



OYH(L)18(XGN□)-24/T630-20

Environmental-friendly Medium Voltage network Switchgear

The Instruction of Installation and Use

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1. General Instruction

OYH(L) 18 (XGN□)-24 series products are environmental friendly medium voltage dry-air insulated ring main unit, which are used in the medium voltage power distribution.

OYH(L) 18 (XGN□)-24 series products are of fully enclosed structure with all the primary live parts inside of welded stainless steel gas tanks and the protection degree is IP67.

OYH(L) 18 (XGN□)-24 series products are of modularized design, which can be combined according to the clients' requirement and used in most of the RMU applications. There are, at most, three modules in the same gas tank. When the quantities of modules are beyond three, the expansion bus bar can be used to connect the panels.

The modules of OYH(L) 18 (XGN□)-24 series products are:

- PT-Disconnecting switch module;
- D-cable connecting module without earthing switch;
- V-vacuum circuit breaker module.

2. Product Structure Features

2.1 The outdoor switching station is made of 304 stainless steel with the protection degree of IP44. There are window blinds in the lower part of station and radiator grills on the top. Air blower, which is controlled by the intelligent automatic controller, is equipped on the top of switching station. Clients can adjust the temperatures inside of the switching station through the controller according to the requirements.

2.2 Fully enclosed insulating design: OYH(L) 18 (XGN□)-24 products are of fully enclosed structure with all the primary live parts inside of 304 welded stainless steel gas tanks inflated with the dry air of working barometric pressure at normal pressure and the protection degree is IP67. This product can be installed in the situations with high humidity, high dust, especially in mining application, box-type substation and air polluted area, where it is easy to cause flashover in the surface. There is no needs to clean and protect from the entering of small animals. The extension bus bar is completely insulated and shielded to keep away from the outside effects.

2.3 The switchgear adopts modular design: circuit breaker in the gas tank, isolation switch, grounding switch, integrated design. When the product is under the maintenance, the cable can be directly grounded through the earthing switch, which is assuring the safety. The product is easy to operate through the interface, which is friendly to the operators on site.

2.4 High stability and operator safety: all the live parts are enclosed in side of the gas tank inflated with dry air. The disconnecting switch is designed with two open contacts. Under the Zero gauge press, the product can meet insulation withstanding voltage (to earth) of

50kV/1 min. The door of cable compartment is of reliable mechanical interlocking with the earthing switch. Only when the grounding switch is in the closed state can the lower door panel be opened, effectively preventing it from accidentally entering the live interval. And the product has also the reliable pressure relief channels.

- 2.5 The rated current is 630A; the rated short-circuit breaking current is 20(25)kA. The product can be used in all the applications of less than rated current of 630A.
- 2.6 Maintenance-free and long life cycle: the product is designed to service 30 years. There is no need to maintain the main switches in the life cycle. The yearly leakage rate is less than 0.05%.
- 2.7 The metering voltage transformer is equipped in the incoming feeder. The product is designed to install the metering instrument and 5G communication module. The power voltage transformer is equipped in the outgoing feeder, through which the battery cell can be charged. The lightening arrester and the voltage transformers are rear-mounted and they are installed at the factory. Only the cables are needed to install on the working site. In this way, the workload on site can be reduced and the reliability can be improved.
- 2.8 The product is designed with inspection window, through which the conditions of disconnecting switch can be observed clearly and the product safety is assured.
- 2.9 Compact structure: the standard width is 420mm and it can be made according the clients' requirements.
- 2.10 The product of OYH(L)18(XGN□)-24 can be equipped with intelligent controlling unit (optional), which can provide the valid protection, remote control and monitoring system, as well as supporting the atomization of the power distribution system.
- 2.11 Eco-friendly products: since the dry air is used for the insulation, there is no pollution to the environment. OYH(L)18(XGN □)-24 products are not only environmental friendly in the products themselves, but also in the manufacturing and the life cycle maintenance free. All the materials used are eco-friendly and the technics of Zero-leakage are adopted. After the life cycle, 90%-95% of the whole product material can be recycled.

