



AVTP 2500

Vacuum Tissue Processor

Service Manual

AMOS SCIENTIFIC PTY.LTD. ABN37 159 778 140

www.amos-scientific.com

Foreward

This service manual is for Three Vacuum Tissue Processor's repair and maintenance, which describes installation and maintenance of mechanical parts and electrical components testing in details . It is also can be used as training materials for internal maintenance staff.

As proprietary technical information , the service manual can not be transferred or leaked by the maintenance staff not from our company or authorized agent to any third party without our permission. Otherwise the person should be responsible for the all losses and bear legal liability .

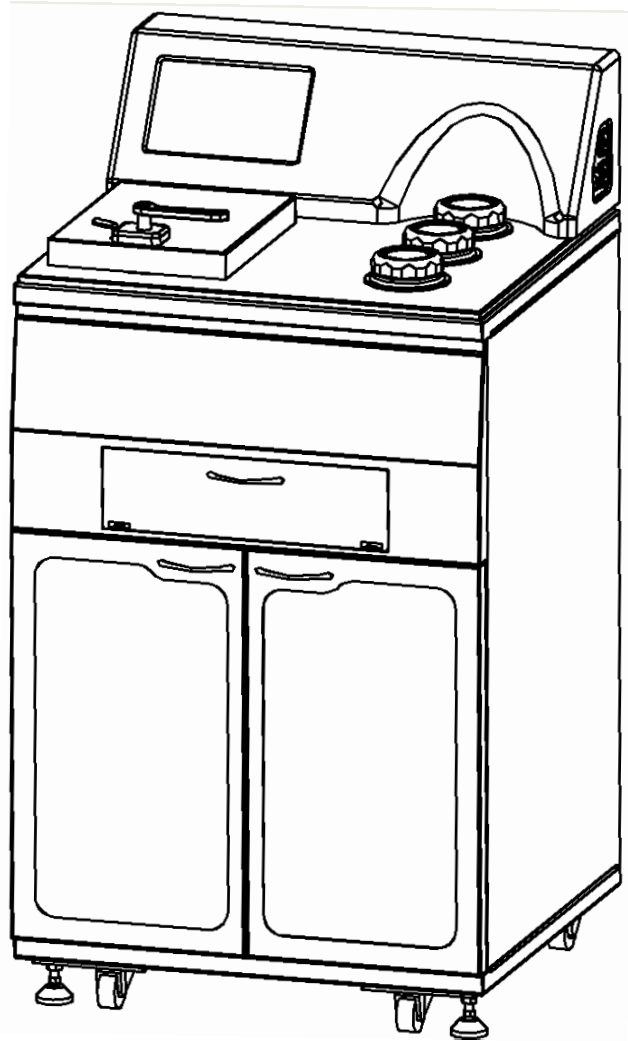
With the development of technology and constantly updating of products , this manual will make the corresponding changes . If you find any product does not match with the manual service, please contact us .

Contents

1、 Functional Principle.....	1
2、 Structure.....	1
3、 Preparation work before maintenance	8
3.1 Tools	8
3.2 Attention Matters	8
4、 Installation and Maintenance.....	8
4.1 Mechanical part installation & maintenance	8
4.2 Principle of air & liquid route.....	10
4.3 Electrical parts installation	14
4.3.1 Motor driver adjustment of distribution valve	14
4.3.2 Wiring diagram.....	15
5、 Trouble shooting.....	16
6、 Clearance and Maintenance.....	21
6.1 Cleaning the instrument.....	21
6.2 Reagent Maintenance.....	22

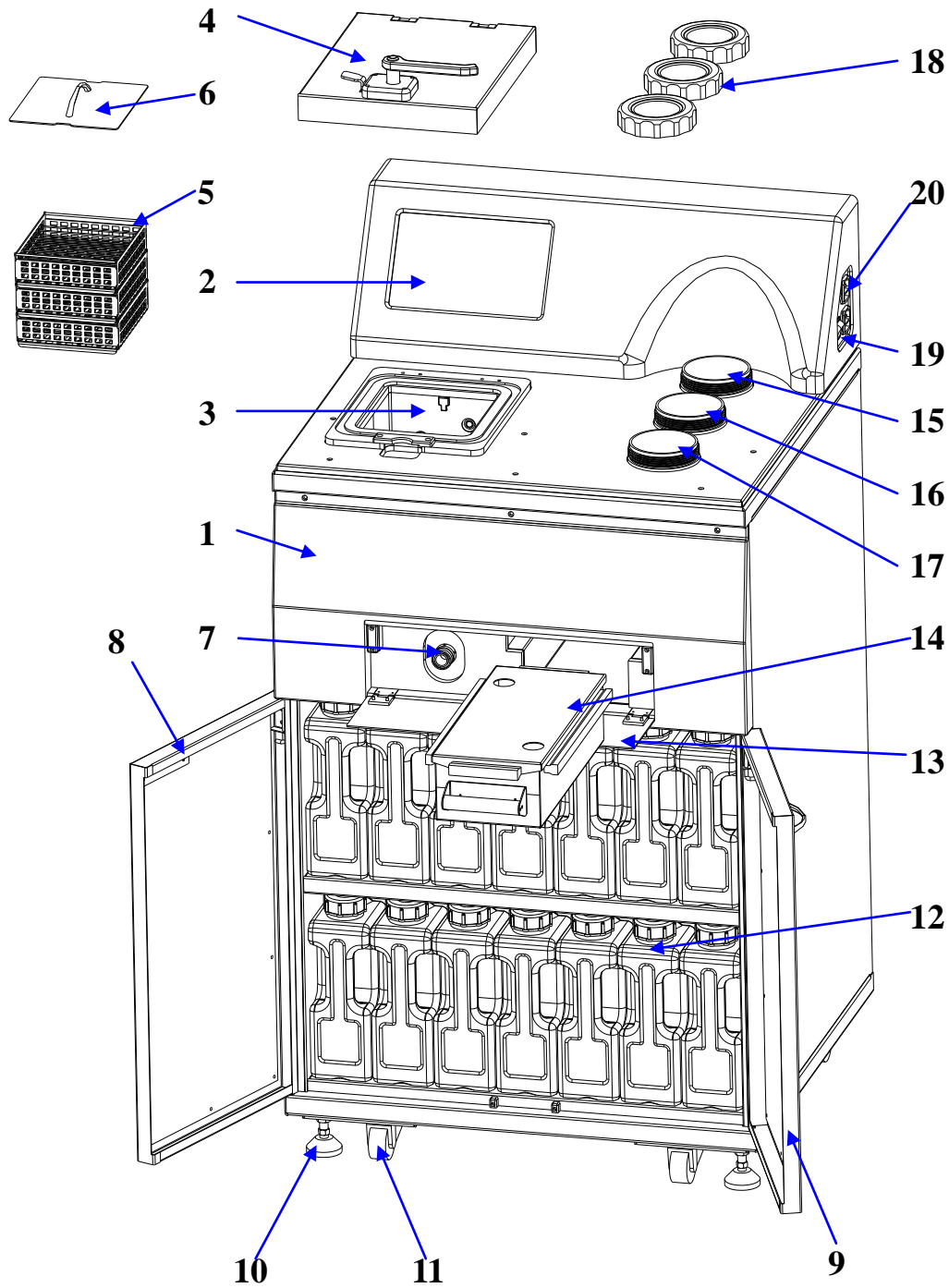
1、 Functional principle

AVTP2500 vacuum tissue processor be worked for processing plant, animal and human cells. This instrument adopts PLC with touch screen control system in reliable performance, complete function and friendly operations . It be widely used in clinical pathology study and analysis of animal and plant ,microorganisms cells.

