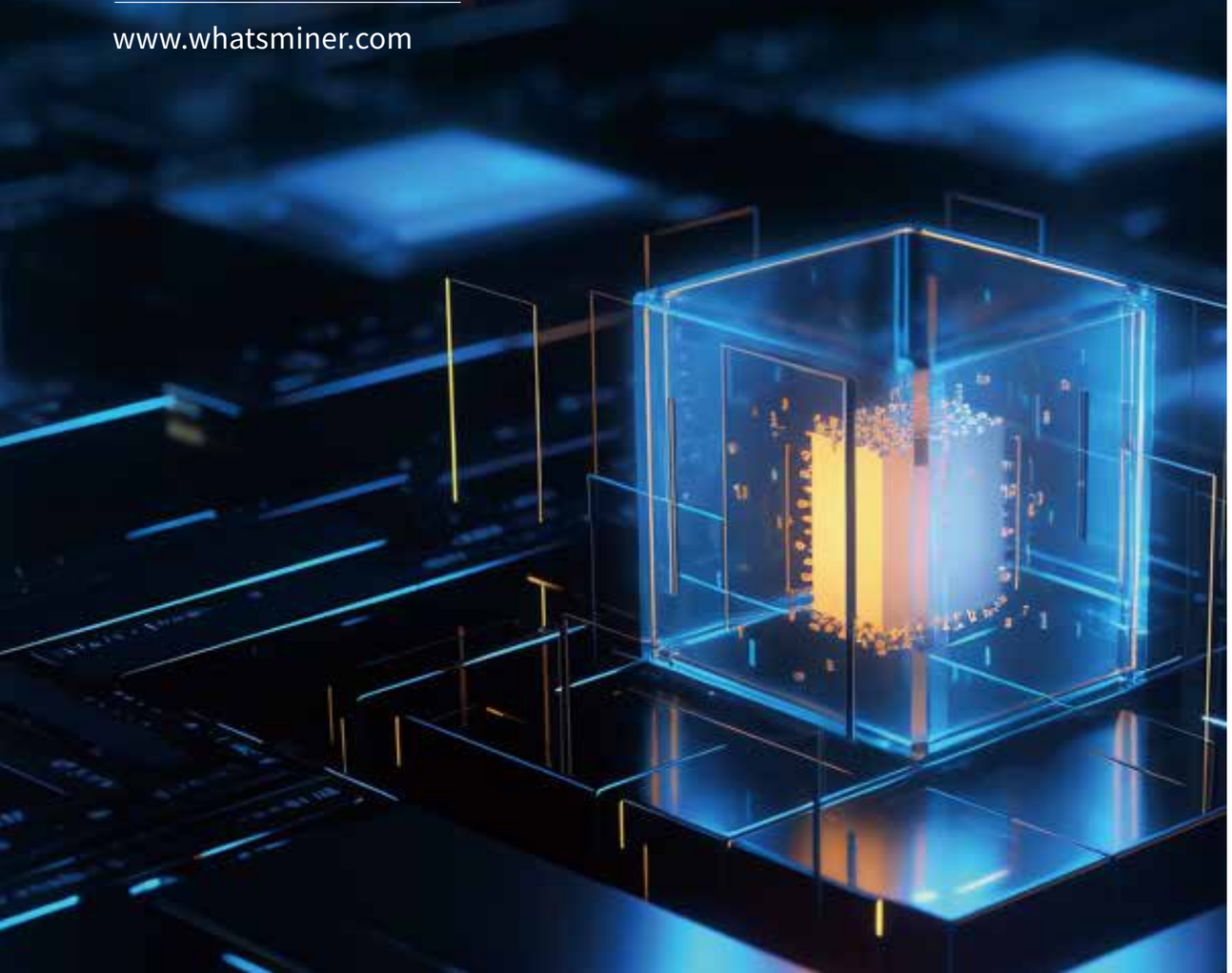
whatsminer

M60 SERIES

WhatsMiner Product Manual

Official website

www.whatsminer.com



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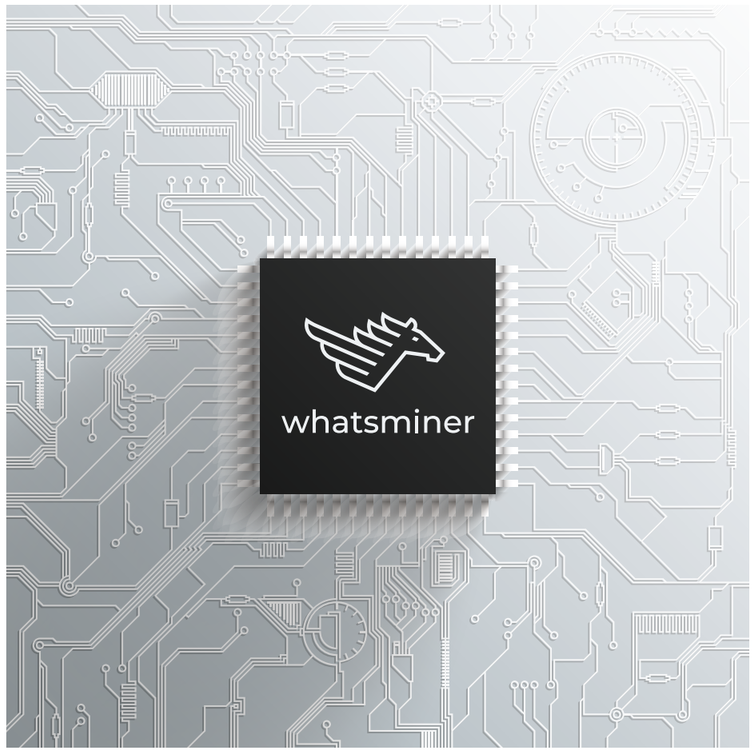
Shenzhen MicroBT Electronics Technology Co., Ltd.



Perfection integrity and win-win

CATALOG

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WHATSMINER M66S

Immersion Cooling

SPECIFICATION

Hashrate	270~298T±10%
Power Ratio	18.5J/T ±5%
PSU	AC380~480V
Size	267.5mm*147mm*401mm with handle
Weight	Net weight: 18kg　Weight with packaging materials:19kg
Power Cable Model	Custom made, ⩾16A
Internet Connections	Ethernet

ENVIRONMENTAL PARAMETERS

Liquid temperature	☐ Working temperature (inlet): 20°C~45°C@normal mode 20°C~40°C@high performance mode; ☐ Inlet temperature control accuracy ± 2°C ☐ Storage and transportation temperature: -40~70°C
Liquid flow	☐ Limited Data：⩾24L/min ☐ Flow control accuracy ± 10% Remarks: 24L/min corresponds to the temperature difference between inlet and outlet close to 7°C@normal mode, 10°C @high performance mode)
Liquid medium	Insulating liquid (S5X/S3X) Remarks: See next page for details on liquid properties and safety requirements.

Humidity	☐ Storage humidity: 5%RH~95%RH (non-condensing) ☐ Long-term storage humidity: 30%RH~69%RH (no condensation)

Remarks: The above liquid flow parameters are based on S5X/S3X as the liquid medium.
If the liquid medium uses other types of coolant, the liquid flow parameters need to be calculated separately. Calculation method: When the mining machine has the same calorific value, the product of the liquid specific heat, density and flow rate is a fixed value,
that is, the flow rate is inversely proportional to the product of density and specific heat.

