



Luoyang Juxing Kiln Co., Ltd.

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## GWDL-VAF Vacuum Atmosphere Furnace Technical Data



Seeking excellence, being pragmatic, honest, prioritizing quality, service, and customers; being down-to-earth and striving for perfection.



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## Technical parameters

The GWDL-VAF series vacuum atmosphere furnace, as shown in the figure, integrates a temperature control system, vacuum furnace chamber, vacuum pump, gas path, and...

The pressure protection, gas flow control, and positive/negative pressure display are integrated into one unit, while the water-cooled unit and furnace body are separate. The furnace lining is made of multi-layer tungsten-molybdenum metal reflectors.

Using tungsten sheets as heating elements, this equipment is a specialized device developed for laboratories in universities, research institutes, and industrial and mining enterprises to sinter, melt, analyze, and produce ceramics, metallurgical, electronic, glass, chemical, mechanical, refractory materials, new material development, special materials, building materials, metals, non-metals, and other compound materials.

The control panel features a touchscreen and PLC intelligent control; intelligent temperature regulation, control of power supply, main heating operation, voltage, current, water pump, vacuum pump, gas flow, positive and negative pressure, electrical contact pressure gauge, and valves, allowing for real-time monitoring of the system's operating status. This product uses reliable integrated circuitry, providing a good working environment and strong anti-interference capabilities. The furnace shell temperature is  $\pm 40^{\circ}\text{C}$  at its highest, significantly improving the working environment. Microcomputer program control with programmable curves enables fully automatic heating/cooling. Temperature control parameters and programs can be modified during operation, offering flexibility, convenience, and simple operation.

**Temperature control accuracy:  $\pm 1^{\circ}\text{C}$  with no overshoot** . Constant temperature accuracy:  $\pm 1^{\circ}\text{C}$ . Fast heating rate, fastest heating rate  $20^{\circ}\text{C}/\text{min}$  ( non-linear ) \*(Here, the host computer screen locks the input value within 1-10 $^{\circ}\text{C}/\text{min}$ , the slave computer retains  $20^{\circ}\text{C}/\text{min}$ , limiting input). \*

Project Category	Parameter content
model	GWDL-VAF
temperature	Long-term operating temperature: 1600 degrees Celsius  Control range: 50 to 1800 degrees  Temperature control accuracy: $\pm 1^{\circ}\text{C}$ (integrated circuit control, no overshoot)  Furnace temperature uniformity: $\pm 2^{\circ}\text{C}$ (depending on the size of the heating chamber)  Temperature sensing element and range: Thermocouple type C, temperature range 0-2300 degrees Celsius.  Heating rate: Freely adjustable; range: fastest heating rate 20 degrees per minute (non-linear), minimum...  Slow heating rate of 1 degree per hour (non-linear) *  High-temperature operation: Temperatures above 1600 degrees Celsius; furnace pressure is maintained by controlling the argon gas flow rate.  Operating at 100-1000Pa to prevent evaporation of the heating element and high-temperature reflector.
furnace	Furnace dimensions (effective thermal zone): 300x200x200 mm (depthxwidthxheight)  Heating element: High-purity tungsten metal sheet (nitrogen gas must not be introduced above 800 degrees Celsius)  Heating element installation location: evenly distributed around the furnace chamber  Thermal insulation: The furnace chamber uses 10 layers of reflective screens (3 layers of tungsten, 2 layers of molybdenum, 2 layers of 310S, and 3 layers of 304).
Furnace body structure	Furnace body: CNC machined, polished, ground, pickled, phosphated, powder coated, and baked at high temperature.  The furnace is aesthetically pleasing and possesses advantages such as oxidation resistance, acid and alkali resistance, corrosion resistance, high temperature resistance, and easy cleaning. The furnace body structure is a 304 stainless steel water-cooled double-layer structure, ensuring a good working environment.  Furnace door opening method: side opening  Furnace shell temperature: For long-term use without shutting down the furnace, the shell temperature should be less than 45 degrees Celsius (with water temperature detection).
Water cooling system	Components: Stainless steel shut-off valve, water inlet, drain tank, digital display water pressure gauge with electrical contacts.  Interfaces: The inlet and outlet are equipped with flange interfaces, which can be directly connected to the user's circulating water system. Protection: The drain pipe has overpressure protection; in the event of a water outage, an audible and visual alarm and interlock device will be activated, and the emergency stop function will be activated simultaneously.  Cooling water.



