WhatsMiner Hydro-Cooling Miner

Operation Guide

V2.3

Shenzhen MicroBT Electronics Technology Co., Ltd.

Forward

About this Document

This Document includes instructions for installing, disassembling, managing, and maintaining a hydro-cooling miner. All pictures and other information are merely for illustrative purposes. Read carefully the manual before using the hydro-cooling miner.

Symbol instruction

Symbol	Instruction
	Provides additional information to supplement the main text.
	Indicates a potential risk which, if not avoided, could result in miner damage or unpredictable results.

Safeguards instruction

- Please check whether there are obvious physical faults before power-on. Be careful of electric shock.
- The miner should be kept away from the water source and should not be operated in a humid environment.
- Professional maintenance is required for the miner.
- It is forbidden to touch the miner directly by hand under the condition of power-on.
- Please use stable voltage.

Revision history

Version	Revision Content	Release Time
V1.0	First release	20200101
V2.0	Updated content	20250217
V2.1	Added description to liquid pressure drop parameters	20250523
V2.2	Added description to corrosion inhibitors and antifreeze	20251107
V2.3	• Added introduction to cleaning requirements for cycle system • Adjust a pH range of coolant	20251208

Legal information

Product certification

Our product has been certified as follows

Contents

1. Introduction

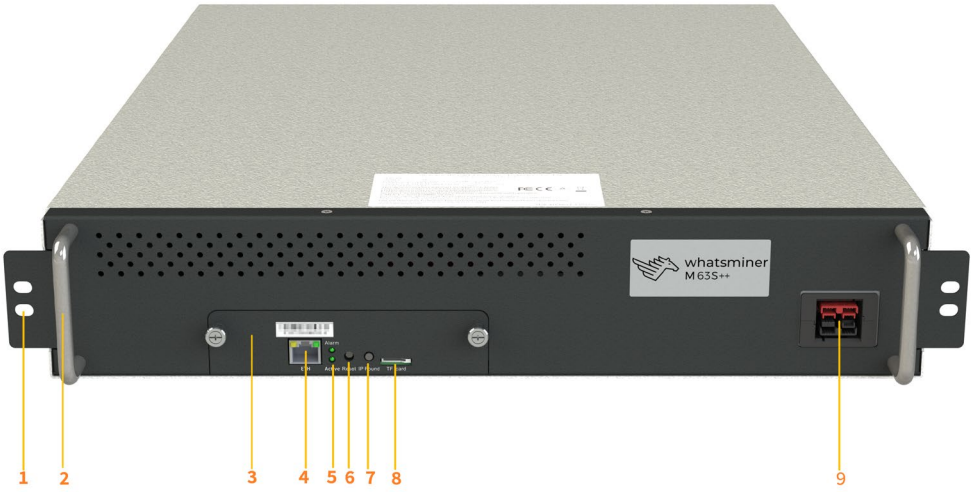
1.1 Overview

Whatsminer hydro-cooling miner includes multiple models, such as M33S+, M33S++, M53, M53S, M53S+, M53S++, M54S++, M63, M63S, M63S+, M64, M65, M63S++, M73, M73S, M73S++. In addition to M54S++ and M64, the remaining models of hydro-cooling miners merely differ in performance and specification, such as power ratio and hashrate, but they are the same in appearance, installation and disassembly methods, operation, and maintenance. Therefore, this Document takes the newest version M63S++ as an example for introduction.

A hydro-cooling miner has many advantages. For example, it can dissipate heat without the need for fans and airflow, completely seals away foreign debris, and even dramatically reduces noise generation. In addition, lower maintenance requirements of hydro cooling, due to fewer moving parts, could free up resources for other aspects of a mining operation. This efficiency could become increasingly important as mining operations scale up. Moreover, environmental friendliness of hydro cooling could also become a key factor as an industry faces increasing scrutiny over its environmental impact. Finally, suitability of hydro cooling for hot and dusty environments could make it an attractive option for the hydro-cooling miner operating in challenging conditions.

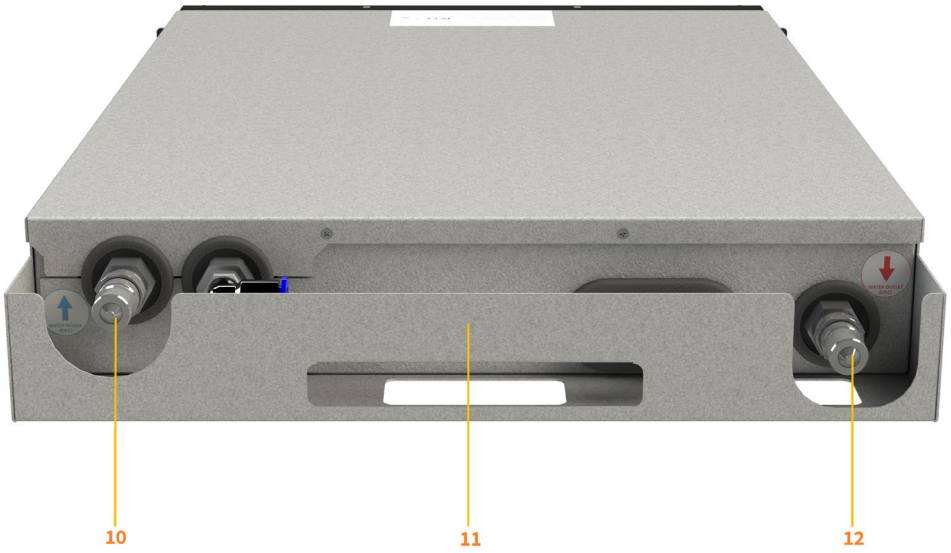
1.2 Components

The following figures show a front board and a rear board of a hydro-cooling miner, which include many components, such as fixed holes, a control board, and handles.



1. Fixed holes
2. Handle
3. Control panel housing
4. Ethernet interface
5. Indicator lights
6. Reset button
7. IP Found button
8. TF card slot
9. Power supply interface

Figure 1-1



10. Water inlet (male quick connector, with blue logo)
11. Baffle
12. Water outlet (male quick connector, with red logo)

Figure 1-2

Note:

- The material of quick connector comes in two types: aluminum alloy and stainless steel. The quick connectors are made of stainless steel by default when the hydro-cooling miner leaves the factory.

- The figures are merely for an illustrative purpose. The actual miner may differ.

1.3 Parameters

Different models of hydro-cooling miners have different specifications. For specific parameters, see the corresponding product manual on the official website (WhatsMiner).
In terms of environmental parameters, antifreeze parameters, and coolant parameters, these hydro-cooling miners are the same.

Table 1-1 introduces environmental parameters of a hydro-cooling miner, in which liquid refers to coolant. Parameters related to the liquid temperature and liquid flow in this table are based on pure water + special corrosion inhibitor as a liquid medium.

Table 1-1

Liquid temperature	• Working temperature (inlet): 20 °C – 50 °C @ normal mode, 20 °C – 40 °C @ high performance mode Note: ▪ For M65S, working temperature (inlet) is 30 °C – 60 °C @ normal mode, and 30 °C – 50 °C @ high performance mode. ▪ For M63S++, M63S+, M63S, M63, M53S++, working temperature (inlet) is 25 °C – 55 °C @ normal mode, and 25 °C – 45 °C @ high performance mode. ▪ When the price of Bitcoin is low and the electricity cost is higher than the income of Bitcoin, you need to adjust the performance mode to low performance mode. At this time, you can complete this operation through WhatsMinerTool or API without the need for any adjustments to a hydro-cooling system. • Inlet liquid temperature control accuracy: ± 2 °C • Storage and transportation temperature: -40 °C – +70 °C Note: Empty the liquid in the hydro-cooling miner during storage and transportation.
Liquid flow	• Rated flow: ⩾ 10 L/min • Flow control accuracy: ± 10 % Note: Temperature difference between inlet liquid and outlet liquid

	corresponds to 10 L/min is close to 10 ℃ @ normal mode, 14 ℃ @ high performance mode.
Liquid pressure drop	Pressure drop is about 68Kpa when rated flow is 10L/min@ Special coolant: pure water (distilled water) + special corrosion inhibitor Note: Refer to Table 1-3 for pressure drop values under different flow rates. The pressure drop includes pressure drop of inlet and outlet quick connectors (including female connectors and their adapters) of the hydro-cooling miner.
Liquid pressure	⩽ 400 kPa Note: When the liquid pressure is more than 400 kPa, cooling plates will be deformed and a risk of liquid leakage will be caused.
Liquid medium	Special coolant: pure water (or distilled water) + special corrosion inhibitor + antifreeze (select a ratio according to a freezing point) Note: ■ The coolant must meet index requirements listed in Table 1-4. ■ The coolant needs to be tested regularly. Refer to Table 1-5 for test indicators and cycles. When test data of the coolant exceeds or is lower than the test indicators, its performance will not meet requirements and the coolant must be replaced. ■ It is recommended to replace the coolant after one year of use.
Liquid PH	Control range: 7 – 8.7
Humidity	● Working humidity: 5 % RH – 85 % RH (non-condensing) ● Storage humidity: 5 % RH – 95 % RH (non-condensing) ● Long-term storage humidity: 30 % RH – 69 % RH (non-condensing)

If a liquid medium uses pure water + special corrosion inhibitor + antifreeze, parameters related to the liquid temperature and the liquid flow of ethylene glycol or propylene glycol solution + pure water (distilled water) + special corrosion inhibitor are shown in Table 1-2.

Table 1-2

Item / Coolant	Liquid temperature	Liquid flow
20 % ethylene glycol or propylene glycol solution + pure water (distilled water) + special corrosion inhibitor	• Working temperature (inlet): 20 °C – 50 °C @ normal mode, 20 °C – 39 °C @ high performance mode • Inlet liquid temperature control accuracy: ± 2 °C • Storage and transportation temperature: -40 °C – +70 °C Note: The liquid in the hydro-cooling miner must be emptied after storage and transportation for more than 2 hours.	• Rated flow: ⩾ 10.7 L/min • Flow control accuracy: ± 10 % Note: Temperature difference between inlet liquid and outlet liquid corresponds to 10.7 L/min is close to 10 °C @ normal mode, and 14 °C @ high performance mode.
30 % ethylene glycol or propylene glycol solution + pure water (distilled water) + special corrosion inhibitor	• Working temperature (inlet): 20 °C – 49 °C @ normal mode, 20 °C – 38.5 °C @ high performance mode • Inlet liquid temperature control accuracy: ± 2 °C • Storage and transportation temperature: -40 °C – +70 °C Note: The liquid in the hydro-cooling miner must be emptied after storage and transportation for more than 2 hours.	• Rated flow: ⩾ 11 L/min • Flow control accuracy: ± 10 % Note: Temperature difference between inlet liquid and outlet liquid corresponds to 11 L/min is close to 10 °C @ normal mode, and 14 °C @ high performance mode.
40 % ethylene glycol or propylene glycol solution + pure water (distilled water) +	• Working temperature (inlet): 20 °C – 48 °C @ normal mode, 20 °C – 38 °C @ high performance mode • Inlet liquid temperature control accuracy: ± 2 °C • Storage and transportation temperature: -40 °C – +70 °C Note: The liquid in the hydro-cooling	• Rated flow: ⩾ 11.4 L/min • Flow control accuracy: ± 10 % Note: Temperature difference between inlet liquid and outlet liquid corresponds to 11.4 L/min is close to 10 °C @ normal mode, and 14 °C @ high performance mode.

Item / Coolant	Liquid temperature	Liquid flow
special corrosion inhibitor	miner must be emptied after storage and transportation for more than 2 hours.	
50 % ethylene glycol or propylene glycol solution + pure water (distilled water) + special corrosion inhibitor	● Working temperature (inlet): 20 °C – 47 °C @ normal mode, 20 °C – 37.5 °C @ high performance mode ● Inlet liquid temperature control accuracy: ± 2 °C ● Storage and transportation temperature: -40 °C – +70 °C Note: The liquid in the hydro-cooling miner must be emptied after storage and transportation for more than 2 hours.	● Rated flow: ⩾ 11.6 L/min ● Flow control accuracy: ± 10 % Note: Temperature difference between inlet liquid and outlet liquid corresponds to 11.6 L/min is close to 10 °C @ normal mode, and 14 °C @ high performance mode.

Pressure drop parameters of the hydro-cooling miner for different coolant (at 20 °C) at different flow rates are shown in the Table 1-3.

Table 1-3

Flow （L/min）	Pressure Drop (Kpa)								
	Water	20% ethylene glycol solution	30% ethylene glycol solution	40% ethylene glycol solution	50% ethylene glycol solution	20% propylene glycol solution	30% propylene glycol solution	40% propylene glycol solution	50% propylene glycol solution
2	3.9	4.8	5.6	6.5	7.6	5.3	6.5	8.1	10.1
4	12.1	14.3	16.0	18.1	20.9	15.2	18.0	21.8	26.3
6	24.9	28.3	30.9	34.3	38.5	29.6	34.0	40.0	47.2
8	42.0	46.8	50.3	55.1	61.0	48.5	54.3	62.9	72.5
10	63.6	69.8	74.3	80.6	88.1	71.8	78.9	90.2	102.3
12	91.2	97.3	103.1	110.6	119.7	99.5	107.9	122.1	137.0
14	123.5	129.1	136.0	145.3	155.9	131.4	141.7	158.3	175.8
16	162.7	165.3	173.6	184.8	197.0	167.4	179.7	199.0	217.2

18	205.2	208.6	214.3	228.7	242.9	206.5	222.7	244.3	262.7
20	252.0	258.5	260.0	276.5	292.8	253.5	270.2	293.9	314.5

Initial index requirements for coolant and coolant test indicators and cycles are shown in the Table 1-4 and Table 1-5.