Coolant EC110 Flow Parameter Calculation Example

Coolant type	Specific heat capacity (J/kg•°C)	Density (kg/m^3)	Flow (L/min)
S5X/S3X	2274	806	24
EC110	2231	778	=(2274*806*24) /(2231*778)=25.35

Insulating liquid performance and safety requirements

1) It has good thermodynamic properties (relatively high thermal conductivity, high liquid specific heat value, and low viscosity among similar substances);
2) It should have good chemical and thermal stability relative to the life cycle of the electronic system and the specified working temperature;
3) Appearance and smell, transparent and no odor;
4) Boiling point (°C), >120°C;
5) Flash point>150°C or no flash point;
6) pour point (°C), <-40;
7) Purity (Wt%) ⩾ 99.5%;
8) Non-volatile residues (Wt ppm) ⩽ 10ppm
9) Water content (Wt ppm) ⩽ 50ppm
10) Acidity (mg KOH/g) ⩽ 0.03
11) Withstand voltage breakdown (KV/2.5mm), initial ⩾ 20, saturated water state > 10;
12) Volume resistivity (Ω•cm) ⩾ 1X109; dielectric constant (100Hz-10MHz) < 8, dielectric loss factor < 0.7%;
13) The particle size limit in oil, after hot oil circulation, the number of particles larger than 5um in 100ml of oil is ⩽2000, and there are no particles larger than 50um.
14) Material compatibility, it should be compatible with most metals and hard inorganic substances, including stainless steel, copper, aluminum, silica, alumina, etc. commonly used in electronic systems, to ensure the appearance, volume and physical properties (mechanical properties). , electrical) impact <1%. For organic substances and elastomers, it should be confirmed by the Soxhlet extraction test, and it should be ensured that after extraction with organic substances in the system, the volume and weight change of organic substances is less than 3%, and the extracted products have no effect on liquid media and other devices that can reach the site through liquid transfer. . The liquid itself should not react chemically with any material it may come into contact with, resulting in the modification or decomposition of the liquid.
15) The physical reaction of the liquid with the contact materials, including dissolution, extraction, etc., should not affect the corresponding functions of the liquid and system materials. For example, the liquid extracts the plasticizer of the cable insulation layer, causing the cable to harden and crack. Or the substances in the system are dissolved in the contact liquid, resulting in an increase in the viscosity of the liquid or deterioration in performance.
16) Dissolved substances caused by liquid convection or driving flow should not affect other materials or devices in contact with the liquid. For example, the plasticizer precipitated from the cable will reduce the heat exchange efficiency on the surface of the heating device through accumulation.
17) The liquid chemical decomposition temperature should be much higher than the system working temperature and potential local overheating temperature.
18) It belongs to the non-toxic category. It is non-irritating to the eyes, non-irritating to the skin, and does not have mutagenic cell mutations or heart diseases.

WHATSMINER M66

Immersion Cooling

SPECIFICATION

Hashrate	240~276T±10%
Power Ratio	19.9J/T ±5%
PSU	AC380~480V
Size	267.5mm*147mm*401mm with handle
Weight	Net weight: 16kg Weight with packaging materials:17kg
Power Cable Model	Custom made, ⩾16A
Internet Connections	Ethernet

ENVIRONMENTAL PARAMETERS

Liquid temperature	☐ Working temperature (inlet): 20°C~45°C@normal mode 20°C~40°C@high performance mode; ☐ Inlet temperature control accuracy ± 2°C ☐ Storage and transportation temperature: -40~70°C
Liquid flow	☐ Limited Data：⩾24L/min ☐ Flow control accuracy ± 10% Remarks: 24L/min corresponds to the temperature difference between inlet and outlet close to 7°C@normal mode, 10°C @high performance mode)
Liquid medium	Insulating liquid (S5X/S3X) Remarks: See next page for details on liquid properties and safety requirements.

Humidity	☐ Storage humidity: 5%RH~95%RH (non-condensing) ☐ Long-term storage humidity: 30%RH~69%RH (no condensation)

Remarks: The above liquid flow parameters are based on S5X/S3X as the liquid medium.
If the liquid medium uses other types of coolant, the liquid flow parameters need to be calculated separately. Calculation method: When the mining machine has the same calorific value, the product of the liquid specific heat, density and flow rate is a fixed value,
that is, the flow rate is inversely proportional to the product of density and specific heat.

