HXMWS Maintenance Free Dehumidifier

Manual

Shanghai Muyi Electric Co., Ltd.

1. Safety

1.1. Safety instructions

Make sure that any persons who is handing installation, commissioning and operating the dehumidifier：

- To be qualified and experienced
- Shall fully comply the instructions of this manual

Improper operations or misuse could cause risks:

- To damage the device and other assets of the operator
- To damage the device's function

1.2. Safety notes on the equipment operation

- Electrical installation is subject to the relevant national safety regulation.
- Mandatory grounding protection to ensure the personal safety of the operator.

2. General description and features

The HXMWS maintenance free dehumidifier (referred as HXMWS in after) is an air purifier designed for transformer, on-load tap-changer or other electrical equipment with insulating fluid. It is mounted on the air inlet of transformer oil conservator or OLTC oil conservator, when the transformer oil volume expands or contracts due to temperature change during operation, the air in the oil conservator is forced to breathe through dehumidifier, and the air enters the transformer through the filter at the bottom of the dehumidifier and the cylinder which is contained with desiccant, thus to ensure that the inhaled air is dry (moisture is adsorbed by desiccant) and clean (dust impurities are blocked by the filter) and maintain the cleanliness and insulation strength of the transformer oil. The HXMWS heats and regenerates the desiccant according to the measured temperature value on air inlet, which greatly saves the cost of material and labor comparing with normal dehumidifier. The product is compact in structure and elegant in appearance, and it is an ideal replacement for existing conventional dehumidifier.

The HXMWS uses desiccant which can be repeated recycle, it is no drying efficient lose, no need to replace regularly, thus to protect environment.

The HXMWS adopts a fan with removable structure, the fan takes out the moisture during the dehumidifier operation, and the moisture does not enter into the oil conservator during heating process, thereby improving the safety and reliability.

Heating system controlled by microcontroller, the oil conservator humidity value could be set as the heater starting, the control is accurate and reliable. The control device is located in control cabinet which has simple structure and good appearance. The product use MODBUS protocol and RS485 interface to transmit the alarm signal and working status signal to RTU.

To meet the needs of the user, HXMWS provides selectable desiccant weight according to the transformer capacity. Please refer to clause 5 "the transformer capacity and desiccant weight selection reference".

3. Operation principle

HXMWS operation principle is as following: during operation the outside air entries into oil conservator through dehumidifier and the moisture is absorbed by the desiccant. Once moisture value detected by sensor is high than the setting value, the heating system starts operation for regeneration of desiccant , the water vapor comes out during the heating process by internal fan, therefore no need to replacing of the desiccant.

HXMWS has two cylinders, it is defined cylinder A located at the right side of control cabinet, and cylinder B at the left side of control cabinet. When the moisture value of cylinder A does not reach to the setting value, cylinder B is closed by the top solenoid valve, air breathes through cylinder A, once moisture value of cylinder A reaches to the setting value, the top solenoid valve change over to open the cylinder B, then air breathes through cylinder B. After completing of desiccant regeneration process of cylinder A, control system compares both moisture values in cylinder A and B, select breath cannel which has lower moisture value. Such design of alternating heating for desiccant in different cylinder ensures air entries oil conservator through dry desiccant, not via the cylinder which is under heating process, and heating times for each is almost equal, therefore the life time of the desiccant in each cylinder will be same theoretically.

The heating temperature will not over the up limit value which is set to temperature sensor, thus to avoid damage of the desiccant in the cylinders.

