ANTMINER

S21 XP Imm. Server

User Guide

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BITMAIN

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Table of Contents

1 Overview

The S21 XP Imm. server is one of BITMAIN's latest Immersion-Cooling server product. This guide set S21 XP Imm. as an example introduce various operations in details, and other server operation are the same.

Top View

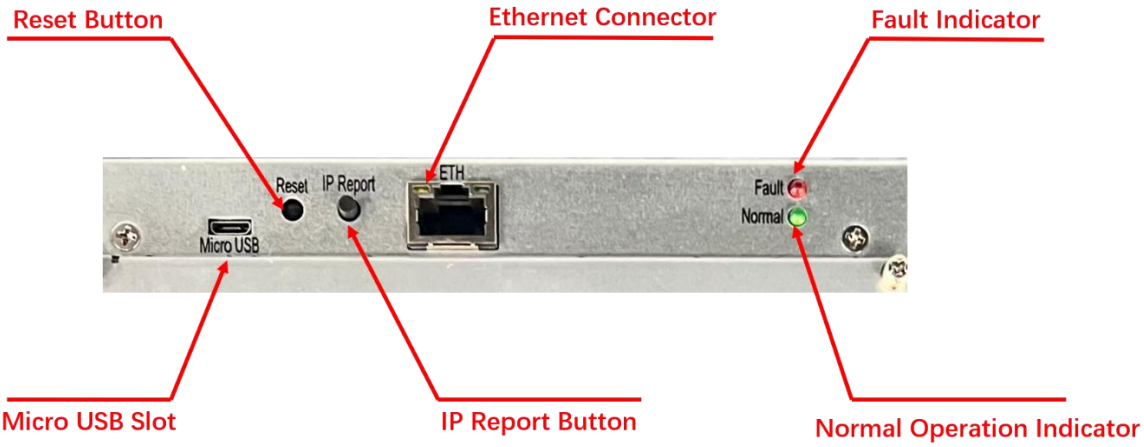
Bottom View

Caution:

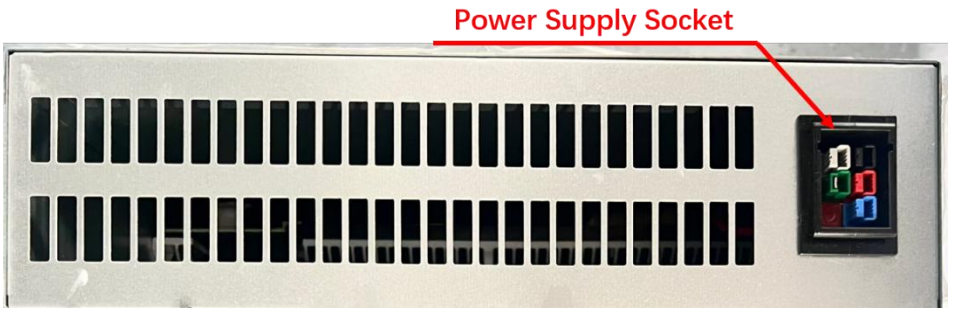
(1) Please note that the equipment must only be placed in its operating orientation. Placing it horizontally may cause damage to the equipment.
(2) Please refer to the layout above to place your goods in usage in case of any damage.
(3) The equipment must be connected to an earthed mains socket - outlet. The socket - outlet shall be installed near the equipment and shall be easily accessible.
(4) When the equipment is power off, be sure to power off all power inputs.
(5) DO NOT remove any screws and cables tied on the product.
(6) The equipment is intended to be immersed in insulating oil cooling environment during operation.
(7) Do not plug or remove the device when it is powered on.
(8) The equipment relies on the PDU being powered down to disconnect the power
(9) Please operate servers with heat-resist gloves in case of high oil temperature.
(10) Please note that the actual server shall prevail.

1.1 Server components

The main components and controller front panel of S21 XP Imm. server are shown in the following figure:



Power Supply:



NOTE:

(1) Power supply APW11M is part of S21 XP Imm. server. For detailed parameters, please refer to the specifications below.

(2) One ANTWIRE-P33 power cord is needed and should be connected to PDU.

(3) The device is powered through a PDU with above listed power cable. Don't plug in or detach the connector.

(4) A readily accessible disconnect device that can simultaneously disconnect L1, L2, and L3 must be incorporated externally to the product.

1.2 Server Specification

Table 1-1 Product Glance

Product Glance	Value	
Model	**S21 XP Imm.**	
Version	**(300T-10)**	
Crypto algorithm/coins	**SHA256|BTC/BCH/BSV**	
Working mode(1-1)	**NEM**	**HEM**
Typical hashrate, **TH/s**(1-2)	**300**	**380**
Power on wall @30°C(1-3), **Watt**(1-2)	**4050**	**5700**
Power efficiency on wall @30°C, **J/TH**(1-2)	**13.5**	**15**

Table 1-2 Detailed Characteristics of Product

Detailed Characteristics	Value
Power supply	
Phase	**3**
Input voltage range, **Volt**(2-1)	**380~415**
Input frequency range, **Hz**	**50~60**
Input max current, **Amp**	**12**

Hardware Configuration	
Networking connection mode	**RJ45 Ethernet 10/100M**
Server size (Length*Width*Height, w/o package), **mm**	**364**(2-2)***236*293**
Server size (Length*Width*Height, with package), **mm**	**600*390*450**
Net weight, **kg**	**16.8**
Gross weight, **kg**	**18.5**
Environment Requirements	
Inlet oil temperature, **℃**(2-3)	**20-50**
Oil flow, m^3**/h**(2-3)	**1.0-1.5**
Storage temperature, **℃**	**-20~70**

Notes:

(1-1) NEM: Normal Energy Mode; HEM: High Energy Mode.

(1-2) The Hashrate value, Power on wall, and Power efficiency on wall are all typical value. The actual Hashrate value fluctuates by ±3%, and the actual Power on wall and Power efficiency on wall fluctuate by ±5%.

(1-3) Inlet oil temperature.

(2-1) Caution: Wrong input voltage may cause server damage.

(2-2) The height includes a 44mm handle.

(2-3) When the mining machine is operating, this parameter must be strictly met.

2 Cooling System Requirements

2.1 Requirements of cooling oil

When purchasing cooling oil, it is recommended to focus on the relevant parameters in Table 2-1. If the requirements are not met, it is recommended to consider refilling and replacing the cooling oil as appropriate.

(1) The primary focus during regular inspection of cooling oil should be the total acid number (TAN). It is not recommended to use the cooling oil when the TAN value is below 0.05 mgKOH/g.

