

Dear Client,

Thank you for Purchasing our XYLH-V SF6 Gas Recovery Device. Please read the manual in detail prior to first use, which will help you operate the equipment skillfully.



Our aim is to continually improve and perfect the company's products, so there may be slight differences between your purchase equipment and its instruction manual.

You can find the changes in the appendix. Sorry for the inconvenience. If you have further questions, welcome to contact with our service department.



The input/output terminals and the test column may bring voltage, when you plug in/pull out test line or power outlet, they will cause electric spark. PLEASE CAUTION RISK OF ELECTRIC SHOCK! To avoid risk of electric

shock, be sure to follow the operating instructions!

## ◆ **SERIOUS COMMITMENT**

All products of our company carry one year limited warranty from the date of shipment. If any such product proves defective during this warranty period we will maintain it for free. Meanwhile we implement lifetime service. Except otherwise agreed by contract.

## ◆ **SAFETY REQUIREMENTS**

Please read the following safety precautions carefully to avoid personal injury and to prevent the product or any other attached products being damaged. In order to avoid possible danger, this product can only be used within the scope of the provision..

*Only qualified technician can carry out maintenance or repair work.*

**--To avoid fire hazard or personal injury:**

### **Use Proper Power Cord**

Only use the power wire supplied by the product or meet the specifications of this product.

### **Connect and Disconnect Correctly**

When the test wire is connected to the charged terminal, please do not connect or disconnect the test wire at will.

### **Grounding**

The product is grounded through the power cord; besides, the ground pole of the shell must be grounded. To prevent electric shock, the grounding conductor must be connected to earth ground. Before making

connections to the input or output terminals of the product, please do check that the product is properly grounded.

### **Pay Attention to the Ratings of All Terminals**

To prevent the fire hazard or electric shock, please be care of all ratings and labels/marks of this product. Before connecting, please read the instruction manual to acquire information about the ratings.

### **Do Not Operate without Covers**

Do not operate this product when covers or panels removed.

### **Use Proper Fuse**

Only use the fuse with type and rating specified for the product.

### **Avoid Touching Bare Wire and Charged Conductor**

Do not touch the bare connection points and parts of energized equipment.

### **Do Not Operate with Suspicious Faults**

If you encounter operating faults/suspect there is damage to this product, do not continue. Please contact with our maintenance staff.

### **Do Not Operate in Wet/Damp Conditions.**

### **Do Not Operate in Explosive Atmospheres.**

### **Ensure Product Surfaces Clean and Dry**

## —Security Terms

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Warning: indicates that death or severe personal injury may result if proper precautions are not taken

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Caution: indicates that property damage may result if proper precautions are not taken.

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# **1 use and model description**

## **1.1、 Description of use**

SF6 gas as an insulating gas, with non-toxic, non-flammable, and good insulation properties, the insulation strength is much higher than the traditional insulating gas, and has good arc quenching, it is widely used in SF6 appliances. Because SF6 gas is expensive, and in the arc, EDM and corona discharge, will produce toxic decomposition. Therefore SF6 electrical appliances need SF6 gas recovery. This device is to produce and repair SF6 electrical equipment, the SF6 gas recovery and filling a special equipment.

### **1.1.1 Scope of application**

The device is suitable for SF6 electrical equipment in sulfur hexafluoride gas for vacuum, inflatable, back filling, purification and recovery.

### **1.1.2 Design**

The device consists of SF6 gas recovery device. The main advantages of the products involved are the ability to store the recovered SF6 gas directly in a liquid form into the container and to recover the residual pressure in the GIS to 53 Kpa (absolute) with a small volume for easy placement, Faster pumping speed, the recovery of SF6 gas can be dried and filtered, but also back to the SF6 SF6 gas back to the electrical equipment.

## **1.2、 Technical characteristics**

1.2.1 、 Built-in filter adsorption system, you can adsorb SF6 gas in the impurities, water, decomposition products and oil and so on.

1.2.2、 The integrated design and small size make it easy to move and use

1.2.3、 Efficient filtration maintenance-free system, which greatly guarantees the quality of SF6 gas recovery

1.2.4、 Built-in phase sequence protector, regardless of when the host can be avoided due to phase sequence error and reverse the concerns

1.2.5、 All electrical systems are of high quality

1.2.6、 High quality casters will greatly protect the floor paint and reduce the manpower required to push it

1.2.7、 The machine is air-cooled without external water supply.