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	<p>Chiller: 3P</p> <p>Water-cooled components: around the outer casing</p>
Vacuum system	<p>Vacuum pumps: Two-stage direct rotary vane vacuum pump (2X-70), pumping speed 70 l/s + molecular diffusion pump, pumping speed 1500 l/s.</p> <p>400mm caliber.</p> <p>Vacuum gauges: 1 digital display resistance vacuum gauge + 1 digital display ionization vacuum gauge. Ultimate vacuum: <math>6.67 \times 10^{-4}</math> Pa (clean, cold state in an empty furnace). Working vacuum: <math>6.67 \times 10^{-3}</math> Pa (clean, empty furnace). Pressure rise rate (cold state in an empty furnace): <math>\leq 0.66</math> Pa/h (calculated after 24 hours of pressure holding).</p> <p>Pumping rate (<math>1 \times 10^{-3}</math> Pa, under ambient temperature empty furnace, timing with main valve open): <math>\leq 120</math> min</p>
Pressure and air path	<p>Furnace lining steel plate thickness: 6-20 mm, double-sided welded, capable of withstanding positive pressure of 0.1 MPa.</p> <p>Pneumatic valves: Imported stainless steel valves</p> <p>Pressure testing: One positive pressure gauge and one negative pressure gauge with digital display.</p> <p>Gas flow meter: One argon mass flow meter for precise control of gas flow.</p> <p>Exhaust port: 1 electrically controlled exhaust port for air venting</p> <p>Pressure protection: The intake valve is automatically closed upon receiving a signal from a digital display pressure gauge/pressure sensor.</p> <p>Open the exhaust valve and alarm to release pressure; the audible and visual alarm buzzer will then activate.</p>
Atmosphere system	<p>Possible atmospheres: argon, hydrogen</p> <p>The inflation system consists of an inflation shut-off valve, a solenoid valve, and a vacuum digital display pressure gauge. The heating process...</p> <p>Adjustable vacuum</p> <p>Inflation line: Equipped with a 0-50 L/min mass flow meter, capable of measuring...</p> <p>Pneumatic system: Composed of pneumatic valves, solenoid valves, oil-water separators, and pressure gauges; air interface connects to the user...</p> <p>Simply connect the gas source interface.</p>
Electrical control and control system	<p>Control method: Closed-loop technology, thyristor module triggering, phase-shift triggering control method, output voltage/current/</p> <p>The power is continuously adjustable and features constant voltage, constant current, and constant power characteristics.</p> <p>Protection functions: overshoot, over-adjustment, under-adjustment, thermocouple breakage, phase loss, overvoltage, overcurrent, overtemperature, current feedback.</p> <p>Soft start, etc.</p> <p>Control precision: Dual-loop control and protection are employed to ensure the safe and reliable operation of the heating element.</p> <p>Display parameters: Temperature, Segment Number, Segment Time, Remaining Time, Output Power %, Voltage, Current, and Pressure.</p> <p>Force, gas flow rate, vacuum degree, etc.</p> <p>Temperature control: Touchscreen intelligent temperature controller, 50-segment programmable control, supports multi-curve input.</p> <p>Controller: Siemens PLC (S7-1200 main unit + expansion), realizing vacuuming, valve control, and interconnection.</p> <p>Control cabinet with functions such as lock protection, heating logic control, and</p> <p>alarms: Equipped with a touch screen to display the working status, and features fault self-diagnosis, audible and visual alarms, and interlock protection.</p> <p>Temperature controller FP93 (Japanese conductive type), temperature control accuracy <math>\pm 1^\circ</math></p> <p>Recording System: Kunlun Tongtai touchscreen for temperature and vacuum chart recording and programming.</p> <p>Temperature measuring thermocouple: Type C thermocouple, with an armored outer shell to prevent oxidation and carburization.</p>
Power supply and power requirements	<p>Power supply voltage: 380V, 50Hz</p> <p>Design power: 60 KW</p> <p>Total power requirements: 380V, 3-phase, 50Hz, 90 KVA (Equipment power supply consists of two circuits, one of which is...)</p>



