SX_2-6-12

Muffle Furnace

Instructions manual

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Preface

The company produces all kinds of material testing equipments and heat treatment furnaces, the company has professional scientific research institutions and design and development personnel, with strong technical force. Since the establishment of the company, in order to better meet the needs of the market and the majority of users, new products emerge in endlessly, always maintain the domestic leading level, reliable quality, reputation first, timely service, widely welcomed by users.

Before using the machine, please read the instruction carefully, fully understand, and then start using. Please take good care of the machine and use it correctly so that the machine can always maintain high accuracy and good running state.

1. Introduction

This series of muffle furnace is used for chemical analysis, physical determination and heating in laboratories, industrial and mining enterprises and scientific research institutes.

This series of muffle furnace with digital display electric furnace temperature controller and thermocouple, implement measure, directives and automatic control of furnace temperature.

2. Main technical parameters

SX2 series 1200℃ muffle furnace technical data:

Model / Parameters	SX2-6-12
Rated power（HP）	8
Rated voltage（V）	220
Phase	1
Ampere	27A
Rated temperature（℉）	1832
Max temperature（℉）	2192
Furnace size（in W*L*H）	7.87×0.98×7.87

3. Installation and use

3.1. Use process of Muffle furnace before work:

3.1.1, must be placed in the flat indoor work table.

3.1.2. Check whether the furnace is clean, clean up sundries, and ensure that the furnace is clean.

3.1.3. Check the furnace wall and bottom plate for breakage and other damage.

3.1.4. Installation and fastening of resistance wire and thermocouple lead rod, and check whether the instrument is normal.

3.1.5. Check whether muffle furnace door switch is flexible.

3.1.6. After ensuring that everything is normal, start to release the working parts.

3.2. Use process of Muffle furnace:

3.2.1. Make sure the power is off when you release the working parts.

3.2.2. Turn on the power supply, set the temperature control curve according to the required working temperature and heating rate, start the instrument operation, make the electric furnace power, temperature control instrument shows the temperature gradually rising, indicating that the electric furnace and temperature controller are working normally.

3.2.3. When using muffle furnace, the furnace temperature shall not exceed the rated temperature to avoid damaging the heating element.

3.2.4, handle gently to avoid damaging the electric heating element, furnace bottom plate, etc.;

3.2.5. It is strictly forbidden to place wet workpieces, and the workpiece heated in the furnace should be kept 1.97 — 2.76 in away from the electric heating element; The workpiece should be placed neatly and not piled up too high to avoid damaging the thermocouple casing

3.2.6. Check all kinds of instruments and instruments during work. If there is any abnormality, repair it in time.

3.2.7. When the furnace temperature is above 1292℉, it is not allowed to open the furnace door to cool down or heat out, so as not to shorten the service life of the furnace due to sudden cooling.

3. 3. Use process of Muffle furnace after work:

3.3.1. Cut off the power supply

3.3.2. Gently release the work parts to ensure that the furnace body and workpiece are not damaged.

3.3.3. Reload the furnace and repeat the procedure above.

3.3.4. Clean up the sundries in the furnace and ensure that they are clean.

3.3.5. Pay attention to daily maintenance work.

3.3.6. Check regularly whether the connection parts of electric furnace and temperature controller are in good contact.

3.4. Precautions for use of Muffle furnace

3.4.1. The refractory material of the new furnace contains moisture. In addition, in order to make the heating element generate oxide layer, it must be baked at low temperature for several hours and gradually heated to 1652℉ before use, and kept for more than 5 hours, in order to prevent the furnace from breaking due to the rapid change of temperature after damp.

3.4.2. Muffle furnace is for the experiment and shall not be used for it. Samples must be stored in a clean crucible and shall not pollute the furnace.

3.4.3. Furnace temperature shall not exceed the highest temperature, so as not to burn the electric heating element, and do not pour any liquid and melted metal into the furnace.

3.4.4. When using muffle furnace, pay attention to safety and avoid scalding.

3.4.5. When doing ashing test, the sample must be fully carbonized on the electric furnace before being put into the ashing furnace to prevent the accumulation of carbon damage to the heating element.

3.4.6. When muffle furnace is heated, the furnace coat will also become hot. Keep the furnace away from combustible materials and keep it easy to dissipate heat outside.

3.4.7. The working life of the heating element depends on the oxide layer on its surface. The destruction of the oxide layer will shorten the life of the heating element, and each shutdown will damage the oxide layer, so the shutdown should be avoided after the startup.

3.4.8. After several cycles of heating, cracks may appear in the heat preservation material of the furnace. These cracks are caused by thermal expansion and have no effect on the quality of the furnace.

3.4.9. When using muffle furnace, always take care of it to prevent accidents caused by self-control failure. Do not use muffle furnace when no one is on duty at night.

3.4.10. Temperature should not rise too fast above 752℉, so as not to affect the measurement results and the life of the furnace.

3.4.11. After using muffle furnace, cut off the power supply to cool it naturally.

Should not open the door immediately, in order to avoid the furnace suddenly cold broken, such as urgent, can first open a small slit to speed up the cooling, until the temperature drops to 392℉, can open the door.

3.4.12. Wear gloves when loading the sample to prevent scalding.

3.4.13. Shall not be stained with water and oil sample into the furnace, shall not be stained with water and oil clip loaded sample.

3.4.14. Do not casually touch the electric furnace and the surrounding sample, loading the sample door opening time should be as short as possible, in order to prolong the service life of the electric furnace.

