Intelligent High-Power Ultrasonic Welder

DATASHEET

Model：KM-JHN 2050

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K AND M TECHNOLOGIED LTD.
No.1700, South Huangpujiang Road, Kunshan City, Jiangsu Province, China (Area Code:215341)

KM-JHN2050 Ultrasonic Wire Splicing Machine

Model	Rated Voltage (V)	Max. Power (W)	Ultrasonic Frequency (kHz)	Time Accuracy (s)
KM-JHN2050	AC220V 50Hz Single-Phase	**5000**	20KHz	1ms

Welding Parameters

Parameter	Specification
Model	KM-JHN2050
Language Selection	Chinese/English
Control Method	Single-chip
Input Voltage	220V
Maximum Output Power	5000W
Working Frequency	20KHz
Welding Time Range	0.5S-2S
Welding Area Range	Within 15 square mm
Operating Humidity	0-40° C
Working Pressure	0.2-0.8MPa
Ambient Temperature	20-70
Bracket Dimensions	46x15x14cm
Chassis Dimensions	58x18x46cm

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Parameter	Specification
Machine Weight	40KG

Features/Advantages

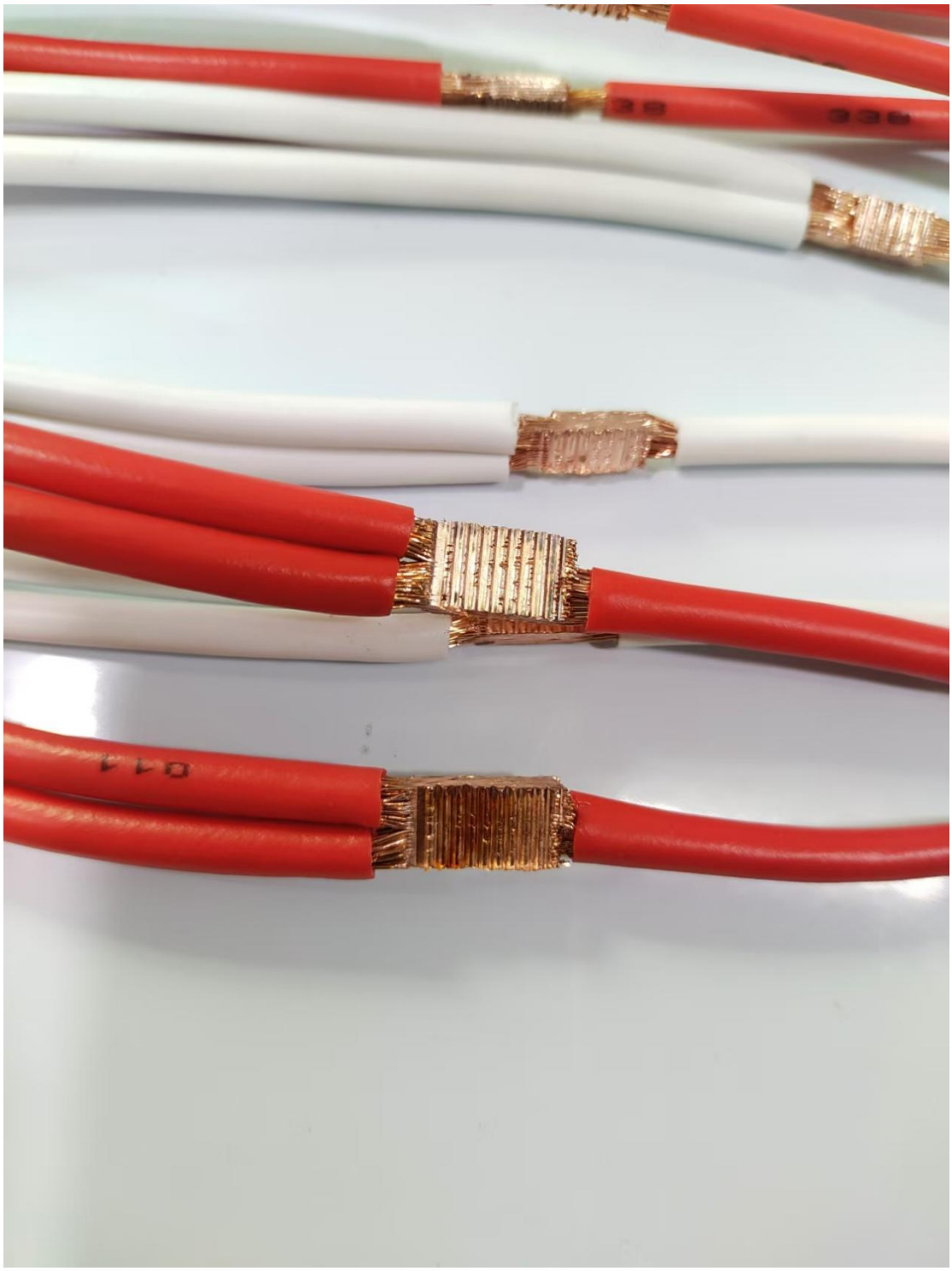
- ✓ Digital circuit, time mode, amplitude adjustable, automatic frequency tracking, intelligent protection, welding head falling, Chinese/English switching.
- ✓ Automatic frequency tracking (truly fully automatic frequency tracking, no need to adjust frequency when changing welding heads).
- ✓ Welding current dynamic indication, with parameters such as usage time, power, and amplitude all displayed.
- ✓ Manual frequency and overcurrent protection adjustable during welding.
- ✓ Precision linear guide rails ensure smooth operation of the equipment and optimal welding accuracy.
- ✓ The power supply maintains stable output during voltage fluctuations.
- ✓ Advantages: Short welding time, high efficiency, fast welding speed, energy-saving. Good electrical conductivity after welding, high strength, zero resistance. No need to add any solder. No spark, no smoke, safe.

