



Company profile

Analytical Technologies is synonymous for offering technologies for doing analysis and is the fastest growing global brand having presence in at least 96 countries across the globe. Analytical Technologies Limited is an ISO:9001 Certified Company engaged in Designing, Manufacturing, Marketing & Providing Service for the Analytical, Chromatography, Spectroscopy, Biotechnology, Biomedical, Clinical Diagnostics, Material Science & General Laboratory Instrumentation. Analytical Technologies, India has across the Country operations with at least 4 Regional Offices, 6 Branch Offices & Service Center. Analytical Technologies has Accessories, Consumables, Services and trainings.

We have 4 Strategic Business Units (SBU) listed Below, Committed to focus in varied interests of our customers.

- Analytical Technologies Limited**
- Analytical Bio-Technologies**
- Analytical Bio-Medical Solution**
- HPLC Solution**
- Multiple labs**

We are the only company in the world to offer entire range of Liquid Chromatography products, like Nano, Micro, Analytical, Bio, Semi-Preparative, and Preparative and process HPLC Systems, and also, offering services, trainings and consumables for any make of HPLC Systems.

The customers and markets we serve include Pharmaceutical, Life Science, Chemical, Petro Chemicals, Cement, Dyes, Intermediates, Food & Beverages, Hospitals, Pathology Labs, Environmental Science, Pollution Control, Forensic Science, Bio Technologies, Universities and Research Institutions.

TD series X-ray diffractometer technical parameters

Name	Items	TD-2500	TD-3000	TD-3500
X-ray tube	Type	Tube voltage 60kV(target arbitrary choice Cu.Fe.Co.Cr.Mo)		
	Focus Size	1×10mm ²	1×10mm ² or 0.4×14mm ²	
	Max Output Power	2.0kW	2.4 kW	
	Control Mode	Microcomputer automatic 1Kv/step1mA/step		
	Max OutputPower	3kW	5kW	



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X-ray Generator	X-ray Tube Voltage	10-60kV		
	X-ray Tube Current	5-80mA	2-80mA	
	Stability	≤0.01% (power supply voltage fluctuation)		
	Alarm Device	Over Kv 、 over mA 、 Kv low 、 mA low 、 no water 、 X-ray tube over-temperature、 over-current protection of instrument、 X-ray tube power protection etc.		
Goniometer	Structure	horizontal(θ-2θ)	vertical(θ-2θ)	Sample level (θs-θd)
	Goniometer Scanning Radius	Standard 185mm(θs-θd adjustable to 285mm)		
	Scanning Range	-35°~170°		-35°~170°
	Scanning Speed	0.06°-76.2°/min		0.006°-96°/min
	Scanning Mode	θ-2θ linkage,θ、 2θ single action, continuous or step scanning		
	Minimum Step Angle	0.001°		0.0001°
	Measuring accuracy	≤0.01°		≤0.0005°
	Angle Positioning Speed	120°/min		1000°/min
	2θ Repeatability Accuracy	≤0.001°		≤0.0005°
Recording Control Unit	Counter	Proportional (PC) or scintillation(SC)		
	Maximum linear Count Rate	5×10 ⁶ CPS		1×10 ⁷ CPS
	Spectrum resolution (Cu. kα Spectrum linear)	≤25%(PC)or≤60%(SC)		≤20%(PC)or≤50%(SC)
	Counter high voltage	0-2100V or 0-1100V continuously adjustable		
	Counter mode	PLC automatic control differential 、 integral mode conversion, automatic PHA, dead time correction		
	Detector High Voltage Stability	±0.01%		±0.005%
	X-Ray Leakage	≤0.2 μSv/h		
Aggregative Indicator	Safety Indicators	Protection system for double protective, have a big and a small shield, to ensure the safety of the users		
	Integrated Stability	≤0.5%	≤0.3%	
	Leakage of x-ray	<0.3%		



Overall Dimensions	1170mm(L)×870MM(W)×18000mm(H)
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Main feature of TD Series X-ray Diffractometer

