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## W5 Optical Emission Spectrometers (Arc/Spark-OES)

### The 4<sup>th</sup> Generation High Performance Metal Analyzer



## Summary

W5 Optical Emission Spectrometer bring in the advanced technology from the USA. It is the 4<sup>th</sup> 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.

# Scope of supply

## 1. Supply list

No.	Item	Specifications	Unit	QTY	Remarks
1	Optical Emission Spectrometer	W5	Set	1	Include in quotation.
2	Business computer	Standard configuration	Set	1	
3	Printer	Standard configuration	Set	1	
4	Flue gas pipe		Pc	1	
5	Flue gas filter	2 filter bottle and accessories	Set	3	
6	Argon gas pressure reducing valve		Set	2	
7	Quick connector		Pc	1	
8	Argon gas pipeline		M	2	
9	Ethernet cables		Pc	1	
10	Three core power line		Pc	1	
11	Calibration samples		Set	1	
12	Daily Maintenance		Set	1	
13	Spectrometer manual		Set	1	
14	Spare parts and tools		Set	1	

Notes: The Buyer knows and agrees that the Seller may adjust the supply when the production of the above-mentioned instruments, spare parts and other suppliers change due to technological progress, product upgrading, market changes, etc.

## 2. Optional items:

Optional item	Qty	Note
High purity argon gas (pure $\geq$ 99.999%)	1 bottle	Essential, if can't get should use argon purifier to get 99.999% argon gas.
Small air conditioning	1 set	Essential, customer should prepare by themselves.
High precision magnetic saturation voltage stabilizer (1KVA)	1 set	Need for voltage instability, if the customer use intermediate frequency furnace, then need 3KVA Voltage Stabilizer
Argon purifier	1 set	When argon gas is not pure
Samples grinder (ferrous metals) or Mini lathe (non-ferrous metals)	1 set	Essential
Type sample	X pieces	Essential for foundry

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# Analytical Program

		FE-001
No	Elements	Low Alloy
1	C	0.006-1.3
2	Si	0.01-3.9
3	Mn	0.03-2.1
4	P	0.002-0.12
5	S	0.002-0.16
6	Cr	0.01-4.5
7	Ni	0.004-4.4
8	Mo	0.004-1.3
9	Al	0.003-1.5
10	Cu	0.002-0.5
11	Co	0.001-0.5
12	Ti	0.002-1.2
13	Nb	0.002-0.3
14	V	0.003-0.9
15	W	0.03-2.1
16	Pb	0.003-0.03
17	B	0.006-0.02
18	Sn	0.001-0.09
29	Zn	0.002-0.04
20	As	0.001-0.1
21	Bi	0.001-0.01
22	Zr	0.004-0.35
23	Sb	0.002-0.02
24	Fe	Reference

**Note:**

The instrument is calibrated with limited standard samples which Wuxi Jinyibo Instrument Technology Co.,Ltd have for general purpose. For special alloy and special elements, the instrument must be calibrated by customer themselves. Or if customer is willing to provide sample collaboration for program development, the customer must provide accurate sample element content tables and ensure sample uniformity, but such curves are not used as acceptance indicators of the instrument.

If the customer has type sample demand, the type sample number can be provided, and the customer can purchase the type sample by himself; if the salesman buys the type sample on behalf of the salesman, the type sample will be shipped separately by Wuxi Jinyibo;

# Technical Data of W5

## 1. Parameter

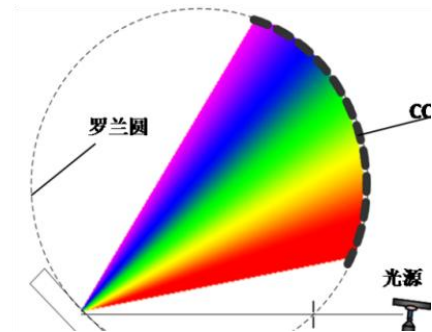
Item	Index
<b>Optical system</b>	
Optical structure	The Paschen Runge construction full vacuum type optics system
Room temperature	35℃±0.5℃
Wavelength range	130-800nm
Focal length	400mm
Grating line	2400m1/mm
First order spectral line dispersion rare	1.2nm/mm
Detector	Multi block high performance linear CMOS array
Average resolution ratio	10pm/pixel
<b>Excitation table</b>	
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
<b>Excitation light</b>	
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
<b>Data collection system</b>	
Interface	Ethernet data transmission based on DM9000A
Power	220VAC 50/60Hz(Customized)
<b>Others</b>	
Base	Fe, Cu, Al, Ni, Co, Mg, Ti, Zn, Pb, Sn, Ag, Mn, Cr etc
Power consumption	Maximum:750W standby:100W