ALL Features Below CAN BE ACHIEVED BY the THIS machine:

- ❖ It should be equipped with a high-performance ultrasonic metal spot welding power supply that automatically tracks the frequency of the transducer and offers two control modes: time and energy.
- ❖ Ultrasonic welding imposes minimal requirements on metal surfaces, eliminating the need to scrape off oxide or electroplated layers, while ensuring high welding efficiency and quality.

- The welding material should not melt, its material properties should remain unchanged, and it should produce no pollution.
- It should enable welding between different metal materials, such as nickel + copper, copper + aluminum, nickel + aluminum, etc.

Welding Examples



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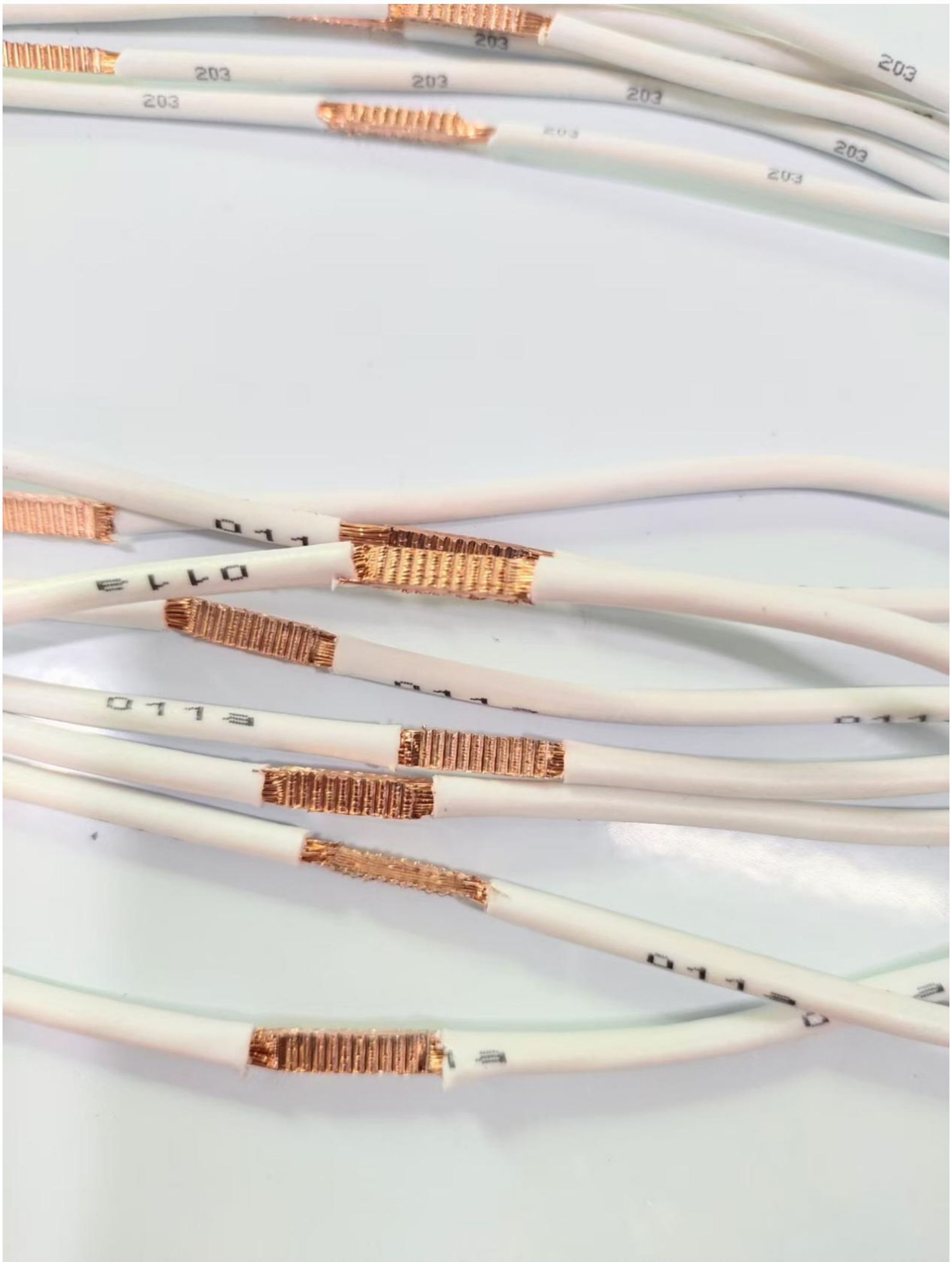
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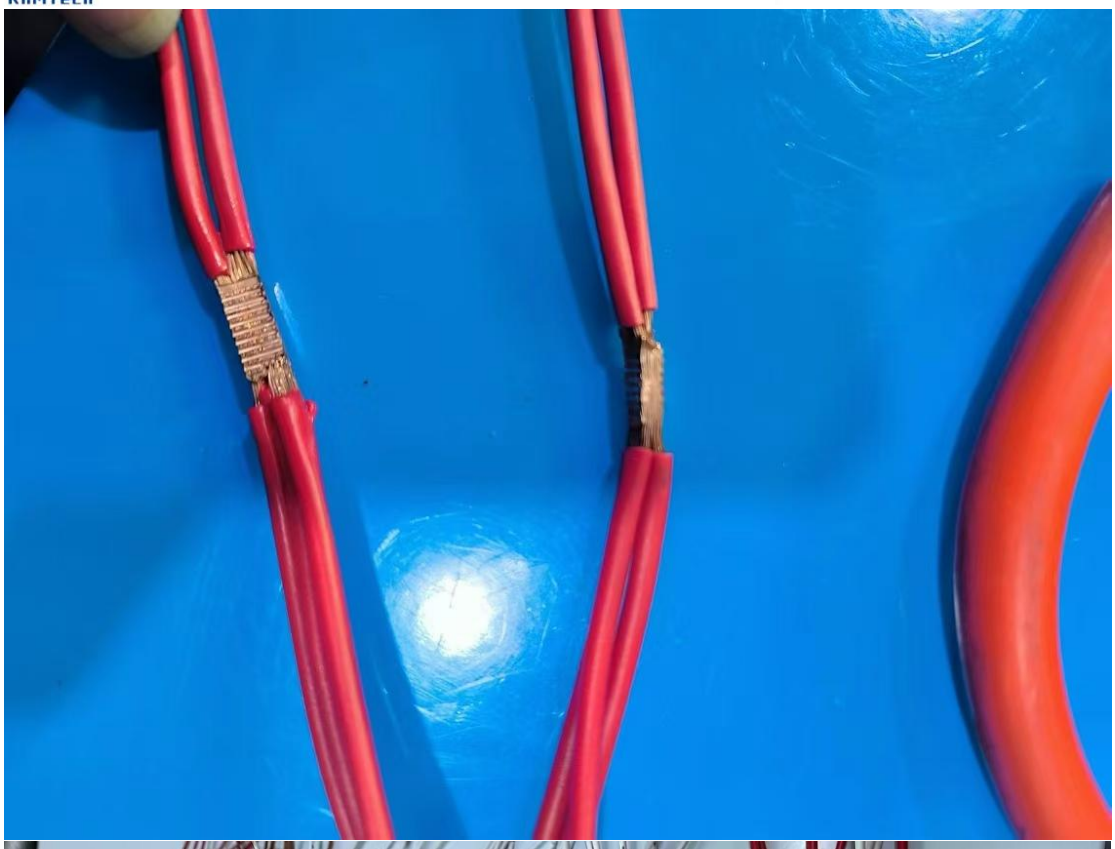