Table 1-4

Items		**Unit**	**Initial indices**	**Test method**
pH (20 °C)		—	7.0 – 8.7	ASTM D1287
Total number of bacterial colonies (microorganisms)		CFU/mL	< 100	AOAC 990
Sulfate		mg/L	< 10	ASTM D5827
Chloride		mg/L	< 20	ASTM D5827
Total hardness ($CaCO_3$)		mg/L	< 20	ASTM D1126
Conductivity (20 °C)		μs/cm	< 2000	ASTM D1125-23
Appearance		—	Clear liquid without precipitation	Visual inspection
Corrosion inhibitor		—	100 % active ingredients	—
Reserve alkalinity		mL	⩾ 2.0	ASTM D11221
Glassware corrosion (70 °C)	Stainless steel	mg/pcs	± 10	ASTM D1384
	3003 aluminum alloy	mg/pcs	± 10	
	6061 aluminum alloy	mg/pcs	± 10	
Non-metal compatibility/mass change	EPDM	%	± 5	ISO 1817
	Fluorinated silicone rubber	%	± 5	
	NBR	%	± 5	

Table 1-5

Items	Unit	Detection Indices	Test cycle	Reference test methods
pH (20 °C)*	—	7.0 – 8.7	Every 2 months	ASTM D1287
Total number of colonies (microorganisms)*	CFU/mL	⩽ 100	Every 6 months	AOAC 990
Sulfate	mg/L	⩽ 10	Every 6 months	ASTM D5827
Chloride	mg/L	⩽ 20	Every 6 months	ASTM D5827
Total hardness ($CaCO_3$)	mg/L	⩽ 20	Every 6 months	ASTM D1126
Conductivity (20 °C)*	μs/cm	Increment ⩽ 1500	Every 2 months	ASTM D1125-23
Appearance*	—	Clear liquid without precipitation	Every 2 months	Visual inspection
Copper ions*	mg/L	Increment ⩽ 0.5	Every 6 months	ASTM D1971-02
Iron ions*	mg/L	Increment ⩽ 0.5	Every 6 months	ASTM D1971-02
Aluminum ions*	mg/L	Increment ⩽ 0.5	Every 6 months	ASTM D1971-02
Corrosion Inhibitor	—	Active ingredients ⩾ 80 %	Every 6 months	Entrust corresponding suppliers to conduct tests
Reserve alkalinity	mL	⩾ 2.0	Every 2 months	ASTM D11221

Note: * indicates that this index must be checked. After the coolant is filled into the hydro-cooling system, it should be circulated for 24 to 48 hours, and then a sample of 8 to 10 liters should be taken as an initial state of a retained sample of the coolant. After completing testing for items marked with *, the remaining coolant should be sealed and stored in a cool place for retention.

The following table introduces freezing points of ethylene glycol at different concentrations.

Table 1-6

Volume Concentration of Ethylene Glycol	Freezing Point (℃)
10%	-4°C
20%	-10°C
30%	-15°C
40%	-24°C
50%	-37°C
60%	-55°C
70%	-48°C

2. Design Considerations of Hydro-Cooling System

A hydro-cooling system uses a closed-loop design in which liquid is circulated through a heat exchanger without coming into contact with electrical components. In the hydro-cooling system, liquid flows through a network of pipes or channels that directly interact with a hydro-cooling miner. As the liquid passes through the hydro-cooling system, it absorbs the generated heat. The heated liquid is then circulated away from the hydro-cooling miner and cooled via the heat exchanger. Once the liquid has released heat and cooled down, it is recirculated back to the hydro-cooling miner to perpetuate a cooling cycle.

Therefore, when you purchase the hydro-cooling miner, the hydro-cooling system is essential. You can choose to purchase our hydro-cooling system, such as Heat Core hydro-cooling system and WANDE hydro-cooling system, and we will provide professionals to build this system for you, so as to help you save time and energy. If you have any interests, feel free to consult our sales.

For example, in the Heat Core hydro-cooling system, warm liquid flows through a cooling plate covering a surface of chips to take away heat from chips. The whole system consists of three parts, including a cabinet, a smart control system (CDU), and a cooling device (dry cooler). The system also can be connected with a heat exchanger, without a dry cooler, to provide heat for various heating scenarios. Every hydro-cooling miner’ s connection uses

a quick auto-closed connector, and hot plug without any liquid leakage, and for main pipes, clamps are used. All pipes and dry coolers use 304L food-grade stainless steel to prevent corrosion and rust. To ensure a stable and suitable liquid temperature flow through hydro-cooling miners, the whole system is automatically controlled by the smart control system, which is equipped with a monitor screen on a front cabinet. The inlet and outlet liquid temperature can be shown on the screen. In the system, there is also a liquid fill tank, which can be auto-refilled, and the bubble is auto-removed by the smart control system. The liquid leakage is also auto-detected by the system. The following figure illustrates a simple example.

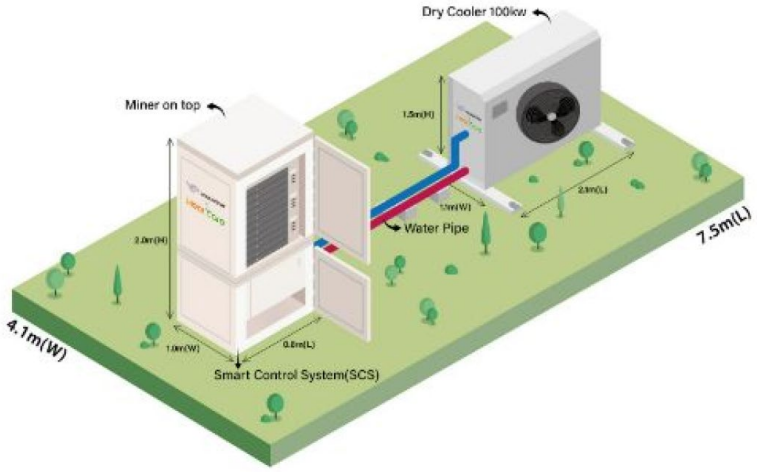


Figure 2-1

In addition, you can also build your hydro-cooling system as needed. To be more specific, you can choose to build a single cycle hydro-cooling system or a double cycle hydro-cooling system.

In the single cycle hydro-cooling system, a hydro-cooling CDU (Cooling Distribution Unit) includes the following components, such as an automatic degassing tank, a safety relief valve, a constant pressure expansion tank, a circulating pump, a make-up liquid pump, a make-up liquid tank, a filter, an automatic exhaust valve, a manual exhaust valve, a drain valve, and the like. In a double cycle hydro-cooling system, the most important component included in the hydro-cooling CDU is a heat exchanger, while other components are similar to those in the single cycle hydro-cooling system. Therefore, when you have necessary components, you can prepare to build a simple hydro-cooling system. The following two figures show examples of CDUs in single cycle and double cycle modes.

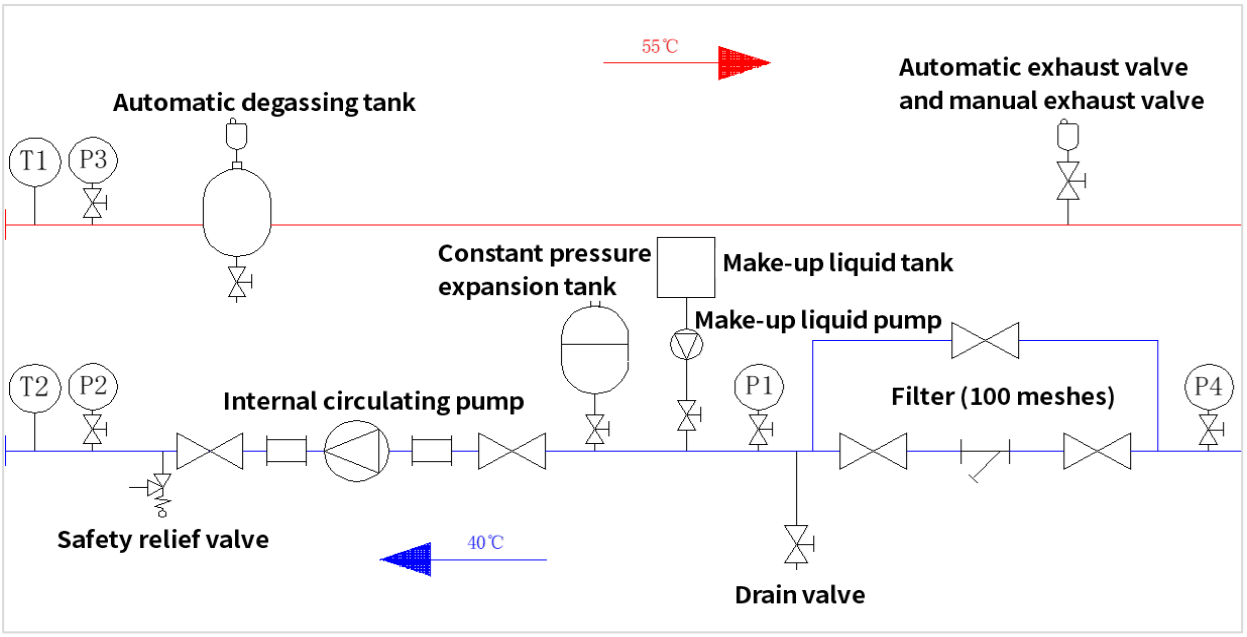


Figure 2-2

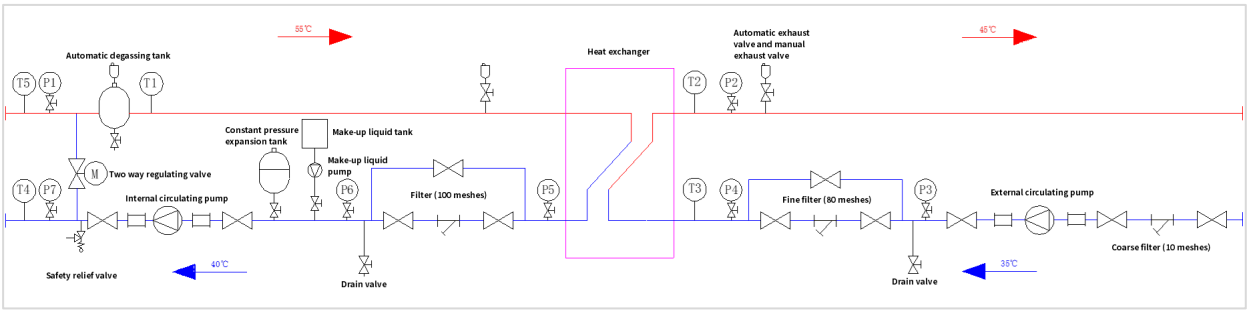


Figure 2-3

Finally, when you design your hydro-cooling system, some considerations must be taken into account. The detailed introduction provided below is for reference only.

1. Hydro-cooling miner inlet liquid temperature control

(1) Control requirements: Constant control inlet liquid temperature with control accuracy of ± 2 °C.

(2) Control range: 20 °C – 50 °C @ normal mode when using pure water + special corrosion inhibitor as a coolant medium, and 20 °C – 40 °C @ high performance mode when using pure water + special corrosion inhibitor as the coolant medium.

Note: If the inlet liquid temperature fluctuates too much or is too high, it may easily cause the temperature of a hydro-cooling miner to fluctuate too much or overheat, and the hydro-cooling miner cannot work stably and properly.

2. Hydro-cooling miner inlet liquid flow control

(1) Control requirements: Constant control of inlet flow with control accuracy ± 10 %.

(2) Control range: Flow of a single hydro-cooling miner is greater than or equal to 10 L/min when using pure water + special corrosion inhibitor as a liquid medium, and temperature difference between inlet liquid and outlet liquid corresponds to 10 L/min is 10°C @ normal mode and 14°C @ high performance mode.

Note: If the inlet liquid flow fluctuates too much, the temperature of a hydro-cooling miner may fluctuate too much and the hydro-cooling miner cannot work stably, or if the inlet liquid flow is low, the temperature of outlet liquid may be too high and the hydro-cooling miner cannot work properly.

3. Hydro-cooling miner inlet liquid pressure

Control range: ⩽ 400 kPa.

Note: If the inlet liquid pressure is too high, cooling plates may have a risk of deformation, which may cause damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

4. Liquid medium

(1) Coolant: Special coolant is pure water (or distilled water) + special corrosion inhibitor + antifreeze (select a ratio according to a freezing point).