1.2.8、 Built-in temperature protection system even at -20 degrees Celsius can also work properly

1.2.9、 Built-in drying and heating system ensures that the desiccant is saturated and then regenerated by heating the equipment, eliminating the need to replace the desiccant

1.2.10、 All ball valves have automatic compensation for sealing elements

1.2.11、 With built-in electromagnetic valve power protection, to prevent the vacuum pump power outage or bite the death of the motor oil

### **1.3、 Exterior**

The equipment layout is reasonable, the structure is simple and compact, the overall nice, easy to operate and maintain, paint adhesion for the first level, the color is orange-red.



## 2 Technical description

### 2.1、 Main components performance parameters

NO	Index name and unit		SF6 GAS RECLAIMER
1	Power AC	V	400(three line five, phase sequence automatic conversion)
2	Rated maximum gas storage pressure (20 C)	MPa	≤4
3	Ultimate vacuum	Pa	≤10
4	Device vacuum degree	Pa	In the 133 Pa pressure to maintain 24h, the vacuum value increased by 400 Pa
5	SF6 compressor		Gulun compressor
6	Compressor pumping rate	m3/h	7m³/h
7	Vacuum pump		2X-4
8	Vacuum pumping speed	m3/h	15
9	Adaptation inlet pressure recovery beginning (20℃)	MPa	0~1.0
10	Electrical Equipment Recycling final pressure (20℃)	MPa	≤50 Kpa
11	After recovering oil gas control	μg/g	Domestic oil <10
12	Means annual leakage rate	%	<1
13	Means continuous trouble-free operation time	h	≥1000
14	Cumulative operation time between failures	h	≥5000
15	Noise level	dB(A)	Machine≤75
16	Theoretical capacity accumulator	KG	50
17	Liquefaction compressor refrigeration		Donper
18	Freezing tank	L	50
19	Recycle gas moisture (PPM / V) after	PPM/V	60
20	After the recovery of gas oil (PPM / V)	PPM/V	10
21	Drying filtering		Vacuum heating activated regeneration
22	Inflatable initial pressure (pa)	pa	≤133

23	Inflatable final pressure (mpa)	mpa	0.8
24	Inflatable rate (m <sup>3</sup> / h)	m <sup>3</sup> /h	≥5
25	Gasification Information		Electric heating automatic temperature control
26	Vehicle type		Hand push type
27	Dimensions		1450×810×1200
28	Total Weight	kg	600
29	cooling method	Air	cooling
30	filtering system		Using the United States HASON technology, three filter - can be more high removal of SF6 gas in the recovery of water, oil, particulate impurities and dust, to ensure that the recycling of SF6 gas recycling

## 2.2、 Concise parameter table

model	SF6 GAS RECLAIMER
Vacuum pumping speed (m3 / h)	15
Ultimate vacuum (Pa)	10
Vacuum pump	Domestic bipolar vacuum pump
SF6recovery compressor (m3 / h)	7
pressure (MPa)	2.5
Compressor manufacturers	Gulun compressor
Filter particles (micron)	0.02
Oil (PPM)	Efficient
Acid value (PH)	0.1
Hydrolyzable fluoride (PPM)	0.2
Toxicity	无
Water (PPM)	≤60
SF6 Purity	≥99.9%
SF6 tank	50L
SF6 tank material	carbon steel
Cooling System	High quality and high efficiency compressor
filter	Original USA
Dryer	Original USA
Gauge	pointer
valve	Unique technology (built butterfly sealed to ensure multiple switch does not leak)

## 2.3、 Main technical parameter description

### 2.3.1、 Recycling

Recovery of initial pressure  $\leq 0.8\text{MPa}$

Recovery of the final pressure  $\leq 50\text{KPa}$

Recovery time: the initial pressure of  $0.8\text{MPa}$  1 m<sup>3</sup> SF<sub>6</sub> gas volume, recovery to final pressure  $5\text{KPa}$ , recovery time of less than 2 hours.

### 2.3.2、 Inflatable

The initial pressure of  $133\text{Pa}$  of 1 m<sup>3</sup> SF<sub>6</sub> gas volume to  $0.8\text{MPa}$ , filling time is less than 0.8 hours.

