OLTC Online Oil Filtering Device
Type MYJ-2

Operation Instructions

Shanghai Muyi Electric Co., Ltd.

Table of Contents

1.Safety

1.1 Warning sign

⚠ Warning sign remind potential threat that may cause casualty accident due to negligent operation and give safe operation reminders.

1.2 Safety precautions

1.2.1. Discharging of oil has potential harm to the surrounding environment. It is strictly forbidden to discharge the oil in the product pipeline into the ordinary sewer pipe. Please handle the oil properly according to relevant regulations.

1.2.2. Before running the OLTC online oil filtering device, please have a check the seal of the oil inlet and outlet section to avoid environmental pollution caused by leakage of oil during operation.

1.2.3. The component temperature of the online oil filtering device may be relatively high after operation, thus please pay attention when handling maintenance.

1.2.4. The unit must be grounded before the oil filtering device is put into operation.

1.2.5. After the oil filtering device is energized, please do not touch the live parts. If the cable inside the unit is damaged, please replace the cable in time.

2. Product general and features

MYJ- 2 OLTC online oil filtering device (hereinafter referred to as MYJ-2) is suitable for filtering of impurities and moisture inside of the OLTC diverter switch oil chamber, thus to extend OLTC maintenance period and avoid potential safety hazard caused by oil insulation drop down during operation of the on-load tap-changer.

The MYJ-2 enclosure is made of stainless steel, the top of the enclosure is designed with inclined surfaces and vents to prevent water accumulation, and to have good ventilation and heat dissipation. The product protection grade is IP55.

MYJ-2 adopts filter element which is made by German HYDAC Technology GmbH. HYDAC specializes in producing components and devices for fluid filtration technology, hydraulic control technology and electronic measurement technology. It is a world-famous filter supplier.

MYJ-2 uses a maintenance-free oil pump and a combined piping system. The overall structural design of the oil circuit reduces the interface of the pipeline and avoids the risk of oil leakage from the interface effectively.

MYJ-2 adopts manual control start-stop mode. It can be started or stopped by manual operation at site or in the remote room of the substation. The running time can be set. After the manual start, even if the STOP key is not pressed, when the operation reaches the setting time, the filtering device will stop running

immediately.

Photos of MYJ-2 online oil filtering device

3. Product structure and main components

MYJ-2 type OLTC online filtering device mainly consists of the following parts:

① Enclosure: Made of stainless steel, the top of the housing is designed with an inclined surface and a heat dissipation hole structure.

② Electrical control panel: there is a select switch for REMOTE/LOCAL control, a set of START and STOP key, 4 indicating lamps including one operation indication lamp and 3 fault indication lamp separately as filter element 1 (for moisture and impurities removal) alarm indication, filter element 2 (for impurities removal) alarm indication, and system pressure alarm indication.

③ Oil pump and pipeline combination system: Reduces the piping interface and avoids the risk of oil leakage from the interface.

④ Filtration system: It consists of a filter element for filtering moisture and impurities and a filter element for filtering impurities. The two-stage filtration is better for reducing impurities and moisture in the oil.

⑤ Heater, cooling fan and temperature automatic control system: Ensure that the unit can operate normally in different environments.

⑥ Bottom mounting plate: The mounting hole size and number of the hole for connection to external power and signal cables can be customized according to customer requirements.

⑦ Oil inlet/outlet: The inlet and outlet of the oil filtering device adopts a pipe thread structure, it is connected to the inlet and outlet ports of the on-load tap-changer through a metal hose, and the connection of the on-load tap-changer inlet and outlet valve is in the form of flange docking.

⑧ Pressure gauge: Used to monitor the pressure of the system and send an alarm signal when the pressure exceeds the setting value.

⑨ Motor: It is used to drive the gearing oil pump and has the characteristics of smooth operation.

