



## Introduction to 500LPH RO System (with a water softening system)

# 360° View Of the System



The front of the machine



The back of the machine



The side of the machine



Machine Dimensions

# System Annotation Instructions

## 500LPH RO System (with a water softening system)

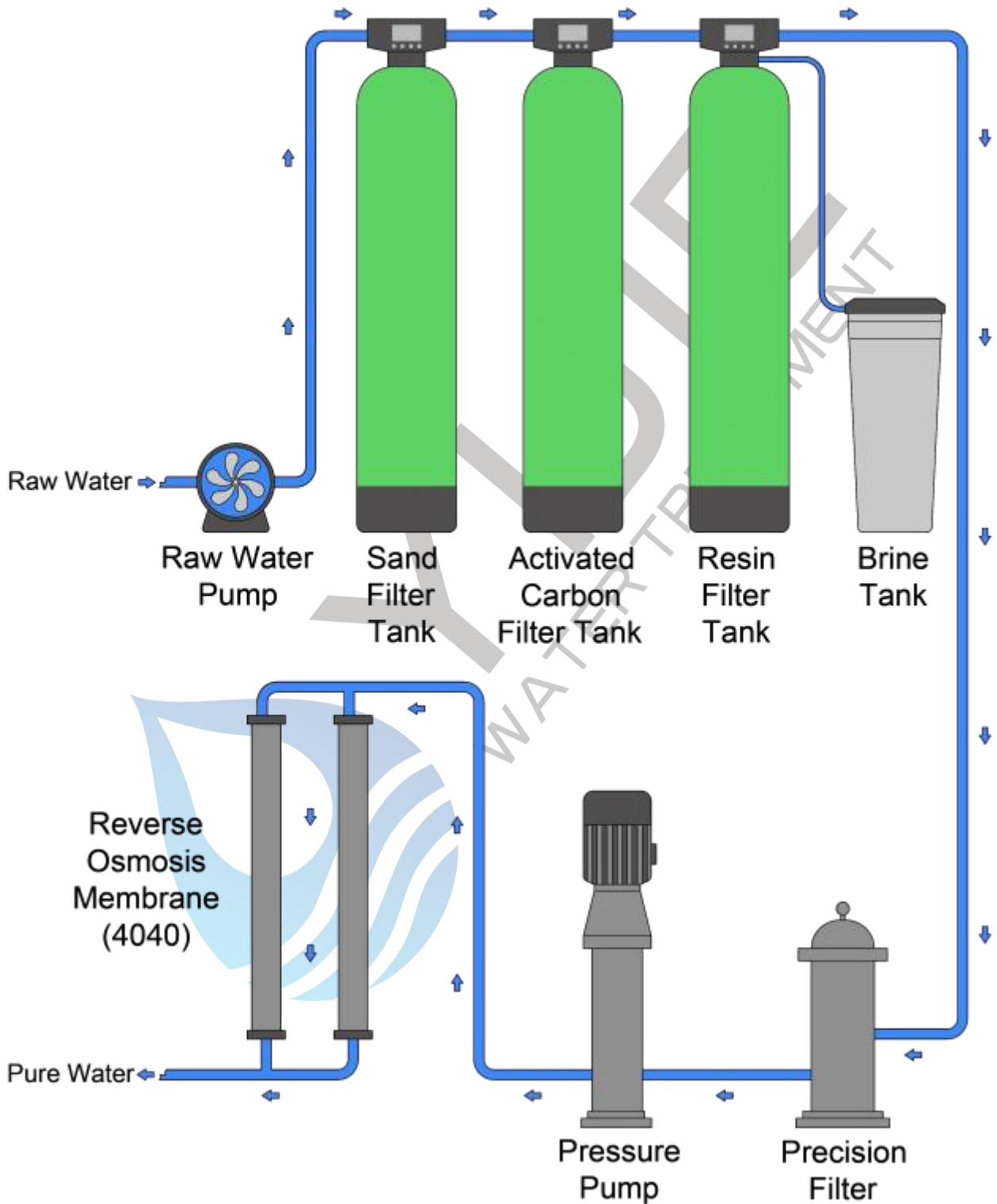


### Parameter

|             |                                                                                  |              |                                         |
|-------------|----------------------------------------------------------------------------------|--------------|-----------------------------------------|
| Model       | 500 L/hour<br>(Sand-Carbon-Resin)                                                | Machine Size | 1500*630*1750mm                         |
| Pressure    | 0.2 ~0.5Mpa                                                                      | Voltage      | 220V                                    |
| Precision   | 0.1nm                                                                            | Power        | 1.5kw / 50Hz                            |
| Material    | stainless steel<br>/fiberglass                                                   | Water Source | tap water, well water,<br>surface water |
| Filter Type | Sand Filter → Carbon Filter → Water Softener<br>→ Precision Filter → RO Membrane |              |                                         |