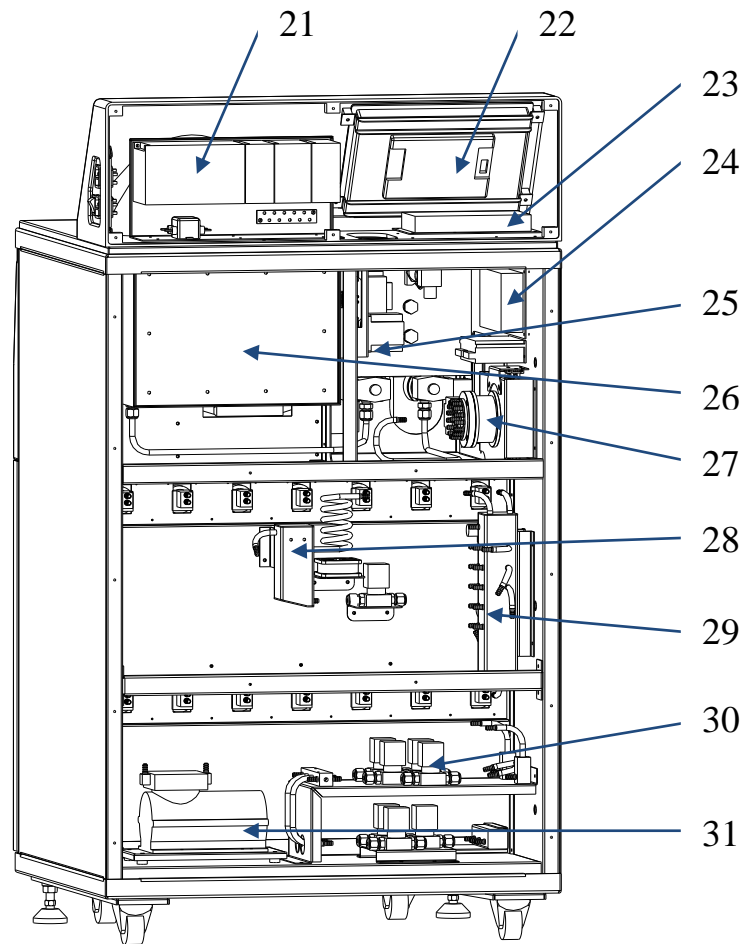


2、 Structure:

The machine includes the following parts : Instrument base Ass'y, Retort Ass'y , Paraffin bath Ass'y , Reagent bottle Ass'y , Waste wax bath Ass'y , Basket Ass'y , Paraffin distribution valve Ass'y , Reagent distribution valve Ass'y , Condenser Ass'y , Bigger drainer Ass'y , Air valve Ass'y , Air pump and electrical control Ass'y . The structure of its function as picture shows :



- | | | |
|--------------------------|--------------------|-------------------------|
| 1. Basis instrument | 8. Left door | 15. Paraffin bath 1 |
| 2. Touch screen | 9. Right door | 16. Paraffin bath 2 |
| 3. Retort | 10. Support foot | 17. Paraffin bath 3 |
| 4. Retort lid | 11. Wheel foot | 18. Wax bath lid |
| 5. Basket | 12. Reagent bottle | 19. Power switch |
| 6. Basket cover | 13. Front panel | 20. Power supply socket |
| 7. Fill/Drain connection | 14. Waste wax bath | |

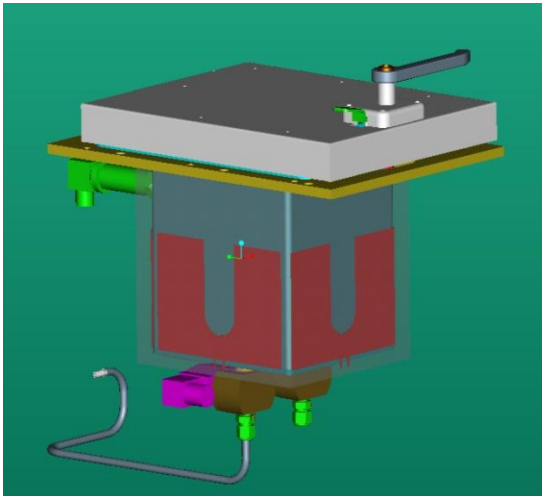


- | | | |
|------------------|---------------------------------------|--------------------------|
| 21. PLC Module | 25. Paraffin distribution valve Ass'y | 29. Bigger Drainer Ass'y |
| 22. Touch Screen | 26. Paraffin oven Ass'y | 30. Air valve's Ass'y |
| 23. Main Board | 27. Reagent distribution Ass'y | 31. Air pump |
| 24. Power supply | 28. Condenser Ass'y | |

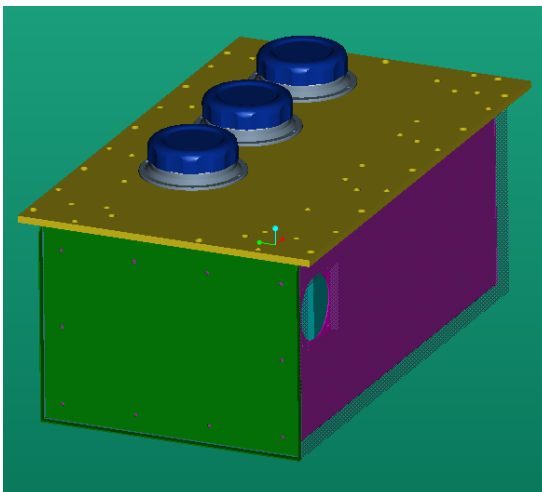
①、Instrument base Ass'y: Its function is a carrier for all components .



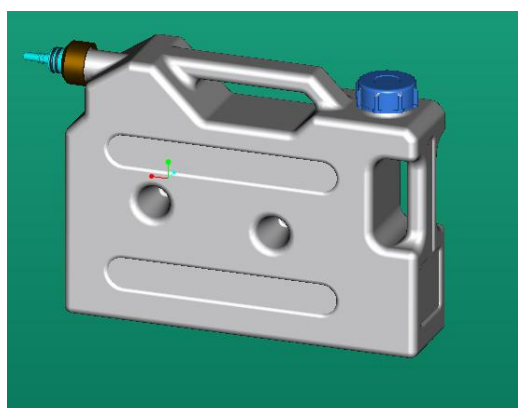
②、 **Retort Ass'y** : It is a chamber where the tissue processing happens .All reagent and paraffin reacts with tissue here .



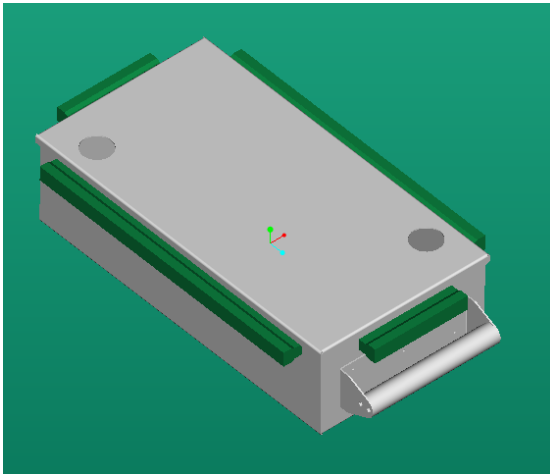
③、 **Paraffin oven Ass'y** : It is where paraffin is put in . It can heating constant-temperature function .



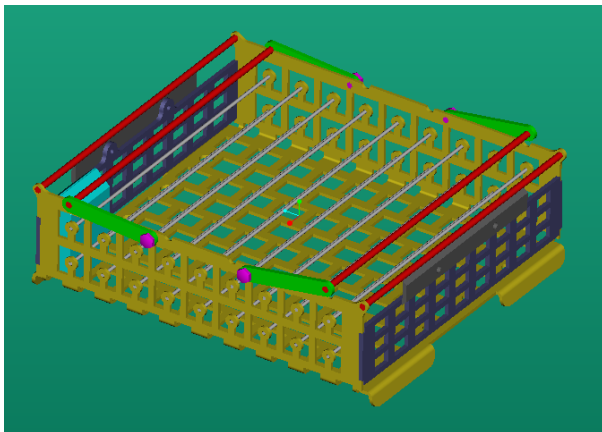
④、 **Reagent bottle Ass'y** : It is where reagent is put . It is divided to waste reagent bottle , processing reagent bottle and cleaning bottles by functions .



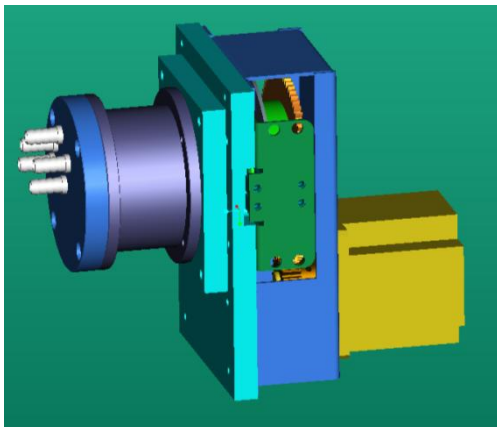
⑤、 **Waste wax bath Ass'y** : It is where the waste was drain off .



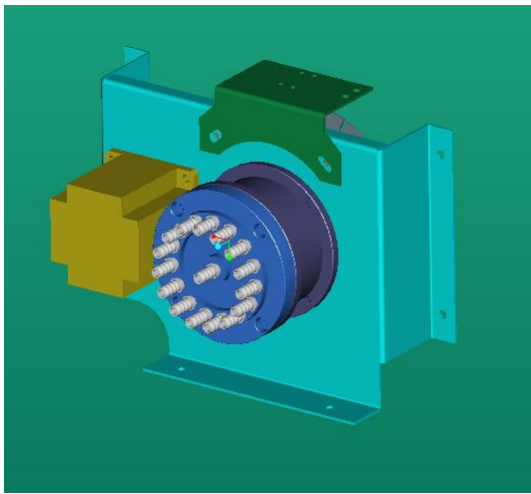
⑥、 **Basket Ass'y** : It is where tissue cassette place .



