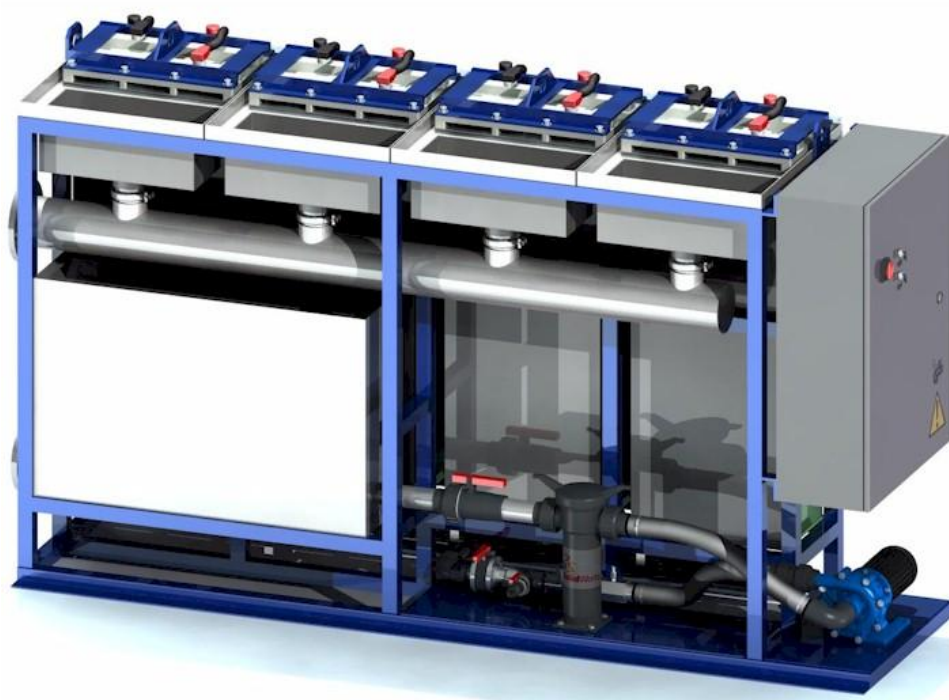


Dear users, you are welcome to choose our mobile electro coagulation device. Please read the instructions carefully before using the equipment. We are very grateful for your support and suggestions.

Operation instructions of KHN mobile electro coagulation device



KHN water treatment Co., Ltd.

www.khnwatertreatment.com

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1. The principle of electro coagulation wastewater treatment

The working principle of electro coagulation wastewater treatment is: to connect several groups of parallel plates with direct current, create electric field between plates, so that the water to be treated into the gap between plates. At this time, the electrified plate will take place electrochemical reaction, dissolve Al^{3+} or Fe^{2+} plasma and hydrolyze in water to produce flocculation reaction. In this process, electrical floatation, oxidation and reduction and other functions occur simultaneously. These effects result in the effective transformation and removal of soluble, colloidal and suspended pollutants in water. It includes the following aspects:

Flocculation: Soluble anode plates such as iron, aluminum and other anodes, after direct current, the anode loses electrons, forming metal cations Fe^{2+} , Al^{3+} , and the solution of OH^{-} to form metal hydroxide colloidal flocculant, this kind of new ecological hydroxide has high activity, strong adsorption capacity, and colloidal and suspended substances in raw water. Soluble pollutants, bacteria, viruses, etc. combine to form larger flocs, which are removed by precipitation and air flotation.

Air flotation: When the voltage reaches the decomposition voltage of water, hydrogen and oxygen are separately separated from the cathode and anode during electrolysis. The generated gas is in the form of tiny bubbles with

very high dispersion. The gas is adhering to the colloid, emulsion oil and other pollutants in the raw water and floating to the surface of the water to be removed.

Oxidation: oxidation in the process of electrolysis consists of direct oxidation and indirect oxidation. Direct oxidation, that is, the oxidation of pollutants directly in the anode loses electrons. Indirect oxidation, the use of the solution of the electrode potential of the lower anions, such as OH⁻, Cl⁻ lost electrons in the anode to produce a new strong oxidant active substances [O], Cl₂, etc., using these active substances to make the pollutants lose electrons, oxidation decomposition.