Working temperature	10-35°C ( temperature $\geq 5^{\circ}\text{C}$ )
Working humidity	20-85%
Dimension	860mm(L)*680mm(W)*438mm(H)
Weight	About 100Kg

## 2. Main features

### 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.



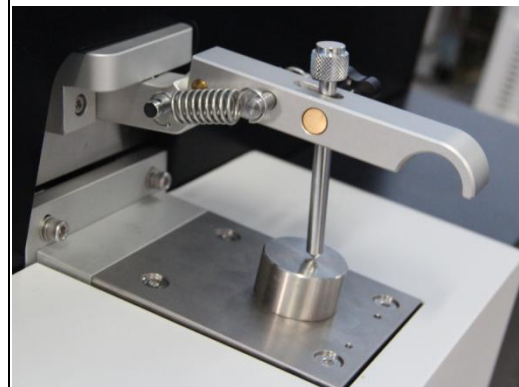
### 2. Intelligent Digital Excitation Light Source

- 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.



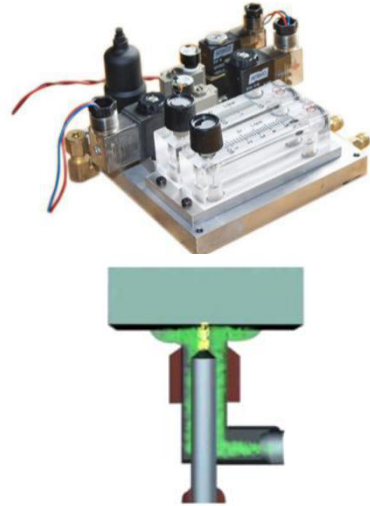
### 3. Intelligent Sample Inspire Stand

- 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

- ①The design of intelligent argon flow and the detection of dust collection.
- ②The 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.
- ③After 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

- ①The vacuum system is program control completely, while ensuring the vacuum to reduce vacuum pump running time.
- ②Two-level setting, under the circumstance of the instrument is not running, the instrument needs to open the standby of vacuum operation status.
- ③Multi-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

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

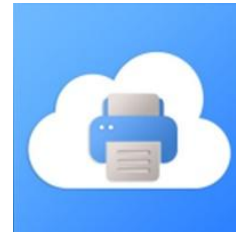


#### 7. Computer and Read-out System

- ①The computer and cellular phone (PAD) can display synchronously, it is easy to operate for panel.
- ②High-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.
- ③The anti-jamming performance is better, the external computer upgrade is related to configuration of instrument, so the instrument has a better applicability.
- ④The data can remote transformation to realize network and it is convenient to monitor and control for the instrument operating status.
- ⑤And the results can have real-time monitoring and the

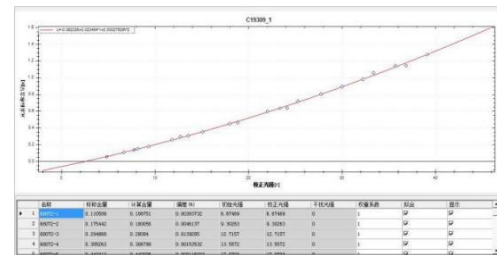


function of printing reports can customize for the users. Meanwhile the data can use cloud print.



### 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 Type sample correction function.
- ⑨ The core device are all original imported, in order to promise the products' quality.

