User Manual

DRAWELL

Artist of Science

Please read the manual before installation and operation.

Drawell International Technology Limited

Chongqing Drawell Instrument CO,.Ltd
Add:Suite 2705,Building No.12,Shiyou Road No.1,Yuzhong District, Chongqing,China
Tel: 0086-023-63268643

Shanghai Drawell Scientific Instrument CO.,Ltd.
Add: Suite 1117,Lane561 XiuChuan Rd.,PuDong New Area,Shanghai,China

Web : www.drawell.com.cn Email : sales05@drawell.com.cn

Contents

Caution: The person in charge needs to know if instrument is not used according to the manners required by manufacturer; the protection provided by instrument itself may be weakened.

Caution: Carefully process various solvents used in analysis according to the safety regulations of laboratory. Refer to the corresponding Material Safety Data Sheet. Wear lab coat, eye-protection glasses and rubber gloves, no matter what time. Be careful while processing hot reagents.

Caution: Risk of electric shock! Only professional and qualified personnel can open the machine cover and the panel.

I. Overview

1. Application

SOX406 Fat Analyzer is the crude fat analyzer designed according to GB/T 14772-2008, can measure the fat in food, dairy products and animal feed, meanwhile, it also applies to measure the soluble organic compounds in detergents, pharmaceuticals, petrochemicals, fiber products, soil and sludge.

For example:

1. Fast and safely measure the fat in food, feed, grains and seeds;

2. Extract oil and grease in waste water and sludge;

3. Extract the semi-volatile organic compounds in soil, such as insecticides and herbicides;

4. Extract the plasticizer in plastics, the rosin in paper and paperboard, the grease in leather and so on;

5. Decomposition pretreatment of solid sample for the gas phase and liquid phase chromatography.

2. Principles

The instrument uses the gravimetric method to measure the fat content according to Soxhlet extraction principle. That is, after the sample is extracted by using anhydrous ether or petroleum ether, the fat is extracted from the sample, and then dried and weighed; the calculated mass differences of the extraction cup before and after extraction is the fat content.

II. Main Performance

1. Technical Indicators

1. Temperature control range: room temperature +5-280 ℃

2. Temperature control accuracy: ±1 ℃

3. Processing capacity: 6 pcs/ batch

4. Volume of solvent cup: 80 mL

5. Sample amount: 0.5-15 g (constant quantity: 2-5 g)

6. Solvent recovery rate: ≥80%

7. Measurement range: 0-100%

8. Rated power: 1KW

9. Operating voltage: 220 VAC ±10% 50Hz

10. External dimensions (mm): 650×320×700

11. Weight: 35 kg

2. Performance Characteristics

1. 4.3’ true color LCD screen, micro-computer control system;

2. The over-temperature alarm and the timed reminder;

3. Triple alarm system with sound and text prompting on LCD screen;

4. Equipped with both the timing function and the chronograph function;

5. Overall metal heating block is adopted for heating, with wide temperature control range and high temperature control accuracy;

6. Lift connection of linear bearing conduction technology, flexible and comfortable for lifting operation;

7. Rich content of the interface, synchronously display the setting temperature, the actual temperature, the setting time and the heating time;

8. The electric circuit and the extraction space are totally separated, which enhances the security;

9. Unique air layer insulation technology keeps the shell of machine body under normal temperature and this instrument is equipped with the dual functions of heat insulation and heat preservation;

10. Compared with traditional Soxhlet analysis, the extracting speed is faster and the efficiency is higher.

3. Working Condition of Instrument

1. Input voltage: 220 V 50 Hz; air switch and electric leakage protection switch need to be equipped;

2. The instrument shall be installed near water source and drainage pond, and equipped with suitable electric outlet;

3. The power configuration shall conform to the requirements of the power supply, preventing electric overload; it must be equipped with a ground wire, separate power supply switch and safety device, ensuring the safety of operators;

4. The instrument shall be installed far away from high-power electrical appliances to avoid the interference of strong electromagnetic field;

5. The instrument shall be installed at the opening with good ventilation.

III. Names of Instruments Parts

Composition of instrument structure

1. Sliding bead 2. Condensation tube 3. Plug cock 4. Extraction cup
5. Wrench 6. Power interface 7. Power switch

IV. Installation Methods of Instrument

1. Inspection before Installation

After unpacking of instrument, check and verify all stated main machine and accessories according to the packing list attached with the equipment, and check if there is any damage, if yes, please contact with the manufacturer timely (Please keep the damaged parts).

