# Stacked Screw Sludge Dewaterer

## Instruction manual


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# Preface

Out of trust and love for Juntai/Nihao, your company has chosen our stacked screw sludge dewatering machine and we express our sincere gratitude. We are dedicated to serving and satisfying our customers.

Juntai/Nihao's stacked-screw sludge dewatering machine, using leading international technology, completes the work of thickening and pressing sludge for dewatering in one cylinder, replacing the traditional filter cloth and centrifugal filtration with a unique and subtle filter body pattern. The series of products have the following characteristics.

1. Non-clogging, easy treatment of oily sludge.
2. Simple operation and management, can be operated fully automatically and unattended.
3. A wide range of sludge concentration can be applied, up to 5000-50000mg/L.
4. Small size, full function, water and energy saving.

In order to better serve our customers, to use the product correctly and to give full play to its unique and good functions, we hope that you will read the operating instructions carefully before using the machine. We hope that you can read the instruction manual carefully before using the machine, so that the stacked screw sludge dewatering machine to serve you better.

It is the aim of our company to create more valuable products for our customers. In order to make this product better and more complete In order to make the product better and more complete, so as to better serve the customers and production requirements, the company hopes that the users can send the product in the process of using In order to make the product better and more complete, so as to better serve the customer and production requirements, our company hopes that the user can use the product in the process of problems and suggestions, using the following address or telephone contact our company in a timely manner, our company combined with network Q&A, on-site service, remote service for rapid response. Once again, thank you for your attention to our products.

# CONTENT

# 1 Product Overview

The main body of the stacked screw sludge dewatering machine consists of multiple fixed rings, moving rings and a spiral filter section.

The machine is compact, easy to operate, stable and can be set in sequence according to the user's operating time. The machine is compact, easy to operate, stable and can be set in sequence according to the user's operating time.

The user should choose the appropriate type of product according to the size of the sludge treatment volume.

## 1.1 Principle Of The Dehydrator

The body of the dewatering machine is mainly composed of the filter body and the spiral shaft, and the filter body is divided into two parts: the thickening part and the dewatering part. Therefore, when the sludge enters the filter body, the relative movement of the fixed ring and the moving ring is used to make the filtrate discharged rapidly outwards through the gap between the laminations, and the sludge is rapidly concentrated and pushed towards the dewatering section.When the sludge enters the dewatering section, the space in the filter cavity is continuously reduced and the internal pressure of the sludge is continuously increased, plus the back pressure of the regulating plate at the mud outlet, so that it achieves high efficiency dewatering and the sludge is continuously discharged from the machine.

## 1.2 Dehydrator Work And Process

(1) The raw sludge is first fed into the mixing tank of the dewaterer via a sludge pump, of which A part of the sludge is returned to the sludge tank and the sludge is fed into the conditioning tank.

(2) After the sludge enters the conditioning tank, the No.1 flocculant is injected by the chemical injection pump1 and allowed to fully stir and react. The sludge is allowed to mature, deodorise and decolourise.

