

Industrial WPS



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Analytical Technologies Limited

An ISO 9001 Certified Company

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The pure water equipment has a simple design and can purify tap water into disinfection and cleaning water in the hospital supply center operating room. It meets demanding pharma-grade water requirements used for drug formulation, complying with pharmacopeial specifications (USP/EP/JP) for Purified Water or Water for Injection (WFI). This includes low TOC, high resistivity, and strict microbial and endotoxin control suitable for GMP-regulated formulation and sterile processing applications. It is a large-scale Disinfection and cleaning pure water system with rapid water production

Features:

1. Fully automatic PLC touch screen or relay control system, compatible with automatic switching between automatic and manual dual control systems, simple and convenient operation, no need for dedicated personnel;
2. The pretreatment system is equipped with a fully automatic controller as standard, with automatic forward and reverse flushing functions at regular intervals, eliminating the need for human operation;
3. The system is equipped with the function that automatic rinse reverse osmosis membrane and rinse when water tank is full in usual atmospheric pressure to extend the life of reverse osmosis membrane.
4. Online monitoring of effluent conductivity or resistivity, online display of flow rate and pressure;
5. Automatic water production and storage; automatic shutdown when water tank is full, automatic power on when water level is fall down
6. System with supplies monitoring function, automatic alarm when. the water quality exceeds.
7. The system adopts integrated advanced process design, and the core components (pump, RO membrane, electronic control system, etc.) adopt imported/domestic joint venture brands;
8. Constant pressure/variable frequency water supply system (optional) to ensure water flow requirements at different water points;
9. Can be used directly with disinfection and cleaning equipment
10. In areas with poor source water quality (TDS>200ppm), the water quality of RO pure water may be reduced to a conductivity of more than 10 μ S/cm; users with higher water quality requirements are recommended to choose a two-stage reverse osmosis + pre-water softener system (multi-media filter+activated carbon filter+water softener).

Pretreatment system:

The pretreatment system includes a raw water tank, raw water pump, quartz sand filter, activated carbon filter, softening filter, etc. The main purpose of the pretreatment system is to remove insoluble impurities, soluble impurities, organic matter, and microorganisms in the water, so that its main water quality parameters meet the water inlet requirements of subsequent treatment equipment.

The treatment effect is mainly manifested in the following aspects:

- (1) Prevent clogging by colloidal substances and suspended solid particles;
- (2) Prevent clogging by organic matter;
- (3) Prevent clogging by microbial fouling;
- (4) Prevent membrane surface scaling (including CaCO_3 , CaSO_4 , SrSO_4 , CaF_2 , SiO_2 , iron and aluminum oxides)

Raw water tank:

It is used for water buffering and storage of raw water to provide a stable and sufficient water source for subsequent equipment water. (Engineering experience proves that the water supply pressure and flow rate of the raw water supply pipe network fluctuate greatly during the peak period of water use without the original water tank. Affect the stability of subsequent equipment operations). Under normal circumstances, the original tank design volume is 0.5 to 1.5 times the system water consumption or at least can provide the water storage capacity of the water system for 15 minutes. The water tank is equipped with a liquid level controller to control the start and stop of the water inlet electromagnetic (dynamic) valve and the original water pump through the level of the water tank level. For example, when the water level of the water tank is low, the water inlet electromagnetic (dynamic) valve opens to automatically replenish water; the water tank is at When the water level is high, the electromagnetic (dynamic) valve automatically stops the water supply; when the water level of the water tank is low, the original water pump automatically stops working.

Liquid level sensor:

This sensor primarily controls the amount of raw water entering the system, ensuring timely water replenishment during system operation. The liquid level sensor has two settings: mid-level and low-level. It controls the start and stop of the booster pump. The booster pump automatically starts when the tank water level is above the mid-level; it stops automatically when the tank water level falls below the low-level.

