



*Professional Water Treatment & Bottling Solutions*

## **Leonard Industrial Co., Limited**

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### **1,000L/H Ultra-Pure Water System (With heat resistant 80°C RO, EDI, UF system for heat sterilizing process)**



#### **1. Design basis and treated water standard:**

- 1.1 Production technique: Two stage RO + EDI System + UF Post Treatment
- 1.2 Produced water's application: Ultra-pure water for Pharmaceutical Use
- 1.3 The capacity of produced water: 1,000L /H (under 25°C)
- 1.5 Production pure water standard: EDI output water electrical resistivity: 10-18MΩ • m (25°C)
- 1.6 Operation Mode: Fully Automatic run by PLC control
- 1.7 System technological process is based on customer provided flow chat layout.



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## 2. System configuration and related process:

### Valves & Piping System

The high purity water system all using SS304, SS316L materials with internal and external polishing process as sanitary level and ISO standard.



**Pneumatic Angle Seat Valve SUS 316L sanitary level**



**Manual diaphragm valve SUS 316L sanitary level**



**HPW sampling valve SUS 316L sanitary level**



**Pre-treatment sampling valve SUS 304 sanitary level**



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**Butterfly Valve SUS304, 316L sanitary level**



**High temperature flow rate meter 304, 316L sanitary level**



**Pipes SUS304, 316L sanitary level**



**Pipe clamp 304 sanitary level**



**Quick fitting clamp set SUS 304, 316L sanitary level**



**304, 316L sanitary level**



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drain valve SUS304, 316L sanitary level



Pressure gage 316L sanitary level

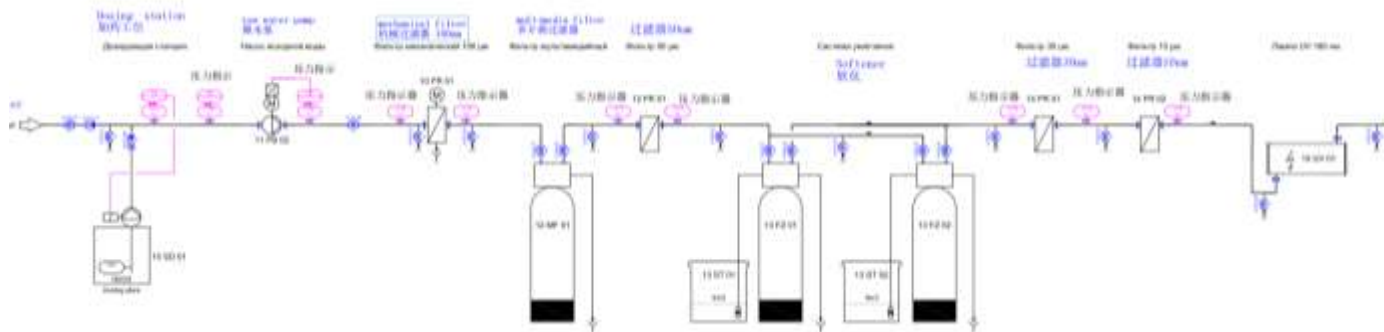


Spray ball SUS304, 316L sanitary level



proportioning valve SUS304, 316L sanitary level

### Pre-treatment System (normal temperature) Flow chat process.





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1. All Piping are using SS304, chemical dosing tank is PE.

2. Fully automatic electric control system.

Main component list:

	Item Name	Origin	Material	Specification	QTY	Photo/ remark
<b>10 SD 01</b>						
1	Dosing Pump (metering pump)	SEKO		PVDF pump nozzle, invariable flow rate can be adjustable	1	
2	Chemical tank	local	PE	40L	1	
3	Pressure meter	Domestic	SS316L	Acuuracy:2.5	1	
4	Check valve	Domestic	SS304	1.5" Tri-Clamp	1	
5	Plug valve	Domestic	SS304	DN10,ISO,MP Ra≤0.5um	1	
<b>11 PB 02</b>						
1	Raw Water Pump	Grandfos	SS304	CR3-7-0.55KW/380V/5 0HZ	1	
2	Frequency Inverter	ABB		2.2KW	1	
3	Pressure gage	Domestic	SS304	0~6bar,63mm Indicator	1	
4	Pressure relay	Domestic		0-6bar	1	
5	Plug valve	Domestic	SS304	DN10,ISO,MP Ra≤0.5um	1	
<b>10 FR 01</b>						
1	Y Type Filter	Domestic		100um	1	
2	Pressure gage	Domestic	SS304	0~6bar,63mm Indicator	1	