High-stability X-ray generator

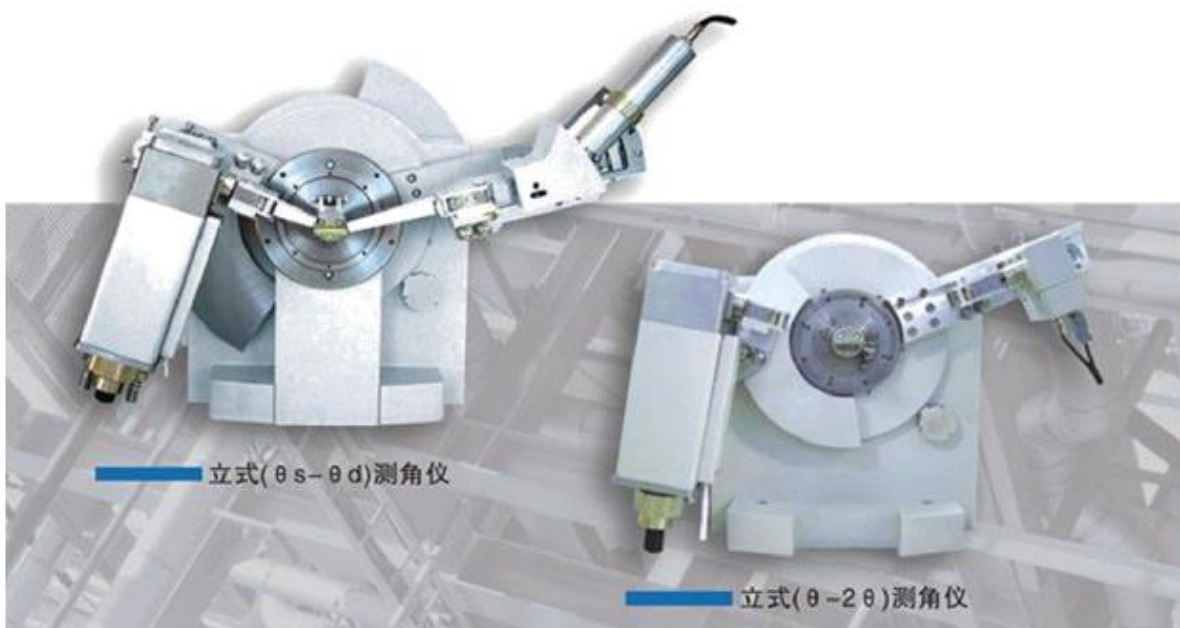
Using Imported Siemens PLC control circuit instead of single-chip control circuit, so that the equipment failure rate is greatly reduced, instrument performance is more stable and reliable. As the use of import PLC (programmable logic controller) is greatly increase the use of instrument X-ray generator power, which meets the special needs form some users who require the high-power X-ray generator for testing special samples. high-voltage control unit and the management system achieve the electrical isolation, the isolation voltage>2500V, PLC module control high-voltage management and real-time monitoring and real time display monitoring information by the true-color touch-screen , the I/O interface module using the optical isolation, achieve electrical isolation between high-voltage generator external circuit and control circuit,each of the module using the isolation to prevent the radiation interference.

NET automated communication and autorun function

Transmission analysis result by LAN

Using function of communication and notice, we can notice test finish, transmission test result by specified address

Auto-run system, automatic finish work shutdown according the timer, realized the management operation of unman on duty.





High-Accuracy Multifunction goniometer

TD series of X-ray Diffractometer can be equipped with many kinds of high-precision multifunction goniometer, goniometer is the heart of XRD, its measurement precision and accuracy and performance of a direct impact on the measurement results of XRD system. TD series goniometer using imported high-precision bearings transmission, to ensure that its measurement accuracy, he measurement results with high accuracy and excellent performance and prolong the life of goniometer, he goniometer motion control by a Sets of high-precision closed-loop vector drive servo system to complete, intelligent drive includes 32-bit RISC micro-processing, high-resolution magnetic encoder automatically adjusts even tiny position error. The reproducibility of the angle reaches to 0.0005 degree and the minimum stepping angle reaches to 0.0001 degree.

θ - 2θ X-ray source fixed ,sample and detector rotation

θ_s - θ_d samples fixed, X-ray and detector rotation

θ_s - θ_d goniometer can satisfy some special users requirements testing some special samples, such as liquid samples、sol-state sample、viscous-state samples, loose powder, bulk solid samples etc. easy to maintenance, set the sample level, is conducive to the operator put and insertion the sample, convenient cleaning on samples, not because of mis-operation causes pollution samples platform, to effect measurement accuracy.