Please refer to Figure 3: MYJ- 2 OLTC online oil filtering device structure diagram

4. Product technical parameter

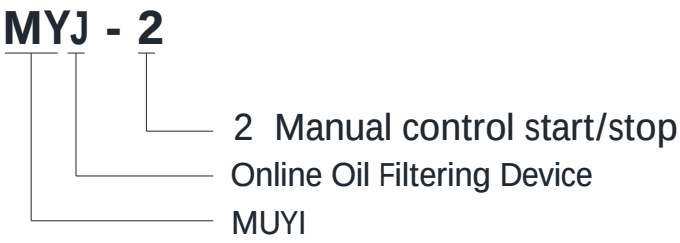
Please refer to below Table 1 for MYJ- 2 main technical parameter

Table 1

1	motor	motor type	AC motor
		power supply	3AC 380V/50HZ Or as required
		rotating speed	1400r/min
2	pump	rated flow	8 L/min
		setting pressure	0.58MPa
3	filter element for impurities removal	type	0180MA003BN
		filtration accuracy	3μm
4	filter element for moisture and impurities removal	type	0180MA010P
		filtration accuracy	10μm
5	* alarm pressure	filter element pressure differential	0.2MPa
		system pressure	0.56MPa
6	oil line interface	For oil filtering device oil inlet/oil outlet size	threaded pipe joint Pc- 1/2" inner threaded pipe
		for on-load tap changer	Flange docking with the OLTC inlet and outlet oil valve
7	oil sampling valve	oil sampling port size	8mm
8	Terminal block	UK5N	Phoenix brand
9	cable hole spec.	hole diameter 22mm	quantity: 3
10	dimensions	overall dimensions	H950, W610, D300 (mm)
		mounting dimensions	H365, W390(mm)
11	enclosure	material	stainless steel 304 or 316L
		protective degree	IP55

*alarm pressure: The filter element alarm is given if one of the filter elements has a pressure difference of 0.2 MPa. When the system pressure reaches 0.56MPa, the system pressure alarm occurs and device will stops working.

5. Product type description



6. Product ordering instructions

Please refer to following list for scope of supply for each device:

① MYJ-2 online oil filtering device
② one piece of belt wrench:300x36mm
③ air release and oil sampling tube: inner diameter 8mm
④ oil inlet and outlet stainless steel flexible hose and connection flange

Please provide below data when ordering:

① AC power supply and frequency for the device:
② connection length of stainless steel flexible hose for oil inlet and outlet
③ on-load tap changer oil inlet and outlet valve connection flange dimension drawing

7. Installation

The accessories required prepared by the user for the installation and commissioning of the OLTC online oil filtering device (except from above scope of supply) are shown in Table 2 below.

Table 2

the required items for installation which shall be prepared by user	(1) 4 sets of M12 bolts, nuts, and washer
	(2) oil gasket for OLTC flange docking
	(3) PTFE tape

Installation steps:

(1) Before installation, check whether all tools and accessories are complete.

② Installation: On the back side of MYJ- 2 OLTC online oil filtering device, there are two vertical mounting brackets and each one has two mounting holes of Φ14, then four sets of M12 bolts and nuts and washers are used to mount MYJ-2 on the transformer tank.

③ Pipe connection: the oil inlet and the oil outlet are respectively connected to one end of the stainless-steel flexible hose through the threaded pipe joint, and the other ends of the stainless-steel flexible hose are connected to the flange of OLTC oil inlet and outlet valve through the mounting flange. Tight threaded pipe joints via wrench, PTFE tape must be used at the pipe thread interface (note that the thickness should be appropriate) to enhance the tightness of the pipe joints.

④ Electric connection: Please make electrical connections according to Table 3-X1 terminal block wiring table

⑤ There is an M12 grounding bolt on the left side of the bottom of the cabinet, it must be grounded before device is energized and put in operation.

Table 3 X1 terminal block wiring table

X1 terminal block numbering	description
1	Q1- 1
2	Q1- 3
3	Q1- 5
4	N
19	filtering device running signal
20	
21	alarm signal for moisture and impurities removal filter element
22	
23	alarm signal for impurities removal filter element
24	
25	system pressure alarm signal
26	
27	motor fault signal
28	

8. Test and commissioning

① Setting pressure of system pressure meter is fixed at factory, it is no need to regulate when application.
② Open OLTC oil inlet and oil outlet valve, and also open oil inlet and oil outlet valve of MYJ-2.
③ Electric connection: check that the unit is grounded and connected to an external power supply using a 4-core cable.

