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CS POWER SDN.BHD.

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HD-NACLO AUTOMATIC SODIUM HYPOCHLORITE GENERATOR SYSTEM

www.cspower.com.my

On-site Sodium Hypochlorite Generator

Brief introduction of sodium hypochlorite

Sodium Hypochlorite is a member of the chlorine family of disinfectants. It is made up of the elements: sodium, oxygen, chlorine and is formed from salt and water.

Sodium hypochlorite, is a strong oxidizing agent with strong bactericidal and bleaching ability, have been widely using in drinking water disinfection, food processing, industrial or power system circulating water disinfection, hospital or sewage treatment, shipyard water treatment, etc.

CHEMNIUM Enhanced Operation

CHEMNIUM has significantly improved on-site hypochlorite generation technology through an enhanced proprietary electrode coating. The coating, which the company has researched and developed since 2005, provides greater operational efficiency, significantly reducing the consumption of salt and electricity.

The electrolytic cell consists of vertical titanium plates divided into arrays of cell packs consisting of an equal number of anodic and cathodic plates. The electrolytic cell packs are configured electrically and hydraulically in series.

The electrolytic cell is fed a DC current from a rectifier and electrolyzes the diluted brine into a sodium hypochlorite solution. Chlorine evolves at the anode surface, while hydrogen and hydroxide evolves at the cathode surface. The secondary reaction of chlorine, sodium and the hydroxyl ion nets sodium hypochlorite (chlorine bleach) at a 0.8% solution. (As a reference, bottled household bleach is typically delivered at a 5% to 6% solution.) In simple terms, the process can be described as follows:

NaCl + H2O + electricity NaClO + H2

or

salt + water + electricity =sodium hypochlorite + hydrogen gas

The enhanced electrode coating reduces salt and energy consumption:

- Reduced salt consumption to as low as 3.0kg/l.kg of chlorine
- Reduced energy consumption to as low as 4.0 kwh/l.kg of chlorine

On-site Generating Process

The operation of the electro chlorination system is straightforward:

- Influent water is passed through a water softener to reduce hardness therefore reducing the scaling of electrodes and lengthening the intervals between cleanings
- Using softened water, salt is dissolved in a tank to form a concentrated brine solution
- The diluted brine solution is passed through an electrolytic cell that, using DC current from a rectifier, electrolyzes the diluted brine into a 0.8% solution of sodium hypochlorite
- The 0.8% hypochlorite solution flows into a storage tank
- Hydrogen, the only byproduct of the process, is safely vented to the atmosphere.

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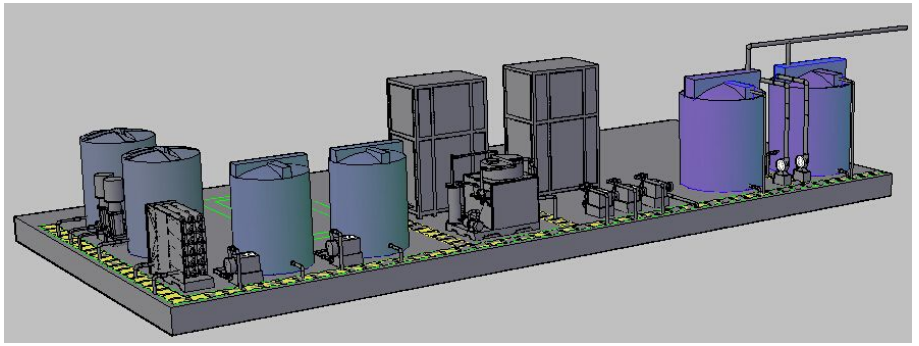
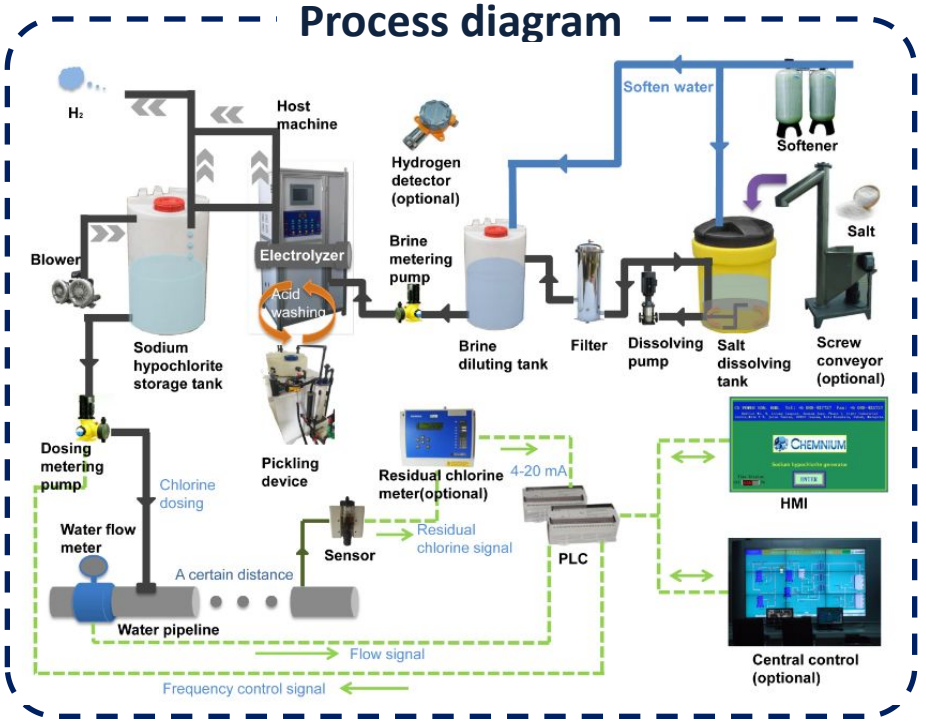
3D System Diagram