The special corrosion inhibitor is an essential component of the coolant. Its primary function is to prevent or slow down the corrosion of metal components in the hydro-cooling system. Corrosion can compromise metal integrity, leading to pipe thinning, clogging, perforation, or damage to components (especially hydro-cooling plates of the hydro-cooling miner). Using the corrosion inhibitor not only protects metal pipes and components but also extends the system's lifespan.

Typically, we suggest that you use the corrosion inhibitor we recommend (PERIC's Composite Corrosion Inhibitor 718E-02), or you may source your own. The recommended dosage for this corrosion inhibitor is 5 wt% to 7 wt%, and its density is approximately 1.03–1.04 kg/L. Taking the preparation of 1000 L coolant as an example, take 50 kg-70 kg of the composite corrosion inhibitor, add it to a stirring container, and then add deionized water (with a requirement of conductivity⩽5 μS/cm) and ethylene glycol mixture to a total mass of 1000 kg, stir evenly, and test pH of the coolant to be around 8.0 before use. Operators must wear protective goggles and gloves during handling. In case of accidental skin contact, rinse promptly with clean water. This corrosion inhibitor should be stored in a cool, dark place at temperatures not exceeding 30 °C. It is prohibited to mix it with other brands of corrosion inhibitors. Ensure it is added in the correct proportion and that the entire hydro-cooling system is thoroughly cleaned before use.

In addition, make sure to check a freezing point of the coolant in a timely manner before winter arrives confirm whether it meets anti-freezing requirements, in order to avoid a risk of miner freezing damage caused by the lack of antifreeze or insufficient antifreeze dosage.

Note: The corrosion inhibitor must be added to the coolant, and the coolant must meet indices in Table 1-4. If the coolant does not meet requirements, it must be replaced immediately, otherwise, it will easily cause system components to rust and corrode, and cooling plates or connectors may have a risk of corrosion and blockage, which may cause damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

(2) Coolant replacement: Check and replace the coolant regularly.

Note: The coolant needs to be tested regularly. Refer to Table 1-5 for test cycle and indices requirements. If the coolant does not meet requirements, it must be replaced immediately.

5. Cycle system

(1) Pipeline: The cycle system must consider rust and corrosion prevention. It is recommended to use stainless steel pipes, and copper is prohibited from appearing in the cycle system.

Note: Cooling plates are made of aluminum. If the cycle system contains copper, there will be electrochemical corrosion. Carbon steel pipe welds have a lot of welding slag, which is difficult to clean and prone to rusting and corrosion. The cooling plates or connectors have a risk of corrosion and blockage, which may cause damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

(2) Filter: A main road of the cycle system should be provided with a filter of more than 100 mesh. It is also recommended to configure a 10-micron side filter system to filter tiny suspended substance.

Note: If the mesh size of the filter is too low to filter out impurities from large particles in the cycle system, the cooling plates or connectors have the risk of the blockage, which may cause the damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

(3) Temperature resistance of cycle system components: ⩾ 85 °C

Note: If the temperature resistance of the cycle system components is lower than 85 °C, it will easily cause the damage to these components or even leakage of a liquid medium, which may cause the damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

(4) Circulating pump: It is recommended to use stainless steel pumps, with one in use and one in standby to improve system reliability.

Note: Cast iron pumps are prone to rust and corrosion, and the cooling plates or connectors have the risk of the corrosion and blockage, which may cause the damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

(5) Pressure test and leak detection of system pipeline: It is recommended to use an air compressor for gas inspection and use a soap bubble method to test sealability of welding connectors.

Note:

- If liquid inspection is conducted in winter, equipment in the cycle system needs to be drained and properly protected against freezing. For the equipment that is difficult to drain completely, there is a risk of freezing damage.
- The efficiency of gas inspection is high, and tedious work of draining and anti-freezing the equipment is saved when detecting the leak in winter.

(6) Exhaust and drain valves: Automatic exhaust valves are installed at some high positions, and drain valves are installed at some low positions. In addition, it is recommended to install manual exhaust valves in multiple positions in the cycle system to improve first injection efficiency of the cycle system.

(7) Cycle system cleaning: The cycle system needs to be cleaned and filtered before hydro-cooling miners are put into a cabinet.

Before connecting the cabinet to the cycle system, deionized water (conductivity ⩽ 5 μs/cm) is used to clean and filter cycle system pipeline multiple times to remove dust, welding slag, and other impurities. Cleaning time should not exceed 8 hours, and cleaning liquid should not be left overnight in the cycle system. After the cycle system is cleaned, the deionized water should be drained, and then coolant is injected for cycling (if the deionized water is not completely drained, it will affect various indicators and parameters of the coolant). Refer to 3 Cleaning Specification of Hydro-Cooling System for a detailed cleaning process of the cycle system

Note: If there are too many residual impurities in the system, the cooling plates or connectors may easily have the risk of the corrosion and blockage, which may cause the damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the miner.

(8) Hydro-cooling miner cleaning: The hydro-cooling miner needs to be cleaned and filtered before it is put into the cabinet.

Note: Before the hydro-cooling miner is put into the cabinet, the deionized water (conductivity ⩽ 5 μs/cm) is used to clean and filter a flow channel of the hydro-cooling miner multiple times to remove the dust, remaining liquid and other impurities. The cleaning time should not exceed 8 hours, and the cleaning liquid should not be left overnight in the hydro-cooling miner. After cleaning the hydro-cooling miner, the deionized water should be drained, and then the coolant is injected for cycling (if the deionized water is not completely drained, it will affect various indicators and parameters of the coolant). If there are too many residual impurities in the hydro-cooling miner, the cooling plates or connectors may easily have the risk of the corrosion and blockage, which may cause the damage to the hydro-cooling miner. We will shoulder no responsibility for such damage to the hydro-cooling miner.

(9) Safety pressure relief valve: To prevent pressure of the cycle system from being too high, the cycle system needs to be provided with 4bar safety pressure relief valves.

Note: Ensure that a pressure relief value has been adjusted before operation, otherwise, when inlet pressure of the hydro-cooling miner is greater than 400 kPa, the cycle system will not be able to release the pressure. We will shoulder no responsibility for such damage to the miner.

(10) Constant pressure expansion tank: To prevent pressure fluctuations in the cycle system, the cycle system should be provided with a constant pressure expansion tank.

Note: Ensure that a pressure value of the constant pressure expansion tank has been adjusted before the operation. Otherwise, the constant pressure expansion tank cannot work, which may easily cause the inlet pressure of the hydro-cooling miner to be greater than 400 kPa. We will shoulder no responsibility for such damage to the miner.

(11) Bypass valve: It is recommended to add a bypass valve on a cooling source side of the cycle system to prevent the inlet temperature from being too low.

Note: If there is no bypass valve, when the cycle system has a sufficiently large heat dissipation temperature difference (a difference between target inlet liquid temperature and ambient temperature), even if a fan does not rotate on the cooling source side, it may still cause the target inlet liquid temperature to be too low and fail to rise to a minimum target value (20 °C). The bypass valve can bypass return liquid with high temperature of the hydro-cooling miner and mix it with outlet liquid on the cooling source side with lower temperature to prevent the temperature of supply liquid from being too low.

3. Cleaning Specification of Hydro-Cooling System

Before connecting a hydro-cooling cabinet to a heat dissipation system, pipeline of a hydro-cooling system must undergo multiple rounds of circulation cleaning and filtration to remove impurities such as dust and debris.

3.1 Pre-Cleaning Requirements

Before cleaning the hydro-cooling system, you need to confirm that supporting conditions meet the following requirements.

Pipeline Material: Use stainless steel pipeline, and avoid to use copper-containing materials (to prevent rust corrosion)

Filtration System:

- Main Circuit: Configure a filter with a mesh size ⩾100 mesh (suitable for filtering particles in a liquid medium with a diameter ⩽149 μm).
- Bypass Circuit: Configure a system with 10 μm precision (to filter fine suspended solids)

Component Performance: Ensure that system components withstand temperatures ⩾ 85 °C

Safety Equipment:

- Install a 4bar safety pressure relief valve (for pressure control)
- Install a constant pressure expansion tank (for pressure stabilization)

3.2 Cleaning Steps

Before cleaning, prepare one filter each with a precision of 149 μm and 53 μm, and several sheets of 50 μm filter paper.

Step 1: Install a 100 mesh (corresponding to 149 μm precision) filter, and then rinse a hydro-cooling system with tap water for 30 minutes to flush out solid residue from pipeline.
Step 2: Replace the 100 mesh filter with a 270 mesh (corresponding to 53 μm precision) filter, and rinse the hydro-cooling system with new tap water for 30 minutes.
Step 3: Maintain the 270 mesh filter, replace the tap water with deionized water, and then clean the hydro0 cooling system in a cyclic manner for 30 minutes.
Step 4: Take 1 L of rinse liquid from a drainage outlet of the hydro-cooling system, pass it through a 50 μm filter paper, and then detect the number of particles with a particle size greater than 50 μm.

Note: If the number of particles with the particle size greater than 50 μm exceeds 10, rinse the hydro-cooling system again with deionized water as a medium and retest.

3.3 Cleaning Qualification Criteria

Table 3-1

Inspection Category	Item	Qualification Criteria	Inspection Method
Visual Inspection	Cleanliness of Pipeline Inner Wall	1. No visible welding slag, oxidation scale, rust, dust, fibers, or oil stains on pipeline inner walls. 2. No obvious discoloration or corrosion spots	● Direct visual inspection of pipe openings (pipe diameter ⩾ 50 mm) ● Endoscopic inspection (pipe diameter < 50mm or long pipes)
	Cleanliness of Pipe Openings and Welds	1. No residual welding flux or welding spatter 2. No uncleaned oxidation layer around welds 3. No burrs or impurity adhesion on edge of pipe openings	● Visual inspection and observation ● Manual touch (no rough or gritty impurities felt)
	Rinse Liquid Appearance	1. Outflow liquid is clear and transparent when flushing with clean water 2. No turbidity, suspended	Collect outflow liquid in a transparent container, and inspection and observe visually.

		particles, oil film floating, or rust-colored liquid	
Wiping Condition Inspection	Wiping Cleanliness of Inner Wall	No stains, rust marks, black powder, metal particles, or other contaminants are present after wiping with a white cloth or lint-free filter paper	Fix a white cloth/filter paper to a long-handled tool, insert it into pipes, evenly wipe inner walls 2-3 times, remove the white cloth/filter paper, and then inspect and observe their condition visually
Residual Index Inspection	Moisture Residue Inspection	No visible water droplets on inner wall, and no damp traces after drying	Wipe the inner walls with a white cloth, and no damp marks remain
	Chemical Residue Inspection	1. pH value: Rinse liquid: pH = 6.5–7.5 (neutral) 2. No residual cleaning agent components (e.g., chloride ions ⩽ 25ppm, applicable to stainless steel pipeline)	● Collect final rinse liquid and test using precision pH test strips/pH meter ● Test for harmful ions using ion chromatography (if necessary)
	Particle Size Inspection	Number of particles ⩾ 50μm inside pipes ⩽ 10 pcs/L, number of particles ⩾ 150μm ⩽ 0 pcs/L	● Use a particle counter to test rinse liquid ● Membrane filtration method (collect and count particles)
Qualification Rules		1. All basic inspection items (visual inspection, wiping condition inspection, residual index inspection) meet standards 2. No signs of secondary contamination	Check each item, and if all are satisfied, a result is qualified. If any single item fails, re-clean and re-inspect.

Note:

1. Conduct visual inspection and wiping condition inspection first, followed by residual index inspection to avoid cross-contamination.
2. Inspection frequency: Randomly select 30% of pipes from each batch of pipeline for inspection. If one pipe fails, the entire batch must be re-inspected and reworked (re-cleaned).

3.4 Cleaning Precautions

When cleaning a hydro-cooling system, you need to pay attention to the following three aspect.

1. You need to ensure that an entire cleaning process should not exceed 8 hours, and rinse liquid must not be left overnight in the hydro-cooling system.
2. After cleaning is complete, you need completely drain deionized water from the hydro-cooling system before filling it with coolant for circulation (residual deionized water can affect coolant parameters).
3. After a hydro-cooling miners is powered on, an increase in coolant temperature can cause an increase in pressure, and you should pay attention to changes in system pressure.

4. Precautions for Miner In and Miner Out

4.1 Installation Location

Before putting a hydro-cooling miner into a cabinet and taking the hydro-cooling miner out the cabinet, you should know an installation position of the miner. Hydro-cooling miners adopt a standard 2u structure design and are installed in a standard 19-inch hydro-cooling cabinet. The front and back of the hydro-cooling cabinet are shown as follows after all hydro-cooling miners are putting into the cabinet.

