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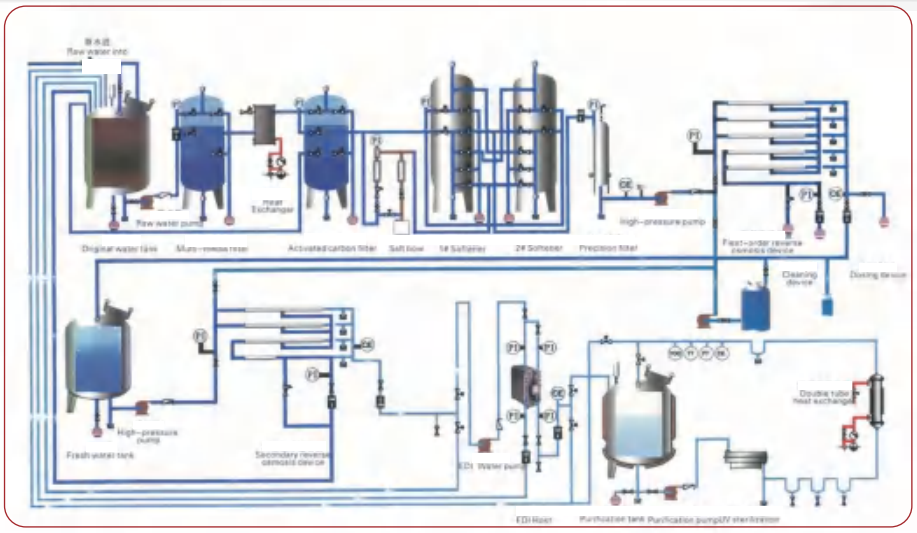
Purified water system

Based on the quality of the raw water, provide reasonable process designs to ensure that the purified water production system can consistently produce purified water that meets pharmacopoeia standards over the long term.

Equipment that converts raw water into purified water or ultra-pure water through various purification processes, The pretreatment process includes a combination of **processes such as raw water tanks, mechanical filters, activated carbon filters, and softeners;**

The purification process includes various combinations such as **RO+EDI, RO+RO, RO+RO+EDI,and RO+EDI+UF**, with the produced water quality meeting the requirements of the European Pharmacopoeia, Japanese Pharmacopoeia, and United States Pharmacopoeia; ultra-filtration technology can be used to produce high-purity water compliant with the European Pharmacopoeia.



Purified Water System Flow Chart

- The entire system is designed with a modular production approach, featuring a rational and compact structure with a small footprint;
- It is equipped with a comprehensive control system to ensure safe and reliable operation of the water treatment system;
- Dual softeners are arranged in series to prevent stagnant water caused by standby process equipment;
- The entire process eliminates intermediate water tanks, offering advantages such as low contamination risk;
- Dual-pipe pure water supply is employed, featuring a unique internal circulation mode within the water treatment system.

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Features

- Achieve pasteurization of the entire system and independent unit modules;
- Fully comply with FDA/EU/GMP requirements;
- The softener adopts a dual-softener design;
- No intermediate storage tank design between the first-stage RO and second-stage RO;
- 83D principle to prevent dead zones;
- Imported welding machines and 100% endoscopic weld sample inspection;
- Dual-supply water system and hygienic internal circulation design; unique energy-saving mode operation;
- Production and quality control are conducted according to the V-Model, with a comprehensive validation document system established.

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Dual reverse osmosis + EDI system

The dual reverse osmosis + EDI system, specifically the RO/hot water type EDI combination, demonstrates excellent removal capabilities for microorganisms, endotoxins, and pyrogens, ensuring these parameters are strictly controlled within the standards specified by the USP, JP, BP, and European Pharmacopoeia. If customers have stringent requirements for bacterial microorganisms, ultrafiltration sterilization can be selected at the product water end. It can maintain pyrogen-free water under low-temperature conditions.

Dual reverse osmosis system

Dual RO Pharmaceutical Pure Water Machine is a high-performance pure water preparation device designed specifically for the pharmaceutical industry. It uses a dual reverse osmosis (RO) process combined with other treatment technologies to produce high-purity purified water or ultrapure water that meets pharmacopoeia, GMP, FDA, and other standards. It uses dual reverse osmosis membrane separation technology to retain ions, organic matter, microorganisms, and other impurities in water through a semi-permeable membrane, gradually improving water purity.

