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Technical Specification for Model RSK2503 (Z)-06A
IR Belt Solar Cell Firing Furnace

TECHNICAL SPECIFICATION

Model

RSK 2503(Z)-06A IR Belt Solar Cell Firing Furnace

Temperature Range

1. Max Temperature. 1000° C
2. Working Temperature: 100～950° C

Working Parameter

1. Belt Width: 254 mm
2. Dimension of Entrance of the Furnace: 300 mm×30 mm（W×H）
3. Dimension of Entrance Table: 450mm×880mm（L×H）
4. Dimension of Exit Table: 550mm×880mm（L×H）

Drive System

1. Belt Type: high temperature resistant V type mesh（Cr20Ni80）
2. Bearing Capacity: >25Kg/m2, still keep steady and non-offset of the belt under long-term running (Special Construction Design)
3. Speed Range: 600 ～ 4000mm/min,
4. Speed Control: Imported frequency converter control stepless speed regulation
5. Drive Mode: Mechanical drive, adaptive tension design

Electric Features

1. Design Power: 65kw
2. Thermal Insulation Power: about 20kw
3. Supply Power: 230V/50Hz 3 phase 5 line

Heating & Thermal Insulation Features

1. Heating Element: IR shortwave heating tube
2. Insulation Material: High & Pure Fiber Material. Its density: > 300kg/ m

Control Features

1. Control Method: Imported single loop intelligent temperature controller, PID control, parameter auto-tuning, upper industrial computer (option)

2. Temperature Zones: 5， select the suitable distant between heating zones and the density of heating bar to ensure the uniformity of the heating.
3. Detection: 2, the testing of temperature of cooling zone and water cooling.
4. Alarm Protection: Thermocouple failure, over temperature, belt stop, overload of electric motor and other audible and visual alarm
5. Control Accuracy: ±1°C
6. Uniformity: ±3°C
7. Temperature Rise of Surface:: ≤30°C

Furnace Layout

1. Heating up Zone: 3 zones; Length: 1250mm; Temperature Set Point: 200~800°C; Typical: 400～650°C
2. Flat-temperature Zone: 2 zones; Length: about 500mm; Temperature Set Point: 600~900 °C; Typical: 900°C

Atmosphere System

Control Atmosphere: 5 inlets, glass rotameter control, use clear compression air or nitrogen.

Cooling System

Use water cooling heat exchanger with two-level-fin at the exit end of the chamber combined with axle blower cooling system which can force convection for heat exchanger to cool the part and the belt quickly. Inflow of each level is individual adjustable. The temperature of the parts at the exit is ≤60° C. Requirement of cooling water: purifying and descaling, temperature of inflow ≤15°C.

Cleaning System

- Belt Cleaning Mode: brush cleaning

Equipment Condition

1. Input Power Supply 380V±10%, 3 phases, 5 wires, 50Hz
2. Outside Dimension: 7000mm×1400mm×1350mm（L×W×H）
3. Weight: 1200kg
4. Ground Accept Weight: 500Kg/m2
5. Environmental Conditions: flat ground, no strong air turbulence, no aggressive gas, no vibration indoor; environmental temperature in electric control room: 0-40° C; environmental humidity: 10%~85%RH
6. Vented Exhaust: draughty environment, environmental temperature≤50℃; environmental humidity 10%~85%RH