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	<p>Power supply: One heating circuit (please specify the size of the two circuit breakers provided by the client, the power of each circuit, and the wire diameter).</p> <p>Water supply: Inlet pressure 0.2~0.3 MPa, inlet temperature ≤32℃, water consumption 3 m³/h.</p> <p>Compressed air: The compressed air pressure required for pneumatic components is 0.4–0.5 MPa.</p> <p>Inert gas: nitrogen or argon, purity 99.99–99.9995%</p>
Safety and Protection	<p>The control system includes overvoltage, overcurrent, overtemperature, and undervoltage protection,</p> <p>as well as alarms and interlocks for water outages, overtemperature, and vacuum pump overload.</p>
Accessories and Documents	<p>Random spare parts: 2 fuses, 1 crucible tong, 1 pair of high-temperature gloves</p> <p>Packing list: 1 electric furnace, 2 fuses, 1 crucible tongs, 1 pair of high-temperature gloves, 1 instruction manual</p> <p>One copy of the certificate of conformity, one copy of the acceptance report (factory inspection report), and one copy of the sales delivery note.</p>
Warranty	<p>Full machine: 1-year free warranty</p> <p>Heating element: Not covered under warranty (free replacement for natural damage within three months).</p>
cable	<p>The supplier shall provide the power supply cable for the equipment. The cable type shall be suitable for the overall capacity of the machine, and the cable length shall be ten meters.</p>



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冷水机配置及技术参数

设备 图片			
基本 配置	名 称	产 地	备 注
	压缩机	松下	
	风机	杭州 顿力	
	蒸发器	温州 瑞速	
	水泵	台州 利欧	
	冷凝器	温州 瑞速	
	干燥过滤器	鸿森	
	膨胀阀	丹佛斯膨胀阀	
	电器	施耐德	
	控制电脑板	邦普	
技术 参数	型号	RSA-U5（风冷式）380V/50HZ	
	制冷量	14.6kw	
		12600kcal/h	
	压缩机	3.75KW	
	蒸发器	盘管式蒸发器	
	冷凝器	铜管套铝翅片	
	水箱容量	100L	
	水泵	功率	0.55
		流量	2.5T
		压力	2KG
冷水出口/进口管 径	DN25		
外型尺寸	1200*635*1180		
性 能 特 点	三相电源保护 压缩机过热保护、高低压保护、电流过载保护、防冻保护		



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Project Name	Touchscreen Function Introduction
Size,	10-inch TFT true color
resolution,	800*480
backlight	led
power,	5W
weight	1Kg
language	You can switch freely between Chinese and English.
Full-screen display and operation	Instrument panel, bar chart, historical trends, data reports, alarm information, data According to export, process flow, system management, etc. (add user login hierarchical management) (The upper computer screen is not visible here.)
Control object	Temperature, pressure, flow rate, liquid level, etc.
Temperature	Touch screen + high-precision integrated module
control starts	Touch operation
heating, pauses	Touch operation
heating, stops heating.	Touch operation
Temperature profile compilation	Touch operation, 30 segments per curve
Temperature curve storage quantity	Unrestricted (each curve can be named in Chinese or Spanish)
Real-time status display	Running curve name, running segment number, segment time, segment running time, number Temperature, real-time curve, 100% power output
Select segment number to start (cross-segment start)	Touch operation
(Dynamic) Curve Range	Adjustable
Historical curve (text and images)	It can be stored for approximately 20 months (the curve includes process gases, vacuum levels, temperature, etc.).
Data Reports (Excel)	Storage lasts approximately 20 months; multiple displays available simultaneously (can be expanded with a USB flash drive). (Data is searchable and exportable)
Historical curves and report records (stored) (Disc) interval time	Adjustable display time from 1 second to 3600 seconds; supports simultaneous display of multiple points (USB flash drive can be inserted for expansion).
Alarm Indication	Color change (red)
Alarm message language	Chinese display (alarm time and event description in Chinese)
Data export interface	USB
Printer interface	parallel port



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Operating the touchscreen and protecting	Password required (operation is prohibited without a password).
the communication	RS485
port screen requirements	Font: Youyuan logo (provided later)