Water inlet solenoid valve

The main function of this device is: when the raw water tank is full, the water inlet solenoid valve is closed; when the water level in the raw water tank is lower than the middle level, the water inlet solenoid valve is opened, thereby realizing automatic replenishment of raw water.

Raw water pump

The raw water booster pump is configured according to the required water output to ensure effective backwashing during backwashing. The pump body is constructed of stainless steel and features compact size, high efficiency, and low noise. The raw water pump automatically starts and stops based on the raw water tank water level. If the raw water pressure exceeds 0.3 MPa, the raw water pump is not required; otherwise, it is recommended.

Quartz sand filter

Quartz sand filter (also known as mechanical filters) use a bed of layered anthracite, sand, finely crushed garnet, or other materials. A typical multi-media filter's top layer consists of the lightest, coarsest-grade material, while the heaviest, finest-grade material is placed in the lower portion of the bed.

The principle is depth-based filtration—larger particles are removed at the top layer, while smaller particles are removed deeper within the filter media. This results in water quality reaching the standard of coarse filtration.

A. Performance and Characteristics: Quartz sand filter remove large suspended solids from water, thereby reducing the SDI value and meeting the water quality requirements for deep purification. This equipment features low cost, low operating expenses, and simple operation. The filter media can be reused multiple times after backwashing, resulting in a long service life.

B. Applications: Quartz sand filter are widely used in water treatment processes, primarily for turbidity removal, water softening, and pre-treatment for electrodialysis and reverse osmosis. They can also be used for silt removal in surface and groundwater. Multi-media filters primarily control filter operation, forward washing, and backwashing via manual or fully automatic control valves. The tank can be made of either fiberglass or stainless steel.

Active carbon filter

The working principle of activated carbon filter is mainly based on the adsorption mechanism of activated carbon. The adsorption mechanism is the interaction between

water, solute and solid particles. The main reason for adsorption is the hydrophobicity of solute to water and the high affinity of solute to solid particles; the other reason is mainly caused by the electrostatic force, van der Waals attraction or chemical bond force between solute and adsorbent.

A. Performance and Characteristics: Activated carbon filters remove organic matter, colloids, and residual chlorine from water through the adsorption of activated carbon. This equipment offers excellent filtration efficiency, low operating costs, and simple operation.

B. Applications: In water treatment, activated carbon filters are primarily used to remove trace pollutants from water, including decolorization, odor removal, and various dissolved organic matter. In water purification processes, they can be used as a pretreatment for ion exchange, electrodialysis, and reverse osmosis to remove organic matter, colloids, and residual chlorine. They can also be used as a post-secondary treatment method to ensure the quality of recycled water.

Activated carbon filters primarily utilize manual or fully automatic control valves to control filter operation, forward flushing, and backwashing. The tank can be made of stainless steel.

Softener resin

The softener uses cationic resin to soften the source water. The main purpose is to allow the cationic resin to absorb calcium and magnesium ions (the main components of scale) in the water, reduce the hardness of the source water, and thus avoid carbonate scaling in pipes, containers, and boilers.

A. Performance Features: The water softener utilizes a programmable control device to automate the ion exchange and resin regeneration processes, including forward wash, backwash, salt absorption, regeneration, and softening. Its rational design ensures efficient resin operation and maximizes its exchange capacity. With a water yield exceeding 98%, the system utilizes a siphon principle, eliminating the need for a salt pump for regeneration. The regeneration cycle is adjustable, eliminating the need for specialized personnel and facilitating easy installation. The tank is available in fiberglass or stainless steel, and the regeneration salt tank is constructed of PE.

B. Applications: Softening filters are primarily used in water treatment to reduce raw water hardness and prevent scaling in reverse osmosis membranes. They can also be used to soften feed water for steam boilers, hot water boilers, heat exchangers, evaporative condensers, air conditioners, and direct-fired engines. They can also be

used for domestic water treatment in hotels, restaurants, office buildings, and apartments, as well as for softening water in the food, beverage, brewing, laundry, printing and dyeing, chemical, and pharmaceutical industries.