### 2.3.3、 Vacuum

The ultimate vacuum of the device is less than or equal to  $10\text{ Pa}$

The time required for evacuating the 1 m<sup>3</sup> SF<sub>6</sub> gas volume to  $133\text{ Pa}$  at an initial pressure of  $0.1\text{ MPa}$  is less than 1.0 hour.

### 2.3.4、 Storage

Storage container volume of  $0.05\text{m}^3$

Nominal liquid storage capacity of  $50\text{kg}$

The maximum storage pressure is  $3.8\text{ MPa}$

### 2.3.5、 Purification

The SF<sub>6</sub> gas whose water content is less than  $1000\text{PPM}$  (volume ratio) is less than  $60\text{PPM}$  (weight ratio), less than  $10\text{PPM}$  (weight ratio)

2.3.6、 Annual leakage rate  $\leq 1\%$  Nominal storage capacity

2.3.7、 Noise  $\leq 75\text{dB}$  (A) Sound pressure level

2.3.8、 Operating temperature  $-10^\circ -40^\circ\text{ C}$

2.3.9、 Power  $\leq 10\text{KW}$

2.3.10、 Power: AC three-phase five-wire system  $50\text{HZ}$   $400\text{V} \pm 10\%$

2.3.11、 Weight approx.  $600\text{ kg}$

2.3.12、 Dimensions (L × W × H):  $1450 \times 810 \times 1200$

### **3 Working principle and structural characteristics**

SF6 gas recovery and discharge device has a comprehensive function of recovery, charge-discharge, purification, vacuum, storage, filling and other systems, the system is complete. The function of the series or switch mainly through the operation focused on the panel side of the electronic control box and ball valve to complete.

Recovery unit is the basic working principle of the use of frozen liquefaction method. In the recovery, the use of the suction and compressibility of the compressor to SF6 electrical equipment within a certain pressure SF6 gas into the compressor, and compressed to a higher pressure. While the use of R22 refrigerant low evaporative temperature characteristics, the higher the temperature of the SF6 gas cooled to the condensing temperature for liquefaction, storage. So that continuous suction to the SF6 compressor running in series until the final pressure to reach the recovery.

In charge and discharge, the first use of the device of the vacuum pump SF6 electrical equipment (or cylinders) and the connection pipe for vacuum, and then directly use the pressure or the use of the suction of the compressor and cause a certain pressure to the device storage container In the SF6 filled SF6 electrical equipment, until the required work pressure. When the need to be filling the same time, as described by the use of R22 refrigerant characteristics, the liquefied SF6 directly into the cylinder.

Purification function is completed in the recovery, charge and discharge functions simultaneously completed.

In the system, two oil separators are installed at the outlet of the compressor to effectively remove the oil contained in the SF6 gas.

A drying filter is provided in the system circuit to ensure the purity of the SF6 entering the storage vessel and to effectively remove water. The filter is equipped with a heating and regenerating device which can be regenerated by heating

under vacuum, and the molecular sieve can be used repeatedly.

The system is equipped with reliable safety protection device, high-pressure pressure controller installed in the SF6 compressor exhaust port, once the exhaust pressure exceeds the limit value it will automatically stop the compressor work until the pressure drops and then restart the compressor; Valve installed in the storage container Once the overpressure safety valve automatically open the exhaust gas, the pressure drops automatically shut down.

In addition, the system also set up a monitoring instrument and a total of seven control instruments, including a vacuum gauge, installed in the device recovery intake and vacuum gauge before the installation of the V7 valve, you need to observe when you can open; Only installed in the recovery inlet, SF6 compressor exhaust, refrigeration compressor suction and exhaust ports and storage containers; refrigeration system set up a thermometer, the use of temperature sensor SF6 liquid temperature sensor.

When the pump stops working, the valve can automatically close the vacuum system, and the atmosphere through the pump inlet into the pump chamber, the pump can be connected to the vacuum pump, Thereby avoiding contamination of the vacuum system by the countercurrent of the pump oil.

The refrigeration system in the system is set by the high and low pressure pressure controller to adjust the inlet and outlet pressure of the refrigeration compressors. Once beyond the limits of the scope of their own will cut off the work of the refrigeration compressor, low pressure disconnect to pressure recovery or high pressure disconnected, to be pressure drop, and then restart the compressor.

