Dual-hole unidirectional fully automatic internal circulation

Push plate electric kiln

technology

technique

square

case

Customer: Luoyang Youci New Materials Co., Ltd.

Item name: GWDL-TB1750C-16LD4R Ultra-high Temperature Dual-Hole Opposite-Facing Fully Automatic Internal Circulation Pusher Electric Kiln

date		Technical review notes by the person in charge			
20250923	Preliminary content plan	Zhang Li Mengyang Wang Biao (without line breaks)			Wire

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Factory in Jianxi District, Luoyang City	
	
Luoyang Xin'an Factory	
	

Equipment Images

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GWDL-TB1750C-16LD3R6 Ultra-High Temperature Dual-Hole Opposite-Directional Fully Automatic Internal Circulation Pusher Type Electric Kiln Technical Solution

I. Main Uses of the Equipment 1.

For firing alumina ceramics. 2. Basic

Process Conditions 2.1.1 Applicable

Products: Dry-pressed alumina ceramics. 2.1.2 Designed Process

Curve: 2.1.3 Holding Time:

Approximately 5 hours at constant temperature in the

high-temperature zone. 2.1.4 Pusher Plate Dimensions:

240W×240L×50H 2.1.5 Improves the energy-saving contribution

of the double-hole kiln structure. 2.1.6 Reduces kiln repair time and costs, improving

the economic efficiency of

kiln operation. 3. Electric Furnace Technical Performance 3.1.1 Main Dimensions

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Furnace dimensions (length × width × height): 15960 × 240 × 350 mm, double holes facing each other.	
Effective working chamber dimensions (length × width × height): 15960 × 240 × 300 mm, dual holes facing each other.	
Push plate dimensions (length × width × height): 240 × 240 × 50 mm, corundum mullite	
Furnace body dimensions (length × width × height): approximately 21000 × 2000 × 1750 mm	
Temperature control cabinet	Mechatronics integration with furnace body

3.1.2 Thermal parameters

Rated temperature	MAX: 1730ÿ
Operating temperature	NOR: 1680ÿ (SK temperature ring standard)
Number of temperature control groups	8-zone heating, 8-point temperature control
Heating power	MAX: 150KW, commonly used power 80KW
working power supply	3P-AC380V/220V-50HZ
Temperature uniformity in high-temperature zone ÿ ±5ÿ	
Furnace temperature stability	±1ÿ/h
Temperature rise on the outer surface of the furnace body	ÿ50ÿ (measured away from heating element outlet, interface, and thermocouple outlet)
Furnace atmosphere	Air
Exhaust chimney	There are 2 kiln holes at each end of the kiln.

3.1.3 Propulsion Parameters

Propulsion	200mmÿ800mm/h, continuously adjustable
speed, common	300/h (process time)
speed, main	8-10T
thrust,	ÿ750mm
stroke, propulsion device composition	1 main pusher and 3 auxiliary pushers

4. Electric Furnace Structure Description

4.1 Technical characteristics of electric furnaces

Based on years of theoretical and practical experience in electric furnace design, ceramic technology, and silicon molybdenum rod manufacturing, the optimized design optimizes the kiln's temperature control.	
	Zone design, distribution of silicon molybdenum rods, refractory materials, thermal insulation material structure, energy-saving heat exchange structure of AB kiln holes
	The design was optimized in terms of structure and propulsion system.
	Single-hole pusher electric kilns are characterized by long furnace lining life and long silicon molybdenum rod life. This double-hole kiln features improved atmosphere...
	The configuration of the single-pass kiln is optimized in terms of structure and thermal configuration, enabling this double-hole kiln to achieve energy savings.
	It has the economic advantages of operating a single-hole kiln.

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Multi-point temperature control adopts multi-temperature zone and multi-point control, mainly used to reduce the formation of closed pores, with 8-point temperature control.	
The thermal distribution of high-efficiency and energy-saving heating elements is rationally designed to make full use of waste heat from cooling for heating.	
Extremely low silicon molybdenum rod loss	A well-designed distribution of silicon molybdenum rods allows for a heating current as low as 110–140 A for high-temperature silicon molybdenum rods. The rod loss rate is very low, demonstrating excellent technical and economic efficiency during periods of high silicon molybdenum rod prices.
Advanced propulsion system Unification	The hydraulic propulsion system features a fast-forward, slow-reverse structure, with a reversal time of only 10 seconds, enabling continuous firing. The propulsion system ensures that the product is heated evenly and stably, and the furnace temperature does not fluctuate due to the propulsion system.
Reasonable high temperature junction Structural Design	For refractory materials and advanced and reasonable structural design
The kiln boasts a beautiful and imposing appearance, and is meticulously crafted.	
Design concept: Modern kiln electromechanical integration	
Business Philosophy: The company possesses reliable quality assurance capabilities and a trustworthy service philosophy.	