2 Installation Conditions

(1) The instrument shall not be installed at the places where expose to direct sunlight, or is too cold, too hot or humid; the general room temperature shall be kept between 10 ℃-28 ℃;

(2) The instrument shall be installed at the working position near water source and drainage pond where is also equipped with power outlet, no matter water supply valve or power supply, their positions from the instrument shall not be more than 1m, to assure the convenience of using and operating; the water flow is required at 1~2 L/min, the water supply shall comply with the required water pressure, and water temperature cannot be more than 20 ℃;

(3) The drainage pond shall be more than 10cm below the drainage exit of instrument to make sure the natural drainage unobstructed

(4) The power configuration shall meet the requirements for power supply, the ground wire must be equipped, and there is separate power supply switch and safety device to ensure the electricity safety of operators;

(5) The instrument shall be installed at the place far away from high-power electrical equipment; there is no vibration, no corrosive liquid and no interference of strong electromagnetic fields at the working place.

3. Instrument Installation

The instrument shall be stably placed on the experimental bench, the back of the instrument shall be 20cm away from the wall, the distance between power outlet and the machine shall not be more than 1m, air switch, electric leakage protection switch and reliable ground wire shall be also equipped. For the water inlet and outlet at the left side of instrument, see Figure 1:

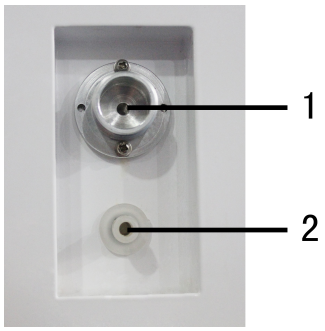


Figure 1

1. Inlet of condensate water, connected with the valve of running water.
2. Outlet of condensate water, connected with the drainage pond.

V. Operation Instruction

1. Reagent, Instrument and Appliances

1. Anhydrous ether (analytically pure), petroleum ether (analytically pure, boiling range of 30-60 ℃)

2. Analytical balance（0.0001 g）

3. Filter paper with diameter of 90 mm

4. 100 mL measuring cylinder

5. Drying cabinet（drying oven）

6. Laboratory pulverizer

7. Mortar and pestle

8. Dryer

2. Pre-treatment of Sample:

2.1 Pre-treatment of Food Samples

2.1.1 Solid sample: take a representative sample of 200g at least, use mortar to mash, porphyrize and mix evenly, and place in the airtight glass vessel; for the samples not easy to mashed and porphyrized, it shall be cut to be fine particles and passed through the round-hole mesh of diameter 1.0 mm, and then be placed in the airtight glass vessel;

2.1.2 Powder sample: take a representative sample of 200g at least (if the powder particle is relatively big, it shall also be placed in mortar for porphyrization), mixed evenly, and passed through the round-hole mesh of diameter 1.0 mm, and then be placed in the airtight glass vessel;

2.1.3 Pasty sample: take a representative sample of 200g at least, mix evenly and place in the airtight glass vessel;

2.1.4 Solid and liquid sample: according to the proportion of solid and liquid, take a representative sample of 200g at least, use organization masher to mash;

2.1.5 Meat products: remove the non-edible part, take a representative sample of 200g at least, use meat grinder to grind twice at least, mix evenly and place in the airtight glass vessel;

2.2 Pre-treatment of Feed Samples

2.2.1 Samples have been smashed or the fat content is relatively low, to process by referring to 2.1;

2.2.2 If the sample is not easy to be smashed or the fat content is high (more than 200 g/kg), it must be pre-extracted in advance.