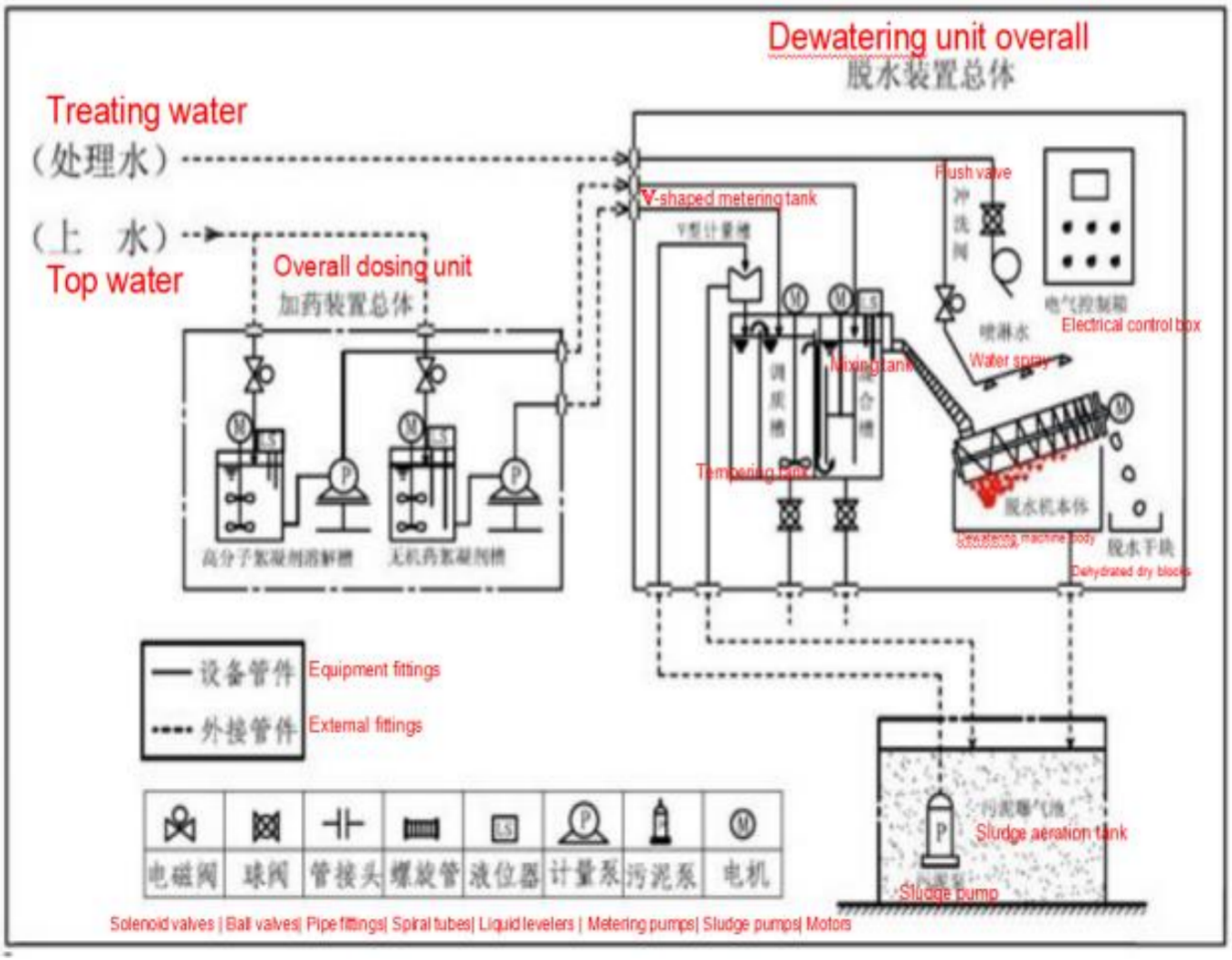
(3) After conditioning, the sludge enters the flocculation mixing reaction tank, where the two liquids are fully mixed and reacted to form a larger alum, and then flows into the filter body, which is driven by a variable frequency motor.

(4) After flowing into the filter body, the sludge first enters the thickening section, in which a large amount

of In the thickening section, a large amount of flocculated sludge is quickly separated from the water, and then the sludge is pushed to the dewatering and pressing section.