⚠**WARNING: the device must be grounded before the product is energized!**

⚠**WARNING: make sure the power is off before connection of power supply!**

④ Close the circuit breaker Q1. If the green LED of the phase sequence relay is not lit, firstly adjust the power phase sequence.
⑤ After the phase sequence is adjusted, when the green LED of the phase sequence relay is lit, press the START key, the motor starts, and the on-load tap changer online oil filtering starts running.

⚠**Note：If the power phase sequence is not correct, the oil filtering device will not work properly.**

⑥ Prepare a drip pan to prevent oil droplets pollution when release the air from MYJ-2 oil line.
⑦ Connect the plastics hose to the outlet of the bleed valve, slowly open the valve, and immediately close the valve when the oil leaks from the hose port. At this time, the OLTC online filtering device is filled with oil completely.
⑧ By adjusting the time relay, the running time of the online oil filtering device can be set. When the set time is reached after starting, the online oil filtering device automatically stops running.
⑩ After above commissioning procedure, the online oil filtering device can be operated normally.

⚠WARNING: to prevent the presence of gas in the piping system, it is forbidden to start the oil filtering device online before the air in the device is released!

9. Maintenance

9.1 On-load tap changer online oil filtering device inspection cycle

In order to ensure the safe operation of the OLTC online oil filtering device, it should be inspected once a day when it is started operation. After one week, it could be checked during regular transformer inspection. The main inspection shall be focused on whether it has oil leaking, whether the operation is normal, whether the thermostat works normally. It should be manually turned on once a month at least, to verify whether the oil filtering device is working properly, if abnormal operation sound or leakage is found during the inspection, it should be stopped operation immediately for inspection and treatment.

9.2 Oil sampling procedure

Open the door of on-load tap-changer online oil filtering device enclosure, close the circuit breaker Q1, press the START key, slowly open the sampling valve its vent shall be connected by a hose, , and wait for the oil to leak out from the hose port, After sampling, close the sampling valve, then close the door of device enclosure.

9.3 Filter element life

① When the pressure difference of the filter element reaches the set value of 0.2Mpa, the filter element differential pressure alarm lamp lights up, indicating that the filter element shall be replaced.

② The service life of the filter element is related to the moisture in the operating environment, the load situation, the number of operations, etc., so generally, after the filter element is in normal operation for 2 years, some impurities will accumulate during the operation, which affects the working efficiency of the oil filtering device, so replacing of the corresponding filter element in time after 2 years operation is recommended.

9.4 Filter element storage

① Before installing the filter element, do not disassemble the sealed package of the filter element. It is recommended to place it in a dry room to avoid direct sunlight.

② A moisture-proof silicone bag should be placed in the package of the filter element.

9.5 Replace of filter element

The replacement of the filter element can be carried out under the on-load tap-changer operating.

The following is the oil filter element replacement procedure:

① Open the door of oil filtering device enclosure.

② Open the circuit breaker Q1, make sure the power supply is disconnected.

③ Close the oil inlet and oil outlet valve port.

④ Place a drip pan on the bottom of enclosure to prevent oil droplets pollution

⑤ Use a belt wrench to loosen the filter element, note that the thread at the joint is a right-handed thread, and remove the filter elements, place the filter elements in a suitable container.

⑥ Place an oil-proof round gasket on the new filter element cover.

⑦ Rotate the new filter element to the interface, tighten the filter element by belt wrench finally.

⑧ Close circuit breaker Q1,open the oil inlet valve and oil outlet valve, press START key to start operation of oil filtering device.

⑨ Check carefully whether the filter element and connection portion have oil leak, if there is no leakage, the device can be normally operated.