Figure 4-1

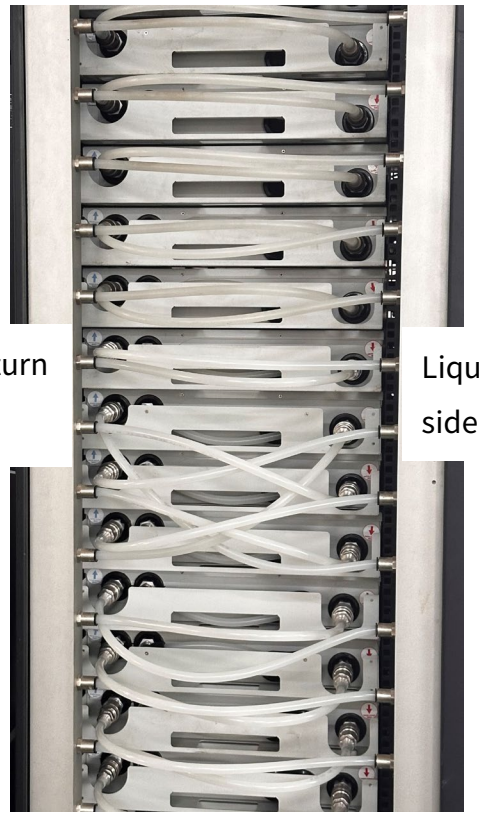


Figure 4-2

4.2 Putting Miner into Cabinet

Step 1 Slowly push a hydro-cooling miner into a cabinet along a rack slot.

Note: Two people are required to complete this operation.

Figure 4-3

Step 2 Align fixed holes on a front board of the hydro-cooling miner with floating nuts of the cabinet, and then fix the front board to the cabinet by screws.

Note: The cabinet comes with the floating nuts.

Caution: When transporting the cabinet with the hydro-cooling miners inside, the screws fixing the front board to the cabinet must be tightened.

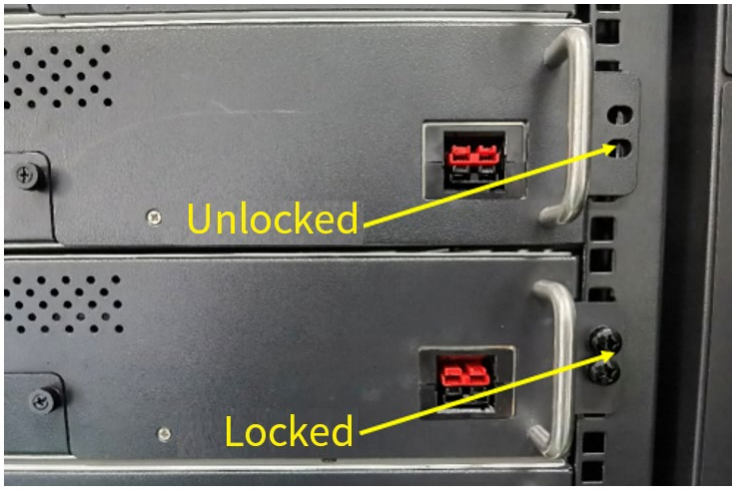


Figure 4-4

Step 3 Plug in inlet and outlet pipes of the hydro-cooling miner.

Firstly, you should remove protective caps of connectors, and then connect female quick connectors on the inlet and outlet pipes with male quick connectors on the hydro-cooling miner.

Note:

- The female quick connectors and the male quick connectors should be plugged into place with each other.
- In the following figures, the left side shows a situation after plugging all inlet and outlet pipes, and the right side shows two situations of plugging in place and plugging not in place.

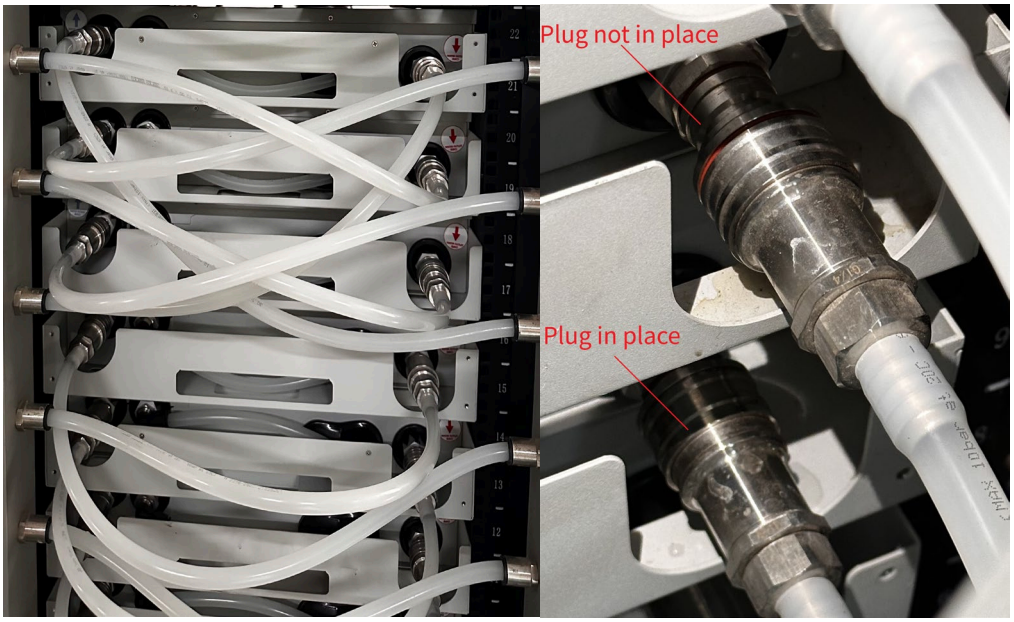


Figure 4-5

Step 4 Connect a network cable and a power supply cable.

Note: The power supply cable is original factory-configured power supply cable.

Figure 4-6

Step 5 Complete an operation of putting the hydro-cooling miner into the cabinet.

Caution: After the hydro-cooling miner is put into the cabinet, inject water to cycle once first, check whether there is water leakage or other issues. If there is no abnormality,

you can power on and connect to the network.

4.2 Taking Miner out of Cabinet

Step 1 Shut down a hydro-cooling miner, and then disconnect the corresponding circuit breaker.

Figure 4-7

Step 2 Unplug a network cable and a power supply cable.

Figure 4-8

Step 3 Unplug inlet and outlet pipes of the hydro-cooling miner.

Disconnect female quick connectors on the inlet and outlet pipes and male quick connectors on the hydro-cooling miner.

Note: You can hold a movable ring in the middle of the female quick connector and pull back to disconnect the female quick connectors and male quick connectors.

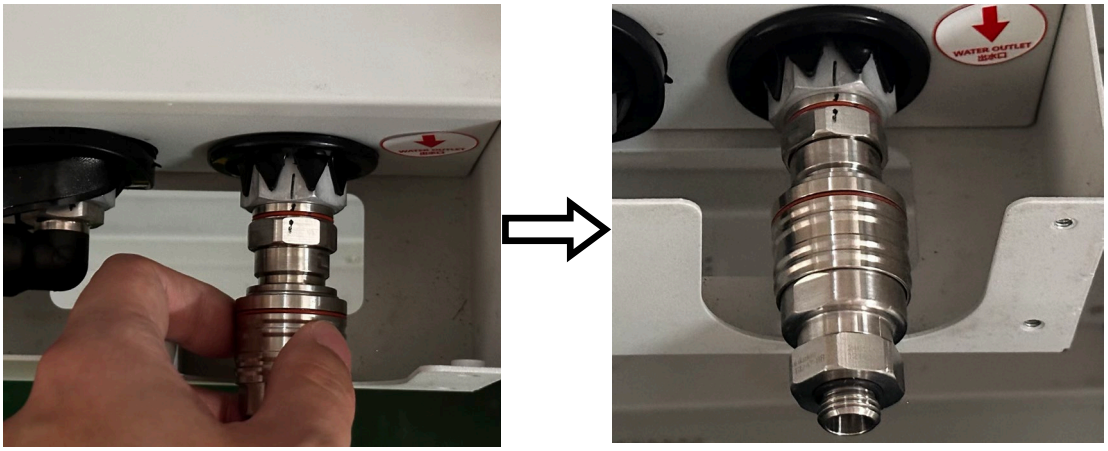


Figure 4-9

Step 4 Loosen screws fixing a front board of the hydro-cooling miner to a cabinet.

Note: The cabinet comes with floating nuts.

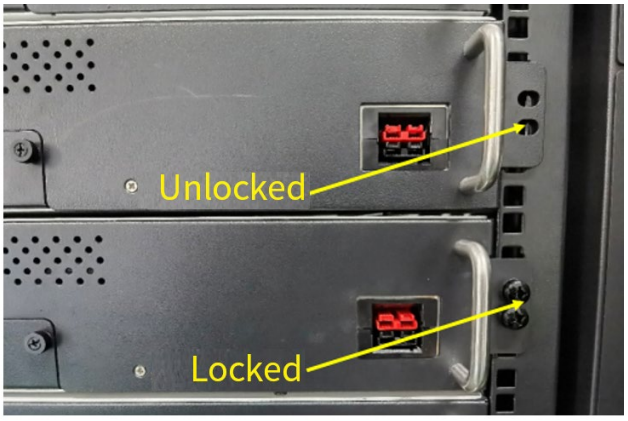


Figure 4-10

Step 5 Take out the hydro-cooling miner.

Note: It is recommended that two people complete this operation, one on each side.

Figure 4-11

After the hydro-cooling miner is removed from the cabinet, if it is stored and transported for more than 2 hours, its internal liquid must be drained out. To drain the liquid inside the hydro-cooling miner, two female quick connectors can be used to respectively connect two

pipes, and then respectively connect to an inlet and an outlet of the hydro-cooling miner, in which one of the two is filled with air at a certain pressure and the liquid is drained by pneumatic pressure.

5. Precautions Before, During and After Operation

5.1 Precautions Before Operation

1. Before powering on a hydro-cooling miner, confirm that a hydro-cooling system is circulating normally, that is, confirm that air in pipes has been emptied and the hydro-cooling system has no leaks.

   Note: If there is the air in the pipes, there is a risk of damage to a circulating pump. Inlet and outlet connectors and intermediate connecting pipes of the hydro-cooling miner need to be carefully inspected. If there is slight leakage, you need to deal with it in a timely manner, otherwise, leakage points may pose a risk of damage to the hydro-cooling miner, which will affect a normal operation of the hydro-cooling system over time. We will shoulder no responsibility for such damage to the miner.
2. When all hydro-cooling miners sharing the same hydro-cooling system are powered on at the same time, in order to avoid overheat protection of the hydro-cooling miner due to out-of-control liquid temperature control of the hydro-cooling system, it is recommended that before all the hydro-cooling miners are powered on, temperature-controlled components of the hydro-cooling system, such as draught fans, circulating pumps, and electric valves, run at full load. After the power of the hydro-cooling miner rises close to the rated power, the hydro-cooling system enters a state of automatic liquid temperature control and adjustment.
3. Before putting all the hydro-cooling miners into the cabinet, you need to inject the liquid for cycling to empty air in a cooling plate of the hydro-cooling miner, and then fill the cooling plate with the liquid. Or you can put one hydro-cooling miner into the cabinet at a time, and then put the next hydro-cooling miner after liquid replenishment is complete.

   Note: Under normal circumstances, there is no liquid in the cooling plate of the hydro-cooling miner. When the hydro-cooling miner is communicated with the hydro-cooling system, the air will enter pipes, leading to liquid shortage in the hydro-cooling

system. Therefore, it is necessary to have an exhausting apparatus and an automatic liquid replenishment apparatus. When the hydro-cooling system operates, it is not possible to connect multiple hydro-cooling miners without liquid at the same time in a short period of time. Because at this time, the hydro-cooling system will suddenly lack a large amount of liquid, and if the liquid replenishment is not timely, the air will mix into the hydro-cooling system, so that damage can be easily caused to a pump when it runs with gas, and local overheat of chips can be caused in other hydro-cooling miners, burning out the hydro-cooling miners or affecting hashrate. We will shoulder no responsibility for such damage to the miner.

4. Confirm that non-condensing exists on the hydro-cooling miner.

Note: When the hydro-cooling miner is not operating, if the ambient temperature rises from the lower temperature to the higher temperature, the temperature of the hydro-cooling miner itself cannot keep up with changes in the ambient temperature, and condensing may occur. If the condensing occurs, the hydro-cooling miner can be heated and dried by heating methods such as solar irradiation. We will shoulder no responsibility for such damage to the miner.

5.2 Precautions During Operation

1. A female quick connector and a power supply cable must be the original factory-configured female quick connector and power supply cable. We will shoulder no responsibility for such damage to the miner.
2. After a female quick connector is plugged into a male quick connector normally, the two quick connectors are communicated with each other and liquid can flow. The two quick connectors can lock themselves, and when the female quick connector is pulled out, the female quick connector and the male quick connector will shut off in both directions without liquid leakage. After the female quick connector is plugged into the male quick connector, you can check if there is any loose connection between the two quick connectors by pulling a hose at head of a pagoda joint of the female quick connector.

Note: If the female quick connector is not actually plugged into the male quick connector, the hydro-cooling miner may not function or even a cooling plate may be damaged due to overheat protection. We will shoulder no responsibility for such damage to the miner.

3. When you plug the female quick connector into the male quick connector, hold the head of the pagoda joint of the female quick connector and push it forward into place. During this process, be careful not to hold a movable ring.