4.2 Temperature Zone Configuration Structure (as shown in the diagram)

Temperature range main parameters:

Temperature	Heating + Cooling	High temperature + constant temperature	5600 heating and	total
zone length (mm)	Preheating Rodless 5600	4760	cooling silicon carbide rod	15960
Number of heating temperature		6		6
zones and control temperature points		6		6

Reference speed: 300mm/h

Detailed parameters for the heating temperature zone:

Temperature zone	Temperature ÿ	Heating element silicon		thermocouple	kiln passage
R1-2	1200	carbide rod silicon	Quantity:	B	A
R3-4	1400	molybdenum rod	24	B	A
R5-6	1700	silicon molybdenum	pieces	B	A
R7-8	1700	rod silicon molybdenum rod	24 pieces 24 pieces	B	B

Note: The silicon molybdenum rods are ÿ9×300×550×50 mm in size, with a total of 72 rods for kiln use.

4.3 Furnace body steel structure

The furnace shell is a modular structure	made of welded steel plates and profiles, and is designed and manufactured in three sections.
External protective and decorative cold-rolled	steel sheet bending decorative cover structure

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4.4 Fire-resistant and heat-insulating structure

The furnace structure features a central column supporting a double-channel design, with heating elements positioned on the left, center, and right sides.	
Slide rail structure machine-pressed sintered 99 wear-resistant corundum slide rail	
Furnace lining material: high-purity, low-silicon corundum (high-temperature zone); high-alumina products (low-temperature zone).	
High-temperature zone furnace bottom structure: chute + high-purity, low-silicon corundum bottom bricks + hollow sphere shaped bricks + hollow spheres/corundum lightweight materials + high-alumina lightweight materials brick	
High-temperature zone furnace side structure: high-purity low-silicon corundum side bricks + hollow sphere shaped bricks + hollow sphere standard bricks + alumina lightweight standard bricks +JM28 Mullite Lightweight Standard Brick + Ceramic Fiberboard	
The high-temperature zone furnace roof structure consists of high-purity, low-silicon corundum roof bricks, hollow spherical shaped bricks, hollow spherical standard bricks, and alumina lightweight standard bricks. +JM28 Mullite Lightweight Standard Brick + Ceramic Fiberboard	
High-purity, low-silicon corundum as the central column material	
Hollow sphere plug + plug seat brick structure	
The rodless heating/cooling zone support frame + thermally conductive baffle heat dissipation structure is used to fully utilize the waste heat from the cooling zone, improving efficiency. High heat exchange capacity	
Furnace sump drain	It is designed with a dedicated vent hole on the top of the furnace for discharging high-temperature polluting exhaust gases from the furnace.

4.5 Intelligent Temperature Control System

Temperature control	Installed on the furnace body
cabinet	8 o'clock
temperature	Six units, dry-type three-phase, installed on the furnace body.
control point	3P-AC380V/220V-50HZ
transformer working power supply output power control	Sixsets of SCR thyristor phase-shift triggered voltage regulation control systems. Utilizing state-of-the-art single-loop intelligent temperature controllers. Trigger integrated circuit, functions include: soft start, soft shutdown, constant current/constant voltage, and overcurrent protection.
The output power	0-98% continuously adjustable
control cabinet panel is equipped with an intelligent temperature controller, a domestically produced brand-name ammeter and voltmeter, buttons, and an over-temperature thermocouple failure alarm indicator. lamp	
Transformer installation	8. Group circuit breakers, SCR voltage regulating components, and protection components.
is configured inside the cabinet.	The transformer is installed in the cooling zone of the furnace body.
SCR cooling method:	Aluminum alloy radiator, cooling fan for strong cooling
thermocouple	Heating zone: B graduation, WRR-130: 6 pieces
Control device	Touchscreen displays enable human-computer interaction, and further, allow for the creation of computer clients and mobile phone interfaces. The app enables real-time monitoring of remote data.