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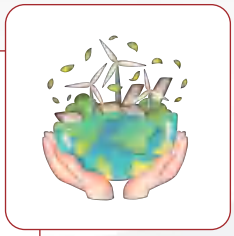
Features

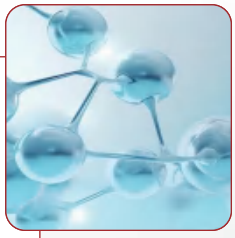
This system is specifically designed for applications with low raw water salinity (such as municipal tap water or low-mineralization groundwater). By streamlining the pretreatment process, it significantly reduces operating costs, effectively removes suspended solids, residual chlorine, and some organic matter, and avoids overreliance on softening or deep desalination processes.

Zero chemical contamination design, compliant with GMP cleanliness requirements. All system contact components are made of 316L stainless steel, eliminating the use of resins and chemical scale inhibitors to prevent contamination from leachates.



Ultra-low total organic carbon (TOC) in the treated water, with a dual-layer protection mechanism integrated into the system to control organic pollutants: 95% of organic matter is removed during the pretreatment stage; high desalination rate spiral-wound composite membrane RO membranes retain organic matter with a molecular weight of 100-300 Da, with a removal rate of >99% for small-molecule organic matter such as humic acid and tannins.

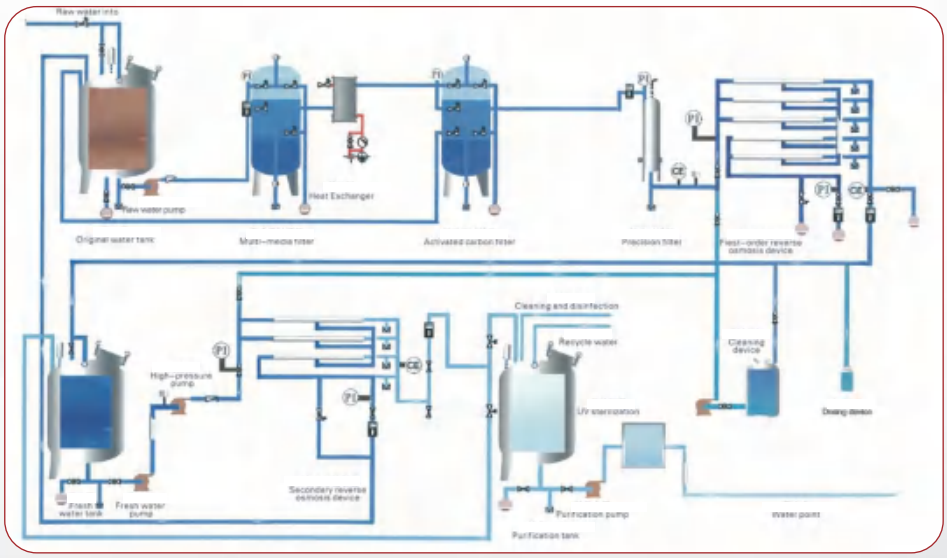
Modular structure design reduces operational complexity. Compact and integrated structure, with pre-treatment, RO main unit, and other components integrated into a standard rack, suitable for clean room space restrictions.Intelligent control, PLC touch screen enables one-button start/stop, real-time monitoring of flow/pressure, and fault self-diagnosis.



Features

This system provides pharmaceutical companies with a cost-effective pure water solution by precisely matching low-salt raw water treatment requirements, strictly controlling organic pollutants, achieving green production, and simplifying maintenance processes.

The system delivers stable water quality (conductivity <5 μS/cm, TOC <30 ppb), meeting the requirements for raw material washing and initial rinsing of formulation water points. It also reduces validation costs and environmental risks, helping pharmaceutical companies efficiently pass GMP certification and FDA audits.



