



Class B Steam Sterilizer

Foster Plus Service Manual



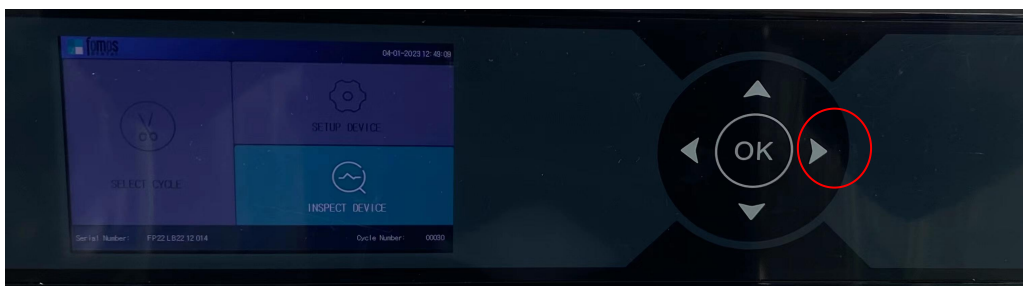
Note:

When an Error Code is reported during the operation, you should restart the steam sterilizer first, and enter the INSPECT DEVICE interface to run the Automatic Detection:

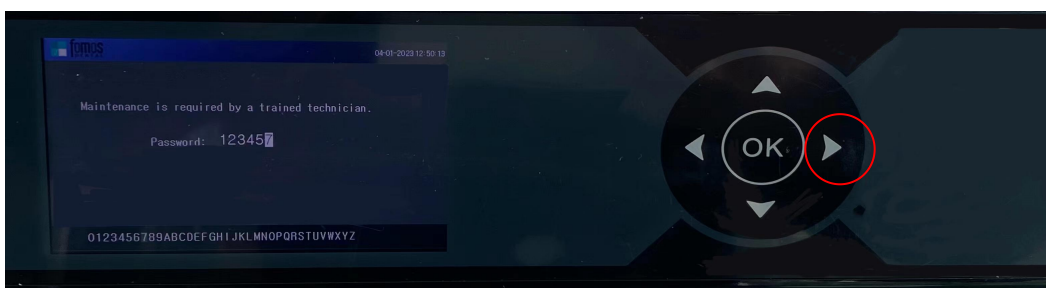
1. Restart the steam sterilizer, press the Left button to enter the function selection interface.



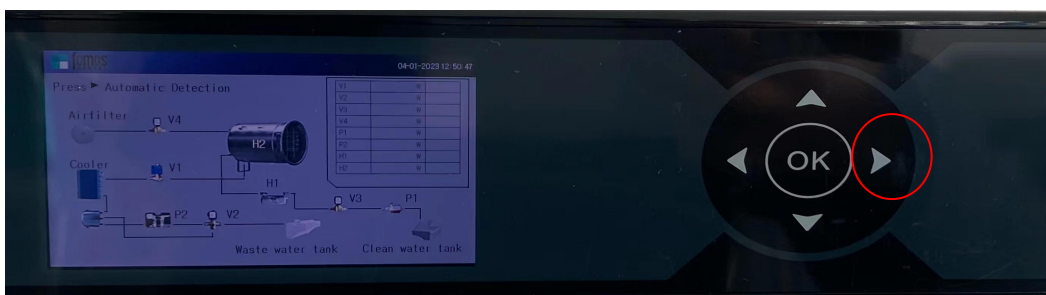
2. Use the Up/Down button to select the INSPECT DEVICE, and press the Right button to confirm.



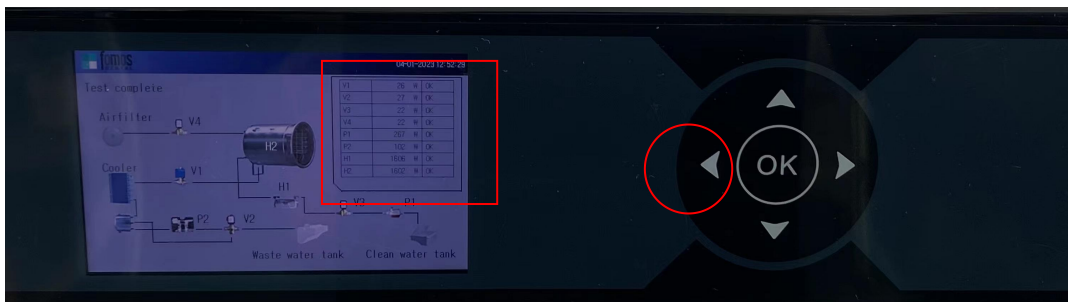
3. Enter the password '123457', and press the Right button to enter the Automatic Detection test.