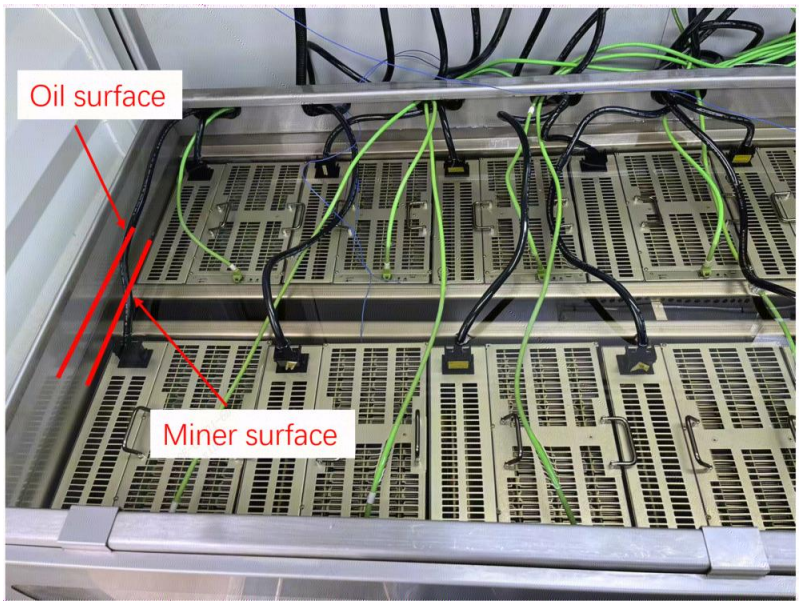
(2) To ensure compatibility between the cooling oil and the components of the mining machine, it is recommended to use a synthetic oil with a simple composition as the coolant.

Table 2-1 Requirements of cooling oil

Product Glance	Value
Specific Heat Capacity	**≥ 2.045 kJ/kg·K(40°C)**
Kinematic Viscosity	**≤ 5 mm^2/s(40°C)**
Thermal Conductivity	**≥ 0.132 W/m·K**
Water Content	**≤ 50 ppm**
Volatility	**≤ 0.6% (m/m) (50°C, 22 hours) ASTM D972-22**
Breakdown Voltage	**≥ 22.5 kV (ASTM D877)**
Flash Point (Open Cup)	**≥ 157°C**
Fire Point (Closed Cup)	**≥ 176°C**
Autoignition Temperature	**≥ 300°C**
Pour point	**＜-66℃**

2.2 Maintenance Requirements of Cooling System

The miner needs to be completely submerged in the cooling oil, and the oil level must be 2-5 cm higher than the upper surface of miner as shown in the figure below. The side of the miner with the handle is the oil outlet, while the opposite side is the oil inlet. The direction of oil flow must be from the oil inlet to the oil outlet, which means it flows from the bottom to the top in the figure.



The operational sequence for setting the miner is as follows: First, completely immerse the miner in the cooling oil. Before powering on the miner, it is essential to check the oil flow and ensure that the oil inlet temperature meets the requirements specified in the table 1-2. Then, connect the power cable and network cable. If it does not meet the requirements in the table 1-2, do not power on the mining machine.

As the core unit of the container cooling system, it is recommended to regularly track and record the cooling oil, at least once a year (TAN value should be tested every six months).

When using the cooling oil, the TAN value, conductivity, and related index parameters of the cooling oil must be regularly tested and recorded. When the requirements in Table 2-1 are exceeded, or there are abnormal changes, new cooling oil that meets the requirements must be replaced in time.

3 Setting up the Server

NOTE:

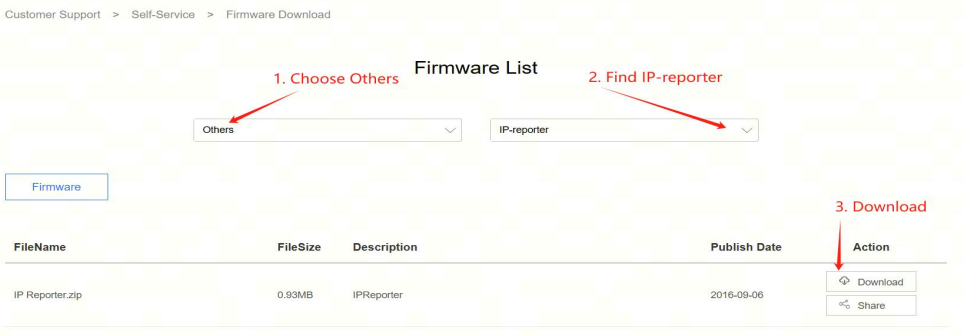
➢ The file IPReporter.zip is supported by Microsoft Windows only.

3.1 Setting up the Server

To set up the server:

1. Go to the following site:

https://file12.bitmain.com/shop-product/firmware/IP%20Reporter.zip.
If the link is invalid, please visit the official firmware download page (https://service.bitmain.com/support/download) and select as shown in the image to download IPReporter.zip.

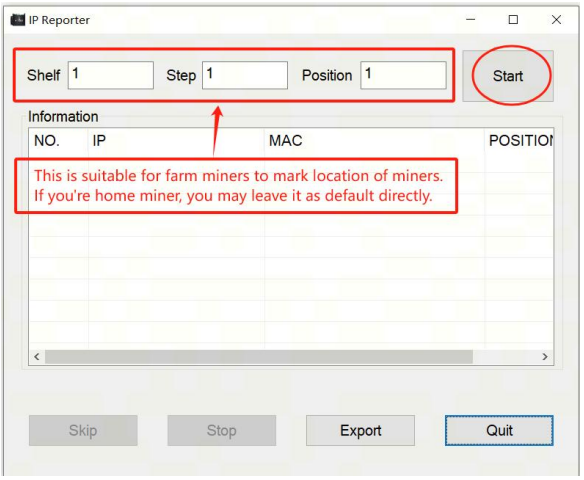


2. Download the following file: IPReporter.zip.
3. Extract the file.

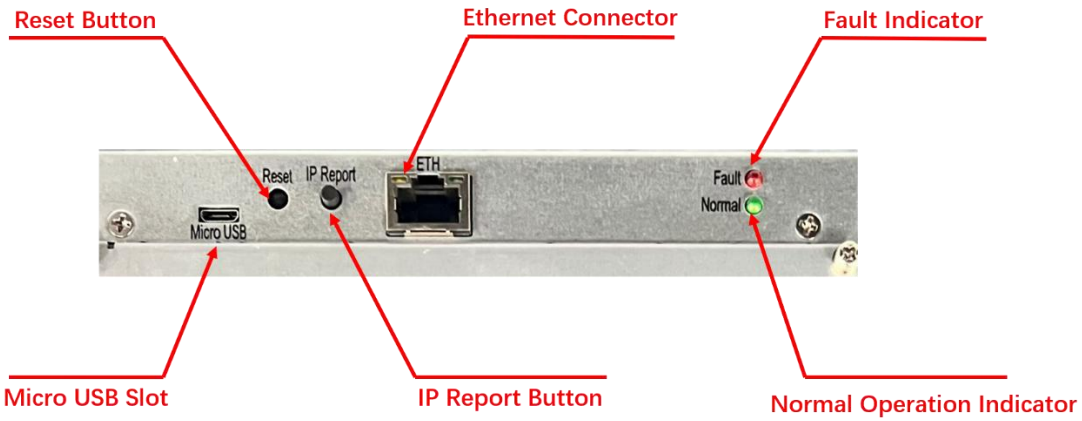
NOTE:

➢ The default DHCP network protocol distributes IP addresses automatically

4. Right-click **IPReporter.exe** and run it as Administrator.
5. Select one of the following options:
   - **Shelf, Step, Position** – suitable for farm servers to mark the location of the servers.
   - **Default** – suitable for home servers.
6. Click **Start**.