RO System

1. Security filter

It can prevent particles larger than 5 microns from passing through and protect the RO membrane from damage.

The 5 μ m security filter intercepts particles larger than 5 μ m carried by the raw water, preventing them from entering the reverse osmosis system. These particles, accelerated by the high-pressure pump, could penetrate the reverse osmosis membrane assembly, causing significant salt leakage and scratching the pump's impeller. The filter element is a replaceable cartridge. It should be replaced when the filter inlet and outlet pressure differential exceeds the set value (typically 0.07-0.1MPa). The security filter features a corrosion-resistant 304 stainless steel housing. The filter element is made of melt-coated polypropylene

Features

- 1) Conical pore structure;
- 2) Filters deep into the filter, creating deep filtration;
- 3) High dirt holding capacity and long life;
- 4) Easy and quick replacement.

2. High pressure pump

The high-pressure pump is selected based on the required water production. It provides sufficient inlet pressure to the reverse osmosis unit, ensuring the proper functioning of the reverse osmosis membrane. Due to the inherent characteristics of reverse osmosis, a certain driving force is required to overcome resistance, such as osmotic pressure, to achieve the designed water production rate.

High-pressure pump high and low pressure control method:

A. low-pressure protection switch is installed before the high-pressure pump enters the water supply to prevent the pump from running dry. If the pressure is too low, the pump will automatically stop and restart when the pressure returns.

B. An overload protection switch is installed at the water supply pump outlet (before the RO membrane enters the water supply) to prevent the pump from suffocating and prevent excessive water pressure in the RO membrane. If the pressure is too high, the

pump will automatically stop and an alarm will be issued, requiring manual investigation of the cause.

3. RO membrane

RO reverse osmosis utilizes the principle of reverse osmosis and a highly selective reverse osmosis membrane to achieve a 99% inorganic salt removal rate in water. It also removes various organic matter and particulates from the water, significantly improving the product's cleaning pass rate. This process is pollution-free, making it widely used in pure water production. After pretreatment, qualified raw water enters the membrane assembly housed in a pressure vessel. Water molecules and a very small amount of small organic molecules pass through the membrane layer, are collected in a collection pipe, and then flow into the water production pipe and into the pure water tank.

Conversely, the 36% of water that cannot pass through, along with over 98% of the anions, cations, and other substances, are collected through another set of collection pipes and then discharged into the wastewater discharge pipe. The system's inlet, product, and concentrate pipes are equipped with a series of control valves and monitoring instrumentation systems to ensure the long-term, systematic operation of the equipment with guaranteed quality and quantity.

A. The reverse osmosis system is the heart of the project's pre-desalination process. Reverse osmosis treatment removes most inorganic salts, organic matter, microorganisms, and bacteria from the water. The rationality of its design directly impacts project investment costs, the overall system's economic benefits, service life, and operational reliability and ease.

B. Selection: The RO membrane uses a polyamide composite membrane that represents the highest level in the world today. The membrane is composed of three layers of thin film composite. The surface layer is made of aromatic polyamide material with a thickness of about 2000 angstroms and is supported by a microporous polysulfone layer. It can withstand high pressure and has good resistance to mechanical tension and chemical corrosion. This element has a large membrane area and a relatively large water production flux. It has a 99.6% salt rejection rate for NaCl, CaCl₂, and MgCl₂.

C. The reverse osmosis device is equipped with on-site instruments to directly display important parameters such as pressure drop, water production, desalination rate, recovery rate, etc. of the device's operating status.

D. The system is equipped with high and low pressure protection switches to ensure safe and reliable operation of the reverse osmosis system, whether automatic or manual.

E. The reverse osmosis water product is equipped with a discharge valve for unqualified water. Unqualified water generated when the reverse osmosis unit is restarted after shut-down is discharged through this valve and does not enter the next process.

