

W5 Optical Emission Spectrometers (Arc/Spark-OES)

The 4th Generation High Performance Metal Analyzer



I. Specification

CMOS -based, spark discharge, metal detection

Ultra-low limits of detection

High integration, reliability, stability

Energy saving 50%, material saving

Low operating cost

Small size, light weight, easy to move and install

Multi-substrate upgrade easy, without changes to increase the hardware

II. Summary

W5 Optical Emission Spectrometer bring in the advanced technology from the USA. It is the 4th generation Arc/Spark-OES with high performance lowing operating cost for metal analysis and this is the latest research and development of detection equipment. The overall optical design has been enhanced, and with improvements of CMOS technology used to further improve the performance of the W5 while retaining the major benefit of earlier units. The CMOS spectrometer is not only contain the full spectrum characteristics of CCD spectrometer but also the extremely low detection limit for non-metallic elements such as C, S, P, B, As, N etc. The operation is simple and easy to learn. The test result is stable and accuracy. It is a good choice of all common metals for incoming and outgoing product quality control.

III. Applications

W5 Optical Emission Spectrometer(spark OES) is used for applications in metal elemental analysis, trace element analysis for science and industry like Metallurgy, Foundry, Mechanical Engineering, Scientific Research, Product Inspection, Automobile, Petrochemical Engineering, Shipbuilding, Electrics, Aerospace, Nuclear Power, Metallic and Nonferrous Metallic Smelting, Processing and Recycling. It is including full element analysis range, but at same time the element analysis amount can be bespoke.

Detection Matrices:

Iron(Fe) and its alloys

Aluminium(Al) and its alloys

Copper(Cu) and its alloys

Nickel(Ni) and its alloys

Cobalt(Co) and its alloys

Magnesium(Mg) and its alloys

Titanium(Ti) and its alloys

Zinc(Zn) and its alloys

Lead(Pb) and its alloys

Tin(Sn) and its alloys

Argentum(Ag) and its alloys

Manganese(Mn) and its alloys

Chromium(Cr) and its alloys

Small sample, special size sample and wire detection

IV. Parameter

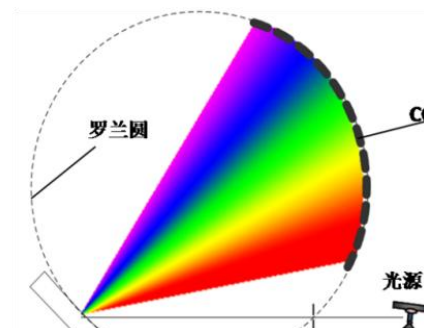
Item	Index
Optical system	
Optical structure	The Paschen Runge construction full vacuum type optics system
Room temperature	35℃±0.5℃
Wavelength range	130-800nm
Focal length	400mm
Grating line	2400m1/mm
First order spectral line dispersion rare	1.2nm/mm
Detector	Multi block high performance linear CMOS array
Average resolution ratio	10pm/pixel
Excitation table	
Gas	Rushing argon(99.999%)

Argon flow rate	When excited: 3-5L/min Standby time: no need for standby traffic
Electrode	Tungsten electrode technology
Purge	Automatic purge function
Make up	Thermal deformation self-compensation design
Analyze the gap	Sample stage:3.4 mm
Excitation light	
Type	HEPS
Frequency	100-1000HZ
Discharge current	1-400A
Special technology	Optimization of discharge parameters design
Pre -combustion	High-energy pre-combustion technology
Processor	High end ARM, high-speed data synchronization acquisition and processing
Data collection system	
Interface	Ethernet data transmission based on DM9000A
Power	220VAC 50/60Hz(Customized)
Others	
Base	Fe, Cu, Al, Ni, Co, Mg, Ti, Zn, Pb, Sn, Ag, Mn, Cr etc
Power consumption	Maximum:750W standby:40W
Working temperature	10-35℃ (temperature ≥5℃)
Working humidity	20-85%
Dimension	860mm(L)*680mm(W)*438mm(H)
Weight	About 100Kg

V. Main features of the apparatus

1. Superior Performance Optical System

- ① Paschen-Runge Structure has concave grating and full spectrum coverage, it can be satisfied with customers demand for elements.
- ② The direct optical technology and optical devices are made of MgF, to guarantee the best performance in the UV region.
- ③ High resolution of Multi-COMS read-out system, lower dark current, better detection limit, higher stability and stronger sensitivity.
- ④ The optical system adopts vacuum constant temperature light room, it can realize that light path through, to eliminate optical path loss, to improve test limit, and the results of test is more accurate, its reproducibility and long-term is perfect.