4. Press the Right button to run the Automatic Detection test.



5. During the procedure of the Automatic Detection test, please observe whether the component power real-time monitoring table displays 'Error'. The power of the Water pump (P1) is about 40-50W. The power of the Vacuum pump (P2) is about 90-100W. The water pump (P1) is running intermittently, thus the measured power may not be within the reference power range. You can judge whether P1 or P2 is working by the sound it makes when it is running. The power of the vapor generator (H1) is about 1600W. The power of the vapor generator(H2) is about 1600W.
6. When the Automatic Detection test detects the solenoid valve, there will be a running prompt sound, and the indicator light corresponding to the solenoid valve on the main board will flash.



The positions of V1, V2, V3, and V4 on the main board shows in the following figure:



Note: This lighting shows that V1 is under detecting.

7. Press the Left button to exit after the Automatic Detection test.

Please check the list of error codes in combination with the automatic detection results.

I. Error codes list

NO.	Error code	Description	Associated Components
1	E01	Steam injection error	P1 Water pump / V3 Solenoid valve
2	E02	Pressure out of set range during sterilization	Pressure sensor / Altitude setting
3	E03	Door loose in cycle	Door Handle
4	E04	Pressure leakage/ Overload	Sealing gasket / Overload
5	E05	V1/ V2 solenoid valve blocked	V1/ V2 Solenoid valve
6	E06	Failed to vacuum	Sealing gasket / Water vapor separator/ Vacuum pump
7	E09	Steam generator damaged	Steam generator temperature protector/ Mainboard silicon controlled/ Steam generator/ Steam generator temperature sensor
8	E10	Heating ring preheat speed slow	Heating ring temperature protector/ Mainboard silicon/ Heating ring/ Heating ring temperature sensor
9	E11	Temperature out of set range during sterilization	No-load or underload / Overuse / Loosened joint of heating ring silicon and radiator
10	E12	Temperature do not reach set range during sterilization	Overload / Sealing gasket / V1Solenoid valve leakage
11	E27	Excessive leakage	Sealing gasket / V1 Solenoid valve leakage
12	E31	Inner chamber temperature out of set range	No-load or underload / Overuse / Loosened joint of heating ring silicon and radiator
13	E32	Steam generator temperature out of set range	Connection of mainboard silicon and radiator/ Steam generator temperature sensor (T2)
14	E33	Chamber temperature out of set range	Connection of mainboard silicon and radiator/chamber temperature sensor (T3)
15	E41	Inner chamber temperature sensor damaged	The connection between inner chamber temperature sensor (T1) and mainboard
16	E42	Steam generator temperature sensor damaged	The connection between steam generator temperature sensor (T2) and mainboard
17	E43	Chamber temperature sensor damaged	The connection between chamber temperature sensor (T3) and mainboard
18	E51	Poor contact inner chamber temperature sensor	The connection between inner chamber temperature sensor (T1) and mainboard
19	E52	Poor contact steam generator temperature sensor	The connection between steam generator temperature sensor (T2) and mainboard
20	E53	Poor contact chamber temperature sensor	The connection between chamber temperature sensor (T3) and mainboard

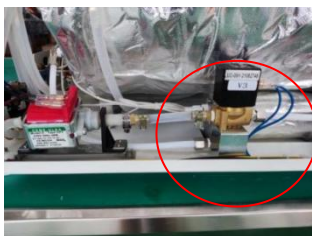
1、E01——Steam injection error

Description:

During heating up, T1 temperature rises less than 3°C within 90 seconds.

Solution:

- (1) Check whether the water in the clean water tank is sufficient and whether there is a block in the connection between the clean water tank and the water pump.
 - (2) When the water pump (P1) is working, pay attention to its noise. If P1 has no working noise, using the multimeter to check the voltage of the P1. If the voltage is abnormal, check the power cables connected to the socket, mainboard and the P1. If the voltage is normal, check or replace the mainboard.
 - (3) If the voltage of P1 and the mainboard is normal, please replace the P1.
 - (4) If the P1 is normal, please check the V3 solenoid valve.
- ① P1 and V3 are synchronized. When there is no prompt sound when V3 is running, please check the connection between the V3 and the mainboard or use the multimeter to check if the voltage of the V3 is 24V. If there is still no prompt sound, please replace the V3. If the V3 is normal, please check or replace the mainboard.
- ② Check whether there is a block in V3 solenoid valve. Steps to clean the V3:



V3 (with blue cables) is on the right of the water pump.