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### 3. 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	



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# Guarantee & Service

## 1. Technical documents and software

- 1.1 Drive and application software installation CD
- 1.2 User manuals
- 1.3 Daily maintenance sheet

## 2. Installation

The Seller's professional technicians will install the instruments and training the users within 2 to 3 workdays for free.

Commissioning will be taken before acceptance. Both parties should sign the acceptance report after the instrument reaches all the technical data prescribed in this agreement.

## 3. Acceptance

The Buyer should acknowledge receipt of goods after checking them against the list shown in the agreement. After the instrument runs steadily at least 24 hours, the testing results should be reached the technical data by using the homogeneous national or international first grade CRM.

## 4. Training

Installation Engineer in the field installation and commissioning process, the Buyer shall organize the relevant users and maintenance responsible person to receive on-site training, training time generally not more than 3 days. Through training, so that the relevant personnel more in-depth understanding of spectral analysis related technologies, skilled in instrument operation and maintenance.

The training includes instrument installation, commissioning, testing samples, testing user's samples, training lab operators about equipment theory, daily operation, software application, daily maintenance and repair, to make sure that users can operate the instrument properly.

## 5. After-sales service

### 5.1 The calculation of the warranty period

- The warranty period of the instrument shall be in accordance with the contract stipulations.
- If the contract does not specifically point out that the warranty shall be implemented in accordance with the following terms:

The warranty period shall be 12 months from the date of acceptance of the goods or 12 months from the date of receipt of the goods by the buyer, whichever comes first.

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The general fragile parts (such as mouse, ordinary keyboard, etc.) are guaranteed for three months from the date of the factory.

The warranty period for external parts (PC, printer, stabilized power supply, etc.) is subject to the manufacturer's requirements.

The repair period is three months.

Consumables (filter cotton, electrode brush, etc.) are not guaranteed.

- If the quality problem of the instrument is affected, the warranty period will be postponed accordingly.

5.2 During the warranty period, the equipment will be repaired free of charge if it breaks down in normal use. However, due to the buyer's operation or maintenance personnel's misoperation or improper use and force majeure factors (war, earthquake, lightning strike, flood and so on), the seller will charge cost and maintenance fees.

5.3 After the instrument has been repaired, the seller confirms the malfunction by telephone and solves the problem. If the problem needs to be solved on site, the seller can rush to the site within 48 hours.

5.4 Maintenance beyond warranty period:

Over the warranty period, the seller will continue to provide maintenance services and use of consultation, if need to go to the customer site service, the Seller will properly charge parts fees, service fees and other fees.

5.5 Spare parts and consumable supplies: the seller will supply spare parts and consumables to the buyer at a favorable price.

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# Installation & Training

After the seller received the buyer's instrument installation notice, sent to the user's site for installation and debugging. It's totally free. The buyer only bears our engineer round airfares and local accommodation (Including the VISA cost).

1. Installation Conditions see Attachment 1 and Attachment 2.
2. After the instruments have arrived at your esteem company, warehouse storage, warehouse temperature 0 ~ 30 °C, relative humidity is not more than 75%, after waiting for installation personnel arrived, mutual unpacking, counting number according to the packing list.
3. Use the standard sample which is bought by your esteem company for instrument acceptance at the scene and check the analysis precision. Or if the customers don't know the standard samples at all, we company can help customer buy from China and ship together with the machine.
4. After installation and debugging, it must be paid to return if the quality can't meet the technical requirements. If only individual elements analysis deviation is slightly larger, mutual analysis reason, through friendly consultation.
5. The training includes how to use the instrument, daily maintenance, software operation.
6. After installation completely, Engineers need to complete an installation acceptance report, and on behalf of the signature or stamp by both parties.
7. Warranty period in accordance with the contract to perform

Attachment 1 Installation conditions should be prepared by buyer.