Reductive action: reduction in electrolysis is divided into direct reduction and indirect reduction. Direct reduction is the reduction of electrons directly from the cathode to the cathode. Indirect reduction means that the electrons in the contaminants are first removed from the cathode, and the electrons in the electrolyte are directly reduced to the low-valent cations or metal precipitates by the high or low-valent metal ions.

2. The composition of mobile electro coagulation equipment.

Electro-flocculation equipment is usually composed of PH adjusting box, electro-flocculation reactor, dosing device, cleaning device, sludge storage device, integrated support, pulse power supply and control system. As shown

in Figure 1. Among them, the PH regulator is used to regulate the PH value of the wastewater entering the electrocoagulation device; the electrocoagulation reactor is composed of several groups of metal electrode plates, which electrolyze metal hydroxide flocs and hydrogen under the condition of electrification, thus producing flocculation and air flotation; the dosing device is used as an auxiliary device, which is convenient and heavy in adjusting PH and adjusting conductivity, etc. The main function of the control device is to realize the coordination and stability of the whole electroflocculation device.

Automatic operation.

3. Main technical parameters of electro coagulation power supply

3.1, AC input voltage: AC three-phase 380V+10%, 50-60HZ;

3.2, DC output voltage: DC can be selected.

3.3, DC output current: DC can be selected.

3.4, high frequency inversion frequency: 15KHZ;

3.5, rated output pulsation frequency can reach as high as 30KHZ. The output waveform is square.

3.6, in order to prevent the anode passivation period reversal time is: 2S-600S optional.

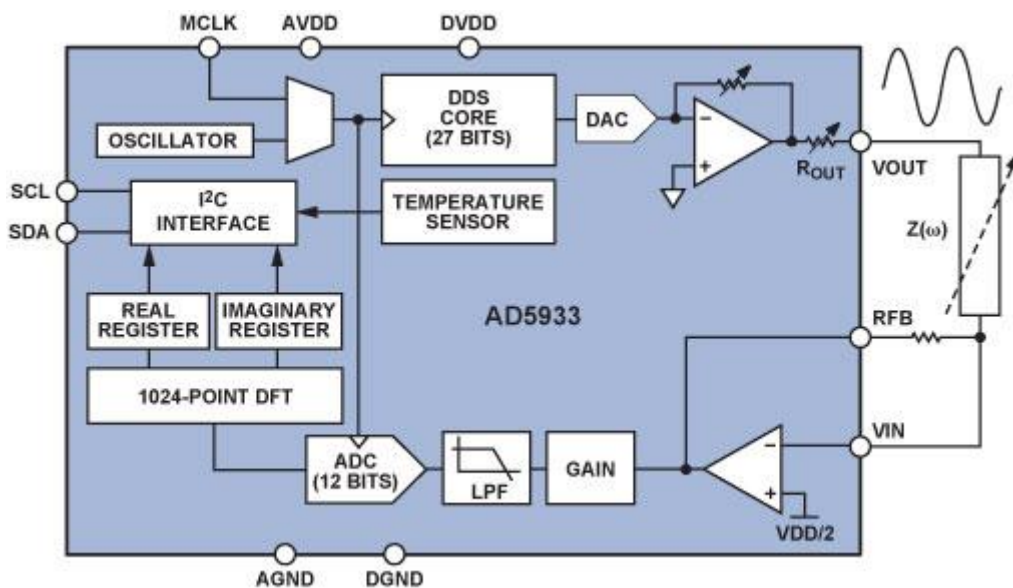
3.7, power efficiency: greater than 90%, power factor greater than 0.9;

3.8, the display accuracy is less than 1%.

4. The principle of power supply

4.1. Control loop

SMR (Switching Mode rectifier) switching technology is adopted in the switching power supply. The circuit is composed of rectifying filter circuit, bridge converter circuit, voltage converter rectifier circuit and so on. Its main circuit is reliable and anti-interference is strong. It is a mature switching technology popular in the world. Its working principle is as follows:



4.2. Protection circuit

Over current protection: In the process of operation, the sudden short circuit of the output part will cause the instantaneous overcurrent of the converter circuit, which will damage the semiconductor devices. The overcurrent protection device will measure the current of the semiconductor and interrupt some excessive current pulses, effectively protecting the semiconductor

devices and prolonging the semiconductor devices. Life span.

Lack of Phase Protection: The protection device will cut off the control loop until the fault is eliminated due to the phenomenon of phase absence caused by the power grid or line.

