Digital Roller Oven
SL-XGRL-4A

Summary

The temperature control of this roller oven adopts the newest intelligent control technology of personal computer. The temperature can be set directly by virtue of digital display. It is characterized by the deviation instruction, high precision and safe working. In addition, the systems of power and electrical control are set in the upper section of the heater body. The import generator control technology of frequency conversion is used in the apparatus. Therefore, the transmission is steady and the noise is slight. It is also convenient for using, maintaining and repairing.

The usage of the instrument is mainly in the following aspects:

(1) Evaluate the stability of drilling fluid additives (Such as various deflocculates and organic polymers).

(2) Used as a drying oven.

(3) Used as an aging oven.

(4) Used as a ball grinder.

(5) Stir chemical solution.

(6) Mix liquids or solids.

(7) Exclude air from a fluid.

Model and specification

Model: XGRL-4A

The main technical parameters of apparatus

The major technical parameters of the instrument are listed in the following table.

<table>
<thead>
<tr>
<th>No.</th>
<th>name</th>
<th>specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply</td>
<td>220V±5% 50Hz</td>
</tr>
<tr>
<td>2</td>
<td>Motor power</td>
<td>370W</td>
</tr>
<tr>
<td>3</td>
<td>Heating power</td>
<td>1000W×2</td>
</tr>
<tr>
<td>4</td>
<td>Temperature range used</td>
<td>0℃~300℃</td>
</tr>
<tr>
<td>5</td>
<td>Roller speed</td>
<td>50r/min,</td>
</tr>
</tbody>
</table>
The structure and working principles of the instrument

The structure
(1) The body of heater
(2) The roller
(3) The aging cells (See Fig. 1 and Table 1)
(4) Heating system
(5) Power system
(6) Electrical circuit control (See Fig. 2)

Table 1 The parts for the aging cell

<table>
<thead>
<tr>
<th>Sequence No.</th>
<th>Model No.</th>
<th>Name &amp; specification</th>
<th>Amount</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LHG-01</td>
<td>Compressed ring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GB819-85</td>
<td>Screw, M4×8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>LHG-02</td>
<td>Cell cap</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>LHG-03</td>
<td>Gas bleeding valve</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GB3452.1-82</td>
<td>'O'ring, φ8×1.9</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>LHG-04</td>
<td>Compressed bolt</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>LHG-06</td>
<td>Supporting ring</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>LHG-07</td>
<td>Sealing cover</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>LHG-08</td>
<td>Sealing ring</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>LHG-09</td>
<td>Cell body</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 2 The plate for electrical circuit control

**The explanations:**

1. Knob for motor closing and opening
2. Knob for heating closing and opening
3. Switch of power supply
4. Timing knob
5. Timing meter
6. Temperature controller
7. Schematic diagram of the roller oven (See Fig. 3)

Fig. 3 The structure of the roller oven
**Explanations:** 1) The lock of gate; 2) The oven body; 3) controlling box for electrical control; 4) The oven gate; 5) The calibrating hole for temperature of the oven.

**Working Principles**

Its working principle and performance are designed according to the API standard issued in the U.S.A. It is used to simulate the velocity of slow circulation for drilling fluids in the downhole annulus and study the character of drilling fluids in the process of heating and rolling.

**Schematic Diagram**

**The operation of the instrument**

The operator should operate the instrument correctly according to the following steps. The detailed instructions are described in the instruction book.

1. The preparation before using
2. Set temperature
3. Set the rolling time
4. The operation of the aging cells
5. The operation of the heater

Ensure all the power supplies have reliable ground protection during using. The hand, clothing and other goods must be far away from the roller and other revolving parts.

1. Preparation
1. Check if the voltage is the same as required. The power supply should be connected to ground to ensure safety.
2. Read this manual instruction carefully and test as operation procedures.
3. Connect power source. The temperature display window shows the current temperature in the furnace.
4. Press the button of Power On then the roller runs and the sample is rolled.
5. Make the motor idle running for several minutes to observe the sound and rotate speed in sound condition. Press Power Off button to turn off motor. The preparation completed and test can start.

(2) Temperature setting
1. Press power switch the digital display window shows the measured value.
2. Press the function key for three minutes until the first light in the setting item instruction on. At this time the display window shows the set value under control
3. Item. Press \( \land \) or \( \lor \) to get the desired value.
4. Press the function key again and the instrument memorizes the set value. The light for the next item of overrun on and display window shows the set value. This value has been set by manufacturer and should not be altered without professional at spot.
5. Press the function again and the light for correction on and display window shows the set value under correction item. This value has been set by manufacturer and should not be altered without professional at spot.
6. Press the function key and the light of setting item instruction off. The display window shows the measured value and test can start.

(3) Timing setting
1. Press \( + \) or \( - \) key to preset the digital switch to desired position.
2. Press timing power key and timing power light on.
3. Timer display 00.01, the former two numbers mean hour and the post two mean minute.
4. Press Power on key and Heating key then timing start. Power is shut off automatically when time comes and sound signal is sent.

(4) Operation of aging cells
1. Before test check all parts in sound condition.
2. Fill the sample in the aging kettle, the sample volume should not exceed 2/3 of aging kettle (about 325ml).
3. Put tetrafluoroethylene sealing gasket in the sealing gland. Cover the sealing gland on the aging kettle body and tighten it. Screw down the three hexagonal bolt evenly.
4. Screw and tighten the kettle cover.
5. The gas source should be connected on the exhaust valve when pre-pressure is needed in aging kettle. Rotate the exhaust valve anti-clockwise for 1/4 circle and let in 7Mpa pressure on the liquid surface then rotate the exhaust valve clockwise to remove gas source. Put the kettle between the two rollers.

(5) Operation of roller oven
After the 1-4 procedures, close the oven port and clock it with locking apparatus
1. Press Power on key and the roller start to roll.
2. Press the heating key then the oven is heated to the set temperature and normal light on.
3. Take out the kettle from the oven and cool it to room temperature after test is over.
4. Unscrew the exhaust valve slowly to let out surplus gas in the kettle.
5. Unscrew the three hexagonal bolt, remove the cover and pour the test sample.
6. Clean all the parts. Spread lubricates grease on the thread.

All the power should be connected to the ground.

Never open the kettle cover until it is cooled to room temperature and all the surplus gas are let out.

**The maintenance of the instrument**
1. Take and dispose carefully when moving, repairing and cleaning the instrument in order to avoid causing parts deformed and influencing precision and use.
2. The colliding of roller axle must been prevented in order to avoid it bent and deformed.
3. The motor and electrical parts should keep clean and dry. Strictly forbid to keep corrosive chemicals and this instrument together.
4. Wipe and clean the heater in time, and then dispose it in a dry environment when finishing rolling.
5. Replace the “O” ring on the air bleeder of aging cell for each time using.
6. Lubricate the chain and chain wheel using lubricating oil periodically.

**The transportation and storage of instrument**
The transportation and storage of instrument should correspond to the JB/T9329-1999 standard. The product should be stored in the room with ventilation. The indoor air does not contain the impurity which can arouse device corrosion.