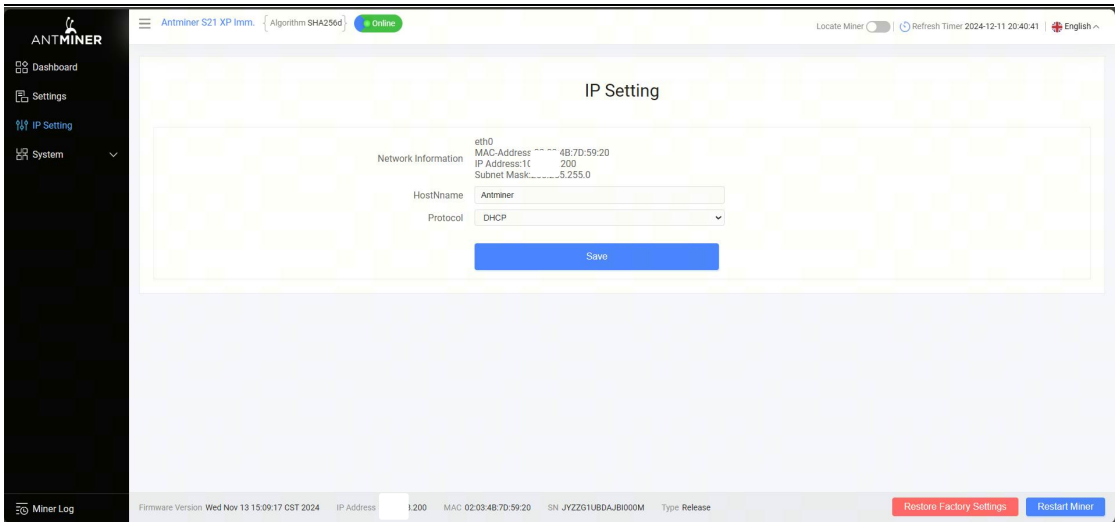


7. On the control panel, click the IP Report button. Hold it down until it beeps (about 5 seconds).



The IP address will be displayed in a window on your computer screen.

8. In your web browser, enter the IP address provided.
9. Proceed to login using **root** for both the username and password.
10. In the Protocol section, you can assign a Static IP address (optional).
11. Enter the IP address, Subnet mask, gateway and DNS Server.
12. Click "Save".
13. Click https://support.BITMAIN.com/hc/en-us/articles/360018950053 to learn more about gateway and DNS Server.

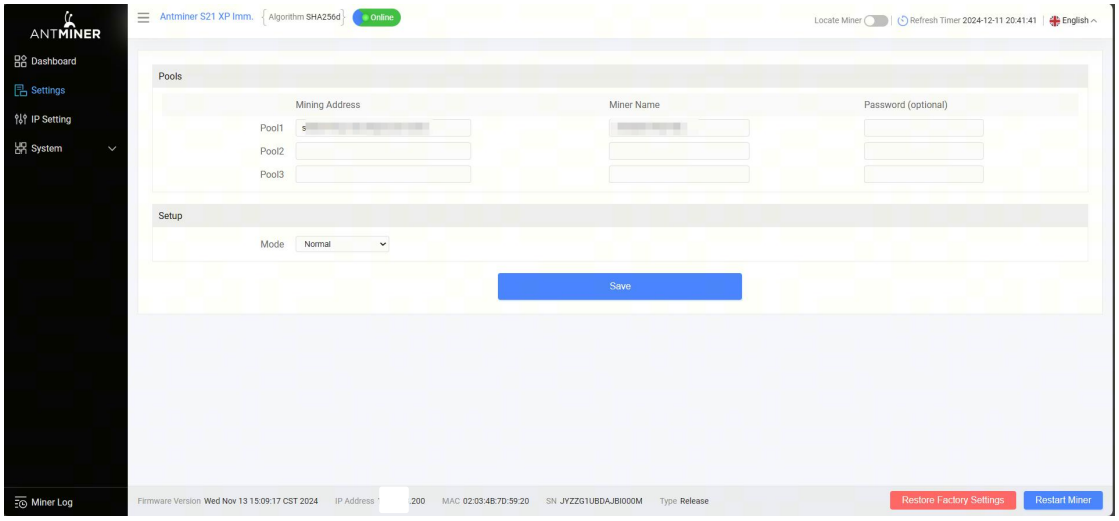


3.2 Configuring the Server

Setting up the Pool

To configure the server:

1. Click **Settings** as below.



2. Set the options according to the following table:

Note:

- There are two working modes of S21 XP Imm. server: Normal mode and Sleep mode. The server enters the sleep mode under the condition that the control board is powered while hashboards are not powered.

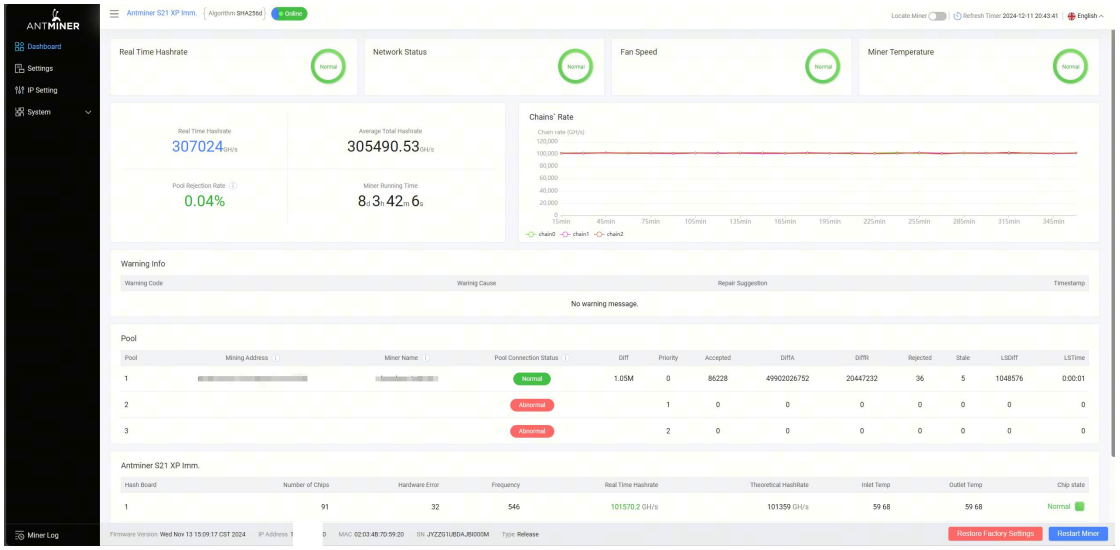
Option	Description
Mining address	Enter the address of your desired pool. The S21 XP Imm. server can be set up with three mining pools, with decreasing priority from the first pool (pool 1) to the third pool (pool 3). The pools with low priority will only be used if all higher priority pools are offline.
Name	Your worker ID on the selected pool.
Password (optional)	The password for your selected worker.