Figure 1: MYJ- 2 OLTC online oil filtering device schematic

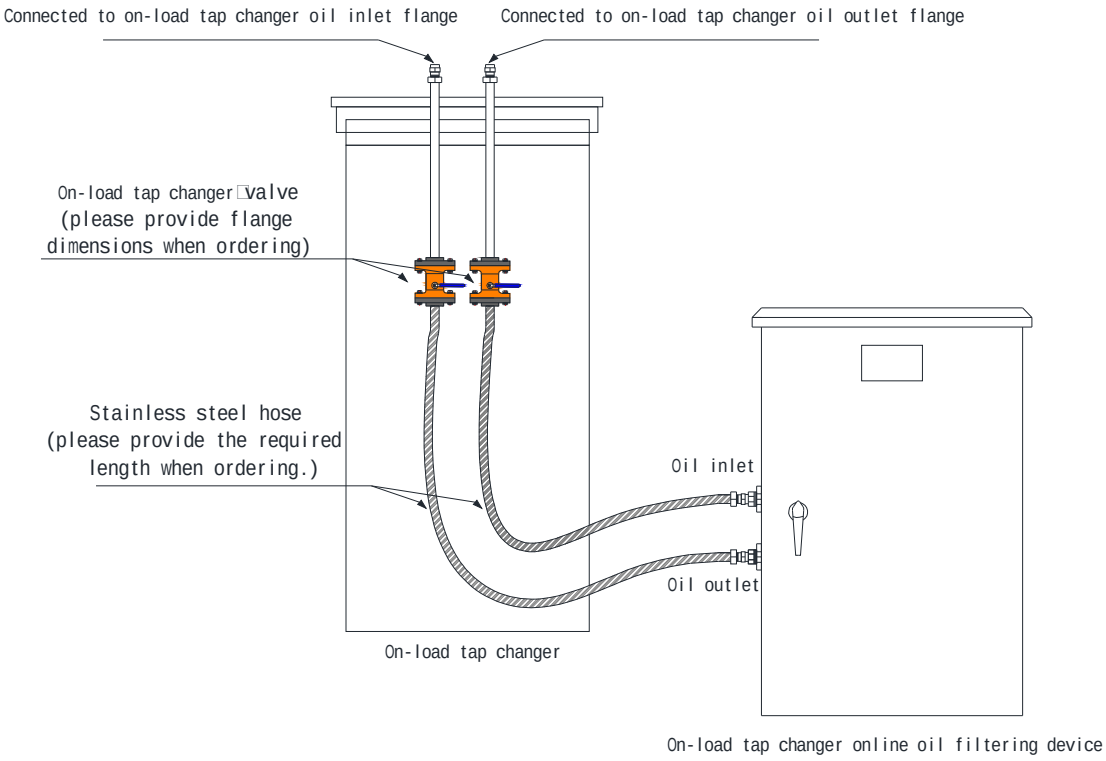


Figure 2: MYJ- 2 OLTC