2. Intelligent Digital Excitation Light Source

- ① Fully digital intelligent composite light source DDD technology can have superior analytical performance.
- ② The compact design and semiconductor control technology, and make light source have better stability and stronger reliability.
- ② HEPS can excite parameter adjustment and fully satisfied different matrix, different samples and the demand of analytical elements.



3. Intelligent Sample Inspire Stand

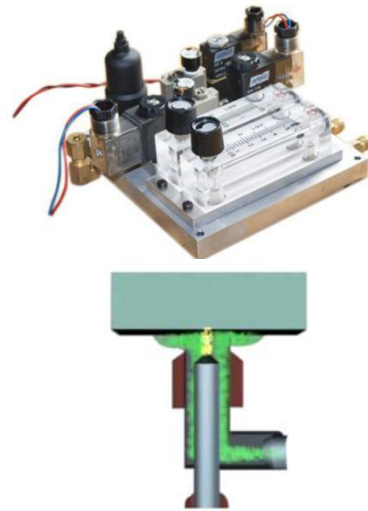
- ① The excitation station can lead laser into the optical system directly.
- ② The open electrode frame design, it can adjust sample folder so as to analyze all kinds of shapes and sizes.
- ③ To transform electrode can have the better performance for small samples and analysis of complex geometry samples.
- ④ Video recognition technology can ensure the safety of sample excitation station and can monitor the panoramic view of sample station.





4. Intelligent Integrated Gas Channel Block

- ① The design of intelligent argon flow and the detection of dust collection.
- ② The special argon injection technology has effectively eliminate excitation process plasma drift and can ensure CMOS detector to observe the high temperature light signal and to improve its accuracy and stability.
- ③ After excitation, the pulsed argon purge improves the effective of dust removal, so it can improve the instrument's short-term and long-term stability.



5. Intelligent Vacuum Measurement and Control

- ① The vacuum system is program control completely, while ensuring the vacuum to reduce vacuum pump running time.
- ② Two-level setting, under the circumstance of the instrument is not running, the instrument needs to open the standby of vacuum operation status.
- ③ Multi-level vacuum isolation measurements and increasing the oil filter device, and it can keep the optical components working in reliable environment.



6. Leans Cleaning Device

- ① The stainless steel vacuum valve has a better isolation effect in cleaning the lens.
- ② The design of single lens can easily disassemble.
- ③ Cross mechanism device can protect optical system effectively under the circumstance of no quarantine.



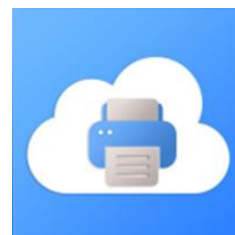
7. Computer and Read-out System

- ① The computer and cellular phone (PAD) can display synchronously, it is easy to operate for panel.
- ② High-performance DSP and ARM processor, it has high speed data collection and control function. And it can detect the model of room temperature, vacuum temperature, argon pressure, light source's conditions.
- ③ The anti-jamming performance is better, the external computer upgrade is related to configuration of instrument, so the instrument has a better applicability.
- ④ The data can remote transformation to realize network and it is convenient to monitor and control for the instrument operating status.





⑤ And the results can have real-time monitoring and the function of printing reports can customize for the users. Meanwhile the data can use cloud print.



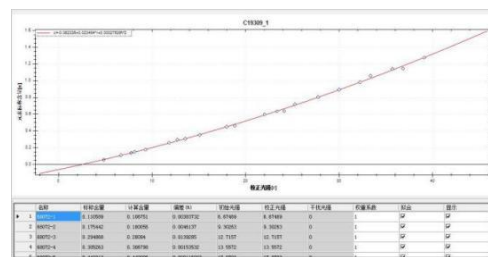
8. Friendly Analysis Software

① The dedicated spectrum software meets international spectrometer production standards, the operation interface has user-friendly design and function standardization.

② The software in the instrument has equipped with multiple factory calibration curves and many material analysis methods and advanced solutions.

③ According to users' material requirements, the staff members can extend upper limit and lower limit of the standard curves on site.

④ The working curve adopts international sample, it was pre-made the working curve, according to its needs to extend the range, every curve is made of more 10 samples to generate and automatically eliminate interference.