- 1.Space: The optical room and sample prepare room should separately. In order to operate convenient, please leave 1 meter space around the instrument.
- 2.Prepare two bottles of high purity argon gas, the purity should be more than 99.996%.
- 3.Spectrometer access side should be equipped with power protection, air switch, over-current protection of the 20A
- 4.Independent special ground, ground resistance is less than 1 ohm, grounding body with 38 ~ 50 mm diameter copper bar, its length is 2.1 m, the method of making the ground see the attachment.
- 5.According to the space of the laboratory, it should be equipped with air conditioner.
- 6.Equip with a double disc grinding prototype or a floor grinder, mill  $\Phi$  350 mm diameter, used in steel specimen surface polishing, generally need 40-60 mesh. If the sample is non-ferrous metals, need a small lathe to sampling.
- 7.In order to ensure the argon gas purity, need to configure an argon gas purifier. If the purity is more than 99.999%, it will not be necessary.
- 8.The standard sample should be prepared by the user. It is used for the calibration function.
- 9.Equip with a high precision regulated power supply if it is before the furnace

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analysis or harmonic interference.

Note

Spectrometer power supply system should be separate with high power electric equipment (such as the power of the medium frequency furnace and its frequent start-stop devices).

Stay away from high-power electrical appliances at least 50 m or so.

Spectral laboratory dustproof effect should be good.

Spectral instrument avoid single heat or direct sunlight.

Attachment 2 The installation of ground wire method

Grounding resistance requirement

(1) Resistance  $< 2\Omega$

The value of the grounding resistance can define the value of earth current. If grounding electric resistance is smaller, the grounding device of grounding voltage value will be smaller. That is to say, the value of the grounding resistance has marked the equipment grounding performance is good or bad.

Resistance measurement

Grounding resistance is generally measured by ammeter, voltmeter, bridge method, grounding resistance measuring instrument etc. At present it is measured by grounding resistance measuring instrument. This method is simple and convenient. Common grounding resistance measuring instrument is the type of ZC - 8 and ZC - 29. Before the grounding resistance test, it should unscrew the ground down lead first.

Installation

Generally speaking, a ground wire buried depth should not be less than 2 m. Installation of grounding in special places, if the depth of less than 2 m should be placed around the grounding salt 5 kg, wood carbon about 10 kg and add water, to reduce the grounding resistance. If you use a minimum of 2 and 2 root of grounding, the distance between each pole should not be less than 2.0 m, in order to reduce the diaspora of the earth resistance. In strong corrosive soil, it should use plating of copper or galvanized grounding electrodes. And grounding shall not be buried in the garbage and ash layer, laying on the ground and the ground is extremely should not be painted, in order to avoid the grounding resistance is too big.

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# International Clients

Royal Dutch/Shell Group of Companies  
Korea Hyundai Motor Company  
Korea Daewoo Group  
Maihan Steel  
VY Madagascar Steel  
Korea Pohang Iron and Steel Co., Ltd  
ZHICHENG PAKISTAN(PVT) LIMITED  
Khan Engineering Company Limited  
KOSGEB  
Angstrom Advanced Inc.  
Crest Systems (M) Sdn Bhd  
PT. SUMBER INOVASI SEJATI  
Metal Cast Egypt  
AMTT group  
Kimiya Teb Tajhiz Baran Company  
Gas Solution Co.,Ltd  
Maisam Steel Mill  
PT.SINAR LAUT BIRU LOGAM PERKASA JAYA  
SADAT HOFIANI STEEL MILL COMPANY  
UNITED STEEL MASTER MFG. CROP  
DAVAO MIGHTY STEEL CORP  
KYCR COIL INDUSTRIES LTD  
CAFCA LIMITED  
MGRI-RGGRU  
Rectificadora Rodríguez  
Boroptik Mühendislik Ar-Ge İmalat ve Ticaret A.Ş  
PT. Tomoe Valve Batam  
Myanmar Zhonglianfeng Special Steel Company Limited  
Vietnam Dinh Vu Steel CO., Ltd. (Dongbu Vietnam Steel Co., Ltd.)  
Tanzania Seven-star Steel Tube Company  
North Korea Sinuiji Yitong Casting  
Vietnam Nomura Welding Technology Co., Ltd.  
Mongolian Country Ulan Bator Tungsten Industry Co., Ltd.  
Kazakhstan Da Ante Steel Co., Ltd.