Overall structure, the device uses hand-push mobile, can adapt to indoor and outdoor use under normal environmental conditions. The device system is more complex, by the vacuum pump, SF6 compressor, refrigeration systems, storage containers, piping, valves, meters and other accessories.

Electrical control box, operating valves and monitoring instruments are all

focused on one side of the panel and there are process instructions, so easy to understand when used.

## **4 Before starting the work**

### **4.1、 Note the points**

Please note the following points before starting:

Pipe connection to ensure the sealing of the connection。

Since this unit has been evacuated at the factory, it is recommended that the unit be vacuumed for the first time when it is turned on, as described in Section 5. In the first boot, the general should be left in the storage container and pipe a small amount of SF6 gas, or boot recommed to vacuum。

### **4.2、 Pipe connection**

Users should first use the rubber hose sent according to the function of the need to connect, as far as possible to reduce the loss of pipelines, pipelines should be as short as possible。

Recycling: Electrical equipment - Rubber hoses - Recycle air intakes

Charge and discharge: electrical equipment - rubber hose - charge and discharge gas (liquid) port

Electrical equipment SF6 recovery filling two hose:

Electrical equipment - Rubber hoses - Recycle air intakes

Cylinder - rubber hose - charge and discharge gas (liquid) port

Storage container SF6 filling:

Cylinder - rubber hose - charge and discharge gas (liquid) port

In addition to the recovery of the inlet device, charge and discharge gas (liquid) port, there is a discharge of the atmosphere, its interface users can decide whether or not with piping。

### **4.3、 Oil level check**

Recycling unit in the compressor using N46 (25 #) as a lubricant oil, vacuum pump oil as a high-speed vacuum pump as a lubricant, you should check the oil level before starting. If the oil level is too low or too high, should be refueled or put oil to the center of the oil standard mirror, in the operation should also pay attention to regularly check the actual oil level line should not be less than the center line too. N46 refrigerating oil, in principle, the use of one year, due to exchange oil.。

### **4.4、 Refrigeration system inspection**

The refrigeration system uses R22 as the refrigerant, the compressor is the completely closed piston type compressor, when needs to add the refrigerant. Before starting the line should also check for damage, whether the connector loose, the fan is normal and so on.

### **4.5、 Power connection**

The power supply of the device is three-phase AC 50HZ 400V  $\pm$  10%, three-phase five-core need to take the zero line, the total power  $\leq$  5KW. All of the electrical control elements of the device are concentrated in the electric control box. Because the button, switch and indicator are installed on the door of the electric control box, the electric control box does not need to be opened in the normal working condition, only the power cable plug on the side of the storage device of the recovery device is connected with the appropriate power source. In this section before the start of several of the work have been completed before the case can be opened control box power switch, enter the working state.

Electrical circuit with phase and phase sequence protection relay can manually adjust the power phase sequence. Electric control box at the top with a

plot instrument, whether it is vacuum pump or SF6 compressor or pump at the same time open, it will automatically time.

## **5 Operating instructions and precautions**

The operation of entering the working state shall be carried out only after the work related to Section IV has been completed.

The device has five basic functions, including vacuum pumping, recycling, storage, filling, bottle filling, purification and drying, and corresponding combined functions. The operation of the device is described separately according to the functions below, and attention should be paid to the sequential operation.

Valves are assumed to be closed at the following start-up.

### **5.1、 Vacuum**

Refers to the pumping of a device or system from an atmospheric pressure to the device's ultimate or certified vacuum.

Note:

Before opening the vacuum pump, decide whether to connect the pipeline to discharge outdoors according to the need.

Before opening the vacuum pump, it is necessary to ensure that the pressure of the pumped device or system is zero gauge pressure or less.

When the vacuum degree needs to be observed, the switch reading of the resistance vacuum gauge should be long pressed.

Do not start SF6 compressor when vacuum is maintained.

When the first start-up is used or the device is in the state of ventilation, vacuum should be pumped on the device itself. The operation method is shown in the table below.

When recycling is needed, the connecting pipes should be vacuum pumped (the valve at the outlet of the electrical equipment connected with the hose should



be closed at this time). The operation method is shown in Table 2 below.

When bottle filling is required, the operation method is the same as above, see Table 3 below.