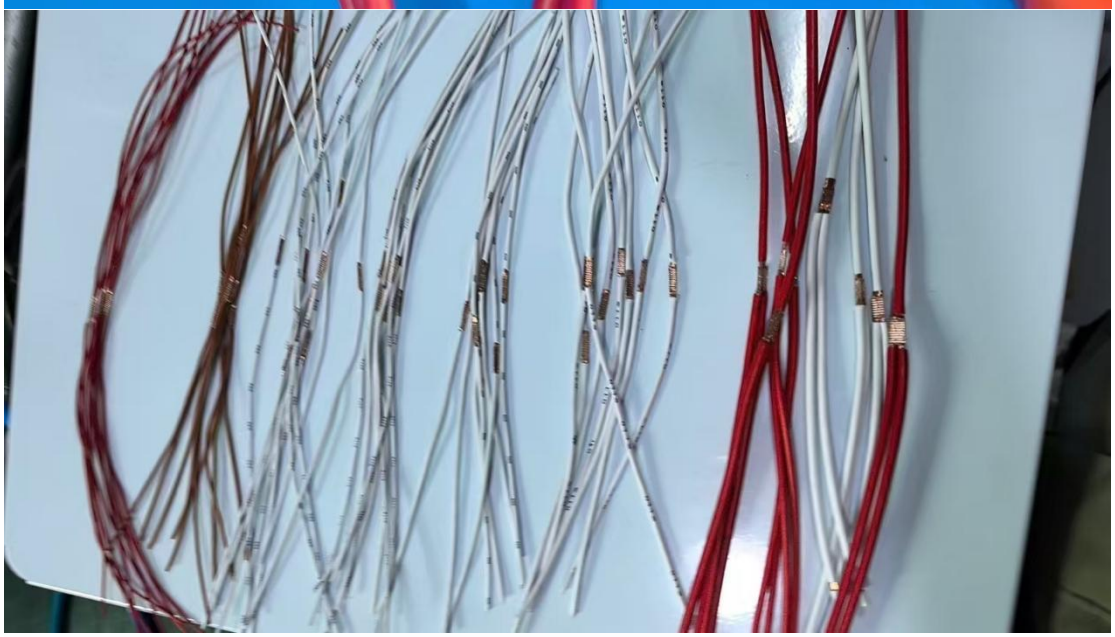

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MES (RS485 External Communication) Communication Technology Protocol

Attribute/Parameter	Description/Value
Communication Device Property	RS485 (1 RS485 port) Chassis 9-pin Female Port
Communication Protocol	Modbus-RTU (note: "RS458" may be a typo, typically it's RS485)
Communication Baud Rate	19200
Data Bit Length	8 bits
Stop Bit Length	1 bit
Data Checksum Method	No checksum

MODBUS Address	Data Represented	Unit	Function Meaning	Data Type
4x00	Wave Emission Status	/	1: Wave is being emitted, 0: No wave is being emitted	16-bit Positive Integer
4x01	Current Frequency	Hz (Hertz)	None	16-bit Positive Integer
4x02	Current Amplitude	% (Percentage)	10~100%	16-bit Positive Integer
4x03	Wave Emission Duration	ms (Milliseconds)	Duration of the current welding session	16-bit Positive Integer
4x04	Maximum Power	W (Watts)	Maximum power during the current welding session	16-bit Positive Integer
4x05	Total Energy	J (Joules)	Total energy consumed	16-bit Positive

MODBUS Address	Data Represented	Unit	Function Meaning	Data Type
			during the current welding session	Integer
4x06	Current Machine Status	/	See Attachment 1	16-bit Positive Integer
4x07 ~ 4x08	Welding Count	PCS	Increments by 1 for each welding session	32-bit Positive Integer
4x09 ~ 4x10	QC Function	/	Off: QC quality monitoring is off, Pass: The current welding session is qualified, Fail: The current welding session is unqualified	2 Chinese Characters

KM-JHN2050 Intelligent Series

The KM-JHN2050 Intelligent Series is another masterpiece meticulously developed by our company over a decade from 2012 to 2022. It features a high-performance anti-interference microprocessor, enabling electronic control. All welding parameters are managed by a microcomputer, and the intelligent frequency control system eliminates the inconvenience of manual frequency adjustment. The machine automatically detects ultrasonic overload, tracks the optimal resonance point in real-time, maintains the lowest temperature of the vibration system, and adjusts frequency changes caused by the temperature rise of the welding head, ensuring more stable operation.