F. A sampling port is installed on the water-producing side of each RO membrane tube for convenient sampling.

4. Pure water tank

Pure water tanks are primarily used to store pure water and have interlocking controls for high, medium, and low water levels. When the water level is low, the inlet pump automatically stops and does not restart until the water level reaches or exceeds the medium level. When the water level is below the medium level, the booster and high-pressure pumps automatically start producing water and stop when the water level reaches the high level.

Pure water tanks can be made of PE, 304/316L stainless steel, or stainless steel sterile water tanks. The inner surface of the sterile water tank should be smooth and flat, without dead corners. A built-in 360-degree spray rinser flushes the inner surface of the sterile water tank to prevent bacterial growth. An external, non-shedding fiber 0.22 μ m hydrophobic volume contraction.

5. Electronic control system

The control system adopts PLC+touch screen control system, which can dynamically display the process flow chart, has automatic mode and manual mode, and has multiple functions such as power-on self-test, automatic water production, automatic flushing, raw water shortage protection, automatic shutdown when the water tank is full, high and low pressure, operation overload alarm, etc. It can monitor the source water conductivity, pure water conductivity, flow, pressure and other operating parameters in real time online. Its main functions are as follows

5.1. Pretreatment utilizes a multi-stage purification device (MMF+ACF+SFF) with a fully automatic control valve and automatic forward and reverse flushing, eliminating the need for frequent packing changes.

5.2. Consumable life statistics are available, including consumable usage time and water volume processed. A buzzing alarm and Chinese prompts remind customers to replace consumables.