# Filtration Process

## 500LPH RO System (with a water softening system)



The raw water pump is a key power component in water purification equipment that is responsible for drawing raw water and delivering it to subsequent treatment units, and it directly determines the water supply stability and treatment efficiency of the equipment.



## I. Basic Introduction to Raw Water Pump

### **Installation Location:**

Connected in series between the raw water inlet and the pre-treatment unit (such as a filter element or a water softener).

### **Core Positioning:**

Extract raw water such as tap water and groundwater from the water source, and transport it while overcoming pipeline resistance.

### **Key Features:**

The flow rate and head can be matched to the scale of different water purification equipment, and some are equipped with a pressure self-adaptive adjustment function.

## II. The Core Functions of Raw Water Pump

### **Providing Conveying Power:**

Overcome the resistance of pipelines, filter elements and other components to ensure the continuous inflow of raw water into the treatment system.

### **Stabilizing Water Supply Pressure:**

Prevent frequent start-ups and shutdowns of the equipment caused by fluctuations in raw water pressure, and ensure the stable operation of subsequent processes such as filtration and reverse osmosis.

### **Adapting to Treatment Requirements:**

Precisely control the raw water delivery speed according to the equipment's water production capacity requirements, and provide suitable water flow conditions for subsequent purification processes.



Quartz sand filtration is a core pre-treatment process in water purification equipment. It removes suspended impurities from water through physical interception, lays a solid foundation for subsequent advanced purification, and serves as an indispensable key link in the water purification process.

## I. Basic Introduction to Quartz Sand Filtration

### Core Principle:

It utilizes the porous structure formed between quartz sand particles to intercept pollutants such as suspended solids, colloids, and sediment in water through mechanical interception and adsorption-coagulation.

### Core Features:

1. Stable purification effect with a high turbidity removal rate;
2. Low raw material cost and long service life;
3. Simple operation, requiring only regular backwashing for maintenance.

## II. The Core Functions of Quartz Sand Filter

### Pre-treatment for Impurity Removal:

It intercepts large-particle impurities, colloids, rust, and other substances in water, preventing clogging or abrasion of subsequent core components such as ultrafiltration membranes, RO membranes, and activated carbon.

### Enhancing Purification Efficiency:

It reduces the turbidity of raw water and lowers the treatment load of subsequent advanced treatment units, thereby optimizing the overall purification effect of the water purification equipment.

### Ensure the quality of effluent water:

It reduces the impact of suspended solids in water on water taste, provides a clean water quality foundation for subsequent disinfection and advanced filtration, and ensures the final effluent is clearer and safer.

# Activated Carbon Filter

Activated carbon filtration is one of the core technologies in the field of water purification, and its core function is to remove impurities from water and improve water quality through adsorption.

## I. Basic Introduction to Activated Carbon Filtration

Activated carbon is a porous carbon material with a large number of tiny pores inside and an extremely large specific surface area. The filtration principle is based on physical adsorption and chemical adsorption, and the pores can capture and lock in various impurity molecules in water. Common types include Granular Activated Carbon (GAC) and Powdered Activated Carbon (PAC); the former has a large adsorption capacity, while the latter has higher filtration precision.



## II. The Core Functions of Activated Carbon

### Removal of Odors and Residual Chlorine:

It efficiently adsorbs chlorine gas, residual bleaching powder in water, as well as odors generated by algae and humus.

### Adsorption of Harmful Organic Substances:

It can capture trace organic impurities in water, such as pesticide residues and industrial pollutants.

### Improvement of Water Taste and Quality:

It reduces off-colors, off-odors, and some soluble impurities in water, making the treated water clearer and its taste fresher.

# Water Softening System

The water softening system is mainly composed of a resin filter and a brine tank, and these two components work together to achieve water softening and resin regeneration.