Single reverse osmosis system

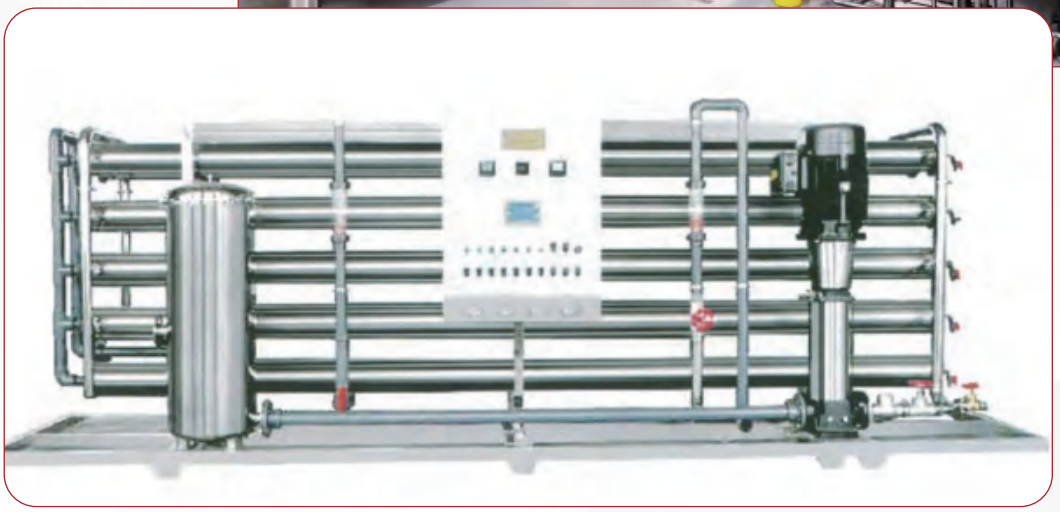
Features

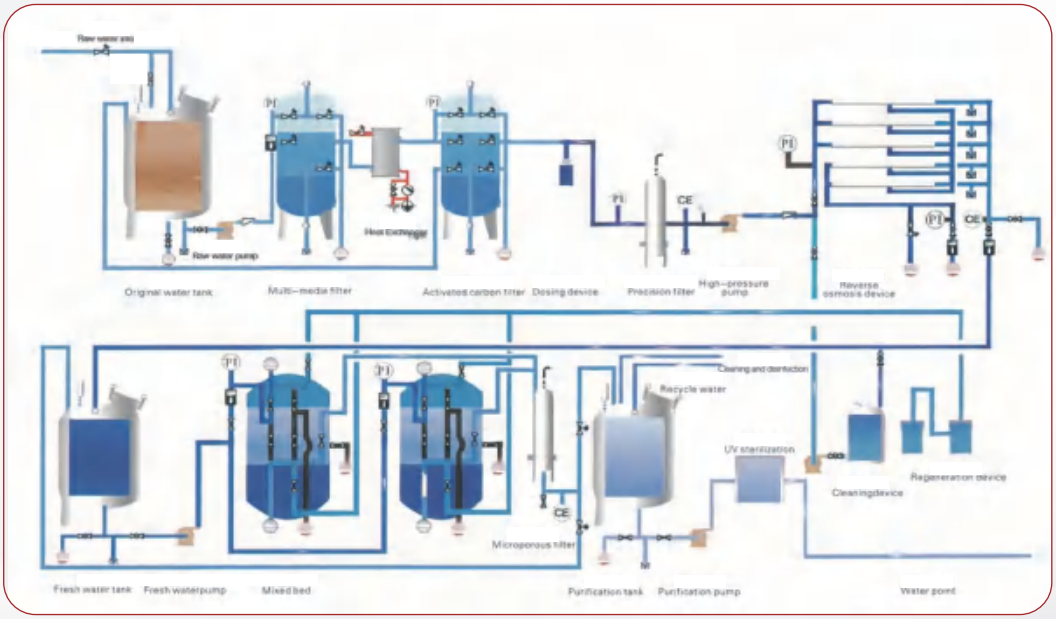
This system is designed specifically for pharmaceutical companies and covers scenarios such as API purification, formulation washing, and analytical laboratories. Through low-cost, high-stability water supply solutions, it helps pharmaceutical companies reduce quality risks and operating costs.

Ultra-low operating costs, significant long-term economic benefits, energy-saving design, optimized RO membrane tonnage; selection of long-life membrane elements to reduce maintenance frequency.

This system provides pharmaceutical companies with a cost-effective pure water solution by precisely matching low-salt raw water treatment requirements, strictly controlling organic pollutants, achieving green production, and simplifying operation and maintenance processes. The stable water quality (conductivity < 5 μS/cm, TOC < 30 ppb) can meet the requirements of API washing and initial rinsing of formulation water points, while reducing validation costs and environmental risks.

Highly stable design, suitable for complex working conditions. Fully automatic operation, PLC controller monitors parameters such as pressure, flow rate, and conductivity in real time, automatically starts and stops when abnormalities occur, and triggers alarms. Material reliability: 316L stainless steel piping is corrosion resistant.



