



YZBF-120LD AIR-COOLED HYDRAULIC POWER UNIT

OPERATIONAL MANUAL

YZBF-120LD-SM

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1. Introduction

YZBF-120LD air-cooled hydraulic unit is to supply hydraulic power for land and offshore drilling tools. The power unit contains electric motor, pump, radiator, electric heater, and electric control cabinet. All the parts are explosion-proof, suitable for desert, plateau, and ocean work environment. In the hot desert, air-cooled radiator can be used to cool hydraulic oil, and can keep oil temperature at 60-70 °C over a long period operation, and secure quality of oil and long service life of hydraulic components and seal rings. In cold area, use electric heater to preheat the hydraulic oil and ensure normal starting of power unit.

The power unit is equipped with explosion-proof electric control cabinet. Only need to input AC 380V can start its running. Explosion-proof grade for electric parts is dIIBT4, protective grade is IP54, suitable for drilling environment with combustible gas.

YZBF-120LD air-cooled hydraulic power unit is mainly supply power for drilling tools such as drill pipe tong, casing tong, hydraulic cathead, hydraulic winch, etc, or supply power for stabbing and pushing working on derrick, or supply power for other auxiliary hydraulic tools such as hydraulic rope mover, hydraulic rope shearer. The power unit has the port to joint those auxiliary hydraulic tools.

The air-cooled hydraulic power unit features compact structure, simple installation, good applicability, visible cooling effect.

2. Technical performance

2.1 Power unit

Max work flow:	120L/min (31.7gpm)
Available volume:	600L(158gal)
Max work pressure:	21.5Mpa(3100psi)

2.2 Explosion-proof motor

Model:	YB2-225S-4-B35
Power:	37kw(49.7hp)

oil tank, radiator, electric heater, electric control cabinet, oil-in & out port, pressure control parts and hand pump, etc. (refer to Fig.1). The power unit is tank-on-the-top structure (see Fig.2), to ensure enough intake of oil for electric motor-pump assembly. Radiator (Fig.2-14) is set under the oil tank (Fig.2-16) with motor-pump group (Fig.2-5). In front of oil tank is explosion-proof electric control box (Fig.2-12), which is to control “on and off” of motor-pump assembly, radiator, and electric heater (Fig.2-6). On the other side of the tank is hydraulic control panel, c/w oil taking filter (Fig.3-11), electric heater (Fig.3-15), Oil return filter (Fig.3-5), tee ball valve (Fig.3-4) and shock-proof pressure gauge (Fig.3-7), liquid-meter (Fig.3-9), and electric oil pump (Fig.7/Fig.2-17), etc.

Oil control for radiator is achieved by a tee ball valve (refer to Fig.3). Right port of lower pressure tee ball valve (Fig.2-4) is to connect main oil return. By rotating the handle of ball valve can control the oil flow direction, and control hydraulic oil to go through radiator or not. Ball valve port I is for oil going directly back to oil tank. Port II is for oil going toward radiator, and passing through port III, and then back to oil tank. Lower pressure ball valve (Fig.3-6) is a switch valve to control the electric pump (Fig.7) from taking oil into tank. Electric oil pump is complete with a transparent suction hose with joint.

On front of motor-pump assembly is oil in & out ports (see Fig.4), involves two groups of oil-in and oil-return ports (Fig.4-2,3,6,7), with different connection types ---- pressure hose port I and II (Fig.4-3,7) M30*1.5 (ball head), and return hose port I and II (Fig.4-2,6) M42*2 (flared). Pressure port I and port II are controlled individually by two plate-type ball valves (Fig.4-8). Return ports are complete with screw plugs (Fig.4-12). There is a NPT1/2 pressure port and a NPT1/2 return port sealed with plugs as standby. Relief valve II (Fig.4-1) is to control max pressure of hydraulic line.

See Fig.5, there is a ball valve (Fig.5-5) at the bottom of oil tank for oil drainage. Oil sump (Fig. 5-6) as a whole body is at the bottom of the power unit, and oil can be drained by unscrewing the releasing plugs (Fig.5-7) on

both sides, or being sucked into oil tank by oil pump.

4. Operation and Maintenance

Besides the above-mentioned structure and principle of unit, also needs to notice the following items:

4.1 Check if oil storage is within the range of liquid-meter. Normally, use hydraulic oil YB-N32 or YB-N46 anti-wear oil. When environmental temperature is below minus 25°C, YC-N32 or YC-N46 also is a choice.