Over-temperature protection: If the rectifier internal temperature is too high, then the temperature protection device will cut off the work of the control circuit to prevent damage to the internal devices until troubleshooting.

Soft start: the protection mechanism when the equipment is running, to prevent sudden large current impact.

5. The use of mobile electric flocculation equipment

- 1, ensure that the chemicals are ready according to the label instructions.
- 2, ensure that the main power is connected.
2. Please adjust the control system button to the automatic or manual state
(manual state please follow the following operation)
3. Start the circulating cooling water pump.
4. Start the electro coagulation power supply.
 - 4.1 before starting, check the input power and the electrical connection correctly.
 - 4.2 put it in a stable gear. Close the air switch, when the indicator diode on the panel stops flickering, set the "start/stop" switch in the "start" gear, when the panel indicator light is on, adjust the output potentiometer, at this time

the output voltage should be continuously adjustable.

4.3 Test under normal load: Connect the load, turn on the power supply, select the required working state (steady or steady state), according to the no-load test method, then adjust the output adjustment knob, output current and voltage should be continuously adjustable.

4.4 Electric flocculation power supply is a high frequency power supply. When working, we should try to avoid directly connecting the two ends of the output to test, resulting in the phenomenon of low voltage and high current.

4.5 When working, if the digital meter suddenly shows zero and the indicator lights keep flashing, that is, overcurrent, short circuit, lack of equal protection, please immediately turn off the start switch and power circuit breaker, and restart after troubleshooting.

4.6 check whether the fan is working properly and whether there is abnormal noise. Check whether the casing is reliable and grounded. Ventilation should be considered in the placement of the power supply, and the tuyere should not be placed directly against the obstacles, so as to reduce the life of the power supply.

5. Observe the equipment usage and inform us in time if there is any problem.

6. Turn off the electro coagulation power supply.

7. Turn off the power supply.

8. After the electrode is used 24h, start the cleaning device and clean the 10min.

9, regularly clean up sludge in storage tanks.

6. Mobile electric flocculation power supply conditions

Cooling mode: forced air cooling, wind speed: 4m/s;

Working environment temperature: air-cooled -5 C - +45 C;

Air humidity: relative humidity <85%;

Altitude: <1000m, otherwise it is necessary to reduce capacity.

Operation conditions: continuous operation under steady current / steady pressure;

The operating place should be free from conductive or explosive dust, non-corrosive gas, direct sunlight, condensation due to temperature changes, and good ventilation conditions.

The equipment should be placed horizontally, not inclined or inverted. The radiation space around it should be no less than 1.5m. It should be placed in a dry and ventilated place. The height of the rectifier should be above 30cm from the ground.

- the continuous fluctuation range of the voltage amplitude of the AC power grid does not exceed 10% of the rated value.

7. Common trouble shooting

Failure cause	Analysis	Elimination measures
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The power is connected to the power cord, and the working indicator is not light after starting.	Three phase four wire zero line missing or missing phase	Check whether the power cord is out of phase and confirm whether the zero line is connected (Note: the zero line and the ground wire never confused).
	The power frequency transformer inside the power supply is damaged, causing no power supply to the pulse trigger board, which makes the rectifier unable to work properly.	Replacing the same specification of power frequency transformer
Power indicator flashing	There are phase, undervoltage and overvoltage in the input power grid.	Check input grid
	Fan damage, resulting in high temperature inside the machine, temperature protector action, rectifier overheat protection.	Replace the same specification fan.
	Rectifier side side rectifier Schottky damage	Replacement of Schottky with the same specification
The starting and stopping switch of the	Start and stop switching part - start (stop) damage	Replace start and stop button switch.

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power supply is invalid.		
The regulated voltage or current can not be continuously adjustable or invalid.	Output adjustment potentiometer damage	Replace the potentiometer.
Close the air switch, the power supply is cracked inside, and can not be closed again.	Air switch damage	Replacement of air switch
	Three phase rectifier bridge damage leads to short circuit of rectifier main line.	Replacement of corresponding three-phase rectifier bridge
	IGBT damage causes short circuit of rectifier main line.	Replace the corresponding IGBT or control panel.
Rectifier housing feels numb.	Due to the humid environment and other reasons, there is electricity leakage inside the power supply or the enclosure is not grounded.	Turn on the rectifier box and remove the moisture in the machine with infrared lamp or hair dryer.

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