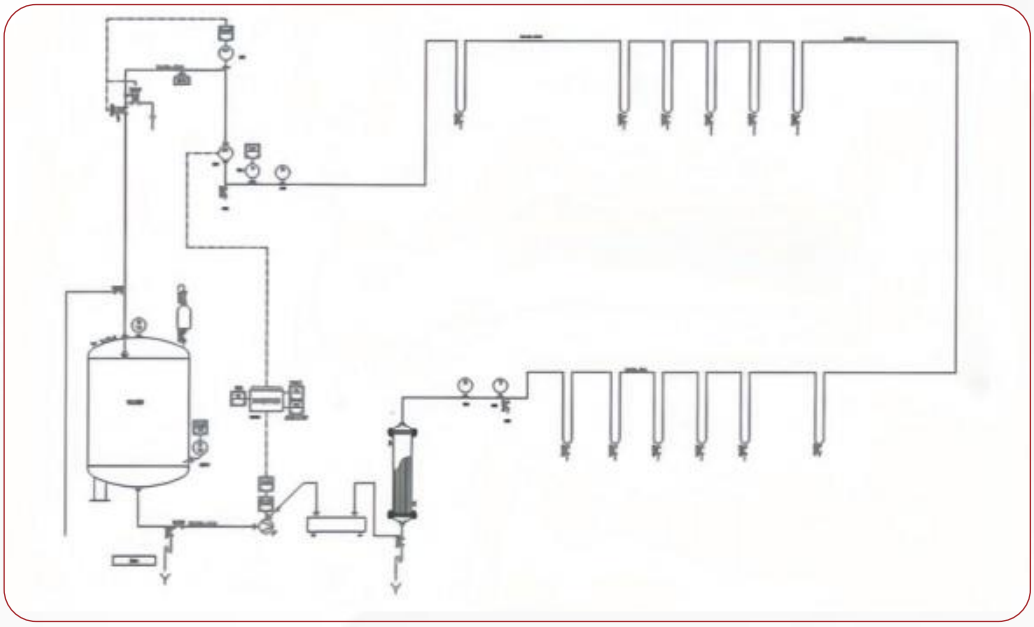


Reverse Osmosis System Flow Chart

Distribution system

The distribution system transports stored pharmaceutical water to process points and ensures that its pressure, flow rate, and temperature meet the requirements of the process points. The distribution system monitors and controls the flow rate, pressure, temperature, total organic carbon, conductivity, and ozone levels of pharmaceutical water in real time, and effectively controls microbial loads in the water through periodic sterilization.

Provides pharmaceutical companies with a purified water system storage and distribution SKID, offering multiple disinfection modes such as pasteurization, ozone disinfection, pure steam sterilization, or superheated water sterilization.