1.1.1 Working Principle

When ultrasonic waves act on the metal contact surface, they generate tens of thousands of high-frequency vibrations per second. These vibrations, with a certain amplitude, transmit ultrasonic energy to the welding area through the upper welding part. Due to the high acoustic resistance at the welding interface, localized high temperatures are generated. Since metals have poor thermal conductivity, the heat accumulates in the welding area, causing the contact surfaces of the two metals to melt rapidly. Under applied pressure, the metals fuse together. After the ultrasonic waves stop, the pressure is maintained for a few

seconds to allow solidification, forming a strong molecular chain and achieving the welding purpose. The welding strength is close to that of the raw material. The quality of ultrasonic metal welding depends on three factors: the amplitude of the transducer welding head, the applied pressure, and the welding time. The welding time and pressure are adjustable, while the amplitude is determined by the transducer and booster. These three factors interact to reach an optimal value. Excessive energy causes excessive metal melting and deformation, while insufficient energy results in poor welding. The applied pressure must also be optimal, calculated as the product of the welding edge length and the optimal pressure per 1mm.

1.1.2 Generator Features

(1) **High Stability:** Fully digital integrated circuit with high-performance anti-interference processors imported from the USA. Reduced component count and simplified hardware structure enhance reliability and stability.
(2) **Automatic Frequency Tracking:** Combines digital frequency synthesis with digital phase-locked loop frequency tracking to eliminate the drawbacks of traditional analog regulators, such as temperature, static load, processing area, and tool wear. This allows easy parameter adjustment and implementation of new control strategies.
(3) **High Power Output:** Utilizes IGBT power modules and separate excitation oscillation circuits, delivering 1.5 times the output power of traditional self-excited circuits.
(4) **Amplitude Stepless Adjustment:** Amplitude can be instantly increased or decreased during adjustment, preventing issues like burn-through or scorching. Suitable for automated applications, the amplitude range is 10% – 100%.

(5) **Intelligent Protection and Fault Alarm:** Includes overcurrent protection, frequency deviation protection, and total output overload protection. The generator stops immediately upon detecting a fault and displays the cause for quick troubleshooting.

(6) **Closed-Loop Amplitude Control:** Maintains constant amplitude output regardless of input voltage or load fluctuations.

(7) **Multiple Welding Modes:** Ensures higher precision, wider applicability, and better welding results.

1.1.3 Ultrasonic Generator

The ultrasonic generator consists of a generator module, a system controller, and a user interface. The generator module converts 50Hz/60Hz AC power into 20kHz electrical energy, while the system controller manages the welding process.

1.1.4 Acoustic System (Vibration System)

Comprising the transducer, booster, and welding mold (welding tool head), the acoustic system is the energy-receiving device for ultrasonic signals. The surface temperature of the transducer, booster, and molds should remain within 10° C – 50° C. If it exceeds 50° C, cooling or stopping is required. The connection surfaces between the booster and mold must be clean, flat, and tightly fastened to avoid energy loss. Damaged or uneven surfaces should not be used, and all connections must be securely tightened.

Table 1.3	Front Panel Display of Ultrasonic Generator
Serial Number	Name
1	Human-Machine Interaction Screen
2	Power Switch
3	Emergency Stop

Serial Number	Name	Function
1	RS485 Interface	RS485 communication interface. (Connect to the exter RS485 communication interface)
2	Start Signal Interface	Input signal for controlling startup. (Connect to the foc switch)
3	USB Data Transmission	Export welding historical data.
4	Expansion Interface	Expand according to customer requirements, and the external control screen is the default.
5	Machine Head Signal Interface	Solenoid valve signal required by the machine head. (Connect to the machine head)
6	Transducer Interface	WS20 - 2 interface, used for the RF cable, providing ultrasonic energy for the transducer.
7	Fuse Holder	Prevent over - load and short - circuit, and protect the safety of the circuit. (30A - 6x30*2)
8	Power Input Interface	Detachable connector plug, used to connect the input power.