9. Other features

① It can detect elements including that C, P, S, N and it is suitable for a variety of metal base. Such as iron-based, aluminum base, copper base, nickel base, chromium base, titanium base, magnesium base, zinc base, Tin base, lead-based, cobalt base, silver base and manganese-based and so on. Full spectrum technology covers the whole range of elemental analysis, the customers can choose channel elements by themselves.

② The design of argon gas circuit is reasonable, it makes argon washing's time is shorten when the sample excitation. In order to save argon for customers, this kind of design is very reasonable.

③ The construction of light room, it makes vacuum room's volume small, the rate of vacuum arrives half of the normal spectrometer's. Its optical path automatically calibrated and optical system automatically goes on line scan, it ensures that receiving is right and to eliminate complex the crest scan job. The instrument can automatically identify specific lines and compare with the old one, it can ensure the drift position and to find out the analysis line's present location of pixel.

④ The rate of analysis is fast, all elements in the channel can be tested within 20s. According to different analysis materials, the instrument can get better analysis results in short time by setting the pre-burn time and marking line.

⑤ Solid absorption trap can prevent oil and gas from polluting the light chamber and improve its stability.

⑥ It adopts tungsten material electrode, it makes electrode longer life, the electrode has the purge function automatically, it is easier to clean up the electrode.

⑦ Standardized parameter modification.

⑧ Control sample correction function.

⑨ The core device are all original imported, in order to promise the products' quality.

VI. Core Components

No.	Product	Brand	Place of origin	Warranty period
1	Grating	Zeiss	Germany	15 years
2	Linear array CMOS	Hamamatsu	Japan	8 years
3	Optical lens	Zeiss	Germany	8 years
4	Optical fiber	Zeiss	Germany	8 years
5	Slit	lenoxlaser	America	10 years
6	Digital light source		JINYIBO	3 years
7	Regulating valve	Burkert	Germany	10 years
8	Vacuum pump		China	2 years
9	Optical fiber	Agilent	America	1 years
10	Filter	TDK	Japan	2 years
11	Pressure sensor	SSI	Canada	2 years
12	Magnetic valve	Burkert	Germany	2 years
13	CMOS acquisition module		JINYIBO	1 years
14	Control module		JINYIBO	1 years
15	Integrated circuit board		JINYIBO	1 years
16	Excitation table module		JINYIBO	2 years
17	Spectral analysis software		JINYIBO	permanent
18	Standard sample		China or Import	

VII. Configuration list

1 Supply list

Part No.	Item	Specifications	Unit	QTY	Manufacturer	Remarks
	Optical Emission Spectrometer Host					
9515001	Spectrometer host	W5	Set	1	JYB	
9515004	Commercial computer	Mainstream configuration	Set	1		
9515005	Printer	Mainstream configuration	Set	1		
	Optical Emission Spectrometer Standard Accessories					
9515006	Vacuum pump	VRB-8	Set	1		Vacuum Model
9515008	Cutting ferrule	KF25	Set	3		
9515057	Cutting ferrule	KF16	Set	2		
9515009	Vacuum connecting pipe	Φ 19-25	Pc	1		
9515010	Vacuum pressure valve	GYC-JQ25	Pc	1		
9515058	Vacuum baffle valve		Pc	1		
9515082	Filter		Pc	1	JYB	
9515020	Three core power cord		Pc	1		
9515115	Flue gas leading		Pc	1		
9515011	Gas bottle	Filter bottle 2 and accessories	Set	1		
9515016	Argon gas pressure reducing valve	YQY-12	Set	1		
9515017	Quick connector	M10*1M internal thread Φ 6	Set	1		Pressure reducing valve
9515018	Argon gas pipeline		Pc	2		
9515019	Network interface cable		Pc	1		
9515020	Host power supply cord	1. 5m	Pc	1		
	Optical Emission Spectrometer of user information					
9515023	Software CD		Set	1	JYB	
9515024	User manual		Pc	1	JYB	
9515025	Certificate of quality		Pc	1		
9515026	Quality policy		Pc	1		
9515027	Installation acceptance report		Pc	1		
	Linear of optical emission spectrometer (according to user needs configuration linear and high and low sample)					

**JINYIBO INSTRUMENT**

Precise Instruments, Perfect Experience

	Spare parts and tools (see the list)					

