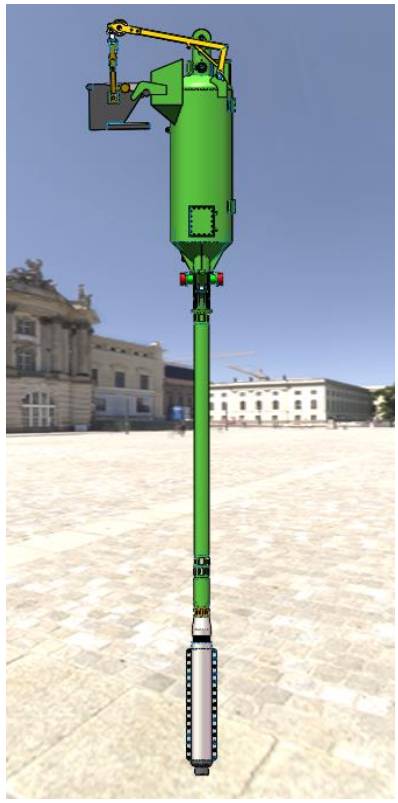
BJZC-BFS-400-180 **Bottom Feed Vibroflot**

Instructions and Maintenance Manual



Beijing Vibroflotation Engineering Machinery Co., Ltd.

Preface

Respected Users:

Thank you for choosing the high-performance vibroflot produced by Beijing Vibroflotation Engineering Machinery Co., Ltd. This *BJZC-BFS-400-180 Bottom Feed Vibroflot Instructions and Maintenance Manual* (hereinafter referred to as *Manual of Use Instructions*) provides you with the structure, working principle, installation, use and maintenance of Bottom Feed VIbroflot, as well as its maintenance, troubleshooting and other related rules and precautions.

In order to give full play to the performance of the vibroflotation device and make it easy for users to use, please read this manual carefully. Using correctly in accordance with the provisions of this manual can be helpful to reduce the occurrence of faults and prolong service life.

This *Manual of Use Instructions* is sent with the product. Please keep it properly. It is ready to be used in the future for the repair and maintenance of the vibroflot.

Due to our commitment to continuous improvement of our products, the information provided by our company is subject to change without notice. Users can visit our website at any time (www.chinazcq.com) for relevant information.

Catalog

I. Overview

1.1 Uses and Characteristics

BFS bottom feed vibroflot is mainly used in the construction of vibroflotation replacement method. It can greatly improve the quality of vibroflotation piles, precisely control the diameter of piles, Its unique circulating water cooling system can realize the dry method construction of vibroflotation engineering in the true sense. The whole process quality control recorder can monitor the whole process of pile making and realize strict control of pile quality. The eccentric block in the vibration body is driven by a special motor for high-speed rotation, which generates strong vibration force in the horizontal direction. At the same time, the high-pressure gas is emitted through the by-pass gas supply pipe from the hole in the head of the vibroflotation device, impact the soil and boring holes to the designated depth. By a lifting hopper, the vibroflot material container can be feed with gravel (the size requirement is within 5 cm) or coarse sand. The filler is conveyed to the bottom of the vibrator by alternating opening and closing the top and bottom valves of the double-lock pressure container and cooperating with the compressed air in the container. Keeping feeding the filler until the required diameter of the pile achieved by using the upside and downside insertion of the vibrator, so that continue the cyclic reciprocating and progressive lifting of vibroflot till the stone pile is overall completed.

II. Performance and Parameters of BFS Bottom Feed Vibroflot

2.1 Basic Performance and Parameters

A. Feeding mode: bottom feed

B. Vibrator control mode: frequency converter control.

C. Bunker form of vibrator: double lock pressure bin, pneumatic control.

D. Boring quality control: whole process quality control of Vibroflotation Gravel Pile.

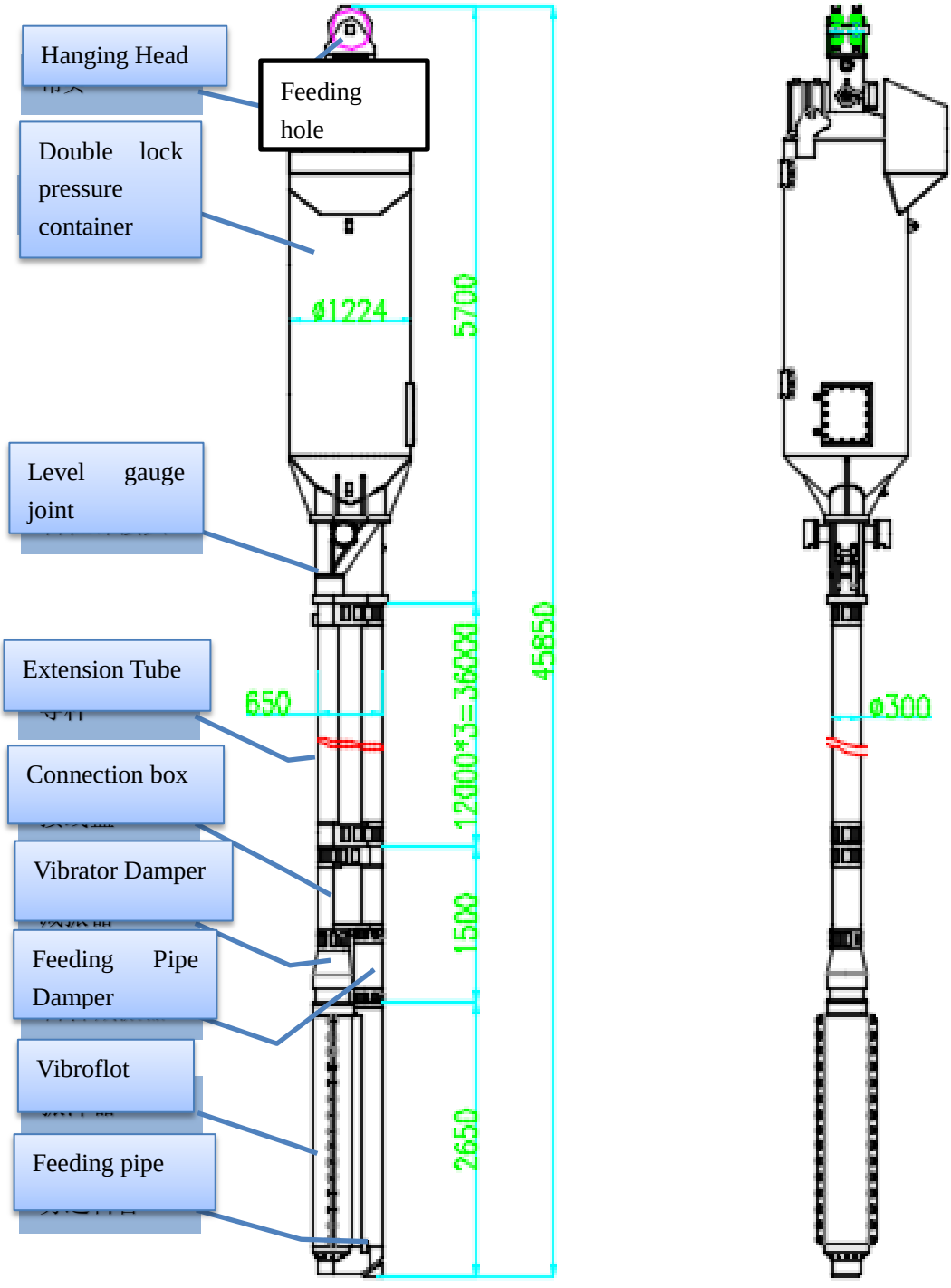
E. Aggregate diameter: ≤50mm.

Main Performance Parameters of BJZC-BFS-400-180 Bottom Feed Vibroflot	
Vibroflot Model	BJZC-BFS-400-180
Vibroflot Motor Power (kw)	180
Exciting Force (kN)	200-300
Motor speed (rpm)	1200-1800
Hopper volume (m^3)	1.2
Working pile diameter (mm)	900-1200
System pressure (bar)	6
Feeding pipe diameter (mm)	DN250
Vibroflot Control method	Frequency conversion control
Cooling Method of Vibroflot Motor	Circulating water cooling
Configuration of air compressor displacement ($10m^3$/mins)	10
Container shape size (length * width * height mm)	4800×1300×1300
Profile Dimension of Standard Extension Tube (Long *Width *High mm)	5000×300×600
Shape dimension of vibrator (long x wide x high mm)	2600×600×700
Standard equipment weight + Extension Tube (ton)	9+3×n
Note: n indicates the number of Extension Tube; 5-meter Extension Tube weighs 1.3 tons and 12-meter Extension Tube weighs 3 tons.	

2.2 Cable and Pipeline Configuration Instructions

Number	Name	Specifications and Models	Length	Purpose	Joint Style
1	95mm² main cable	3*95mm²	120 m	Connect variable frequency control cabinet to vibrator	Terminal
2	Gas pipes for container pressurization	1½"	140 m	Connect air compressor to main gas supply pipe of silo	Double-headed pagoda insertion
3	Bypass water supply pipe	1½"	120 m	Connect the water pump to the level gauge joint	Double-headed pagoda insertion
4	Bypass air supply pipe	1½"	120 m	Connect air compressor to level gauge joint	Double-headed pagoda insertion
5	Recirculating pipe intake pipe	1"	150 m	Cooling station to vibration punch motor	British hose joint
6	Recirculating water pipes	1"	150 m	Cooling station to vibration punch motor	British hose joint
7	Control trachea	¾"	150 m	Air compressor to silo control intake	Round orifice hose joint
8	40mm control cable	40mm wire harness	80 m + 40 m	Warehouse control cabinet and warehouse control cable	Waterproof industrial plug

2.3 Structure Description of BFS Bottom Feed Vibroflot



1. Hanging Head

When using crane configuration, it is used to connect the vibroflot, and when using pile frame configuration, it is used to connect the movable pulley group.

2. Double Lock Pressure Container

Used for stone collection, through the action switching of the blanking valve, continuously provide stone to the bottom of the vibroflot driven by compressed air.

3. Level Gauge Connector

It is used to monitor the volume of stone and connect the upper and lower structures.

4. Extension Tube

It is used to connect junction box and level gauge joint. The length of Extension Tube is determined by pile depth. The standard length of Extension Tube is 5 meters and 12 meters.

5. Connection box

It is used for connection and dis-assembly of power cable of vibroflot and for connection and dis-assembly of circulating water pipe of vibroflot motor.

6. Vibrator Damper

It is used to reduce the vibration impact on the upper parts including the extension tube and hoisting mechanism when vibroflot is working.

7. Feeding Pipe Damper

It is used to reduce the the vibration impact on the upper feeding tube and assure the stone can be transported from container to the bottom of the vibrator.

8. Vibrator

The motor drives the eccentric block in the vibration body through the coupling to produce centrifugal force, which makes horizontal vibration produced along the whole vibrator body.

9. Feeding Pipe

Attached to one side of the vibrator. Through it, the stone is conveyed to the bottom of the vibrator.

III. Equipments

a. Main working crane: According to the length of pile. (50 tons crawler crane can be selected for 12 meters extension tube, 100 tons crawler crane for 24 meters extension tube and 200 tons crawler crane for 36 meters extension tube).

b. Auxiliary crane (25 tons automobile crane can be used for 12 meters extension tube, 50 tons automobile crane for 24 meters extension tube and 50 tons automobile crane for 36 meters extension tube).

c. Feeding equipment: model 200 of excavator (for lifting hopper loading) or model 30 loader with side dump.

d. Generator: 500KVA (used for vibroflot less than 180KW power with supporting parts).

e. Screw style air compressor, air flow rate is not less than 10 cubic meters per minute, exhaust pressure is not less than 7 kg (bar).

f. Submersible pump: 4KW (from water source to 3-5 cubic meters of water tank).

g. Sewage pump: 7.5KW (drainage of land construction site).

h. High-pressure water pump: auxiliary boring.

i. Water tank: Stock water for hole making and motor cooling system.

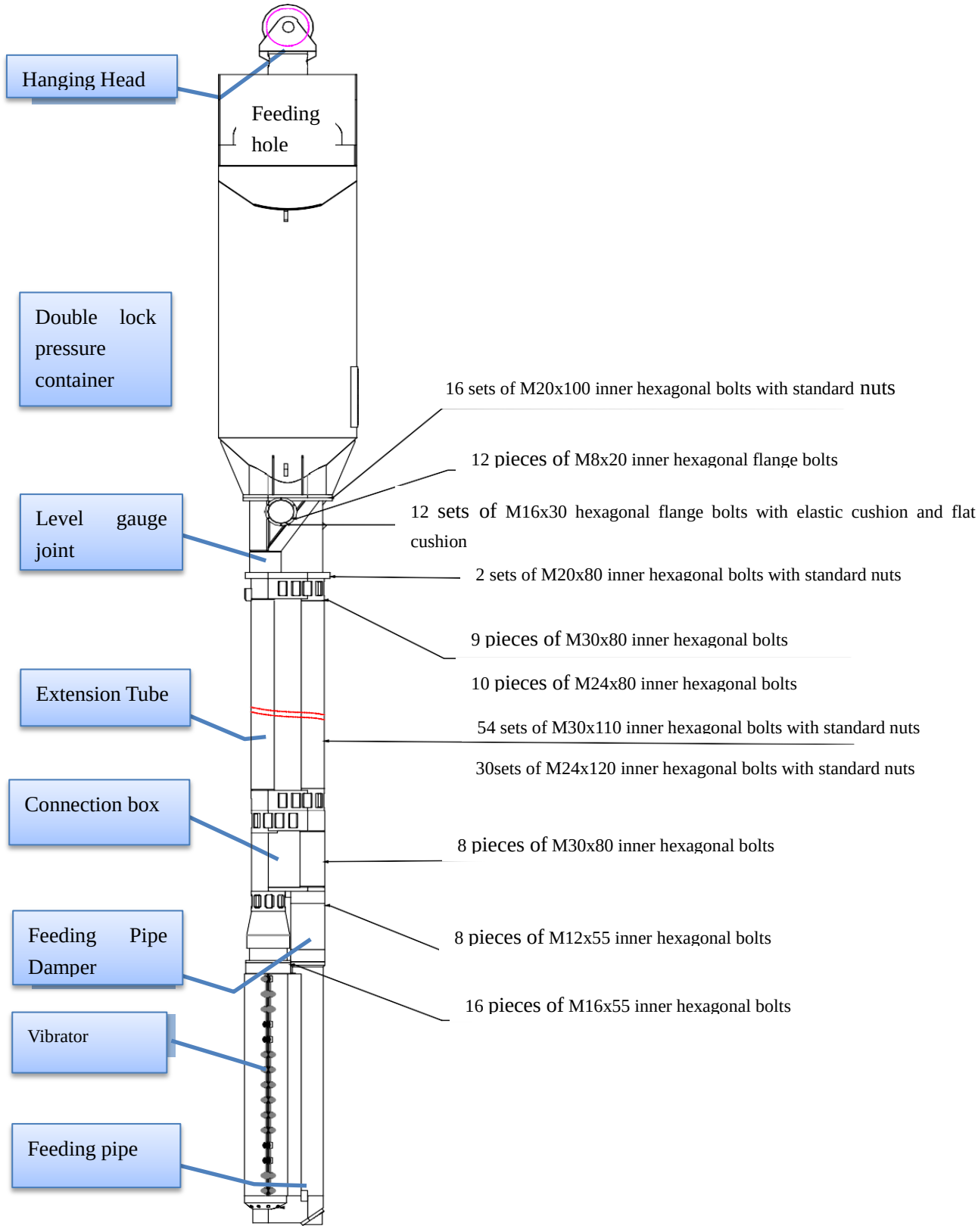
j. Circulating cooling pump system of vibroflotation motor: for the cooling of the motor when the vibroflot is working.

k. Lighting equipment: Provides lighting for night construction, according to the site environment, the independent mobile power generation lighting can be applied.

a	b	c	d
			
e	f	g	h
			
i	j	k	
			

IV. Assembly and Dis-assembly

Choose a flat and open site, the ground roughness requirement is not more than 10 cm, the site area is not less than 1000 square meters, and ensure that site where lifting equipment stands has enough bearing capacity to meet the safety requirements.