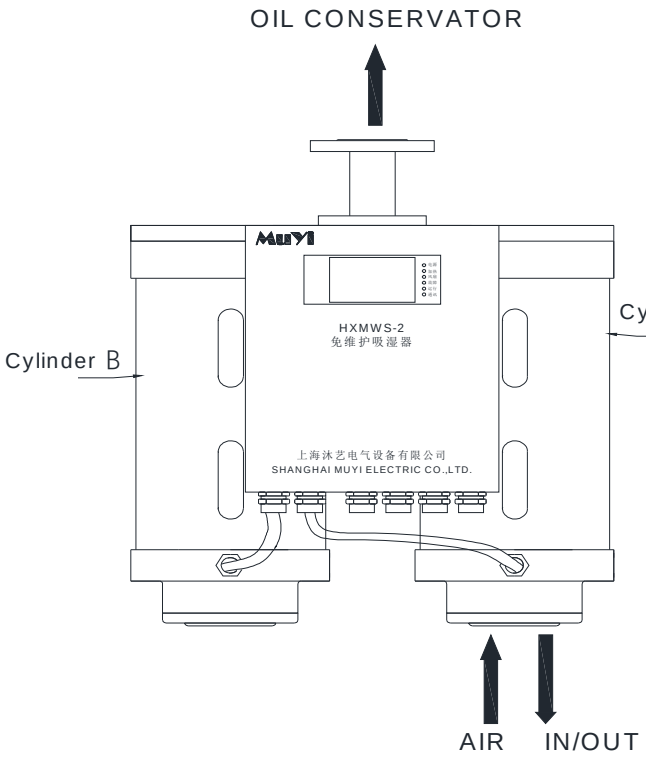

Figure 1：Schematic diagram of cylinder A in operation

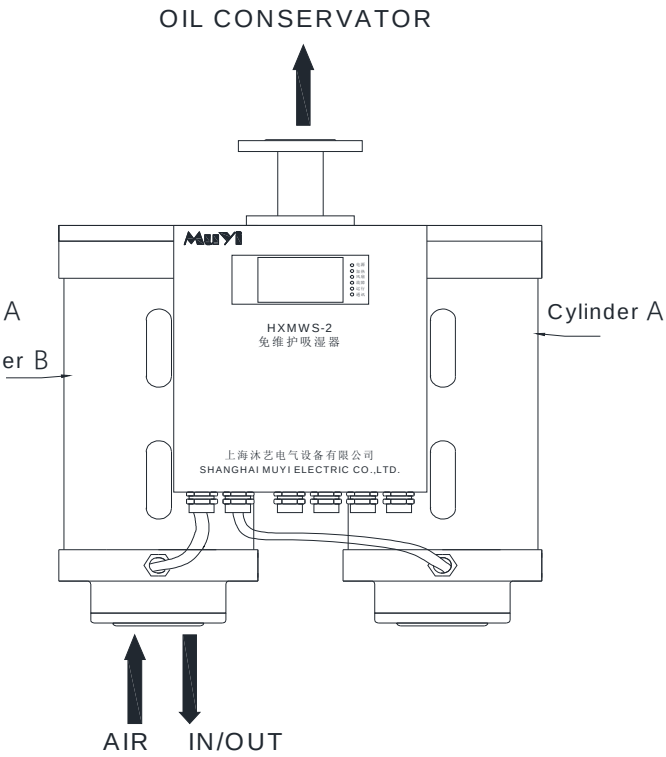

Figure 2： Schematic diagram of cylinder A in regeneration

4. Technical features

HXMWS cylinder		
Metal material	Cylinder protective hosing is made of stainless steel, the top and bottom part of cylinder as well as connecting flange is made of aluminum alloy.	
Connection flange size	DN25	
Connection location	Connected to air inlet of oil conservator	
Seal property	Prevent dust and moisture effectively	
Protective degree	IP56	
Net weight	22KG	
Ambient temperature	-40℃~+70℃	
Control cabinet (mounted together with cylinder before delivery)		
Protective degree	IP56	
Cable gland	8-M16*1.5	
Display screen	OLED	
Indication lamp	Power	Green light on (Power source on)
	Heating	Red light on (Heater working)
	Fan	Red light on (Fan running)
	Fault	Red light on (Fault)
	Regeneration	Green light on (Regeneration process)
	Communication	Green light flash (Normal communication)
Power supply		
voltage	AC/DC 100V~265V	
Output signals		
Digital signal output	MODBUS RTU communication protocol via RS485 interface	
Dry contact output	2-relay signal output, one for power supply fault and another for regeneration operation	
Contact capacity	3A/250VAC, 3A/30VDC	

5. The transformer capacity and desiccant weight selection reference

Transformer specification	Dehumidifier model	Desiccant weight
Transformer capacity≤40MVA	HXMWS-2	2 KG
40MVA < Transformer capacity ≤200MVA	HXMWS-4	4 KG
Transformer capacity > 200MVA	HXMWS-6	6 KG