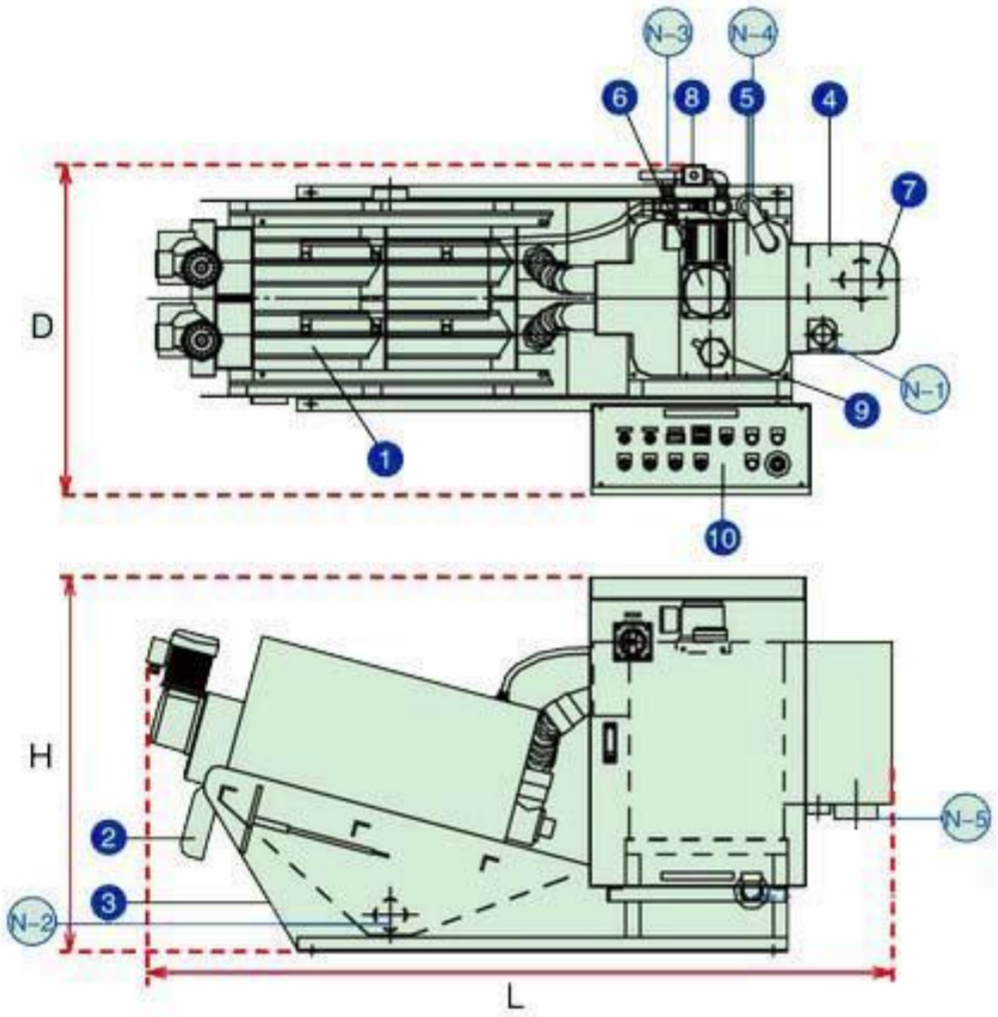
(5) In the dewatering section, the relative movement of the fixed ring and the moving ring and the increasing pressure inside the filter body are used to achieve high efficiency dewatering and the filter cake is discharged from the machine. In addition, due to the high internal pressure inside the filter body, a small amount of SS sometimes overflows with the filtrate from the outer surface of the filter cylinder, so the upper part of the filter body is equipped with a spraying spout to keep it clean with spraying water. After spraying, the effluent is returned to the conditioning tank, etc. (The specific spraying interval time is set or adjusted according to the actual site) The process diagram is shown below:

## General Working Diagram Of a Stacked Screw Sludge Dewaterer



# 2 Standard Profile Drawing And Names Of Components

## 2.1 Standard Profile Drawing



## 2.2 Name of each component

| | | | | | |
|---|---|---|---|---|---|
| 1 | Filter body | 6 | Flocculation reaction tank mixers | N-1 | Mud inlet |
| 2 | Mudguard | 7 | Liquid level adjustment tubes | N-2 | Filtrate discharge outlet |
| 3 | Base | 8 | Water supply solenoid valves | N-3 | Wash water supply port |
| 4 | Mud inlet slots | 9 | Liquid level gauges | N-4 | Liquid transfer port |
| 5 | Flocculation reaction tanks | 10 | Integrated electronic control cabinet | N-5 | Reflux port |

# 3 Layout And Installation Of The Dehydrator

## 3.1 Layout

(1) The layout of the dewatering machine should take into account a certain amount of space around the unit to ensure easy movement for daily operation for easy access for daily operation, regular maintenance, etc.
(2) The complete unit of the dewatering machine should be installed as level and stable as possible.
(3) The filter cake discharge hopper of the dewatering machine should be located as close as possible to the top of the filter cake storage bag or the conveyor.
(4) Where design drawings are available, try to fit the unit in accordance with the drawings.