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3	Plug valve	Domestic	SS304	DN10,ISO,MP Ra≤0.5um	1	
<b>12 MF 01</b>						
1	Multi-media filter	Domestic	SS304	Φ500×1600 SStank With quartz sand 350kg	1	
2	Runxin automatic multi-way valve	Domestic	Plastic	4 inch	1	
3	Plug valve	Domestic	SS304		1	
<b>12 FR 01</b>						
1	Micron Filter	Domestic	SS304	50um 20" x 5 cores	1	
2	Pressure gage	Domestic	SS304	0~6bar,63mm Indicator	1	
3	Plug valve	Domestic	SS304	DN10,ISO,MP Ra≤0.5um	1	




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13FZ01 13FZ02		13FT01 13FT02					
1	Softener filter	Domestic	SS304	Φ500×1600 anticorrosion tank	2		
2	Cation resins			350kg	1		
3	Runxin Automatic control head	Domestic	Plastic	4 inch	2		
4	Pressure gage	Domestic	SS304	0~6bar,63mm Indicator	1		
5	Plug Valve	Domestic	SS304	DN10,ISO,MP Ra≤0.5um	2		
6	Salt tank	Domestic	PE	40L	2		
14 FR 01 30um		14 FR 02 10um					
1	Micron Filter	Domestic	SS304	30um-10um 20"x5cores,	2		

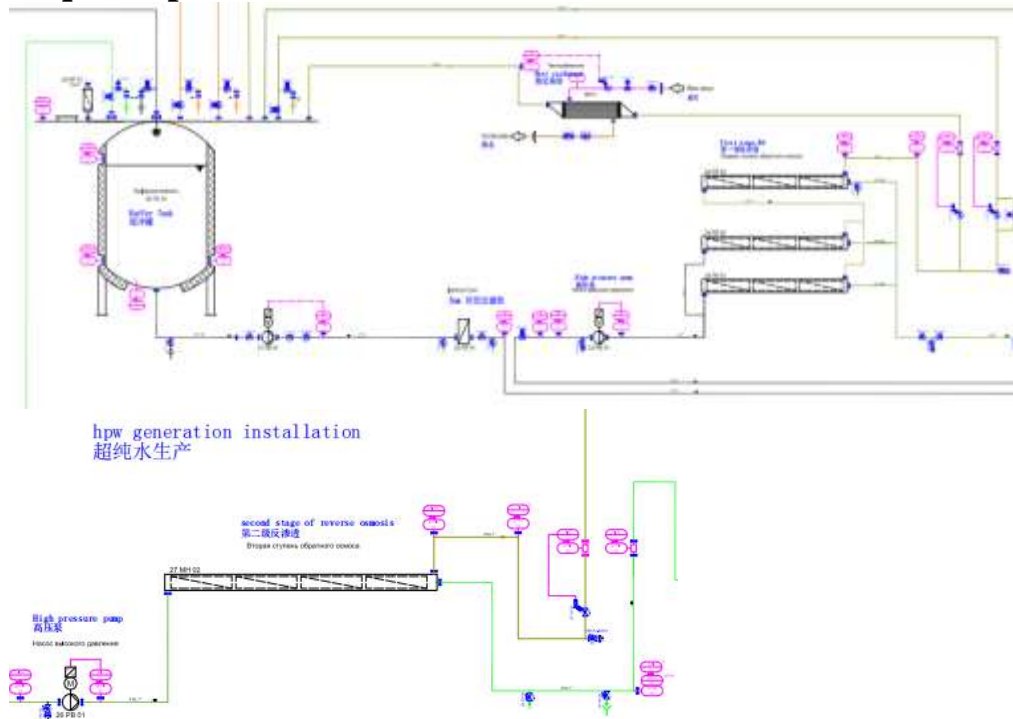


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2	Pressure gage	Domestic	SS304	0~6bar,63mm Indicator	2	
3	Plug valve	Domestic	SS304	DN10,ISO,MP Ra≤0.5um	2	
<b>15 UV 01</b>						
1	UV Sterilizing System	Domestic	SS304	60W	1	