6. Overall and mounting dimensions

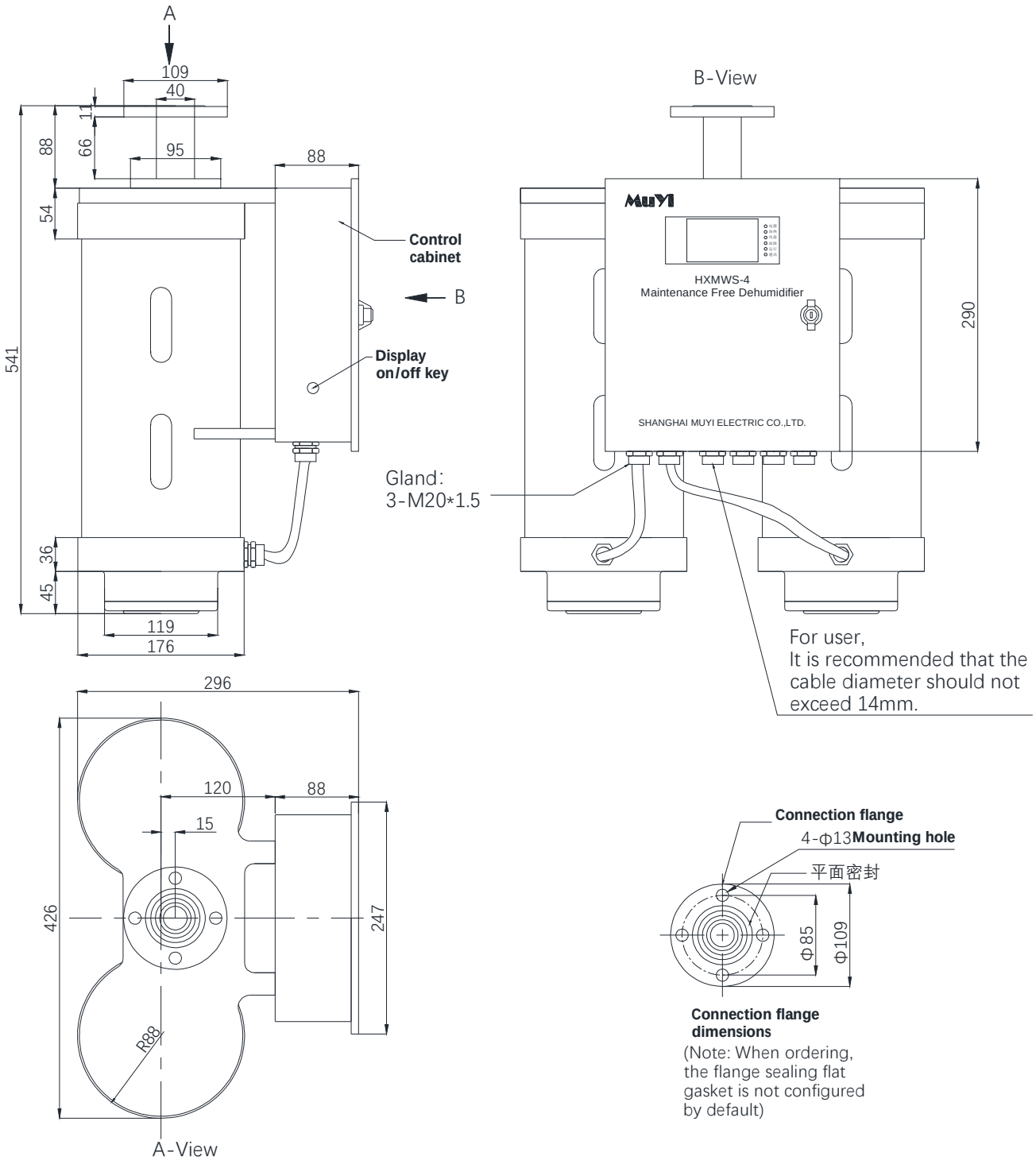

Fig.3 HXMWS-4 overall and mounting dimensions

NOTE: Other specifications are provided separately.