3. Instrument Operation

1. Operation control panel of instrument, see Figure 2

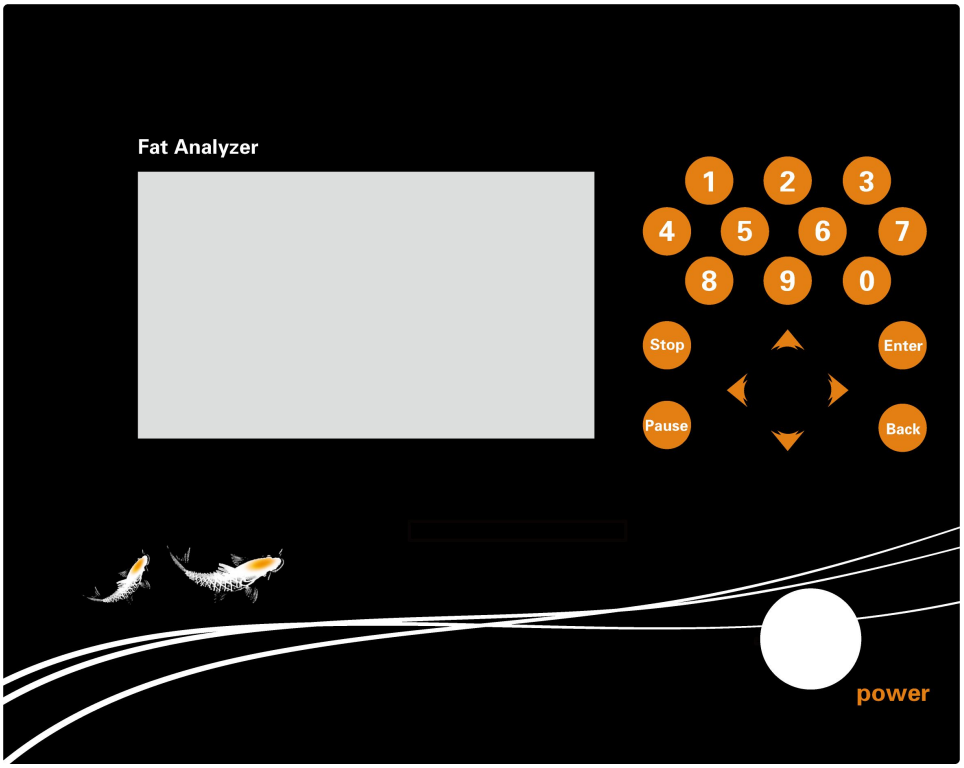


Figure 2

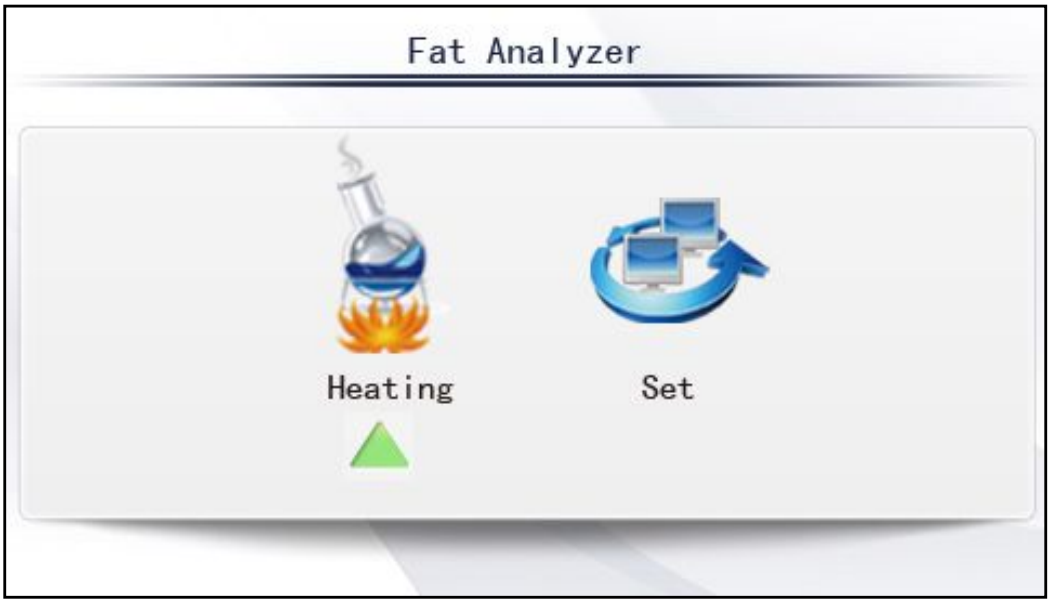


Figure 3

2. The setting of temperature and time: after starting up, press “Enter” 

to enter into “heating” menu, see Figure 4.

Figure 4

After setting temperature and time well, press " 

" to start heating, the display interface of the heating process is shown as the following, see Figure 5.

