

G W D L

LUOYANG JUXING KILN CO., LTD.

1600°C High-Temperature Vacuum Furnace

Technical Specifications

Professional High-Temperature Heating Equipment Manufacturer

Operating Range: -60°C ~ 2600°C

ISO 9001 Quality Management

ISO 14001 Environmental Management

ISO 45001 Occupational Health & Safety

CE Certified

High-Tech Enterprise

Specialized & Innovative SME

Member Unit of China Heat Treatment Industry Association

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GWDL — Luoyang Juxing Kiln Co., Ltd.

Professional High-Temperature Equipment (–60°C~2600°C) · Member, China Heat Treatment Industry Association

1. Furnace Overview

Furnace Type	Vertical, top-opening door. Controller & furnace integrated compact design, lab-type furnace.
Effective Working Area	Diameter 250 mm × Height 500 mm
Design Max. Temperature	1600°C (Heating element max. continuous: 1500°C)
Max. Heating Rate	0–10 °C/min
Leak Rate	0.67 Pa/h (average measured after pumping down)
Est. Net Weight	1.2 T
Power Supply	380V, 3-phase 5-wire, 50Hz
Rated Power	65 kW (Max. heating power: 30–40 kW)

2. Heating Zone (Thermal Field)

Heating Element	Molybdenum-lanthanum (Mo-La) alloy, max. continuous operating temp: 1500°C, design max: 1600°C. Horizontally ring-shaped arrangement. Max. heating rate: 0–10°C/min.
Heating Element Connectors	Horizontally ring-shaped arrangement
Insulation	99.5% alumina ceramic
Reflection Shields	4 layers molybdenum (0.8+0.5+0.5+0.5 mm) + 3 layers stainless steel 310S (0.5+0.5+0.5 mm)
Top Cover	Integrated with furnace cover; same number of layers as the barrel
Bottom Sample Stage	Molybdenum legs (Ø16 mm, 5 pcs). Molybdenum sample stage: 5 mm thick, 230 mm diameter
Fixing Frame	304 stainless steel frame

3. Vacuum Furnace Shell

Furnace Shell	Double-layer water-cooled structure. Outer: Q235 carbon steel (5 mm). Inner: 304 stainless steel (5 mm)
Bottom Head	Double-layer welded structure
Top Flange	Forged 304 material, 40 mm thickness, machined flat
Cover Flange	Forged 304 material, 40 mm thickness, machined flat, with O-ring groove
Furnace Door	Double-layer: outer Q235 carbon steel (5 mm) + inner 304 stainless steel (5 mm)
Lift Mechanism	Rear side of furnace body. Motor + reducer + screw drive. Lift shaft: 45# steel, Ø50 mm, with 2 sliding bearings

Door Seal Ring	Custom seamless fluororubber O-ring
Locking Handwheels	4 pcs, positioned to avoid cold-water pipe connections, for easy operation
Thermocouple Holes	304 threaded pipes on furnace side, with knurled nuts for manual tightening
Vacuum Holes	304 KF flanges on side, KF40 port, standard silicone rubber O-rings
Electrode Holes	2 pcs on side, 304 stainless steel flanges. Outer ports machined flat, with multi-layer stainless steel flat flanges + insulating gland flat flanges + standard silicone O-rings. All flanges same specification. Electrode pipes at 90° to furnace body, deviation $\leq \pm 1^\circ$
Gas Inlet Holes	2 pcs, 304 KF flanges. H ₂ inlet at bottom side, inert gas inlet at top side. Standard O-rings + clamps
Exhaust Hole	1 pc, located at top cover area (to confirm). Standard O-ring + clamp
Pressure Gauge Holes	Pointer pressure alarm gauge, pressure transmitter, vacuum gauge, balance pressure/vent needle valve — 1 pc each, 4 shared housing port with standard O-ring + clamp
Water Fittings	304 fittings with sufficient wall thickness to prevent crush of PTFE washers when tightening water pipes
Safety Valve	KF25 port on furnace cover, with standard KF flange, silicone O-ring & clamp

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4. Vacuum System

Vacuum Pump	Nanwu 2X-30 two-stage rotary vane vacuum pump, with outlet oil vapor filter. Placed at rear of furnace body, separate from furnace stand
Vacuum Tubing	Vacuum bellows
Vacuum Valve	Pneumatic butterfly valve, KF40–KF25

5. Tail Gas Burning System

Type	Vertical tube furnace
Working Principle	H ₂ tail gas from main furnace enters ceramic tube from bottom, ignited by mixing with air in the high-temperature section
Tail Gas Tube	310S heat-resistant steel in the heated section
Heating Element	Silicon carbide rod
Control Method	Thermostat + thyristor + Type-K thermocouple. Not integrated into main furnace auto-run
Tube Material & Size	95% alumina ceramic or quartz, inner Ø30 mm, heated length 250 mm, with foam ceramic packing to slow gas rise rate
Continuous Operating Temp	800°C
Power	4 kW