3. Click **Save** after the configuration.

3.3 Monitor your Server

To check the operating status of your server:

1. Click **dashboard** marked below to check the server status (taking S21 XP Imm. 300T as an example).



2. Monitor your server according to the descriptions in the following table:

Option	Description
Number of chips	Number of chips detected in the chain.
Frequency	ASIC frequency setting.

Real Hashrate	Real-time hashrate of each hash board (GH/s).
Inlet Temp	Temperature of the inlet (°C).
Outlet Temp	Temperature of the outlet (°C).
Chip state	One of the following statuses will appear: ● **The Green Icon** - indicates normal ● **The Red Icon**- indicates abnormal

3. Monitor your server according to the LED indicator light:

Status	Fault Indicator(RED)	Normal Indicator(GREEN)
Normal	OFF	ON
Over temperature	ON	OFF
Network disconnection	ON	OFF

4 Administering your Server

4.1 Checking your Firmware Version

To check your firmware version:

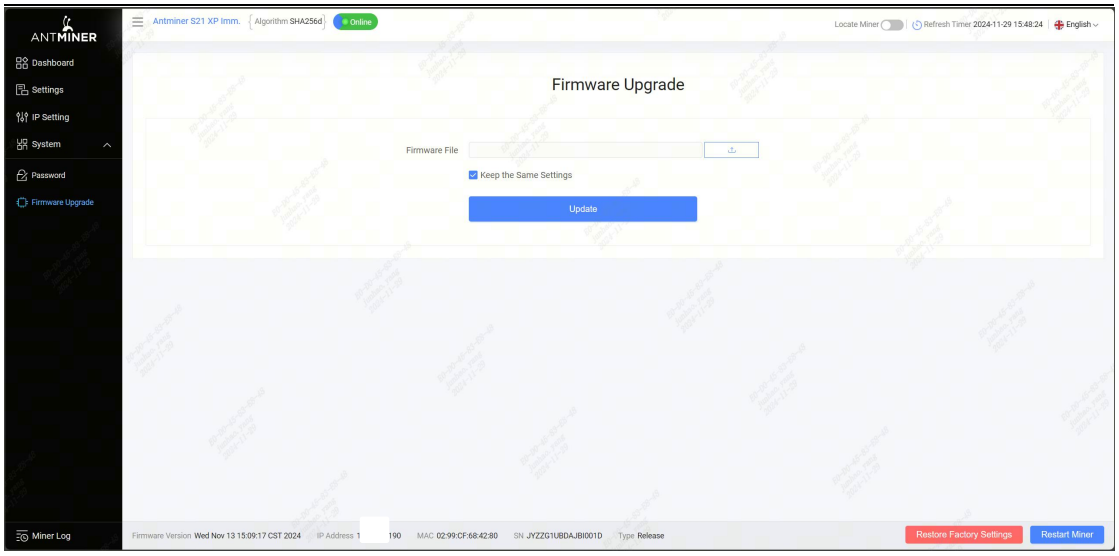
1. Enter the backstage of your server, find the firmware version on the bottom.
2. **Firmware Version** displays the date of the firmware your server uses. In the examples below, the server is using firmware version **20240608165002**.

4.2 Upgrading your System

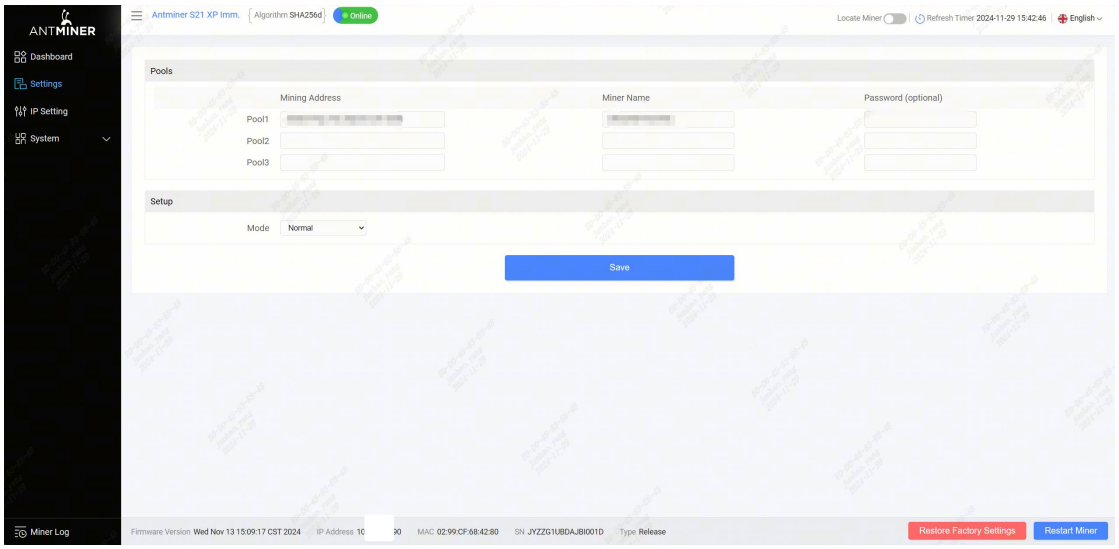
Make sure that the S21 XP Imm. server remains powered during the upgrade process. If power fails before the upgrade is completed, you will need to return it to Bitmain for repair.