Process diagram



Integrate Sodium Hypochlorite Generator

Consist of HADA's patented electrolyzer, Siemens LCD touch screen, Siemens PLC, SEKO metering pump, high frequency voltage constant current power supply, Precision filter, Softener, etc.

HDT-50

HDT-100 ~ HDT-500

Model	Size	Cl_2 production	Concentration	Salt Consumption	Power Consumption
	L*W*H mm	g/h	ppm	g/h	w/h
HDT-50	1320×820×1180	50	8000	≤150	≤200
HDT-100	1800×1000×1180	100	8000	≤300	≤400
HDT-200	1800×1000×1180	200	8000	≤600	≤800
HDT-300	1980×1280×1260	300	8000	≤900	≤1200
HDT-400	1980×1280×1260	400	8000	≤1200	≤1600
HDT-500	1980×1280×1260	500	8000	≤1500	≤2000

Features

- Compact type design, small space occupation
- Full automatic operation, one time salt feeding can meet the demand of 5~7 days
- Automatic descale patent, pickling free.
- Low running cost and long service life

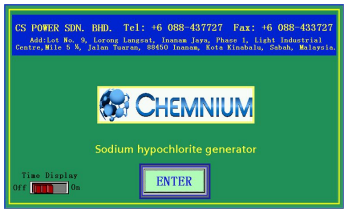
Applications

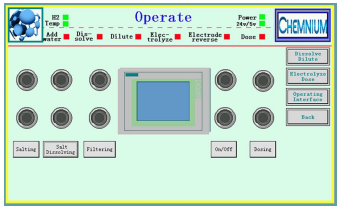
- Small village and rural area water treatment plants
- Small water pump station
- Large aquatics and swimming pool
- Ballast water for vessel
- Food & beverage processing

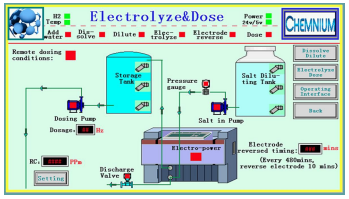
Interface of LCD touch screen and control panel

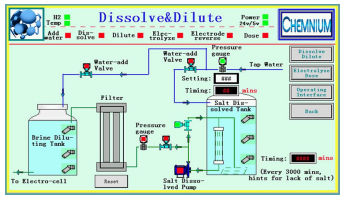
Control cabinet internal view

Interface Of Touch Screen









Application Cases

Fuzhou airport pump station supplementary chlorination

Model: HDT-200-NACLO
Chlorine production: 200g/h
Function: pump station supplementary chlorination
Running method: fully automatic/PLC control
Range of residual chlorine: 0.2~0.4 ppm

Mongolia swimming pool disinfection project

Model: HDT-200-NACLO
Chlorine production: 200g/h
Function: swimming pool circulation water disinfection
Running method: fully automatic/PLC control
Range of residual chlorine: 0.3~0.5 ppm

Split Type Sodium Hypochlorite Generator

Consist of HADA's patent electrolyzer, Siemens LCD touch screen, Siemens PLC, SEKO metering pump, high frequency voltage constant current power supply, Precision filter, Softener, pickling system, etc.