Hanging Head
Feeding hole
Double lock pressure container
Level gauge joint
Extension Tube
Connection box
Feeding Pipe Damper
Vibrator
Feeding pipe
16 sets of M20x100 inner hexagonal bolts with standard nuts
12 pieces of M8x20 inner hexagonal flange bolts
12 sets of M16x30 hexagonal flange bolts with elastic cushion and flat cushion
2 sets of M20x80 inner hexagonal bolts with standard nuts
9 pieces of M30x80 inner hexagonal bolts
10 pieces of M24x80 inner hexagonal bolts
54 sets of M30x110 inner hexagonal bolts with standard nuts
30sets of M24x120 inner hexagonal bolts with standard nuts
8 pieces of M30x80 inner hexagonal bolts
8 pieces of M12x55 inner hexagonal bolts
16 pieces of M16x55 inner hexagonal bolts

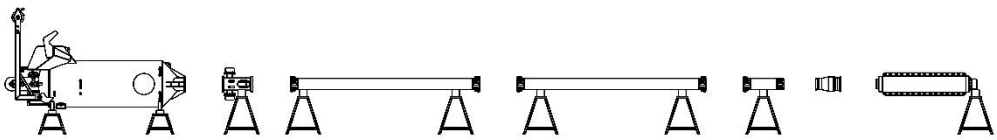
4.1 Equipment Assembly

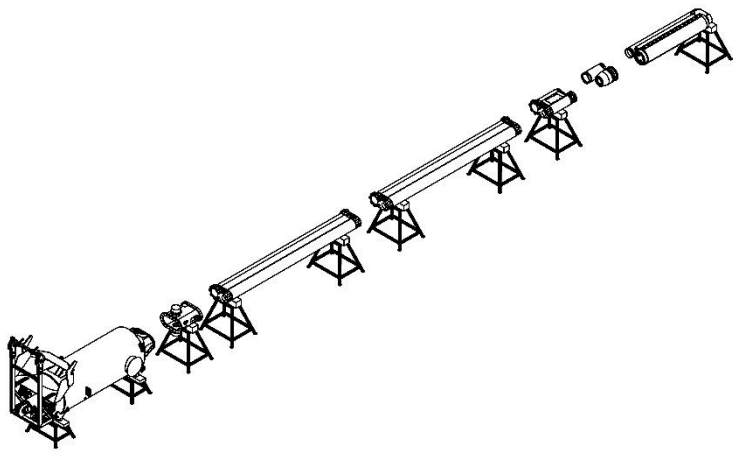
Step 1:

The sundries in the extension tube and junction box must be cleaned up.

Place the container, level gauge connector, extension tube, junction box, vibrator damper and feeding pipe damper on a straight line. It is more suitable to use square section wood pad for other parts except container, and the pad height is 0.4m.

The distance of each part is about 1 m.



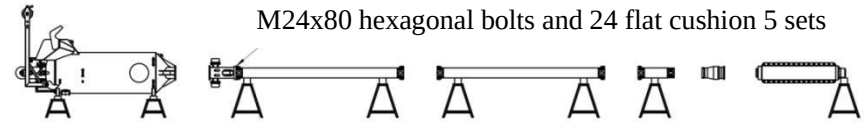


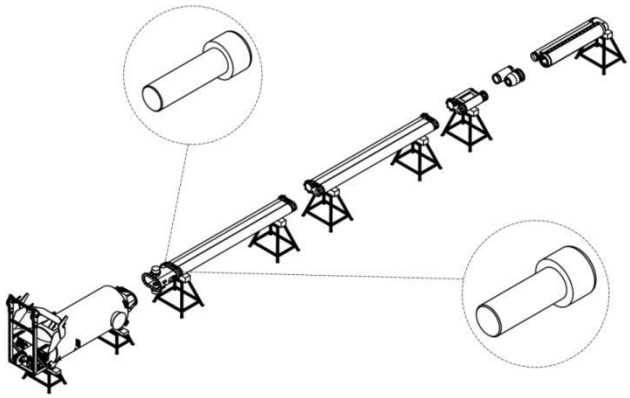
Step 2:

Prepare bolts, gaskets between flanges, sealants and tools for connection.

Connect the level gauge joint with the extension tube tightly.

Catheter gasket 1 piece
M30x80 inner hexagonal bolts 9 pieces
M24x80 hexagonal bolts and 24 flat cushion 5 sets



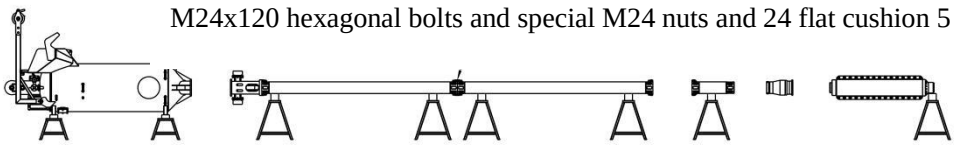


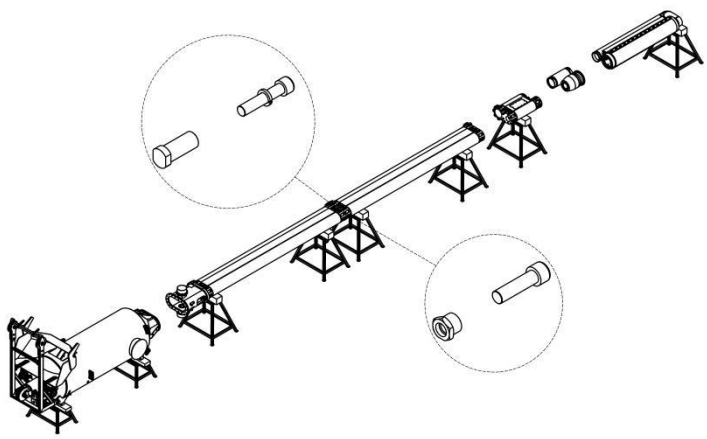
Step 3:

The cable passing through the extension tube and the cooling water circulating pipe of the vibrator are tied synchronously through the extension tube with the leading wire (e.g. 8# iron wire). When the cable circulating pipe enters the extension tube, it should not be entangled with each other.

Sealing gaskets should be placed first when passing through the connecting flange.

Catheter gasket 1 piece
M30x110 inner hexagonal bolts and special M30 nuts 9 pieces
M24x120 hexagonal bolts and special M24 nuts and 24 flat cushion 5 sets





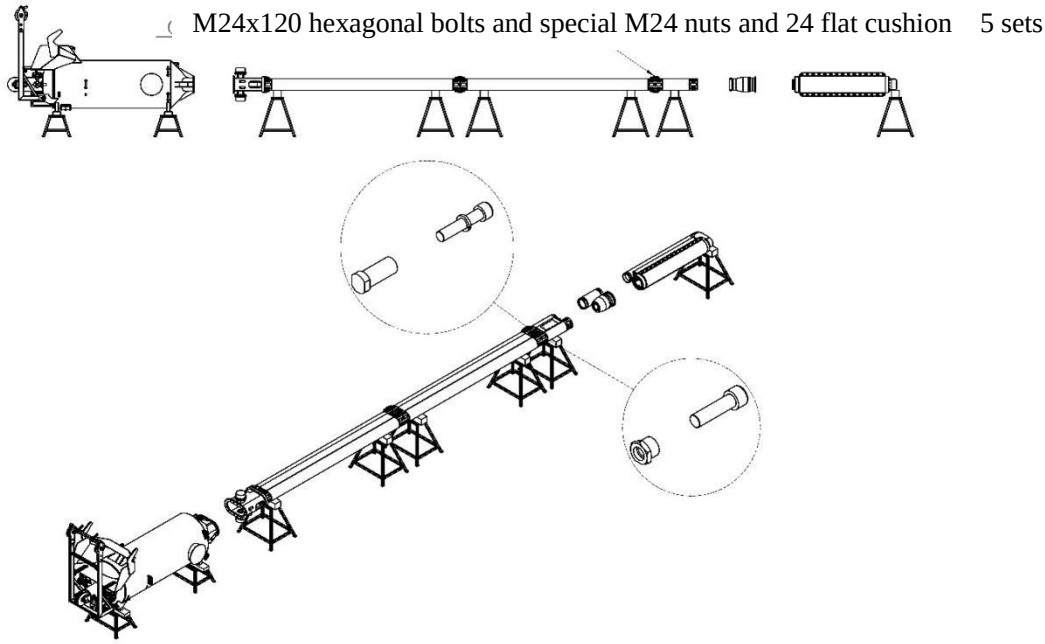
Step 4:

After pulling the cable and circulating water pipe out of the connecting box, the extension tube and the connecting box are tightened.

Catheter gasket 1 piece

M30x100 inner hexagonal bolts and special M30 nuts 9 pieces

M24x120 hexagonal bolts and special M24 nuts and 24 flat cushion 5 sets



The connection between the motor lead cable and the main cable should be allocated in the middle of the opening cover of the junction box for easy maintenance.

Cable joints should be dislocated and three joints should not be in the same position.

The cable joints should be tightly connected and tightly bandaged to prevent leakage of water and electricity. After the three-phase joints are bandaged, the anti-wear layer should be outsourced. (Geotextiles or thick nylon wraps can be used).

Step 5:

Connect the cooling water circulating pipe of the vibrator motor.

Connections should be tightened to ensure no leakage.

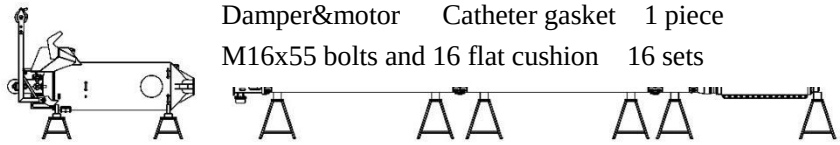
Step 6:

After the connection of cable and circulating water pipe is completed, the position of feeding pipe of vibrator should be adjusted to be on the same side as the feeding pipe of extension tube.

The vibrator is hoisted horizontally and connected with the vibrator damper at the junction box end. During the butting process, the level gauge connector cable and the inlet of the circulating water pipe should be cooperated, and the cable and the circulating water pipe should be pulled out slowly to ensure they are tightened in the room of extension tube.

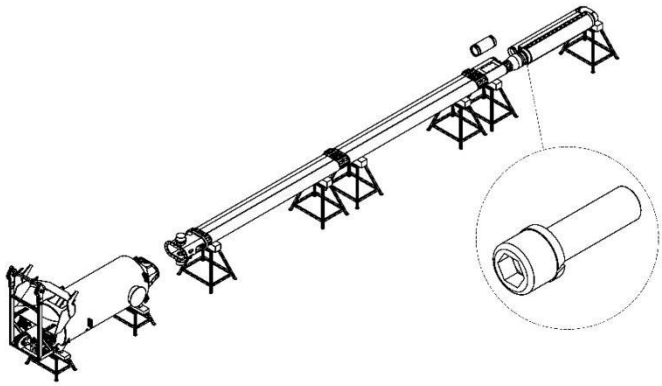
All connecting bolts of the vibrator damper should not be fully fastened before the feeding pipe damper is tightened to facilitate the installation of the feeding pipe damper.

The vibrator damper connecting bolt is tightened after the feeding pipe damper is well docked.