3.4.15. Cut off the power supply after use.

4. Common faults and maintenance methods

4.1. Not heating up

The power supply voltage is normal, the controller works normally, and the ammeter has no display. The likelihood is electric furnace wire break, usable multimeter checks and the electric furnace wire of same specification changes.

The power supply voltage is normal and the controller does not work. The switch inside the controller, fuse and the travel switch of the furnace door can be repaired. If the furnace door is not related to a good controller can not work, according to the maintenance method of the controller fault maintenance.

4.2. Slow heating

The power supply voltage is normal and the controller works normally. The likelihood is partial electric furnace wire break, usable multimeter is checked, change with electric furnace wire of same specification.

Check whether the temperature control instrument is set to curve heating test, and set to fixed-point temperature control according to the accessories.

4.3. Abnormal temperature

The thermocouple is not inserted into the furnace, causing the furnace temperature to lose control.

The difference between the indexing number of thermocouple and the

indexing number of temperature control instrument will cause the difference between the temperature of furnace and the temperature control instrument.

4.4. Some furnace wire is not red

Carefully check the cause of line damage and replace some damaged parts.

If the input indication is normal, the fuse may be broken, the connecting line is loose or the furnace wire is broken. Tighten the pile head of the consolidated line, replace the fuse and connect the furnace wire.

4.5. The seal of muffle furnace door is not in place

Furnace door stuck, clean foreign matter. Furnace door is shifted and refastened.

4.6. Abnormal closing

Check whether muffle furnace protection switch is loose or damaged, fix the protection switch again and fix it within a safe distance or replace the protection switch.

5. Daily maintenance and safety instructions

5.1. Flat cement workbench or flat ground, the controller should not be placed too close to the electric furnace, to avoid overheating aging components, and even affect the normal work.

5.2. Properly connect the power supply and all wires before heating up.

5.3. In order to ensure safety, the controller, electric furnace need grounding.

5.4. This furnace is only used indoors, and ensure to take out the work piece first power off, to ensure safety.

5.5, the new furnace for the first time or stored for too long to be used again should be oven drying treatment, the process is as follows:

Room temperature ~ 392℉ for 1 hour

392℉ to 752℉ for 1 hour

752℉ to 1112℉ for 1 hour

1112℉ to 1472℉ for 1 hour

5.6. When the electric furnace is used, the furnace temperature shall not

exceed the rated temperature, so as not to damage the heating element, and it is forbidden to inject all kinds of liquid directly into the furnace to dissolve metal, and often clean the oxide and iron filings in the furnace to protect the inner clean.

5.7. Regularly check the electric furnace, temperature controller and power supply between the wire contact is good, if found loose should be tightened in time.

5.8. This series of electric furnace is suitable for the following working conditions:

① The altitude is less than 1000 meters;

② Ambient temperature within the range of 23°F～104°F;

③ The relative humidity of the environment is not more than 90%;

④ There is no conductive dust, explosive gas and corrosive gas around the furnace.

⑤ No obvious vibration and bumping.

Appendix:

Setting of temperature rise curve of temperature control meter

After electrify the instrument, temperature control meter PV zone is displaying present measured value, SV zone is showing instrument present running state, now press key ◀ on the panel. Instrument enter temperature control curve setting state, now the instrument PV zone is showing parameter name, SV zone is showing corresponding parameter value, user can press ▲(add key) or ▼(reduce key) on the panel to amend the present parameter values. When finishing amending a parameter value, the user can affirm by pressing the SET key, then show the next parameter. After all parameters are SET, press the ◀ and SET key at the same time, and then release the key at the same time to exit the setting state of temperature control curve. Otherwise, the user could also wait for 5~10s, the instrument will automatic exit temperature control curve state. The order of parameters showing up and corresponding parameters see table 4.1.

Table 4.1

Parameter name	Parameter value
C/sp ××	××
t ××	××
C/sp ××	××
t ××	××
C/sp ××	××
…	…

Appear in order

Start temperature, can be set to room temperature or 0

Heating time, can be set to -121 or other positive number, when a period of time set for -121, means meter stop in this period.

The “C/sp” in “C/sp××” represents temperature and “××” represents segment number. The “t” in “t×× ” represents time and “××” also represents segment number; temperature unit is °F, time unit is minute.

Examples as below:

1. Heat up in a slope manner, for example, the Muffle furnace is heated from room temperature to 1832°F at a rate of 9°F/min and then stops. The parameters of temperature control curve are set as follows:

Table 4.2

Parameter name	Parameter value
C/sp 01	Room temperature
t 01	200
C/sp 02	1832
t 02	-121

The instrument was heated from room temperature to 752°F at a rate of 9°F/min and kept at a constant temperature for 20 min, and then heated to 1472°F at a rate of 9°F/min and stopped. The temperature control curve parameters were set as shown in Table 4.3 below:

Table 4.3

Parameter name	Parameter value
C/sp 01	Room temperature
t 01	80
C/sp 02	752
t 02	20
C/sp 03	752
t 03	80
C/sp 04	1472
t 04	-121

2. Heat up according to the fixed point: as shown in Table 4.4, the Muffle furnace was first raised to 1472°F at the maximum power and then kept the constant temperature until the constant temperature reached and stopped automatically. (If the constant temperature time is not enough, the 200 of T 01 can be lengthened or another paragraph can be added at the end, as shown in Table 4.5)

Table 4.4

Parameter name	Parameter value
C/sp 01	1472

t 01	200
C/sp 02	1472
t 02	-121

Table 4.5

Parameter name	Parameter value
C/sp 01	1472
t 01	200
C/sp 02	1472
t 02	200
C/sp 03	1472
t 03	-121