Model	Size(host machine)	Cl_2 production	Concentration	Salt Consumption	Power Consumption
	L*W*H mm	kg/h	ppm	kg/h	Kw/h
HD-1K	900×700×1780	1	8000	3	4
HD-2K	1200×860×1950	2	8000	6	8
HD-5K	1200×860×1950	5	8000	15	20
HD-10K	1200×860×1950	10	8000	30	40
HD-30K	1760×960×1980	30	8000	90	120
HD-60K	2300×960×1980	60	8000	180	240

Features

- **Brine** and **Sea water** can be used as raw material
- Flexible combination modes and free collocation depends on the requirement of project
- Central control of real-time monitor
- Low running cost and long service life

Applications

- Municipal water & waste water plants
- Oil & power plant
- Food & Beverage Processing
- Cooling Tower & Recycling Water treatment

Interface of LCD touch screen

Interface of control panel

Control cabinet internal view

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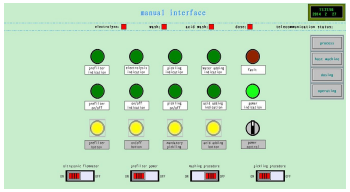
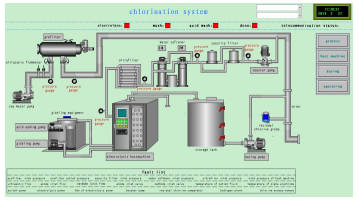
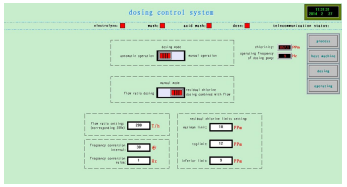
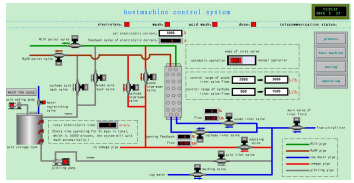
Interface Of Touch Screen









Application Cases

Malaysia water treatment plant chlorination

Chlorine production: 2kg/h
Function: Water treatment plant chlorination
Running method: fully automatic/PLC control
Range of residual chlorine: 1~1.5 ppm

Model: HD-2K-NACLO×2
(1 work 1 standby)

Hunan waste water treatment plant disinfection

Chlorine production: 30kg/h
Function: Waste water disinfection and ammonia nitrogen removal
Running method: fully automatic/PLC control
Range of residual chlorine: 0.3~0.5 ppm

Model: HD-30K-NACLO×2
(1 work 1 standby)

2011 Universiade water treatment plant project

Chlorine production: 5kg/h
Function: Water treatment plant chlorination
Running method: fully automatic/PLC control
Water treated amount: 5000ton/h

Model: HD-5K-NACLO×2
(1 work 1 standby)

Seawater chlorination system

Chlorine production: 10kg/h
Function: Seawater make sodium hypochlorite and disinfection
Range of residual chlorine: 0.3~0.5 ppm
Dosing rated: 2ppm continuous dosing , 5ppm shock dosing

Model: HD-10K-NACLO

Main Components

- **pure titanium electrode** – ensure long service life >18 years
- **25 times ruthenium iridium oxide coating, 20um coating thickness** – ensure lower power and salt consumption, high chlorine production and long life
- **3mm gap between anode and cathode** – anti-scale design, 60% Less scaling

Electrolytic Cell

Power Supply

- High-frequency, stability and constant current power specialized for **marine-leveled** electrolytic power
- **Antiseptic, moisture-proof, dust-proof**, input overvoltage, under voltage, default phase, output overvoltage, over current, short circuit and overheat protection;
- Electric conversion efficiency: **≥92%;**

Frame Work

- **Anti-corrosive aluminum material** as support of host machine
- Oxidation treatment
- Resistant of salty atmospheric corrosion
- **15 years long life** as good as new