Recording Control System





Using PLC control circuit instead of the original single-chip control circuit, this improvement makes the instrument more stable, easier to control and more structurally compact. The application of the imported Siemens PLC control circuit, which is of high degree of automation, ensures a longtime and stable operation of the whole system. It owns the simple management for the circuits so that it's easy to debug and install. It only contains a Siemens PLC system and two highly integrated circuit boards such as rotating goniometric control, computer interface, X-ray generator control and signals collection, are controlled by software. This greatly simplifies the hardware system and reduces the failure rate of the system.

The use of advanced real color touch-screen to achieve human-computer interaction, the protect functional operation is very convenient, three-dimensional sense of strong animation design more user-friendly, more intuitive, easy to use and to determine the operator's failure information.

As a result of the modular and the man-machine dialogue design, easy to determine fault and maintenance, without professional and technical personnel on-site maintenance, after receive a simple technical training, the user will maintain their own .

Application software

Data analysis and processing functions:

Smoothing;

Background subtraction;

$k\alpha_2$ peel off ;

Find peak (subscript d, intensity,

HKL) To change the sampling step;

Removal of impure peaks, interference peak;

d values, peak amendment;

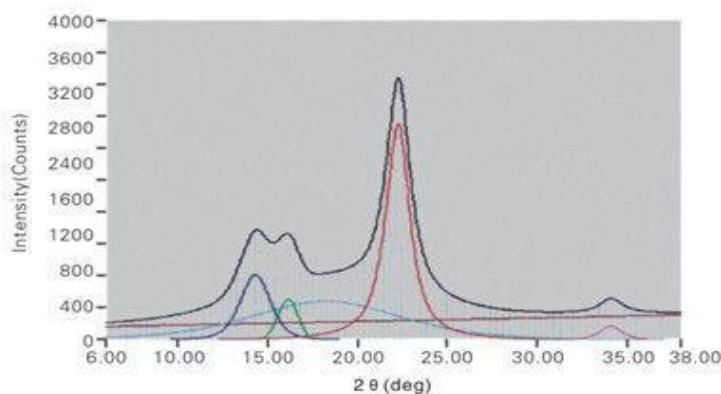
To calculate area, integral width, HKL;

Spectra addition and subtraction, spectrum combined;

the crystallization degree of calculation, unit cell parameters

Degree of crystalline calculated

Multi-peak separation and crystallization degree of calculation, using Gaussian and Lorentz function model fitted to the decomposition of overlapping peaks to determine the angle of each diffraction peak intensity, HKL and area, and calculate the degree of crystalline.



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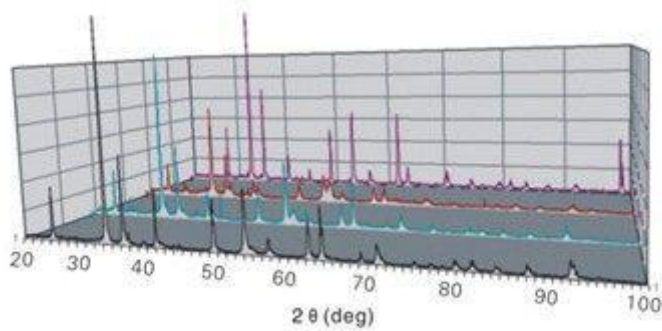
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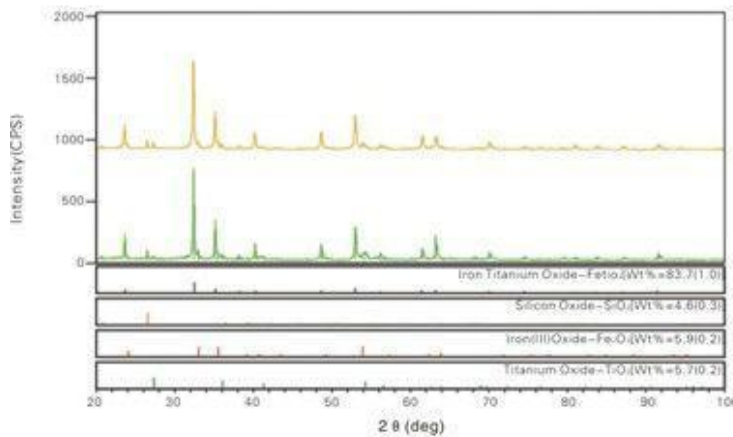
Spectra comparison function

You can open up to 10 spectra, three-dimensional contrast, spectra of a variety of functions, such as tiled contrast compared to show the same sample at different temperatures changes. You can paste, zoom in, zoom out the spectra in data processing software, also put the picture in the clipboard and paste it in Word or Excel.