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5) Flash point>150°C or no flash point;
6) pour point (°C), <-40;
7) Purity (Wt%) ⩾ 99.5%;
8) Non-volatile residues (Wt ppm) ⩽ 10ppm
9) Water content (Wt ppm) ⩽ 50ppm
10) Acidity (mg KOH/g) ⩽ 0.03
11) Withstand voltage breakdown (KV/2.5mm), initial ⩾ 20, saturated water state > 10;
12) Volume resistivity (Ω•cm) ⩾ 1X109; dielectric constant (100Hz-10MHz) < 8, dielectric loss factor < 0.7%;
13) The particle size limit in oil, after hot oil circulation, the number of particles larger than 5um in 100ml of oil is ⩽2000, and there are no particles larger than 50um.
14) Material compatibility, it should be compatible with most metals and hard inorganic substances, including stainless steel, copper, aluminum, silica, alumina, etc. commonly used in electronic systems, to ensure the appearance, volume and physical properties (mechanical properties). , electrical) impact <1%. For organic substances and elastomers, it should be confirmed by the Soxhlet extraction test, and it should be ensured that after extraction with organic substances in the system, the volume and weight change of organic substances is less than 3%, and the extracted products have no effect on liquid media and other devices that can reach the site through liquid transfer. . The liquid itself should not react chemically with any material it may come into contact with, resulting in the modification or decomposition of the liquid.
15) The physical reaction of the liquid with the contact materials, including dissolution, extraction, etc., should not affect the corresponding functions of the liquid and system materials. For example, the liquid extracts the plasticizer of the cable insulation layer, causing the cable to harden and crack. Or the substances in the system are dissolved in the contact liquid, resulting in an increase in the viscosity of the liquid or deterioration in performance.
16) Dissolved substances caused by liquid convection or driving flow should not affect other materials or devices in contact with the liquid. For example, the plasticizer precipitated from the cable will reduce the heat exchange efficiency on the surface of the heating device through accumulation.
17) The liquid chemical decomposition temperature should be much higher than the system working temperature and potential local overheating temperature.
18) It belongs to the non-toxic category. It is non-irritating to the eyes, non-irritating to the skin, and does not have mutagenic cell mutations or heart diseases.

WHATSMINER M63S

Hydro Cooling

SPECIFICATION

Hashrate	360~390T±10%
Power Ratio	18.5J/T ±5%
PSU	AC380~480V, 3W+ ground, input 10kw
Size	86mm*482.6mm*663mm with handle
Weight	Net weight: 27.5kg Weight with packaging materials:30kg
Coolant demand per machine	About 1L
Power Cable Model	Custom made, ⩾16A
Internet Connections	Ethernet

ENVIRONMENTAL PARAMETERS

Liquid temperature	☐ Working temperature (inlet): 20℃~50℃@normal mode 20℃~40℃@high performance mode; ☐ Inlet temperature control accuracy ± 2℃ ☐ Storage and transportation temperature: -40~70℃ Note: please empty the liquid in the equipment during storage and transportation.
Liquid flow	☐ Limited Data：⩾10L/min ☐ Flow control accuracy ± 10% Remarks: 10L/min corresponds to the temperature difference between inlet and outlet water close to 10℃@normal mode, 14℃@high performance mode