Vacuum pumping	Boot up	Stop
1 Device itself	Open Vacuum Pump, V1, V2, V3, V5	Turn off V1, vacuum pump, V2, V3, V5
2 Recovery pipeline	Open Vacuum Pump, V1, V7	Turn off V1, Vacuum Pump, V7
3 Electrical equipment Charging and discharging pipeline Steel cylinder	Open Vacuum Pump, V1, V6	Turn off V1, Vacuum Pump, V6

## 5.2. Recycling and Storage

SF6 gas in electrical equipment is recovered and stored in the storage container of the device, generally from the initial recovery pressure to the final recovery pressure of the device or the recognized final recovery pressure.

After pipeline connection, first of all, it should be determined whether it is necessary to vacuum the device or pipeline. The judgment and operation method can be found in Section 1 of this section.

According to the ambient temperature and the amount of gas recovered at that time, the refrigeration compressor is started half to one hour ahead of time until the end of the recovery.

When the initial recovery pressure (M1) is high, V6, V2 and SF6 compressors are opened and V3 is opened.

The exhaust pressure gauge (M2) of SF6 compressor should be observed after start-up. The pressure indication value of M2 should be less than 2.0 MPa. If the indication value reaches the limit value of 2.0 MPa, the pressure controller can automatically cut off the operation of the compressor and restart the compressor when the pressure decreases and stabilizes. Therefore, when the exhaust pressure rises too fast, the size of V2 valve opening in the compressor intake can be properly adjusted to control.

During the recovery process, the liquid level in the storage container should

be observed carefully through the mirror glass. The maximum liquid level should not exceed 2/3 of the mirror.

When the recovery reaches the final recovery pressure or predetermined value, the recovery work is completed.

Turn off refrigeration compressor, turn off V6, V2, SF6 compressor, V3.

### **5.3、Charging and discharging**

SF6 stored in the storage container of the device is charged to the electrical equipment until the required working pressure is reached.

After pipeline connection, first of all, it is necessary to determine whether to vacuum electrical equipment and pipeline. The judgment and operation method are as follows: 1. Vacuum extraction.

When the pressure of storage vessel is high, open V4 and inflate directly to electrical equipment. The value of M6 pressure gauge can be observed.

When the pressure of storage vessel decreases, it is impossible to directly inflate the gas to the electrical equipment. At V7, the external air source directly inflates the gas to the electrical equipment through V7 and V6, or when the pressure of the external air source is low, SF6 of the external air source is also filled into the electrical equipment by the compressor. At this time, V6 is turned off and V7, V2, V3, SF6 compressor and V4 are turned on until the required working pressure is reached.

The SF6 compressor in the system shall be collected into the storage container until the suction pressure (M1) is zero gauge pressure, and the SF6 compressor and related valves shall be closed.

### **5.4、Bottle filling**

Bottling refers to the direct reclamation of SF6 in electrical equipment into cylinders.

After pipeline connection, the first step is to determine whether vacuum is needed. The recovery pipeline and the cylinder connection pipeline can be pumped together.

Turn on the refrigeration compressor in advance.

Open V5, V2, SF6 compressors, V3, V4, cylinder valves and carry out bottles.

During the filling process, attention should be paid to the exhaust pressure of SF6 compressor. If it approaches 1.9 MPa, switching operation should be carried out to release the high pressure gas from the upper part of the cylinder and make it enter the low pressure vessel.

Switching operation: Turn off V4 and quickly turn on V5 and V2 for about 1 to 2 minutes. When the exhaust pressure reaches 2MPa, the operator can control it by himself. Turn off V5 and quickly open V3 and V4, which can be switched over and over again until the cylinder is full. When the cylinder is full, close the V4 and cylinder valve. The compressor is used to drain the liquid in the pipeline until M1 pressure gauge reaches zero gauge pressure. Relevant to SF6 compressor, cooler, refrigeration compressor and related valves.

Note: The bottle refers to a certain amount of SF6 liquid in the tank before filling. The liquid level indication can be observed at any time.

## **5.5、 Purification and drying**

The device removes the solid impurities, oil and water contained in SF6 gas without reducing the purity of the original gas, so as to ensure the purity of SF6 gas entering electrical equipment. The general purification drying process is completed synchronously with the recovery, storage and filling process. The self-circulation purification method is as follows:

When SF6 circulates in the tank, the refrigeration compressor, V5, V2, SF6 compressor and V3 are opened. If the exhaust pressure of SF6 compressor is too high, the opening size of V2 valve can be adjusted for normal gas circulation.