Distribution Pipeline Flow Chart

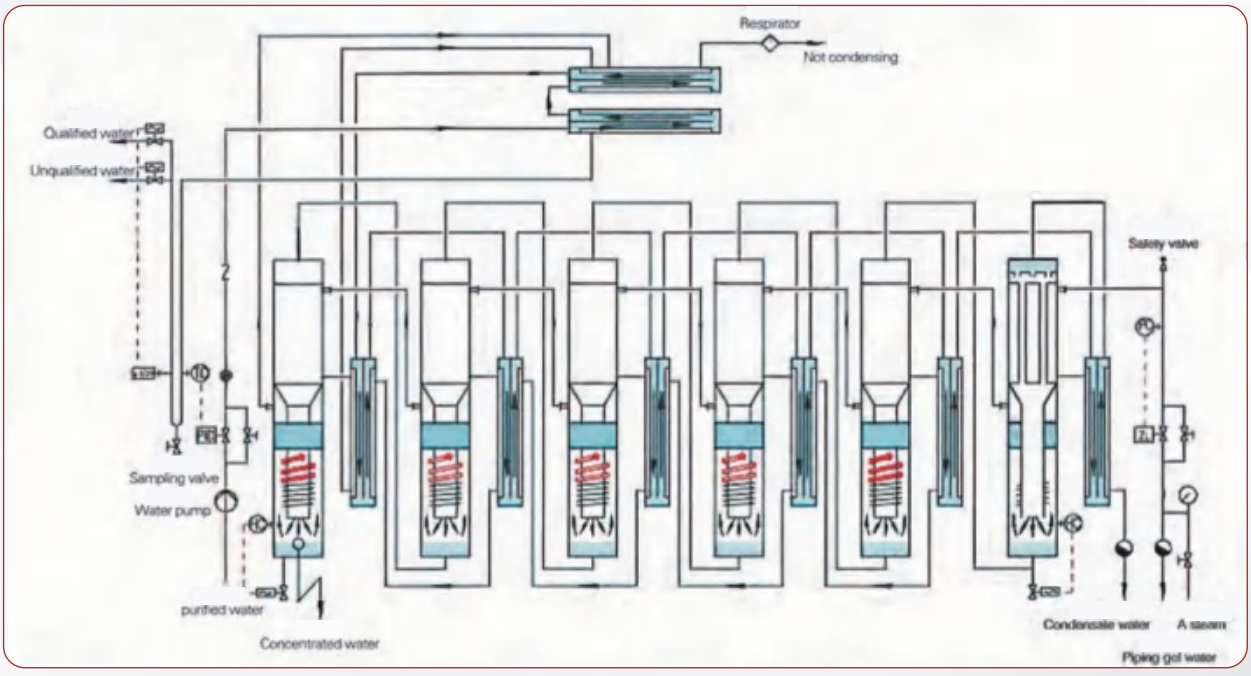
Multiple-effect Distilled Water Machine

Utilizing multi-effect distillation technology to ensure pure water quality, this system is suitable for high-demand applications such as pharmaceutical manufacturing and laboratory use.

The production technology for this multi-effect distillation water machine is sourced from Italian STILMAS, representing world-leading standards from the mid-to-late 1990s. Control modes include manual, PLC automatic, and fully automatic.

Features:

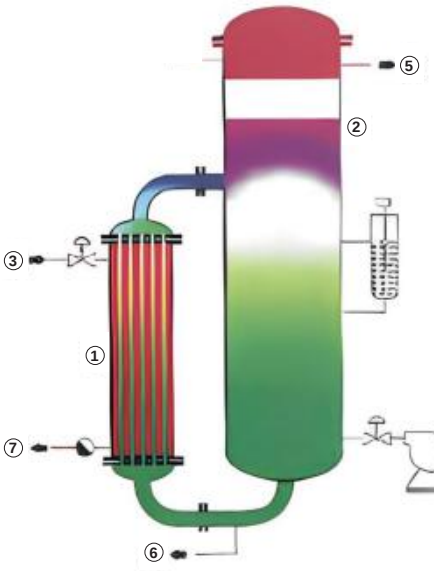
- The machine uses a double tube plate design to prevent cross-contamination between different materials.
- The sealing structure is well-designed, with most components connected via flanges to prevent leaks.
- The five-effect machine uses minimal cooling water, while the six-effect machine does not require cooling water at all.
- Designed with a high operating pressure (0.88 MPa), it offers a long service life and high water production capacity.
- Significant energy and water savings: due to the adoption of new technology, the machine's heat exchange efficiency is highly effective, achieving 20% energy savings compared to other models. Additionally, the minimal or no use of cooling water results in approximately 15% water savings.



Principle d of Multi-effect Distillation Water Machine

Pure steam generator

Pure steam generator is currently one of the most important pieces of equipment used for sterilization in tank-type equipment, piping systems, and filters, and can also be used to drive sterilizers. They comply with the current requirements of the United States Pharmacopeia, the European Pharmacopoeia, the Japanese Pharmacopoeia, and the Chinese Pharmacopoeia regarding injectable water, and must be designed and manufactured in strict accordance with pressure vessel standards. They can be used in process production lines in industries such as food, pharmaceuticals, and biotechnology.



1. Evaporator
2. Separator
3. Industrial steam inlet
4. Raw waterinlet
5. Pure steam output
6. Concentrated water discharge port
7. Condensate discharge port

Pure steam generator structure

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Features:

316 Structural Materials: All components in contact with raw water and pure steam are made of 316L stainless steel.

SL Chemical Polishing: The stainless steel surfaces undergo electrochemical polishing to ensure the quality of pure steam production and extend the equipment's service life.

SS Double-tube plate design: The external preheater and evaporator are designed with double-tube plates, compliant with GMP requirements, effectively eliminating the possibility of contamination from low-grade media. All hot surfaces are insulated, and the exterior is enclosed in a 304 stainless steel housing.