Liquid pressure	⩽400kpa Remarks: when the pressure is more than 400kpa, the water-cooled plate will be deformed and cause the risk of coolant leakage.
Liquid medium	Special coolant: pure water (or distilled water) + special corrosion inhibitor + antifreeze (select the ratio according to the freezing point); Notice: (1) The coolant must meet the index requirements listed in Table 3; (2) The coolant needs to be tested regularly. For testing indicators and testing cycles, refer to Table 4. When the testing data exceeds or is lower than the testing indicators, its performance will not meet the requirements and the coolant must be replaced. (3) It is recommended to replace the coolant after one year of use;
Liquid PH	Control range: 6~8
Liquid medium circulation system(Machine side)	☐ Anti-rust and anti-corrosion of pipeline; ☐ The particle diameter of the liquid medium is ⩽53microns, that is, the circulation system is equipped with a 270mesh filter; ☐ Before connecting the cabinet to the heat dissipation system, clean and filter the system pipeline with deionized water to remove dust, welding slag and other impurities; ☐ The temperature resistance of system components is above 85°C; ☐ The circulatory system is recommended to be equipped with a UV lamp sterilization device to prevent the liquid from breeding bacteria and attenuate the heat dissipation capacity of the system; ☐ The system is equipped with a 4bar safety relief valve; ☐ The system is equipped with a constant pressure expansion tank. Note: when the temperature of the coolant rises after the miner is turned on the pressure will rise.

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 (no condensation)

Remarks: The above liquid temperature and flow parameters are based on deionized water as the liquid medium. If the liquid medium uses antifreeze, the liquid temperature and flow parameters need to be calculated separately. Table 2 shows an example of 30% glycol antifreeze temperature and flow parameters.

Table2 Example of temperature and flow parameters of 30% ethylene glycol antifreeze

Temperature	☐ Working temperature (inlet): 15℃~45℃@normal mode 15℃~35℃@high performance mode ☐ Inlet temperature control accuracy ± 2℃ ☐ Storage and transportation temperature: -40~70℃ Note: please empty the liquid in the equipment during storage and transportation.
Flow	☐ Limited Data：⩾11L/min ☐ Flow control accuracy± 10% Remarks: The temperature difference between the inlet and outlet liquids at this flow rate is close to 10℃@normal mode, 14℃@high-performance mode)

Table3 Coolant initial index requirements

Project	Unit	Initial indicator
PH(20°C)		7.0~8.7
Total number of colonies (microorganisms)	cfu/ml	<100
Sulfate	mg/L	<10
Chloride	mg/L	<20
Sulfide	mg/L	<1
Total hardness (CaCO3)	mg/L	<1
Conductivity (20°C)	μs/cm	TBD
Exterior		Clear and translucent liquid without precipitation
Copper ions	mg/L	<0.5
Iron ions	mg/L	<0.5
Aluminum ions	mg/L	<0.5
Corrosion inhibitor		100% active ingredients
Reserve alkalinity	ml	2.9~3

Table4 Coolant testing index requirements

Project (Note: Items marked with * are mandatory for inspection)	Unit	Detection Indicator	Detection period	Reference testing instruments/methods
PH(20°C)*		7.5~9.5	Every 2 months	PH meter/ASTM E70
Total number of colonies (microorganisms)*	cfu/ml	⩽1000	Every 6 months	3M bacterial culture dish SN/T 1897
Sulfate	mg/L	⩽10	Every 6 months	Ion Chromatography/HJ84
Chloride	mg/L	⩽20	Every 6 months	Ion Chromatography/HJ84
Sulfide	mg/L	⩽1	Every 6 months	Ion Chromatography/HJ84
Total hardness (CaCO3)	mg/L	⩽20	Every 6 months	GB/T 6909
Conductivity (20°C)*	μs/cm	Increment⩽1500	Every 2 months	Conductivity meter/GB/T 11446.4
Exterior*		Clear and translucent liquid without precipitation	Every 2 months	Visual inspection
Copper ions*	mg/L	Increment⩽0.1	Every 6 months	Inductively coupled plasma spectroscopy/HJ 776
Iron ions*	mg/L	Increment⩽0.1	Every 6 months	Inductively coupled plasma spectroscopy/HJ 776
Aluminum ions*	mg/L	Increment⩽0.1	Every 6 months	Inductively coupled plasma spectroscopy/HJ 776
Corrosion inhibitor*		⩾80% active ingredients	Every 6 months	UV spectrophotometer, ion chromatography, gas chromatography mass spectrometer, etc.
Reserve alkalinity	ml	⩾2.3	Every 2 months	Automatic Potentiometric Titrator/ASTM D11221