Correct example (female quick connector has been pushed in place)✓

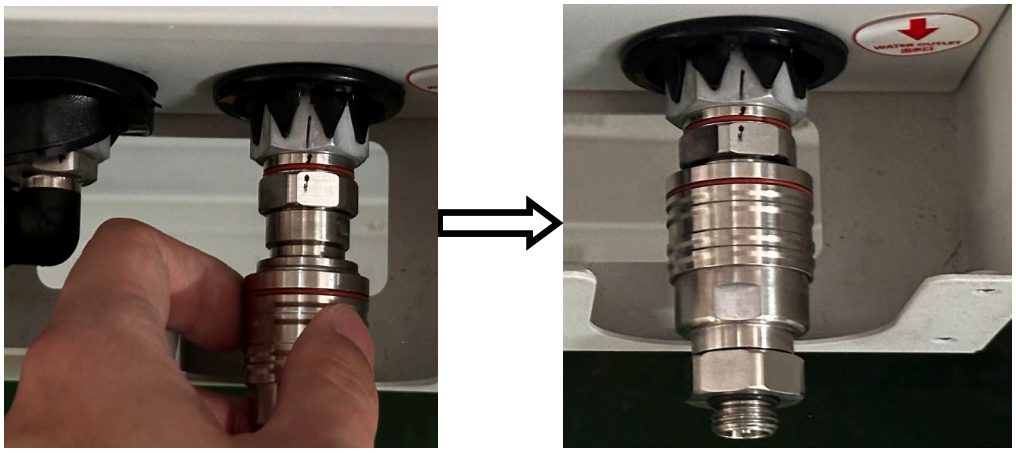


Figure 5-1

Wrong example (female quick connector is not pushed in place)❌

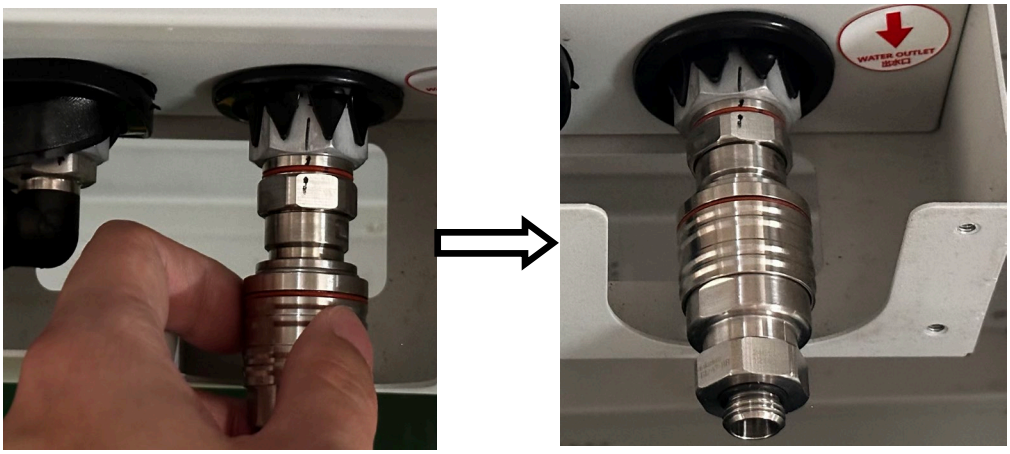


Figure 5-2

4. Press a shrapnel when unplugging the power supply cable.

Figure 5-3

5.3 Precautions After Operation

After a hydro-cooling miner is powered off, when a liquid inlet and a liquid outlet of the hydro-cooling miner are disconnected from a hydro-cooling system, that is, no liquid is injected into the hydro-cooling miner for cycling, it is necessary to drain the liquid inside the hydro-cooling miner to prevent damage to a cooling plate.

Note: We will shoulder no responsibility for such damage to the miner.

6. Introduction to Accessory Specifications

For a hydro-cooling miner or a cooling system, accessories are very important. In the following, specific specifications about the required accessories will be introduced.

6.1 Introduction to Accessories

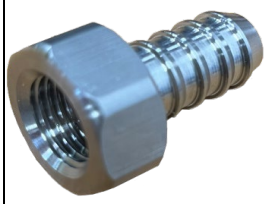
Table 6-1

Accessories	Specifications	Legend	Remarks
Hydro-cooling cabinet	● Effective space: 43 U ● Dimensions (height x width x depth): 2000 mm x 800 mm x 1000 mm ● Liquid supply and return side interface size: 2-inch quick-loading chuck		A cabinet integrates a switch, a distribution manifold for liquid supply and return, and a PDU, and can accommodate 20 2U hydro-cooling miners.
Male quick connector-aluminum alloy	● Interface size: M16 x 1.0 mm screw thread ● Interface sealing method: Sealing ring end face sealing ● Color identification: Blue		This connector is the one used for an original liquid inlet of a hydro-cooling miner.
Male quick connector-aluminum alloy	● Interface size: M16 x 1.0 mm screw thread ● Interface sealing method: Sealing ring end face sealing ● Color identification: Red		This connector is the one used for an original liquid outlet of the hydro-cooling miner.

Accessories	Specifications	Legend	Remarks
Female quick connector (pagoda head)-aluminum alloy	• Interface: Pagoda joint length is 20 mm, outer diameter is 12 mm, matched with a PTFE tube with an inner diameter of 10 mm • Color identification: Blue		This connector is compatible with an original liquid inlet connector of the hydro-cooling miner. A liquid supply side of the cabinet provided by you needs to use such connector to match the liquid inlet connector of the hydro-cooling miner. Note: You should not replace this connector with connectors of other specifications or other brands to match the original liquid inlet connector of the hydro-cooling miner.
Female quick connector (pagoda head)-aluminum alloy	• Interface: Pagoda head length is 20 mm, outer diameter is 12 mm, matched with a PTFE tube with an inner diameter of 10 mm • Color identification: Red		This connector is compatible with an original liquid outlet connector of the hydro-cooling miner. The liquid return side of the cabinet provided by you needs to use such connector to match the liquid outlet connector of the hydro-cooling miner. Note: You should not replace this connector with the connectors of other specifications or other brands to match the original

Accessories	Specifications	Legend	Remarks
			liquid outlet connector of the hydro-cooling miner.
Female quick connector (screw thread)-aluminum alloy	• Interface: G1/4 screw thread • Interface sealing method: Sealing ring end face sealing • Color identification: Blue		This connector is compatible with the original liquid inlet connector of the hydro-cooling miner. The liquid supply side of the cabinet provided by you needs to use such connector to match the liquid inlet connector of the hydro-cooling miner. Note: You should not replace this connector with the connectors of other specifications or other brands to match the original liquid inlet connector of the hydro-cooling miner.
Female quick connector (screw thread)-aluminum alloy	• Interface: G1/4 screw thread • Interface sealing method: Sealing ring end face sealing • Color identification: Red		This connector is compatible with the original liquid outlet connector of the hydro-cooling miner. The liquid return side of the cabinet provided by you needs to use such connector to match the liquid outlet connector of the hydro-cooling miner. Note: You should not replace this connector with the connectors of other

Accessories	Specifications	Legend	Remarks
			specifications or other brands to match the original liquid outlet connector of the hydro-cooling miner.
Male quick connector (screw thread)-stainless steel	• Interface size: M16 x 1.0 mm screw thread • Interface sealing method: Sealing ring end face sealing • Color identification: Blue identification represents liquid inlet and red identification represents liquid outlet.		This connector is the one used for the original liquid inlet and the original liquid outlet of the hydro-cooling miner.
Female quick connector (screw thread)-stainless steel	• Interface size: G1/4 screw thread • Interface sealing method: Sealing ring end face sealing • Color identification: Blue identification represents liquid inlet and red identification represents liquid outlet.		This connector is compatible with the original liquid inlet connector and the original liquid outlet connector of the hydro-cooling miner. The liquid supply side and the liquid return side of the cabinet provided by you need to use such connector to match the liquid inlet connector and the liquid outlet connector of the hydro-cooling miner. Note: You should not replace this connector with the connectors of other specifications or other brands to match the original liquid inlet connector and the original liquid outlet of

Accessories	Specifications	Legend	Remarks
			the hydro-cooling miner.
Adapter of Female quick connector (Pagoda head)	• Specifications: Female quick connector screw thread G1/4 to Φ 12 pagoda head • Material: 304 stainless steel		This connector is compatible with the female quick connector (screw thread) of the hydro-cooling. When the connector malfunctions, the connector can be directly disassembled and replaced.
Power supply cable	• L = 400 mm • Double head with plugs • 4 x 2 mm^2		This power supply cable is used to connect a power supply of the hydro-cooling miner to a PDU in the cabinet, and plugs at both ends of the power supply cable match a power supply interface (socket) of the hydro-cooling miner. Note: A PDU interface in the cabinet needs to be an interface (socket) that matches a power supply cable plug. The power supply cable is suitable for a usage scenario where the cabinet is provided by us.
Power supply cable	• L = 1000 mm • Single head with socket • 4 x 2 mm^2		The power supply cable interface (socket) is of the same specification as the power supply interface (socket) of the hydro-cooling miner.

Accessories	Specifications	Legend	Remarks
Power supply cable	• L = 1000mm • Single head with plug • 4 x 2 mm ^{2}		The plug of the power supply cable matches the power supply interface (socket) of the hydro-cooling miner.

6.2 Precautions for Accessories

Table 6-2

Accessories	Legend	Remarks
Old quick connectors (one set)		The old quick connectors and the new quick connectors are not compatible with each other. When purchasing and using them, it is necessary to distinguish between the two to prevent liquid leakage caused by cross use.
New quick connectors (one set)-aluminum alloy		
New quick connectors (one set)-stainless steel		The new aluminum alloy quick connectors and the new stainless steel quick connectors are not compatible with each other. When purchasing and using them, it is necessary to distinguish between the two to prevent liquid leakage caused by cross use.

7. Environment Configuration for Miner

7.1 Device List for Miner Configuration

Table 7-1

No.	Name	Quantity	Description
1	Computer	1	Configuring hydro-cooling miner related parameters

No.	Name	Quantity	Description
			and operations.
2	Power Supply	1	Powering a hydro-cooling miner.
3	Network Switch	1	Enabling communication between the hydro-cooling miner and a computer.  Note: A network switch can connect to an external network.
4	DHCP Miner/Router	1	Providing a dynamic IP address for the hydro-cooling miner when initially powering on it.
5	NTP Miner/Router	1	Providing NTP network time for the hydro-cooling miner.

7.2 Network Environment Configuration for Miner

When a hydro-cooling miner leaves the factory, it defaults to obtaining a dynamic IP address through DHCP (Dynamic Host Configuration Protocol). Therefore, a DHCP server should be configured in a network of a mining farm, or a router enables DHCP to dynamically allocate IP addresses. The operating time of the hydro-cooling miner and the accuracy of hashrate statistics depend on the network NTP (Network Time Protocol) time. The hydro-cooling miner itself is configured by default with multiple public NTP server addresses. In order to accelerate speed of NTP obtaining the network time and improve the time precision, it is recommended to configure a local NTP server in the network of the mining farm.

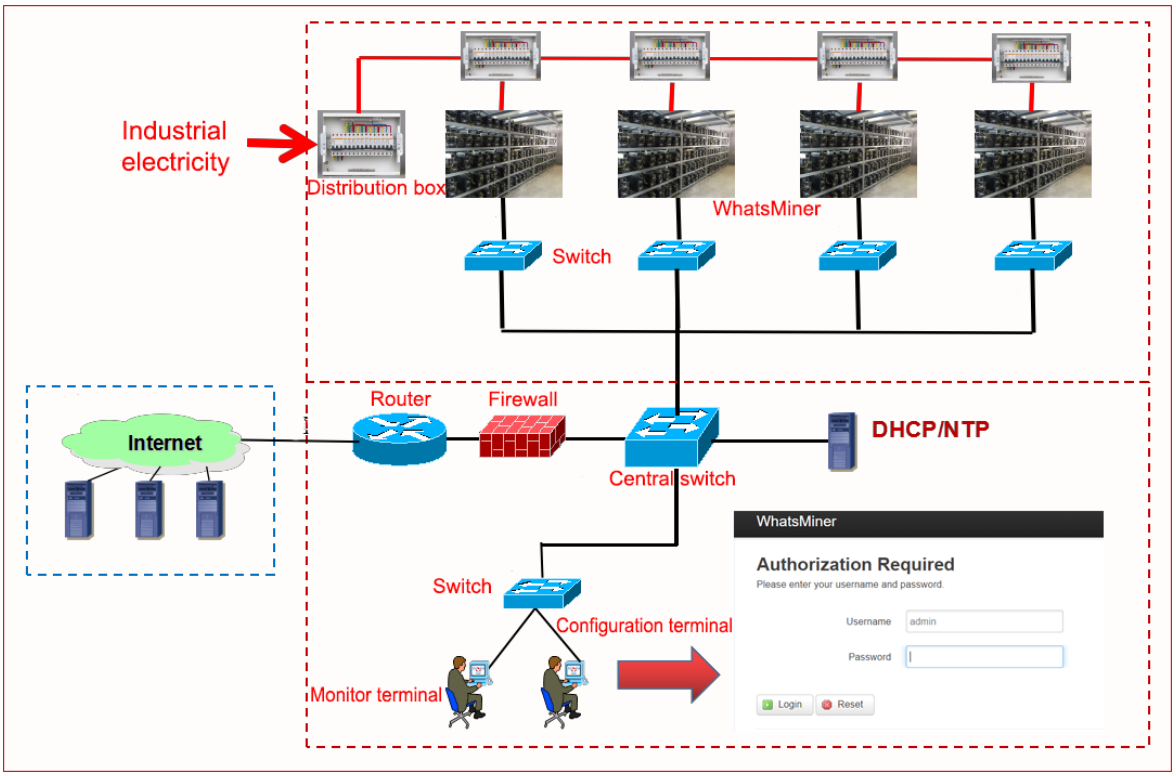


Figure 7-1

7.3 Data Configuration for Miner

You can configure data for a hydro-cooling miner on the webpage.