3. Standards Applied

- GB 3906-2020 3.6kV~40.5kV AC Enclosed Metal Switchgear and Control Equipment
- GB/T 11022-2020 the Common Technical Requirements of HV Switchgear and Control Equipment
- GB 1984-2014 HV AC Circuit Breaker
- GB 1985-2004 HV AC Disconnecting Switch and Earthing Switch
- GB 3804-2017 3.6kV~40.5kV AC HV Loading Switch

- GB 16926-2009 AC HV Loading Switch—Fuse-Combination Unit
- GB 311.1-1997 Insulation Match of HV Power Transportation and Distribution Equipment

4. Normal Ambient Conditions

4.1 Ambient Temperature: +40°C (Max.) -40°C (Min.)

Average Temperature in 24h: $\leq 35^{\circ}\text{C}$

4.2 Humidity:

Largest relative humidity in 24h: $\leq 95\%$; monthly average value: $\leq 90\%$

4.3 Altitude

For standard product inflated with standard working air pressure $\leq 1500\text{m}$

For plateau type product $\leq 3000\text{m}$

4.4 Special conditions

For special operating conditions beyond the conditions of normal use, Clients shall discuss technical issues with our company before placing POs.

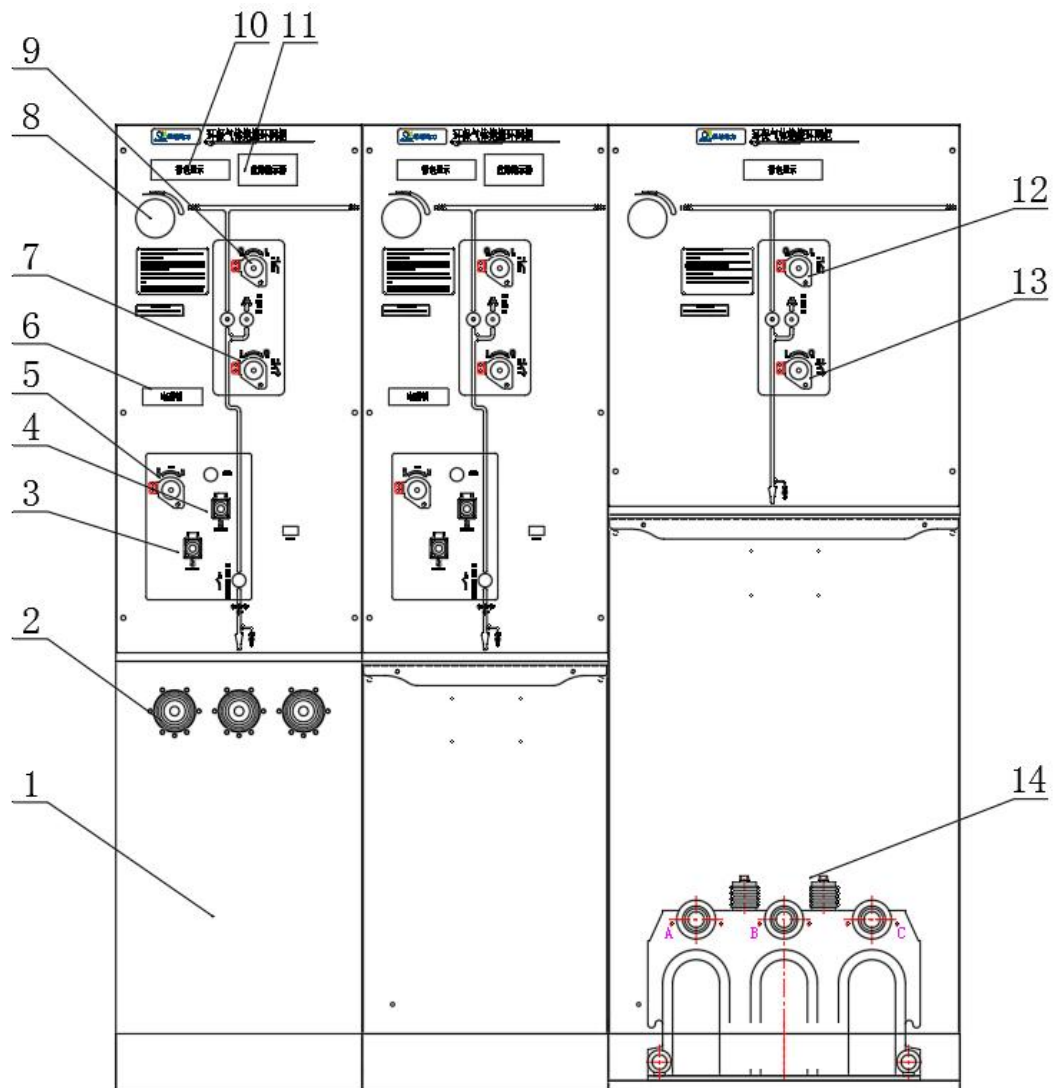
5. Main Technical Parameters

5.1 Technical Parameters of OYH(L)18(XGN□)-24 CGIS

Nr.	Items	Unit	Parameter
1	Rated Voltage	kV	24
2	1 min Power Frequency Withstand Voltage (phase to phase, ground/fracture)		65/79
3	Lightning Impulse Withstand Voltage (phase to phase, ground/fracture)		125/145
4	Rated Current	A	630
5	Rated Short-Circuit Breaking Current	kA	20 /25
6	Rated Short-Circuit Closing Current		50 /63
7	Rated Short Time withstand Current		20 /25
8	Rated Peak Withstand Current		50 /63
9	Rated Short-Circuit Continuous Current	s	3/1
10	Mechanical Life	Times	10000
11	Yearly Leakage Rate		0.05%
12	Protection Degree (Gas tank/shell)		IP67/4X

6. Product Dimensions and Structures

6.1 Product Dimensions and Structure (referring to Drawing I)

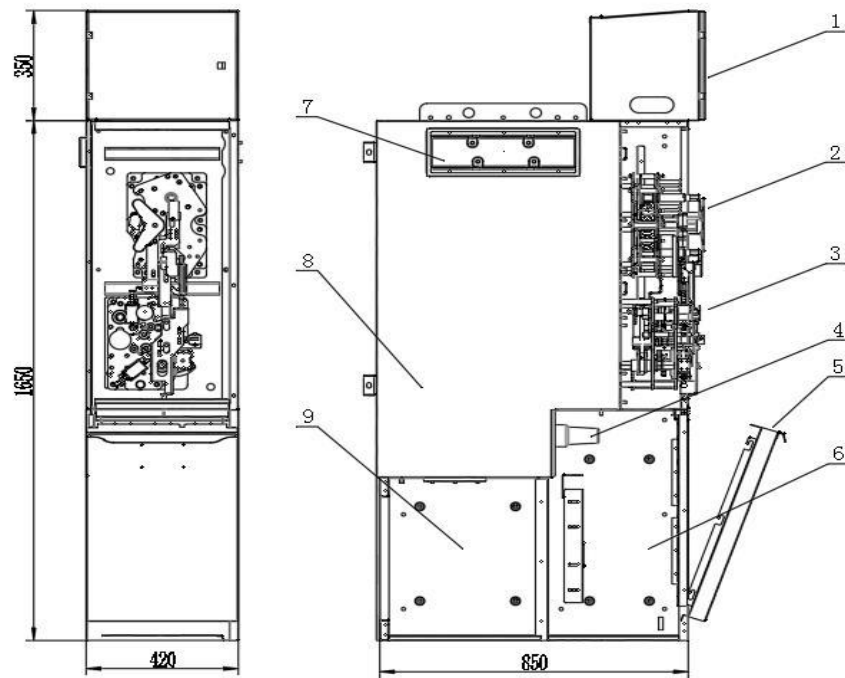


Drawing I

(Taking single gas tank V+V+PT for example)