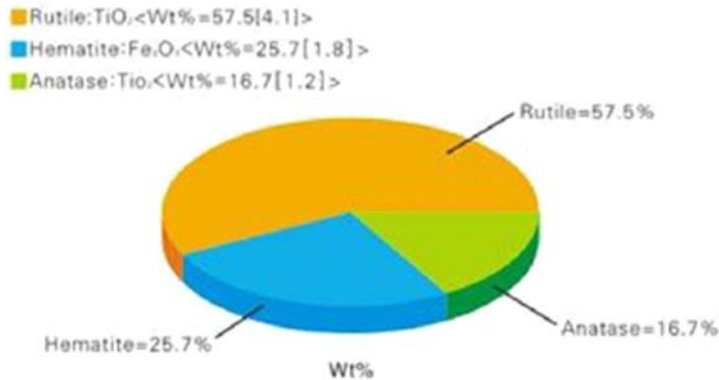
Qualitative analysis

Data-processing software has a full-spectrum and the diffraction peaks match and search function. To retrieve the whole spectrum of diffraction peaks do not indicate the angle, using a model designed to scan the whole spectrum of processing, will retrieve the peak's main phase, a small amount of phase, micro-phase qualitative analysis, according to diffraction peak and intensity information to retrieve of diffraction angle, commonly used in qualitative analysis with big error data of diffraction angle.

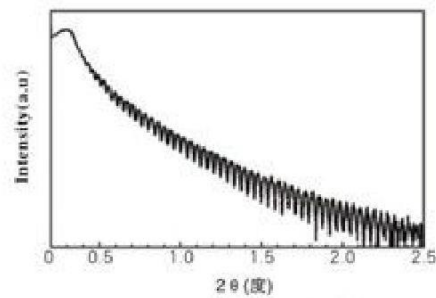
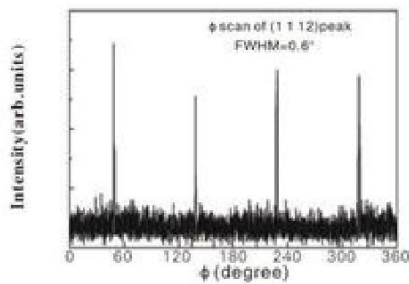


Quantitative Analysis

Quantitative analysis using non-standard samples and full spectrum fitting method to calculate the main phase, small amount of phase, the percentage content of micro-phase.

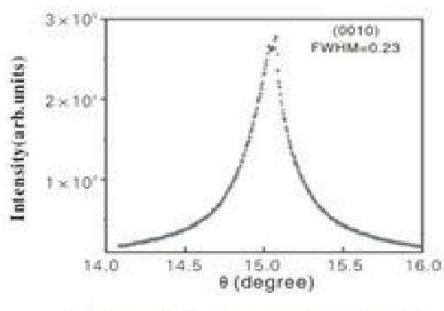


Accessories of X-Ray Diffractometer



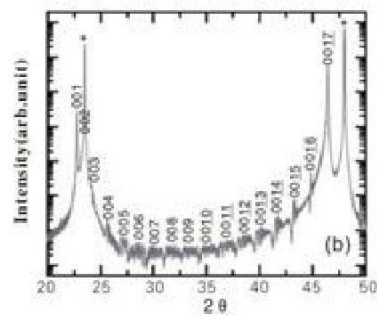


Thin-film Φ scan testing



Thin-film scan testing (rocking curved)

TXT-9 small angle diffraction



Thin-film super lattice XRD

TBM-8 parallel light thin-film measurement accessory





Using X-Ray method research through the evaporation deposition in the glass、 silicon single crystal、 metal polymer of analogues on the base of the film, installation the thin-film accessory on the wide-angle goniometer

Fixed the θ axis in low angle, low angle incident, 2θ axis automatic scanning, remove x-ray from matrix by flat crystal monochromator, effective detection film diffraction line, measure D value larger sample in commonly.