7.3.1 Querying Dynamic IP Address Obtained by Miner

You can query a dynamic IP address of the hydro-cooling miner on WhatsMinerTool. You can download this software on WhatsMiner.

Before configuring miner data, connect your computer to the same network segment as the hydro-cooling miner.

Step 1 Double-click WhatsMinerTool to enter a main page.

Note: Before operating WhatsMinerTool, download it first.

Step 2 Click **IP Monitor** tab, configure **Room**, **Shelf**, **Layer**, **Place**, and **Step** as needed, and then click **Start**.

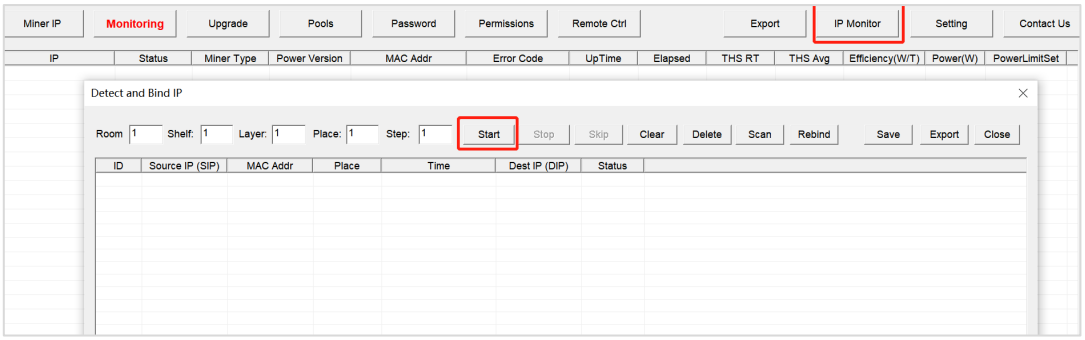


Figure 7-2

7.3.1.1 Checking IP Address Reported by Miner

After the hydro-cooling miner is powered on for about 30 seconds, under normal circumstances, a yellow light on a network port is always on and a green light is flashing. At this time, press **IP Found** button on a control board of the hydro-cooling miner for more than 2 seconds, then two LED lights, **Active** and **Alarm**, will flash a few times, indicating that the hydro-cooling miner has broadcast its IP address and MAC address to the network.

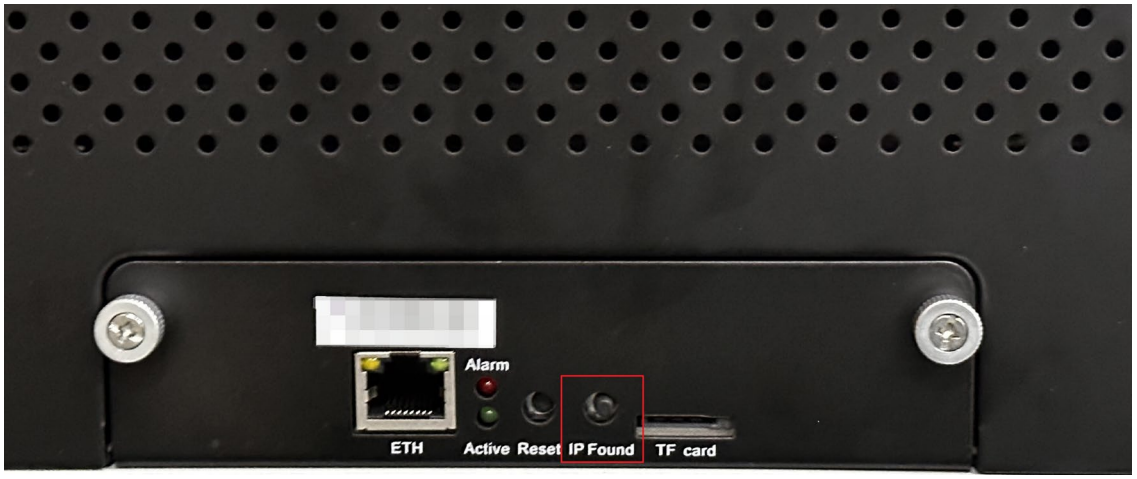


Figure 7-3

You can view the dynamically obtained IP address and MAC address, and miner place reported by the hydro-cooling miner in WhatsMinerTool.

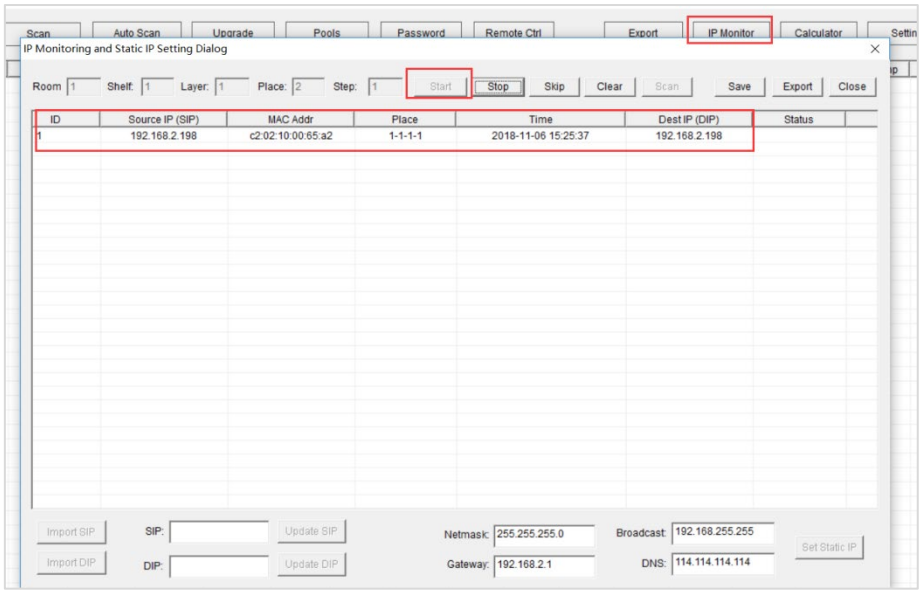


Figure 7-4

Note:

- If all lights on a control board of the hydro-cooling miner are not lit up after power-on, check whether a power supply cable is connected reliably and correctly.
- If the two LED lights, **Active** and **Alarm**, on the control board of the hydro-cooling miner are lit up, but lights on the network port are not lit up, or the green light is not flashing, check whether a switch is functioning properly, a network cable is connected reliably, and there is a problem with the quality of the network cable.
- The computer operating WhatsMinerTool and the hydro-cooling miner must be in the same network segment. Otherwise, WhatsMinerTool may not receive a broadcast message from the hydro-cooling miner, so that the IP Address and MAC Address reported by the hydro-cooling miner cannot be queried.
- If the computer and the hydro-cooling miner are in the same network segment and a DHCP service is enabled in the network, but WhatsMinerTool does not query the IP address of the hydro-cooling miner after pressing an **IP Found** button, long press a **Reset** button on the control board for more than 5 seconds to restore factory default configuration, then power off and power on the hydro-cooling miner to restart it, and press the **IP Found** button again to detect the IP address of the hydro-cooling miner after powering on for 30 seconds.
- If the computer is operating WhatsMinerTool, when you click **Start** but do not manually press the **IP Found** button on the control board, WhatsMinerTool automatically finds the IP address and MAC address of the hydro-cooling miner, indicating that the **IP Found** button of the hydro-cooling miner may be stuck in the

control board, you need to find a hydro-cooling miner corresponding to a MAC address(referring to a MAC address barcode stuck on a case of the hydro-cooling miner) displayed in WhatsMinerTool, then power off the corresponding hydro-cooling miner, and reinstall the control board to ensure that buttons and indicator lights on the control board are exposed and not stuck in the control board.

7.3.1 2 Configuring Pool and Worker

Step 1 Open a browser on a computer, enter the obtained IP address of a hydro-cooling miner in an address bar, and then enter a username and a password to enter a main page of a backend of the hydro-cooling miner.

Note:

- The computer and the hydro-cooling miner should be in the same network segment.
- The username and the password are the same, default is admin.

Step 2 Click **Configuration** -> **Miner Configuration**, enter a pool name and a worker name as needed, and then click **Save & Apply** to save the configuration.

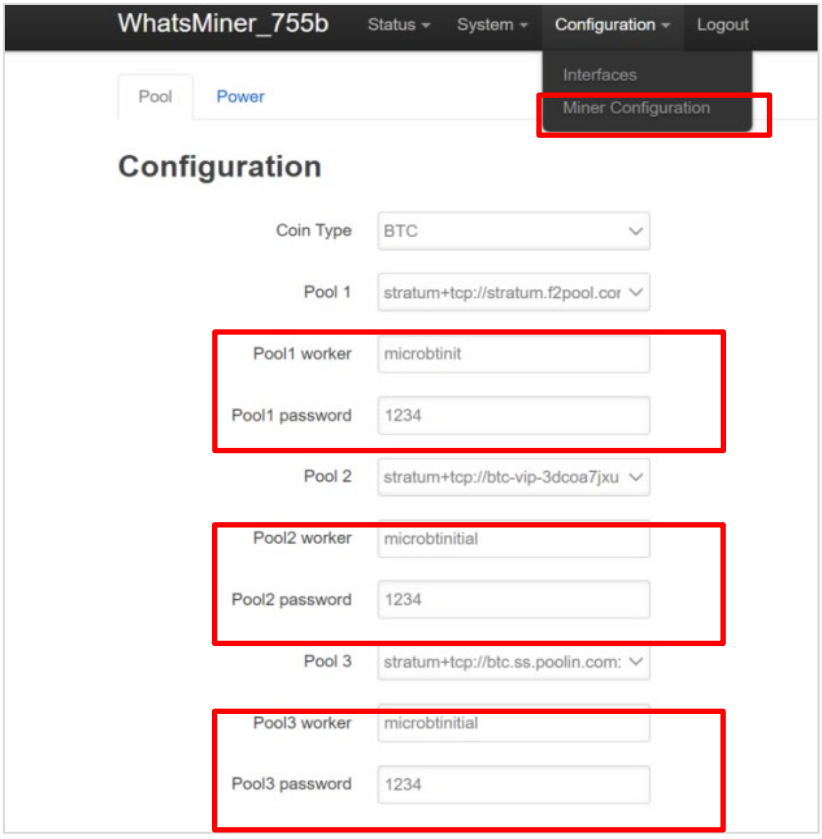


Figure 7-5

Note: After completing the configuration, you need to restart a miner program or a

control board to make the configuration effective.

- Restart the miner program: In the main page of the backend of the hydro-cooling miner, click **Status** -> **Miner Status**, and then click **Restart Miner** to restart the miner program.

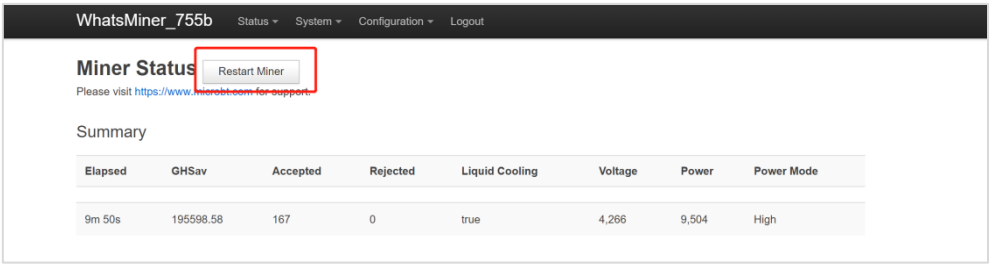


Figure 7-6

- Restart the control board: In the main page of the backend of the hydro-cooling miner, click **System** -> **Reboot**, and then click **Perform reboot** to restart the control board.