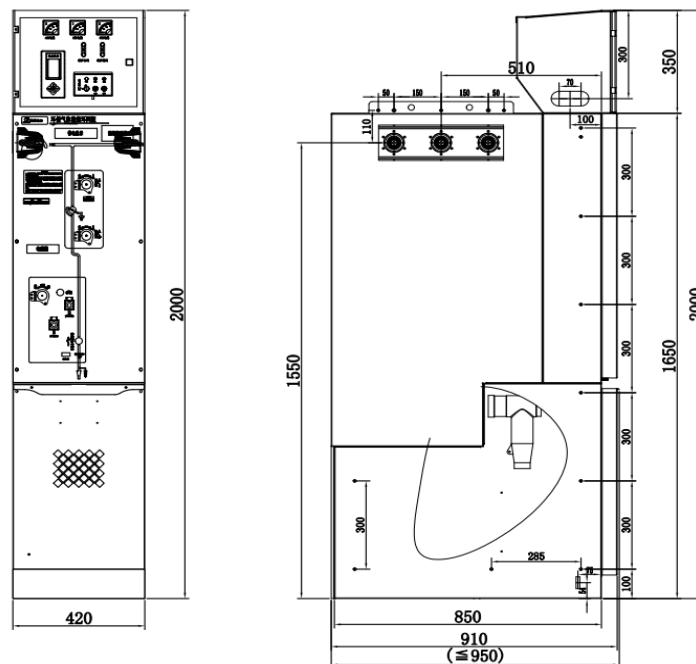
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|--|--|
| 1. Cable compartment | 2. Cable bushing |
| 3. Button for CB opening | 4. Button for CB closing |
| 5. Hole for CB energy storage operation | 6. Magnetic lock |
| 7. Hole for earthing switch operation | 8. Barometer |
| 9. Hole for disconnecting switch operation | 10. Live display (optional) |
| 11. Fault indicator (optional) | 12. Hole for PT disconnecting switch operation |
| 13. Hole for PT earthing switch operation | 14. Voltage transformer |

6.2 Installation Structure referring to Drawing II



Drawing II

- | | | |
|----------------------------|------------------------------|-----------------------------|
| 1. Low voltage compartment | 2. Disconnecting drive | 3. CB drive |
| 4. Cable bushing | 5. Door of cable compartment | 6. Cable compartment |
| 7. Side expansion bushing | 8. Eco-friendly gas tank | 9. Press relief compartment |
- (the dimensions are just for references)

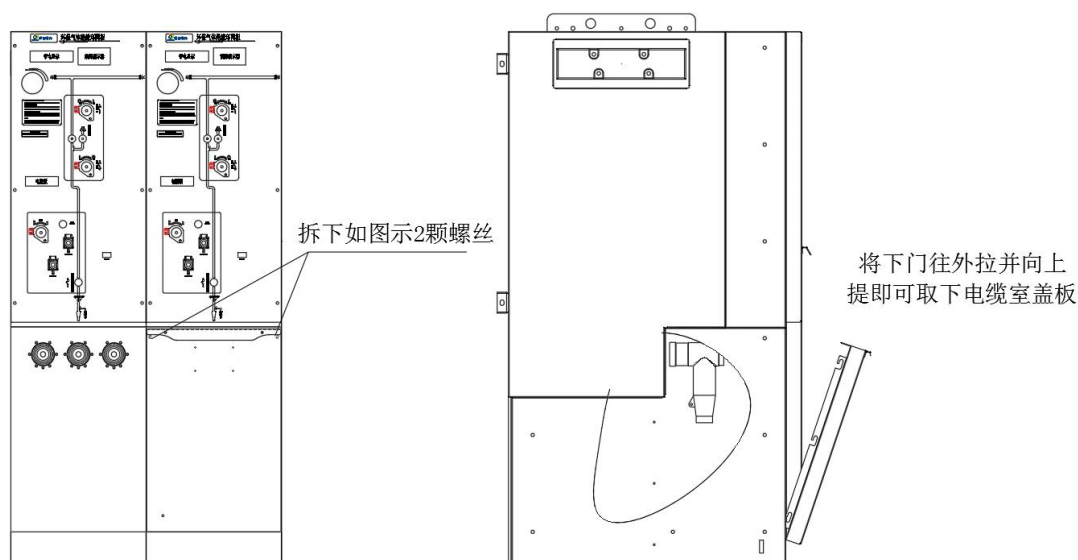


The appearance of the product is for reference only. The specific details are subject to the actual product.

7. Installation

7.1 Cable compartment

Before cable connecting, remove the cover on the cable compartment first. The cover is of plug-in type. Loosen the two bolts in the upper side of the cover (referring to Drawing III). Please neglect this if there are no bolts in the cover. Open the cover outwards and then move to the upwards, then it can be removed.



Drawing III: Removing the cover of cable compartment

Attentions! The cover of the cable compartment can be interlocked with earthing switch and CB switch. When the interlocking drive is installed, the cover can only be removed when both the earthing switch and CB switch are in the CLOSE position.

7.2 Cable connection

- OYH(L)18(XGN□)-24 series RMU products have equipped with outside bushings, which can meet with the standards of cable connector DIN47636T1 and T2/EDF HN 525-61.
- The distance to the ground for all the bushings is the same and the bushings are protected by the cover of cable compartment.
- Please refer to the detailed operation from the suppliers.
- All the installation shall comply with the *Instructions*. The bushings shall be lubricated by the silicone grease supplied.