TZG-5 multifunction integrated measurement accessories



In the past, most of the wide-angle goniometer attachment is designed for the powder samples. but in recent years, X-ray diffraction analysis are increasingly being used to Plates, substrate materials membrane analysis, Multifunction integrated measurement accessories is to be detected in crystalline phase, stress testing .

Features :

- Polar diagram testing device(reflection method, transmission method, γ Shake),stress testing accessory、 thin film accessory.
- Test sample of Large and thick (Maximum Φ 40mm, thick 10mm)
- Due to design is dexterous,convenient disassembly.
- TD system automatic control each direction.

Function

- Polar diagram testing
- Stress testing
- Thin-film testing
- Quantitative testing

Tech-spec

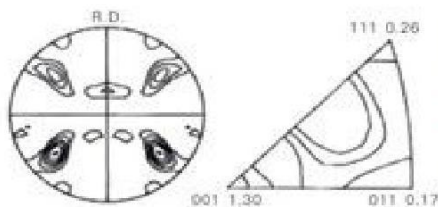
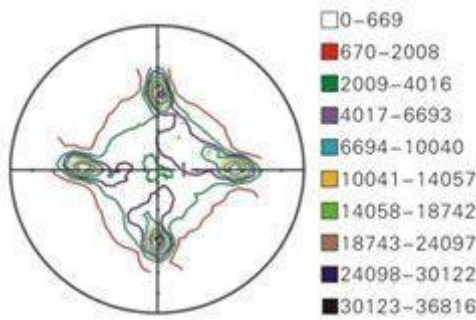
α axis	Action range: -45°—90°	Minimum step 0.001°
B axis	Action range: 0°—360°	Minimum rotational distance:0.005 °
Z axis	Action range: 10mm	Minimum moving step:0.001mm



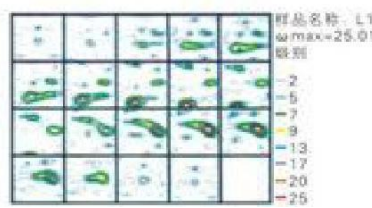
γ axis	Action range: $\pm 10\text{mm}$	Level 45° swing
Sample size	Maximum $\Phi 40\text{mm}$, thick 10mm	

Application range

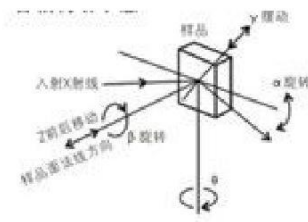
- Evaluation of rolled sheet metal
- Evaluation orientation of ceramic
- Evaluation orientation of macromolecular compound
- Evaluation orientation of thin-film sample with crystal preferred direction
- Testing residual stress of all kinds of metal material, ceramic material.
- Testing residual stress of multilayer film.
- Analysis of high-temperature super-conducting material. Metal with surface oxidation.
- Analysis the electroplating materials of macromolecular、paper.



Annealing aluminum pole figure Rolling to inverse



Φ ODF figure



Axis rotation figure

High-temperature and low-temperature accessory



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Improve the peak to background ratio, reduce the background, improve the resolution of weak peak, reflectivity > 35%

Graphite curved crystal monochromator



Analysis the crystal structure change and all kinds of material dissolve each other in high temperature, temperature range -192°C – 160°C

High-temp and low-temp



Automatic sample changer

Using step motor, control by PLC, without artificial replace the sample, system test sample automatically and continuously, the system automatically save the data.