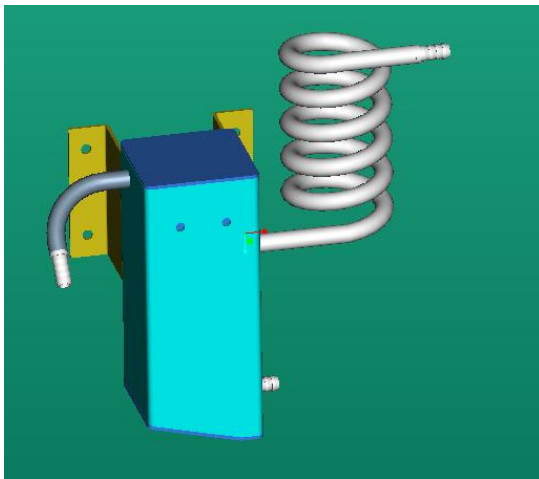
⑦、 **Paraffin distribution valve Ass'y** : It controls the paths between tissue retort and 3 paraffin bath or tissue retort and waste wax bath .



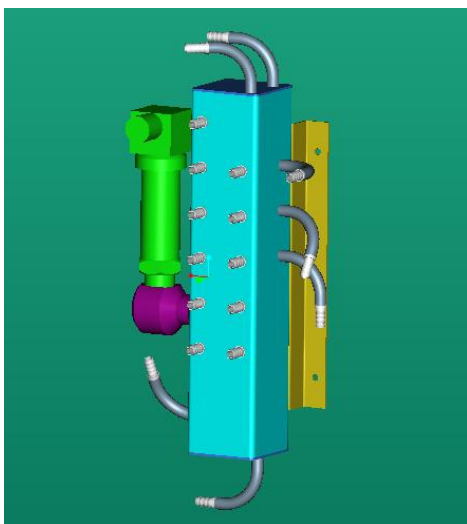
- ⑧、 **Reagent distribution valve Ass'y** : It controls the paths between tissue retort and 13 reagent bottles or tissue retort and outside fill/drain connection .



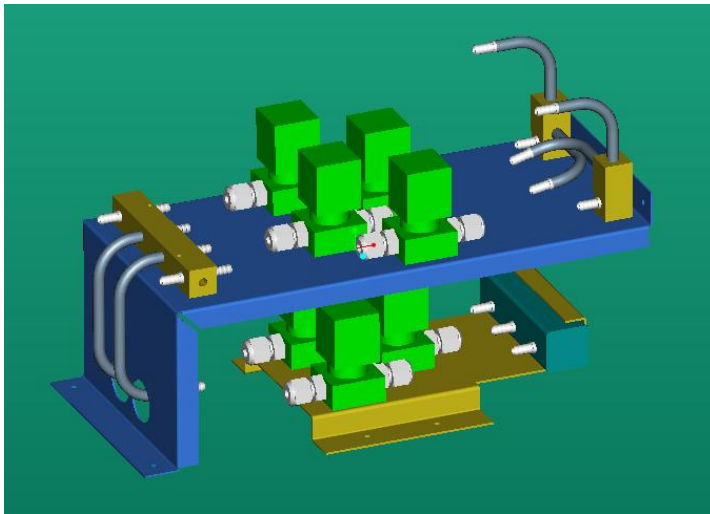
- ⑨、 **Condenser Ass'y** : It condense the steam in air pipe and store the condensate temporarily .



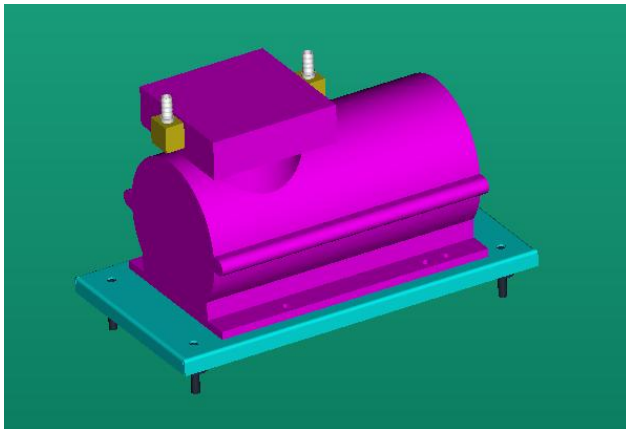
- ⑩、 **Bigger drainer Ass'y** : It is the air way junction of paraffin bath and reagent bottle , and it can store the condensate temporarily .



⑪、 **Air valve Ass'y** : It control the air path and flow direction for the whole air system .



⑫、 **Pump Ass'y** : It offer power for air way and fluid way .



⑬、 **Electrical control Ass'y** : It control the automatic running for the whole system .



3、 Preparation work before maintenance

3.1 Tools

Arrange the relative tools before maintenance, it includes:

- * Allen wrench(include 2.5、 3、 4、 5 five kinds)
- * Phillips screwdriver (large and small two kinds)
- * Slotted screwdriver (large and small two kinds)
- *Pinchers (includes: pliers, long nosed pliers, circlip pliers, diagonal cutting plier, Strippers)
- *Fork Spanner(includes 5.5、 7、 8、 10 four kinds)
- *Small adjustable spanner
- *Hammer
- *Forceps
- *Spring disassembly tools (includes 2、 2.5、 3 three kinds)
- * Multimeter
- * Soldering Iron
- * Knife and scissor

3.2 Attention Matter

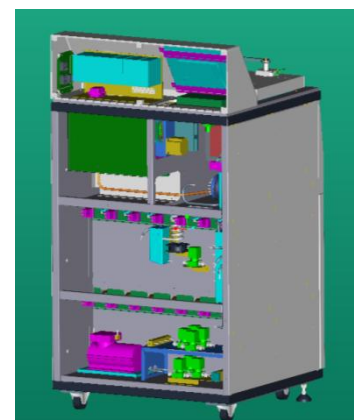
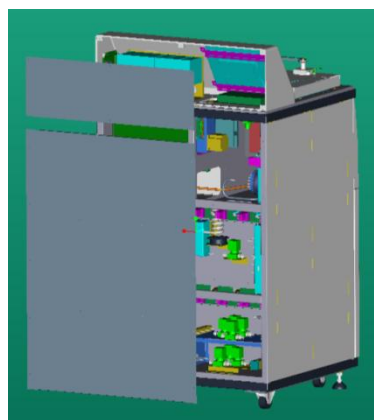
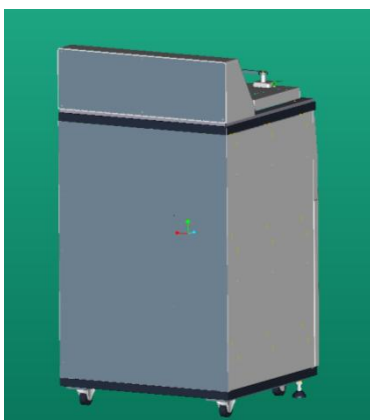
- ①、 Don't do any electrical work during maintenance , in order to avoid electrocuted accidentally.
- ②、 Use Multimeter and soldering Iron correctly during the maintenance, specially during the electrified testing , in order to avoid the electrical components damage caused by short circuit .
- ③、 During the entire maintenance process , should pay attention to the temperature of various heating parts , to avoid burns .
- ④、 It should be equipped with gloves , masks etc protection equipment to avoid to inhale or touch various reagents and steam .

4、 Installation and Maintenance instruction

4.1 Mechanical part maintenance

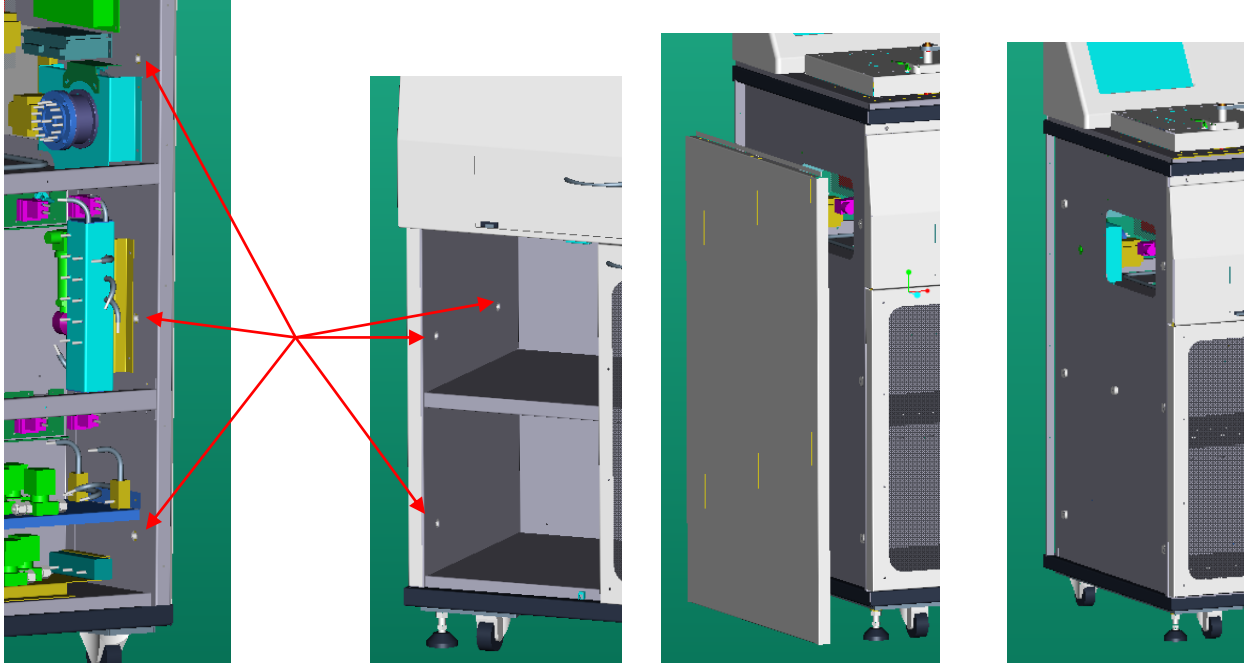
4.1.1 Disassemble the instrument to maintenance status