4.6 Hydraulic Propulsion System

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Propulsion	One main pusher, three auxiliary pushers, hydraulic structure.
device: main	8-10T
propulsion thrust,	200mmÿ800mm/h, continuously adjustable
	It features slow advance, slow retreat, fast retreat, and speed adjustment functions, with independent advancement for each of the two holes.
propulsion speed,	Balance the lever structure to ensure smooth progress.
functional propulsion structure, propulsion components.	A hydraulic system consists of five parts: power element, actuator, control element, and auxiliary element. Components and hydraulic fluid.
5. Installation	Uniform and stable speed
conditions for	Overtravel and overshoot, designed with a bell for charging.

main propulsion speed control fault alarm

Basic power	3P-AC380V/220V-50H, 150KVA
supply	Matching electric furnace foundation and cable laying cable trench or cable tray
requirements: The furnace's site dimensions (length × width × height) are approximately 21000 × 2800 × 2000 mm.	
Kiln usage sites	Temperature: 0~40ÿ. No significant indoor air convection or corrosive gases. Steel structure workshop. Design an exhaust hood exhaust system.
External exhaust pipe leading to the outside	

6. Use Hu An Responsibility appoint

Basic conditions are in place: primary power supply is available, and an exhaust chimney (to be provided by the supplier) is ready.	
Provide installation materials including connecting wires for the furnace body, control panel, and transformer, and cable trays (cable trenches).	
Responsible for the project	Kiln lifting, positioning, and process debugging

7. Preparation

spare parts and documents

Silicon	5
molybdenum	5
rod terminal	5 sticks
clamp, aluminum	1
strip	5 pieces
terminal	10 pieces
fast fuse plug,	Installation and operation manual, instrument manual, electrical diagrams

push plate technical document 8. Appearance color

9. Quality	Heat-resistant silver paint
Assurance (Furnace Body,	Electrostatic powder coating, customer-specified color

External Decorative Panels)

Overall warranty and maintenance	One year (excluding consumable parts such as silicon molybdenum rods, thermocouples, plugs, push plates, and aluminum foil strips).
guarantee for electric furnaces	For any malfunctions caused by the supplier's design and manufacturing, the supplier shall be responsible for free repairs; for malfunctions caused by the buyer's incorrect operation... For any malfunctions caused by improper operation, the supplier shall be responsible for repairs, and the buyer shall bear the repair costs.

II. Features: Low energy consumption, low pollution, low cost, and high efficiency.

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and silicon molybdenum rod manufacturing, **national high-tech enterprises and specialized and innovative enterprises have optimized the design of kilns in terms of temperature zone design, silicon molybdenum rod distribution, refractory materials, insulation material structure, double kiln hole energy-saving heat exchange structure, intelligent digital control system, and propulsion system.**

In addition to the basic performance characteristics of kilns, our products exhibit the following superior performance.

1. Dual-hole opposing modular structure: Two parallel channels are arranged inside the furnace, doubling the production capacity compared to a single-hole kiln, and enabling fully automated operation.

The cyclical operation reduces the labor intensity of production workers and effectively improves production efficiency.

2. Independent temperature control in two channels: A and B holes can be adapted to sintering 95 ceramics and 99 ceramics respectively.

3. Stable and uniform temperature: The unique design structure, reasonable control method, and power distribution ensure stable temperature inside the furnace.

The uniformity reaches the optimal state of ÿ±5ÿ, thereby greatly improving the sintering quality of the product.

4. Control device: including a touch screen display, enabling human-computer interaction; furthermore, establishing computer clients and mobile phone interfaces.

The app enables real-time monitoring of remote data.

5. Significant energy saving: The double-hole facing structure makes full use of waste heat, which can reduce energy consumption by more than 35% compared with the single-hole kiln.

6. Waste Heat Exchange: The waste heat from the high-temperature zone A to the cooling zone is transferred to the preheating zone B to preheat the products, allowing them to be exported.

The low temperature extends the lifespan of the kiln furniture and reduces production costs.

7. Unique Design Structure: Advanced structural design and rational material selection extend kiln life, eliminating the need for major repairs within three years, thus reducing...

This reduces kiln repair time and costs, improves the economic efficiency of kiln operation, and saves users on subsequent operating costs.

III. Illustrations of each functional interface:

1. Main Menu (Main Interface): This is the initial screen displayed when the control system is powered on.

The intermediate screen for each sub-function of the temperature control system is accessed by clicking the corresponding button. (e.g., ...)