WHATSMINER M63

Hydro Cooling

SPECIFICATION

Hashrate	334~366T±10%
Power Ratio	19.9J/T ±5%
PSU	AC380~480V, 3W+ ground, input 10kw
Size	86mm*482.6mm*663mm with handle
Weight	Net weight: 27.5kg Weight with packaging materials:30kg
Coolant demand per machine	About 1L
Power Cable Model	Custom made, ⩾16A
Internet Connections	Ethernet

ENVIRONMENTAL PARAMETERS

Liquid temperature	☐ Working temperature (inlet): 20℃~50℃@normal mode 20℃~40℃@high performance mode; ☐ Inlet temperature control accuracy ± 2℃ ☐ Storage and transportation temperature: -40~70℃ Note: please empty the liquid in the equipment during storage and transportation.
Liquid flow	☐ Limited Data：⩾10L/min ☐ Flow control accuracy ± 10% Remarks: 10L/min corresponds to the temperature difference between inlet and outlet water close to 10℃@normal mode, 14℃@high performance mode

Liquid pressure	⩽400kpa Remarks: when the pressure is more than 400kpa, the water-cooled plate will be deformed and cause the risk of coolant leakage.
Liquid medium	Special coolant: pure water (or distilled water) + special corrosion inhibitor + antifreeze (select the ratio according to the freezing point); Notice: (1) The coolant must meet the index requirements listed in Table 3; (2) The coolant needs to be tested regularly. For testing indicators and testing cycles, refer to Table 4. When the testing data exceeds or is lower than the testing indicators, its performance will not meet the requirements and the coolant must be replaced. (3) It is recommended to replace the coolant after one year of use;
Liquid PH	Control range: 6~8
Liquid medium circulation system(Machine side)	☐ Anti-rust and anti-corrosion of pipeline; ☐ The particle diameter of the liquid medium is ⩽53microns, that is, the circulation system is equipped with a 270mesh filter; ☐ Before connecting the cabinet to the heat dissipation system, clean and filter the system pipeline with deionized water to remove dust, welding slag and other impurities; ☐ The temperature resistance of system components is above 85°C; ☐ The circulatory system is recommended to be equipped with a UV lamp sterilization device to prevent the liquid from breeding bacteria and attenuate the heat dissipation capacity of the system; ☐ The system is equipped with a 4bar safety relief valve; ☐ The system is equipped with a constant pressure expansion tank. Note: when the temperature of the coolant rises after the miner is turned on the pressure will rise.

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 (no condensation)

Remarks: The above liquid temperature and flow parameters are based on deionized water as the liquid medium. If the liquid medium uses antifreeze, the liquid temperature and flow parameters need to be calculated separately. Table 2 shows an example of 30% glycol antifreeze temperature and flow parameters.

Table2 Example of temperature and flow parameters of 30% ethylene glycol antifreeze

Temperature	☐ Working temperature (inlet): 15℃~45℃@normal mode 15℃~35℃@high performance mode ☐ Inlet temperature control accuracy ± 2℃ ☐ Storage and transportation temperature: -40~70℃ Note: please empty the liquid in the equipment during storage and transportation.
Flow	☐ Limited Data：⩾11L/min ☐ Flow control accuracy± 10% Remarks: The temperature difference between the inlet and outlet liquids at this flow rate is close to 10℃@normal mode, 14℃@high-performance mode)

Table3 Coolant initial index requirements

Project	Unit	Initial indicator
PH(20°C)		7.0~8.7
Total number of colonies (microorganisms)	cfu/ml	<100
Sulfate	mg/L	<10
Chloride	mg/L	<20
Sulfide	mg/L	<1
Total hardness (CaCO3)	mg/L	<1
Conductivity (20°C)	μs/cm	TBD
Exterior		Clear and translucent liquid without precipitation
Copper ions	mg/L	<0.5
Iron ions	mg/L	<0.5
Aluminum ions	mg/L	<0.5
Corrosion inhibitor		100% active ingredients
Reserve alkalinity	ml	2.9~3