## Double Stages Reverse Osmosis System (heat resistant system for 80 degree high temperature sterilizing)

Required process flow chart:



All piping using SS304,SS316L Materials, with internal and external polishing process as sanitary level and ISO standard.

Control mode with fully automatic and manual.






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### Main component list:


20TK01						
1	Raw water tank	Domestic	SS304	1000L sanitary level	1	
2	Spray ball	Domestic	SS316L	360° stationary type	1	
3	Water inlet Pneumatic Butterfly Valve	Domestic	SS316L	1.0", Tri-Clamp, ISO, single action, normally closed, with mechanical switch display, EPDM	1	
4	Manual Butterfly Valve	Domestic	SS316L	1.0" Tri-Clamp, ISO, gear handle, EPDM	2	
5	Conductivity probe	Domestic	SS316L	0~20µs/cm	1	
6	Multi-channel transmitter	Domestic		1 channel	1	
7	Liquid level transmitter	TOBO	SS316L	4-20mA, 0-3M	1	
21 PB 01						
1	Raw Water Pump	Grandfos	SS304	CR3-7-0.55KW/380V/50 HZ	1	
2	Frequency Inverter	ABB		2.2KW	1	
3	Pressure gage	Domestic	SS316L	0~6bar,63mm Indicator	1	
4	Pressure relay	Domestic	SS316L	DN10,ISO,MP Ra≤0.5um	1	
5	Plug valve	Domestic		0-6ba	1	
22 FR 01						
1	Micron Filter	Domestic	SS316L	5um 20"x5 芯,	1	
2	Pressure gage	Domestic	SS316L	0~6bar,63mm Indicator	1	
3	Plug valve	Domestic	SS316L	DN10,ISO,MP Ra≤0.5um	1	



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4	Pneumatic Angle Seat Valve	Domestic	SS316L	ISO normally closed, with mechanical switch display, if first stage with problem will switchover to second stage	1	
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**23 PB 01**



1	High pressure pump (1 <sup>st</sup> stage)	Grandfos	SS304	CR3-31 3KW/380V/50HZ	1	
2	Frequency Inverter	ABB		2.2KW	1	
3	Plug valve	Domestic	SS316L	DN10,ISO,MP Ra≤0.5um	1	

**24 FR 01**  
**24 FR 02**  
**24 FR 03**


1	RO Membrane (1 <sup>st</sup> stage, heat resistant)	USA DOW FILMTEC	PAI	HSRO4040-FF operation temperature: ≤85°C	6	
2	Membrane vessel	Domestic	SS304	2m	3	



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3	Diaphragm sampling valve	Domestic	SS316L	DN8 connector, EPDM membrane	4	 
4	Manual ball valve	Domestic	SS304	ISO standard, SS304+EPDM, 1.0" , MP Ra≤0.6um,	3	
5	Check valve	Domestic	SS304	SS304, 1" Tri-Clamp	1	
6	Check valve	Domestic	SS304	SS304, 0.75" Tri-Clamp	1	
7	Manual Diaphragm valve	Domestic	SS316L	10", Bite type fittings, Ra≤0.6um,PTFE/EPDM	1	
8	Concentrated water flow meter	Domestic	SS304	SS304, 19.08x1.5, Water, 1500L/h, 0-100°C	1	
9	Production flow meter	Domestic	SS304	SS304, 25.4x1.5, Water, 2500L/h, 0-100°C	1	
10	Pressure gage	Domestic	SS316L	0~25bar,63mm Indicator,	1	
11	Pressure gage	Domestic	SS316L	0~25bar,63mm Indicator,	1	
12	Conductivity probe	Domestic	SS304	, 0~100µs/cm, 1.5",C=0.1,Temp:0-150 °C	1	
13	Multi-channel transmitter	Domestic		1channel	1	
14	Control frame	Domestic	SS304	Main frame of the system	1	