To upgrade the server's firmware:

1. In System, click Firmware Upgrade.



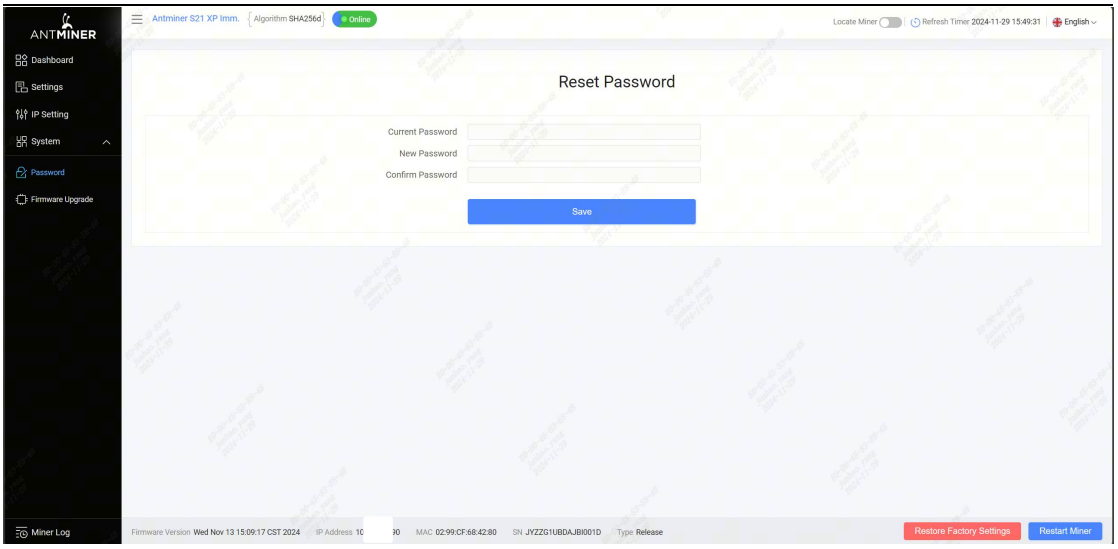
2. For Keep Settings:
   (1) Select "**keep settings**" to keep your current settings (default).
   (2) Unselect "**keep settings**" to reset the server to default settings.
3. Click the  button and navigate to the upgrade file. Select the upgrade file, then click Update.
4. When the upgrade is completed, restart the server and it will turn to the setting page.



4.3 Modifying your Password

To change your login password:

1. In System, click the Password tab.
2. Set your new password, then click **Save**.



4.4 Restoring Initial Settings

To restore your initial settings:

1. Turn on the server and let it run for 5 minutes.
2. On the controller front panel, press and hold the **Reset** button for 10 seconds.

Resetting your server will reboot it and restore its default settings. The red LED will automatically flash once every 15 seconds if the reset is operated successfully.

4.5 Error Code

Here is the server error code and the corresponding reasons and suggestions:

Error Code	Reason	Suggestion
R:1	Average total hashrate is low	Update the firmware to the latest version, replace the power supply, or return to factory for repair
R1:1	Chain1 is broken or has low hashrate	Check if chain1 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
R2:1	Chain2 is broken or has low hashrate	Check if chain2 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
R4:1	Chain3 is broken or has low hashrate	Check if chain3 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair

R8:1	Chain4 is broken or has low hashrate	Check if chain4 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
J1:1	Chain1 has bad ASIC	Update the firmware to the latest version, replace the power supply, or return to factory for repair
J2:1	Chain2 has bad ASIC	Update the firmware to the latest version, replace the power supply, or return to factory for repair
J4:1	Chain3 has bad ASIC	Update the firmware to the latest version, replace the power supply, or return to factory for repair
J8:1	Chain4 has bad ASIC	Update the firmware to the latest version, replace the power supply, or return to factory for repair
N:1	Average total hashrate exceeds the sale hashrate too much	Update the firmware to the latest version
N:2	Frequency is reduced too much	Update the firmware to the latest version
V:1	Power initialization error	Replace the power supply, or return to factory for repair
V:2	Power supply is not calibrated	Update the firmware to the latest version, replace the power supply, or return to factory for repair
V:3	Power exceeds specified value	Check the current ambient temperature,replace the power supply, or return to factory for repair
V:4	Power supply	Check power output wiring, replace the power

	voltage error	supply, or return to factory for repair
P:2	Low temperature protection	Check if the environment temperature is normal
J1:4	Chain1 EEPROM data error	Redo the factory test for chain1
J2:4	Chain2 EEPROM data error	Redo the factory test for chain2
J4:4	Chain3 EEPROM data error	Redo the factory test for chain3
J8:4	Chain4 EEPROM data error	Redo the factory test for chain4
J:6	Temperature sensor error	Check if the hashboard connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
M:1	Memory allocation error	Update the firmware to the latest version, replace the control board, or return to factory for repair
J1:2	The number of chain1 chips is less than the design	Check if chain1 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
J2:2	The number of chain2 chips is less than the design	Check if chain2 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
J4:2	The number of chain3 chips is less than the design	Check if chain3 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair

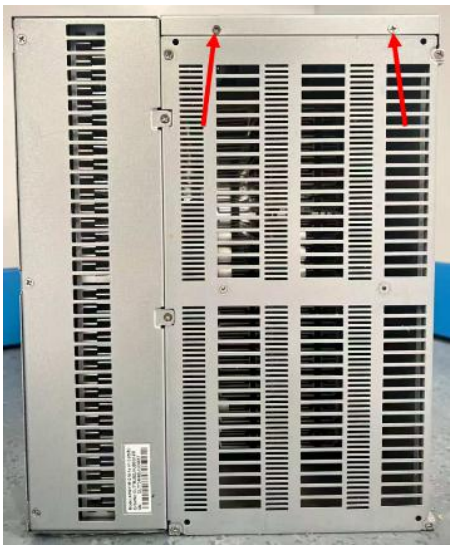
J8:2	The number of chain4 chips is less than the design	Check if chain4 connection is normal, update the firmware to the latest version, replace the hashboard, or return to factory for repair
L1:1	Chain1 voltage or frequency exceeds the limit	Update the firmware to the latest version, or return to factory for repair
L2:1	Chain2 voltage or frequency exceeds the limit	Update the firmware to the latest version, or return to factory for repair
L4:1	Chain3 voltage or frequency exceeds the limit	Update the firmware to the latest version, or return to factory for repair
L8:1	Chain4 voltage or frequency exceeds the limit	Update the firmware to the latest version, or return to factory for repair
L:2	Cannot find the mixed level	Update the firmware to the latest version, or return to factory for repair
L1:2	Chain1 voltage or frequency mismatch	Update the firmware to the latest version, or return to factory for repair
L2:2	Chain2 voltage or frequency mismatch	Update the firmware to the latest version, or return to factory for repair
L4:2	Chain3 voltage or frequency mismatch	Update the firmware to the latest version, or return to factory for repair
L8:2	Chain4 voltage or frequency	Update the firmware to the latest version, or

	mismatch	return to factory for repair
N:4	Network connection is lost	Check if the network connection is normal