## I. Basic Introduction to Resin Filter

The ion exchange resin filled inside the resin filter is mostly granular polymer material, which is commonly used in water softeners and water purification equipment to specifically treat hardness ions in water.

## II. The Core Functions of a Resin Filter

### Water softening:

Adsorbs calcium and magnesium ions in water, reduces water hardness, and prevents scale formation.

### Auxiliary purification:

Some special resins can adsorb heavy metal ions such as iron and manganese, improving water purity.

## III. Basic Introduction to the Brine Tank

As a supporting device for resin filters, it contains regeneration salt (mostly industrial salt or special water softening salt) inside. It is mainly made of plastic, featuring a simple structure and good sealing performance.

## IV. The Core Functions of the Brine Tank

### Provide regenerant:

After salt dissolves, it forms brine, which acts as a source of sodium ions for resin regeneration.

### Restore resin activity:

When the resin becomes saturated with adsorption, brine replaces the calcium and magnesium ions on the resin through ion exchange, allowing the resin to regain its water-softening capacity.



# Precision Filter



The precision filter is a core component of pre-treatment. Its main functions are to trap fine impurities, protect the core water purification components at the back end, and at the same time improve the cleanliness of the effluent water.

## I. Basic Introduction to Precision Filters

### Definition:

Also known as the pre-treatment security filter for water purification, it is a key filtration device in the water purification system that is located before the RO membrane (Reverse Osmosis Membrane).

### Core Components:

The filter housing is made of stainless steel, and the filter element is a PP melt-blown filter element. Both comply with food contact safety standards.

### Filtration Precision:

The filtration precision ranges from 1  $\mu\text{m}$  to 5  $\mu\text{m}$ .

## II. The Core Functions of Precision Filters

### Pretreatment Interception:

Efficiently trap fine impurities such as rust, sediment, colloid, and eggshell fragments remaining in tap water, preventing these impurities from entering the subsequent system.

### Protect Core Components:

Prevent high-value core components such as RO membranes and nanofiltration membranes from being scratched or clogged by particles, extend the service life of membrane elements, and reduce replacement costs

### Improve Effluent Quality:

Reduce the subsequent filtration load, resulting in lower turbidity and a fresher taste of the terminal effluent, while providing a fundamental guarantee for sterile water purification.

# Pressure Booster Pump

The pressure booster pump is the "power hub" of water purification equipment, with its core function of maintaining stable water pressure to ensure the water purification system operates efficiently and meets filtration standards.

## I. Basic Introduction to the Pressure Booster Pump

### Installation Location:

Installed at the front end of the RO membrane.

### Core Material:

Stainless steel, featuring corrosion resistance, no secondary pollution, and a compact size that saves space.



## II. The Core Functions of the Pressure Booster Pump

1. Make up for insufficient water pressure and solve the problems that the water flow cannot pass through the filter element and the purified water stagnates due to excessively low water pressure.
2. Meet the high-pressure filtration requirements, provide pressure for the RO reverse osmosis membrane, and ensure the interception of impurities, heavy metals, etc.
3. Stabilize the water outlet state, ensure uniform purified water flow and constant water pressure, prevent the water output from fluctuating (being sometimes large and sometimes small), and improve water usage comfort.

# Reverse Osmosis Membrane



The RO membrane is the core component of reverse osmosis technology. It achieves high-precision water purification through selective permeation and serves as a key part in water purification equipment.

## I. Basic Introduction to RO Membranes

- 1.The material is mainly composed of high-molecular substances such as polyamide, featuring strong chemical stability and good anti-pollution performance.
- 2.It has an asymmetric structure: the surface layer is a dense active layer (which determines the filtration precision), and the lower layer is a porous support layer (which ensures water flow passage).
- 3.This membrane is a low-pressure membrane, featuring low operating pressure (0.4-1.0 MPa) and an energy-saving advantage. It is suitable for surface water and municipal water treatment.

## II. The Core Functions of RO Membranes

### High-precision filtration:

It can retain particles smaller than 0.0001 microns, including suspended substances such as sediment, rust and colloid.

### Deep desalination:

It can remove more than 99% of dissolved salts in water, solving the problems of hard water quality and salty taste.

### Water Quality Purification:

It effectively separates pollutants such as organic matter, heavy metal ions, bacteria and viruses, and produces pure water that meets standards.