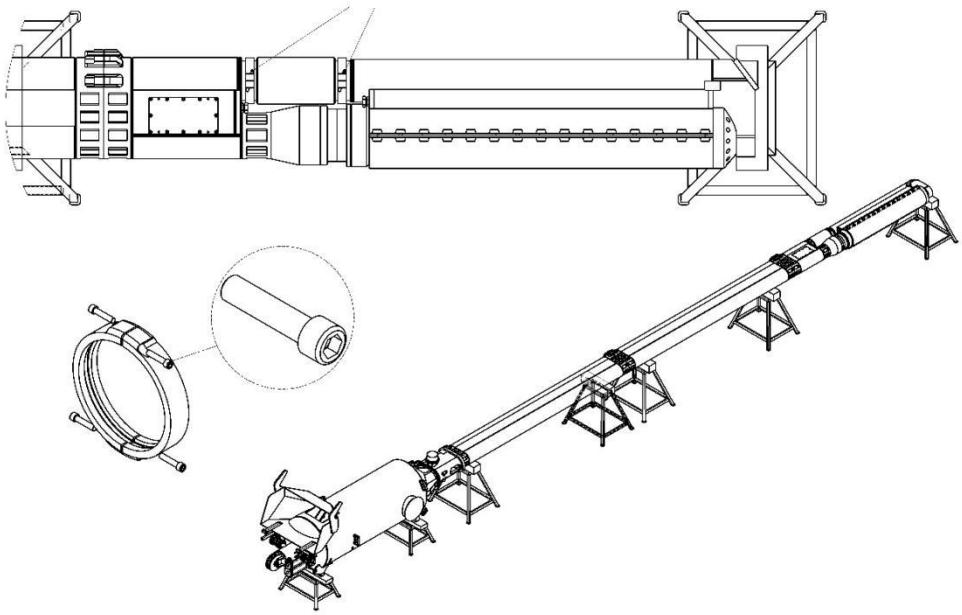


Damper&motor Catheter gasket 1 piece

M16x55 bolts and 16 flat cushion 16 sets



M12x55 inner hexagonal bolts 8 pieces



Step 7:

Open the cover plate of the junction box and fix the cable joint and the circulating cooling water pipe.

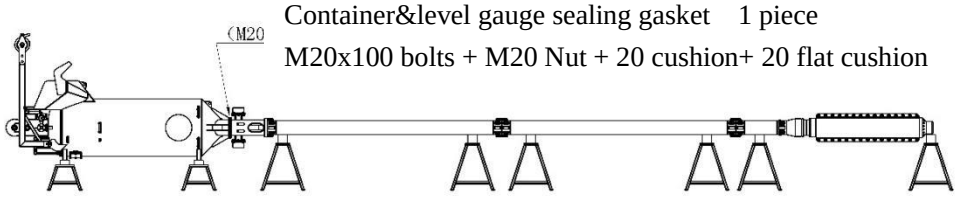
Sealing tape should be installed before the cover plate of the upper junction box, and then tightened with sealant to prevent leakage.

Step 8:

Connect 3/4 "main supply pipe, 3/4" main water supply pipe on both sides of connection box vibrator.

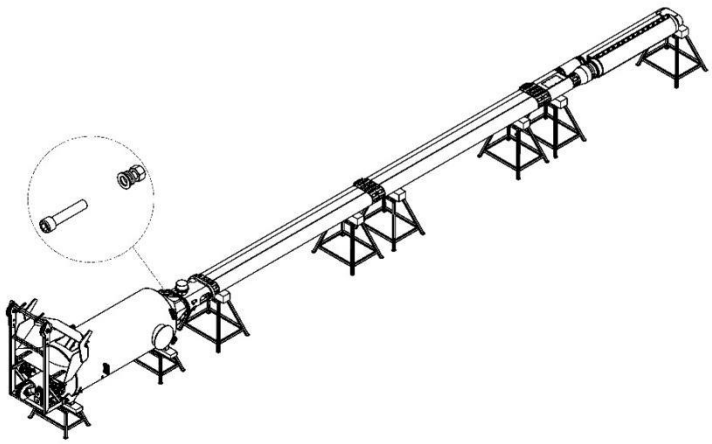
Step 9:

Adjust the height of flange end of material level gauge joint to ensure that there is room for adjustment when the container and material level gauge joint is connected. The container is hoisted and connected with the flange of the level gauge joint.



Container&level gauge sealing gasket 1 piece

M20x100 bolts + M20 Nut + 20 cushion+ 20 flat cushion 16 sets



Step 10:

Install the level gauge and its controller, temporarily supply power to the container junction box, test whether the level gauge is normal.

Step 11:

The cables, circulating water pipes, control lines and main air pipes of the container shall be fixed in the splint on one side of the container, and the position shall be fixed firmly to prevent loosening.

Step 12:

Install vibrator1½"main water pipe and1½" main bronchus pipe at the joint of level gauge, and install safety pull net.

Step 13:

All joints should be carefully checked to ensure that they are correct.

Step 14:

The flange end should be joined with welded reinforcement after the container's function is conformed to be in good condition by commissioning.

Connect the vibrator damper with the vibrator by welding anchor chain to prevent falling off.

Step 15:

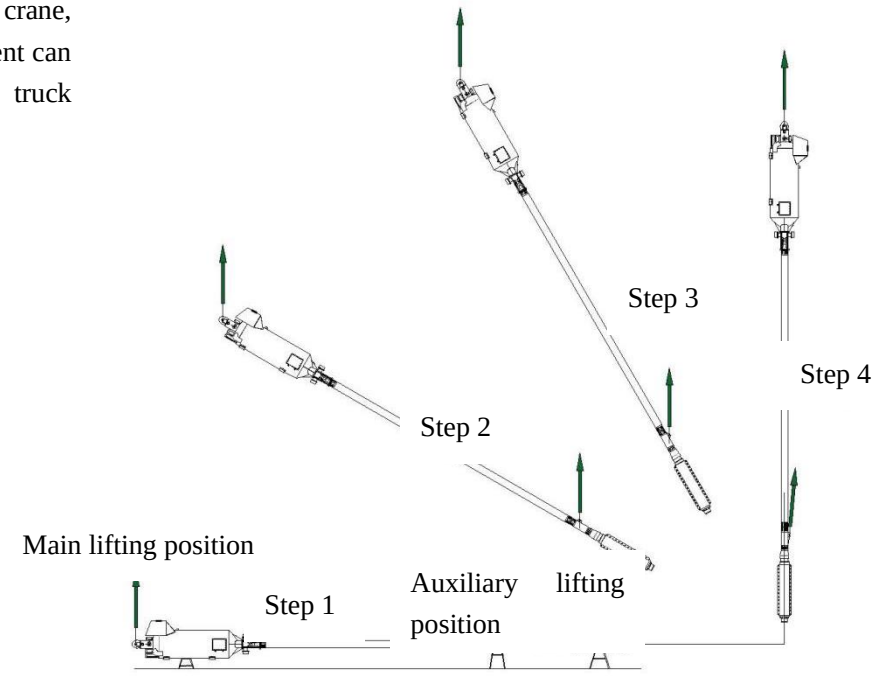
Equipment lifting should not be done before all function debugging are completed and all joints are welded firmly.

4.2 Equipment Lifting

After the installation is completed, the professional hoisting commander will command the hoisting under the condition that the connection of the test signal and the test data are all correct.

1. Hoisting for12-meter extension tube

The main crane is not less than 70 tons crawler crane or truck crane, and the auxiliary lifting equipment can be used not less than 25 tons truck crane.



The crane shall be configurated strictly according to the main and auxiliary lifting positions shown in the figure.

Step 1:

The main lifting equipment and auxiliary lifting equipment are lifted at the same time.

Step 2:

The lifting hook of the main lifting equipment is lifted, the auxiliary lifting equipment is slowly lowered and the lifting hook is rotated, gradually tilting the vibroflot.

Step 3:

The main lifting equipment continues to lift slowly. The auxiliary lifting equipment only needs to ensure that the end of the vibrator is in contact with the ground without load, and gradually tilts the vibroflot equipment

Step 4:

When the main lifting equipment hoists and vibroflot equipment to almost vertical state, the auxiliary lifting equipment lowers the hook and completes the mast of the equipment.

2. Hoisting for24-meter extension tube

The main crane is not less than 100 tons crawler crane or truck crane. The auxiliary lifting equipment can be used not less than 25 tons truck crane.

The crane is arranged strictly according to the main lifting position and auxiliary lifting position shown in the figure. The auxiliary lifting is lifted by movable pulley group. The diameter of the auxiliary lifting rope is not less than 22mm and the length is 14-15m.

Step 1:

The main lifting equipment and auxiliary lifting equipment are lifted at the same time.

Step 2:

The main lifting equipment hook is lifted, the auxiliary lifting equipment is slowly lowered and the hook is rotated, gradually tilting the vibroflot equipment to keep the bottom of the vibrator touching the ground slightly.

Step 3:

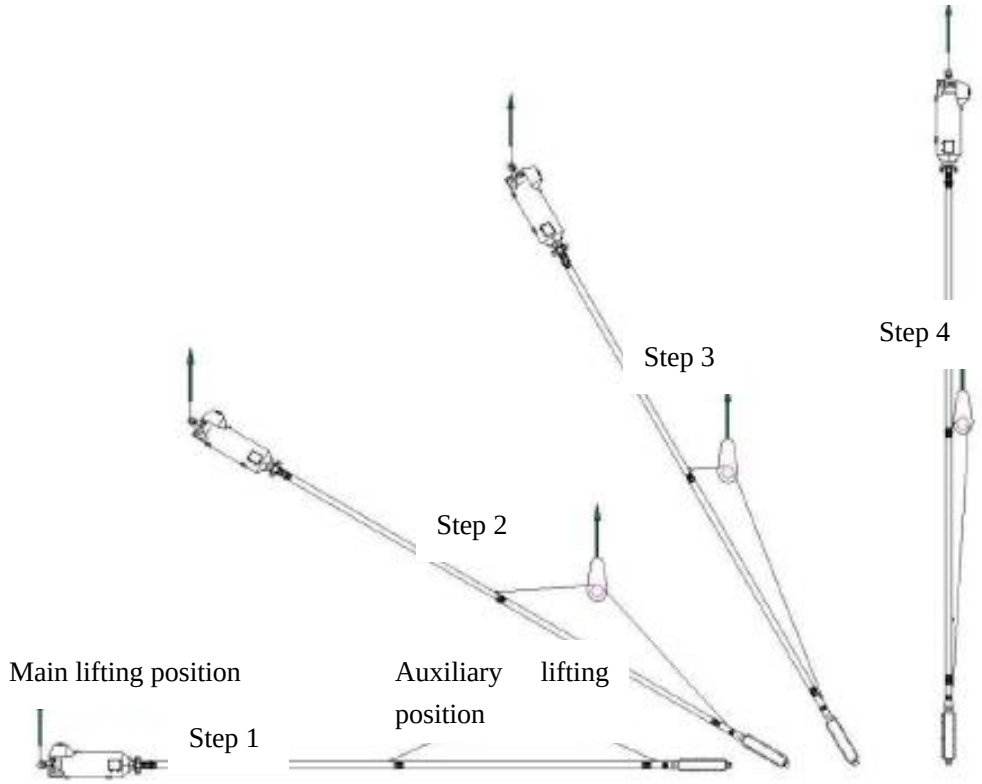
The main lifting equipment continues to lift slowly. The auxiliary lifting equipment only needs to ensure that the end of the vibrator is in contact with the ground without load, and gradually tilts the vibroflot equipment.

Step 4:

When the main lifting equipment hoists the vibroflot equipment to almost vertical state, the auxiliary lifting equipment drops the hook to complete its supporting.

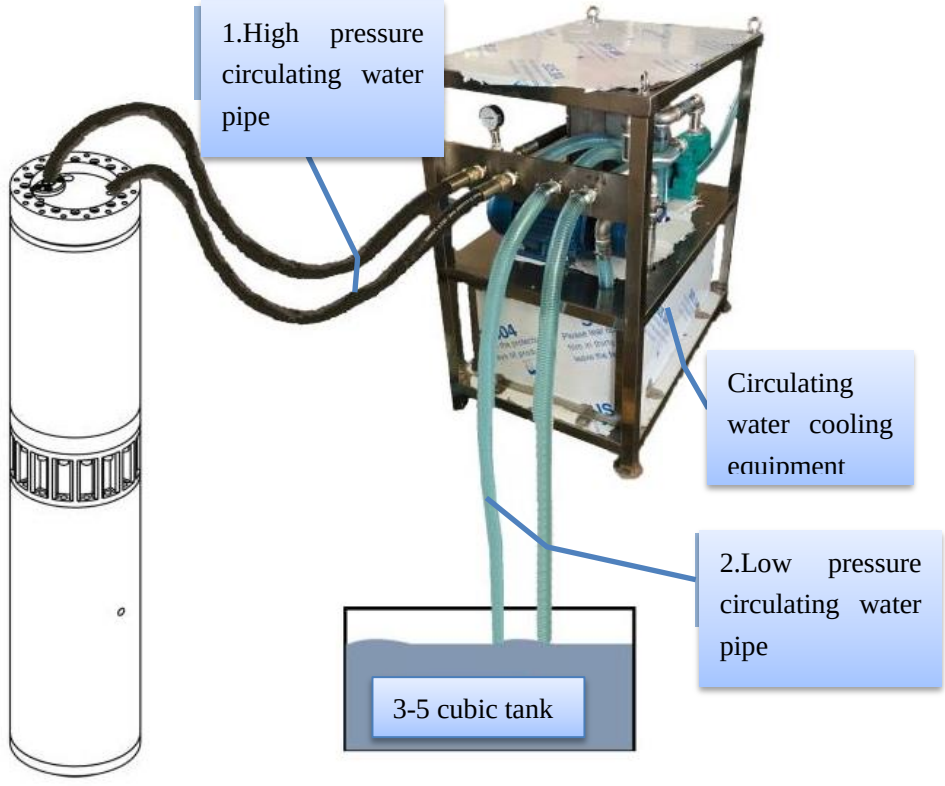
Step 5:

The lifting wire rope is dismantled by using of manual hanging basket or hole forming to auxiliary lifting position.



V. Installation of Circulating Water Cooling Control System

BJZC-CS-4P circulating water cooling control system is a cooling guarantee equipment for the normal work of dry vibroflot motor. It mainly consists of control box, high-pressure cooling pump, circulating water cooling pump, plate heat exchanger, cooling liquid tank, cooling water tank and connecting water pipe. The motor is powered by 380V/50HZ power supply, and the protection level is IP56.



5.1 High Pressure Circulating Pipe

Specification: DN25, steel wire braided pressure hose, single length 50 meters, DN25 inch joint connection.

5.2 Low Pressure Circulating Pipe

Specification: DN32, transparent steel plastic pipe, 6 meters in length, DN32 pagoda joint connection.

Operation steps:

Step 1:

Before use, check the looseness of the connecting pipes.

Step 2:

Add enough medium water to the coolant tank and check the level of coolant should be the upper limit.

Step 3:

Connect the vibroflot motor with cool the circulating water pipe.