## 3.2 Pipeline Configuration

(1) The inlet and outlet pipe connections of the dewatering machine are basically concentrated in the lower back of the machine body, therefore, when taking over the pipes, the appearance of each The piping should be neat and stable in appearance and free from leaks.
(2) The piping of the filtrate pipes should be kept horizontal or not higher than the interface of the filtrate outlet.
(3) There is no winter protection for the inlet and outlet piping, so if it is used in colder areas, a separate anti-freeze countermeasure should be added. If used in colder areas, additional anti-freeze countermeasures should be added to ensure normal sewage treatment.

## 3.3 Electrical Wiring

(1) Electrical wiring shall be carried out in accordance with the provisions of the Low Voltage Electrical Regulations and the relevant operating procedures of the electricity company. Operation. Especially for long-distance wiring, excessive voltage drops should be avoided as far as possible, otherwise there is a risk that some motors will not start. In general, the voltage drop should be kept within 2%. In addition, the work must be carried out under electrical
(2) All mains power is 380V, 50/60Hz.

# 4 Operation And Handling

## 4.1 Operation Of The Whole Machine

**4.1.1** Start-Up Preparation And Pre-Linked Operation

(1) The flocculant solution for sewage treatment is pre-configured.

(2) Please check that the external pipes are correctly connected as required and that there are no leaks.

(3) The valves of each pipeline are correctly positioned (sludge inlet valve open; spray inlet valve open; discharge bottom valve closed). Discharge bottom valve off).

(4) The external power supply should be correctly connected.

(5) Check the terminal screws in the electrical box, any loose ones should be retightened, push on the power switch to ON.

(6) Push the main power switch in the electrical operation box to ON, check the electrical components and contacts for any abnormalities and confirm that they are normal before pushing on the 380V control power switch.

(7) Cut the function changeover switch (i.e. manual and automatic switch) on the electrical box panel to manual gear. Check whether the operation of each single machine action is normal.

(8) Turn the dewatering machine control switch to manual and check whether the rotation direction of the dewatering machine body drive motor is (the correct direction is clockwise from the direction of filter cake discharge), otherwise, there will be breakage or malfunction.

Otherwise, damage or failure will occur.

※ Disposal When Mechanical Reversal Is Detected:

1) Closing of the main gate in the attached electrical control box

2) Closure of the corresponding air switch

3) Reverse the corresponding red and black wiring positions (should not be switched with the middle wiring)

4) After power on, confirm the correct direction or not, otherwise, go back to 3) re-operation until the direction is correct

(9) Turn the control switch of injection pump 1 to manual and check whether the pump is turned correctly and whether the flocculant solution can be input normally to ensure normal delivery of the solution.

(10) Turn the mixing mixer control switch to manual and check if the mixer is operating abnormally, so that

the flocculant and the sewage are fully stirred and reacted.

(11) Turn the sludge pump control switch to manual, check whether the sludge pump steering is correct, check whether the raw sewage can be input normally, if there is air in the pump, then the remaining air can be discharged by exhausting or adding diversion water to ensure normal sewage conveyance. (Note: normal recommended sludge pump using screw pump conveying)

(12) If the user uses two varieties of flocculant liquid, the control switch of the drug injection pump2 should be set to manual, check whether the direction of the drug injection pump is correct, check whether the flocculant liquid can be input normally, if there is air in the pump, then the remaining air can be exhausted or added drinking water to ensure the normal delivery of the liquid.