At the end of the cycle, close V5, V2, SF6 compressor, V6, refrigeration compressor, etc.

## **6 Repair and maintenance**

Recycling equipment and its environment should always be kept clean, the major equipment should always check, regular maintenance and repair, please note that can not be free to loose any joints, bolts, nuts, there should be specialized personnel to operate, repair

### **6.1、 Vacuum pump**

#### **6.1.1 Precautions for use**

6.1.1.1 Often pay attention to oil level

6.1.1.2 Open the valve after the pump is started

6.1.1.3 Often note that the pump is running normally, with or without special sound, the motor is overloaded

6.1.1.4 Note that the pump temperature does not exceed 40 °C

6.1.1.5 It is forbidden to use kerosene, gasoline, alcohol, etc. for non-disassembly cleaning

6.1.1.6 If the pump is not in use for long periods, drain the oil and inject new oil

#### **6.1.2 Oil change period**

After running the new pump running, there may be a small amount of metal debris and other impurities deposited in the tank, the pump's performance will not be affected, but removal is appropriate, it is recommended after 100 hours of use, the oil release, A small part of the oil impurities removed, the rest of the clean oil filter can still be added to the pump, the discretion to add a little new oil, after the

oil change period, oil users based on the use and effectiveness of discretion. The principle of replacement once a year (about 2000 hours)

### **6.1.3 Oil change method**

First open pump running about half an hour, until the oil becomes thin, stop the pump from the oil drain hole put oil. And then open the inlet run 10 to 20 seconds, here you can slowly add a small amount of new intake of oil. To replace the pump cavity of the oil, such as out of the dirty oil, which can be repeated, can not be used to rinse the pump cleaning fluid and oil impurities.

## **6.2、SF6 compressors**

### **6.2.1 Precautions for use**

Due to start the frequency will affect the motor life, so the number of starts per hour should be less than 5 times, each downtime should be more than 3 minutes

6.2.1.1 Try to avoid the compressor for a long time vacuum operation, so pay attention to observe the compressor inlet pressure, when the initial recovery pressure (M1) shows zero gauge pressure, to a predetermined value, to stop the compressor recovery

6.2.1.2 The oil level in operation should be kept within the range of oil sight glass, ie 1 / 4-3 / 4 position. Lack of oil stops running。

### **6.2.2 Oil change period**

In principle, once a year replacement (about 2000 hours)

Oil change method: cut off the SF6 compressor system, release the oil return pipe joints, put the oil from the oil drain hole, clean and refuel to the central position, then connect the oil return line, the SF6 compressor vacuum, pumped to 100Pa below compressor Can be put into use.)

## 6.3、 Refrigeration system

6.3.1 The refrigeration system is composed of a refrigeration compressor, an air-cooled condenser, a liquid reservoir, a filter, a solenoid valve, a thermal expansion valve and an evaporator. In order to maintain the high efficiency of the condenser, should pay attention to this device work site clean, the condenser into the wind surface and the wall at least 0.5 meters

6.3.2 The refrigeration compressors are fully enclosed compressors, and the number of open / closed times per hour shall be less than 5 times, each running time shall be more than 5 minutes, and the shutdown time shall not be less than 3 minutes

6.3.3 During operation, check whether the value of the suction and discharge pressure of the refrigeration compressor is within the specified range. The high and low pressure controller has been adjusted at the time of delivery. See section 8 for details. When the pressure is lower than the low pressure limit, , When more than high-pressure limit, to be reduced after the pressure to restart the compressor

6.3.4 Operation should pay attention to whether the abnormal refrigeration compressor noise, condenser fan is running normally, if abnormal phenomena, then cut off the power, and then check the repair

6.3.5 Pay attention to whether the connection site leakage and oil leakage phenomenon, often part of the leakage of oil leakage site, the occurrence of such phenomena, timely shutdown inspection processing

6.3.6 Do not run directly in contact with piping, so as not to high temperature part of the human body burns

6.3.7 Not to loose the connection parts of the bolt and take over the nut, repair should be specialized personnel

6.3.8 After the refrigeration system is overhauled, it should be strictly cleaned and dried, and there shall be no residual impurities, and the refrigeration system

should be evacuated to below 100Pa before charging R22.