- ①、 Back Cover



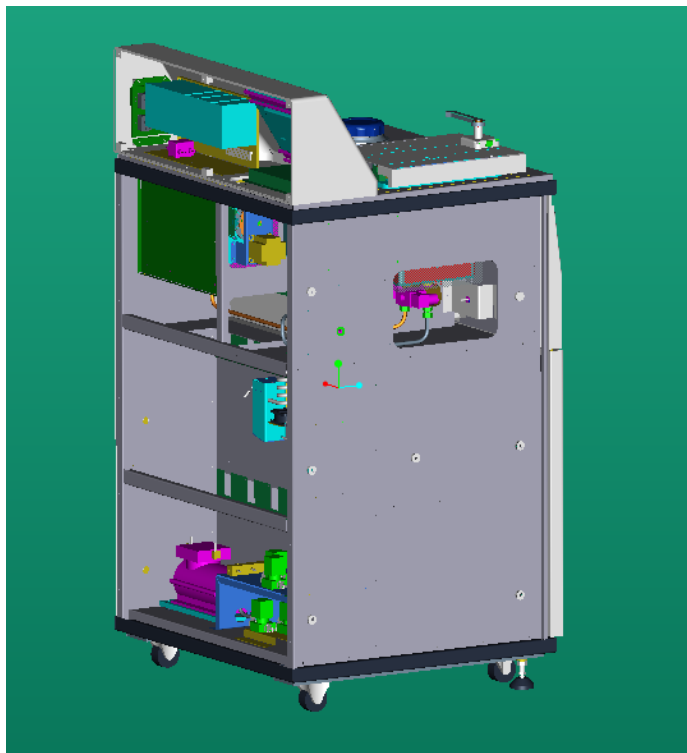
Remove the 14 screws on rear cover and 6 screws on the up back cover ,as picture shows .

②、 Left cover

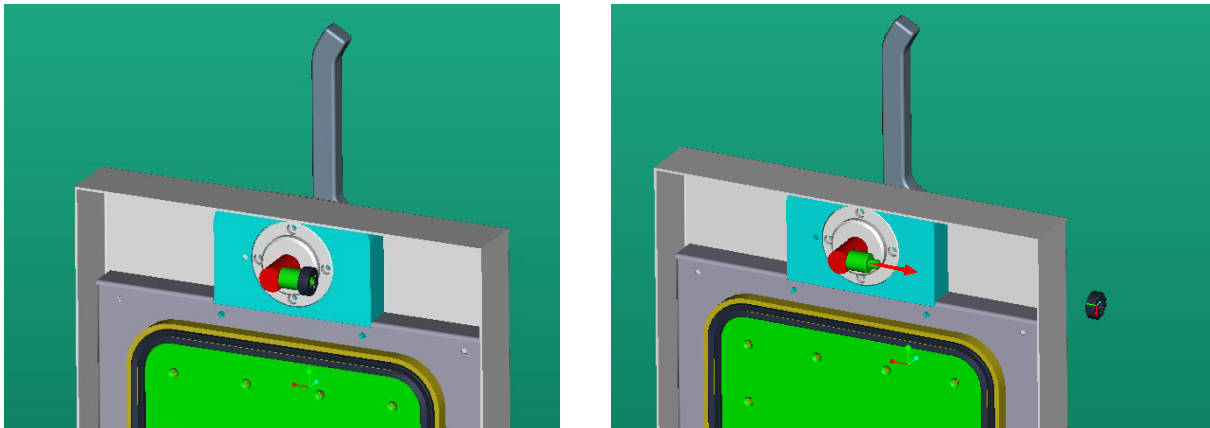


Remove the 6 screws shown in the picture , pull the bottom of the left side cover outward and then remove it .