Step 4:

Connect the power supply and check whether the rotation direction of the pump motor is the same as the direction indicated by the impeller.

Step 5:

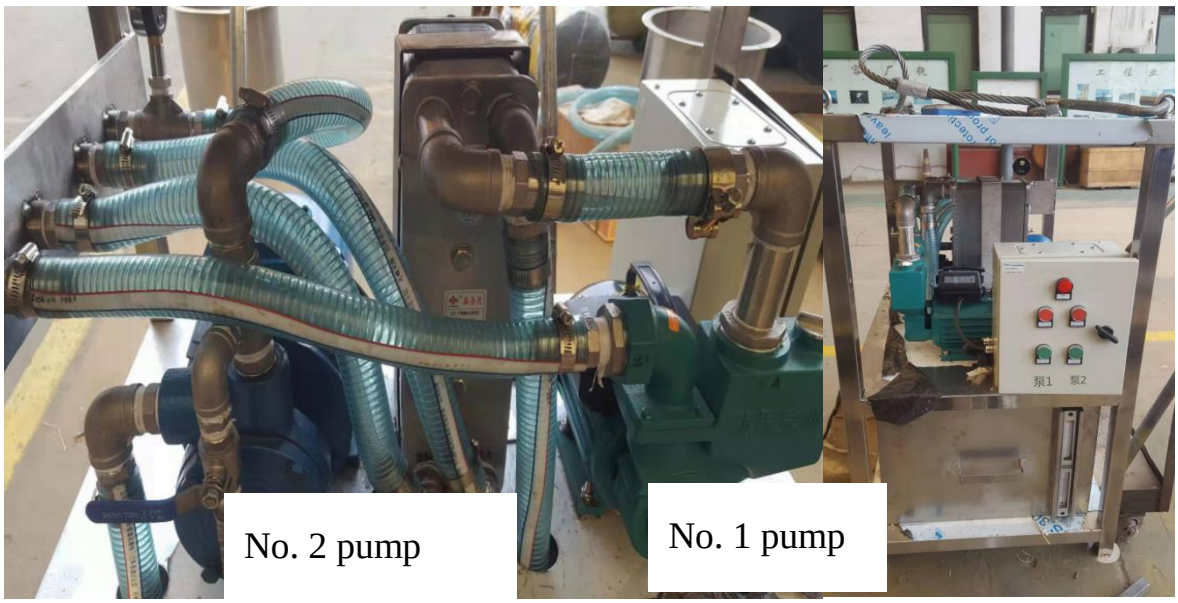
Start the circulating water cooling pump (No. 1 pump) to check whether the water circulation is normal.

Step 6:

Start the high-pressure circulating pump (No. 2 pump) of the vibroflot equipment system, check whether the pipeline is smooth and the small circulating water tank is running normally.

Step 7:

Check the amount of coolant at any time during operation. If the consumption is too fast, check the leakage of the circulating pipeline in time. At the same time, ensure that the water in the cooling water tank is sufficient (not less than 3/4, the total capacity is 3-6 cubic meters).



VI. Instructions for the Operation and Use of Frequency Conversion Cabinet

Manual of Use Instructions

(Before using this product, please read the manual carefully.)

6.1 Protection Grade and Description of Main Components

1. The protective grade of body cabinet is IP65.
2. The main components in the cabinet are Schneider products.
3. Inverter selection: Inviden GD200-200G/220P-4, rated current 380 A.

6.2 Designed Function

1. The power supply circuit breaker terminal control the power supply of the cabinet to facilitate maintenance and improve safety protection.
2. Frequency conversion function:

A. According to the geological and technological requirements of the construction stratum, the exciting force can be changed by adjusting the frequency of the vibrator to achieve better construction effect.

B. When the vibroflot motor starts up, because of the large power of the motor, it will impact the power supply network and the vibroflot mechanical parts, thus possibly reducing the service life of the mechanical parts. Through the control of frequency converter, the vibrator can be started in a relatively smooth acceleration curve, thus avoiding the above problems.

C. Overvoltage, undervoltage, phase-gap, overcurrent, overload, grounding, short-circuit protection and so on.

3. The control part is DC 24 V low voltage control, which improves the safety of the electronic control cabinet.
4. Cabinet operation panel:

A. Monitoring ammeter and three-phase voltmeter all use digital instruments. The current alarm value of vibroflot equipment construction technology can be set on the digital instrument, which makes the operation safer and more intuitive.

B. Installation of a digital display for the total working time of vibroflot equipment construction. According to this table, we can see the actual construction time of the electronic control cabinet, and it is also a measure of the quality of electrical components.

C. Add a fault alarm display lamp. When the electronic control cabinet has a corresponding fault, there will be a corresponding fault display lamp to indicate the cause of the fault.

D. All distribution boxes use buttons to control on-off to improve operation safety.

5. Protective ground wire is added to the cabinet. When the leakage occurs in the cabinet or the outer shell of the output electrical equipment, the leakage current will flow into the earth through the protective ground wire, reducing personal injury and improving safety and reliability. Therefore, all cabinet output devices must be grounded.

6.3 Parameter Settings

1. Parameter setting of vibrator ammeter

PP89: Set the input signal type to 17 (0-20mA standard signal).

PP36: Setting range display parameters are as follows: range low limit: 0000; range high limit: 0380; transmission low limit: 0000; transmission high limit: 0380.

PP01: Set the process alarm value J1:200, J2:195 (this value is the encrypted current value, if Party A Supervisor requires the encrypted current to reach 200 A, then this value is set to 200. When the current reaches 200, the process alarm light will be turned on, and when the current is from 200 to 195, the process alarm light will be extinguished).

2. Parameter Setting of Vibrator Frequency Meter

PP89: Set the input signal type to 17 (0-20mA standard signal).

PP36: Setting range display parameters are as follows: range low limit: 0000; range high limit: 0060; transmission low limit: 0000; transmission high limit: 0060.

3. Power Voltmeter Parameter Setting

0089: Display line voltage value: UL.

4. Power Frequency Meter Parameter Setting

No parameters need to be set, wiring can be done.

5. Inverter parameter setting (Inviden 200G parameter setting)

Parametric code		Setting values	Function	Terminal	Remarks
P01	00	2	Speed tracking restart, smooth start without impact		
P00	01	1	Running Instruction: Terminal Running Channel		
	03	60HZ	Maximum Output Frequency		
	05	10HZ	Lower Limit of Operating Frequency		
	06	6	A Frequency Instruction Selection: Multi-Speed Range Running Settings		
	08	1	Parking Mode: Free Parking		
	15	1	Motor Parameter Self-learning: Rotary Self-learning		
P02	01	180	Rated Power		
	02	50	Rated Frequency		
	03	1450	Rated Speed		
	04	380	Rated Voltage		
	05	350	Rated Current		
	27	120%	Overload Protection Coefficient of Motor		
P05	01	1	Forward Running	S1	
	02	9	External Fault Input	S2	
	03	7	Failure Reset	S3	
	04	16	Multistage Speed Terminal 1	S4	
	05	17	Multistage Speed Terminal 2	S5	
	06	18	Multistage Speed Terminal 3	S6	
P06	03	5	Inverter Fault	RO1	
	04	14	Overload Early Warning	RO2	
	14	4	Output Current	AO1	
	15	0	output Frequency	AO2	
P7	00	12345	Password		
P10	04	+75%	Multistage Speed 1:45HZ		
	06	+83%	Multistage Speed 2:50HZ		
	14	+91%	Multistage Speed 3:55HZ		
P11	5	01	Current Limiting Selection		
	6	92%	Automatic Current Limiting Level		350A
	8	001	Hundred bit 0: Always tested. Ten bit 0: Overload and underload continue to run. Bit 1: Select frequency converter to forecast alarm.		
	9	92%	Percentage of Alarm Pre-overload Detection Level		350A
	10	3S	Overload Forecasting Warning Delay Time		

6.4 Interpretation of Components in Electric Cabinet

Number	Symbol	Function	Number	Symbol	Function
1	HVZC	Inverter Fault	21	HGZC	Vibrator stop
2	HVJY	Clean Water Pump Overheating	22	HRZC	Vibrator working
3	HVCS	Submersible Pump Overheating	23	SRET	Inverter Reset
4	HVZCM	Overheating of Main Motor	24	SGZC	Vibrator Start
5	HGJY	Clean Water Pump Stop	25	SRZC	Vibrator Stop
6	HRJY	Clean Water Pump working	26	SPZC	Local Converter Remote
7	SJY	Start and Stop of Clean Water Pump	27	SHZC	Inverter Low, Medium and High Speed
8	HGCS	Submersible Pump Stop	28	VSP	supply voltage
9	HRCS	Submersible Pump Working	29	HZP	Power Frequency
10	SCS	Automatic Stop and Manual Start of Submersible Pump	30	TZC	Vibrator Timer
11	HGDL	Power Stop	31	HYP	A-phase Power Supply
12	HRDL	Power Output	32	HGP	B-phase Power Supply
13	SDL	Power on and off	33	HRP	C-phase Power Supply
14	HGZM	Lighting power supply	34	SEGY	Emergency Stop
15	HRZM	Illumination Output	35	HW	Control Power Supply
16	SZM	Lighting Start and Stop	36	QZ	Total Circuit Breaker
17	AZC	Vibrator working Current	37	F	Valve Arrester
18	HZZC	Vibrator working Frequency	38	QZC	Vibrator Circuit Breaker
19	HVGY	Working electrical Current	39	VZC	Frequency Converter
20	HVZCM	Motor preload	40	LZC	Reactor
Number	Symbol	Function	Number	Symbol	Function
41	MZC	Vibrator motor	61	QACDC	AC/DC Circuit Breaker
42	QJY	Clean Water Pump Circuit Breaker	62	GDC	DC Power Module
43	KJY	Clean Water Pump Contactor	63	QDC	DC Circuit Breaker
44	FJY	Clean Water Pump Thermal Relay	64	QAC	220 Control Circuit Breaker
45	MJY	Clean Water Pump Motor	65	KAZCM	Vibrator Overheating
46	QCS	Submersible Pump Circuit Breaker	66	KAZC	Vibrator Working
47	KCS	Submersible Pump Contactor	67	KAJY	Clean Water Pump Working
48	FCS	Submersible Pump Thermal Relay	68	KACS	Submersible Pump Working
49	MCS	Submersible Pump Motor	69	KADL	Power Output

50	QWDL	External Power Circuit Breaker	70	KAZM	Illumination Output
51	KWDL	External Power Contactor	71	KAAC	220 Control Normal
52	PWDL	External Power Output	72	KAYC	Remote FM
53	QWZM	External Lighting Circuit Breaker	73	KABD	Local FM
54	KWZM	External Lighting Contactor	74	KAEGY	Emergency Stop
55	PWZM	External Lighting Output	75	KACS	Water Level Relay
56	QZM	Lighting Circuit Breaker	76	KAVF	Inverter Fault
57	BZM	Lighting Limit Switch			Vibrator Stop
58	GZM	Lighting Lamps			Vibrator Working
59	QFS	Fan Circuit Breaker			Inverter Reset
60	GFS	Fan			Vibrator Start

6.5 Environmental Requirements for Use

Environment	Condition
Ambient temperature	"- 10 to + 50 degrees Celsius”When the ambient temperature exceeds 40, please reduce the amount by 3% at 1℃. We do not recommend the use of transducers in environments above 50 degrees Celsius.
Humidity	The relative humidity of air is less than 90%. No dew is allowed. In the presence of corrosive gases, the maximum relative humidity should not exceed 60%.
Altitude	Under 1000m, when the altitude exceeds 1000m, please reduce the amount by 1% according to the ratio of 100m reduction.
Vibration	The maximum amplitude does not exceed 5.8m/s2(0.6g).

6.6 Power Output Quota

1. Vibrator power: 180KW

2. Clean water pump power: 37KW

3. Submersible pump power: 20KW

4. Power Output Power: 30KW

5. Illumination output power: 6KW

6.7 Motor Rotation Direction Adjustment Method

The direction of vibroflot is specified as clockwise rotation observed from the head of vibroflot. The direction of the submersible pump and the clean water pump should be the same as the direction of the arrow on the pump. If the direction of the motor is opposite to the direction of the driving requirement, the direction of the rotating magnetic field will be reversed and the direction of the motor will be changed as long as any two-phase power supply wire is switched.

6.8 Control Cabinet Panel

Switches, indicator lights and meters are set on the control panel for starting and stopping of the motor, working status, alarm information, current and voltage frequency value, and can be operated and read according to the above indication. The control panel is as follows:

变频器故障	Inverter fault	潜水泵停止	Submersible pump stop	A 相电源	A-phase power supply
清水泵过热	Clean water pump overheating	潜水泵运行	Submersible pump working	B 相电源	B-phase power supply
潜水器过热	Submersible overheating	动力停止	Power stop	C 相电源	C-phase power supply
振冲过热	Vibrator overheating	动力输出	Power Output	控制电源	Control power supply
振冲电流	Vibrator working current	照明停止	Lighting stops	启动	start-up
振冲频率	Vibration frequency	照明输出	Lighting output	停止	Stop
电源电压	Supply voltage	备用	Spare	自动	Automatic
电源频率	Power Frequency	振冲电源	Vibrator power supply	手动	Manual
工艺电流	Process Current	振冲运行	Vibrator working	低速	Low speed
变频器预过载	Inverter Pre-overload	变频器复位	Inverter reset	中速	Medium speed
振冲计时器	Vibrator timer	振冲启动	Vibrator start	高速	High speed
清水泵停止	Clean water pump stop	振冲停止	Vibrator stop	急停	Emergency stop
清水泵运行	Clean Water Pump working	变频器	Frequency converter	本地	Local
				远程	Remote

VII. Instructions for Operation and Use of Material Container Control Cabinet

Manual of Use Instructions

(Before using this product, please read the manual carefully.)