online oil filtering device mounting dimensions

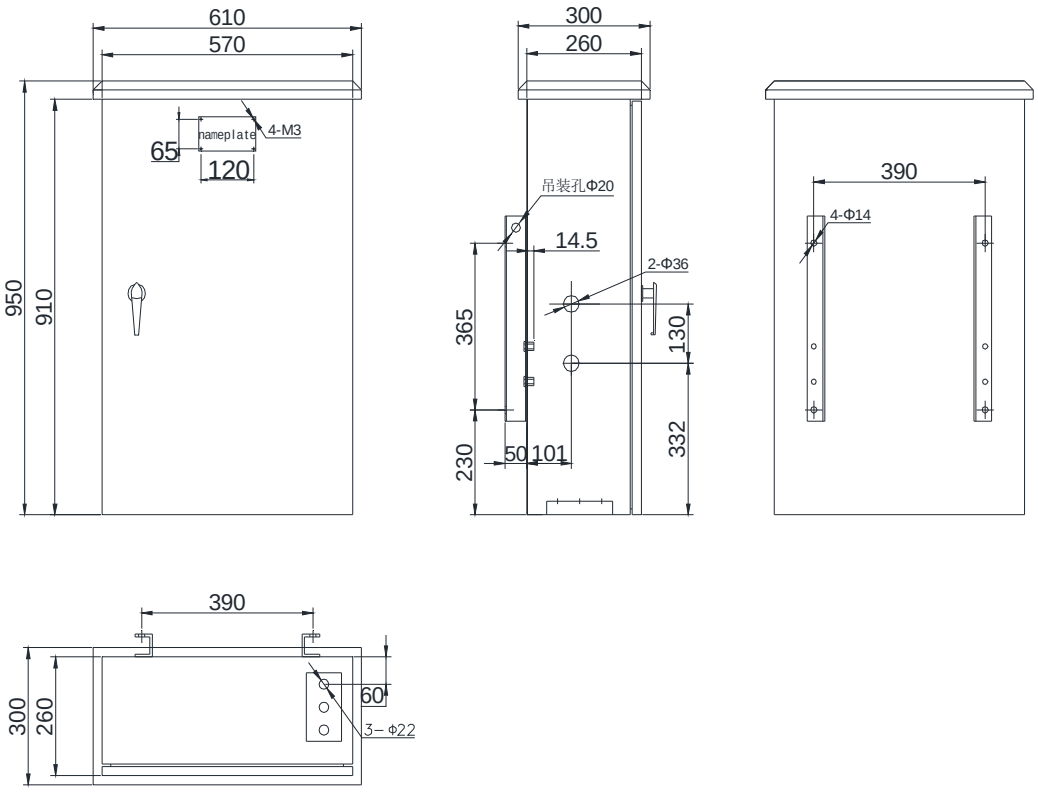
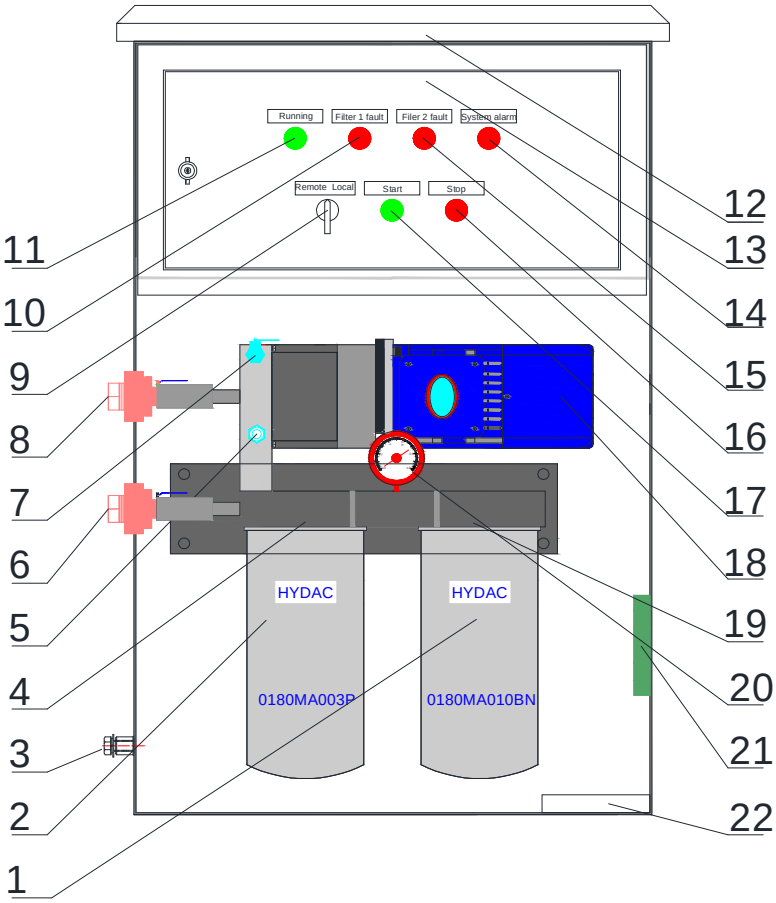