LCD Touch Screen & PLC

- **Siemens LCD touch screen:** All running status are shown clearly and all parameters can be adjusted directly by the touch screen
- **Siemens PLC control center:** Every step of the whole system is detected and controlled by the smart PLC center, safety, reliability

Other Components

Screw conveyer

Metering dosing pump

Conductivity monitor

Hydrogen blower

Hydrogen detector

Temperature controller

Automatic Dosing Device

Sodium hypochlorite dosing system

PAM dosing system

Application Scope

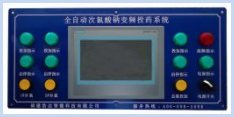
HD-DOSE intelligent dosing system is designed to apply in transporting many kinds chemical like Sodium hypochlorite liquid, PAC, Alums, Caustic soda flakes, and Anti-sludging agent in water treatment process. Variable-frequency metering pump to dose through positive pressure, continuously dosing, close-loop feedback adjust automatically, control accurately.

Parameters

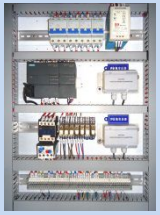
Material of tank: food grade PE
Volume of tank: 5L to 10T
Dosing pump: metering pump
Dosing amount: 1L/H to 5000L/H
Working method: can run alone or combination
Configure instrument: according to the actual requirement
Dissolved agitator: according to the actual requirement
Control method: dosing according to the PLC or timer

Sodium Hypochlorite Dosing System

Consists of storage tank, dosing metering pump, control panel, level gauge, flow meter, damper, valves and pipes. All components assemble and mount on the anti-corrosion UPVC base. We can design according to client's requirement. To meet different process requirements, it can transport chemicals(one or many kinds) to the liquid(one or many kinds).



Control panel and LCD touch screen view



Control cabinet internal view

Application case

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PAM Dosing System

Consists of storage tank, dosing metering pump, control panel, level gauge, flow meter, damper, valves and pipes. All components assemble and mount on the anti-corrosion UPVC base. We can design according to client's requirement. To meet different process requirements, it can transport chemicals(one or many kinds) to the liquid(one or many kinds).

Features & Advantage

- Three-grooves auto control dosing equipment
- Siemens PLC
- Touch screen, visual operation and setting
- Powder input auto-calculation
- Auto-dosing system, adjusted by PLC according to real-time flow rate
- All-in-one design, easy installation and commissioning
- 304 Stainless steel with anti-corrosion treatment
- Ajustable concentration setting for final solution

Application Scope

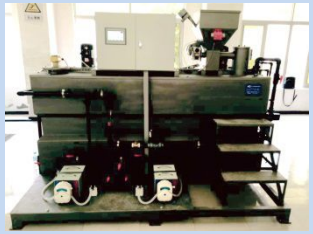
- Municipal water supply
- Industrial water treatment
- Paper industry
- Petrochemical industry
- Raw water pretreatment of thermal power plant
- Wastewater treatment
- flocculation, sludge dewatering, oil recovery and other application which suitable for PAM dosing system

Product introduction:

PAM dosing system is an automatic control system for the dissolving, diluting and dosing of flocculant PAM solid reagent. The PAM solution prepared by stages processions in several seperated tanks, ensure its best reaction time and concentration. The system is control by PLC, and when liquid level at low limit, the water supplement valve will be ON. Dosing unit start up by flow rate meter's signal and auto-adjust according to the flow rate to reach the acurate concentraion, and it'll stop when it reach the high limit, while the two or three antigators still working. The system is also suitable for the dilution of latex like polymer of cation, anion or non-ion, make them into 0.3~0.5g/L solution.

Parameters

Power of agitator: 1.1kw
Material of agitator: 304 or 316 stainless steel
Level control: magnetic or ultrasonic
Volume of tank: Can be set according to design chart
Control center: Siemens S7-200 series PLC
Interface: Siemens smart 700IE LCD touch screen
Dosing amount: 1000 ~ 10000L/H

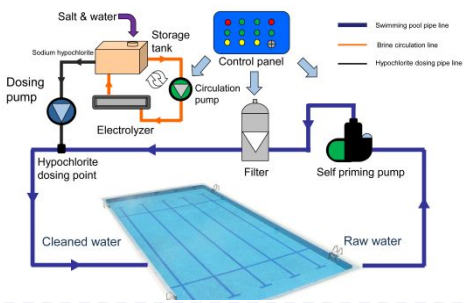


Application case # 1

Application case # 1

Auto Filtering Disinfection System

Process diagram



Summary

It is a combination of filter and disinfection. Disinfection system is producing sodium hypochlorite solution by the electrolysis of salt water or sea water. Filtering pump, electrolysis system, dosing system are all controled automatically.