V3 Split diagram

Replace the V3 if the error still.

2、E02—— Pressure out of set range during the sterilization

Description:

The pressure is out of set range during heating up stage or sterilization stage.

Solution:

(1) Check the PRESSURE CORRECTION. The pressure should be under 10Kpa when the door is open. If the pressure exceeds 10 Kpa, please use the password '777777' enter the INSPECT DEVICE interface to reset the pressure.

(2) After reset the pressure, please power off the steam sterilizer, restart the machine till the chamber is cold and then run the cycle.

(3) If the error still, please contact the service engineer.

3、E03——Door loose in cycle

Description:

Door loose in cycle.

Solution:

(1) Ensure the door and door handle are fully closed before the cycle.



Door Handle

(2) Do not open the door during the cycle.

(3) Check the connection of the micro switch and the door, tighten it.



Micro Switch

(4) Check the connection of the yellow connecting line and the mainboard, tighten it.



Yellow Micro Switch line

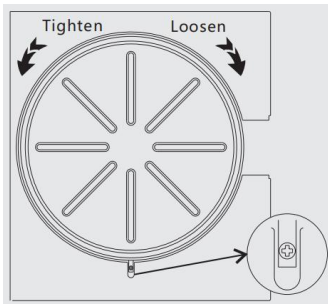
4、E04——Pressure leakage/ Overload

Description:

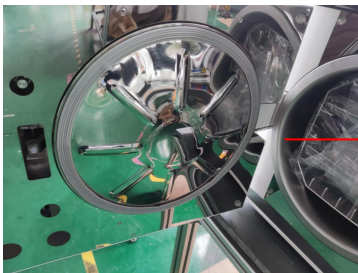
The pressure did not get the set value within 14 minutes. Overload or Loosen door gasket may cause the leakage.

Solution:

(1) Check the door gasket and the door. Steps to adjust the door and sealing cap are as follows:



Replace the door gasket if it is aging. Steps are as follows:



Door Gasket

Tool: A plain screw driver without sharp head is needed.

	
1. Hold verge of the gasket by one hand softly, and insert the screwdriver into the gap between gasket and door, take out the seal slowly.	2. Check and clean the gasket and the groove of the gasket, replace the gasket if there is any damage.
	
3. Equably insert 4 spots into groove firstly when fix the clean gasket, and then insert other parts. After that, press the gasket equably by hand.	4. Check the door gasket carefully, and insert the the gasket into groove by screwdriver carefully.

(2) Ensure the clean water tank with enough water.

(3) Reduce the items in the chamber.

(4) Restart the steam sterilizer and run the cycle.

5、E05——V1/V2 solenoid valve blocked

Description:

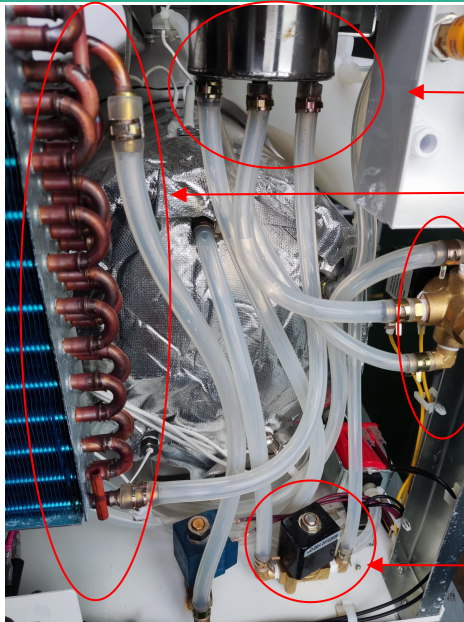
The pressure could not get 30 Kpa during exhausting stage.

Solution:

(1) Run the automatic cleaning program. In the INSPECT DEVICE interface, using the password '223456' to run the automatic cleaning program.