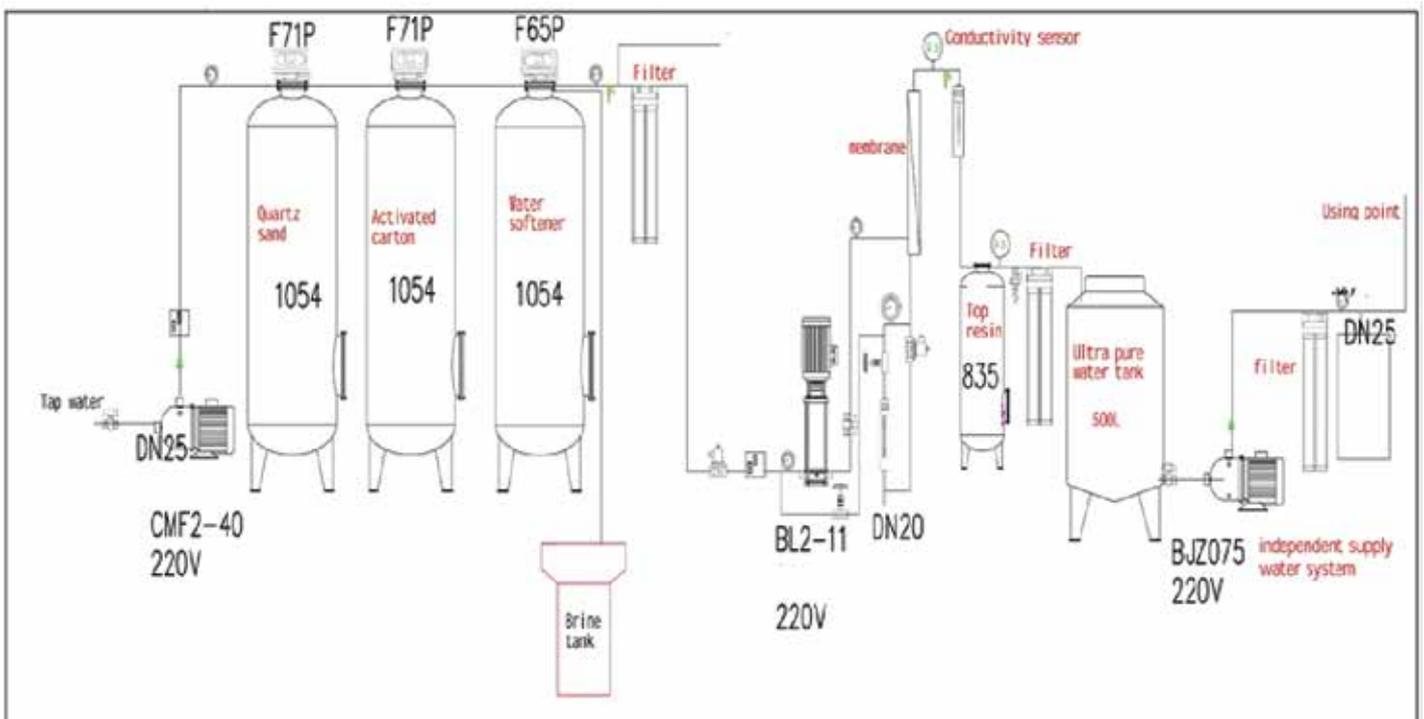
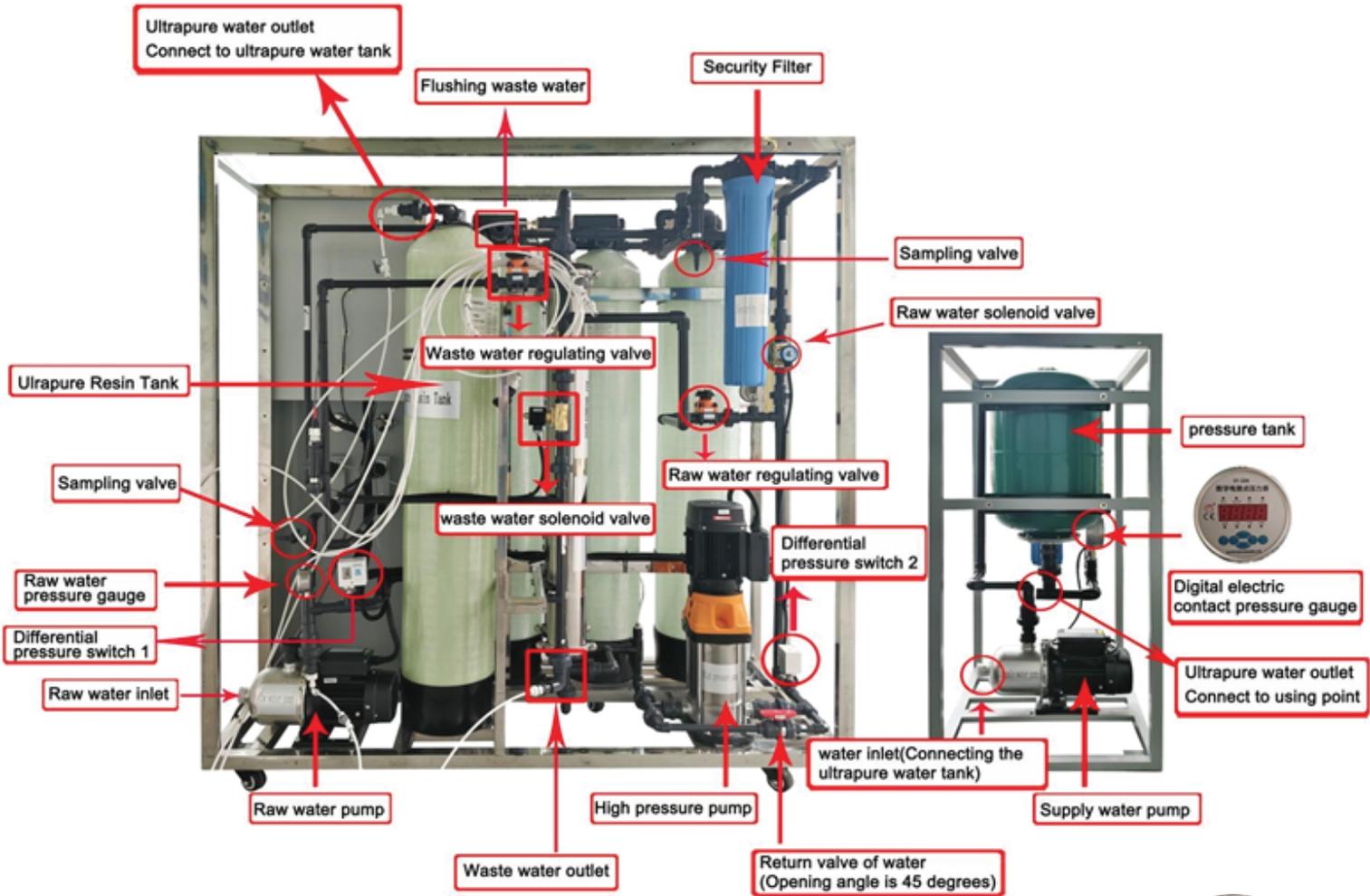
5.3. Automatic, pulsed, and manual flushing functions are available, along with a built-in water quality discharge function to prevent secondary contamination of the purified water.