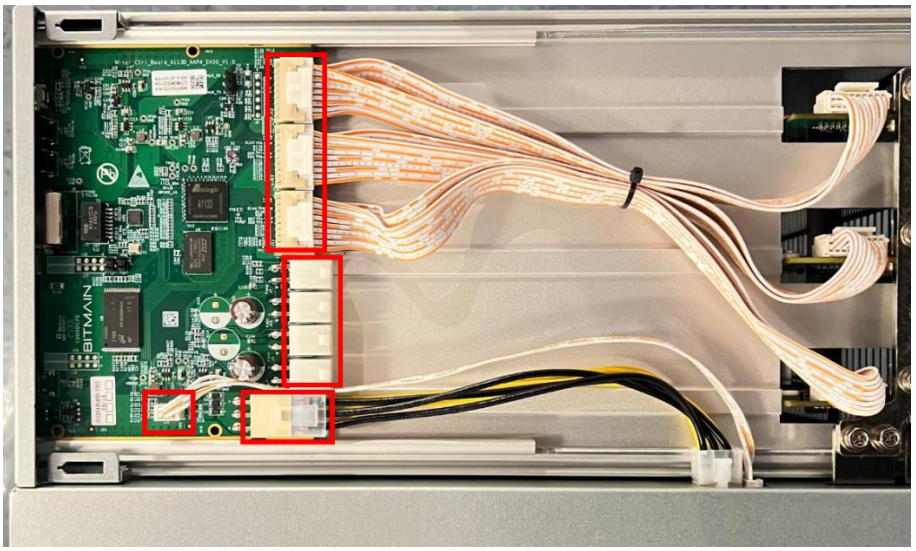
5 Server Disassembly and Installation

5.1 Control Panel Disassembly and Installation

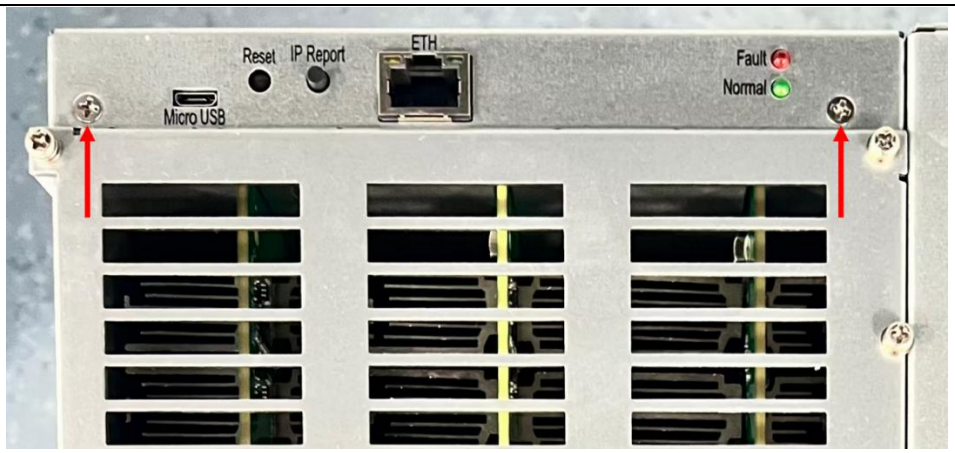
1. Remove the 2 upper cover screws of the server, as shown in the figure：.

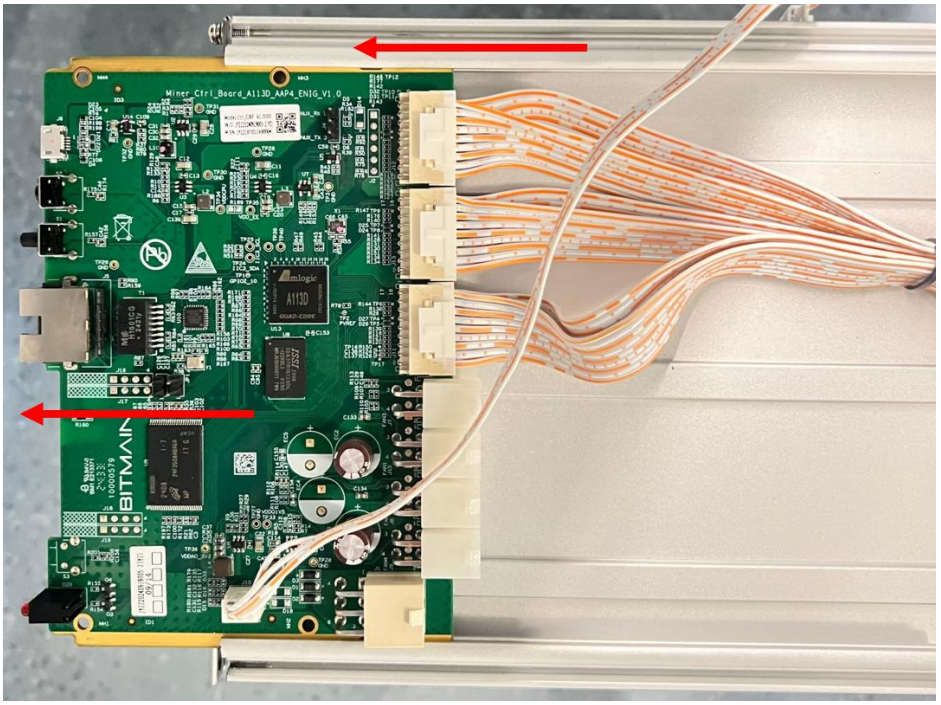


2. Remove the one upper covers and unplug a total of 5 cables on the control board, including the operation board arrangement cables, the control board power supply cables and the power supply voltage regulating cables, as shown in the figure：



3. Remove 2 screws from the front cover of the control panel, remove the front cover, and push the control panel along the chute, as shown in the figure：



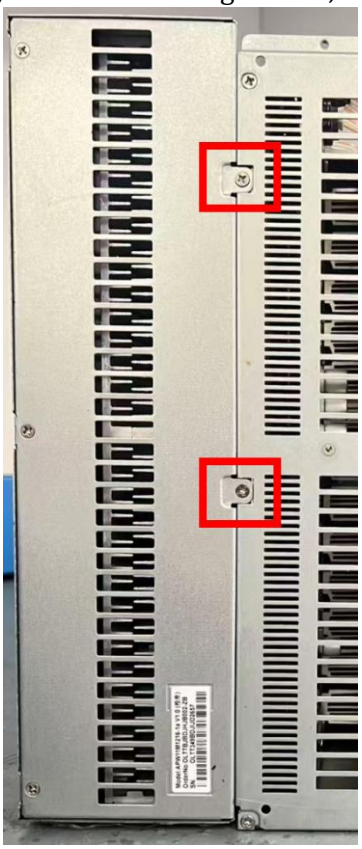


4. The installation steps are opposite to the disassembly steps, and it can be install in the steps of the opposite above order.