Attentions! The earthing switch must be in the CLOSE position or the bushings must be covered with touchable dummies before the cable connection and the products operation.

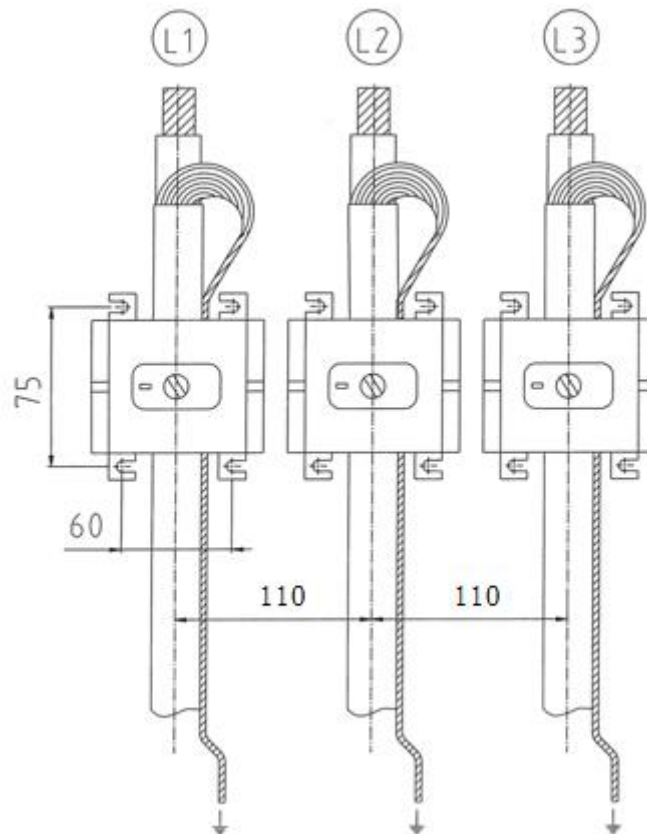
7.3 The installation of straight through current transformer

- The installation of current transformer. Make the cables go through the center hole and return, then ground.

- VCB module has equipped with protection device. Put the cables from the protection device to CT in the cable compartment, and make preparation to connect with CT.

Before installation:

- check the type, specification, parameters of the CT with PO requirements, together with if the installation sizes are correct or not.
- Before the assembly of the cable connectors, the CT must be installed in the HV cables first (Three-phase integrated CT has already been installed in the cable bushing before delivery)
- The cable grounded shield must go through center hole of CT and return (referring to Drawing IV), and then ground through earthing bus bar in the cable compartment. The CT mounting plate shall be assembled in the cable compartment.
- After the installation of CT, connect the protection device with the CT cable according to the requirements of secondary drawing.
- It is the basic requirement to perform the function of protection device when making correct connection between CT and protection device.



Drawing IV: The installation of straight through current transformer

7.4 The gas pressure

Under the temperature of 20°C, the rated pressure of dry air inflated in OYH(L) 18 (XGN□)-24 series products is 0.09Mpa (Relative pressure). One gas density meter with temperature supplement is installed in each separate gas tank.

When the pointer of gas density meter is in the green field, the gas pressure is normal.