Figure 5

After the setting time is up, the heating will stop.

If the temperature exceeds the setting temperature of instrument by 25℃, the instrument will remind over-temperature, such as Figure 6

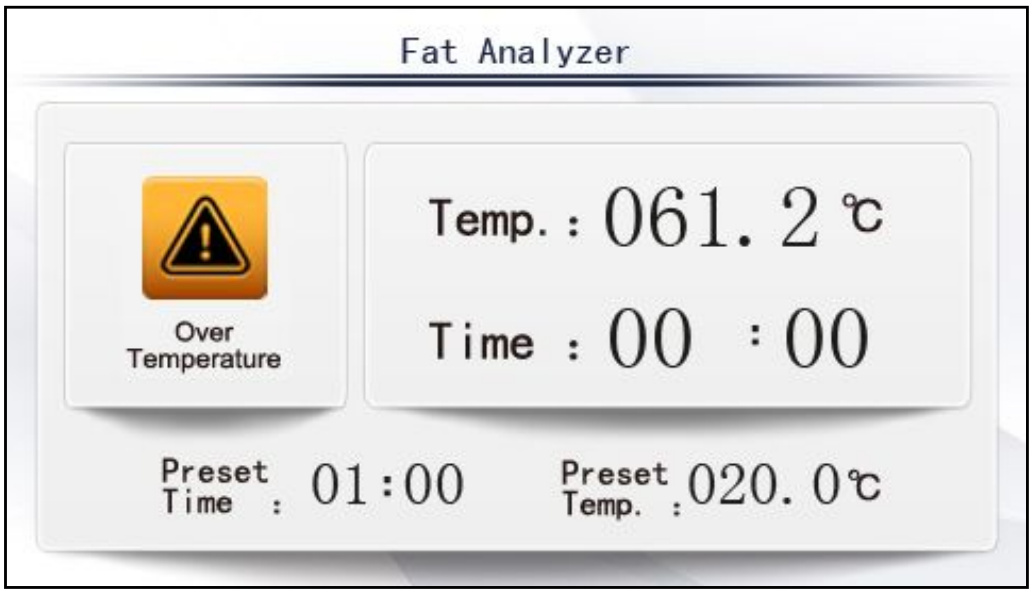


Figure 6

4. Setting of system configuration: after the initialization of starting up is finished, press arrow key  to move cursor to “Set”, press 

key to enter into “Set” interface, see Figure 7.