Figure 1)

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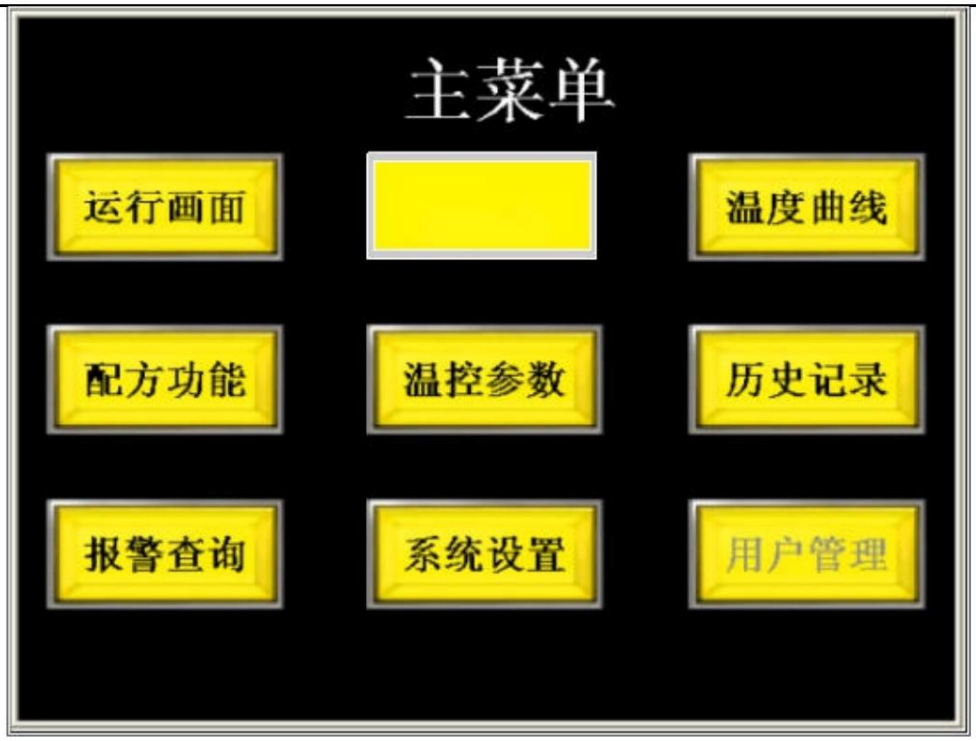

Figure 1

1. Reverse inner loop screen

This screen displays the kiln's rotation status and the temperature of each zone. (See Figure 2)

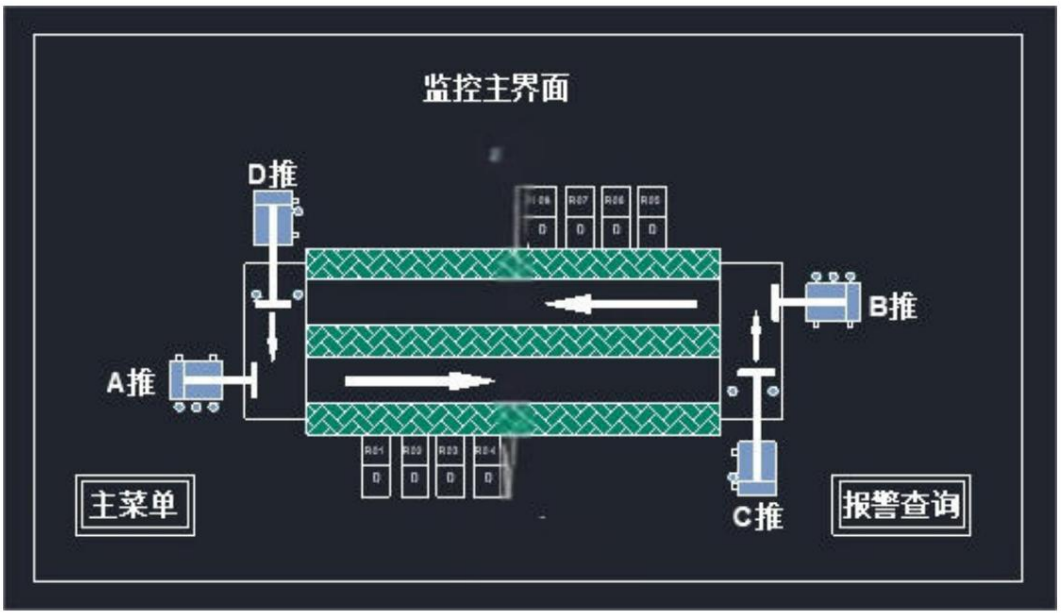

Figure 2

2. Temperature curve display screen:

This screen displays the kiln's temperature distribution using both curves and numbers, and allows users to change settings within the screen.