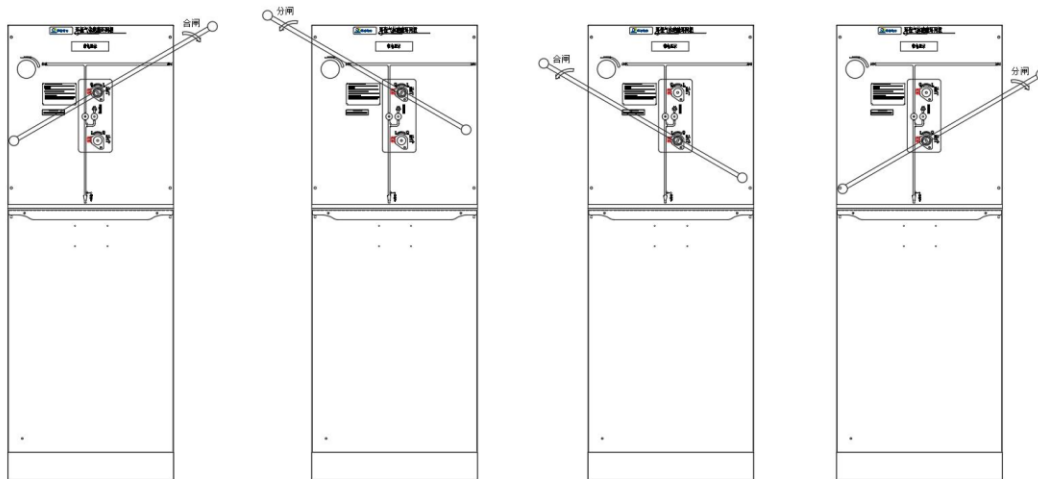
8. Performing Operation

8.1 Interlocking

The product's interlocking function meets with the "Five Protection" requirements set by State Grid. At the same time, special designs have been made in order to avoid the mis-operation. The main function of interlockings are as following:

- After the CB is close, the disconnecting switch cannot be moved to avoid opening and closing it with hot-line work.
- After the disconnecting switch is close, earthing switch cannot be moved to avoid closing it with hot-line work.
- The cabinet door has also interlock function. Only when the disconnecting switch is close and the earthing switch is close, the door of cable compartment can be opened. The earthing switch cannot be open when the door isn't close.
- All the switches must be operated through the special operating handle.
- CB has reliable inside mechanical interlocking to the relative earthing switch to avoid mis-operation. CB can also have the further interlocking with the relative earthing switch via padlock. The earthing switch is operated by a spring mechanism to ensure quick closing

8.2 PT Panel Operation



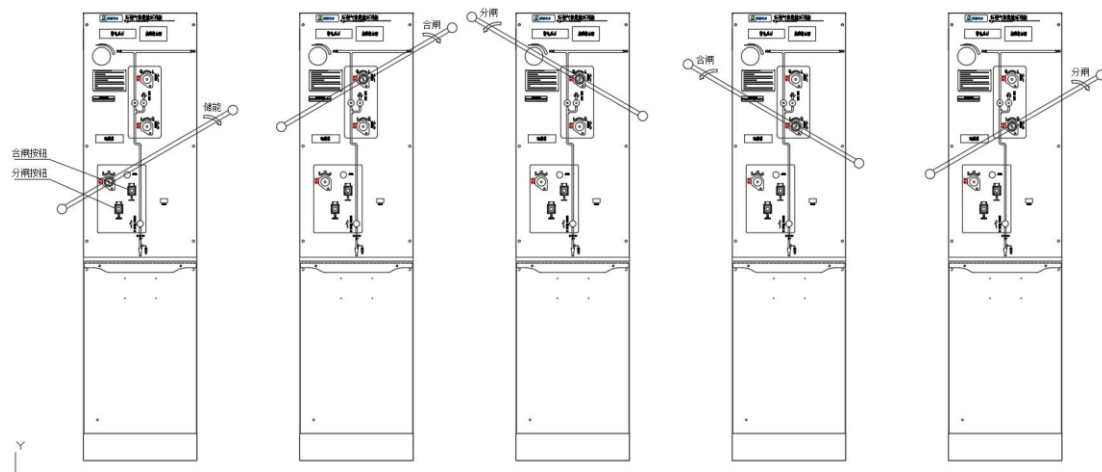
Drawing V: The disconnecting operation
of PT panel;

Drawing VI: The earthing operation
of PT panel;

- The disconnecting operation: Put the handle into the operation hole of disconnecting switch, rotate the handle clockwise to close the disconnecting switch; and anti-clockwise to open it. (referring to Drawing V)
- The earthing operation: Put the handle's hexagonal hole end into the operation hole of earthing switch, rotate the handle clockwise to open the earthing switch; and anti-clockwise to close it. (referring to Drawing VI)

Notes: Referring to the operation panel for the details.