**26 PB 01**

1	2 <sup>nd</sup> stage high pressure pump	Grandfos	SS304	CR3-27-2.2KW/380V/50 HZ	1	
2	Frequency Inverter	ABB		2.2KW	1	
3	Plug valve	Domestic	SS316L	DN10,ISO,MP Ra≤0.5um	1	

**27 MH 02**

1	Heat resistant RO membrane(2 <sup>nd</sup> stage)	USA DOW FILMTEC	PAI	HSRO4040-FF operation temperature: ≤85°C	4	
2	Membrane vessel	Domestic	SS304	2m	2	
3	Diaphragm sampling valve	Domestic	SS316L	DN8 connector, EPDM membrane	2	



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4	Pneumatic Angle Seat Valve	Domestic	SS304	25.4x1.65, water	1
5	Manual ball valve	Domestic	SS304	ISO standard, SS304+PTFE, 1.0" , MP Ra≤0.6um	1
6	Manual ball valve	Domestic	SS304	ISO standard, SS304+PTFE, 0.75" , MP Ra≤0.6um, <b>Bite type fittings</b>	1
7	Manual ball valve	Domestic	SS304	ISO standard, SS304+PTFE, 0.75" , MP Ra≤0.6um, <b>Bite type fittings</b>	1
8	Check valve	Domestic	SS304	SS304, 1.0" Tri-Clamp	11
9	Check valve	Domestic	SS304	SS304, 0.75" Tri-Clamp	2
10	Manual Diaphragm valve		SS316L	SS316L, 1.0" , <b>Bite type fittings</b> , Ra≤0.6um,PTFE/EPDM	3
11	Concentrated water flow meter		SS304	SS304, Water, 1000L/h, 0-100°C, 25.4x1.5, <b>Bite type fittings.</b>	1
12	Production flow meter		SS304	SS304, Water, 1500L/h, 0-100°C, 25.4x1.5, <b>Bite type fittings</b>	1
13	Pressure gage		SS316L	SS316L,0~25bar,63mm Indicator, Acuuracy:2.5	1
14	Pressure gage		SS316L	SS316L,0~25bar,63mm Indicator, Acuuracy:2.5	1
15	Pressure transmitter		SS316L	SS316L,0-10bar, 1.5"TCOutput: 4-20mA	1
16	Pressure transmitter		SS316L	SS316L,0-10bar, 1.5"TC, Output: 4-20mA	1
17	Conductivity probe		SS304	0~20μs/cm, C=0.1,Temp:0-150°C	1
18	Multi-channel transmitter			1 channel	1

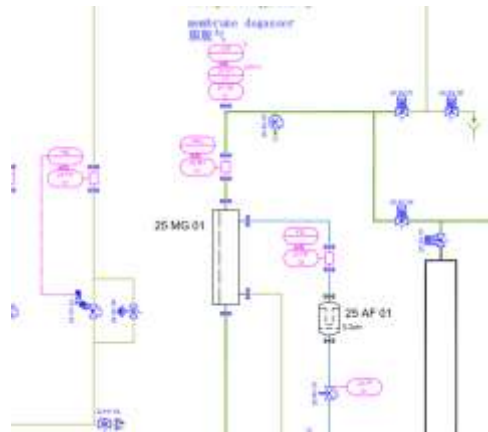




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19	Pneumatic diaphragm valve		SS316L	1.0",ISO,MP Ra≤0.6um,PTFE+EPDM double membrane, welding, casting, normally closed, <b>with mechanical switch display</b>	1
20	Pneumatic diaphragm valve		SS316L	1.0",ISO,MP Ra≤0.6um,PTFE+EPDM double membrane, welding, casting, normally closed, <b>with mechanical switch display</b>	1