4.2 Pay attention to the handle position of three low-pressure ball valves and two pressure ball valves. That is: on and off of two-way valves and flow direction of three-way valves. Two low-pressure ball valves (Fig.3: No.6 and Fig.5: No.5) should at “off” position. Low-pressure tee valve (Fig.3; No4) is at I position as Fig.3 indicated. One of the two plate-type ball valve (Fig.4: No.80 is at “on” position, the other one is at “off” position.

4.3 Choose a well ventilating place to set the power unit.

4.4 Electric source of the power unit should have a ground connection to secure safety of personnel and equipment.

Hanging of the unit

1. Shift the power unit near to drill platform. Hanging chain should fix with lifting eyes of the power unit, avoiding impact and damaging.

2. The power unit is welded with four upper lifting ears (Fig.2-1) and four lower lifting eyes (Fig.2-13) to secure safe lifting.

Operation

1. Connect hoses (pressure hose, return hose, drain hose) between power unit and control console and hydraulic tools.

2. Connect power source to electric control cabinet. (Joint on the cabinet is pin, on the power end is box.)

3. Turn on the main power switch and press start button. Check rotating direction of electric motor to secure it is correct. (Rotating direction should

be identical to the tag pointed.)

4. Start electric motor to drive pump working. Check the pressure gauge reading to see if power unit running normally.

5. Check every connecting site to see if leaking.

6. After have started the power unit, do not adjust each ball valve.

7. If oil temperature is too high and need to start radiator, do first shut off main electric power, and adjust well tee ball valve, then start main electric machine and electric machine of radiator.

8. If oil temperature is too cold to start main electric machine, need to run electric heater.

9. When stop the power unit, do shut off main electric machine and electric machine for radiator and electric heater.

10. When do not use the power unit for a long time, do shut off electric source.

Maintenance

Power unit is to supply power for other hydraulic tools and ensure normal work of the tools. So it is important to perform maintenance for the power unit, and make sure that the unit can work normally, safely, and stably, and reliably.

Common maintenance:

1. Regular check the oil level in the tank, keep the oil within the indicating range of liquid-meter.

2. Check if have leakage at pipe connecting sites. If leakage occurs do stop the power unit and have a good repair. Do not perform connecting repair when power unit is running.

3. Check pressure gauge to see if ok. From the stability of reading and dial can judge fluctuation status of pressure and flow.

4. Check all the fastenings to see if loose.

5. Check if plunger pump is running normally, and return pressure if too high. Do stop the unit and replace the filter elements of oil taking filter and

return filter when necessary.

6.Keep the unit clean. When the unit is working do shut off each door. Do not uninstall the doors and safeguard net. Do prevent water and impurities from entering into the oil pool at bottom.

7.Do not put articles on net shield of radiator, so as not to obstruct ventilating. When radiator is completely cool down, clear off mud and dirties on the net shield.

8.When replace wearable parts or other parts, do pull out the power plug.

Normally, hydraulic oil should be replaced once a year or after six months' work. Clean oil tank and oil taking line; do prevent water and impurities entering into oil and line. If do not use the power unit for a long time, clear off oily dirt and dust on surface, and drain off remaining oil in the oil pool, shut off all doors, protect with covering, and put the unit on a safe place.

5. Trouble-shooting

Item	Troubles	Reasons	Solutions
1	No oil goes from pump.	1.Rotating direction of electric engine is wrong. 2.Too low of oil level in the tank. 3.Oiltaking filter is jammed. 4.Leaking of oil taking line. 5.Viscosity of oil is too high.	1.Change its rotating direction. 2.Add oil. 3.Replace filter element. 4.Repair oil taking line 5.Replace with oil of low viscosity.
2	No pressure of pressure fails to go up.	1.Relief valve core is blocked. 2.Pressure is adjusted too lower through relief valve. 3.Leakage is too much.	1.Dismantle and repair relief valve or replace. 2.Adjust pressure higher. 3.Repair the system. 4.Repair or replace the

		4.Wear or damage inside the plunger pump.	plunger pump
3	Discharge decrease.	1.Relief valve fails to lock well. 2.Much leakage for plunger pump or variable head is blocked dead.	1.Dismantle and clean relief valve or replace. 2.Repair or replace plunger pump.
4	Too much noise of plunger pump.	1.Oil level is too low. 2.Jammed oil taking filter. 3.Leaking of oil taking line. 4.Oil temperature is low. 5.Too high viscosity of oil or have much foam.	1.Add oil. 2.Replace filter element. 3.Repair oil taking line. 4.Start up electric heater. 5.Replace with low viscosity oil.
5	System is hot	1.Fail to unload when idle run. 2.High viscosity of oil. 3.Return pressure is too high or return filter blocked. 4.Long time no use of the unit.	1.Should avoid such thing. 2.Lower its viscosity. 3.Repair return line or replace return filter element. 4.Start up heat radiator.