2 Spare parts and tools list

Spare parts and tools list						
Part No.	Item	Specifications	Unit	QTY	Manufacturer	Remarks
9515028	Tungsten electrode	Φ 6	Pc	1	JYB	
9515029	Electrode pressure spring		Pc	1	JYB	
9515030	The electrode fixed screw	tighten the screws Φ 3	Pc	2		
9515031	Electrode brush		Pc	2	JYB	
9515033	Lens holder sealing ring	Inner diameter Φ16x2.65	Pc	2		
9515037	Spark machine cover sealing ring	inner diameter ΦΦ72 (Φ71) x2.65	Pc	1		
9515038	Exhaust gas filter core		Pc	1		
9515110	Degreasing cotton		Set	1		
9515008	Cutting ferrule	KF25	Pc	1		Vacuum Model
9515057	Cutting ferrule	KF16	Pc	1		
9515040	Power socket	national standard	Pc	1		
9515111	Internal hexagonal wrench		Set	1		
9515112	Long handle phillips screwdriver		Pc	1		
9515113	12-14 fixed wrench		Pc	2		
9515114	Spark machine screw	M6	Pc	4		
9515116	Fuse	10A	Pc	2		Vacuum Model
9515117	Fuse	5A	Pc	2		

Notes:1. Due to technological progress, product upgrading, market changes and other reasons the instrument parts, spare parts production and supplier change, with the actual delivery shall prevail.

2 This configuration is suitable for Vacuum-type models, for example, Non-vacuum type models, "Vacuum" in the notes The above parts are out of range.

VIII. Laboratory environment

1 Environmental Requirements

Instrument shall be placed in a dedicated laboratory, indoor area larger than 10 square meters, and to ensure that surrounding non hazardous, flammable and corrosive gases. Caution: Do not use this instrument placed in the chemical analysis laboratory.

Working temperature: 10°C ~ 30°C, within 3 hours at room temperature fluctuation is less than 2°C, requires laboratory installation of air conditioning.

Storage temperature: 0°C ~ 45°C

Relative Humidity: 20% to 80%, for wet areas, to be equipped with a dehumidification machine.

W5 optical emission spectrometer spectral chamber mounted in the housing having a temperature control device, can work in such an environment range, if beyond the scope of these requirements, service life and measurement accuracy of the instrument will be affected.

2 Power Requirements

1) Power supply: single-phase 220 ± 20V, 1KVA power supply.

In order to ensure W5 optical emission spectrometer normal use, please for the instrument is equipped with a 1kVA single-phase 220V AC voltage regulator parameters.

2) W5 optical emission spectrometer with protective grounding single-phase power. To ensure reliable instrument, the user must ensure the grid PE protected well grounded and separate from other protected areas of large equipment. If you can't guarantee that PE is well grounded, please prepare a ground instrument separately for grounding resistance of less than 4Ω.

3 Argon requirements

1) Argon purity ≥ 99.999%, oxygen ≤ 2ppm, including the amount of H₂O ≤ 5ppm, (argon gas cylinders can't open storage, non-rain). If there is no purity argon gas, argon gas purifier is recommended.

2) The use of argon gas flow rate: standby flow rate of about 0.1L/min, maintaining the flow of about (0.4-0.5) L/min, to stimulate the flow of about 3.5L/min.

3) Argon pressure control: 0.5Mpa.

4 Argon connection pipe

You must use special argon supplied brass connection.

5 Row of cylinders

Instrument exhaust gas through a 14mm diameter PVC reinforced pipe routed supplied filter bottle. Exhaust bottle should be cleaned in time to prevent poor gas replacement.

6 Sample Preparation

Non-ferrous metal samples for aluminum, copper, etc. must use special lathe sample preparation. For iron-based samples must use special sample preparation grinding prototype, a prototype mill and a floor-grinding machine for grinding steel sample surface. White cast iron samples must be uniform.

Users need a cutting machine for processing shape suitable for spectrometric analysis of samples. Samples to be analyzed must be uniform, no holes, no casting defects, preparation must achieve a smooth surface, no oxide layer, no oil, no burr edge of the sample.

7 Standard sample request

W5 optical emission spectrometer factory will be bundled with a spectral calibration standards for the overall spectral calibration instrument drift. In addition, users need to prepare for their own internal control standard sample or sample product type, for correcting the instrumental analysis curve.

8 PC and printer requirements

Prepare a general configuration of the current PC (notebooks and desktops can be), requires more than 1GB memory, CPU dual-core 1.8G Hz or more, for the installation W5 optical emission spectrometer analysis software.

Prepare a printer, laser, inkjet or dot matrix printer can be used to analyze the data to print the report.