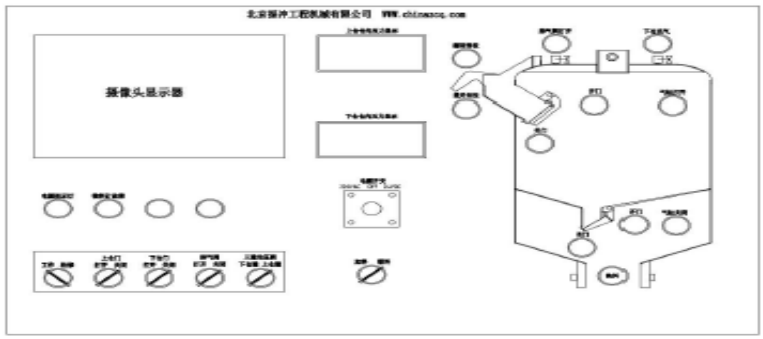
7.1 Protection Grade and Description of Main Components

The cabinet body protection grade is IP65, which can ensure long-term use in outdoor, seaside and other harsh conditions.

The power supply mode of the control cabinet has two choices: AC220V and DC 24V. Any power supply mode can be selected by the switch on the control cabinet (shown in the right picture), and the power supply wire can be connected to the corresponding voltage power supply (note: DC24V positive and negative can not be connected back). The number'1'is AC220V; the number'2' is DC24V; and the number'0'is power off for the control cabinet.

The main components of the control cabinet are Taiwan Yonghong PLC and aviation heavy-duty connector.

7.2 Designed Function



摄像头显示器	Camera Display	排气阀打开	Exhaust valve open	加料	Charging
电源指示灯	Power Indicator Lamp	排气阀关闭	Exhaust valve closure	幕料	Curtain material
物料计故障	Material Meter Failure	三通均压阀	Three-way pressure equalizing valve	翻转到位	Flip position
工作	Work	下仓通	Bottom container jab	提升到位	Promotion in place
检修	Overhaul	上仓通	Top container jab	下仓充气	Inflation bottom container
上仓门打开	Top container door open	上仓仓内压力显示	Pressure Display in top container	开门	Open the door
上仓门关闭	Top container door closed	下仓仓内压力显示	Pressure Display in bottom container	关门	Close the door
下仓门打开	Bottom container door open	电源开关	Power switch	气缸打开	Cylinder opening
下仓门关闭	Bottom container door closed	缺料	Shortage	气缸关闭	Cylinder closure

1. Limit reminder function:

A.Completed Lifting reminder function. When the hopper rises near the inlet port, the upgraded display lamp triggers, reminding the crane driver to reduce the speed of sub-hoisting and slow sliding into the overturning frame.

B. Turn-over position reminder function. When the hopper turns to the angle at which all stone can be dumped, the turn-over position indicator light triggers, reminding the crane driver to stop the sub-hoisting and mention the main hoisting and lowering.

C. The display function of top container cavity door opening/closing status, real-time display of the position and status of container door.

D. The display function of the bottom container cavity door, which can display the position and status of the bottom container cavity door in real time.

E. three-way valve air supply display function, real-time display air compressor air supply for container or container air supply.

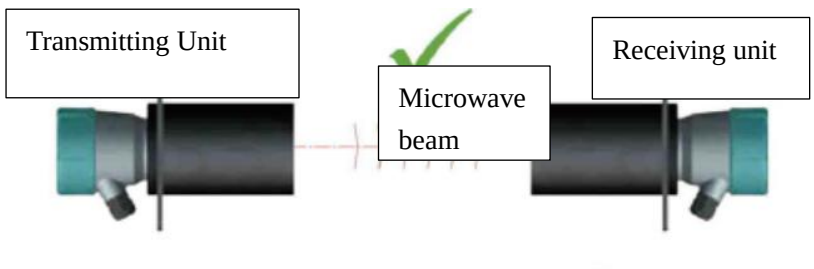
F. exhaust valve opening and closing function, real-time display exhaust valve processing closed state or exhaust state.

2. Pressure display function:

A. Top container cavity pressure display, real-time display of top container cavity pressure, easy to judge whether the top container cavity door is sealed and the status of three-way air supply valve.

B. Bottom container cavity pressure display, real-time display of bottom container cavity pressure, easy to judge whether the bottom container cavity door is sealed and three-way valve gas supply.

3. Material level display function:

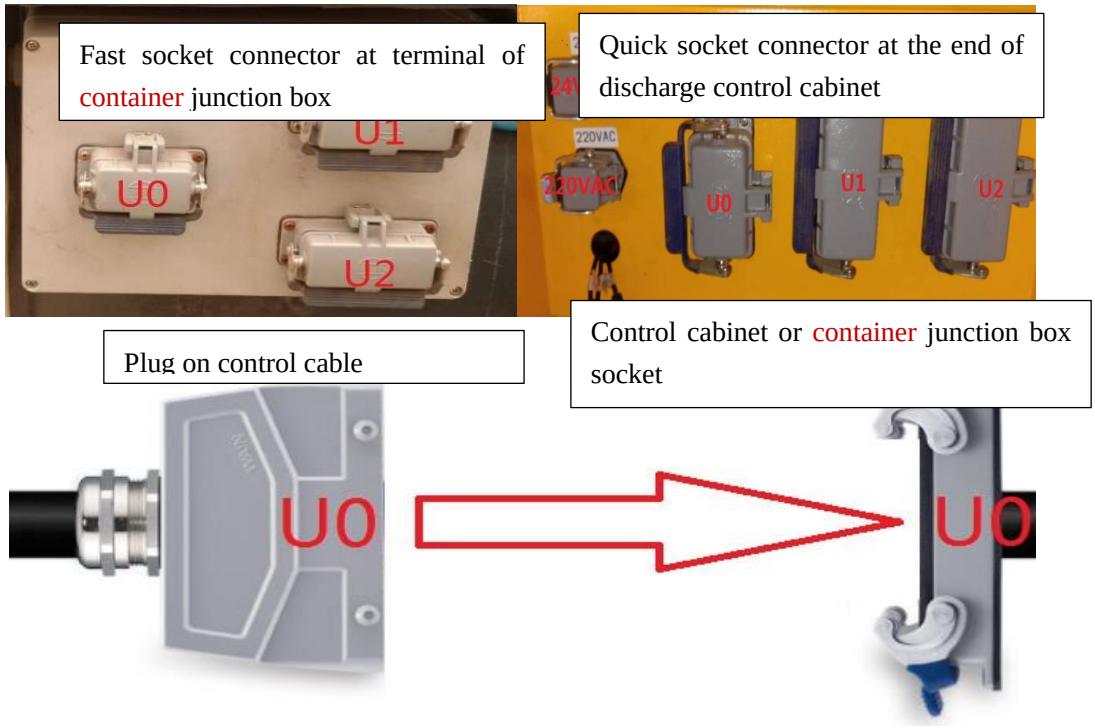


The microwave level sensor is used to monitor the aggregate in the silo. When the silo is short of material, the receiving unit can receive the signal of the sending unit, and the buzzer alarms while material shortage state in container will be shown.

7.3 Control Cable

The control cable is a control line connecting the bin control cabinet and the bin body. The cable is a special control line with twin steel wires for tension and torsion resistance. The cable passes through the stainless steel wrapped threading pipe to protect against abrasion, immersion and corrosion.

The control cable is connected by heavy-duty aviation fast plug-and-play connector, which is safe and reliable. The two ends of the cable are connected with container and control cabinet by three groups of heavy-duty fast socket joints. The number of plugs in the three groups is different, and the installation orientation of positioning pins in sockets is different. Through this design, the plug insertion reversal can be completely avoided.



7.4 Monitoring Equipment

The system adopts 720P high-definition digital wireless transmission function, which provides security for the safe operation and operation of the equipment.

The system transmits the signal to the display screen of the control cabinet in real time through two cameras installed on the feed port and the flip rack of the container. Operators can observe the whole process of hopper feeding and lifting through the real-time image in the display screen, and can also find out whether the hopper is turned over and whether there is stone accumulation at the entrance of the hopper so as to accurately operate the upper and blanking control valves and complete a work cycle.

7.5 Description of Working State of Material Container

1. Valve states when power supply is not connected (control gas supplied)

Top container cavity door: close without electricity, open with electricity.

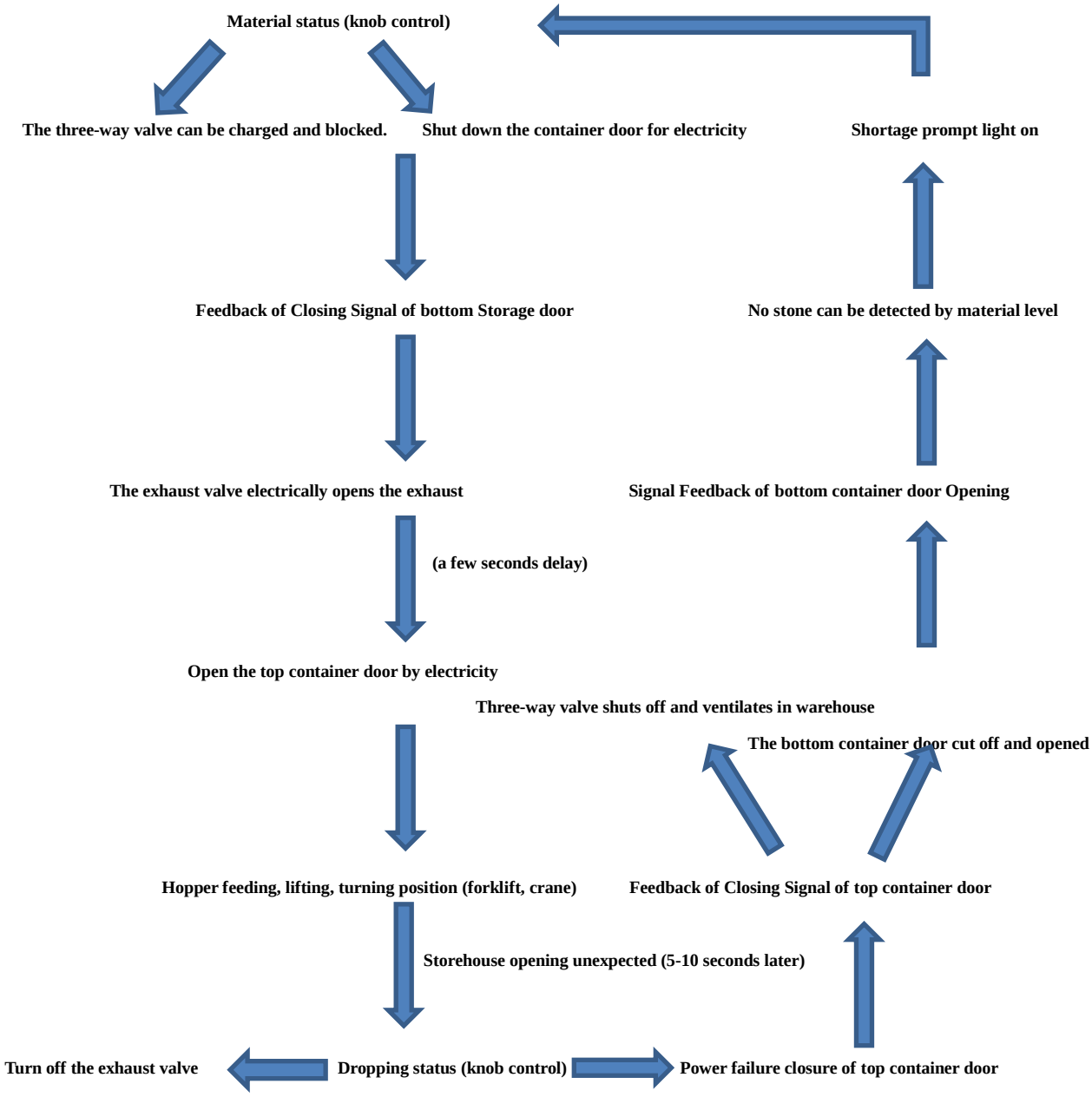
Bottom container cavity door: open without electricity, close with electricity.

Three-way valve: The top container cavity will aerate when no electricity is supplied, will cut off compressed air when electricity is supplied, the bottom container cavity always keep compressed air

Exhaust valve: closed when no electricity is supplied, exhaust when electricity is supplied.

After the control box is powered, the working state is judged by the position of the top and bottom container doors**.**

Automatic control flow of feeding and blanking buttons



2. Feeding process:

When the shortage prompt lamp is lit, the rotary switch is struck to the feeding position, the three-way ball valve is electrically charged to the container and the cylinder of the bottom container door is electrically closed. When the bottom container door is closed in place and the proximity switch is triggered, the exhaust valve is electrically opened to exhaust. When the top container pressure is lower than the set value of the top container pressure meter 5Bar, the cylinder of the top container door is electrically opened. At this time, the forklift driver has filled the lifting hopper with stone. When the lifting hopper is lifted to the entrance of the container by the crane driver's pick-up sub-hoist, the lifting hopper will be lit by the in-place indicator lamp. At this time, the crane driver should slow down and turn the hopper over until the turning point indicator light is lit. When all the stones are thrown out, the lifting hopper can be put back to the ground at a uniform speed.

3. Blanking process:

After observing that there is no residual stone at the entrance of the container through the monitoring display screen, when the rotary switch is switched on to the blanking position, the exhaust valve is turned off and the cylinder of the top container door is turned off. When the top container door is closed in place and the proximity switch is triggered, the three-way valve is turned off and the top container ventilation is turned off, the bottom container door is turned off and the bottom container door is opened in place, the connection is triggered. Close to the switch, showing that the bottom container door has been opened. When the missing light is on, continue feeding operation.

7.6 Overhaul Status

1. When the container needs to be repaired, the key switch knob needs to be struck to the maintenance state. At this time, the top container door, bottom container door, exhaust valve and three-way pressure equalizing valve can be controlled manually separately to facilitate equipment maintenance.

2. Inspection methods that can't be pressurized due to blocking material in top container door can't be closed strictly, which leads to air leakage in container. They are: turning the key switch of work/maintenance to the maintenance state, closing the exhaust valve, closing the bottom container door, ventilating the container, repeatedly acting the top container door switch, shaking the stone stuck at the container door, and switching to work after the pressure is established in container and the state of work.