6. Wearable Parts List

Item	Part No.	Description	Specificatio n	Remarks
1	TFX-250*100	Filter element		For TF-250*100F filter
2	FBX-250*30	Filter element		For RFB-250*30 filter
3	Q14F-64P-11/4	Tee ball valve	1 1/4	For return line shift
4	JB/ZQ4224-97	O ring	35*3.1	For hose joint of radiator
5	JB/ZQ4224-97	O ring	95*3.1	For filter flange

6	20.13-07	Copper gasket		For pressure gauge joint
7	JB982-77	Compound ring	14	
8	JB/ZQ4224-97	O ring	50*3.1	For pump inlet
9	JB982-77	Compound ring	48	For pump inlet and outlet
10	JB/ZQ4224-97	O ring	28*3.1	For pump out

7. Attached Figures

7.1 Fig.1 Schematic Diagram of YZBF-120LD air-cooled hydraulic power unit

7.2 Fig.2 Outline Drawing of YZBF-120LD air-cooled hydraulic power unit

7.3 Fig.3 Outline of Control Panel

7.4 Fig.4 Oil In & Out Ports and Control Drawing

7.5 Fig.5 Outline of Oil Tank and Oil Sump

7.6 Fig.6 Electric Schematic Drawing

7.7 Fig.7 Electric Oil Pump

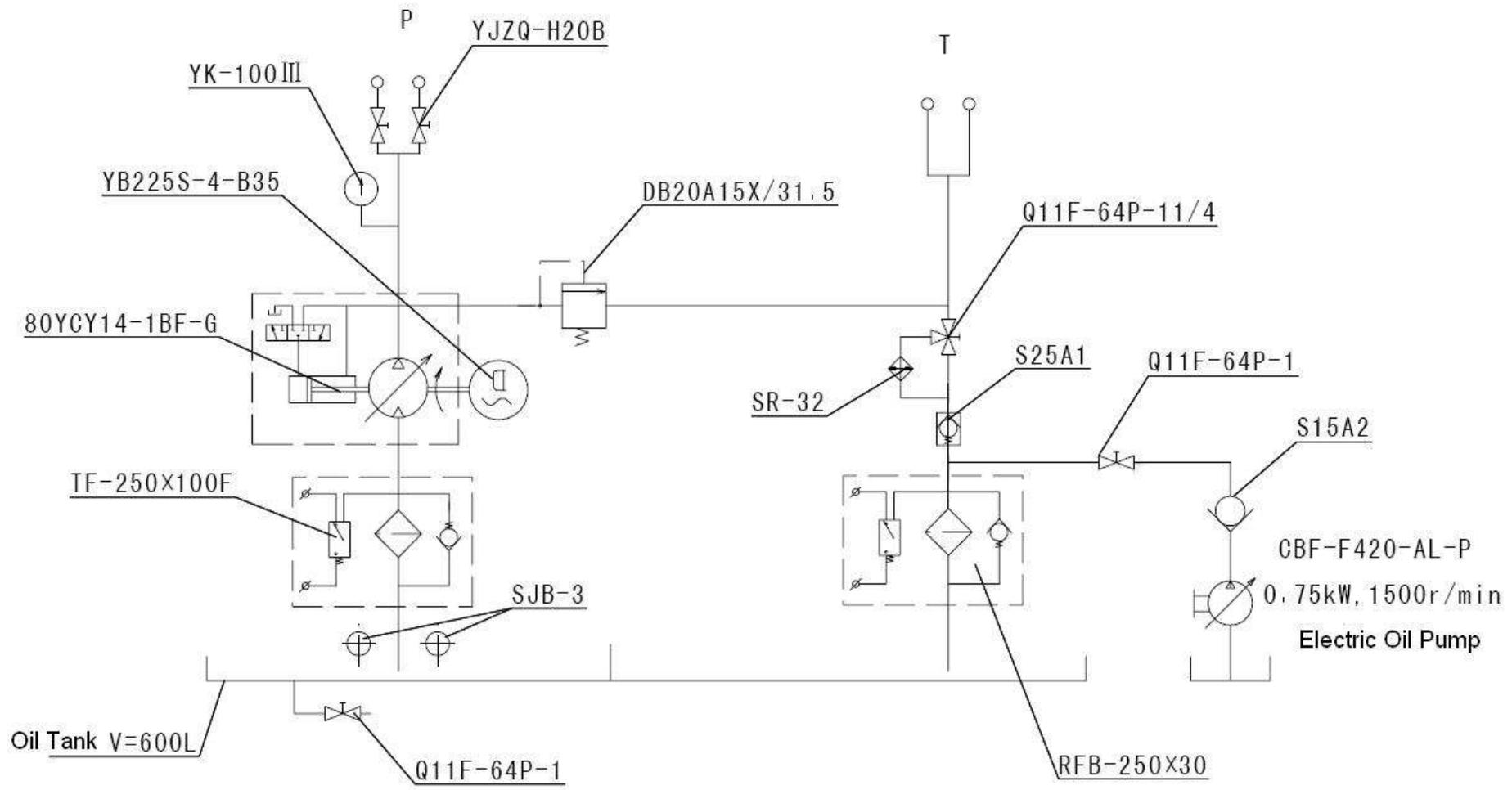


Fig.1 Schematic Diagram of YZBF-120LD Air-cooled Hydraulic Power Unit

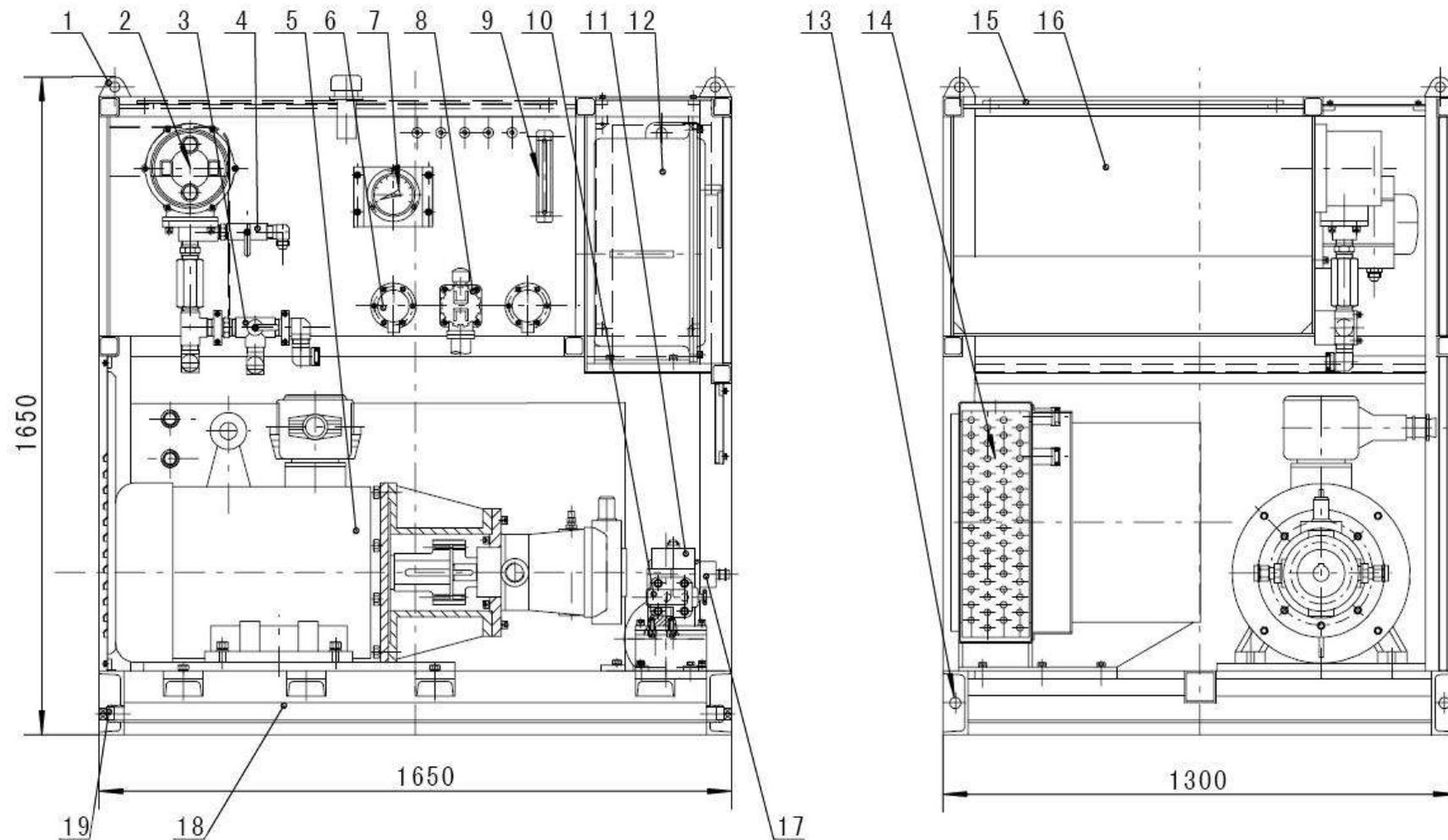


Fig.2: Outline of YZBF-120LD Air-cooled HPU