Electrical Component Configuration List

category	Serial Number	Component Name	brand	Remarks/Model
Vacuum system core	1	Molecular Pump	KYKY	FF250/1500, furnace body diameter 400mm
	2	Dry vacuum pump; 3.	Bose	IDSP45/12.5
		Main valve pneumatic baffle valve - stainless steel;	Osko Osko	GCQ-250
	4	Pre-evacuation valve pneumatic baffle valve -	Osko Osko	KF-50
		stainless steel; 5. Bottom valve pneumatic baffle valve	Osko Torch	KF-50
		- stainless steel; 6. High	Star Osko	KF-50
		vacuum vent valve; 7.	Osko	DN250
		Outlet cold trap; 8. Inlet valve pneumatic baffle valve -	Osko Osko	KF-25
		stainless steel; 9. Outlet valve pneumatic baffle valve -	Ruibao	KF-25
		stainless steel; 10. Air breaker valve pneumatic baffle valve - stainless steel.	Beijing Star	KF-25
Vacuum measurement	6	Vacuum gauge		Composite
	7	Digital pressure sensor	Instrument	-0.1Mpa-0.1Moa
	9	Resistance gauge	Ruibao	KF16
	10	Ionization gauge;	Ruibao	KF35
Temperature control	11	Temperature	Japan Shima Electric	FP93
	12	controller thermocouples (three inside the furnace), one K-type measuring device. outer side of the heat shield	Taisho	Type C (How to measure uniformity) (Fault, over-temperature protection)
pneumatics and flow	13	Pneumatic solenoid valve	Yatak	4v210
	14	cylinders	Yatak	SC100-150-S
	15	Gas mass flow controller; 17 Automatic	Seven Stars Huachuang	0-50L, CS200
		pump inlet filling valve; 18 Gas		DCY-80
		source treatment assembly; 19	Airtac	(Gas source, exhaust, accessories)
Low voltage electrical appliances		Molded case circuit breaker; 20 Miniature circuit	Schneider	EZD100E/3P60
		breaker; 21 AC contactor; 22 Thermal	Schneider	ICP65N-DC
		overload relay; 23 Two-	Schneider	LC1D50
		position push-button switch.	Schneider	LRN22N
			Schneider	XB5AK123B1C
	24	Phase loss and phase sequence protection relays	Schneider/Omron RM22TG20	TR32
Control and Automation	25	PLC	Siemens	S7-1200
	26	Touchscreen (HMI) 27	Kunlun Tongtai 10-inch	
		Intermediate Relay	Omron/Schneider RXM2AB2BD+RXZE1M2C	
	28	Electrical Control System	Torch Star	(Including heating power supply and human-machine interface) noodle)
Sensors (Gating) Switch, position detection	29	Sensors (proximity switches, etc.)	Omron	XS618B1MAL2



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wait)				
Heating and power supply				
	30 24V	Switching Power Supply	Wanke	Wago787-1722
	31	DC heating power supply	Yingjie	PSM460X-50V600A-T4/TB
	32	Water-cooled electrodes and	Torch Star	ý20
		lead copper	Luo Copper	/
other		plates/cables 33 Fuse	Torch Star	/
		holders 34 Buzzers, indicator lights	Torch Star	/
	35.	Terminal blocks, cables, wire gauges, etc.		/
	36.	Cooling water inlets		CF50
	37.	Safety valves		DN40 / KF40
	38.	Compensating bellows		DN101

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## Overview of Luoyang Juxing Kiln Co., Ltd.

Luoyang Juxing Kiln Co., Ltd., established in 2008, is located in Luoyang City, Henan Province. It occupies 20 mu in Jianxi Industrial Park and 40 mu in Xin'an Economic and Technological Development Zone. It specializes in heat treatment technology services and the research, development, manufacturing and sales of industrial electric furnaces. It is a member of the China Heat Treatment Industry Association, a provincial specialized and innovative enterprise and a national high-tech enterprise. Our company specializes in the research and development and production of various high-temperature electric furnaces (-100y-2600y). Our products encompass laboratory electric furnaces, vacuum atmosphere furnaces, industrial kilns, medium-frequency induction heating systems, and complete sets of industrial furnace equipment, as well as environmental protection equipment. Our main products include: box furnaces, vacuum atmosphere furnaces, tube furnaces, melting furnaces, lifting furnaces, thermal shock furnaces, hot press furnaces, pit furnaces, fire-testing ash blowing furnaces, tail gas purification furnaces, degreasing furnaces, drying ovens, pusher kilns, bogie furnaces, rotary kilns, bell furnaces, tunnel kilns, roller kilns, mesh belt furnaces, medium-frequency induction furnaces (including those for aluminum and aluminum-based alloys, dual-mode medium-frequency furnaces, series inverter medium-frequency furnaces, those for copper and copper-based alloys, and those for melting magnesium, silicon, and zinc-tin). These furnaces are widely used in new energy, new materials, wafer semiconductors, functional ceramics, photovoltaic power generation, glass and optical fibers, abrasives, machinery manufacturing, military, chemical, and pharmaceutical fields. Our customers are located in advanced materials laboratories, industrial and mining enterprises, universities, and research institutes worldwide. For nearly two decades, we have consistently pursued technological innovation and the highest quality. Currently, the company has obtained ISO9001, ISO45001, and ISO14001 management system certifications, as well as EU CE and SC certifications, and some WPS and WPC certifications. The company has 21 registered trademarks, 29 patent applications, 7 qualification certificates, 27 software copyrights, and 1 copyright. In the future, we will continue to uphold the development philosophy of innovation-driven, lean manufacturing, and customer-centricity, deepen international cooperation, promote technological upgrades, and provide global customers with even better services and products.