**Degassing System (heat resistant system for 80 degree high temperature sterilizing)**



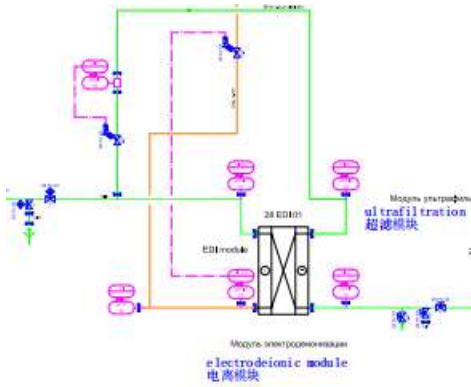
25 MG 01 25 AF 01					
1	<b>High temperature degassing membrane</b>	3M Liquicel		EXF-4x28X-50	1
2	Pneumatic Angle Seat Valve	Domestic	SS304	25.4x1.65, water	2
3	Manual ball valve	Domestic	SS304	ISO standard, SS304+PTFE, 0.75" , MP Ra≤0.6um	1
1	Air filter	Domestic	SS304		1





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## EDI Module System

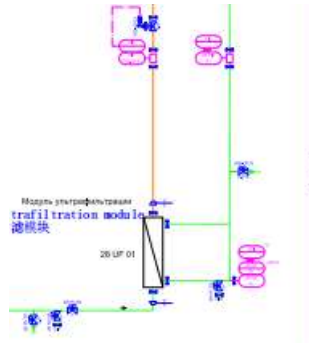


28 EDI 01						
1	<b>High temperature EDI</b>	Ionpure		IP-LXM10HI-3 Operation temperature: ≤85°C; Running temperature: ≤45°C	1	
2	<b>EDI Power source</b>	Monsun		MS3000A,0-6A	1	
3	Manual diaphragm valve	Domestic	SS316	SS316L, 1.0" Ra≤0.6um,PTFE/EPDM	1	
4	Manual diaphragm valve	Domestic	SS316L	SS316L, 0.75" Ra≤0.6um,PTFE/EPDM	1	
5	Sampling diaphragm valve	Domestic	SS316L	DN8 connector, EPD Mmembrane	1	
6	Flow rate switch	Domestic	UPVC	Water, 0-50°C; 30-300L/h	1	
7	Diaphragm pressure gage	Domestic	SS316L	SS316L,0~6bar,63mm Indicator	4	
8	Conductivity probe	Domestic	SS304	0~20μs/cm	1	
9	Multi-channel transmitter	Domestic		1 channel	1	



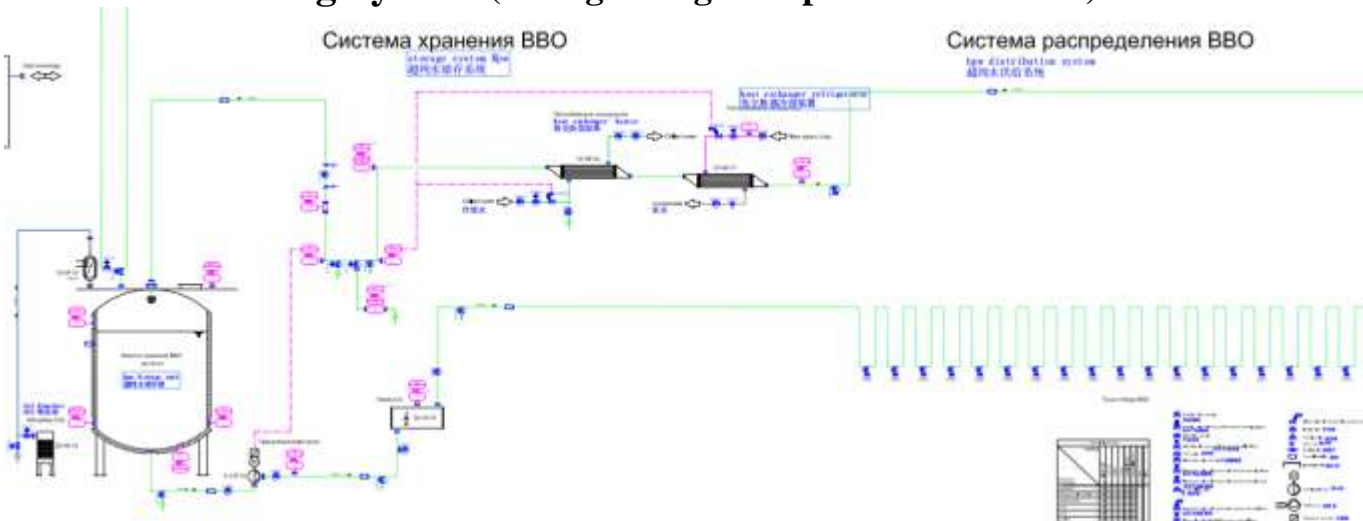
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## Ultra Filtration System (80 degree high temperature resistant)