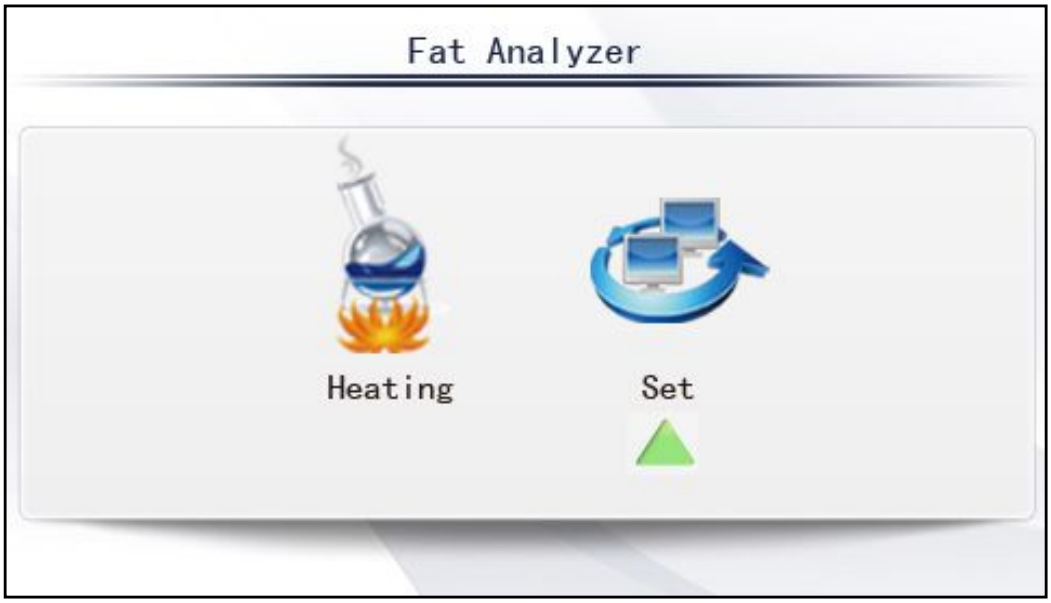
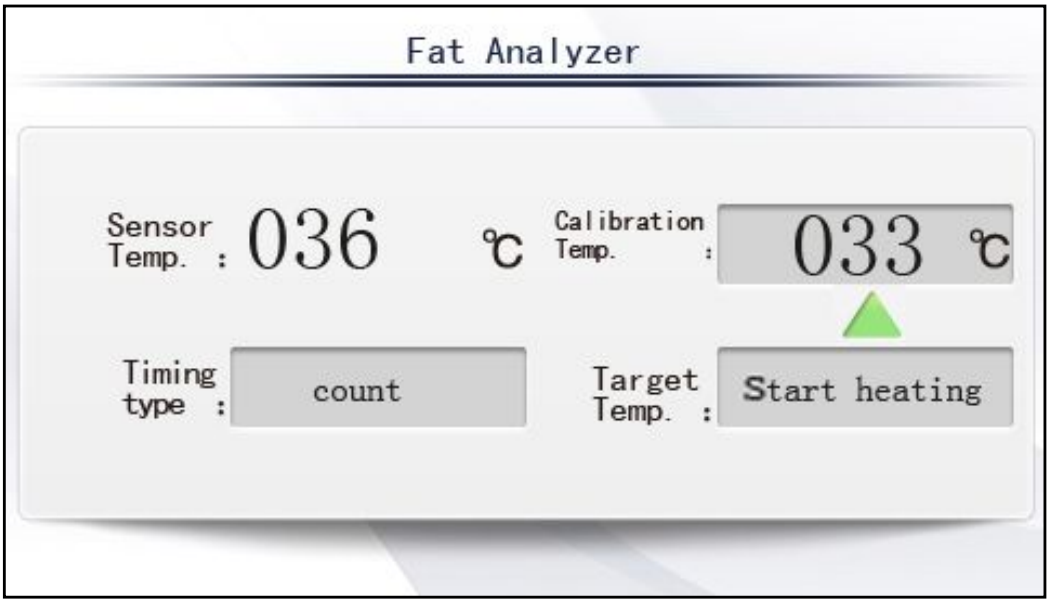