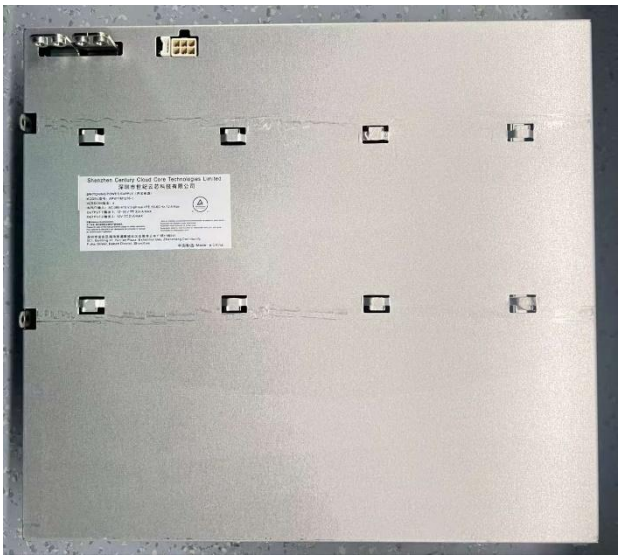
5.2 Power Supply Disassembly and Installation

1. Remove the upper cap according to the above method.
2. Unplug the 2 cables connected to the control board and remove the 4 copper screws, as shown in the figure：

3. Remove the power supply and chassis fixing screws, as shown in the figure：



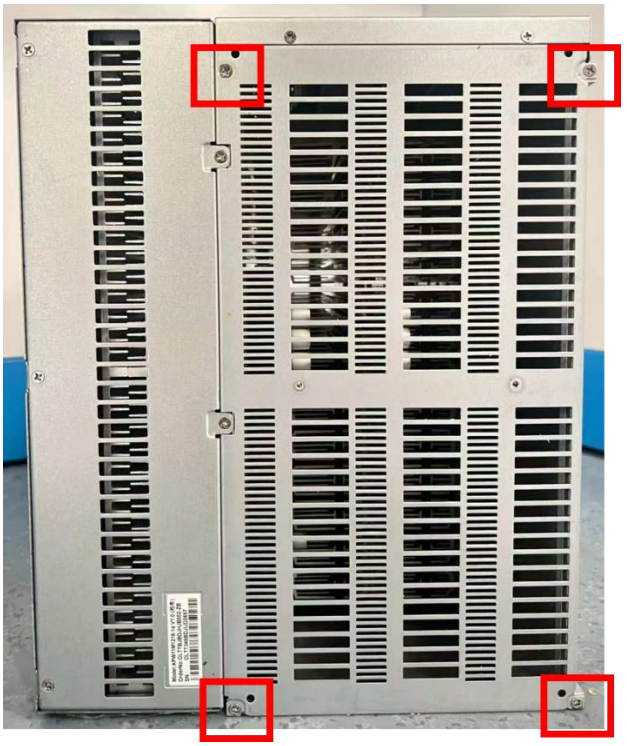
4. Take out APW power supply, as shown in the figure：

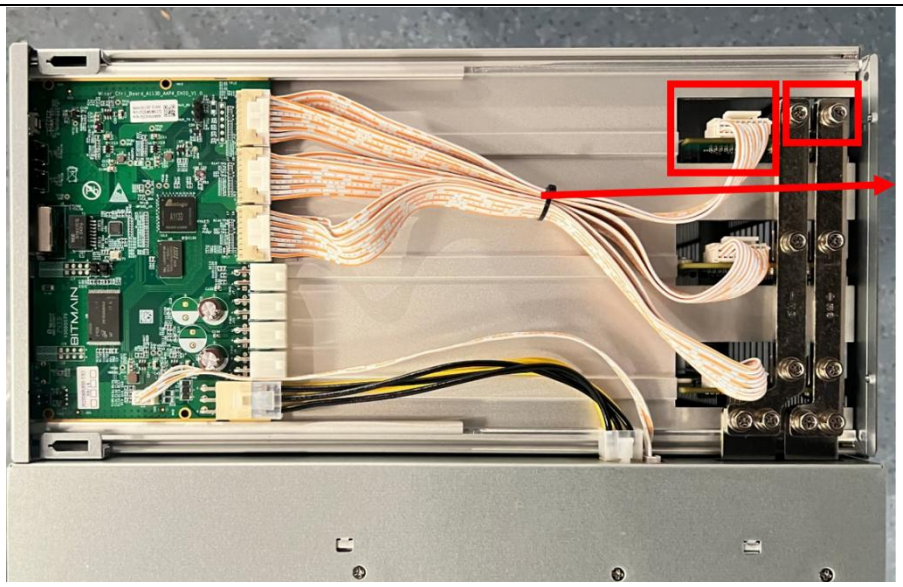
5. The installation steps are opposite to the disassembly steps, and it can be install in the steps of the opposite above order.

5.3 Hash Board Disassembly and Installation

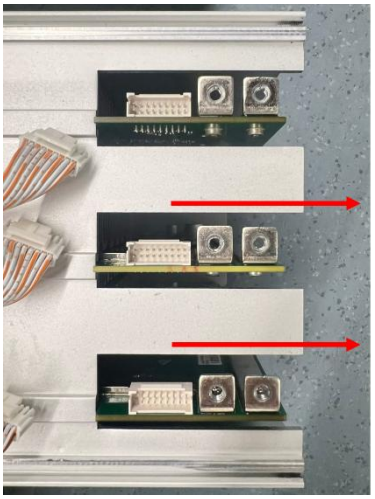
1. Remove the upper cap according to the above method.
2. Remove 4 screws as shown in the figure：

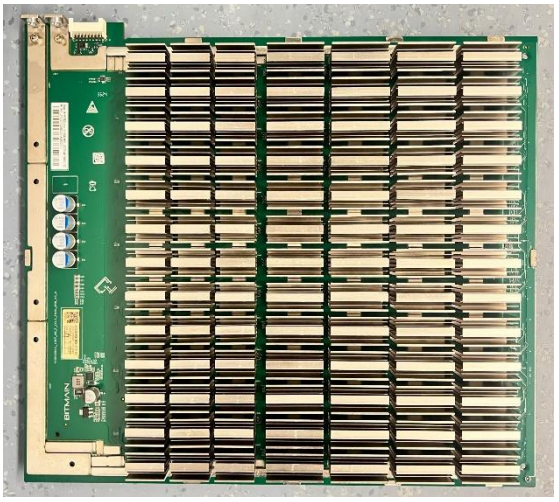


3. Pull out the cable of the hash board, unscrew two screws on the copper bar, and the hash board can be pulled out, as shown in the figure：



4. Remove the cables and screws, the rest of the hash board can be extracted, as shown in the figure:





5. The installation steps are opposite to the disassembly steps, and you can install in the steps of the opposite above order.