(13) After all the above parts are normally put into operation, observe the alum condensation in the mixing reaction tank, adjust the flocculant flow rate of the drug injection pump, observe the filtrate outflow between the solid and active stacks in the thickening section, requiring the filtrate to be clear and basically free of sludge solids entrainment; observe the sludge water content at the sludge outlet end, adjust the back pressure plate gap, and at the same time observe the amount of sludge filter cake output, adjust the sludge pump return valve next to the tempering tank to make Adjust the sludge pump return valve next to the tempering tank so that the amount of sludge processed matches the model. Special note: The flow of water into the sludge must be stable, otherwise it will lead to unstable mud output and frequent malfunctions, overload operation is forbidden, after normal manual operation, it can be transferred to automatic operation.

### **4.1.2** Linkage Operation

The function positioning changeover knob switch on the electrical panel is in the manual position, then toggle the following buttons one by one:

(1) In the above single action is normal, and through the adjustment of the material balance state, the electrical box panel function conversion switch to automatic gear, at this time can realize the whole machine system linkage.

(2) In this state, the sludge pump will open and close the sludge pump according to the liquid level in the mixing tank through the electrode level meter signal, while the drug injection pump will open or close with the action of the sludge pump.

(3) The amount of sludge to be treated is based on the concentration of the sludge to be treated. The amount of sludge to be treated is set according to the concentration of the sludge to be treated and the type of

machine used, and the amount of treatment is selected.

(4) Method of determining the polymer injection volume:

The amount of medicine to be injected is determined by the incoming sludge flow and the concentration of the incoming sludge.

The type of drug is: the concentration of the cationic solution is usually 1-3 parts per thousand.

There is often considerable variation in the selection of drug types and dissolution rates of agents depending on the type of sludge, so Look forward to contacting us at any time.

(5) Setting of the action running time relay

During the operation of the linkage, the action delay time relay can be set to stop the sludge pump, the medicine injection pump, the mixing mixer and the spraying water before the whole machine is set to run, while the filter body drive motor continues to run to remove the sludge from the filter body until the remaining sludge is basically completely removed, which is set to 15 minutes when the dewatering machine is delivered.

Host time delay setting method:


First, facing the front of the time relay and looking at the right-hand area, press the "ten, -" adjustment button in red on the lower right-hand corner to reflect the unit for switching the time: seconds, minutes, hours, and then press the "ten, -" adjustment button in black. -" button in black font to reflect the corresponding time size. Pressing the "10, -" button in black will reflect the corresponding time size.

(6) Setting of electric spray valve opening and closing time relays:


The opening and closing times of the electric valve can be adjusted as required, with the stopping time set in the right area and the working time set in the left area. General setting: stop time (closed) 10 minutes, working time (open) 6 seconds. The working time and working condition can be adjusted, e.g. 10 minutes closed, 10 seconds open.

(7) Filter body speed setting.

The rotational speed is controlled by the frequency converter, which has a frequency setting range of 10 to 50 Hz. (The factory setting is 30 Hz).

**4.1.3** Automatic operation operation

Parameter setting and mode determination

(1) Setting of the "filter time" operator on the electrical control box panel. Setting the operator in the AUTO position indicates operation according to the requirements set in the time sequence (i.e. automatic control operation).

Setting of the AUTO operation operation.

① If the operation is to be set according to time during a 24-hour period, the 24-hour scale should first be set with the pointer in the current time position, then the desired operating time and operating stop time position.

-Operating operating time setting:

Push the pointer corresponding to the desired working time inwards.

-To set the operating stop:

Pushes the pointer corresponding to the desired stopping time to the outside.

②The 24-hour time operator guarantees approximately 200 hours of power failure (if it has been charged for 48 hours). If the solenoid switch is switched off for a long time, the original time setting will be misaligned and should be reset. Please note that this is a problem. Please refer to the operating instructions of the Panasonic A-TB72 time relay for details.

(2) There are two modes of automatic operation: 24-hour automatic operation mode and automatic linkage mode.