Accessories	Qty (PCS)
Treadle/Foot Switch	1
Ultrasonic Horn/Mold (Standard Version)	1
Ultrasonic Horn/Mold (Customized Version)	2
Phillips Screwdriver	1
Adjustable Wrench	1
Hex Wrench Set	1
Ultrasonic Output Cable	1
Control Cable	1
Power cord	1
Compressed air hose	1
Accessories Total Net Weight (kg)	2.72

Physical photograph (taken on April 2025.) of the machine for reference :

Front View of the - Ultrasonic Metal Wire Splicer - Model:KM-JHN2050

Top View of the - Ultrasonic Metal Wire Splicer - Model:KM-JHN2050

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Back View of the - Ultrasonic Metal Wire Splicer - Model:KM-JHN2050

Accessories

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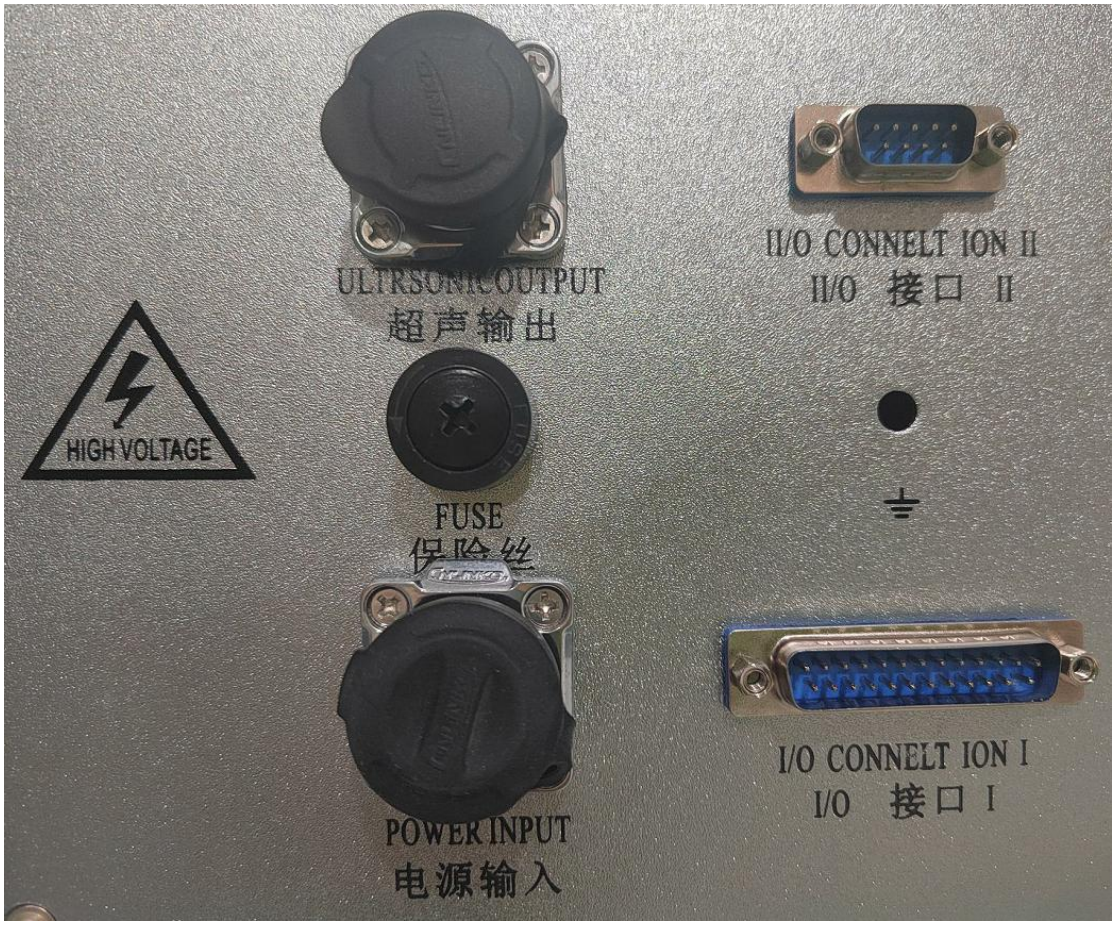
Front Panel of the Ultrasonic Generator



Detailed Back View of the Ultrasonic Generator

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Top View for Ultrasonic Horn of Wire Splicer