8.3 V Panel Operation



Drawing VII
V panel CB operation

Drawing VIII
V panel disconnecting switch
operation

Drawing IX
V panel earthing switch
operation

- The CB operation: Put the handle's hexagonal hole end into the energy storage operation hole of CB, rotate the handle clockwise to store the energy of CB drive. When the energy storage is finished, put the close button to close the CB and put the open button to open the CB. For each close operation, the energy storage operation must be performed (referring to Drawing VII)
- The disconnecting switch operation: Put the handle's hexagonal hole end into the operation hole of disconnecting switch, rotate the handle clockwise to close the disconnecting switch; and anti-clockwise to open it. (referring to Drawing VIII)
- The earthing switch operation: Put the handle's hexagonal hole end into the operation hole of earthing switch, rotate the handle clockwise to open the earthing switch; and anti-clockwise to close it. (referring to Drawing IX)

Notes: Referring to the operation panel for the details.

9. Maintenance

- Since the dry air is inflated in the gas tanks for the insulation, all the parts in the life cycle are maintenance-free. Gas tanks is welded by 304 stainless steel, which can assure the airtightness of the product and keep the dry air away from the ambient effects.
- Under the conditions of outside scratch or damage, the product must be repaired by paintings to avoid the corrosion.
- The operation drive is located in the outside of gas tank and in the back of front panel, which can be operated, maintained and changed easily.
- All the surfaces of the drive have been anti-corrosion treated and all the moving parts have lubricated before delivery to meet with the life cycle operation. If the drive is used in rugged environment, the necessary maintenance shall be done to it, including cleaning and moderate lubricating. If it is necessary, the drive shall be changed.

The troubleshooting of common faults.

Nr.	Faults Phenomenon	Fault Diagnosis
1	The close button cannot be operated.	Checking if the drive is in the condition of energy-storage.
2	The door of cable compartment cannot be open or close.	Checking if the switch is in the open position or not; if the live display is live or not (for the products equipped with magnetic lock); if the secondary loop is live or not.
3	The open button cannot be operated.	Checking if the CB is in the condition of close position or not.
4	Electric drive operation cannot be close.	Checking if the interlocking joints is working or not; if the link is connected or not; if the lower door interlocking micro switch is in the position or not.

9.1 Gas Control and Monitor

OYH(L)18(XGN□)-24 series RMU is a pressure enclosed system, and there is no need to do the special check under the normal conditions. However, before the operation, the air pressure values of the gas density meter must be checked to see if they are in the safety range or not.

9.2 The Product Life Cycle

OYH(L)18(XGN□)-24 series RMU is designed according to the standard of IEC 298 and has the indoor-use designed life cycle of 30 years. In addition, the VCB operation life cycle is 10000 times; the loading switch operation life cycle is 5000 times; the disconnecting switch and earthing switch life cycle are 3000 times separately. During the whole life cycle, the operation times shall not beyond the designed times. When the operation times are over designed life cycles, the change must be taken into consideration or contact the manufacturer for the evaluations to confirm whether the product can be still used, maintained or scraped or not.

10.Product Acceptance

10.1 The packages of the product shall be opened in the dry field to prevent from exposing to the rains.

- (1) To check if there are any damages during the lift and transportation;
- (2) To protect the product from scratching when open the package;
- (3) To check if there are any damages on the surface, any water inside or serious humidity or not;
- (4) To check if the gas density meter is normal or not (referring to Drawing X, the pointer shall be in the green field). To check if the accessories matching with the packing list or not.



Drawing X

10.2 Test

- If it is needed, the product shall be undertaken the power-frequency voltage withstand test to verify the product meeting the requirement.
- Since the product hasn't been connected with cables, the insulation distance between the incoming and outgoing cable struts cannot meet the requirements. The cable struts must be protected with insulating covers before the power-frequency voltage withstand test.
- All the products have been tested the power-frequency voltage withstand before delivery, therefore only 80% power-frequency voltage withstand test shall be performed.

11. Transportation and Storage

- The whole product shall be packed into the package and well fixed during the transportation. The product shall not be turnover, inclined and shall adopt the precaution against the shocking.
- The product shall be stored in a dry, ventilated, moisture-proof, shock-proof and harmful gas-proof the indoor room. Check the ambient conditions at a regular time for any long-time storage. The loading, opening package and storage shall be in the dry room.

12. Documents with Product

- (1) Product qualification certificate
- (2) Routine test report
- (3) Instruction book of installation and use
- (4) Packing list

13. Ordering Instructions

Please provide the following documents before placing POs.

- (1) Product specifications and types, primary system diagram, arrangement diagram and floor plan diagram;
- (2) Operation type and voltage;
- (3) The names and quantities of accessories and special tools.
- (4) The other special requirements