③、 Maintenance status as below picture shows

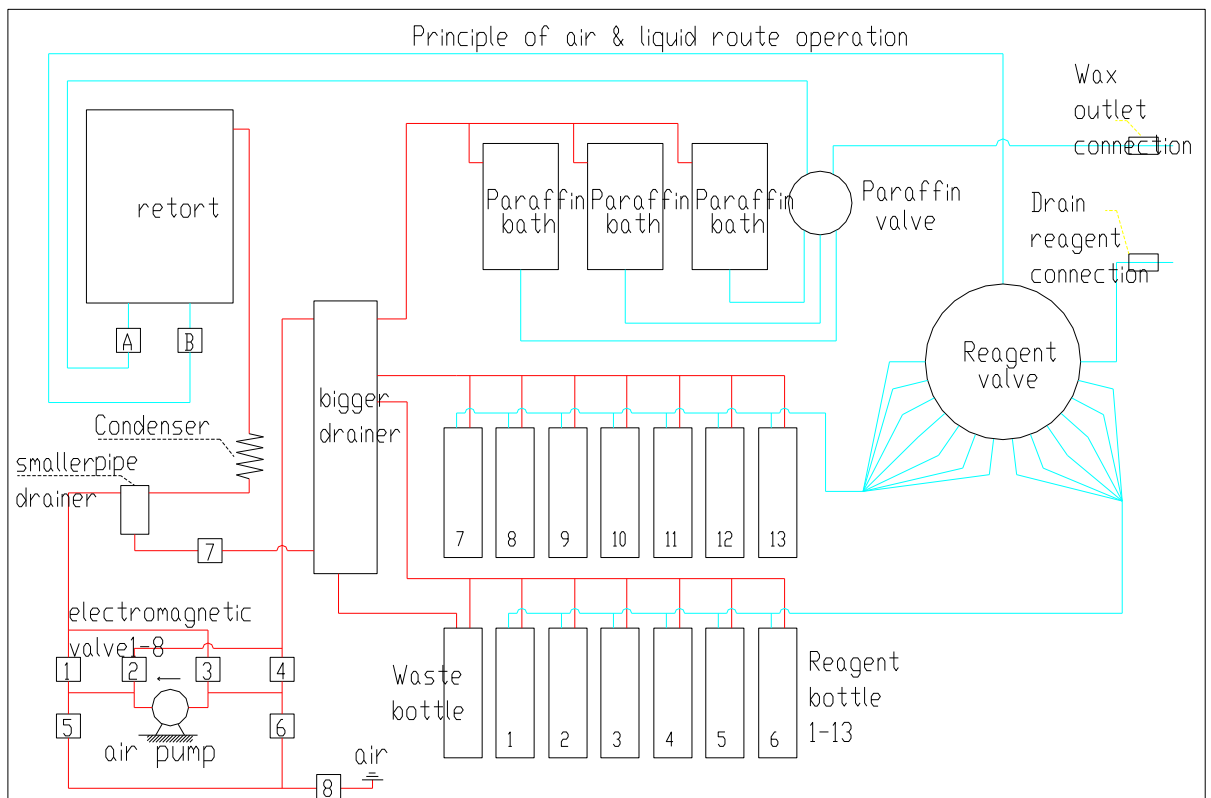


4.1.2 Replacement of bearing for lock shaft of tissue retort lid

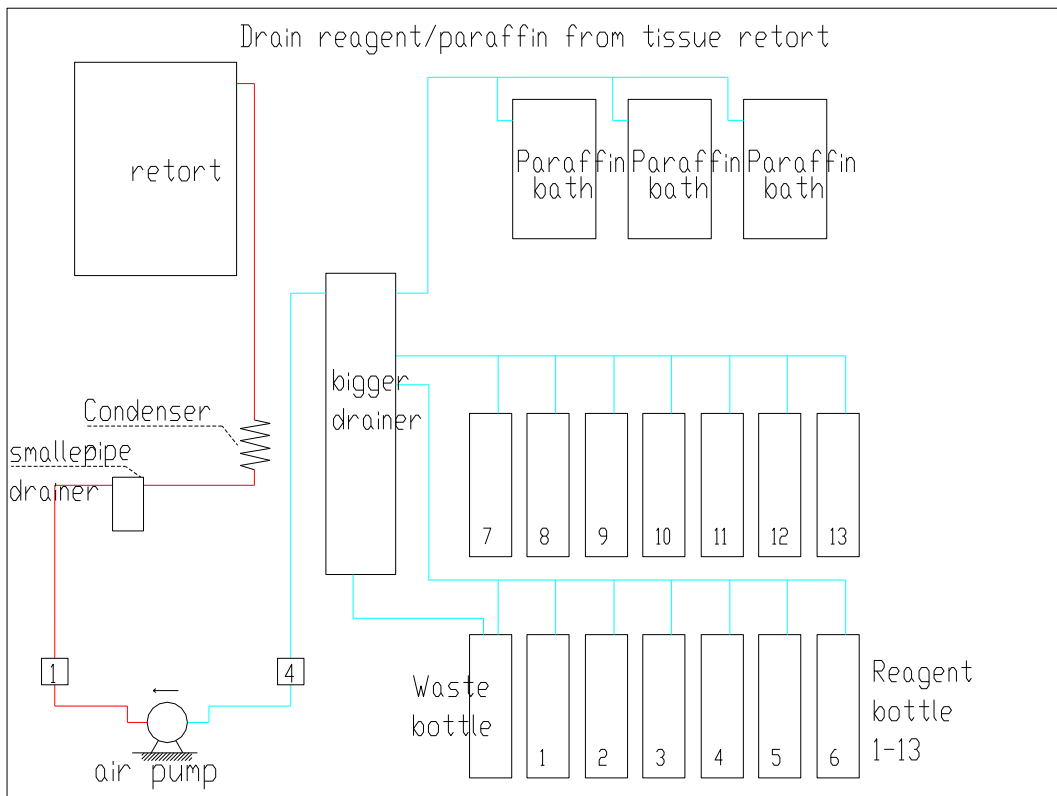
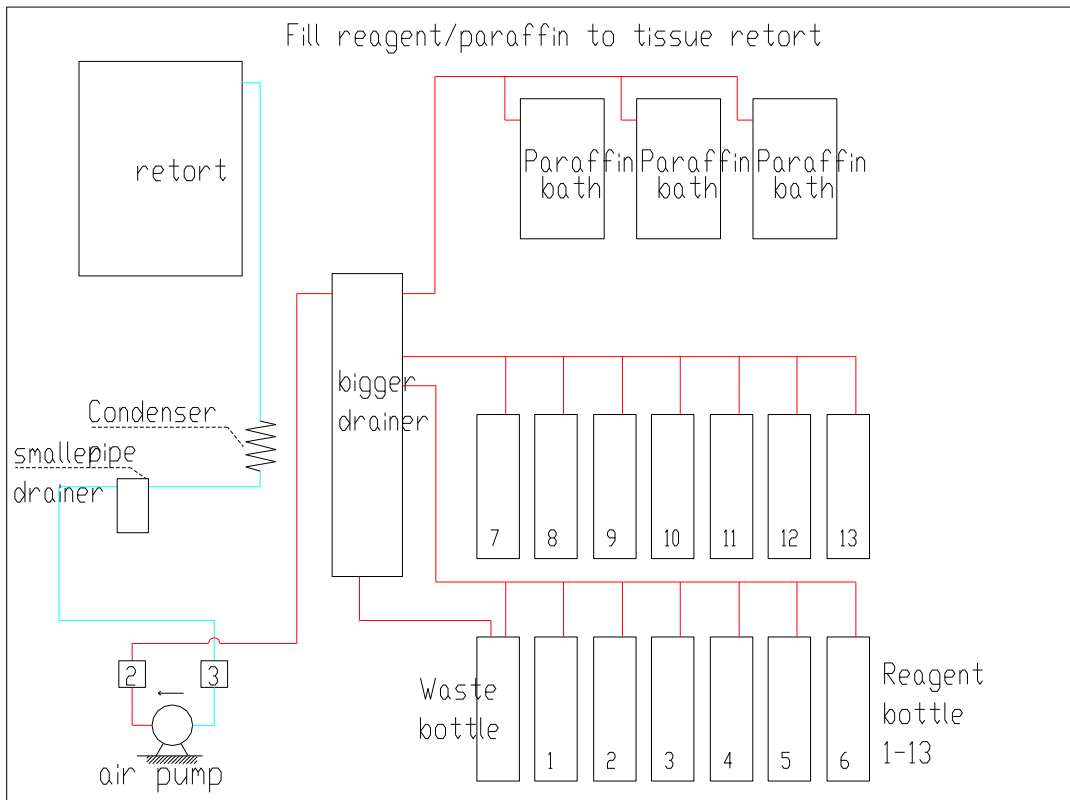


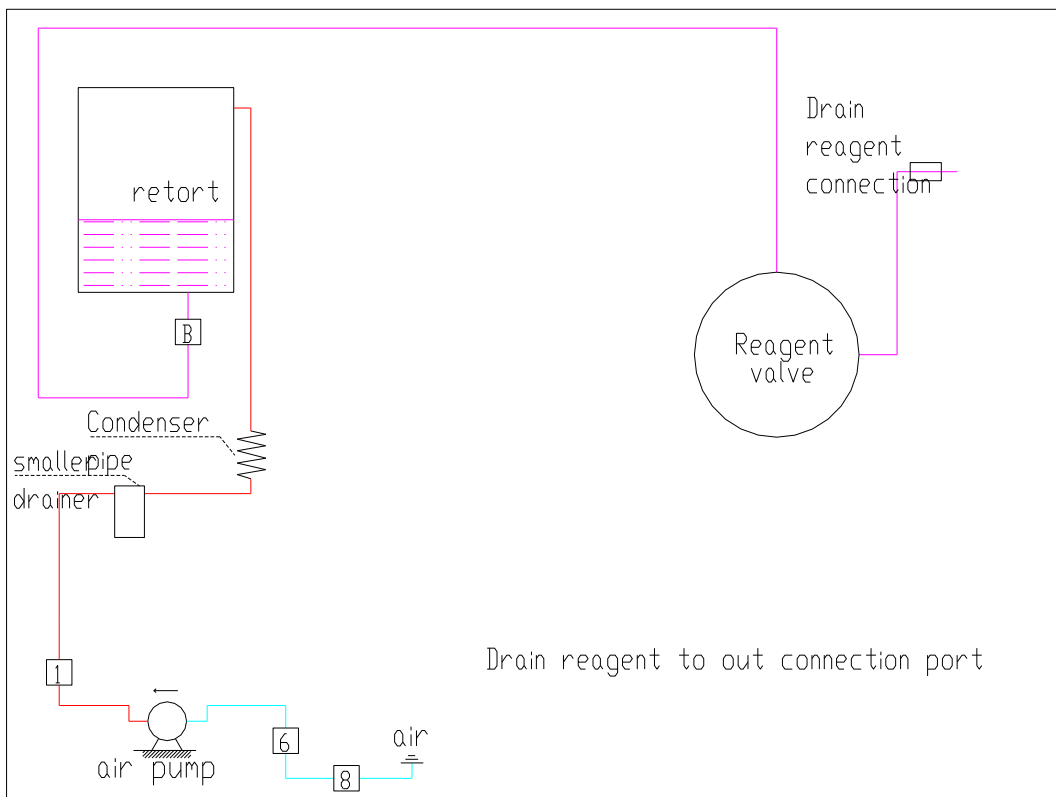
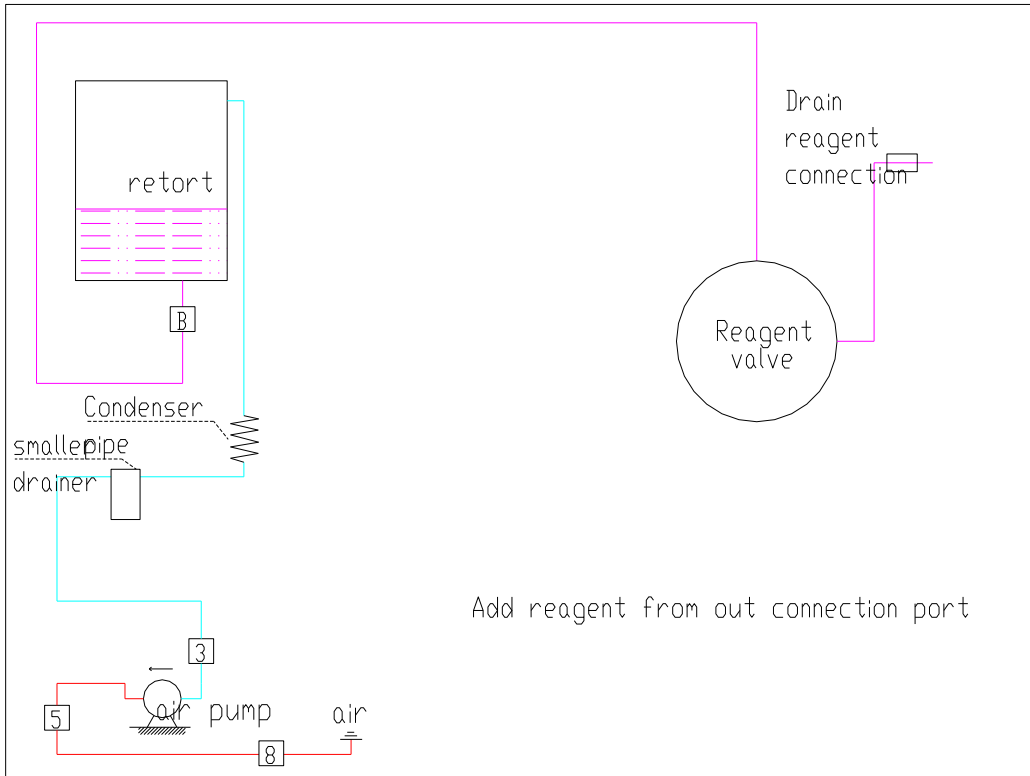
Remove the screw as picture shows and take out the bearing