Features

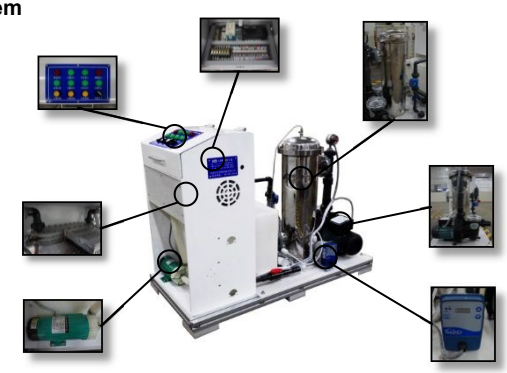
01 **Circulation filtering system**

02 **Disinfection system**

03 **Auto/Manual control**

04 **Environmental friendly**

05 **Easy maintainence**



Main Components

Control panel: indicating the running status of every function; the filter, electrolysis, dosage are all control auto/ manual here.

Inside circuit: including power supply, PLC, relay, AC contactor etc. And the PLC is available for the connection with the light in the swimming pool, or other function.

Magnetic pump: In charge of circulation of the solution from the tank to electrolyzer. 800~1200L/hour, 0.2 MPA

Electrolyzer: Titanium(TA1) material, 25 times special coating of ruthenium and iridium, auto polarity exchange design, ensure and high production and long life.

Bag filter: SS316 shell, easy-clean filter-bag, an important part for the removal of impurity of water.

Circulation filter pump: "AQUA" self priming pump, IP55 level, stainless steel, 1.5~7 CBM per hour, responsible for swimming pool water circulation and raw filtering function.

Dosing pump: "SEKO" metering pump, IP65 level, 4~5L/hour, 0.35MPA, auto-control the accurate dosage of sodium hypochlorite.

Advantage For Swimming Pool Application

All-in-one system

It combines of almost every components needed for a swimming pool, filter, disinfection, water circulation, when you receive that machine, just connect the pipeline, the electricity wire, input the salt and press the button, then it will take over all the job.

Low running cost

The only material for disinfection is salt, the system will electrolysis the 3% concentration salt water into 0.5% sodium hypochlorite, and dose into the swimming pool automaticly. 300g salt is surficient enough to treat 20~50 tons water.

Safer and easier operation

The machine take place in a closed loop system and running automatically, Pool technicians will no longer have to mix or hand dose chlorine again, only salt is needed to be pull into the dissolving tank, then after 60~100 minutes, you'll get 3500~4000ppm sulotion. Besides, the storage of chemicals will no longer be required in the stores or plant room making the whole place safer for both guests and employees.

Better quality water

With the System installed on your pools you will no longer see the water go cloudy during busy periods which happens with traditional dosing systems when they can not keep pace with the chlorine demand of the pool. The machine is sized to keep the pool water in perfect condition during the hottest and busiest periods. The slightly saline solution in the pool is similar to the natural salinity of our eyes. Contact lens solution is a similar salinity, hence most people find swimming in this environment far more pleasant than fresh water.

High Concentration Sodium Hypochlorite Generator (up to 12.5%)

Introduction

High concentration sodium hypochlorite generator, is using membrane electrolysis 25% ~ 30% brine to produce chlorine gas, and sent into the reaction tower for mix reaction with sodium hydroxide, then got the final product of 12% sodium hypochlorite solution;
The system combine of: salt treatment unit, ultra-pure water system, control cabinet, electrolytic unit, reaction tower, sodium hydroxide recycled unit etc.;

The main reaction:
1. the diaphragm cell reactions
The power is 2NaCl + 2H2O=H2 +CL2 +2NaOH
Anode: 2Cl – 2e = Cl2
Cathode: 2H2O + 2e- = H2 + 2OH-
2. The reaction tower:
Cl2 + NaOH = NaCl + NaClO + H2O(NaOH cooling liquid in case)