7.7 Debugging

1. Maintenance status

The control cabinet of the container is in accordance with the action control of the container. Before the connection between the container and the extension tube of the vibroflot, the container is put on the ground separately, the control cables between the container control cabinet and the container and the intake pipes on the container are connected, the control cabinet is electrified, the work/repair knob is set to the maintenance position, and the individual action experiment is carried out. The opening and closing of the container door, the bottom container door, the exhaust valve and the three-way ball valve are separately operated. Observed at the entrance or exit of the container, the actions of the container door and the ball valve are consistent with the action names of the knobs, and the states of different container doors and ball valves are consistent with those of the corresponding indicator lights. If the action of cylinder or ball valve is opposite to that of switch, the position of port A and B of the corresponding reversing valve can be changed. (Note: Corresponding ports A and B of red and black tubes)

2. Working state

The container control conforms to the automatic control process. Put the work/overhaul knob to the working position for automatic feeding or blanking. The action sequence of each executing body is in accordance with the following: the automatic control flow chart and explanation of the feeding and blanking buttons can be done.

3. Level Meter Testing

The working principle of the level gauge: The microwave energy beam is transmitted from the transmitter to a separate receiver in pulse mode at a frequency of about 200 times per second. If the transmission path from the transmitter to the receiver is blocked by any object or material that absorbs or reflects microwave energy, the receiver will not be able to detect microwave energy signals. The intelligent switch controls the relay according to the appearance or disappearance of the signal at the receiver to achieve the purpose of indication or control. According to the working principle of the level gauge, an iron plate is used to separate the transmitter and receiver of the level gauge. If the defect indicator of the control cabinet is extinguished, it means that there is material in the level gauge; if the baffle is moved away and the defect indicator is lit, it means that there is material shortage. The level gauge works normally.

VIII. Whole Process Quality Control Recorder for Vibroflotation Construction

Manual of Use Instructions

(Before using this product, please read the manual carefully.)

8.1 Overview

The whole process quality control recorder of gravel pile can be controlled by wireless, and the control distance is 500 meters. The real-time and accurate monitoring of construction current, depth and filling quantity changes has a good quality control for construction. Operating interface is displayed by 10 inch industrial touch screen, which is convenient and fast, more intelligent and efficient, bilingual design, setting up Chinese and English language interface, and promoting international communication.

8.2 Main Monitoring Contents of Recorder

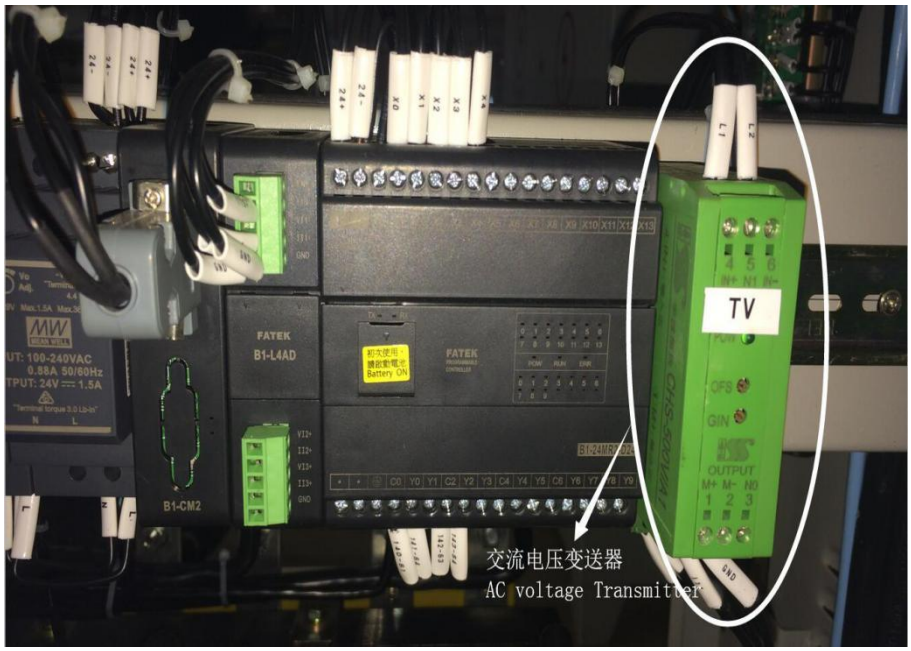
- Vibrator working current
- Boring depth
- Filling amount (can be gravel, can be sand)

Record the data and form curves and tables. It can also read data through USB interface, manage and analyze the derived data by special software on computer, make curves and print them out, and control the construction quality and invisible construction process of the whole construction in all aspects.

1. Current monitoring

The converter in the converter control cabinet converts the current value of the vibrator to 0-20MA current signal, and then inputs the signal to the current intelligent instrument XMT606B through the A01 and GND output ports of the converter to display the current. The intelligent instrument transmits the current value of the vibrator to the standard DC signal of 4-20mA through its own converter output port. Enter the analog input port of PLC in the frequency conversion control cabinet, and then transmit the measurement results through the program calculation to the touch screen through the wireless digital radio for data recording and display.

2. Voltage monitoring



The AC voltage transmitter is installed on the main circuit of the converter control cabinet. It measures the voltage of two of the fire wires. The measured voltage value is converted into 4-20mA standard DC signal, which is input to the analog input port of the converter control cabinet PLC. The measured result is transmitted to the touch screen through the wireless digital radio through the program calculation. Recording and displaying row data.

3. Depth measurement

The deep-sounding pulley group drives the encoder to rotate, and the pulse signal generated is transmitted to the high-speed counter of the recorder PLC through the shielded cable, and then the measured results are transmitted to the touch screen for recording and displaying through the program calculation.

4. Filling volume record

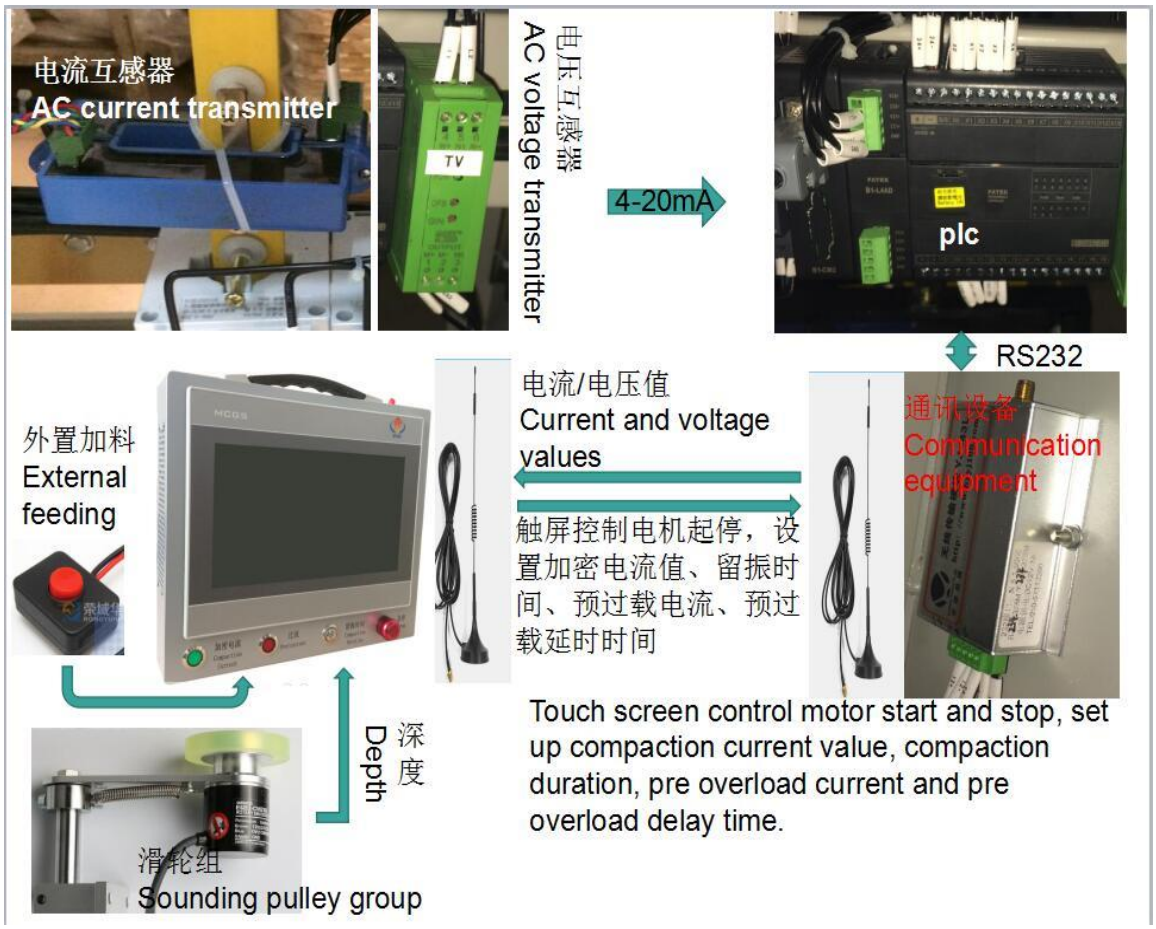
4.1 Sensor Weighing (Weighing and Feeding)

After the parameter setting window is set as the sensor weighing, the recorder can measure the current material weight of the stone in the hopper. The manual charging operation is carried out by the stone confirmation button on the touch screen of the recorder or the external charging button of the recorder. The current material weight is recorded every time the recorder is pressed. Active accumulation and display.

5. Compaction Current/Pre-overloaded Current/Vibration Retention Time Tips

In piling process, when the current value reaches the preset value of compaction current or preset overload current or vibration retention time, the indicator lamp or buzzer of the control panel of the recorder will give a prompt. The parameter setting window of the recorder can set compaction current/detention time/pre-overload current/pre-overload delay, the current intelligent instrument of the frequency conversion control cabinet can set process alarm, and the frequency converter can set pre-overload alarm value (see the instruction for the use of the frequency conversion cabinet for details).

Control flow chart between frequency converter and recorder:



8.3 Main Technical Parameters

1. The recorder power supply is DC24V DC power supply, and the maximum power supply is 18W.

2. Sounding device: encoder power supply voltage is DC24V, resolution 600P/R, NPN output.

3. AC current/voltage transformer power supply is DC24V DC power supply, current range is 720A, voltage range is 600V, transformer output signal is standard 4-20mA DC current signal.

4. Plate tension meter is used for weighing sensor. The power supply voltage is DC24V DC power supply with a measuring range of 5T. The output signals are all standard 4-20mA DC current signals.

5. The power supply of PLC in frequency conversion control cabinet, container control cabinet and recorder is DC24V, and the output of PLC in frequency conversion control cabinet and container control cabinet is relay output.

6. The power supply voltage of digital radio in frequency conversion control cabinet,container control cabinet and recorder is DC12V, communication baud rate is 9600BPS, 8 data bits, 1 stop bit, no check.

8.4 Recorder Equipment Installation

1. The recorder is installed in the operating room of the crane, and the antenna is adsorbed on the top of the operating room. Obstacles between them should be avoided as far as possible when the antenna is installed, otherwise the intensity of the signal will be affected.

2. Selection of installation position of bathymetric pulley group:

2.1 When 1 # pulley group is selected, the sounding pulley group is pressed on the fixed pulley flange at the top of the crane.

2.2 When the 2 # pulley group is selected, the bathymetric pulley group is installed on the bottom section of the crane arm.

3. The weighing sensor is installed on the wire rope where the hoisting hopper is located. The cable is connected with the PLC analog expansion module in the warehouse control cabinet or the wireless weighing distribution box (see wiring diagram for details).

1 # pulley set is as follows:

12# pulley set is as follows：

8.5 Introduction of Recorder Interface

1. 2-core DC24 power supply interface;2, 4-core encoder interface;

3. 2-core external feeding interface;4. Power switch;5. Antenna interface;6. USB interface;7. Encrypted current indicator;8. Over-current indicator; 9. Vibration retention time indicator;10. emergency stop button

The definition table for the connection of the recorder aviation plug is as follows：

Plug Name	Model	Pin	Definition
The power plug	GX16-2P (male)	1	+ 24V Power Supply
		2	0V
Encoder Plug	GX16-5P (male)	1	+ 24V Power Supply
		2	0V
		3	A phase
		4	B phase
		5	empty
Standby (feeding plug)	GX16-2P (male)	1	X2
		2	0V

Aviation Plug Connection of Encoder Shielded Cable：

Position	Plug Type	Pin	Definition
Plug on Encoder	Blue Waterproof Aviation Plug SP16-5 core (male)	1	Brown DC24
		2	Blue 0V
		3	Black A
		4	White B
		5	Shield
Connecting end of 30m shielded cable and encoder	Blue Waterproof Aviation Plug SP16-5 core(female)	1	Red DC24V
		2	Orange 0V
		3	Green A
		4	Blue B
		5	Shield

Connection End of 30m Shielded Cable and Recorder	Metal Aviation Plug GX16-5P (female)	1	Red DC24V
		2	Orange 0V
		3	Green A
		4	Blue B
		5	shiled

8.6 Operational Sequence Guide

1. Boot up

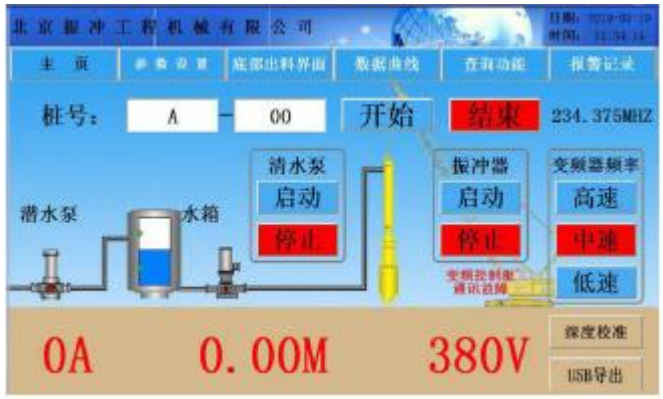
After the recorder and the depth measuring pulley group are in place and the cables between them are connected, the recorder DC24V power cord is connected to the crane battery or cab power supply (note: distinguish positive and negative poles), and the power switch button on the recorder is pressed to complete the power supply. The recorder first carries out self-inspect, which is displayed by the home page language selection interface (shown on the right). Select the language type "Chinese" or "English" by touching the display screen with your finger and go directly to the home page interface. (Take Chinese as an example)

Homepage: Language Selection Interface

2. Introduction of Home Page Function

When the language selection is complete, go to the home page (shown on the right). In the home page interface, you can modify the pile number, depth calibration, data recording,

query data, start/stop of control motor, frequency regulation of frequency converter, data export, etc. to display the working status of submersible pump/clean water pump/damper, current voltage/current/depth, communication frequency, communication status of frequency conversion control cabinet (when communication failure occurs). When the home page appears, the font of the communication fault of the frequency conversion control cabinet and begins to flicker.