The equipment has no moving parts, operating quietly and reliably.

Reliable PLC control with standardized procedures.

Easy to operate and maintain.

PLC Control system: Utilizes PLC automatic control technology to meet various customer control requirements. From basic steam quality assessment and distribution to advanced functions such as continuous regulation of various media, integration with storage systems, hierarchical password control, and even control of evaporation rate changes.

Whole-machine performance factory testing: In the whole-machine testing workshop, whole-machine testing is conducted under simulated actual working conditions according to established procedures.

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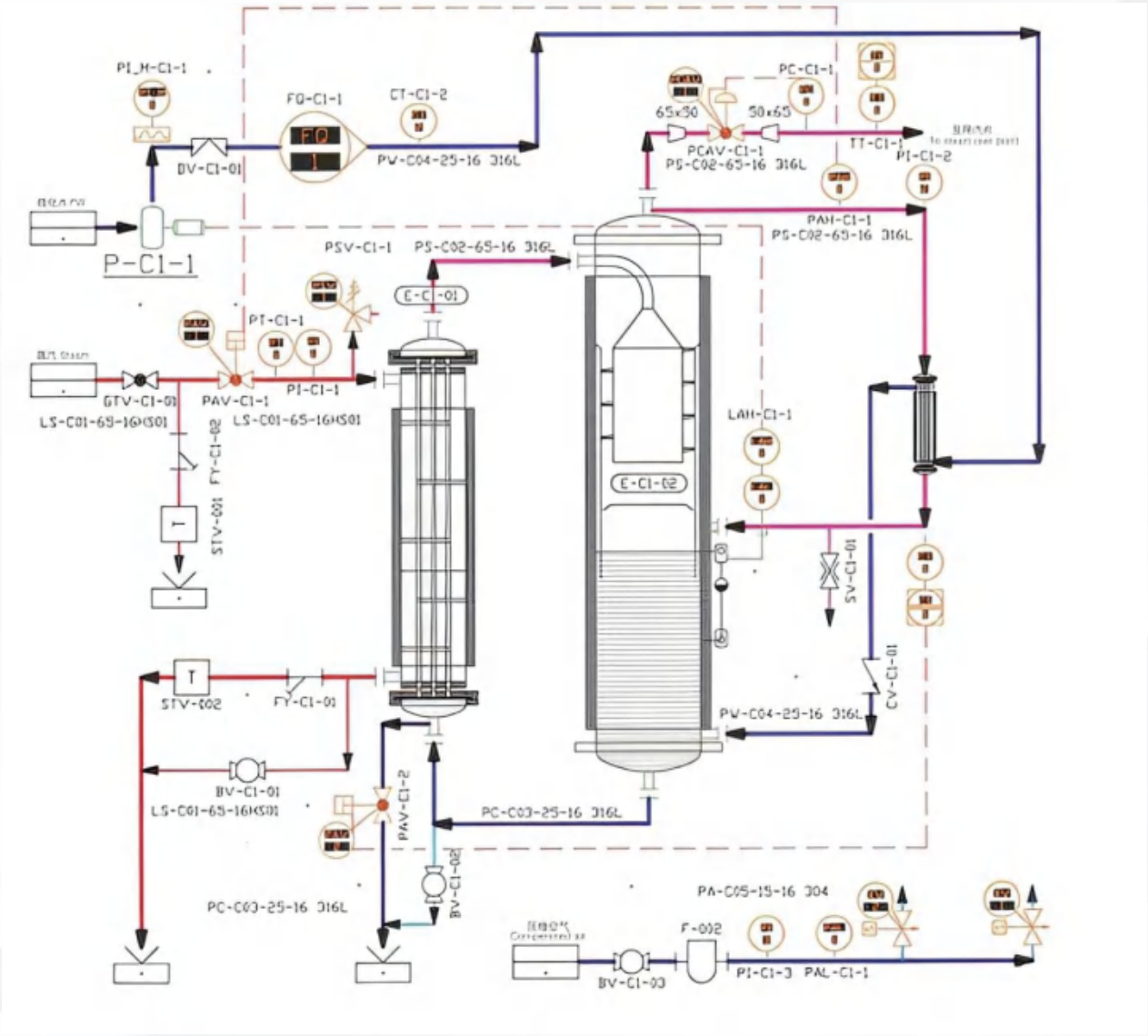

Pure Steam Generator PID Diagram

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