Figure 7

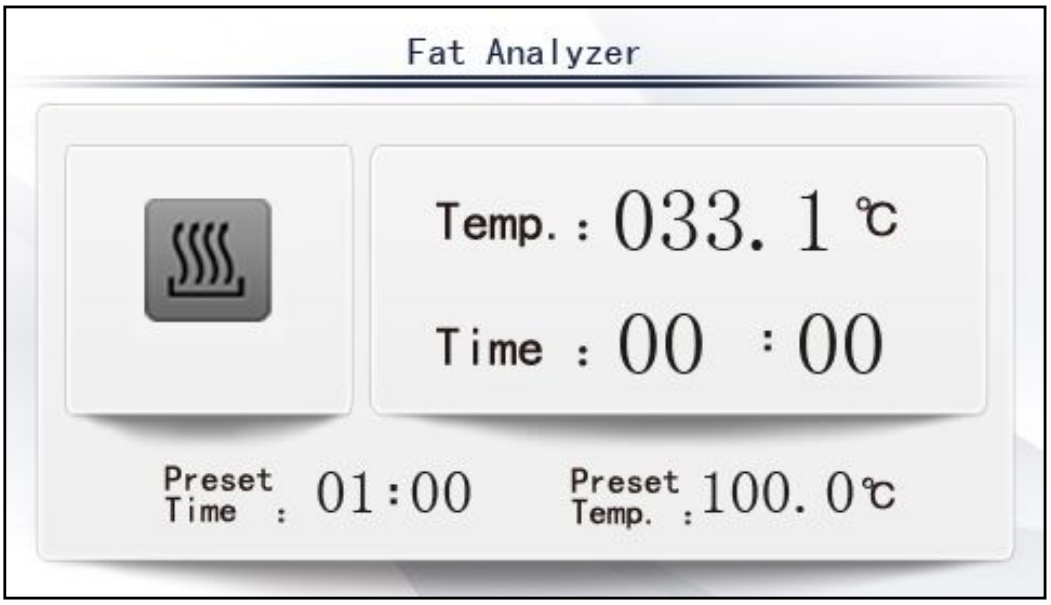


Temperature of sensor: temperature collected by temperature sensor

Calibrated temperature: actual temperature of heating device; after inputting, it can correct the display temperature of system.

Mode of timing: for counting, the heating time starts counting; for counting down, the heating time starts counting down.

Timing point: starting heating, the instrument starts timing from the time when heating is started. If the temperature is reached, the instrument starts timing from the time when the setting temperature is reached.



Besides, during the heating process, press "Pause" and the heating can be stopped temporarily, after press again, the heating restars; press "Stop", the heating can be stopped for emergency, and it goes back to the function selection interface, see figure 3.

5. In normal operation, press return key, it can go back to the instrument system operation interface, see figure 3.

4. Experimental Operation

1. Sample binding up, use analytical balance to weigh 2-5g of processed sample (accurate to 0.0001g), place in the filtration paper cylinder (the filtration paper cylinder shall be rolled well by using the roll bar included with instrument), and then put in the filter paper holder, use magnet to hold the filter paper holder;

2.Dry the extraction cup of constant weight, record the qualitative properties of the extraction cup, and then put 60 mL of petroleum ether or anhydrous ether into the extraction cup, and then place the extraction cup on the heating plate;

3.Press down the wrench, make the seal washer press the extraction cup tightly, move the sliding bead, put the filtration paper cylinder in extraction cup to make the sample completely immersed into solvent;

4. Turn on the power supply of instrument, open condensate water, set the temperature and the required time;

5. After extracting for a certain period of time, move the sliding bead, raise the filtration paper cylinder to high-order position, and carry out extraction; after the extraction is finished, turn off the plug cock on condensation tube, make solvent completely evaporate in the liquid storage tank at the lower part of condensation tube, and then turn on the plug cock to make solvent flow down, repeatedly wash out for several times to make sure that no residual fat in the sample, at last turn off the plug cock to make the solvent in extraction cup completely evaporate in the liquid storage tank, and then stop heating;

6. When the heating plate and the extraction cup is cooled to room temperature, lift up the wrench, open the plug cock and recycle the solvent in liquid storage tank;