1. upper lifting eye 2. return filter 3.tee ball valve 4.ball valve 5.pump-motor group 6. electric heater 7.shock-proof pressure gauge 8.suction filter 9.liquidometer 10.relief valve 11.pressure ball valve 12.flameproof cabinet 13.lower lifting eye 14.radiator 15.tank cover 16.oil tank 17.electric oil pump 18.oil sump 19.drain plug.

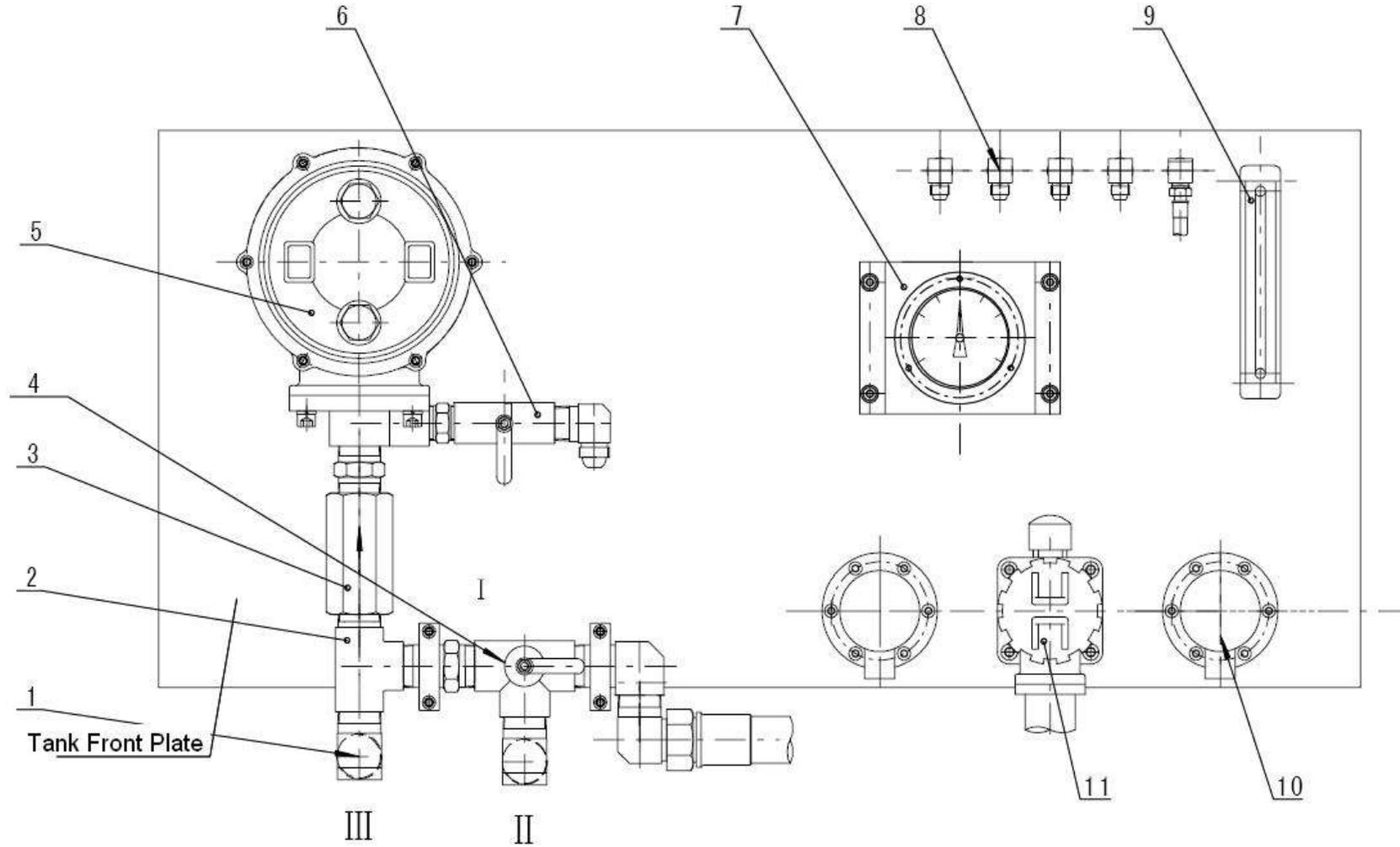


Fig.3 Outline of Control Panel

- 1.angle joint 2.tee joint 3.check valve 4.tee ball valve 5.return filter 6.ball valve 7.pressure gauge 8.drain joint 9.liquidometer
 10.electric heater 11.suction filter