Home page: Work interface Table 1

北京振冲工程机械有限公司	Beijing Vibroflotation Engineering Machinery Co., Ltd.	水箱	Water tank
日期	Date	清水泵	Clean water pump
时间	Time	启动	Start-up
主页	Homepage	停止	Stop
参数设置	Parameter Settings	振冲器	Vibrator
底部出料界面	Bottom discharge interface	变频器频率	Inverter Frequency
数据曲线	Data Curve	高速	High speed
查询功能	Query function	中速	Medium speed
报警记录	Alarm Record	低速	Low speed
桩号	Pile number	深度校准	Deep calibration
开始	Start	USB 导出	USB Export
结束	End	变频控制柜通讯故障	Communication failure of frequency conversion control cabinet
潜水泵	Submersible pump		

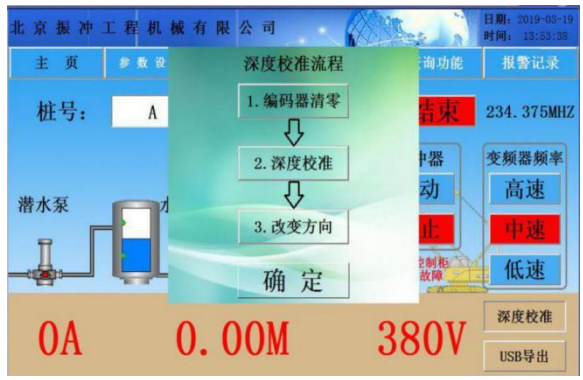
3. Parameter Settings

Click on the "parameter setting" button and there will be a parameter setting window, where you can edit the setting compaction current value, pre-overload alarm value, vibration retention time, pre-overload delay (current greater than pre-overload alarm value delay time, arriving at the time when the vibrator stops), select the filling mode (sensor weighing or custom filling), and volume of lifting hopper (set when choosing custom filling mode), volume of one ton of stone (set when choosing sensor weighing mode), weight pulley ratio (number of ropes on the moving pulley where hopper is located), data saving interval, then click confirm and exit the parameter setting window (shown on the right).

北京振冲工程机械有限公司	Beijing Vibroflotation Engineering Machinery Co., Ltd.	水箱	Water tank
日期	Date	清水泵	Clean water pump
时间	Time	启动	Start-up
主页	Homepage	停止	Stop
参数设置	Parameter Settings	振冲器	Vibrator
底部出料界面	Bottom discharge interface	变频器频率	Inverter Frequency
数据曲线	Data Curve	高速	High speed
查询功能	Query function	中速	Medium speed
报警记录	Alarm Record	低速	Low speed
桩号	Pile number	深度校准	Deep calibration
开始	Start	USB 导出	USB Export
结束	End	变频控制柜通讯故障	Communication failure of frequency conversion control cabinet
潜水泵	Submersible pump		

参数设置	Parameter Settings	一吨石料体积	Volume of a ton of stone
加密电流值	Encrypted current value	称重滑轮倍率	Weighing pulley ratio
预过载报警值	Pre-overload alarm value	传感器称重	Sensor weighing
留振时间	Vibration retention time	自定义填料	Custom Packing
预过载延时	Pre-overload delay	确定	Confirm
存盘间隔	Inventory interval		

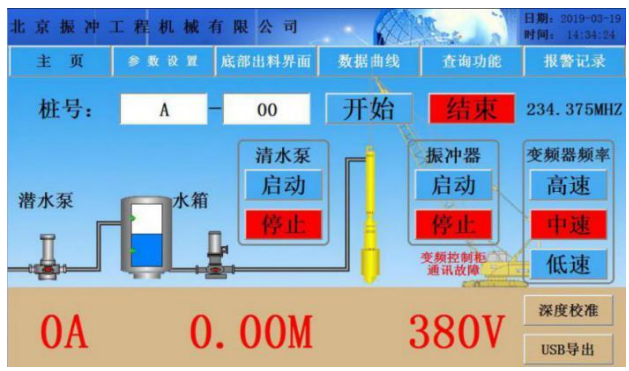
4. Deep calibration



Click on the "depth calibration" button, there will be a depth calibration process window, and operate according to the process sequence: first, the vibrator head just touches the ground surface (zero datum level), then click on the "encoder zero" button; then, when the vibrator is raised to 1 meter, click on the "2. depth calibration" button to specify the depth above the ground; For positive value, when the direction is opposite, click the "3. Change direction" button to change direction and complete the depth calibration operation. Click the "confirm" button to exit.

北京振冲工程机械有限公司	Beijing Vibroflotation Engineering Machinery Co., Ltd.	水箱	Water tank
日期	Date	清水泵	Clean water pump
时间	Time	启动	Start-up
主页	Homepage	停止	Stop
参数设置	Parameter Settings	振冲器	Vibrator
底部出料界面	Bottom discharge interface	变频器频率	Inverter Frequency
数据曲线	Data Curve	高速	High speed
查询功能	Query function	中速	Medium speed
报警记录	Alarm Record	低速	Low speed
桩号	Pile number	深度校准	Deep calibration
开始	Start	USB 导出	USB Export
结束	End	变频控制柜通讯故障	Communication failure of frequency conversion control cabinet
潜水泵	Submersible pump	深度校准流程	Deep calibration process
编码器清零	Encoder Zero Clearing	深度校准	Deep calibration
改变方向	Change direction	确定	Confirm

5. Controlling of motor start/stop and frequency regulation of frequency converter

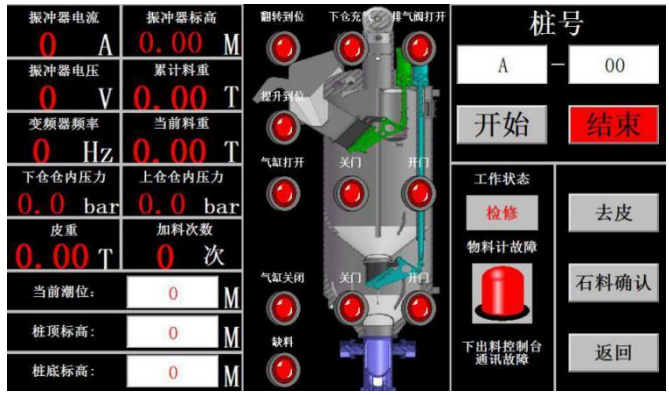


When the remote control cabinet is selected, the starting and stopping of the vibrator and the water pump can be controlled at the first interface, and the frequency adjustment of the frequency converter can be controlled. When the vibrator and the clean water pump are in operation, the "start" button becomes red; when the vibrator and the clean water pump are in stop state, the "stop" button becomes blue. Click on the "high" or "medium" or "low" button to switch the frequency of the vibrator. The red high-speed button indicates that the vibrator runs at high speed. The same is true at medium and low speed.

北京振冲工程机械有限公司	Beijing Vibroflotation Engineering Machinery Co., Ltd.	清水泵	Clean water pump
日期	Date	启动	Start-up
时间	Time	停止	Stop
主页	Homepage	振冲器	Vibrator
参数设置	Parameter Settings	变频器频率	Inverter Frequency
底部出料界面	Bottom discharge interface	高速	High speed
数据曲线	Data Curve	中速	Medium speed
查询功能	Query function	低速	Low speed
报警记录	Alarm Record	深度校准	Deep calibration
桩号	Pile number	USB 导出	USB Export
开始	Start	变频控制柜通讯故障	Communication failure of frequency conversion control cabinet
结束	End	水箱	Water tank
潜水泵	Submersible pump		

6. Material Container Control Interface

The interface can display the current, voltage, frequency and elevation of the vibrator, the current material weight, cumulative material weight, skin weight and packing times, the top and bottom container cavity pressure, limit switch state, container door state, cylinder and air valve state, material meter state, and can set the current tide level, pile top elevation, pile bottom elevation, repair, etc. Pile number modification, peeling, feeding and other operations.



振冲器电流	Vibrator current	提升到位	Promotion in place
振冲器电压	Vibrator voltage	气缸打开	Cylinder opening
变频器频率	Inverter Frequency	气缸关闭	Cylinder closure
下仓仓内压力	bottom container Pressure	缺料	Shortage
皮重	Tare	开门	Open the door
振冲器标高	Vibrator elevation	关门	Close the door
累计料重	Cumulative weight	下仓充气	Inflation under warehouse
当前料重	Current material weight	排气阀打开	Exhaust valve open
上仓仓内压力	top container Pressure	桩号	Pile number
加料次数	Number of feeding times	开始	Start
当前潮位	Current tide level	结束	End
桩顶标高	Pile top elevation	工作状态：检修	Working status: overhaul
桩底标高	Pile bottom elevation	物料计故障	Material Meter Failure
翻转到位	Flip position	下出料控制台通讯故障	Communication failure of discharging console
返回	Return	去皮	Peel
石料确认	Stone Confirmation		

7. Hoisting hopper peeling

The crane lifts the empty hopper off the ground. After clicking the "peeling" button, the weight of the hopper is displayed at the location of the skin weight. The current weight of the hopper is automatically returned to zero to complete the peeling operation. After the peeling operation, the quality of the stone is shown at the current material weight position.

8. Elevation settings

When piling on land, **the current tide level, pile top elevation and pile bottom elevation** are set to zero; when piling on sea, the record operation can only be carried out according to the elevation requirement of each pile, and when the vibroflotation mark reaches the design depth requirement, the hole-making shall be stopped.

9. Modification of Pile Number

Before each new pile is started, it is necessary to modify the pile number once. Touch the input box of the pile number with your finger, pop up the keyboard and change the pile number to the required number (example: A01-00 to A01-01), then click to confirm the modification.

请输入：（大写）	Please enter: (capitalization)
确认	Confirm
取消	Cancel

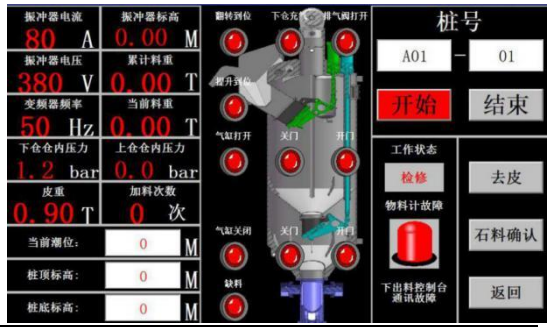
10. Start data recording

10.1 When piling on land, the current tide level, pile top elevation and pile bottom elevation must be set to zero. After the pile number has been modified, it can be recorded only when the vibrator head is aligned with the pile position and is in contact with the stratum 0 meters (because every time the start recording button is pressed, the depth is cleared).

10.2 When driving piles at sea, after modifying the pile number and current tide level, pile top elevation and pile bottom elevation, when the vibrator head aligns with the pile position and is in contact with the sea surface, the button turns red after pressing the start button, and the recording of data begins.

11. Feeding operation

Sensor weighing as an example: in the process of compaction, the number of fillers is recorded by touching the stone confirmation button on the screen or pressing the remote control stone feeding button. Each time the filler is added, the number of fillers display box adds an additional value. The amount of fillers is automatically accumulated and displayed at the accumulative weight position. (shown on the right).



振冲器电流	Vibrator current
振冲器电压	Vibrator voltage
变频器频率	Inverter Frequency
下仓仓内压力	bottom container Pressure
皮重	Tare
振冲器标高	Vibrator elevation
累计料重	Cumulative weight
当前料重	Current material weight
上仓仓内压力	top container Pressure
加料次数	Number of feeding times
当前潮位	Current tide level
桩顶标高	Pile top elevation
桩底标高	Pile bottom elevation
翻转到位	Flip position
提升到位	Promotion in place
气缸打开	Cylinder opening
气缸关闭	Cylinder closure
缺料	Shortage
开门	Open the door
关门	Close the door
下仓充气	Inflation under warehouse
排气阀打开	Exhaust valve open
桩号	Pile number
开始	Start
结束	End
工作状态：检修	Working status: overhaul
物料计故障	Material Meter Failure
下出料控制台通讯故障	Communication failure of discharging console
去皮	Peel
石料确认	Stone Confirmation
返回	Return

12. Ending Data Recording

After completing a pile, press the end button and the button turns red to stop recording the data. The next pile repeats the steps. (9.10.11.12)

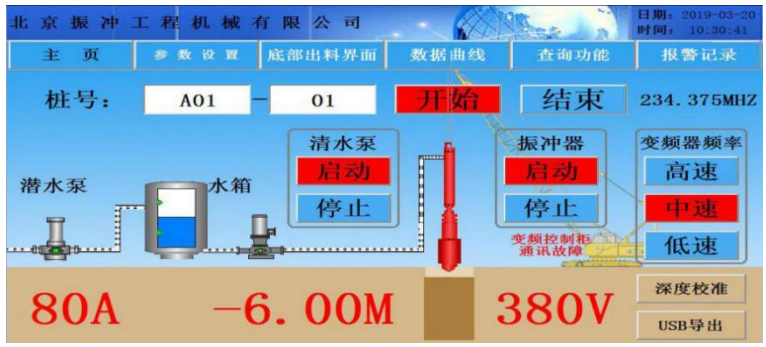
13. Data export

Export the data completed in one day, press the USB Export button on the home page, and pop up the data export settings window (such as the right picture). You can edit the project name of the exported data. There are two ways to export: export all the data and export according to the settings time, and prompt the export success after export. Note: The recorder can only store data within 240 hours based on the current time, and automatically delete data beyond the specified time. It is recommended that the data be exported to the U disk once a day. (USB interface supports USB2.0 and below)

数据导出设置	Data export settings
项目名称：港珠澳大桥人工岛	Project Name: Artificial Island of Hong Kong-Zhuhai-Macao Bridge
开始时间	Start time
结束时间	Ending time
共导出 4060 条数据	A total of 4060 data were exported.
导出成功	Successful export
导出所有数据	Export all data
按设定时间导出	Export by set time
返回	Return
说明：记录仪只可以存储以当前时间为基点 240 小时内的数据，超过规定的时间数据自动删除，强烈建议每天将数据导出一次到 U 盘。	Note: The recorder can only store data within 240 hours based on the current time, and automatically delete the data beyond the specified time. It is strongly recommended that the data be exported to the U disk once a day.