7. Control cabinet

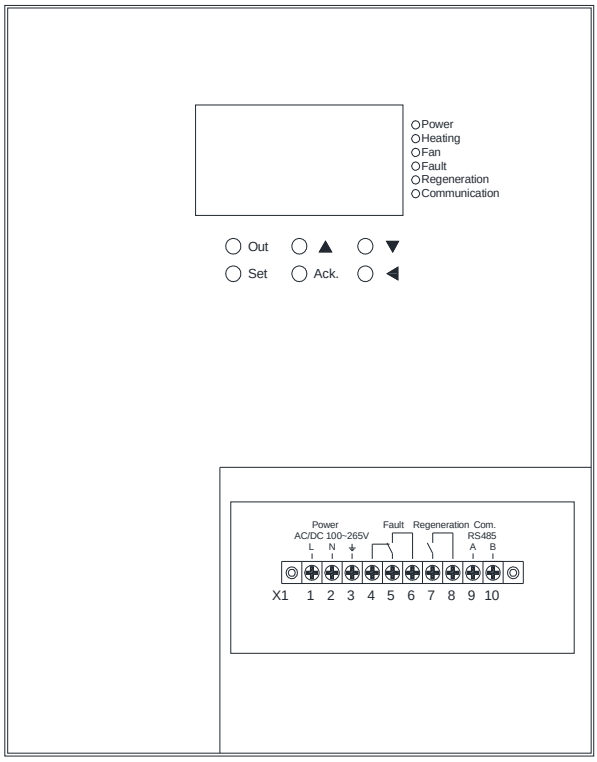

Fig.4 Schematic diagram of control cabinet front panel

7.1. Wiring by the user

Terminal X1 shall be connected by the user before operation.

X1-1 and X1-2: power supply connection

X1-3: grounding

X1-4,X1-5,and X1-6: fault signal output

X1-7 and X1-8: operation signal output

X1-9 and X1-10: RS485 interface

7.2. Operating keys

After power on, user can set via 6 keys descripted as following:

"Out": for return back to home page

"▲"、"▼": for selection and change the data

Press "Set" key to set interface and data

"**ACK**": for set data confirmation

" ◀ " Move cursor left or right

7.3. Explanation for displayed parameter

Double Tank P1	
RH1=28.8%	T1=25.7℃
RH2=31.7%	T2=21.5℃
PT1=34.7℃	FS1= 0
K1(H) = off	K2(F) = off

Double Tank P2	
RH3=5.3%	T3=30.8℃
RH4=30.3%	T4=28.7℃
PT2=247.9℃	FS2= 0
K3(H) = on	K4(F) = on

Double Tank P3		
T5=26.7℃	RH5=25.4%	
K5 = off	K8 = on	
K6 = on	FW1= N	HW1= N
K7 = off	FW2= Y	HW2= N

Fig. 5 HXMWS parameter display interface

HXMWS dehumidifier has 3 of parameter display interface:P1,P2,P3。

Interface P1：

RH1、T1: the values of moisture and temperature which are measured by the sensor on top of cylinder A, heater and fan on/off is based on measured values on the top of cylinder.

RH2、T2: the values of moisture and temperature which are measured by the sensor on bottom of cylinder A, for real time monitoring of the moisture and temperature of the desiccant on the bottom of cylinder A.

PT1: the temperature measured by PT 100 sensor of heater inside cylinder A, to prevent over temperature of the desiccant.

FS1: the rotary speed of fan on bottom of cylinder A, to judge whether fan is operating in normal.

K1(H): indication of heater on/off status for cylinder A

K2(F): indication of fan on/off status for cylinder A

Interface P2：

RH3、T3: the values of moisture and temperature which are measured by the sensor on top of cylinder B, heater and fan on/off is based on measured values on the top of cylinder.

RH4、T4: the values of moisture and temperature which are measured by the sensor on bottom of cylinder B, for real time monitoring of the moisture and temperature of the desiccant on the bottom of cylinder B.

PT2: the temperature measured by PT 100 sensor of heater inside cylinder B, to prevent over temperature of the desiccant.

FS2: the rotary speed of fan on bottom of cylinder B, to judge whether fan is operating in normal.

K3(H): indication of heater on/off status for cylinder B

K4(F): indication of fan on/off status for cylinder B

Interface P3：

RH5、T5: the values of moisture and temperature which are measured by the sensor inside control cabinet, to prevent electric elements working in moisture or low temperature ambient.

K5: indication on/off status of solenoid valve on the top of dehumidifier.

The solenoid valve K5 change over working per moisture value measured by the top sensor, when RH1 (cylinder A) is higher than RH3 (cylinder B), the solenoid valve is on, cylinder B provides dry air to oil conservator, cylinder A is started regeneration process, on the contrary, when solenoid valve is off, cylinder A provides dry air to oil conservator.

K8: the indication of start/stop status of dehumidifier regeneration process.

K6: the indication of start/stop status of heater inside of control cabinet

K7: Fault indication（such as power supply fault，heater fault，fan fault）.