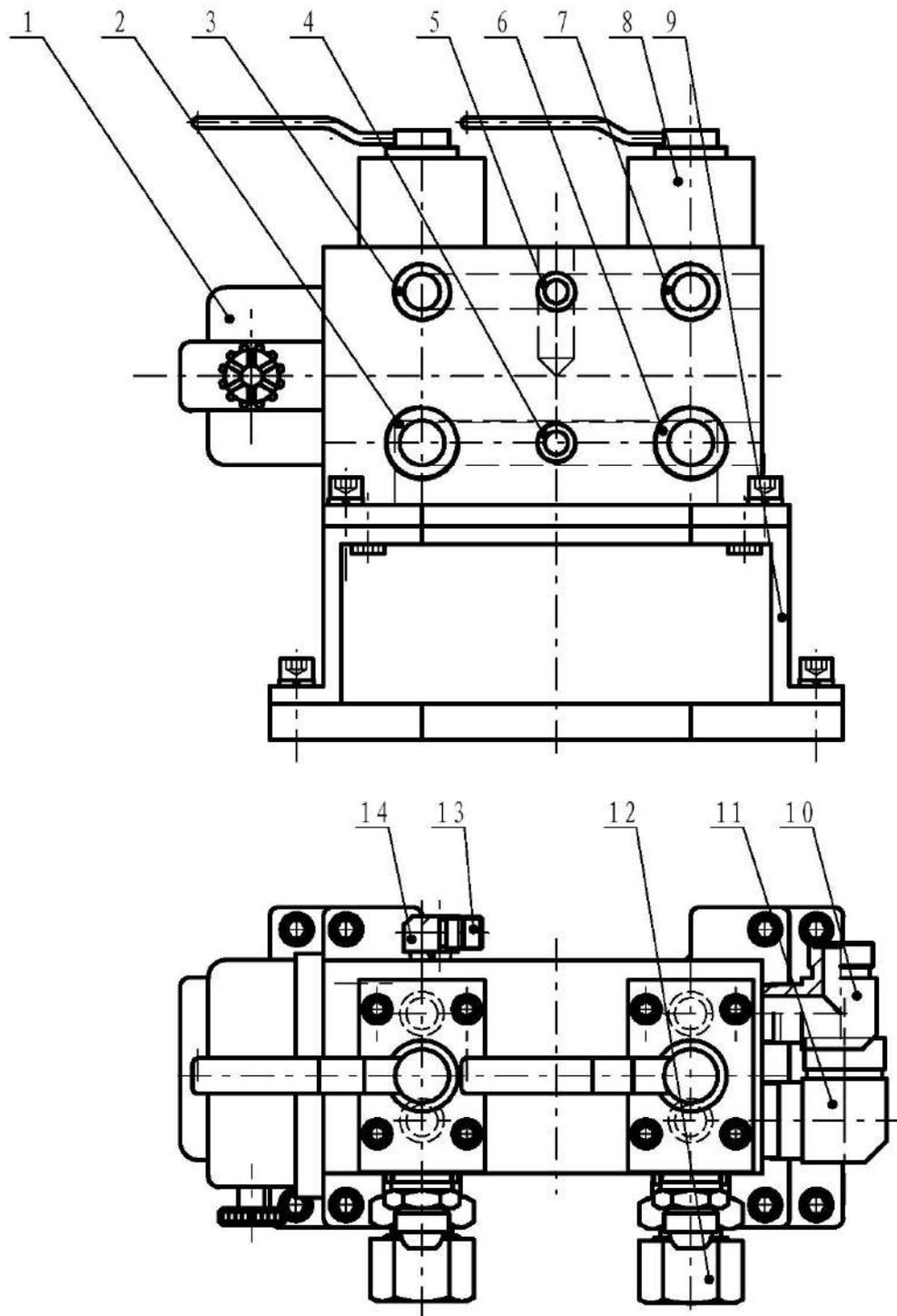


Fig.4 Oil In & Out Ports and Control Drawing

- 1.relief valve II 2.return port I 3.pressure port I 4.return port spare
 5.pressure port spare 6.return port II 7.pressure port II 8.plate type ball valve
 9.support 10.pressure output end 11.return end 12.return plug 13.gauge port
 14.remote control port