8.7 Quality Information of Completed pile

1. Display of equipment status information



In the process of hole boring, observe the working status of indicator lamp and the value displayed in display box. When submersible pump/clean water pump works, the indicator lamp of corresponding equipment on the screen changes from red to green, the vibrator turns red when it works, and the information of current voltage/current/depth is displayed (shown on the right side).

北京振冲工程机械有限公司	Beijing Vibroflotation Engineering Machinery Co., Ltd.
日期	Date
时间	Time
主页	Homepage
参数设置	Parameter Settings
底部出料界面	Bottom discharge interface
数据曲线	Data Curve
查询功能	Query function
报警记录	Alarm Record
桩号	Pile number
开始	Start
结束	End
潜水泵	Submersible pump
水箱	Water tank
清水泵	Clean water pump
启动	Start-up
停止	Stop
振冲器	Vibrator
变频器频率	Inverter Frequency
高速	High speed
中速	Medium speed
低速	Low speed
深度校准	Deep calibration
USB 导出	USB Export
变频控制柜通讯故障	Communication failure of frequency conversion control cabinet

2. View real-time curves

Click on the **"curve"** button to enter the real-time curve interface. By choosing the four buttons of **current curve, voltage curve, depth curve** and **stone volume curve** in the lower right corner of the switching screen, we can enter the corresponding curve (shown on the right).

电流曲线	Current Curve
电压曲线	Voltage curve
深度曲线	Depth curve
石料曲线	Stone Curve
内容	Content
绝对时钟	Absolute clock
电流	Electric current
坐标范围	Range of coordinates
当前值	Current value
单位	Unit

3. Pile Information Query

Click on the **inquiry function** button on the home page and enter the inquiry interface of pile information. You can inquire about the pile information that has been drilled. The display content includes pile number, compaction current, start time, end time and total time, such as the right figure.

序号	Number	上一页	Previous page
桩号	Pile number	下一页	Next page
加密电流	Encryption current	置顶	Roof setting
开始时间	Start time	置底	Bottom setting
结束时间	End time	记录的数据	Recorded data
总时间	Total time	设置	Set up

4. Recorded data

In the pile information query interface, click on the "Recorded Data" button and enter the historical table of the data query. The contents of the query include pile number, time, current, voltage, depth and filling volume (shown on the right side).

序号	Number
桩号	Pile number
加密电流	Encryption current
开始时间	Start time
结束时间	End time
总时间	Total time
上一页	Previous page
下一页	Next page
置顶	Roof setting
置底	Bottom setting
记录的数据	Recorded data
设置	Set up

5. Alarm Record Query

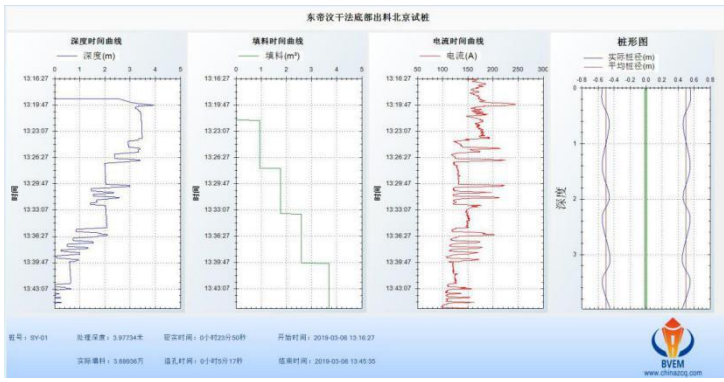
Click on the **"alarm record"** button to enter the alarm information inquiry window, and display the start and end time of the clear water pump current overload, the vibrator current overload, the vibrator overload and the communication failure in the form of a table (shown on the right side)

日期	Date	振冲器过流	Vibrator Overflow
时间	Time	振冲器过流了	Vibrator overflowed
对象名	Object name	清水泵过载	Clean water pump overload
报警描述	Alarm description	清水泵过载了	Clean water pump overloaded
结束时间	Ending time	配电柜通讯状态	Communication Status of Distribution Cabinet
振冲器过载	Vibrator overload	通讯故障	Communication failure
振冲器过载了	Vibrator overloaded		

6. Boring curve

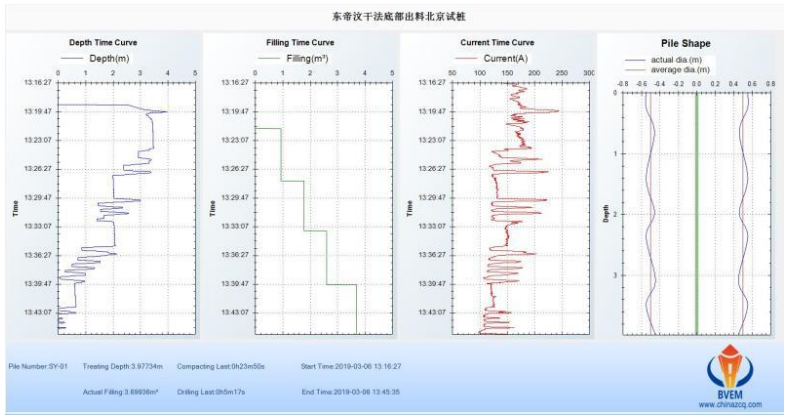
The quality information of boring is exported through USB interface and transmitted to computer. With the help of boring quality data processing software, the boring curves in Chinese and English formats can be obtained.

A. Quality Control Curve of Chinese Interface in the Whole Process



东帝汶干法底部出料北京试桩	Beijing Pile Test of East Timor Dry Process Bottom Discharge	实际桩径（m）	Actual Pile Diameter (m)
深度时间曲线	Depth-time curve	平均桩径（m）	Average Pile Diameter (m)
填料时间曲线	Filling time curve	桩号	Pile number
电流时间曲线	Current-time curve	处理深度：3.97734 米	Depth of treatment: 3.97734 m
柱形图	Column diagram	实际填料：3.69936 万	Actual packing: 369.36 million
深度（m）	Depth (m)	密实时间：0 小时 23 分 50 秒	Closed time: 0 hour, 23 minutes and 50 seconds
填料（m^3）	Packing（m^3）	造孔时间：0 小时 5 分 17 秒	Hole-making time: 0 hour, 5 minutes and 17 seconds
电流（A）	Current (A)	开始时间	Start time
		结束时间	End time

B. Whole Process Quality Control Curve in English Interface



IX. Equipment Maintenance and Troubleshooting

1. Maintenance and Maintenance

A. Vibrators work in bad working environment and heavy load. They must be maintained in time. The degree of maintenance directly affects the service life and working efficiency of vibrators.

B. Vibrators should be welded and strengthened under the guidance of our company. Welding in other parts is strictly prohibited. Otherwise, it will be regarded as automatically giving up the free warranty period.

C. In the construction process, always observe whether the connecting screw of each part of the vibroflot is loosened, and the situation should be tightened in time. Welding parts should be strengthened in time according to wear condition.

D. In the process of construction, attention should be paid to whether the vibrator has noise, check whether the ammeter has fluctuation, and timely repair and treatment according to the situation. The working state of the vibroflot must be perpendicular to the ground. Transverse vibration should be prohibited to avoid internal damage.

E. After the new equipment is put into use for 1000 linear meters, it should be replaced and maintained by adding lubricating oil according to the quantity specified in the technical parameters. Normal use of lubricant replacement every month for maintenance, the specific replacement time depends on the operation of the equipment.

F. According to the service life and workload of the equipment, the equipment will be regularly repaired and maintained after about 1 month or 5000 linear meters of construction footage, and the vulnerable parts will be replaced.

G. Oil-lubricated vibrators need to be replaced every 5000 linear meters.

H. Silo sealant board should be replaced when using 3000 linear meters.

2.Troubleshooting

Faults of equipment and methods of inspection and removal are detailed in the table below.

Number	Fault condition of equipment	Inspection and exclusion
(1)	Vibrator does not start properly	Check whether the line power supply is missing, check the power supply voltage, check the clearance of the vibrator coupling, check whether the vibrator and motor bearings are damaged. (Check the consistency of lubricating oil in winter, heat treatment).
(2)	Excessive No-load Current of Vibrator	Check the voltage, check the amount of lubricating oil and the consistency, check whether the vibrator and motor bearings are damaged.
(3)	Vibrator has abnormal sound when working	Check the bearing and connecting parts.
(4)	Temperature Rise of Bearing Part of Vibrator at Work	Check the amount of lubricating oil, check the bearing.
(5)	Vibrator running normally suddenly shut down	Check whether the motor cable leakage, check the control circuit and protection device.
(6)	Vibrator charged at whole body	Check the leakage protection device.
(7)	The action of the cylinder in the container is contrary to that of the cylinder.	Check whether the position of the A and B holes in the intake air of the cylinder is interchangeable, and check whether the A and B holes of the solenoid valve in the state of power gain and power loss are reversed.
(8)	Sealing leak of container makes pressure rise difficult	Check if there is any stone stuck at the turning board and there is wear on the sealant board.
(9)	Failure of flip limit switch	First, check whether there is no reset card involved, second, judge whether the limit switch is damaged, and then check whether the cable control line is damaged.

Be careful

If it is not suitable to put oil or oil immediately after work or just stop running, because the heat generated by the work of the vibrator will expand the cavity in a certain space. Workers should stand on the side of the oil hole to avoid hot oil burns caused by bolt ejection and splashing.

Be careful

Before repairing, the oil in the chamber of the vibrator should be discharged cleanly, and the oil plug should be kept in an open state, so as to prevent the personnel from deflagration and scald caused by excessive oil temperature during the cutting and welding process.

X. Safety Guidelines

10.1 Bottom Feed VIbroflot Technical Conditions

1. Strictly follow the operation specifications of the product instructions.
2. No conversion or modification of vibration and punching equipment is allowed without approval.
3. Maintain regularly.
4. The safety device is in good working condition.
5. The implementation of the technical code for vibroflotation foundation treatment referred to DL/T 5214-2016 is not indicated.

10.2 Personnel Quality Requirements for staff

All operators involved in the construction site must be equipped with safety helmet, safety shoes and reflective clothing before they can enter the construction site. Operating electricians and welders must obtain corresponding operation certificates and be trained to be qualified before they can take up their posts.

1. Crane operator

A. Lifting operators should be trained in professional safety and qualified to hold operation certificates before they can participate in lifting operations.

B. Having the corresponding physiological and psychological qualities of safe crane operation (enough eyesight and hearing, able to respond quickly).

C. Authorized operation of the crane.

D. Personnel who have grasped the instructions of matters needing attention in the construction of vibroflot piles through the technical explanation of vibroflot equipment construction.

2. Equipment Operators

A. Equipment operators are trained in professional technology to fully understand the risks in the construction process and to understand the corresponding response plan personnel.

B. Personnel who have grasped the instructions of matters needing attention in the construction of vibroflot piles through the technical explanation of vibroflot equipment construction.

C. Authorized operation of the equipment.

3. Electrical Operators

A. Personnel who have received professional training and passed the examination and hold the electrician's operation certificate.

B. Personnel skilled in electrical operation of vibration and impulse related equipment.

C. Personnel who have grasped the instructions of matters needing attention in the construction of vibroflot piles through the technical explanation of vibroflot equipment construction.

4. Welders

A. Personnel who have received professional training and passed the examination and hold the welder's operation certificate.

B. Personnel skilled in electrical operation of vibration and welding operation instructions.

C. Personnel who have grasped the instructions of matters needing attention in the construction of vibroflot piles through the technical explanation of vibroflot equipment construction.

Appendix I Standard of Bolt Fastening Torque

Tightening Torque of M6~M24 Screws or Nuts (Operator's Reference)

Nominal diameter dimensions of threads d/mm	The tightening moment applied to the wrench M/N.m	Key Points of Force Operation	Nominal diameter dimensions of threads d/mm	The tightening moment applied to the wrench M/N.m	Key Points of Force Operation
M6 M8 M10 M12	3.5 8.3 16.4 28.5	Only wrist force Adding wrist and elbow force Adding whole body arm strength Add half-strength	M16 M20 M24	71 137 235	Strengthen your whole body Press on the whole body weight Press on the whole body weight

Refer to the following table (common bolt tightening moment) when no tightening moment requirement is specified.

Bolt strength level	Yield strength N/mm^2	Nominal diameter of bolt mm							
		6	8	10	12	14	16	18	20
		Tightening torques N.m							
4.6	240	4-5	10-12	20-25	36-45	55-70	90-110	120-150	170-210
5.6	300	5-7	12-15	25-32	45-55	70-90	110-140	150-190	210-270
6.8	480	7-9	17-23	33-45	58-78	93-124	145-193	199-264	282-376
8.8	640	9-12	22-30	45-59	78-104	124-165	193-257	264-354	376-502
10.9	900	13-16	30-36	65-78	110-130	180-201	280-330	380-450	540-650
12.9	1080	16-21	38-51	75-100	131-175	209-278	326-434	448-597	635-847

Refer to the following table (common bolt tightening moment) when no tightening moment requirement is specified.

Bolt strength level	Yield strength N/mm^2	Nominal diameter of bolt mm						
		22	24	27	30	33	36	39
		Tightening torques N.m						
4.6	240	230-290	300-377	450-530	540-680	670-880	900-1100	928-1237
5.6	300	290-350	370-450	550-700	680-850	825-1100	1120-1400	1160-1546
6.8	480	384-512	488-650	714-952	969-1293	1319-1759	1694-2259	1559-2079
8.8	640	512-683	651-868	952-1269	1293-1723	1759-2345	2259-3012	2923-3898
10.9	900	740-880	940-1120	1400-1650	1700-2000	2473-3298	2800-3350	4111-5481
12.9	1080	864-1152	1098-1464	1606-2142	2181-2908	2968-3958	3812-5082	4933-6577

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