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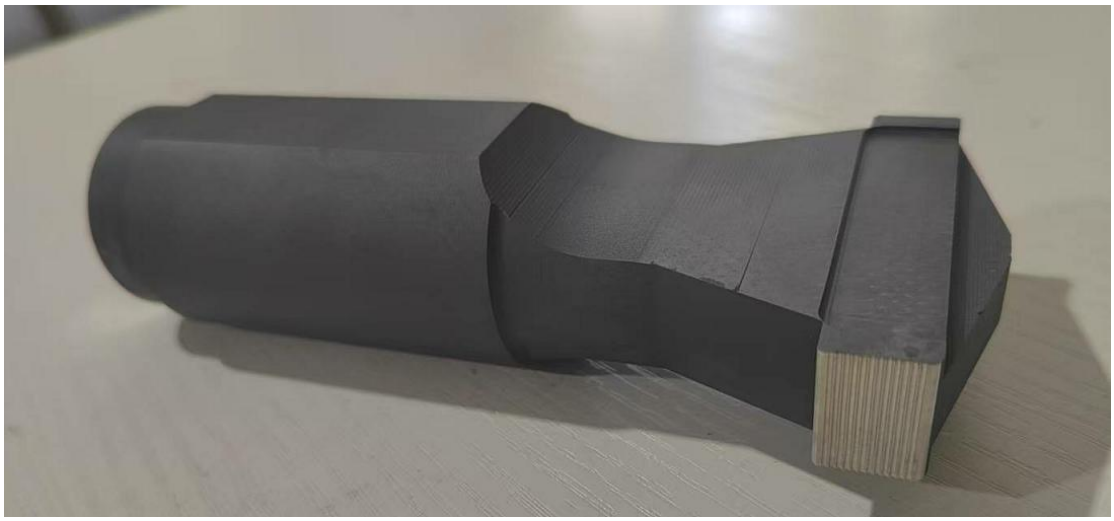
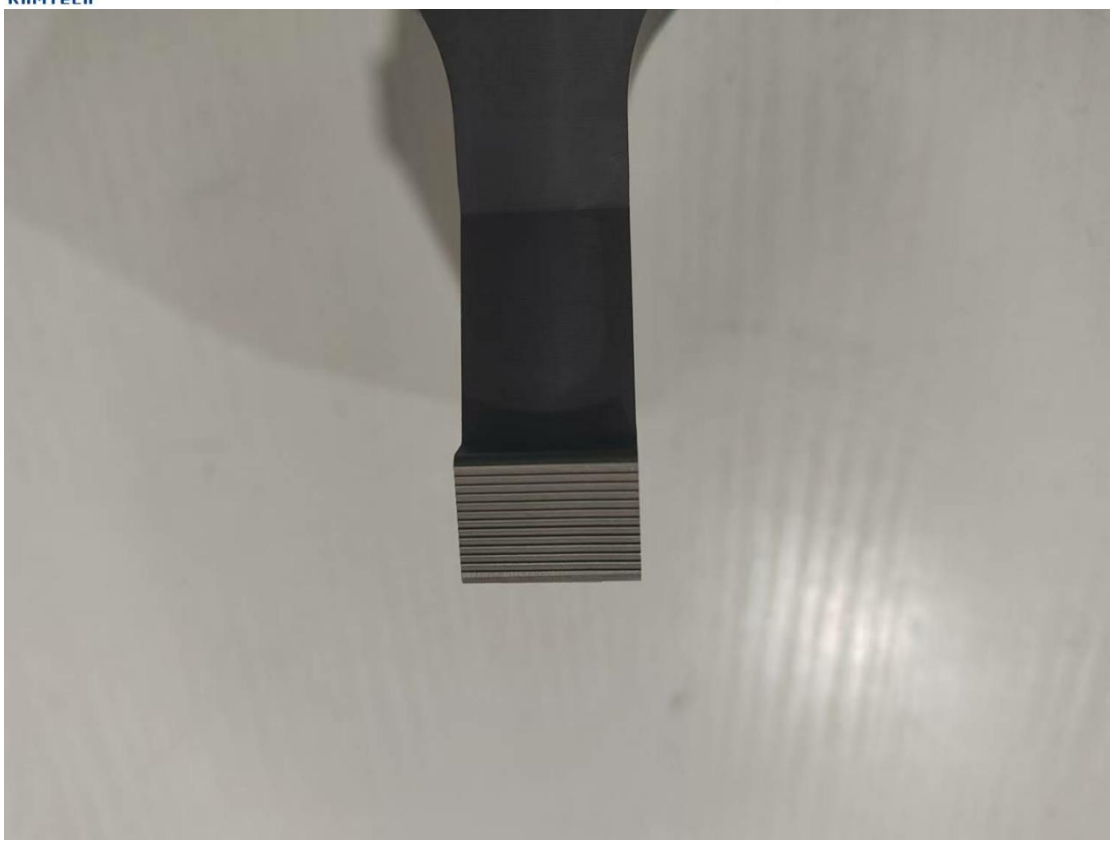
Comparison diagram of Ultrasonic Horn size versus hand