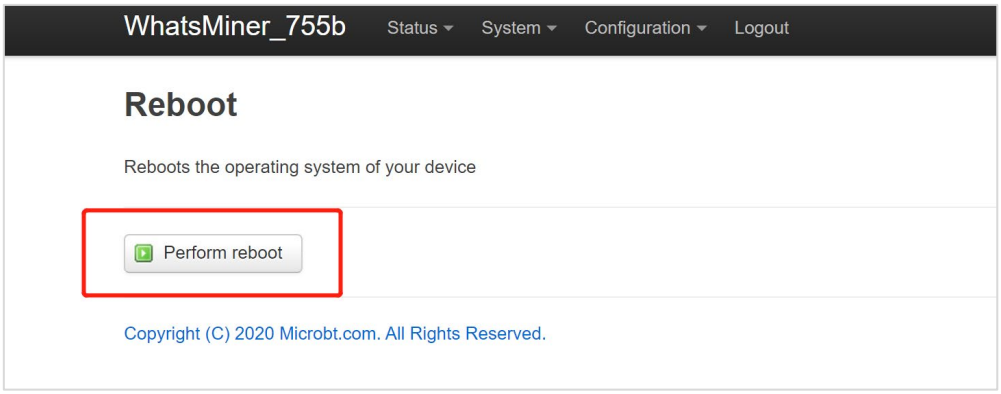


Figure 7-7

After restarting for about half a minute, the page will automatically jump to a login page.

7.3.2 Configuring NTP Synchronization Server Address (Optional)

The hydro-cooling miner has been configured by default with 4 NTP server addresses. You can modify or add an NTP server address when a default NTP server address cannot be connected or you want to connect your own server address as needed.

Step 1 Open a browser on a computer, enter the obtained IP address of a hydro-cooling miner in an address bar, and then enter a username and a password to enter a main page of a backend of the hydro-cooling miner.

Note:

- The computer and the hydro-cooling miner should be in the same network segment.
- The username and the password are the same, default is admin.

Step 2 Click **System** -> **System**, and then configure an NTP server candidate.

Note: An **Enable NTP client** function is enabled by default.

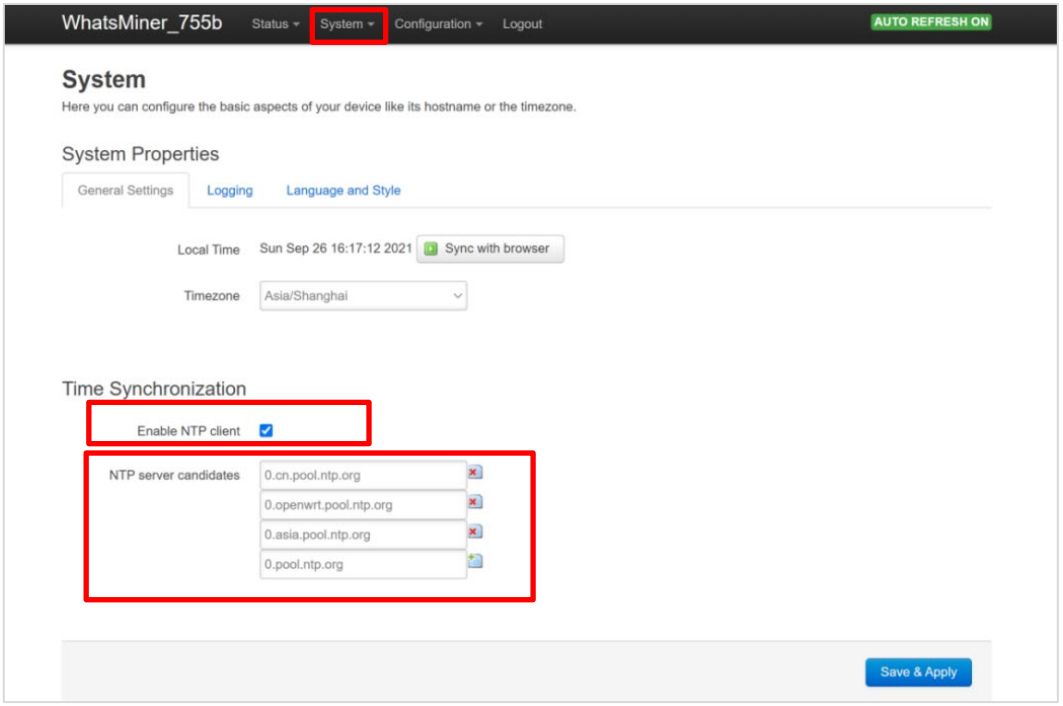


Figure 7-8

Step 3 Click **Save & Apply**.

7.3.3 Configuring Static IP Address (Optional)

You can modify an IP address obtained through DHCP to a static IP address for network planning of miner operation. When there is an IP conflict, configuring the static IP address can avoid not being able to search for the IP address of the hydro-cooling miner.

Step 1 Open a browser on a computer, enter the obtained IP address of a hydro-cooling miner in an address bar, and then enter a username and a password to enter a main page of a backend of the hydro-cooling miner.

Note:

- The computer and the hydro-cooling miner should be in the same network segment.
- The username and the password are the same, default is admin.

Step 2 Click **Configuration** -> **Interface**, and then click **Edit** under **Actions** tab.

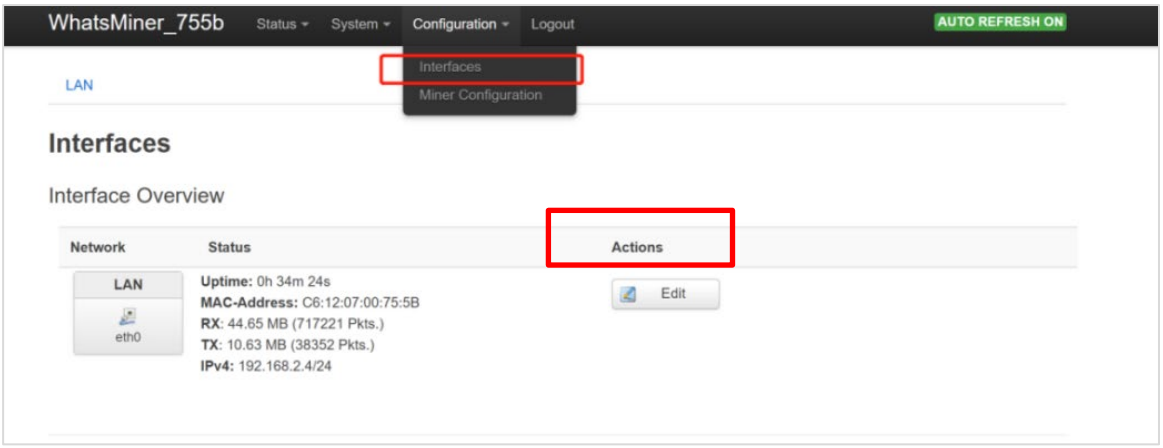


Figure 7-9

Step 3 In an **Edit** page, select **Static address** from **Protocol**, click **Switch protocol**, and then change an IP address, a mask, a gateway, a broadcast address, and a DNS address to an actual planned address of the hydro-cooling miner.

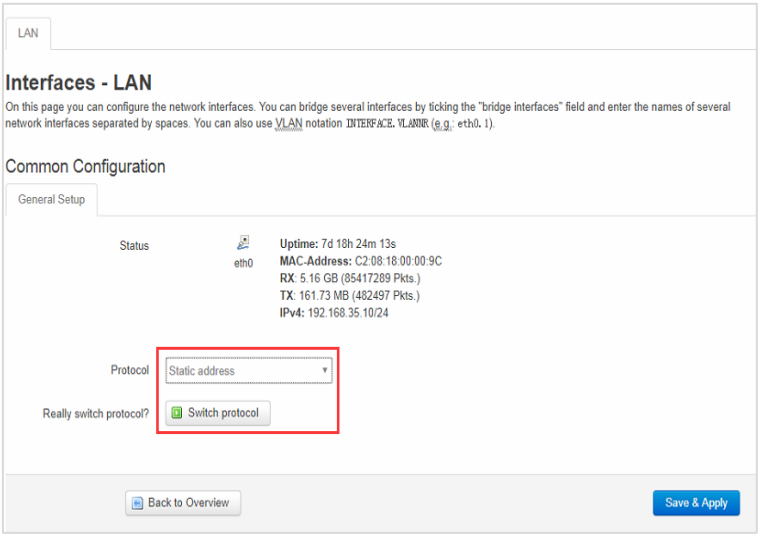


Figure 7-10

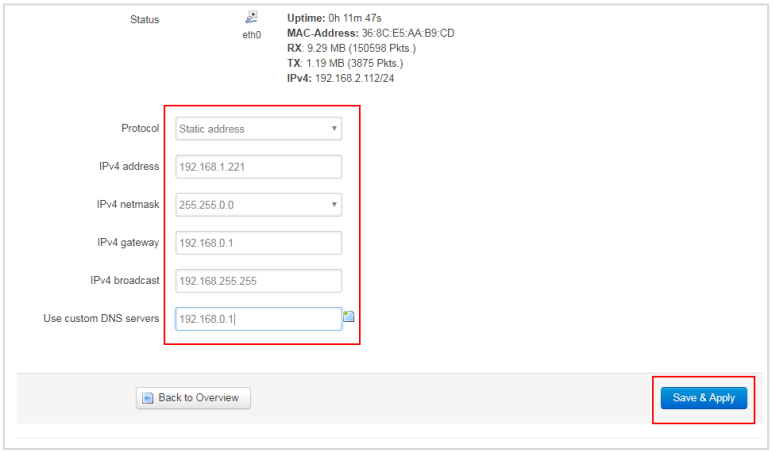


Figure 7-11

Step 4 Click **Save & Apply**.

Note: After saving the configuration, you need to reuse the newly configured static IP address to log in to the hydro-cooling miner, otherwise the page will remain loading until it fails to load.

8. Operation Status Check for Miner

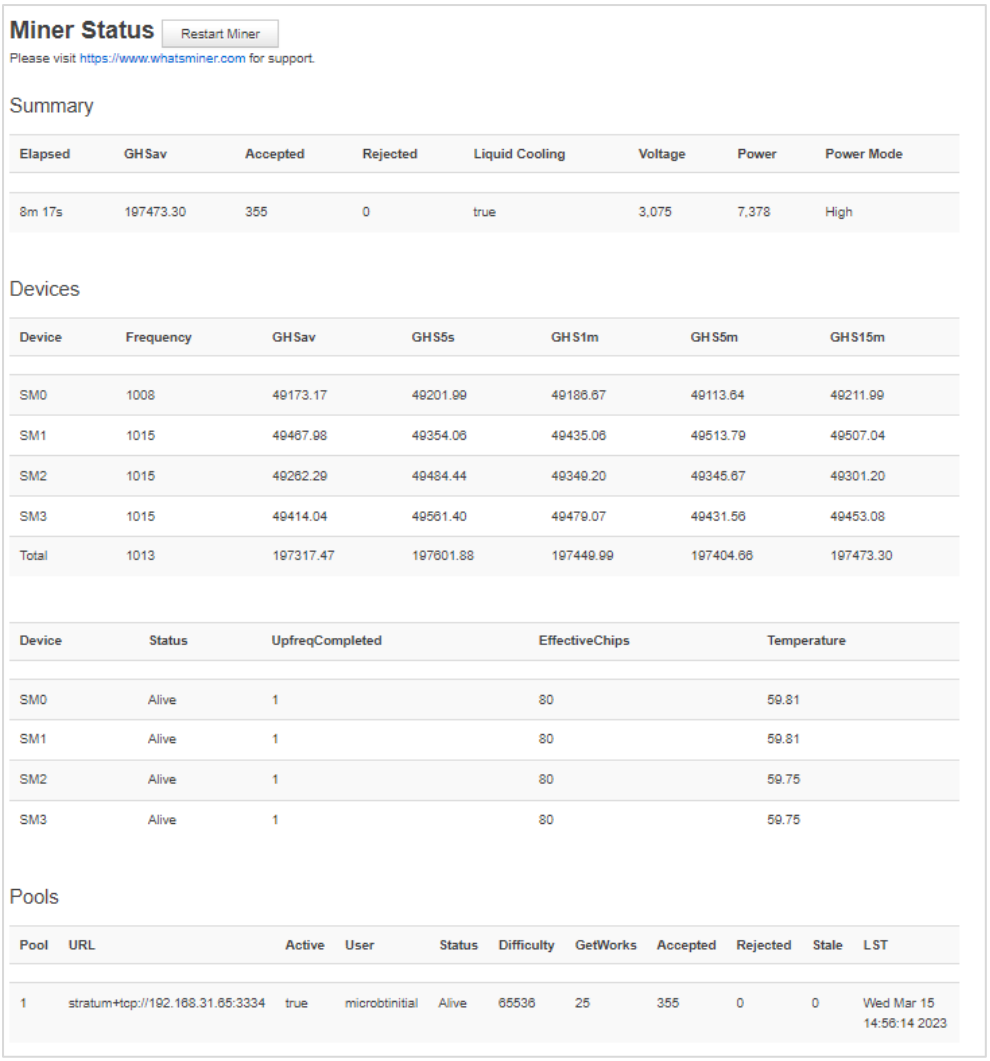
After a hydro-cooling miner is connected to a network, you can log in to the hydro-cooling miner on a computer connected to the same network segment to check its operation status.

Step 1 Open a browser on a computer, enter the obtained IP address of a hydro-cooling miner in an address bar, and then enter a username and a password to enter a main page of a backend of the hydro-cooling miner.

Note:

- The computer and the hydro-cooling miner should be in the same network segment.
- The username and the password are the same, default is admin.