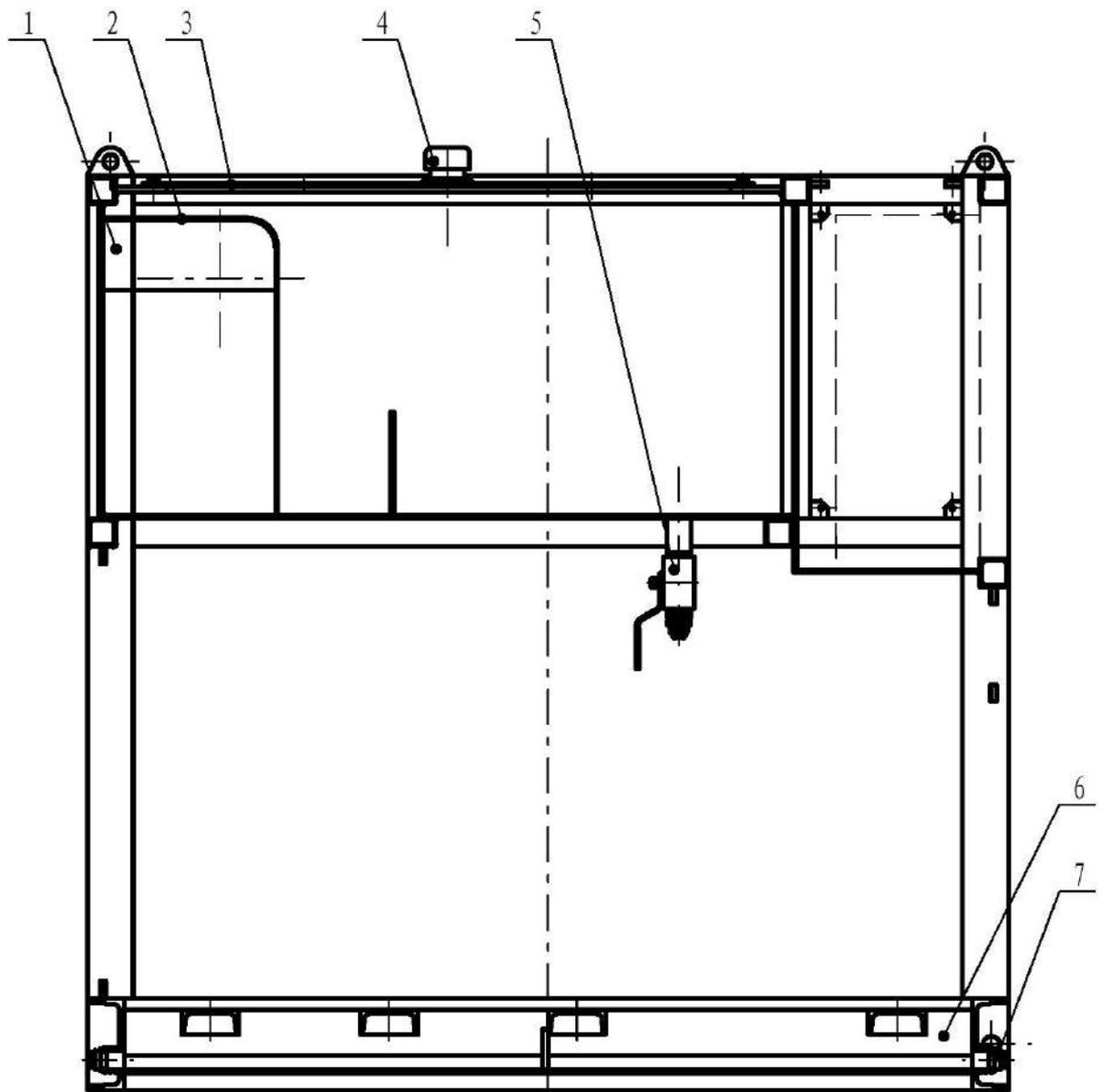


Fig.5 Oil Tank and Oil Sump

- 1.tank 2.retainer 3.tank cover 4.breather 5.ball valve 6.oil sump 7.drain plug

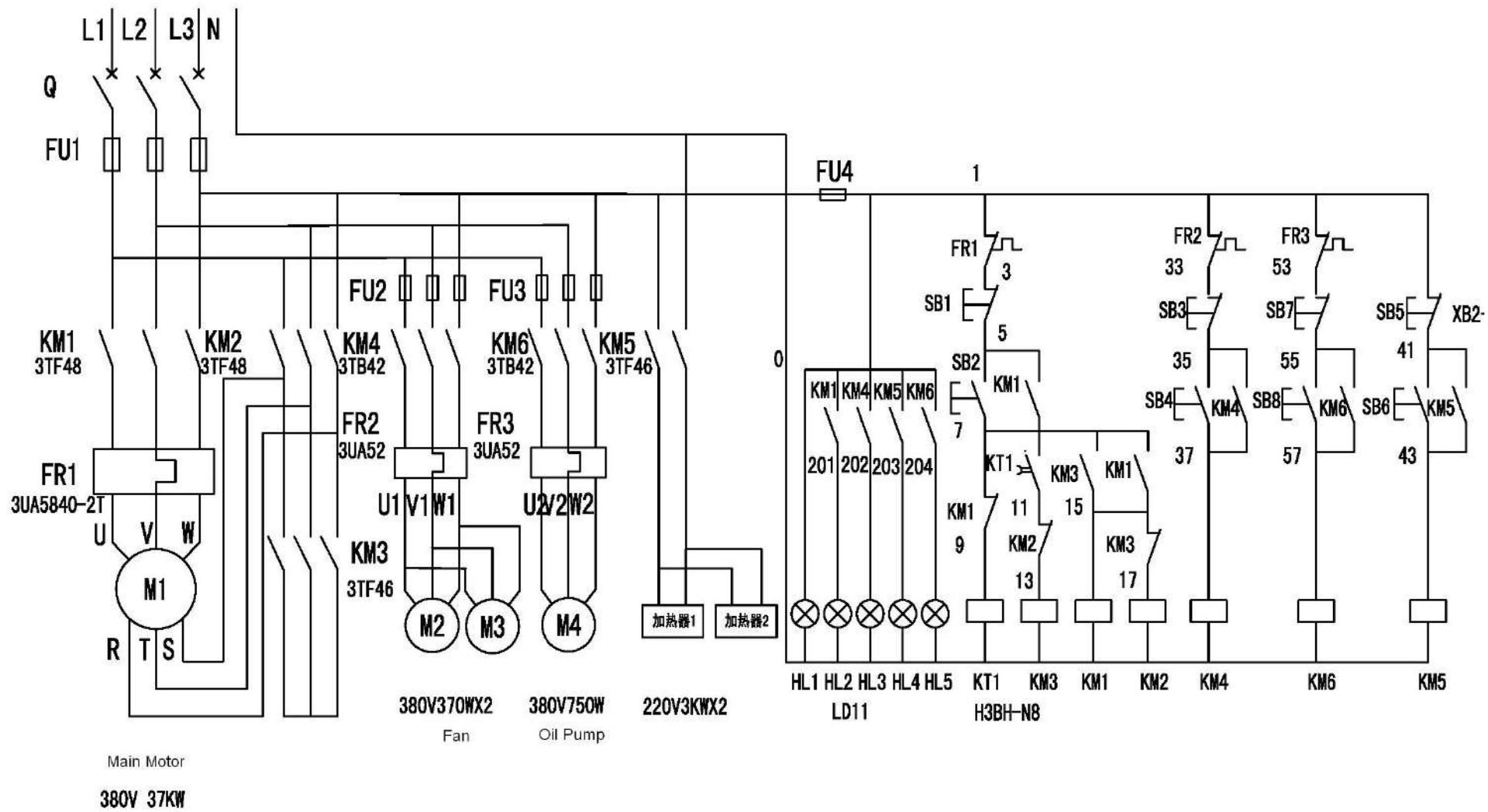


Fig.6 Electric Schematic Drawing

Electric Components List

No.	Part No.	Description	Type	Qty.	Remarks
1	Q	Breaker	CM1-160L/3300	1	ChangShu FuShi
2	KM1,KM2	AC contactor	3TF4822/220V	2	SIEMENS
3	KM3	AC contactor	3TF4622/220V	1	SIEMENS
4	KM4	AC contactor	3TB4222/220V	1	SIEMENS
5	KM5	AC contactor	3TF4622/220V	1	SIEMENS
6	KM6	AC contactor	3TB4222/220V	1	SIEMENS
7	FR1	Thermal relay	3UA5840-1T	1	SIEMENS
8	FR2	Thermal relay	3UA5240-1B	1	SIEMENS
9	FR3	Thermal relay	3UA5240-1B	1	SIEMENS
10	KT1	Time relay	H3BH-N8	1	OMRON
11	HL1,2,3,4,5	Indicator light	XB2-BVB5C	5	Shinaide
12	SB12345678	Button	XB2-EA	8	Shinaide
13	FU1	Fuse	RT28-10	3	10×51 10A
14	FU2,3,4,5	Fuse	RT28-10	6	10×38 10A