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tech enterprises and specialized and innovative enterprises (changes to individual target values or overall formula changes). (See Figure 3)

Figure 3

2. Recipe setting screen:

This screen is used to set the kiln's process formula, which can be pre-set according to the production temperature required by your company's different production areas.

Once the recipe is set up and saved, it can be easily retrieved for different products, eliminating the need to manually select different recipes each time production begins.

Each product requires individual parameter resetting, reducing the workload. Its main functions are described below:

A. Formula Preparation: Each product corresponds to a specific temperature formula. When producing a particular product, the corresponding formula must first be prepared.

Recipes are identified by recipe numbers (1-100). To retrieve the recipe for a specific product, first click on the yellow number following the recipe number.

The menu will pop up a recipe number input keypad. Enter the recipe number you want to retrieve, click OK, and then click the "Retrieve Recipe" button.

Press the button to bring up the recipe for the corresponding recipe number (the data in the table will display the corresponding set temperature), as shown in Figure 4 below.

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Figure 4

3. Temperature control parameter setting screen:

This screen is used to set the temperature control parameters of the kiln temperature controller, such as manual/automatic switching, PID parameter self-tuning, etc.

These parameters are only used by your company's administrator or debugger during debugging. There are a total of eight control modules, divided into three...

The settings screen is shown in Figures 5, 6, and 7 below:

Figure 5

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Figure 6

Figure 7

4. Temperature control historical record screen:

This screen displays historical temperature parameters from kiln operation. Users can view historical temperatures on this screen.

The data (in curve format) can also be transferred to an Excel file by inserting a USB drive and clicking "Save to USB Drive".

View and analyze the settings on the computer; there are two separate settings screens. The interface is shown in Figure 8 below:

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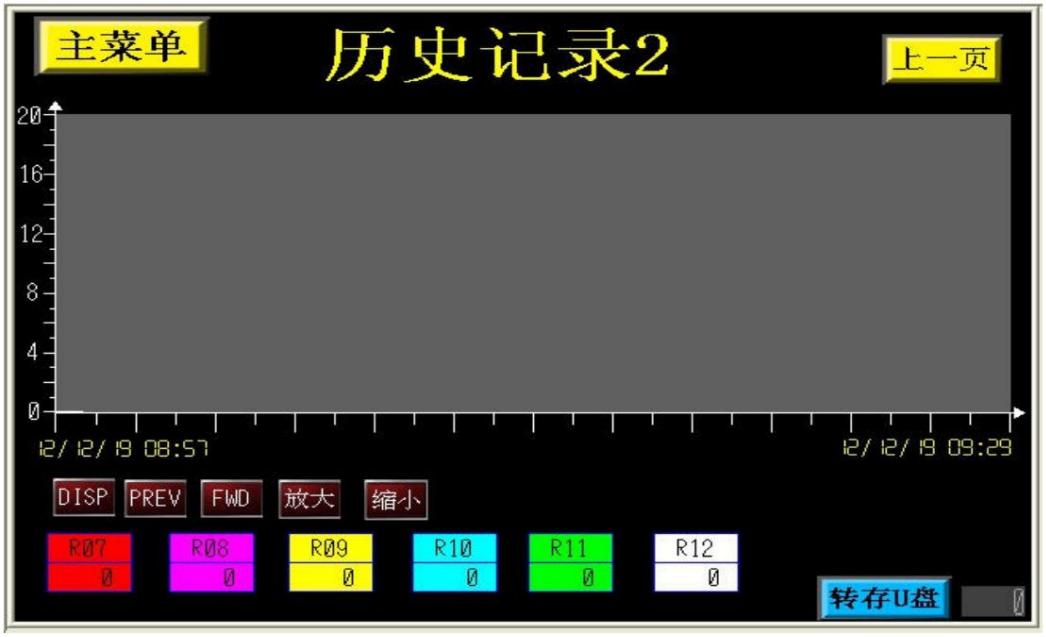

Figure 8

5. Alarm recording screen:

This screen displays historical records of abnormal situations (alarms) that occur during kiln operation. Users can view these records.

This screen displays historical alarms (in table format). The interface is shown in Figure 9 below:

Figure 9

Three-password protection

To ensure system security, this software system is designed with two levels of passwords: Level 1 for operators and Level 2 for users.

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the administrator level. Level 2 passwords include the functions of Level 1. When accessing the corresponding screen, you will be prompted to enter the password corresponding to your permissior

Enter the corresponding password and press Enter to access the corresponding screen. Please keep your password safe.

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