Step 2 Click **Status** -> **Miner Status** to enter a status page of the hydro-cooling miner. You can view an overall hashrate of the hydro-cooling miner (see **GHSav** under **Summary** and **Devices** sections), pool information, hash board temperature, power, power mode, and the like as needed.



Miner Status Restart Miner

Please visit https://www.whatsminer.com for support.

Summary

Elapsed	GHSav	Accepted	Rejected	Liquid Cooling	Voltage	Power	Power Mode
8m 17s	197473.30	355	0	true	3,075	7,378	High

Devices

Device	Frequency	GHSav	GHS5s	GHS1m	GHS5m	GHS15m
SM0	1008	49173.17	49201.99	49186.67	49113.64	49211.99
SM1	1015	49467.98	49354.06	49435.06	49513.79	49507.04
SM2	1015	49262.29	49484.44	49349.20	49345.67	49301.20
SM3	1015	49414.04	49561.40	49479.07	49431.56	49453.08
Total	1013	197317.47	197601.88	197449.99	197404.66	197473.30

Device	Status	UpfreqCompleted	EffectiveChips	Temperature
SM0	Alive	1	80	59.81
SM1	Alive	1	80	59.81
SM2	Alive	1	80	59.75
SM3	Alive	1	80	59.75

Pools

Pool	URL	Active	User	Status	Difficulty	GetWorks	Accepted	Rejected	Stale	LST
1	stratum+tcp://192.168.31.65:3334	true	microbtinitial	Alive	65536	25	355	0	0	Wed Mar 15 14:56:14 2023

Figure 8-1

Note: When the hydro-cooling miner is connected correctly and the network is normal, the hydro-cooling miner will automatically perform a frequency search test after being powered on. The frequency search test takes about 40 minutes, and only after the frequency search is completed will it enter a formal mining phase. At this time, the displayed is a hashrate when the hydro-cooling miner is normally operating. If the frequency search has not ended yet, the displayed will be lower than a hashrate when the hydro-cooling miner is normally operating.

9. Batch Configuration for Miner Data

You can use WhatsMinerTool for batch configuration of hydro-cooling miners' data, such as upgrading firmware and collocating pool. For details, see *WhatsMinerTool_Operation*

Guide_V2.2_20250925.

10. Installation and Disassembly of Control Board for Miner

When you receive a new hydro-cooling miner, you do not need to assemble it, but when the hydro-cooling miner encounters problems, you may need to disassemble some components of the hydro-cooling miner to resolve the problems. The following will specifically introduce how to disassemble and install a control board.

Installing and Disassembling Control Board

When indicator lights on a control board are not lit up or when an error code related to the control board is displayed on a main interface of WhatsMinerTool, you can remove the control board and check it. For details about error code and WhatsMinerTool, see *WhatsMinerTool_Operation Guide_V2.2_20250925*.

Disassembling Control Board

Step 1 Loosen 2 screws that secure a housing of a control board to a case of a hydro-cooling miner, and then pull out the housing of the control board slowly until it is no longer pulled out.

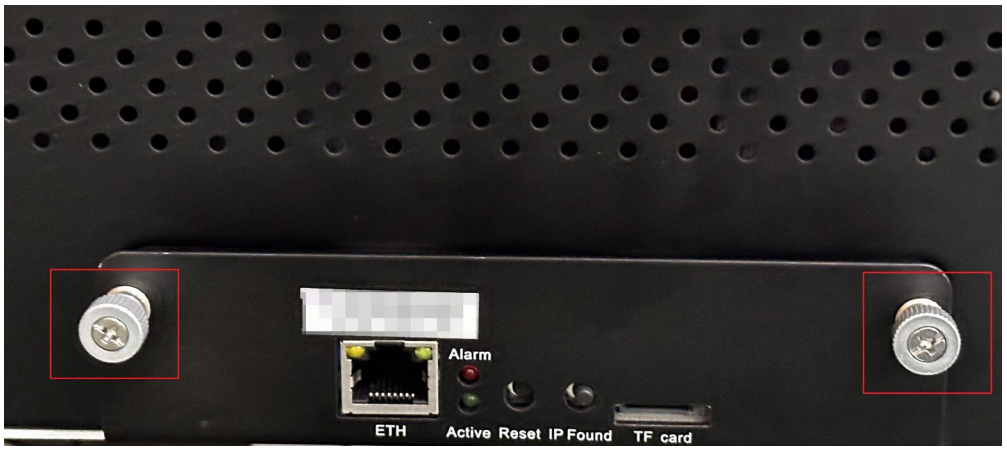


Figure 10-1

Step 2 Unplug 3 flat cables, and then pull out the entire housing of the control board.

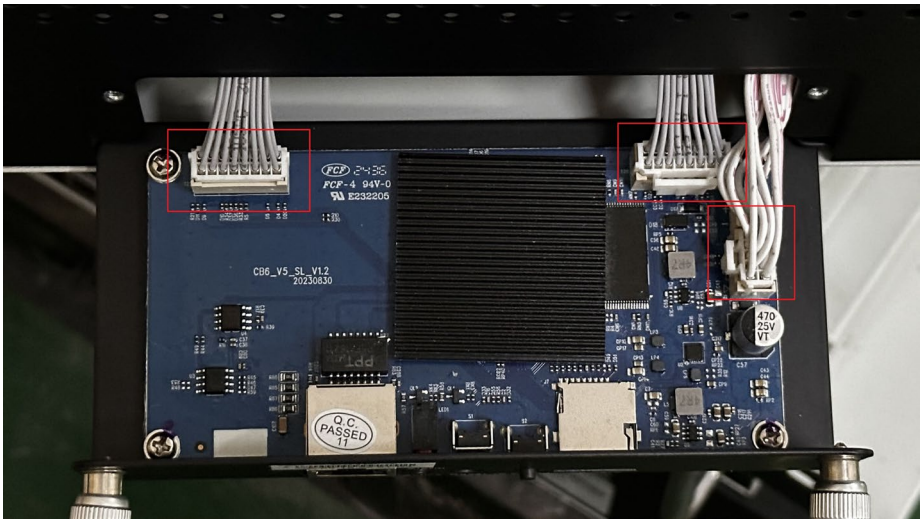


Figure 10-2

Step 3 Remove 4 screws that secure the control board to the housing, and then remove the control board from the housing.

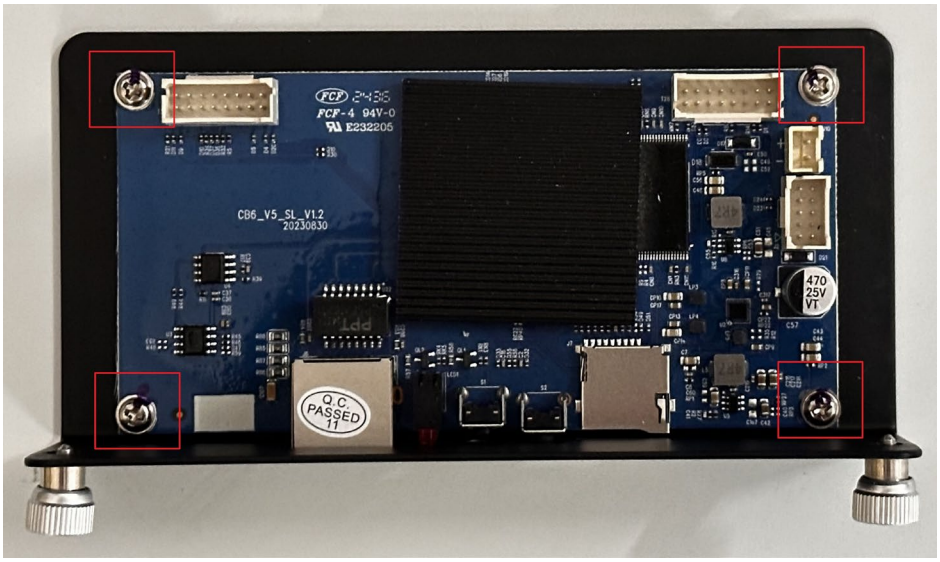


Figure 10-3

Installing Control Board

Step 1 Align holes on a control board with holes on a housing, and then screw in 4 screws and tighten them.

Step 2 Insert 3 flat cables into corresponding slots on the control board.

Step 3 Tighten 4 screws that secure the housing to a case of a hydro-cooling miner.

11. Appendix

11.1 Care and Maintenance

After a miner has been in operation or stored for a period of time (3 - 6 months), dust should

be regularly cleaned on a hash board, a control board, an adapter board, flat cables, and other components to prevent corrosion, dusty, moisture, and the like. For details, see https://www.youtube.com/watch?v=IoM-SRGpslw&t=39s for the video tutorial.

Note: We will shoulder no warranty responsibility if the miner has serious corrosion, dusty, moisture, and the like.

11.2 After-Sales Warranty Policy

Integrity is our commitment to you. MicroBT promises you a one-year warranty period and provides free maintenance service under our warranty coverage. After purchase, it is deemed as an agreement to this policy. Please note that products are not covered under our warranty coverage if the following situations occur.

1. Products are damaged due to improper operation and failure to be properly put into a cabinet, including but not limited to reverse insertion, insufficient insertion or no insertion of wires.
2. Products are damaged due to failure to use in accordance with product manual or product operation parameter requirements, including but not limited to using incorrect parameters such as voltage, current, environmental temperature and humidity, dust particles, liquid pressure, liquid pH value, and the like.
3. Products are damaged due to failure to use in accordance with operation guide requirements, including but not limited to improperly on and off a shelf, haphazard pulling, scraping, lifting, or hitting leading to component missing, unstable connections, and open circuit on PCB (Printed Circuit Board).
4. Products are damaged due to disassembly, modification, re-assembly, or maintenance without official written or electronic authorization.
5. Products are damaged due to insufficient hashrate or mismatch by using unofficial accessories, including but not limited to PSU (Power Supply Unit), control board, fan, cable, and the like.
6. Products are damaged due to insufficient hashrate, abnormal hashrate, excessive power consumption, or burnout by using unofficial software.
7. Products are damaged directly or their service life is shortened due to self-modification of operation parameters (such as overclocking).
8. Products are damaged due to on-site environmental issues, including but not limited to humid environments, corrosive environments, high-temperature environments, dust particles, abnormal voltage and current (surges, impacts, instability), low or high AC

voltage, and the like.

9. Product labels, serial numbers, and the like, have been modified, defaced, or removed.

10. Products are physically damaged due to deformation, oxidation, corrosion, and the like, including but not limited to extrusion and deformation caused by excessive liquid inlet pressure and non-standard use leading to freezing of cooling plates (hydro-cooling products), corrosion caused by excessive or insufficient pH value of liquid media and failure to use specified liquids (immersion-cooling products), damage caused by excessive conductivity of liquid media, and the like.

11. Products are damaged due to force majeure, including but not limited to earthquakes, fires, heavy rain, lightning, sandstorms, and other extreme environmental factors.

Due to regulatory requirements of the hydro-cooling products for system environment, medium, voltage, temperature, flow rate, and the like, the hydro-cooling products are also not covered under our product warranty if the following situations occur.

1. Products are damaged due to corrosion, blockage, and other damages to various system components by using coolant that does not meet requirements specified in this Document.

2. Products are damaged due to deformation of cooling plates caused by inlet pressure exceeding 400 kPa in the case that a hydro-cooling system is not equipped with a constant pressure tank and a mechanical pressure relief valve.

3. Products are damaged due to corrosion and blockage of cooling plates or connectors by using system components made of metals or materials that are prone to electrochemical reaction corrosion, such as copper, cast iron, carbon steel, and the like.

4. Products are damaged due to blockage of cooling plates or connectors led by entry of impurities caused by a low filter mesh size.

5. Products are damaged due to damage or even liquid medium leakage if temperature resistance of components in a cooling system is below 85°C.

6. Products are damaged due to corrosion or blockage of cooling plates or connectors caused by too many residual impurities in a hydro-cooling system.

7. Products are damaged due to liquid leakage or products overheat protection to failed operation caused by loose connections in quick connectors.

8. Products are damaged due to damage to a liquid pump operating with gas, overheating of localized chips in other products, and product burnt out or hashrate affected since air is mixed into a hydro-cooling system without an exhaust apparatus and an automatic liquid replenishment apparatus.

9. Products are damaged since condensation on the products caused by ambient temperature rising from a lower temperature to a higher temperature is not dealt with in a

timely manner.

10. Products are damaged due to damage to cooling plates caused by failure to drain coolant inside the products within two hours after shutdown.

This warranty grants you specific legal rights, and you may also have other rights that vary by country/region. The interpretation of this warranty policy belongs to MicroBT.

11.3 Terms of After-Sales Warranty Fees

During a warranty period, except for warranty restrictions, we will undertake to repair or, at our sole discretion, replace a defective miner, miner part or component with a qualified miner, miner part or component. You will bear costs associated with returning the miner, miner part, or component to our repair facility. We will bear costs of a part, component, and labor required to perform maintenance and restore the miner to its normal operating status. Upon completion of the repair, we will ship the miner, miner part or component back to you.

You need to return the miner in good condition to our repair facility, and prepay shipping fee, including insurance. If the miner, miner part or component is returned without insurance, you will bear all risks of loss or damage during shipment.

Striving For Perfection