Auto-control temperature cooling water device

SPLIT-TYPE COLLING DEVICE



ONE-PIECE COOLING DEVICE



TZL-30 Auto-control temperature cooling water device

Working voltage: 220V, 50Hz

Input power: 1940W

Output power: 5675W

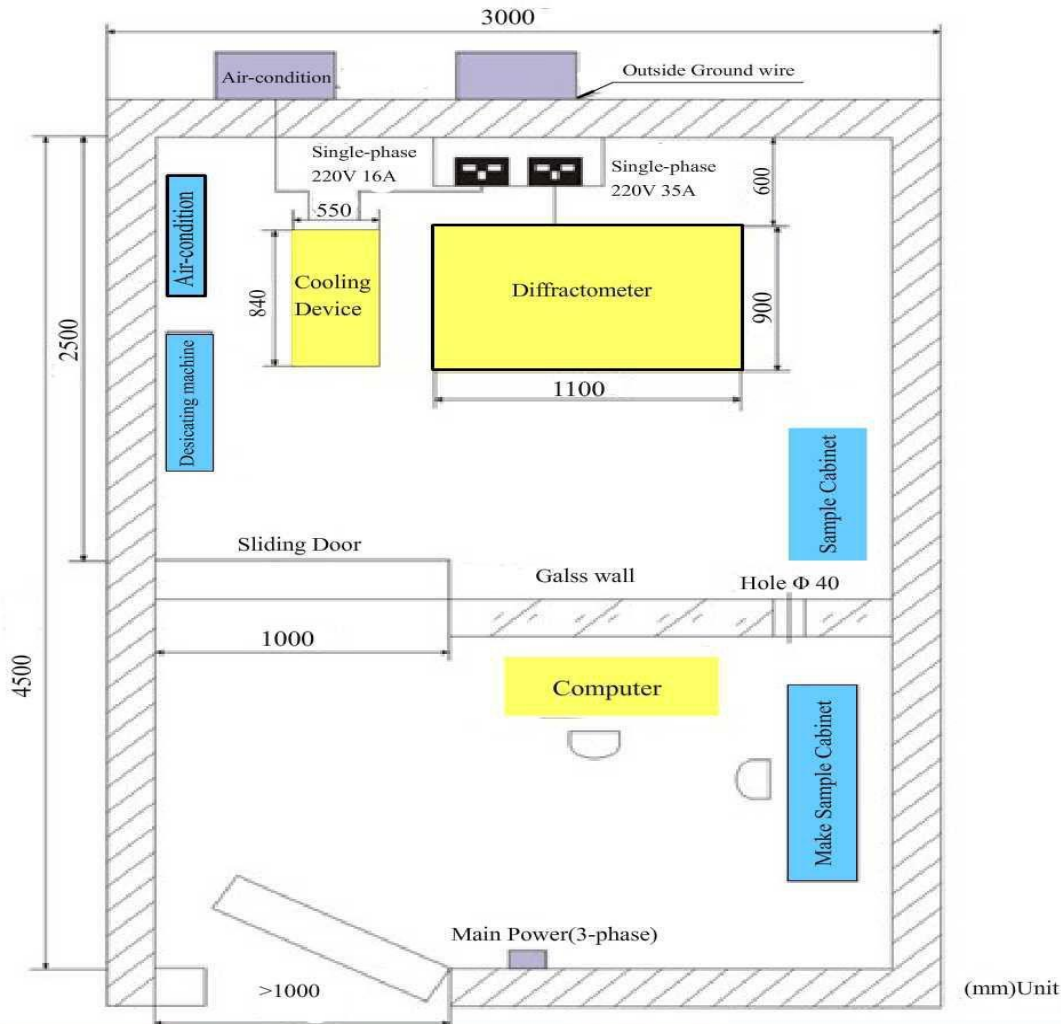
Cooling water flow: 16-40L/min

Press of water outlet: 2.5-4Kg/cm²



Dimension:840*550*810(
Temperature range:0-50°C,
Control-temp precision: ±0.5°C

TD Series x-ray diffractometer laboratory plan



Main technical requirement

- Host power supply voltage single phase 220V, capacitance>35A, 50Hz±10%
- Room temperature:15°C—25°C
- Relative humidity: 30%—80%
- Grounding resistance of grounding device<4 Ω
- The surrounding environment should not have flammable and corrosive gas, dust and vibration



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The power supply circuit should not have arc interference of machine. electric welding machine, high-frequency electric furnace and so on.

Cooling water (distilled water) should be accord with standard of X-ray tube requirement, replaced water every three month.

Main power should be three-phase five-wire

Wire diameter of enter the main power supply >6mm², wire diameter of the main power supply to the branch power >4mm², 15A, 35A and power of PC by main power three-phase supply.

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