FW1: fan for cylinder A fault

FW2: fan for cylinder B fault

HW1: heater for cylinder A fault

HW2: heater for cylinder B fault

Note: RH1,RH3,K5 is set at factory, to prevent misoperation password is required in case of change of setting.

7.4. Principle diagram

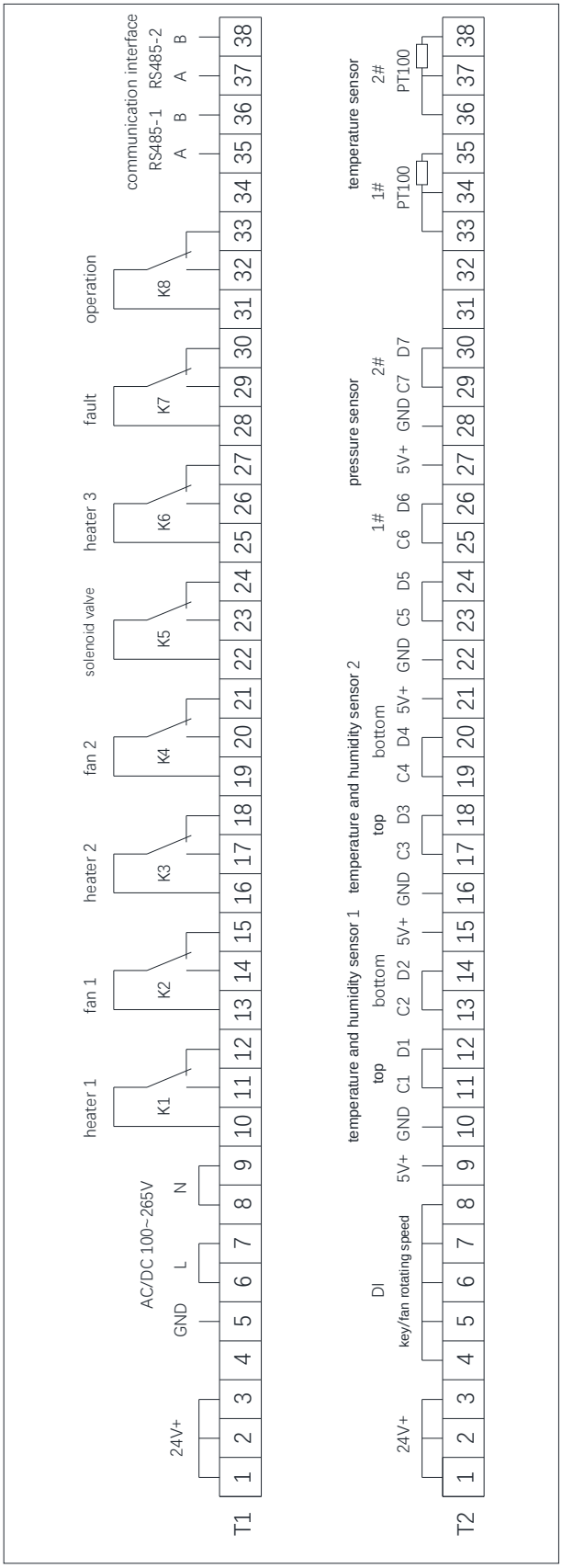

Fig. 6： HXMWS principle diagram

Please note for followings:
There are terminal blocks T1 and T2.
T1 terminal block is for operation control of internal devices, and transferring of signals to remote via RS485 interface.
K1 and K2 is used for heater and fan of cylinder A,
K3 and K4 is used for heater and fan of cylinder B,
K5 is for control of top solenoid valve
K6 is for start/stop of control cabinet heater
K7 is for device fault alarm output
K8 is for dehumidifier regeneration signal output

T2 terminal block is for sensor signal input
Temperature and moisture signal 1 is from top sensor and bottom sensor of cylinder A, temperature and moisture signal 2 is from top sensor and bottom sensor of cylinder B, pressure signal is from sensor inside of cylinder A and cylinder B respectively, heating temperature signal is from PT100 inside cylinder A and cylinder B.

Note: all above terminal wiring is completed at factory, therefore no need wire connection by the user.

8. Maintenance

During the periodic inspection of the transformer, we recommend the following inspections of the HXMWS: check the equipment outward appearance to see if there is heavy dirt and damage especially dust cover and built-in fans, and whether the tightness of the control cabinet is ok. If the regenerative processing time is too long or frequency, it is better to replace the new dehumidifier which is with more desiccant to meet its functional requirements.