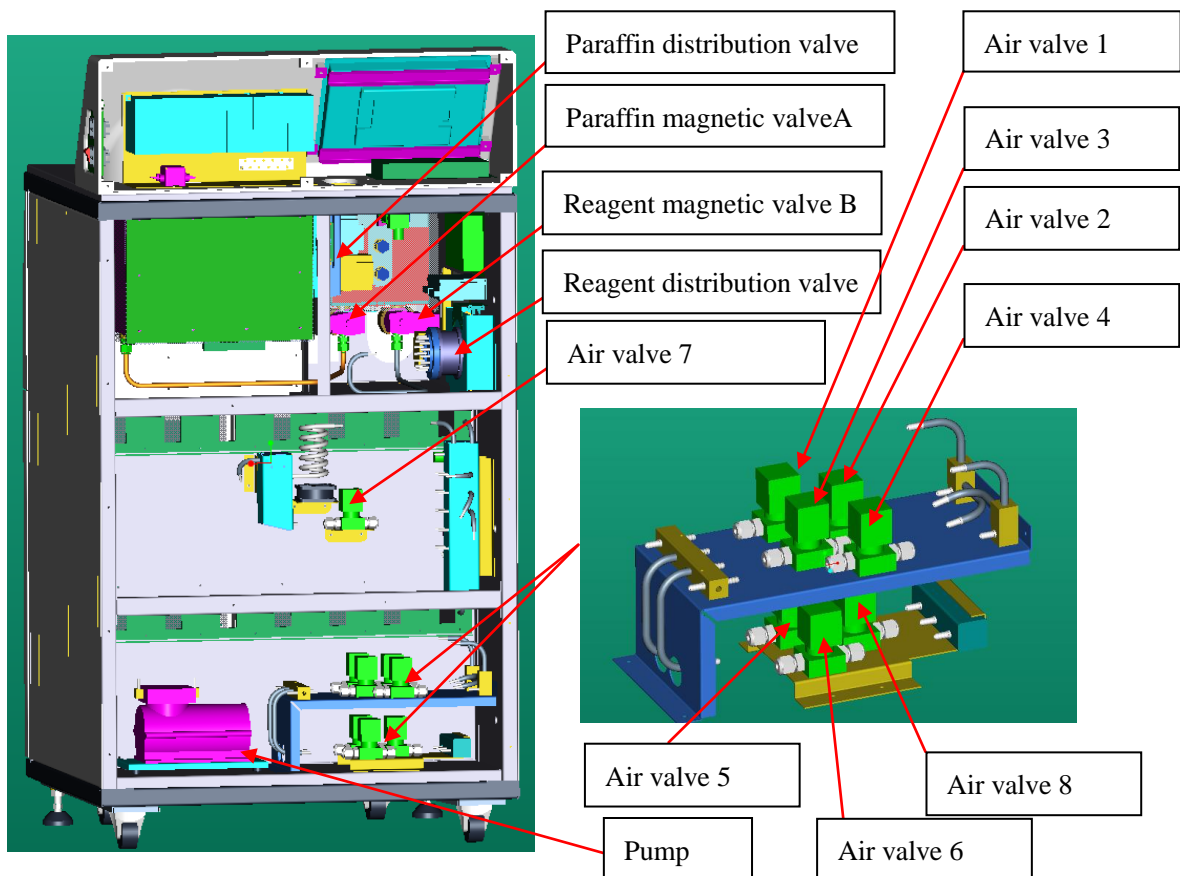
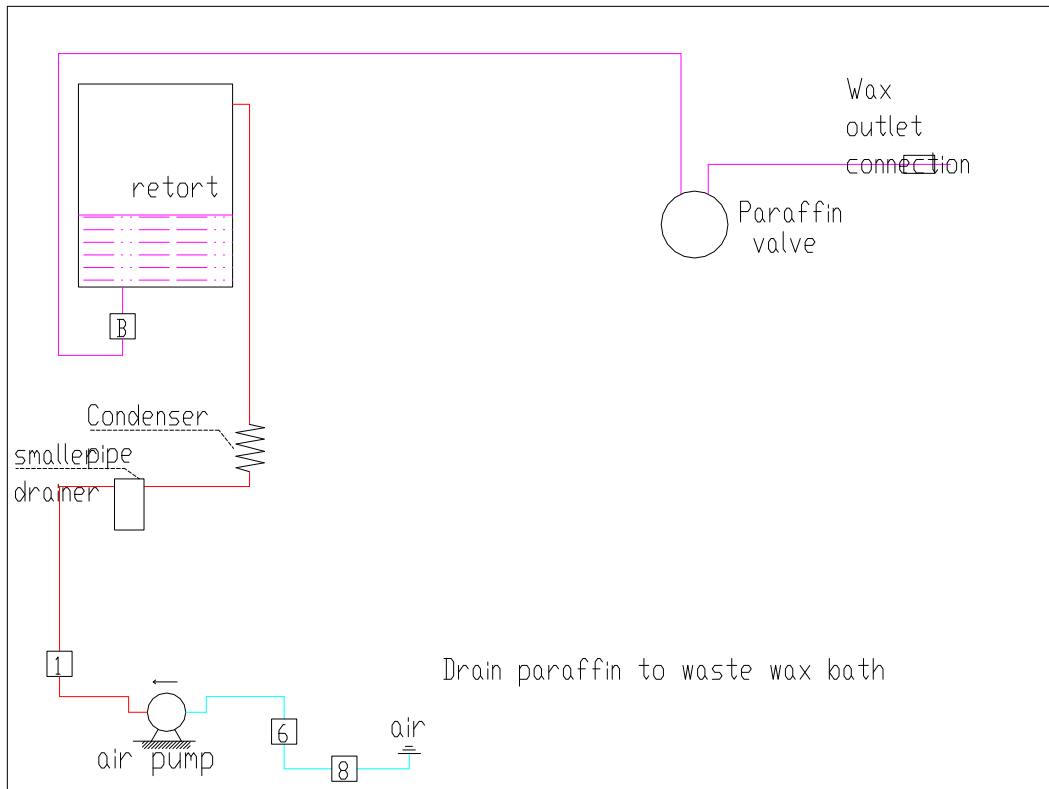
4.2 Principle of air & liquid route



Principle instruction : As shown in the picture , the pump offer air power ,and its flow is controlled by No.1~8 valve, to generate pressure between paraffin bath ,reagent bottle and tissue retort through reagent and paraffin distribution valve to fill/drain the reagents and paraffin to/from tissue retort .