BRIEF SPECIFICATION

Chamber Structure

1. Overall Length of the Furnace: 4500mm, including six zones: entrance transition zone, heating up zone, flat-temperature zone, cooling transition zone, forced cooling zone and exit transition zone.
2. Entrance transition zone: length: 250mm, no heating element. Mainly prevent the overheating of the entrance of the furnace and the interference of external environment to the chamber.
3. Heating up zone: Length: 1250mm, 3 zones; the power of each zone is 15Kw, 5Kw, 5Kw separately and total is 25kw.
4. Flat-temperature Zone: length: 500mm, 2 zones; length of each zone: 250mm. There are 6 IR lighting tubes with 40mm space of each other at top and button of chamber. The power of each zone is 15Kw, 20Kw separately and total is 35kw.
5. Cooling transition zone: Length: 250mm, no heating element. There is a stainless steel water jacket to insulate heat generated by forgoing heating zone.
6. Forced cooling zone: Length: 2050mm, two segment chambers of water cooling heat exchanger with two-level-fin at the exit end of the chamber combined with axle blower cooling system which can force convection for heat exchanger. There is one thermocouple which can display the temperature of the cooling chamber for testing in the chamber.
7. Exit transition zone: length: 200mm. One stainless steel jacket. Mainly prevent the interference of external environment to chamber.
8. Whole fiber material design in chamber, and heating mode with IR heating tube which is convenient for maintains and replacement.

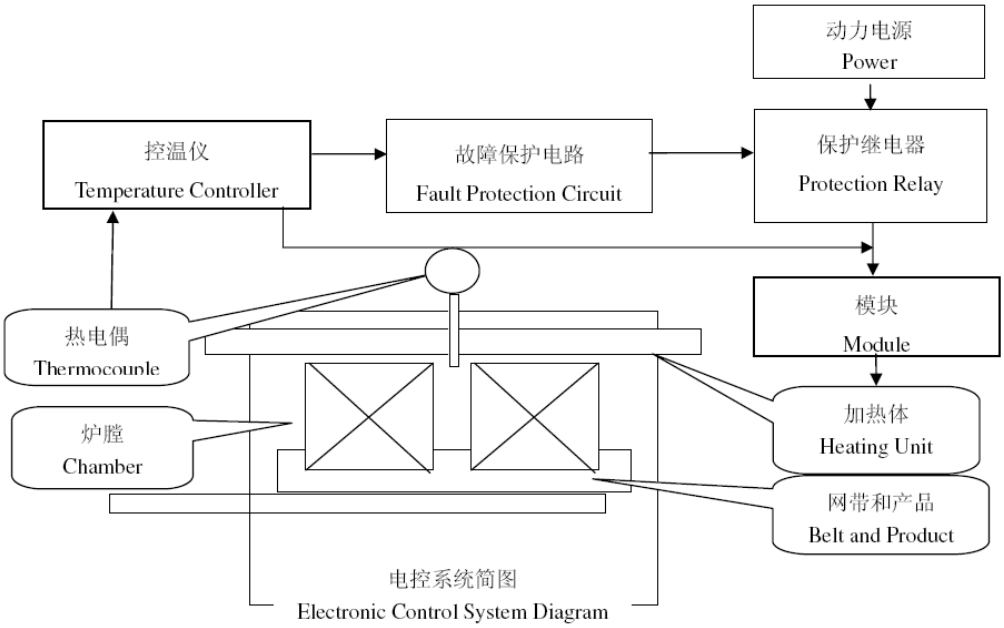
Atmosphere Control

According to process requirements, use 5 inlet atmosphere control (2 exhausts are used for auxiliary exhaust)

1. 1 air inlet from the upper of the entrance of the chamber form a blockade curtain of the entrance
2. 1 air inlet from the upper of the exit of the chamber form a blockade curtain of the exit.
3. 1 air inlet from the middle of cooling transition zone for preventing heat loss.
4. 1 exhaust in the middle of the heating zone, the exhaust damper is adjustable for removal the waster and moisture.
5. 1 exhaust in the middle of cooling zone, the exhaust damper is adjustable and are used for adjusting air flow direction in the chamber

Electronic Control System

Single loop imported intelligent temperature controller with PID parameter auto-tuning function controls temperature automatically. Lower industrial computer uses imported intelligent temperature controller to control temperature. Single point control diagram as below:



Drive System

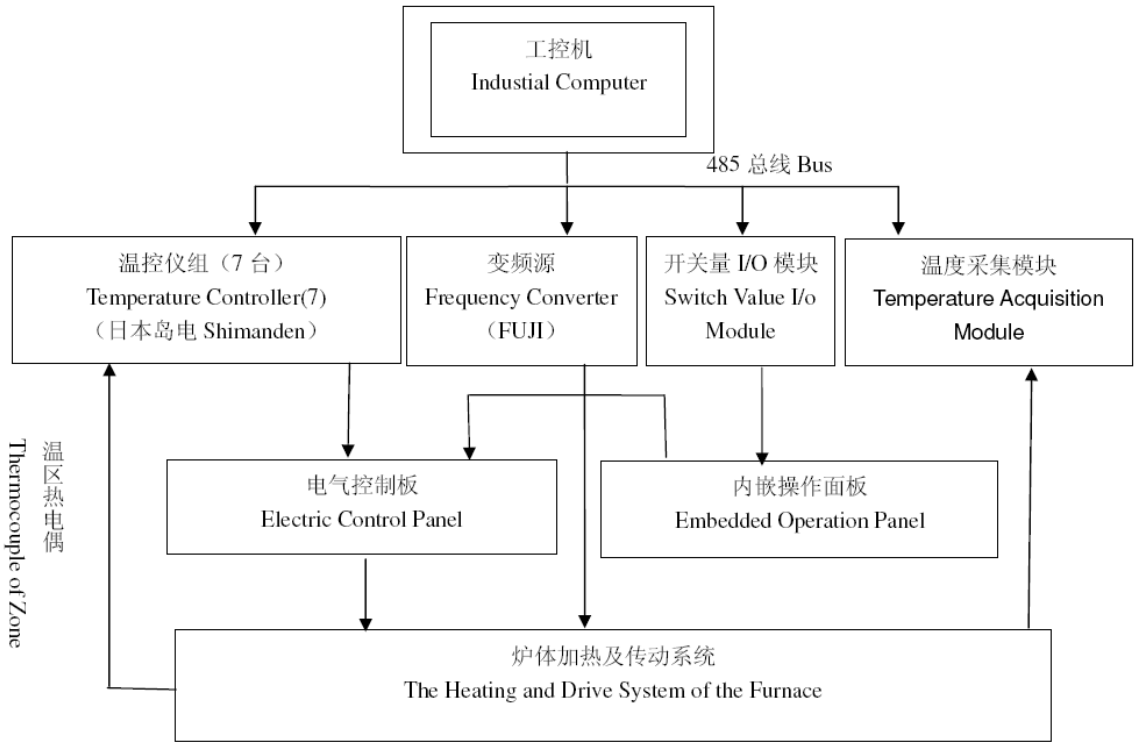
Chain-belt drive mechanism, AC frequency conversion speed control, large power motor with gear box drive, reasonable drive mechanism with deviation prevention and reasonable selection of belt material preventing low-speed running of the belt.

Options

DCS distributed control system:

1. Upper industrial computer monitor accomplishes saving of the temperature profile, temperature control, speed frequency conversion control, the monitoring and recording of equipment working data, unusual alarm and modification of variable control parameter and other function. Alarm protection includes over-temperature, thermocouple failure, air pressure etc.

2. Lower temperature control uses single loop imported intelligent temperature controller with PID parameter auto-tuning function to accomplish automatically control of the temperature. The DCS system can keep records with upper and lower industrial computer; when upper computer fails, lower computer can continue working, which increases the reliability of the system. Single point control diagram as below:



3. Monitoring System of the computer mainly carry out the following functions

- The acquisition and recording of temperature: convenient for management and monitoring of the quality and can print out at any time.
- Profile saving and automatic retrieval: user can set variety curve according to different product and retrieval for use at any time.
- Parameter adjustment: includes temperature, control parameter and other adjustable parameter of lower computer that can carry out to control at the upper computer.
- Recording and analysis system of temperature profile: testing and analyzing the chamber temperature and actual temperature profile of part surface regularly.