Do not tighten the nut, open the freon cylinder, so that the flon gas out to drain the air inside the tube, and then tighten the nut, open the globe valve

Open the refrigeration compressor inhaled Freon, attention should be controlled at this time freon cylinder valve opening, to avoid excessive flow of the compressor discharge fluid

Note that the process of filling the weight of the freon cylinder to reach the charge after the charge can be stopped

Close the cylinder valve, valve, return to normal working condition

If the refrigerant is in excess, release R22 from the fill port

## **6.4、 Purification, drying system**

### 6.4.1 Oil separator

There are two oil separators in the unit, installed in the vacuum pump SF6 compressor outlet

### 6.4.2 Dry the filter

Dry filter should be regularly regenerated or replace the molecular sieve, if the long-term shutdown or SF6 gas water content exceeds the standard, should be used before the regeneration treatment.

## **6.5、 meter**

The main instruments of this device are pressure gauges, vacuum gauge, the meter should be based on user requirements, regular checksum

Vacuum gauge to be observed in the open V7 valve, close the valve is observed

## **7 Common faults and elimination methods**

The following points electrical appliances, vacuum pumps, compressors,

refrigeration systems, purification and drying systems, instruments, systems and other aspects of the SF6 recovery unit can not work out the list of possible failures. Please note: the exchange of any parts, you must first cut off the total power supply recovery unit.

## 7.1、 Electrical appliances

NO.	malfunction	possible reason	Approach
1	When the SF6 recycle unit is connected, the indicator lamp 5XD does not light within 15 seconds after the power is turned on	A) The phase sequence is incorrect B) Relay 2 JXW defect C) LED defect	A) Turn the toggle switch to 1 or 2 B) Check the relay 2 JXW C) Check the indicator light 5XD
2	Vacuum pump running, indicator 1XD does not shine	Indicator light defect	Check indicator 1XD
3	SF6 compressor running, light 2XD does not shine	Indicator light defect	Check indicator 2XD
4	When the chiller is running, the indicator light 3XD does not light	Indicator light defect	Check indicator 3XD
5	Electric heating work, light 4XD does not shine	Indicator light defect	Check indicator 5XD
6	Vacuum pump motor does not turn	a) Circuit breaker blown b) Motor overload c) Motor defect d) contactor defects	a) Check the breaker 1DL b) Check the thermal relay 1RJ c) Check the pump motor d) Check coil 1C and contacts
7	SF6 compressor motor does not turn	a) Circuit breaker blown b) Motor overload c) contactor defects d) Motor defect	a) Check the breaker 2DL b) Check the thermal relay 2RJ c) Check the coil 2C and contacts d) Check motor



8	Refrigeration compressor does not turn	<ul style="list-style-type: none"> <li>a) Circuit breaker blown</li> <li>b) Motor overload</li> <li>c) contactor defects</li> <li>d) Motor defect energized or just less than 3 minutes of downtime</li> </ul>	<ul style="list-style-type: none"> <li>a) Check the breaker 3DL</li> <li>b) Check the thermal relay 3RJ</li> <li>c) Check the coil 3C and contacts Check motor</li> <li>b) Please wait</li> </ul>
9	Frozen compressor turn, the condenser does not turn	Fan motor defect	Check the fan motor
10	Electric heating does not work	<ul style="list-style-type: none"> <li>a) Circuit breaker blown</li> <li>b) Electrical heating is defective</li> </ul>	<ul style="list-style-type: none"> <li>a) 4DL Check the circuit breaker 4DL</li> <li>b) Check the electrical heating</li> </ul>

Check the possible causes of the failure, it should also pay attention to check the total power circuit breaker and the switch, button contact and the wiring situation.

## 7.2、 Vacuum pump

### 7.2.1 Causes and Elimination Methods of Low Vacuum

7.2.1.1 Vacuum pump outlet inspection, the pressure is not high, spin to the gas plug no significant leakage sound, may be stored properly, there is water vapor into the pump, should replace the new oil.