IX. Installation and commissioning

1 Delivery check and storage

After the buyer receives the goods, you should check the packaging is intact. As packaging is damaged or corrupted optical emission spectrometer, the user should keep relevant evidence and promptly notify the seller, with the seller to the responsible party claim. Otherwise, assume

self-destruction of the goods by the buyer.

After the equipment arrived at the buyer, the buyer should be placed in the instrument temperature $0^{\circ}\text{C} \sim 45^{\circ}\text{C}$, humidity 20% to 80% of the indoor environment in custody. Before installing the engineer does not arrive, the buyer can not be allowed out of the box, otherwise regarded as acceptance of goods.

2 Installation and commissioning

Instruments arrive within a month, the buyer should have the installation conditions and notify the seller installed.

After installation engineers arrived, along with the packing list one by one to check received by both parties, representatives of both parties to fill the packing list in duplicate entries in acceptance based on test results and signed. If missing parts on the acceptance of a single note by the installation engineer and immediately notify the seller sent it to us.

Instruments arrive within two months the buyer still have installation conditions, or cause damage to the instrument in custody, the seller is entitled to require the buyer to pay the additional installation costs, all costs for equipment damage caused by the formation of custody shall be borne by the buyer. The buyer will bear the seller engineer round airfares and local accommodation.

3 Installation steps:

Engineer to the site according to the instrument installation procedures for installation, commissioning.

Test sample selection:

- 1) According to the buyer's analysis of the content of the sample, the seller and the buyer to jointly negotiate to determine, select a set of suitable for the user's daily analysis of the standard sample (the set of the buyer to provide or negotiate with the seller purchasing), as the instrument of acceptance. The standard sample selection principle should be based on the principle of the content of the daily production of the buyer.

- 2) Test:

After the instrument, the instrument temperature, pressure and argon atmosphere after the instrument to meet the requirements of the instrument, by the seller and the installation

engineer with a set of pre - determined, the establishment of the instrument, and then the two sides agreed to take a sample of the standard sample (usually not containing high and low standard sample) for precision testing. General provision of 4~6 points (excluding abnormal excitation) of data to calculate the standard deviation (SD) value or relative standard deviation (RSD) value.

3) Precision calculation formula:

$$\text{The relative standard deviation (RSD)} = \frac{\text{standard deviation (SD)}}{\text{The average content (AVG)}} \times 100\%$$

$$(SD) = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n-1}}$$

AVG — n times the average measured value

X. After-sales and other

1 Random Technical Documentation and Software

Driver and application software installation CD

User Manual

Routine maintenance Leaflet

2 Training

Installation engineers on site installation and commissioning process, the buyer should organize relevant use and maintenance responsibility to accept on-site training, the training time is generally not more than three days. Through training, making personnel a better understanding spectroscopy related technologies, skillfully equipment operation and maintenance.

The seller will occasionally hold free and fee-based technical training courses. Training Notice will be sent to the hands of users in a timely manner, the user can decide whether to send personnel to participate according to their own circumstances.

3 Service

1、The warranty period is calculated as follows:

1) The instrument warranty subject to terms of the contract;;

2) If the contract is not specifically stated, warranty executed in the following terms:

Warranty period from the acceptance of goods newcomer 12 months, or the buyer receives the goods from month 12 months, whichever comes first.

General wearing parts (such as a mouse, general keyboard, etc.) the warranty period of three months from the date of delivery;

Whichever external accessories (PC, printer, power supply, etc.) the warranty period provided by the manufacturer;

Repair parts warranty period of three months;

Consumables (cotton filters, electrodes brush, etc.) do not warranty.

If indeed the instrument quality problems affect the use, the warranty period will be extended accordingly.

2.The warranty period, under normal use instrument malfunction occurs, free maintenance; however due to the buyer operating or maintenance personnel operating errors or improper use and force majeure (war, earthquakes, lightning, floods, etc.) and other causes of damage to the instrument hardware The seller will be charged for the cost and maintenance expenses.

3. Instrument repair problems after the seller to confirm the failure phenomenon and solve the problem over the phone, for the scene to solve, can be rushed to the scene within 48 hours.

4. The warranty period repair:

After the warranty period, the seller will continue to provide maintenance services and use of consultants and, if necessary to the user on-site service, the seller will be charged the appropriate fee components, service fees.

5、Spare parts and consumables supply:

The seller will discount the price to supply spare parts and consumables to the buyer.