Figure 3: MYJ- 2 OLTC online oil filtering device structure diagram



1: moisture and impurities remove filter
2: impurities remove filter
3: Grounding bolt
4.differential pressure alarm generator for filter 2
5: system pressure safety valve
6: oil outlet
7: valve for air release and sampling
8: oil inlet
9: REMOTE/LOCAL select switch
10: filter 1 (moisture and impurities) alarm indication
11: filtering device running indication
12: cooling fan
13: temperature controller
14: system pressure alarm indication
15: filter 2 (impurities) alarm indication
16: STOP key
17: START key
18: motor
19: differential pressure alarm generator for filter 1
20: system pressure meter
21: heater
22: connection cable interface

Figure 4: MYJ- 2 OLTC online oil filtering device control panel

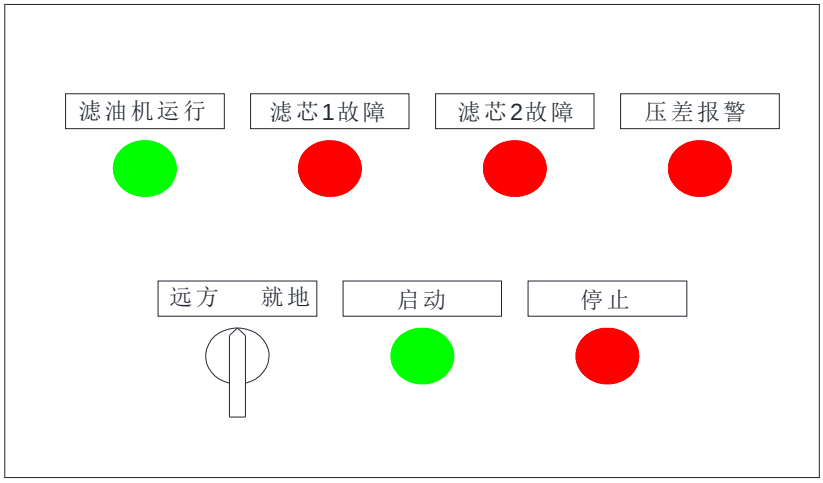


Figure 5: MYJ- 2 OLTC online oil filtering device circuit diagram (1)