7.2.1.2 No leakage of sound, oil change is invalid, should check the small hole on the valve seat is blocked, the hole position in the pump short valve at the moon-shaped slot

7.2.1.3 Access to the system after the vacuum is not high, the system may be joints, pipe valves, all kinds of equipment leaks, one by one leak detection, troubleshooting

7.2.1.4 Pump without demolition cleaning, a sudden crash, vacuum decreased, can check the vane spring is broken, or whether the foreign matter into the pump

7.2.1.5 Pumps used for a long time, the vacuum gradually decreased, may be mixed with condensable gases and lubricants splitting deterioration, as well as parts aging, available oil, parts, one by one test

7.2.1.6 After pump disassembly, there is a large leak sound, may be improper assembly of rubber, damaged, should be adjusted or replaced

7.2.1.7 Exhaust valve sheet aging deformation, damage or screw pull off, there will be abnormal gas and oil surface of the significant pan-movement, will also affect the vacuum, should be re-installed

7.2.1.8 The above measures are invalid, no leakage sound, may use the course of time, parts wear or corrosion caused by may also be the rotor deformation, precision, or even rotors, rotors and other parts damaged, should be open inspection, dressing or Replace the new parts

## **7.2.2 Reason and Elimination Method of Fuel Injection and Oil**

7.2.2.1 Oil mist, fuel injection is not allowed, may be the oil filter aging (available for one year) oil level is too high, oil plate loose, due to improper assembly, one by one inspection

7.2.2.2 Oil leakage may be oil seal spring off, wear, oil drain plug and gasket damage, gasket is not good, one by one check the exchange

## **7.3、SF6 compressors**

7.3.1 Compressor shutdown immediately after start, may be too high inlet pressure, resulting in high pressure exhaust pressure is too high, automatic shutdown, reduce the inlet pressure

7.3.2 Compressor motor overload, thermal relay is not reset, may not run

7.3.3 Compressor internal noise, there should be professionals to check or replace the compressor

## **7.4、 Refrigeration system**

7.4.1 Frozen compressor high pressure is too high, the fault is due to the condenser cooling fan is not open (or not running) or the condenser is blocked by pollutants, the exclusion method: the former to run the fan, which cleans the condenser

7.4.2 Cold compressor pressure is too low: the expansion valve is blocked, should be cleaning expansion valve or clean dry filter, the second reason may be refrigeration system leaks, should find the source of leakage, and remove them, if necessary, add refrigerant

7.4.3 Frozen compressor high pressure is too low and low pressure is too high, the compressor may be internal failure should be disassemble check

7.4.4 Frozen compressor cylinder frost, or even exhaust pipe frost

One reason: improper adjustment of the expansion valve, the flow is too large, should re-check the regulation of expansion valve

Reason two: evaporator internal short circuit, should check the evaporator internal situation

The third reason: the refrigerant charge is too large, may be appropriate to vent refrigerant

## **7.5、 Purification drying system**

7.5.1 Oil separation effect is not good

May be a high gas temperature, cooler fan should check whether the normal operation, the fan blades are intact. Oil separator failure, replace the oil separator.

7.5.2 Drying effect is not good

May be molecular sieve saturation should be self-regeneration treatment, may also be dry filter plug, should be open inspection, if necessary, replace the inner parts

7.6、 meter

7.6.1 The pressure controller to achieve the upper and lower limits but not cut off the circuit, the pressure controller circuit may be faulty, should be open inspection, if necessary, replace

7.6.2 Other pressure gauges or vacuum gauge readings may be instrument damage, should be verified or replaced

7.6.3 The instrument does not read, should check whether the interface is intact

## **8 After-sales service**

8.1 The warranty period of the product is 1 year from the date of installation

8.2 When the equipment fails and the buyer can not resolve it, 72 hours respond and give the solution

8.3 Technical documents: to provide complete relevant technical documents and information. Technical documents, including drawings, brochures and so on. The format and content of the technical documentation should be as detailed and understandable as possible and should meet the needs of the design, installation and maintenance technicians

8.4 Manual: The installation and use of equipment and maintenance of a detailed description of the drawings

8.5 Technical training: technical training for general maintenance of users' operation personnel and maintenance personnel.

8.6 In the process of installation and commissioning of the equipment, the company arranges the experience of the engineering and technical personnel to provide installation and debugging guidance and other services

8.7 Provide technical training to the purchaser and provide relevant Chinese training materials and materials.

8.8 Equipment life-long maintenance

8.9 The user may at any time the use of the instrument or advice to the Company