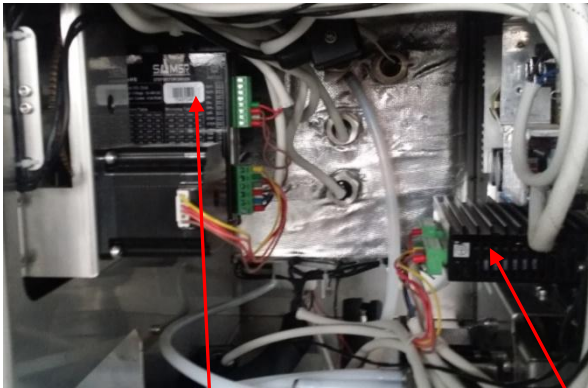






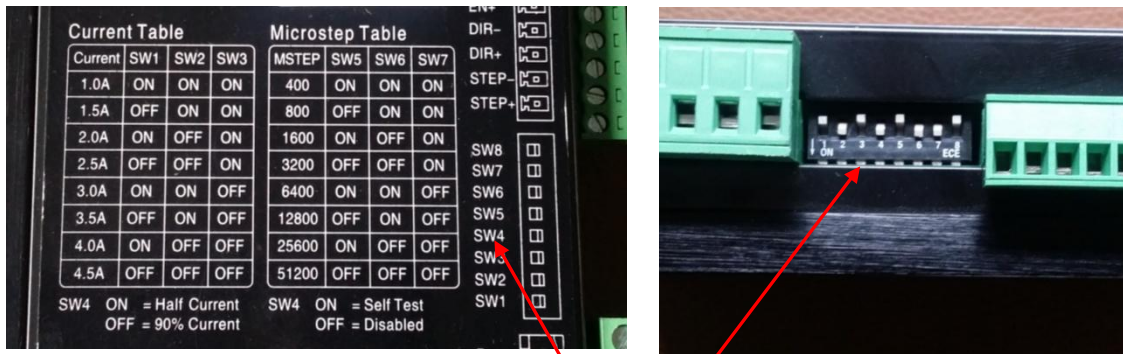
4.3 Electrical parts installation

4.3.1 Paraffin distribution valve and reagent distribution valve driver



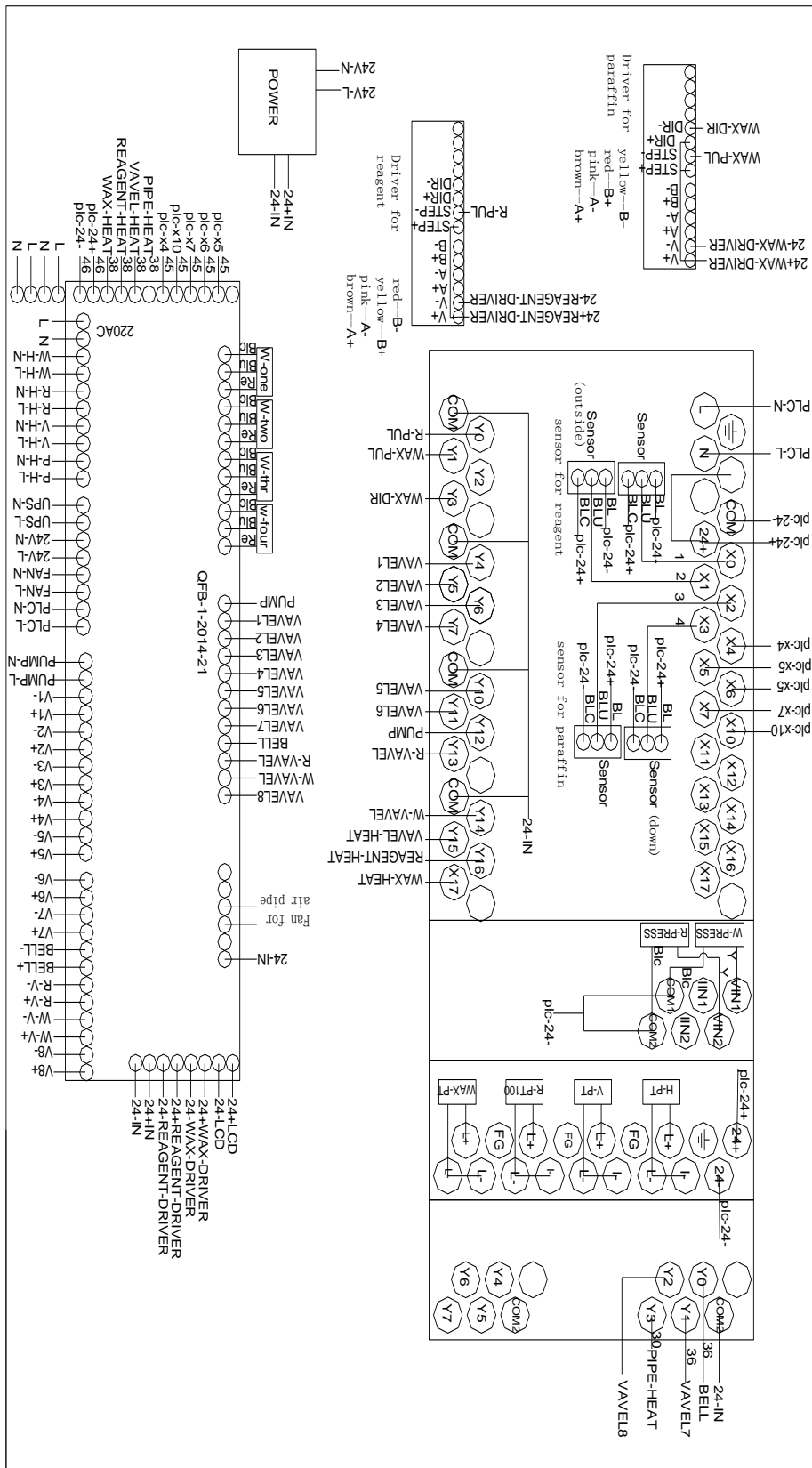
Paraffin distribution valve driver

Reagent distribution valve driver



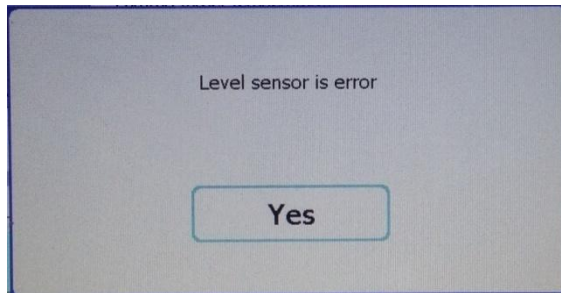
As picture shows ,the subdivision is 800 , current is 3.5 A ,half current is valid .

4.3.2 Wiring Diagram



5、 Trouble Shooting

5.1 Level sensor is error



System criterion condition: The high-level sensor is triggered and the low-level sensor is not triggered .

Appearance: the light next to the tissue retort on touch screen is on behalf of the liquid level , the up is on and the down is off .

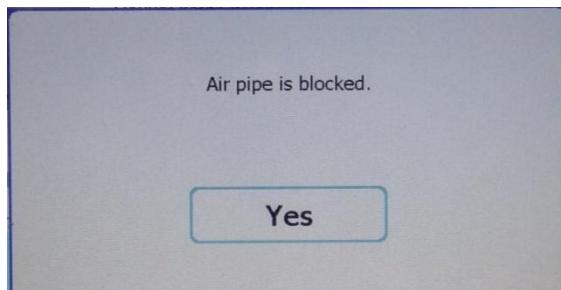
Possibility: 1、 The level sensor is damaged or the sensor electrical connection failure .

2、 The level sensor prism is blocked by foreign body , cause a error misjudgment .

Method: Clean level sensor prism or replace the sensor and then re-test .

Trouble shooting: clean level sensor prism or replace the sensor .

5.2 Air pipe is blocked



System criterion condition : No change in the status of the level sensor ,the pressure absolute value is less than 10 KP , the current operation lasts 6 minutes .

Possibility: 1、 If the pump works properly

2、 If the gas pipe is blocked by paraffin or foreign body .

3、 If the tissue retort seals (retort lid is locked or not) , the reagent is inserted in correct place .

4、 If the air valve works properly .

Method: 1、 If pump works properly can judged by audible sound .

2、 Open the back cover to observe if the gas pipe is blocked by paraffin or other foreign matter

3、 It can be judged directly or by operation if the tissue retort seals and the reagent bottle insert in correct place .

4、 Please judge if air valve works properly as below sheet .

Trouble shooting : Replace corresponding spare parts .

The current status	Possibility	Method	Solution
Fill paraffin or reagent to tissue retort	Air valve 2、 3	1. Test the valve terminal connect to main circuit board is charged or not by multimeter 2. Check the air valve can works proper separately	Replace the broken magnetic valve
Drain paraffin or reagent from tissue retort	Air valve 1、 4		
Fill reagent from outside connection	Air valve 3、 5、 8		
Drain waste paraffin to waste wax bath or drain reagent to outside bottle	Air valve 1、 6、 8		

5.3 Reagent pipe is blocked



System criterion condition : No change in the status of the reagent operation ,the pressure absolute value is higher than 10 KP , the current operation lasts 6 minutes .

Possibility:

- 1、 The reagent pipe is blocked by paraffin(solid or semi-molten status) or foreign matter .
- 2、 If reagent valve works properly
- 3、 If the reagent valve connection on main board has 24 output.

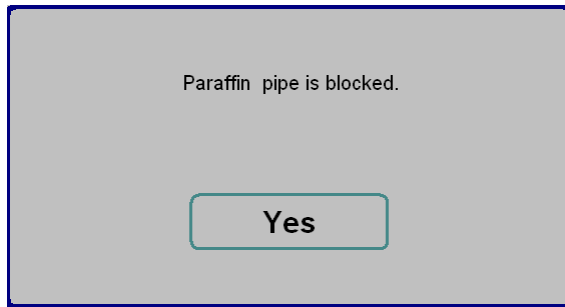
Method:

- 1、 If the reagent pipe is blocked can be judged by vision
- 2、 If the reagent valve can work normal separately by inputting 24V power .
- 3、 Test if the reagent valve connection on main board has 24 output.