① 24-hour automatic operation mode:

a .Double check the preparations required for each start-up.

b.The "filter time" operator switch on the electrical control panel, in the AUTO position, indicates operation according to the requirements set in the time sequence (i.e. automatic control operation).

c.The rotary operating switch on the panel is set to "AUTO" to automatically start the operation.

② Automatic linkage mode:

a. Double check the preparations required for the start-up.

b. Push the "filter time" operator switch on the electrical control panel to position O N. This cancels the 24-hour automatic operation mode and switches to the automatic operation manual monitoring mode.

c.Turn the knob switch on the panel to "AUTO" and the automatic operation manual monitoring mode starts to operate.

**4.1.4** Manually operated operation

This operating state is mainly used when the machine is in abnormal condition or needs temporary inspection, etc. Each part Turn on or stop as required by toggling the electrical box panel rotary switch one by one.

(1) The function positioning changeover switch on the electrical box panel is set to the manual position

(2) Dewatering machine switch to ON or OFF

(3) Mixing and reaction mixer on or off

(4) Medicine injection pump on or off

(5) If the user uses two varieties of pharmaceuticals, the tempering mixer and the drug injection pump1 are switched on or off.

※ Adjustment of the flow rate adjustment tube：

a. If the outer sleeve of the adjustment tube is rotated to the left, the flow rate of the mud supply increases.

b. If the outer sleeve of the adjustment tube is turned to the right, the flow rate of the mud supply is reduced.

c. The flow scale next to the V-port is for flow adjustment reference only.

**4.1.5** Shutdown operation

1. Stopping in manual operation operation

(1) Stop the sludge supply pump, i.e. turn the knob switch to off.

(2) Stop the drug injection pump and the drug mixer, i.e. turn the knob switch to OFF.

(3) Stop the mixing mixer, i.e. turn the knob switch to OFF;

(4) Stop the tempering mixer, (this operation is required when using two agents).

(5) Continue to airlift the filter body and airlift it for 15 minutes according to the size of the model to discharge all the remaining sludge from the filter body.

(6) After emptying all the remaining sludge in the filter body, turn off the drive motor of the filter body and turn the knob switch is turned to OFF.

(7) After stopping at the end of each day's work, flush the sludge deposited on the periphery of the dewatering section stack with a water pipe.

(8) Turn the function position changeover switch on the electrical box panel to "STOP".

2. Automatically operated running state stop

(1) According to the operating time set by the time operator, the complete machine system will automatically shut down in stages according to the interval set by the delay time relay.

(2) After the daily shutdown, the sludge deposited on the outer ring of the dewatering section stacks is flushed with a water hose.

Note: ※No.1 flocculant and No.2 flocculant are used depending on the nature of the user's sludge, they can be either cationic or anionic flocculants, they can be used as a single agent or as a double agent. If only a single agent is used, the mixing mixer switch knob is set to ON and the tempering tank mixer switch knob is set to OFF; the drug injection pump 2 switch knob is set to ON and the drug injection pump 1 switch knob is set to STOP; if a double agent is used, the mixing mixer switch and tempering tank mixer switch as well as the drug injection pump 1 switch and drug injection pump 2 switch knob are set to ON.

## 4.2 Operating requirements for the whole machine

(1) Selecting a reasonable operating mode for the whole machine according to the working conditions, setting a reasonable operating and stopping interval for automatic operation, and completing the whole process as required.

(2) Adjusting the "flow control tube" to different heights depending on the sludge concentration, by rotating downwards for high sludge concentrations and upwards for lower concentrations.

(3) It is strictly forbidden to overload the sludge volume, resulting in undesirable consequences, to prevent the sludge from accumulating in the thickening section due to excessive sludge volume in the body of the dewaterer and affecting the normal operation of the machine.

(4) In order to ensure the operating life and quality of the whole machine, it is strictly forbidden for hard solids such as large sludge blocks, wood blocks and metal blocks to flow into the sludge pump body and the filter body of the dewaterer.