6 Environmental Requirements

Please ensure that your server operates in accordance with the following environmental requirements.

6.1 Basic Environmental Requirements

6.1.1 Climatic Conditions

Table 5-1 Requirements of climatic conditions

Descriptions	Requirements
Operating Temperature, **℃**	**-20-45**
Operating Humidity, **RH**	**10-90%(non-condensing)**
Storage Temperature, **℃**	**-20-70**
Storage Humidity, **RH**	**10-90%(non-condensing)**
Altitude, **m**	**<2000**

6.1.2 Site Requirements of the Server Running Room

Please ensure that the server operating room is kept away from industrial pollution sources:

(1) For heavy pollution sources such as smelters and coal mines, maintain a distance of more than 5 km.

(2) For moderate pollution sources such as chemical industries, rubber, and electroplating industries, maintain a distance of more than 3.7 km.

(3) For light pollution sources such as food factories and leather processing factories, maintain a distance of more than 2 km. If unavoidable, choose a site in the perennial upwind direction of the pollution source.

Please do not set up your location within 3.7 km of the seaside or a saltwater lake. If this is unavoidable, ensure that the structure is as airtight as possible and equipped with air conditioning for cooling.

Please clean your server when the machine surface is found to be heavily dusted (it is recommended to check once a month).

Please click https://support.bitmain.com/hc/en-us/articles/115004520173-How-to-clean-and-dust-the-ANTMINER to get more information about how to clean your server.

6.1.3 Electromagnetic Environmental Conditions

Please keep your site away from transformers, high-voltage cables, transmission lines, and high-current equipment. For example, there should be no high-power AC transformers (>10KA) within 20 meters, and no high-voltage power lines within 50

meters. Additionally, keep your site away from high-power radio transmitters; for example, there should be no high-power radio transmitters (>1500W) within 100 meters.

6.2 Other Environmental Requirements

The server running room shall be free of explosive, conductive, magnetically conductive and corrosive dust. The requirements of mechanical active substances are shown below.

6.2.1 Mechanical Active Substances

Table 5-2 Requirements of mechanical active substances

Mechanical Active Substance	Requirement
Sand, **mg/m^3**	**≤30**
Dust (suspended), **mg/m^3**	**≤0.2**
Dust (deposited) , **mg/ m^2h**	**≤1.5**

6.2.2 Corrosive Gas

Table 5-3 Requirements of corrosive gas

Corrosive Gas	Unit	Concentration
H_2S	**ppb**	**< 3**
SO_2	**ppb**	**< 10**
Cl_2	**ppb**	**< 1**
NO_2	**ppb**	**< 50**
HF	**ppb**	**< 1**
NH_3	**ppb**	**< 500**
O_3	**ppb**	**< 2**
Note: **ppb** (part per billion) refers to the unit of concentration, 1**ppb** stands for the volume ratio of part per billion.		

7 Regulations

7.1 Federal Communications Commission (FCC)

FCC Notice:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

7.2 Industry Canada

CAN ICES-003(A) / NMB-003(A)

7.3 European Community

Warning: Operation of this equipment in a residential environment could cause radio interference.

UAB Bitmain Development Lithuania

Vilnius, Bistrycios g.40-21

EU WEEE

Disposal of Waste Equipment by Users in Private Household in the European Union:

This symbol on the product or on its packaging indicates that this product

must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handling it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where your purchased the product.

7.4 Taiwan ROHS

設備名稱：服務器　　型號：S21 XP Imm.						
單元	限用物質及其化學符號					
	鉛	汞	鎘	六價鉻	多溴聯苯	多溴二苯醚
	(Pb)	(Hg)	(Cd)	(Cr^{6+})	(PBB)	(PBDE)
外殼	○	○	○	○	○	○
電源	—	○	○	○	○	○
控制板	—	○	○	○	○	○
算力板	—	○	○	○	○	○
線材組件	○	○	○	○	○	○
備考 1.〝超出 0.1 wt %〞及〝超出 0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。						
備考 2.〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。						
備考 3.〝－〞係指該項限用物質為排除項目。						

7.5 FCC Supplier's Declaration of Conformity

Supplier's Declaration of Conformity

Trade Name: BITMAIN ANTMINER

Model Number: **S21 XP Imm.**

Responsible Part---U.S. Contact Information

Company: Bitmain Technologies Delaware Limited

Street Address: 100 Spectrum Center Drive, Suite 1255

City, State: City of Irvine, State of CA - California

Zip Code: CA 92618

Telephone number: +1 949-381-9884

Internet contact information: https://www.bitmain.com/

FCC Compliance Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

7.6 EU Declaration of Conformity

BITMAIN

CE **EU Declaration of Conformity**

Manufacturer's Name: BITMAIN DEVELOPMENT PTE. LTD.

Manufacturer's Address: 1 Raffles Place, #36-01 One Raffles Place, Singapore 048616

For the following equipment

Trade Mark: BITMAIN ANTMINER

Product: Server

Model No.: S21 XP Imm.

is herewith confirmed to comply with the requirements set out in Directive 2014/35/EU, Directive 2014/30/EU, and Directive 2011/65/EU. Compliance with 2014/35/EU and 2014/30/EU are evaluated by applying the following standards:

Safety standard: EN 62368-1:2014+A11

EMC standard: EN 55032:2015+A11:2020(Class A); EN 55032: 2015;
EN 55035: 2017; EN 55035: 2017+A11:2020
EN IEC 61000-3-2: 2019; EN 61000-3-3: 2013+A1:2019

This declaration of conformity is issued under the sole responsibility of the manufacture.

Signature: Xiaoxian Luo **Date:** 2025.06.25

Position/Title: President of Product Division II

8 Warranty

1. A 365-day warranty is provided starting from the shipping date. BITMAIN will cover shipping costs when shipping a replacement unit within the warranty period.

2. The warranty only applies to the original purchaser who purchased the machine directly from BITMAIN. Once the miner is resold, warranty coverage becomes the responsibility of the re-seller.

3. If the user fails to use the product per the given instructions, specifications, and conditions provided or changes the function settings of the unit without BITMAIN's prior consent, BITMAIN will not be liable for any damage arising therefrom.

4. Click https://service.bitmain.com/support/policy for a complete list of the Terms & Conditions that apply to all orders placed on https://shop.bitmain.com.

Note:

- Only new machines are eligible for a 365-day warranty; used machines are not included.