28 UF 01						
1	UF Membrane	Ultradyn Nadir		MOLSEP FS10-FS ≤98°C	1	
2	Pneumatic diaphragm valve	Domestic	SS316L	0.75",MP Ra≤0.6um,PTFE+EPDMd double membranes, welding, casting, normally closed, <b>with mechanical switch display</b>	1	
3	Diaphragm sampling valve	Domestic	SS316L	DN8 connector , EPDM membrane	1	

## HWP Distributing System (80 degree high temperature resistant)





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30TK01	31CP01	32UV01	33HE01	33HE02			
1	Pure water tank	Domestic	SS316L	3000L	1		
2	Spray ball	Domestic	SS316L	Rotating type, 360 °	1		
3	Electric heating rebreather	Domestic	SS316L	0.22um	1		
4	Degassing system	Domestic	SS316L		1		
5	static-pressure liquid level transmitter	Domestic		Connect type: <b>sanitary diaphragm</b>	1		
6	Constant pressure feeding pump		SS316L	<b>Sanitary level centrifugal pump</b>	1		
7	Frequency converter	Siemens		3.5KW	1		
8	UV Sterilizing Unit	Domestic	SS316L		1		
9	Double tube plate type heat exchanger	Domestic	SS316L	Double tube plate type, ( heat exchange area: 1.0M2)	2		
10	Pressure gage	Domestic	SS316L	SS316L,0~6bar,63mm Indicator	1		
11	Diaphragm sampling valve		SS316L	SS316L,DN10 , EPDM	1		
12	Return water flow rate meter		SS316L	SS316L, Water, 5000L/h, 0-100°C	1		
13	Conductivity probe		SS316L	SS316L, 0~20µs/cm, 1.5" Tri-Clamp, C=0.01, Temp:0-150°C, 5M;	1		
14	Transmitter	Createc		1 channel	1		
15	Temperature transmitter		SS316L	SS304,0~160°C,φ6×50m m, accuracy level: A class	1		
16	Steam Pneumatic Angle Seat Valve	Jukang	SS316L	SS304, 1.5" Welded, ISO standard, normally closed	1		
17	Steam Traps	Spirax.sarco	SS316L	DN20 ball float type; ISO standard	1		

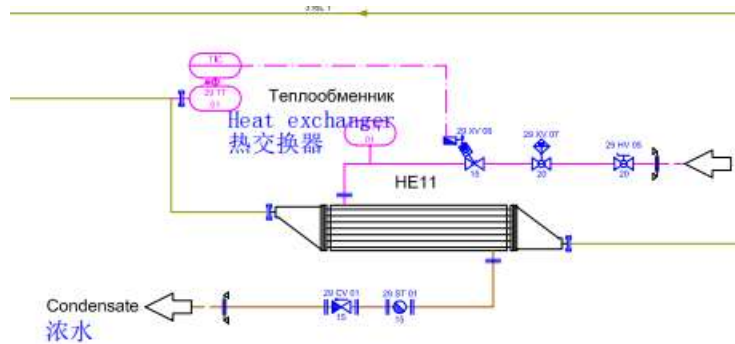




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## Tubular Heat Exchanger



HE11						
1	Tubular Exchanger	Domestic	SS304	1.56M2, temperature from 15°C cyclic heating 60min to 85°C, heating media: 3Bar industrial steam, connector DN40, heating area: 1.56m2	1	
2	Temperature transmitter	TOBO	SS304	SS304, 0~200°C, φ6×50mm, accuracy level: A class	1	
3	Proportioning valve	high-flyer	SS304	SS304, 1.5" Weld, ISO normal closed, adjust water temperature with temperature proportion for pasteurization	1	



