Compliance

This topic provides the standards that the cabinet complies with in terms of environment, structure, and lightning protection.

Table 11-1 lists the standards that the cabinet complies with.

Table 11-1 Standards that the cabinet complies with

Item	Standards Compliance	Level
Environment	ETSI 300 019-1-4: Environmental conditions and environmental test for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weather protected locations	Class 4.1 requirement can meet all ETSI countries environmental requirement
	ETSI 300 019-1-2: Environmental conditions and environmental test for telecommunications equipment; Part 1-2: Classification of environmental conditions; Transportation	Class 2.3 Public transportation
	ETSI 300 019-1-1: Environmental conditions and environmental tests for telecommunications equipment; Part 2-1: Classification of environmental conditions; Storage	Class 1.3 E non-weather protected storage locations extended
Lightning protection & EMC	ETSI EN 300 386: Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; Electro Magnetic Compatibility (EMC) requirements	non-telecom central equipment
	EN 55022: Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement	Class B
	EN 55024: Information technology equipment – Immunity characteristics – Limits and methods of measurement	-
	K.45: Resistibility of telecommunication equipment installed in the access and trunk networks to over-voltages and over-currents	-

Item	Standards Compliance	Level
	IEC 61643: Performance requirement for surge protective device connected to low-voltage distribution systems of telecommunication stations/sites	-
Safety	<ul style="list-style-type: none"> • IEC/EN60950-1: Information technology equipment-Safety-Part 1: General requirements • IEC/EN60950-22: Information technology equipment-Safety-Part 22: Equipment to be installed outdoors • IEC/EN60950-21: Information technology equipment-Safety-Part 21: Remote Power Feeding 	-
Protection	IEC 60529: Degrees of protection provided by enclosures (IP Code)	IP55
Structure	<ul style="list-style-type: none"> • IEC 60297-1: Panels and racks IEC 60297-3 subracks and associated plug-in units IEC 60297-2 Cabinets and Pitches of racks structure • IEC 60297-2: Cabinets and Pitches of racks structure 	-
Grounding	K.35: Bonding configurations and grounding at remote electronic sites	-

A Acronyms and Abbreviations

A

AC	Alternating Current
ADSL	Asymmetrical Digital Subscriber Line

D

DC	Direct Current
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E

EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMS	Electromagnetic Shield
EMU	Environment Monitoring Unit
EN	End Node
ETS	European Telecommunication Standards
ETSI	European Telecommunications Standards Institute

I

IDC	Internet Data Center
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector

M

MDF Main Distribution Frame

O

ODF Optical Distribution Frame

P

POTS Plain Old Telephone Service

PSTN Public Switched Telephone Network

PWM pulse-width modulation

VDSL Very high data rate Digital Subscriber Line