Trouble shooting :

- 1、 Clean the blocked pipe .
- 2、 Replace the reagent valve Ass'y.
- 3、 Replace main board .

5.4 Paraffin pipe is blocked



System criterion condition : No change in the status of paraffin operation ,the pressure absolute value is higher than 10 KP and the current operation lasts 6 minutes .

Possibility:

- 1、 The paraffin pipe is blocked by foreign matter or solid paraffin because of low temperature .
- 2、 Paraffin valve works properly or not .
- 3、 If the paraffin valve connection on main board has 24 output or not.

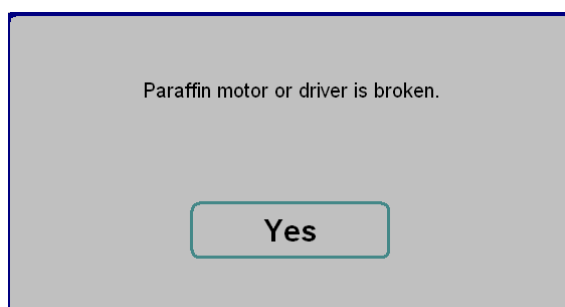
Method:

- 1、 Check if the paraffin pipe temperature is normal , and any foreign matter in the pipe by vision .
- 2、 If the paraffin valve can work normal separately by inputting 24V power .
- 3、 Test if the paraffin valve connection on main board has 24 output.

Trouble shooting:

- 1、 Clean the paraffin pipe and replace corresponding heating spare parts .
- 2、 Replace paraffin valve Ass'y .
- 3、 Replace main board .

5.5 Paraffin motor or driver is broken



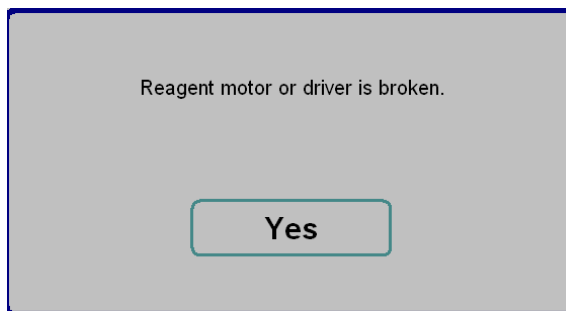
System criterion condition : During operation , the two photoelectric switches in the paraffin distribution valve Ass'y don't receive the signal in 6 minutes simultaneously , it means the motor don't turn or stall , or not stop .

- Possibility:**
- 1、 The motor doesn't turn : the motor or the motor driver is broken .
 - 2、 The motor don't stall : it is caused by high resistance . The temperature of oven is not high enough , or the ceramic cartridge is broken .
 - 3、 The motor don't stop : the photoelectric switch is broken .

- Method:** Observe the running situation :
- 1、 Check the reliability of the motor and the driver as well as the connecting line by replacement .
 - 2、 Measure the oven temperature , check the rotation of ceramic cartridge .
 - 3、 Check if the two photoelectric switches and connection line work normally or not by replacement .

- Troubleshooting:**
- 1、 Replace the motor or driver and connection line .
 - 2、 Replace the ceramic cartridge .
 - 3、 Replace the photoelectric switch and its connection line .

5.6 Reagent motor or driver is broken



System criterion condition : During operation , the two photoelectric switches in the reagent distribution valve Ass'y don't receive the signal in 6 minutes simultaneously , it means the motor don't turn or stall , or not stop .

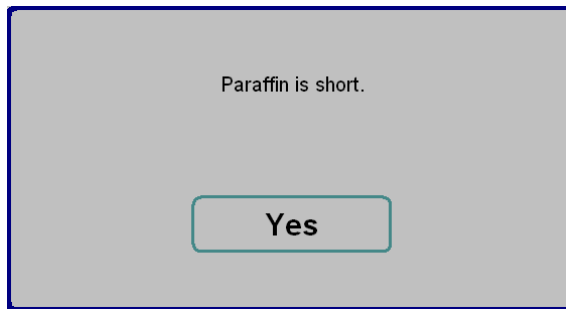
- Possibility:**
- 1、 The motor doesn't turn : the motor or the motor driver is broken .
 - 2、 The motor don't stall : it is caused by high resistance . The temperature of oven is not high enough , or the ceramic cartridge is broken .
 - 3、 The motor don't stop : the photoelectric switch is broken .

- Method:** Observe the running situation :
- 1、 Check the reliability of the motor and the driver as well as the connecting line by replacement .
 - 2、 Measure the oven temperature , check the rotation of ceramic cartridge .
 - 3、 Check if the two photoelectric switches and connection line work normally or not by replacement .

- Troubleshooting:** 1、 Replace the motor or driver and connection line .

- 2、 Replace the ceramic cartridge .
- 3、 Replace the photoelectric switch and its connection line .

5.7 Paraffin is short



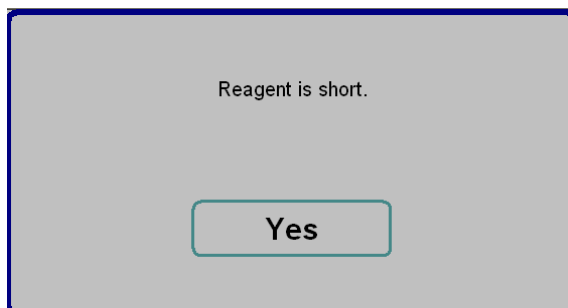
System criterion condition : During the process of filling paraffin into tissue retort from paraffin bath, the pressure absolute value changes from higher than 10 KP to lower than 10KP , while the liquid level don't reach the set level .

Possibility: The paraffin is short .(The level is lower than min calibration line .)

Method: Drain the paraffin back to paraffin bath , and observe the liquid level .

Trouble shooting : Add enough paraffin

5.8 Reagent is short



System criterion condition : During the process of filling reagent into tissue retort from reagent bottle, the pressure absolute value changes from higher than 10 KP to lower than 10KP , while the liquid level don't reach the set level .

Possibility: The reagent is short .(The level is lower than min calibration line .)

Method: Drain the reagent back to reagent bottle , and observe the liquid level .

Trouble shooting : Add enough reagent

5.9 Fan is broken

Fan is broken

As above picture shows , the fan may appear to be faulty .

5.10 Malfunctions in power failure

Power-failure Protection

Fig a

Protection Finished

Fig b

If the power failure more than 15 minutes, the machine will automatically turn off.

*If the program runs before protection bottle when meet power failure , the user clicks on the following fig a to continue running when the power comes.

*If the program runs after protection bottle when meet power failure, the machine will automatically return to protect position as fig b , the specimen could be protected in protection reagent.

*If the program runs to paraffin bath, the machine will stop in the current place as Fig a, and continues to run after confirmation.

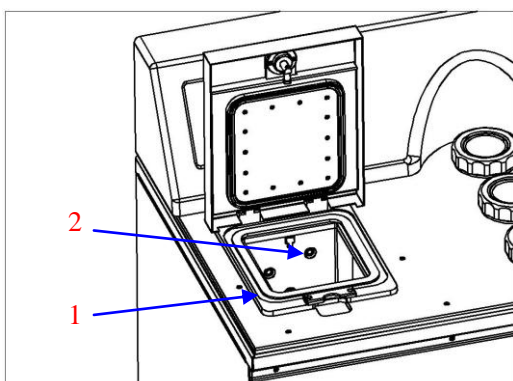
6、 Cleaning and maintenance

6.1 Clean the instrument

- ⊙ Cleaning the appearance

Use the dry cloth to clean the outside and wet cloth to clean the areas always be touched when operate the instrument,

- ⊙ Cleaning the retort bath and sensor of liquid level



User have to clean the two parts before processing:
 Surface in Retort bath(1)
 Sensor in Retort bath(2)

Clean the surface in retort bath by paper or dry cloth, and soft cloth cleans the sensor in retort bath.

● MUST do the cleaning before start processing .

6.2 Reagent maintenance

Details referred in item 4.9

- 6.2.1 Set the limit value in RMS, and clear the times to ZERO after any new reagent additional.
- 6.2.2 If the reagent bottle displayed on the screen change to RED color, it means the used times had been reached to the limit , please replace to new reagent.
- 6.2.3 Must clean the waste paraffin bath timely for each new paraffin filling. Fill the paraffin be required by hand.
 - ⊙ Suggest Filling paraffin particles by two times , fill to the max scale position at first time and do the second filling 500g again after paraffin melt.
 - ⊙ Filling the melted paraffin, the filled paraffin volume be required MUST bigger than minimum scale and lower the max scale.

Published by:



AMOS SCIENTIFIC PTY.LTD

7 Gabrielle Court, Bayswater North VIC 3153 Melbourne , Australia

Tel: +61-410190188 Fax: +61-410190188

ABN 37 159 778 140

www.amos-scientific.com