6. Control Cabinet

Cabinet Shell	Carbon steel cabinet, powder-coated paint
Panel Components	Thermostat, water temp gauge, voltage gauge, ammeter, touchscreen, emergency stop button, power switch, manual power adjustment knob, heater circuit button, pump start/stop button, vacuum valve button
Power Type	380V, 3-phase 5-wire, 50Hz
Rated Power	65 kW
Max. Heating Power	30–40 kW

7. Main Circuit

Main Circuit Breaker	Schneider, 160A 3P MCCB
Main Heater Contactor	Schneider, 125A 3P MCCB
IGBT Power Supply	Yingjie integrated type, with phase-loss, power-cutoff, overcurrent alarm functions
Busbar	T2 copper, neatly arranged
Water-Cooled Electrodes	T2 pure copper hollow tubes, with 304 stainless steel water-cooled sleeves, 2 pcs

8. Control System

Thermostat	Japan Sato FP93, control accuracy $\pm 1^{\circ}\text{C}$, 1 unit
PLC	Siemens S7-1200, 1 unit
Touchscreen	Wondertech 10", with remote communication, 1 unit. Screens: status, parameter setting, temperature setting, recording
Control Thermocouple	Single-core tungsten-rhenium thermocouple, range 0–1800°C, 1 pc
Pressure Transmitter	0–0.2 MPa range. Furnace pressure: –100 to +100 kPa; water pressure: 0–1000 kPa; air pressure: 0–1000 kPa
Vacuum Gauge	Ruibao resistive vacuum gauge, with 485 communication. Separate display panel + touchscreen display
Gas Inlet	H ₂ line: manual valve + H ₂ mass flow meter + solenoid valve, 20 SLM. Inert gas line: manual valve + float flow meter + solenoid valve, 40 SLM
Exhaust	Solenoid valve + check valve + manual valve
H ₂ Concentration Detector	Installed near furnace. Triggers H ₂ leak alarm & interlock when ambient H ₂ exceeds set limit
Other Electrical Components	Contactors, solenoid valves, relays, buttons — domestic first-tier quality brands

9. Safety Features

Water Temp. Thermocouple	1 pc, on water separator outlet, standard silicone O-ring
Water Pressure Pointer Gauge	1 pc, on water inlet separator
Pressure Pointer Gauge	1 pc, on furnace body
Balance Valve (Vent/Inlet)	1 pc stainless steel needle valve, on furnace body

10. Water Cooling System

Closed-Loop Water Cooling	Customer to provide
Cooling Tubes	Steel-wire-reinforced high-pressure rubber. Tubes requiring rotation (e.g. on cover) must have sufficient length with mid-section fixed to avoid loosening/leaking during door operation
Water Manifold	304 stainless steel, 1-inch inlet/outlet
Manifold Valves	Ball valves for each branch

11. Automatic Operation

User-configurable parameters (via touchscreen): 1. Vacuum level; 2. H₂/N₂ flow rate & start time; 3. Heating curve; 4. H₂ shut-off time; 5. Exhaust pressure value.

Auto-run sequence: 1. Pump down to user-set vacuum level. 2. After reaching specified vacuum, start H₂ filling to set pressure, then begin heating. 3. Heat according to set curve; after final segment, main circuit cuts off and natural cooling begins. 4. After cooling to room temperature, fill N₂, then open furnace door to retrieve sample. Manual mode also available.

12. Safety Interlock Functions

Heating Section	Phase-loss alarm, overcurrent alarm, thermocouple break alarm, over-temperature alarm
Cooling Water	Outlet over-temp alarm, abnormal pressure alarm
Vacuum	Pump overheat alarm, post-pump-down leak test, abnormal leak alarm
Gas Pressure	Over-pressure alarm
H ₂ System	Ambient H ₂ concentration exceeds limit → alarm & stop H ₂ inlet
Power Failure	Balance valve closes. Short power cut: program paused, resumes after power restore. Long power cut: program terminates & saves data

13. Dimensions & Documentation

Est. Furnace Dimensions	Width 1300 × Depth 1100 × Height 1200 mm
Vacuum Pump Dimensions	800 × 800 × 700 mm
Est. Packed Dimensions	Furnace: 1400×1200×1300 mm; Pump: 900×900×1000 mm
Est. Weight	1.2 T (net) / 1.4 T (packed)
Documents Provided	Overall dimension drawings, circuit diagrams, manuals, maintenance instructions, sensor & controller manuals, certificate of compliance

Company Information

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