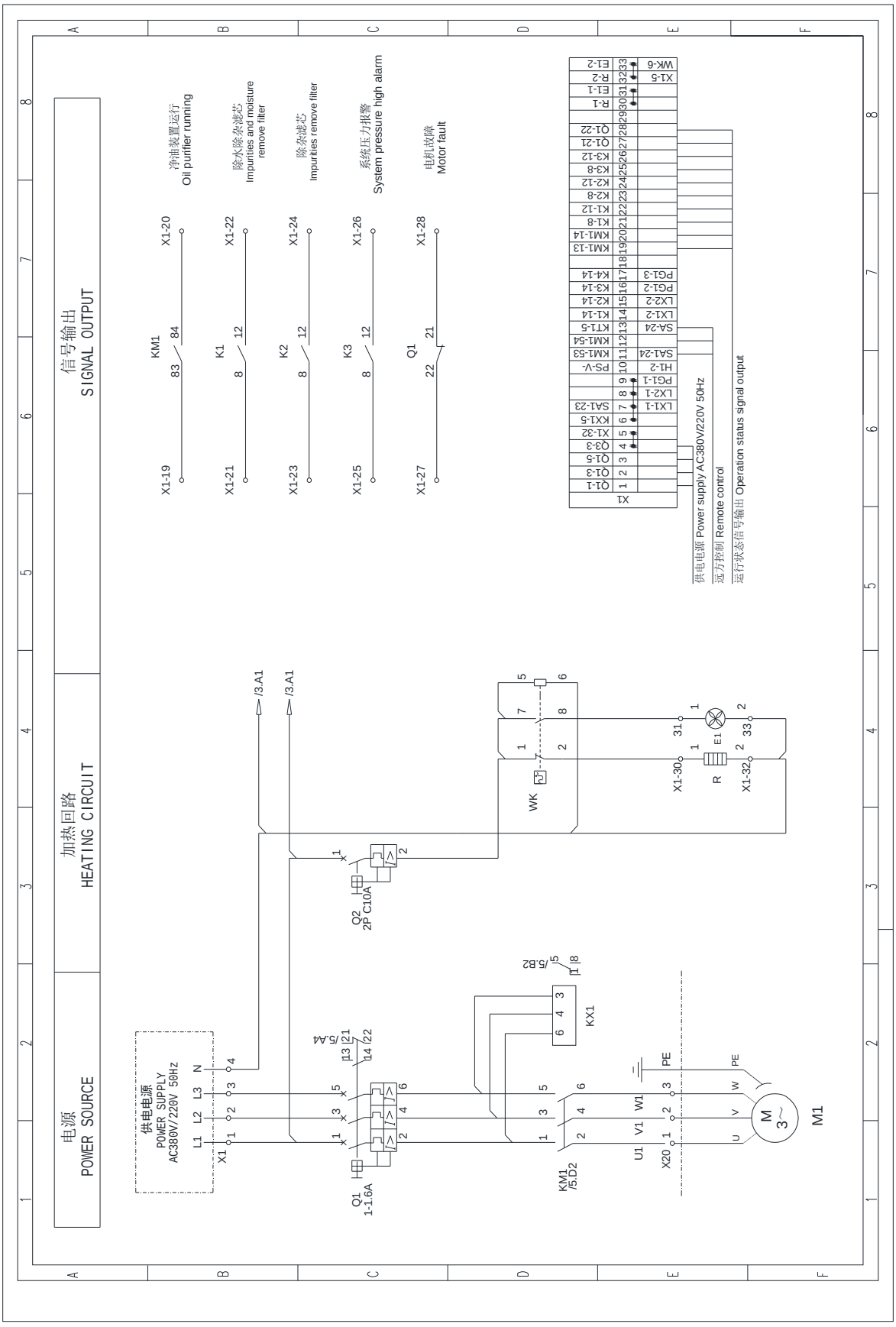


Figure 6: MYJ- 2 OLTC online oil filtering device circuit diagram（2）

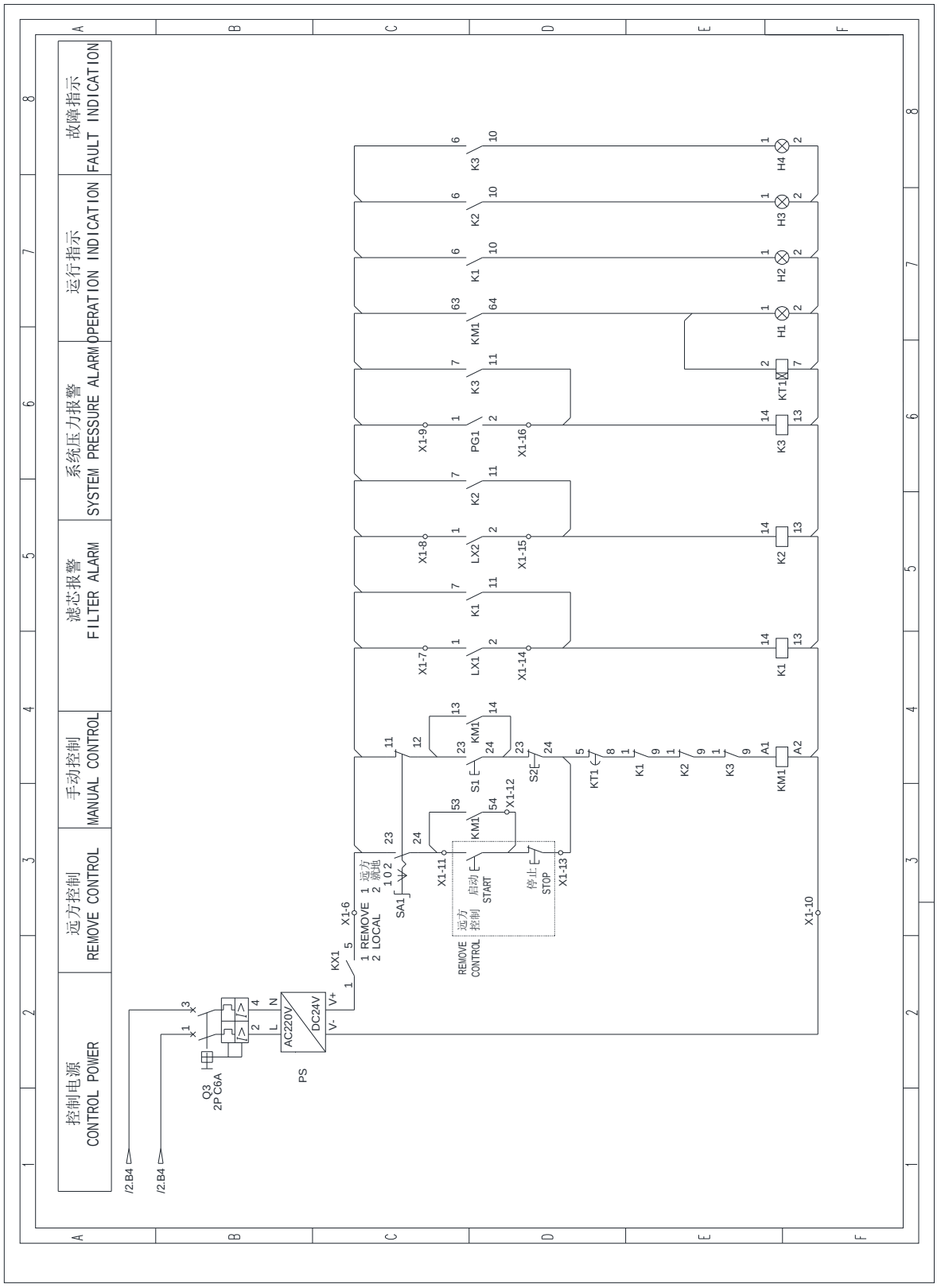


Figure 7: MYJ- 2 OLTC online oil filtering device electrical component list

序号 No	代号 Code	名称 Name	数量 Quantity	型号 Model	制造商 Manufacturer
17	X1	端子排 Terminal	30	UK5N	菲尼克斯 PHOENIX
16	PG1	压力表 Pressure gauge	1	LX1-1	红旗 HONGQI
15	LX1,LX2	信号继电器 Signal relay	2	LX1-1	沐艺电气 MUYI
14	SA1	选择开关 Selected switch	1	LW39-B2-CX	西门子 APT
13	S1,S2	按钮 Button	2	LW39-11	西门子 APT
12	H1,H2,H3,H4	信号指示灯 Signal lamp	4	AD16-22	西门子 APT
11	E1	散热风扇 Cooling fan	1	DP 201AT 220V 0.1A	英威利 SUNON
10	R	加热器 Heater	1	DJR-50 50W	沐艺电气 MUYI
9	WK	温度控制器 Temperature controller	1	JWT6011R	雷普电气 LEIPO
8	KT1	时间继电器 Time relay	1	AH3-2	安良 ANLY
7	KX1	相序继电器 Phase sequence relay	1	APR-3S	安良 ANLY
6	SP	电源模块 Power supply module	1	AC220V/DC24V	明纬 MEAN WELL
5	K1-K4	继电器 Relay	4	RXM4LB2E7	施耐德 SCHNEIDER
4	KM1	接触器 Contactor	1	LC1-D09E7C+LDAN40C	施耐德 SCHNEIDER
3	Q3	断路器 Circuit breaker	1	IC65N 2P C6A	施耐德 SCHNEIDER
2	Q2	断路器 Circuit breaker	1	IC65N 1P C10A	施耐德 SCHNEIDER
1	Q1	断路器 Circuit breaker	1	GV2-M06C (1-1.6A)+GV-AE11	施耐德 SCHNEIDER