Table4 Coolant testing index requirements

Project (Note: Items marked with * are mandatory for inspection)	Unit	Detection Indicator	Detection period	Reference testing instruments/methods
PH(20°C)*		7.5~9.5	Every 2 months	PH meter/ASTM E70
Total number of colonies (microorganisms)*	cfu/ml	⩽1000	Every 6 months	3M bacterial culture dish SN/T 1897
Sulfate	mg/L	⩽10	Every 6 months	Ion Chromatography/HJ84
Chloride	mg/L	⩽20	Every 6 months	Ion Chromatography/HJ84
Sulfide	mg/L	⩽1	Every 6 months	Ion Chromatography/HJ84
Total hardness (CaCO3)	mg/L	⩽20	Every 6 months	GB/T 6909
Conductivity (20°C)*	μs/cm	Increment⩽1500	Every 2 months	Conductivity meter/GB/T 11446.4
Exterior*		Clear and translucent liquid without precipitation	Every 2 months	Visual inspection
Copper ions*	mg/L	Increment⩽0.1	Every 6 months	Inductively coupled plasma spectroscopy/HJ 776
Iron ions*	mg/L	Increment⩽0.1	Every 6 months	Inductively coupled plasma spectroscopy/HJ 776
Aluminum ions*	mg/L	Increment⩽0.1	Every 6 months	Inductively coupled plasma spectroscopy/HJ 776
Corrosion inhibitor*		⩾80% active ingredients	Every 6 months	UV spectrophotometer, ion chromatography, gas chromatography mass spectrometer, etc.
Reserve alkalinity	ml	⩾2.3	Every 2 months	Automatic Potentiometric Titrator/ASTM D11221

WHATSMINER M60S

Air Cooling

SPECIFICATION

Hashrate	170~186T ± 5%	Size	430mm*155mm*226mm
Power Ratio	18.5J/T ± 5% @25° C	Weight	11.7KG
Power On Wall	3145~3441W ± 10%	Internet Connections	Ethernet
Working Temperature	-5° C ~ 35° C	Power Cable Model	IEC C19, ⩾16A
Air flow	350CFM	PSU Model	P221B/P222B AC220V ~ 240V

Components	Power Supply, Fan, Control Board, Hash Board, Case
Flashing Light Introduction	Blinking Green Light: Working normally Green and Red Lights Alternately Flashing: Alarm status and need to find the response error code
Safety Guidelines	1. Please check if there is any obvious physical failure before power on, beware of electric shock 2. The product must be kept away from water sources and must not be operated in a humid environment 3. It requires professionals to carry out daily maintenance on the product 4. It is forbidden to directly touch the product by hand when power is on 5. Please use the stable voltage
Warranty Period	One year after leaving the factory
After-sales Contact Information	1. Email: Support@microbt.com 2. Telegram Group: @WhatsMiner Community

WHATSMINER M60

Air Cooling

SPECIFICATION

Hashrate	150~172T ± 5%	Size	430mm*155mm*226mm
Power Ratio	19.9J/T ± 5% @25° C	Weight	11.7KG
Power On Wall	3104~3422W ± 10%	Internet Connections	Ethernet
Working Temperature	-5° C ~ 35° C	Power Cable Model	IEC C19, ⩾16A
Air flow	350CFM	PSU Model	P221B/P222B AC220V ~ 240V

Components	Power Supply, Fan, Control Board, Hash Board, Case
Flashing Light Introduction	Blinking Green Light: Working normally Green and Red Lights Alternately Flashing: Alarm status and need to find the response error code
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CONTACT US

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Sales Consulting：Sales@microbt.com

Technical Support：Support@microbt.com

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VI.02 2023.10.24