7.Take the extraction cup from the heating plate and put in the drying cabinet for drying water and residual organic solvent, and then move into the dryer and weigh after cooling, calculate the fat content;

8. Turn off power, close condensate water.

VI. Common Faults and Treating Methods

No.	Causes of Failure	Analysis Reasons	Treating Methods
1	The whole machine without electricity	The fuse is burnt The power cord is not plugged firmly	Replace the fuse Plug the power cord well
2	Solvent gas leaks during the process of experiment	1. The flow of condensate water is not enough 2. The rubber ring at the lower part of condensation tube is aging, sealing failure 3. The condensation tube is damaged.	Increase water flow Replace the rubber ring Replace the condensation tube
3	Instrument does not work normally, system halted.	Check whether there is interference from strong magnetic field or strong electric field around the instrument	Turn off instrument, remove the source of interference and restart machine.

VII. Daily Maintenance of Instruments

1. The instrument needs heating when it works, so good ventilation and cooling conditions are needed;

2. Try to use the same kind of solvent for the same set of extraction system within a short time, to prevent the cross contamination of solvent;

3. Use damp cloth to wipe the instrument clean, it is important that the cleaning cloth must be wet to avoid generating static electricity; a piece of abrasive cloth shall be used for the cleaning of heating plate to clean all ash to improve heat transferring;

4. Pay attention to the cleaning of extraction cup at ordinary times, it needs cleaning regularly;

5. Make sure if there is seaweed plant growing in the cooling unit; if necessary, please use 1 mol/L hydrochloric acid or hypochlorite solvent to clean up.

VIII. Matters Need Attention

1. Please read the operation instructions carefully and operate according to its instructions, the personnel who are not familiar with the operation instructions shall not use instruments;
2. Damp cloth must be used to clean the surface of the leaching and extraction system, especially for glass products, and dry cloth will bring the electrostatic danger;

3. The maintenance for the leaching and extraction system shall be carried out strictly in accordance with operating procedures, the replacement of glass products, accessories and wires shall be carried out under the

guidance of post sales engineers of Hanon, but all the other necessary maintenance work must be handled by the post sales engineers of Hanon;

4. Hanon Company shall not guarantee for any unauthorized modification, transformation and recondition on instrument, and shall assume no responsibly for any personal casualty or property loss caused thereby;

5. Main power must be cut off while disassembling the cover and replacing the protective tube;

6. There are glass accessories in instruments; therefore, it needs to be careful during the process of carrying and transporting.

7. If the instrument will not be used for a long time, the solvent in condensation tube shall be discharged;

8. Try to use the same kind of solvent for the same set of extraction system within a short time, to prevent the cross contamination of solvent;

9. There is explosion danger while taking out or putting back organic solvent, the operator shall avoid solvent being exposed in the environment with naked flame and static electricity;

10. Do not touch the heating block at the heating state, in order to avoid scald;

11. During the experiment process, there shall be specially-assigned person to guard the laboratory.

IX. Supplementary

Since the date of the product being sold (subject to the date of the issued invoice), the complete machine has one year warranty, but the following situations are beyond the scope of warranty:

1. Over the warranty period;
2. Damage caused due to improper use;
3. Damage caused by self-disassembling without permission of manufacturer;
4. Damage caused by improper transportation or storage.

X. Temperature Value Reference

As affected by room temperature, the heat transfer efficiency from heating plate to extraction cup and other factors, the heating temperature needs to be regulated properly; the suitable temperature shall be controlled to make the dropping speed of solvent at about 3-5 drops per second. For the extraction temperature of common organic solvent, please see the form below.

Solvent	Extraction temperature (℃)
30-60 Petroleum ether	80
Ethyl ether	60
Acetone	76
Dichloromethane	60
Hexane	89
Methanol	85
Ethanol	98
Chloroform	82
Benzene	100

※Note: if the organic reagents that not mentioned in the form are used, the extraction temperature could be increased by 20℃ on the basis of boiling point.

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