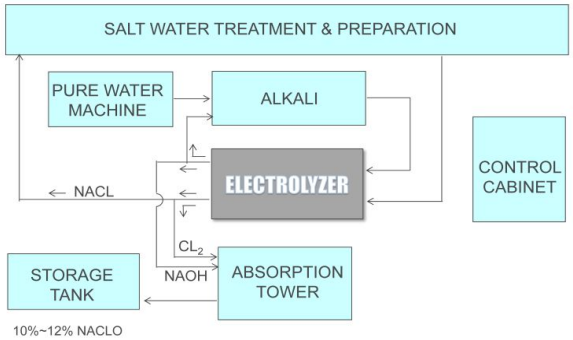
The High concentration sodium hypochlorite solution is a solution with high oxidation and strong sterilization ability, which widely apllied for bleaching and disinfection.

Features & Advantages

- Mature processing, stable performance
- Fully automatic operation, reducing the work and cost
- The components are all from famous domestic and foreign brand, ensure the stable running and long life
- The actual configuration can be adjusted according to customer demand and ensure cost-effective
- Excellent design, flexible capacity arrangement, easy installation

Model: HD-10%-NACLO-50K

Process Diagram



Main Components

Control cabinet

Electrolytic unit

Reaction tower

Alkali tank + alkali recover sytem

Ultra-pure water system

Multi-stages brine treatment system

EDI System

Features

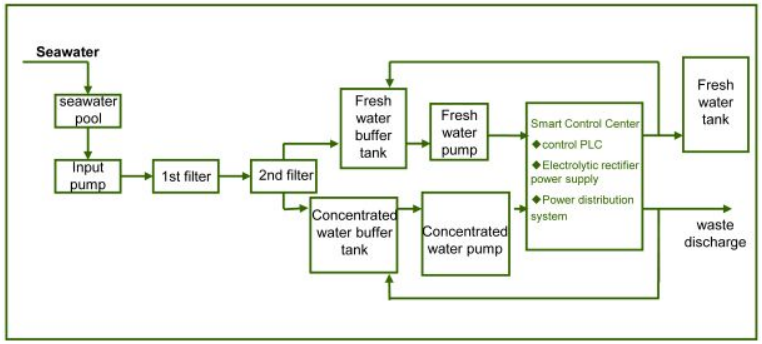
With high conductivity for the removal of residual salt and other impurities

The electrodialysis (EDI) technology transfers ions from one solution to another through selective ion exchange membranes. EDI system runs by electricity not chemicals, and the water can be purify <500mg/L as TDS. The system is suitable for a variety of applications, including: **seawater desalination**, chemical, light industry, metallurgy, paper and pharmaceutical industry, especially in preparation of pure water and disposal of waste water.

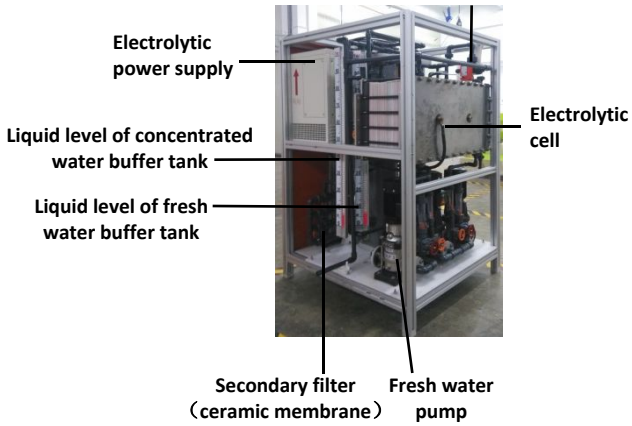
Advantages

- Low energy cost as well as operation
- Small space occupation for facilities
- Reduces chemical consumption and salt effluent
- Operates simply and expands easily due to modular system designs
- Long service life

Process Diagram



Main Components



primary filter （PP cotton）

Control Cabinet & Panel

Internal Diagram

Electro-Power Control Box

Control Panel

Pipeline Design

Raw Water Input

Fresh Water Output

Ceramic membrane filter discharge

Discharge of concentrated water