(5) When cleaning manually, water must not be discharged onto electrical components such as motors and electric control boxes.

(6) When this device is switched to manual operation, the control of the sludge water level will be invalid, so try to avoid manual operation of the operation.

## 4.3 Safety precautions for the operation of the whole machine

### Dangerous!!!

① Do not put tools or hands into the flocculation reaction tank at random to prevent them from being caught in the mixer and causing injury.

② Do not insert tools, plastic pipes, hands, etc. at the sludge inlet of the body of the stacked screw sludge dewaterer, as this may cause injury or damage to the equipment.

③ Adjustment of the gap of the sludge outlet pressure plate of the dewatering machine body: Never adjust the operation during operation to prevent being caught in it, which may cause injury and damage to the equipment.

### Warning!

① In the wiring of electrical works, the operation procedures should be carried out in accordance with the standards of the technical operation procedures for electrical equipment and the operation procedures specified for indoor wiring.

② In electrical engineering wiring, attention should be paid to wire damage, breakage, hard twisting, stretching, etc. to avoid causing accidents such as fire and electric shock.

③ If the insulation resistance is below the value of 0.2MΩ, there is a risk of electric shock, the power should be switched off immediately and a full-time electrician should be called to check and eliminate hidden dangers.

### Note!!!

①When working with the flocculant stock solution, dissolving solution in the dissolving tank or in the pipeline, you must wear protective glasses.

② Protective eyewear must be worn at all inspection and observation ports in the unit to prevent splashing.

### Forbidden!！ ！

Do not dismantle or modify the unit to prevent possible electric shock, damage or other hazards.

### Finally, please note!

① During regular inspection and daily maintenance, first you must first turn the switch to stop gear, pull the electrical box The air switch should be pulled down to cut off the power supply to prevent the sudden start

of machinery and motors from causing injury accidents.

② When the device is stopped for a long time, the power switch should be pulled down to cut off the power supply to prevent insulation deterioration and other causes of leakage, electric shock and other accidents.

③ When the device does not start and an abnormal situation occurs, ask a mechanic to check the cause and eliminate the fault in order to avoid accidents. To avoid accidents, ask a mechanic to check the cause and eliminate the fault.

# 5 Daily inspection and maintenance

## 5.1 Maintenance, inspection items

| Spot check position | Inspection items | Spot check or not |
|---|---|---|
| (1) Operator box panel | Confirmation of automatic operation | |
| | Presence or absence of abnormal signals such as overload | |
| (2) Dewatering machine drive motor | Rated value indicated by the frequency converter | |
| | Confirmation of the direction of rotation of the shaft | |
| (3) Time relay for operation | Whether the shaft is in the desired time position | |
| (4) Supply to sludge return valve | Whether the flow rate and concentration are appropriate | |
| (5) Flocculation mixing tank electrode | If there is any debris such as lint or sludge, remove it immediately. | |
| (6) Flocculant stock retention | Check the amount of stock liquid, if it is low, replenish it | |
| (7) Dosing pump | Adjust the injection volume according to the flocculated alum. | |
| (8) Flocculation mixing tank | Are peanut-sized alum blooms forming | |
| (9) Filtrate | Is there any abnormal SS coming out of the filtrate | |
| (10) Pressure regulator | whether the setting of the pressure regulator is correct. | |

| | | |
|---|---|---|
| | Is the proper filter cake discharged properly | |
| (11)Miscellaneous noise | Is there any noise in the moving parts | |
| (12) Fixed Stacked Pillar Shaw | Are the front and rear nuts loose | |
| (13) Movable lamellae in the filter body | whether the movable lamellae move evenly with the spiral shaft | |
| (14) Sludge volume in the filter body | Whether the sludge is filled to the thickening section | |

Note: The rack needs to be painted and maintained once a year to ensure that no rusting occurs.