Detailed View of Ultrasonic Horn Teeth Pattern (for thin wire)




超声波金属线束焊接机CE
ULTRASONIC METAL WIRE SPLICER
型号 Model
KM-JHN2042
超声频率 US Frequency
20Khz
超声输出功率 US Output Power
4200W
额定电压 Rated Voltage
220V
额定电流 Rated Current
11-12A
气源压力 Air Pressure
0.2-0.6Mpa
设备重量(KG) Net Weight
40
设备尺寸(mm) Overall Size
L570*W460*H400
K&M Technologies Ltd.
Add: No.1700, South Huangpujiang Road, Qiandeng Town, 215341,
Kunshan, Suzhou City, China; Website: www.knmsonic.com

CE Certificate of - Ultrasonic Metal Wire Splicer - Model:KM-JHN20Series

ORIGINAL

1. Exporter
K&M TECHNOLOGIES LTD.
ADD: SHANGHAI PUDONG NEW AREA DISTRICT, NANZHANG LU NO .8, BUILDING NO.3, ROOM114 CHINA

Certificate No. C243324211270003

CERTIFICATE OF ORIGIN
OF
THE PEOPLE' S REPUBLIC OF CHINA

2. Consignee
Due to confidentiality considerations for protecting customer information, it cannot be displayed.

3. Means of transport and route
FROM SHANGHAI CHINA TO CALIFORNIA, UNITED STATES (OF-AMERICA) BY AIR

5. For certifying authority use only
ISSUED RETROSPECTIVELY

4. Country / region of destination
UNITED STATES

Verification:origin.customs.gov.cn

6. Marks and numbers	7. Number and kind of packages; description of goods	8. H.S.Code	9. Quantity	10. Number and date of invoices
	ULTRASONIC GENERATOR MODEL, KM-JHN-2042G TOTAL, 1 PAPER PACKAGE (STAINLESS STEEL, THE OUTPUT OF ULTRASONIC WAVES BY ULTRASONIC METHOD)	85.15	13.91KG N.W.	KNM20241115 MT-F56424 NOV. 29, 2024
	ULTRASONIC METAL WIRE SPLICER PAPER BOX 1 PCS APPLICATION FOR WELDING THE FOLLOWING METAL MATERIALS BARE & TINNED COPPERSPECIFICATIONRANGE FROM 18AWG (COMPOSED OF 16 FINE STRANDS WITH A DIAMETER OF 0.254MM) TO 4AWG (COMPOSED OF 133 FINE STRANDS WITH A DIAMETER OF 0.44MM)	84.68	23.23KG N.W.	
	(STAINLESS STEEL, USE WITH ULTRASONIC METAL WELDING MACHINES)QTY, 1 PCS	84.33	0.5KG N.W.	
	(COPPER AND RUBBER, USE WITH ULTRASONIC METAL WELDING MACHINES) QTY, 3 PCS	85.44	0.4KG N.W.	
	*** *** *** *** ***			
FROM KNMTECH Producer, K AND M TECHNOLOGIES LTD.				

11. Declaration by the exporter
The undersigned hereby declares that the above details and statements are correct, that all the goods were produced in China and that they comply with the Rules of Origin of the People's Republic of China.

Shanghai, China, DEC. 19, 2024

Place and date, signature and stamp of authorized signatory

12. Certification
It is hereby certified that the declaration by the exporter is correct.

SHANGHAI CUSTOMS 中华人民共和国 上海 ORIGIN 海关 THE PEOPLE'S REPUBLIC OF CHINA

2422000582093

Shanghai, China, DEC. 19, 2024

Place and date, signature and stamp of certifying authority

CO Certificate of - Ultrasonic Metal Wire Splicer - Model:KM-JHN2050

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