5.4.RO reverse osmosis concentrate recovery equipment improves raw water utilization, reduces energy consumption, and stabilizes raw water pressure.

5.5.Online water quality monitoring, including production flow rate, operating pressure, and supply pressure monitoring, is available. The RO pure water measurement range is 0-200 $\mu\text{S}/\text{cm}$. The conductivity cell has a sensitivity constant of $\leq 0.01\text{cm}^{-1}$ and a temperature sensitivity of $\leq \pm 0.1^\circ\text{C}$.Automatic water temperature compensation improves water quality accuracy.

5.6.Three-level device management permissions prevent unauthorized operation by unauthorized personnel and facilitate after-sales maintenance and system upgrades. Operating parameters can be updated based on user preferences.

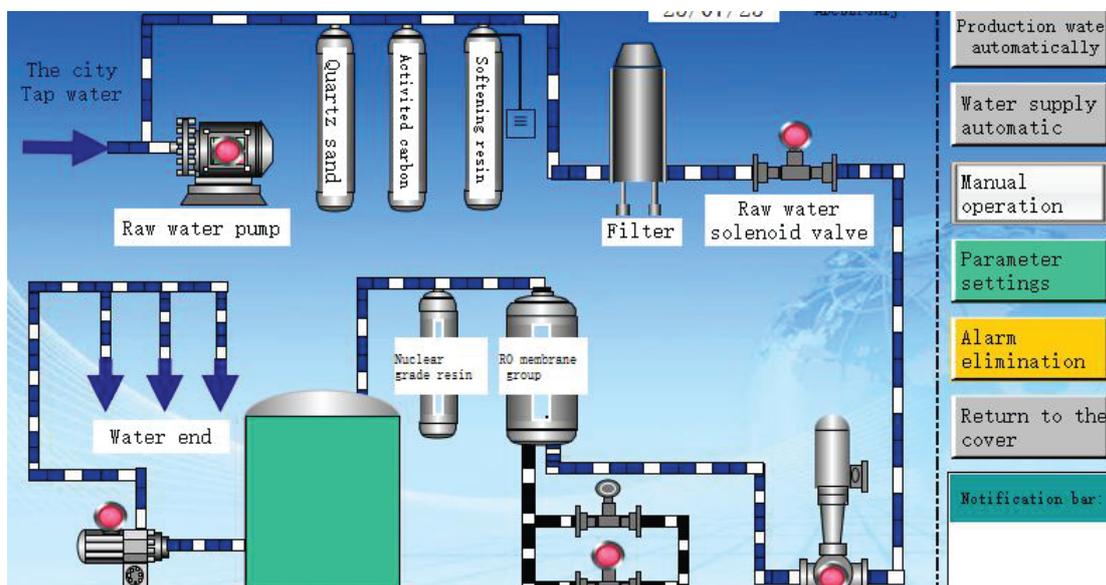




Technical Specification:

Water Purification System Ultra Series Type1 500L/H RO water purification system (Include the Raw water pump),with Touch screen panel with UV System, Ultrapure Resin system (resin tank 1054+top resin 60L)	
Outlet water conductivity <0.1µs/cm	
Raw water pressurization system	
Raw water pump 2-40	1 Set
Accessories	valve /pipe fittings / pressure gauge
Multi media filter	
Vessel	10"×54",FRP/, with upper and lower water distributor
Controller	F65,Full automatic time filter / full / regular back washing
Filter Material	quartz sand Activated carton filter Coconut shell activated carbon
Water softener	
Vessel	10"×54 " ,FRP/, with upper and lower water distributor
Controller	F71,Full automatic time filter / full / regular backwashing
Filter Material	softener resin
Regeneration	salt tank 60L,Sanitary grade PE/vertical valve /atmospheric/ salt suction Safety filter
shell	UPJM-80,Engineering plastic shell/PP filter core and so on
Filter	2.5 " ×20 " ,PP/ aperture 5um
RO system	
RO System	Water Production 500L/H,Desalination rate 99%,Recovery rate 75%
High pressure pump	CDL2-11/380V/1.1KW,Vertical stainless steel multistage centrifugal pump / over flow unit304
RO Membrane	YZYQS-4040, imported / polyamide composite film
Membrane pressure	vessel,4040- 1,Ss 304 /. 300Psi/1 shell, 1 core system
Water production	flowmeter,Plexiglass panel type
Drain water	flowmeter,Plexiglass panel type, conductivity meter,Dashboard
Inlet solenoid valve	ZS20B,220V A C50Hz
Flushing solenoid	valve,220V AC50Hz
pressuregauge	0-2.2MPa, Oil filled seismic type
Pipe fittings	adopt high qualitynUPVC
Frame,Welded	stainless steel
accessories	other equipment accessories

Ultrapure Resin system	
Vessel	10"×54 " ,FRP/, with upper and lower water distributor
Filter material	top resin PLC Control system Full set 7" PLC touch screen+Manual+automatic System working process: tap water → quartz sand filter → activated carbon filter → softening System → security filter → RO system → Ultrapure system → water tank or using points
Equipment demand conditions	
Backwashing capacity	Backwashing capacity
Power requirements	380V/3 phase /50HZ 1.5KW
Equipment placement	≥9m ³ (preferred indoor display)
Equipment to achieve the effect of	
Produced water capacity	500L/H
Package	mostly wooden cases
G.W (kg):	500kg
Size of RO machine(mm)	1600*7100*1700mm
Optional device:	
1.Constant pressure water supply system	
2.1000L Feed water tank and 500L Pure water tank	



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HPLC Servicing :HPLC Servicing : We have team of service engineers who can attend to any make of HPLC promptly @the most affordable cost.

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AMC's/CMC :AMC's/CMC :We offer user training both in-House and at customer sites on HPLC principles, operations, trouble-shooting.

Validations :Validations :We have protocols for carrying out periodic Validations as per GLP/GMP/USFDA norms.

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LCMS



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Chromatography system



Maldi TOF



Optima Gas
Chromatograph



Flash
Chromatograph



DAC
Column



GCMS
3068



UHPLC



HPTLC



Ion Chromatograph



Production
HPLC



HPLC



Column



DLS



Water purification
system

▶▶▶ Regulatory compliances



▶▶▶ Corporate Social Responsibility

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Analytical Foundation

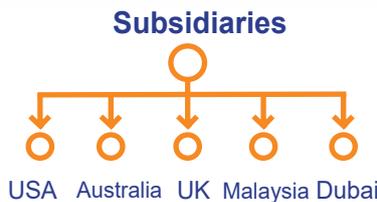
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