# 5.2 Causes of faults in drive geared motors and how to deal with them

| Contents of the fault | Cause | Response |
|---|---|---|
| No rotation at no load | No electricity | Check the power supply and contact the on-call electrician |
| | Broken wiring | Check the circuit |
| | Poor contact of contact switch | Repair or replace |
| | Broken fixer coil | Send to specialist workshop for repair |
| | Three-phase power supply connected as single phase | Check terminal voltage |
| | Damage to gears, shaft or shaft train | Contact our company |
| Does not rotate under load | Insufficient voltage | Is the wiring too long |
| | Excessive gear wear | Contact our company |
| | Overload operation | Overload operation Load shedding |

| | | |
|---|---|---|
| Abnormally hot | Overload operation | Reducing the load |
| | Too frequent starting and stopping | Reduce frequency |
| | Bad bearings | Repair or replace |
| | Voltage too high or too low | Check voltage |
| There are noises | Continuous sound: bad bearings, worn gears | Have it repaired by a professional |
| | Intermittent sound: Injured gears or foreign objects | Have professional repair |
| Vibrates a lot | Wear and tear of gears and bearings | Have it repaired by a professional |
| | Poor mounting or loose screws | Tighten fasteners |
| Oil leakage | Sealing section not sealed | Tighten fasteners |
| | Damaged seals | Replace |

# 5.3 Countermeasures in case of failure

| Situation | Reasons | Countermeasures |
|---|---|---|
| 1. No sludge in the flocculation reaction tank Sludge | ① Valve is closed | Open the valve |
| | ② Sludge input pump failure | Check the sludge input pump |
| 2. Excessive SS in the filtrate | (i) inappropriate drug injection volume | Adjust the flow rate of the drug injection pump |
| | ② Faulty concentration section stacking | Check the stack and report to the manufacturer |
| 3. The filter cake does not come out | ①Blocking of the pipe from the reaction tank to the filter body | Checking the removal of debris from the tube |
| | ② Bad alum in the flocculation reaction tank | Check for proper dosing |

| | | |
|---|---|---|
| | ③The pressure regulator is closed too far | Adjust the pressure plate gap |
| | ④ The drive motor is not running | Check for overload; inverter in good condition |
| 4．The chemical is not injected | ① Pump flow regulator is zero | Re-adjust flow rate |
| | ② No chemical | Check the amount of stock solution retained |
| | ③ Blockage in the pipe | Remove foreign objects from the tube |
| 5．No water for spraying | ① Valve is closed | Open the valve |
| | ② Electric valve is blocked | Clean up the rubbish |
| | ③Failure of the electric control of the electric valve | Check for faults in the electric control system of the electric control valve |
| 6．Automatic operation does not work | ① External stop signal illuminated | Identify external abnormalities |
| | ② The automatic controller is not on Auto | Reset |
| | ③ A connector is disconnected | Check wiring |
| 7．Dewatering machine stopped working | ① Sludge blockage | Get the spiral shaft reversed |
| | ② Drive motor failure | Have it checked by a professional electrician |
| | ③ Inverter failure | Check the inverter |
| 8. The water content of the filter cake is significantly Increased | ① Back pressure plate is not tightened, the gap increases | Stop the machine to readjust the back pressure plate gap |
| | ② Improper speed of screw shaft | Adjust inverter values |
| | ③ Inappropriate amount of flocculant | Readjust the flow rate of the drug injection pump |
| | ④ Excessive amount of sludge feed | Adjust sludge feed volume |
| 9.Excessive | ① Improper setting of pressure | Readjust pressure plate gap |

| | | |
|---|---|---|
| extrusion of sludge from the dewatering section | regulator | |
| | ② Weak alum strength | Adjust the dosage |
| 10. No alum blossom | ①Inadequate injection of chemical | Check the dosing system |
| | ②Inappropriate dosage | Do not underfill, but maintain a certain amount |

THANK YOU FOR YOUR CHOOSE AGAIN,WHEN THE PRODUCT OPERATION PROCESS HAVE ANY PROBLEM,JUST FEEL FREE TO CONTACT US,WE WILL PROVIDE OUR BEST SERVICE TO DEAL,THANK YOU!

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