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4	Manual ball valve	Domestic	SS304	SS304, 1.0" Tri-Clamp, ISO, EPDM	1	
5	Steam Traps	Spirax.sarco		Ductile cast iron, DN20 ball float type; flange connection, ISO standard	1	

### RO CIP Cleaning System

1	Cleaning Pump	CNP	SS304	SS304, 0.37W/380V/50HZ,EPDM	1	
2	CIP chemical tank	local	PE	V=200L,PE tank	1	
3	Micron filter	local	SS304	SS304, 1.0" Tri-Clamp, 5µm, 2T/h,	1	
4	Manual ball valve	Jukang	SS304	SS304, 1.0" Tri-Clamp, ISO,	1	
5	Manual butterfly valve	Jukang	SS304	SS304, 1" Tri-Clamp, ISO,	1	

### System connection pipes

Pre-treatment system	Domestic	SS304	ISO, internal and external polishing, ISO2037	1batch	
Post treatment system	Domestic	SS316L	ISO, internal and external polishing, ISO2037	1batch	



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## HPW Distribution Pipes

1	Pipes	Domestic	SS316L	Φ32mm	260M	
2	Pipeline elbow	Domestic	SS316L	Φ32mm	120	
3	Manual diaphragm valve	Domestic	SS316L	Φ25mm	25	

## Electric Control System

1	PLC Controller	Siemens		S7-200 CPU	1	
2	Touch screen Panel	Siemens		10" ( smart series )	1	
3	Emergency stop switch	Schneider		XB2ES542C	1	
4	AC contactor	Schneider		1NO,18A	5	
5	Heat relay	Schneider		TesysD series, 7-10A	5	
6	Breaker	Schneider		C65N 1P/D6A	1batch	
7	Control cabinet	Domestic	SS304	1800(H)*800(W)*350(d eep)	1	
8	Indicator	Schneider		XB2ES	3	
9	Electric spare parts	Schneider			1batch	



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## Features of Electric Control:

\*Inlet low pressure protection switch of high-pressure pump:

Linkage with the high-pressure pump, pressure below the set value, high-pressure pump will stop running.

\*The membrane inlet high pressure protection switch:

Linkage with the high-pressure pump, if operated high pressure too high, the membrane will be easy to get blocked, even penetrated. When the membrane system operating pressure exceeds the setting value, the high-pressure pump will stop running.

\*The reverse osmosis unit equipped with low pressure automatic flush valve:

Linkage with the high-pressure pump, set by the time relay, when the reverse osmosis unit start to work, the system auto startup, washing the film surface with large-flow, so the sediments on membrane surface washed away in time, to ensure the normal operation of membrane.

\* Raw water tank / pure water tank high and low level control switch

The raw water pump / high pressure pump linkage, the raw water tank at low level, the raw pump automatic shutdown for protection, when pure water tank full, high-pressure pump to stop.

\*When RO pure water tank in low level, EDI booster pump will be stop, when RO pure water tank in middle level and EDI pure water tank not each high level, EDI booster will automatic start, and EDI system detect the flow rate signal will automatic turn on power and start operation. When EDI pure water tank reach high level, the EDI system will be automatic stop.

\*RO membrane component with multiple protection function and automatic washing program,



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complete system can run fully automatically. During the system running, if the high pressure inductor detect the pressure higher than normal level the system will stop and alarming.

\*Control panel with display program for the system running situation, conductivity/ resistivity for feed water, RO water and EDI water, production volume, temperature, PH and UV lamp situation