(2) Manual cleaning procedure:

① Pull out the tubes from V1 normally open solenoids, V2 two position three pass valve, water vapor separator and condenser, clean the tubes manually and plug back in. The connections referred to the tube connection diagram.



Water Vapor Separator

Condenser

V2 Two Position Three Pass solenoid Valve

V1 Normally Open Solenoid valve

- ② Check and clean the V1 normally open solenoid, or replace it.

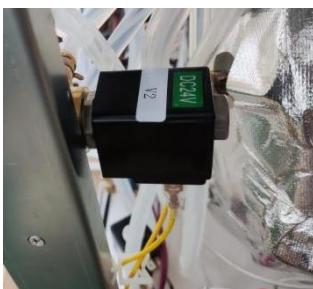


V1 Normally Open Solenoid Valve



Exploded view (V1 Normally Open Solenoid valve)

- ③ Check and clean the V2 two position three pass solenoid valve (yellow line), or replace it.



V2 two position three pass solenoid valve



V2 two position three pass valve



Exploded view (V2 two position three pass valve)

- ④ Check and clean the condenser, or replace it.



Condenser

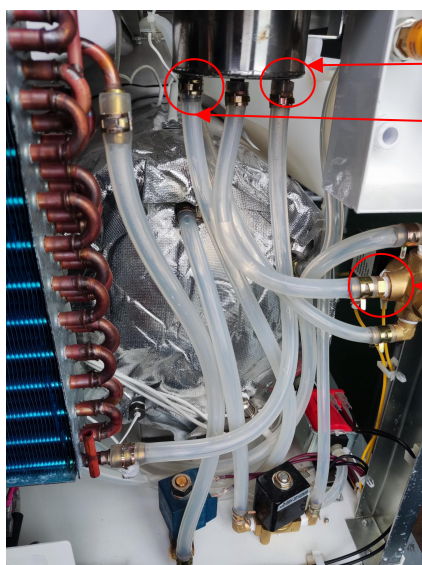
6、E06——Failed to vacuum

Description:

During the pre-vacuum (the first pre-vacuum), the pressure did not get to -72Kpa within 8 minutes.

Solution:

- (1) Check the seal of the door and the door gasket, solutions referred to E04 (1).
- (2) Check and clean the normally open solenoid valve(V1), the two position three pass solenoid valve(V2), or replace the solenoid valve.
- (3) Check whether the water in the water vapor separator is overflowed. When it is overflowed, pull out the mid tube of the two position three pass solenoid valve and put into the container. And then pull out the tubes on the right and left sides of the water vapor separator, so the waste water could discharge automatically after the air circulated. Plug all the tubes back after the discharge. Note: Do not spill to the machine during the discharge!



Pull out the tubes of the water vapor separator

Pull out the mid tube of the two position three pass solenoid valve.

7、E09——Steam generator damaged

Description:

The temperature of steam generator (T2) is less than 65°C after 3 minutes of preheating.

Solution:

(1) Use the multimeter to check the steam generator heating rod, and replace it if it is abnormal.

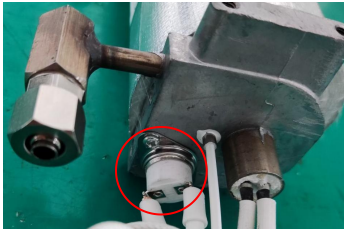


H2 steam generator heating rod



Using the multimeter gear of 200Ω to check the heating rod. The resistor of the heating rod should be around 31-35Ω. If the result is abnormal, please replace the heating rod.

(2) Use the multimeter to check the steam generator temperature protector and replace it if it is abnormal.



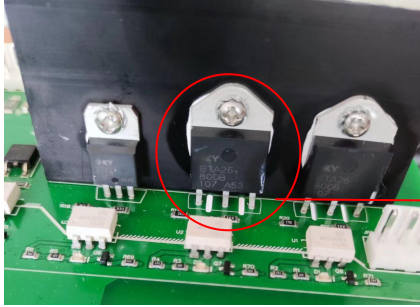
Using the multimeter gear of continuity beeper to check the steam generator heating protection ring. If the result is abnormal, please replace it.

(3) Check the voltage of the steam generator heating rod during the cycle.



During the cycle, use the multimeter gear of AC 750V to check whether the steam generator has voltage when the steam generator LED indicator lights up (mainboard D2). If there is no voltage, please replace the steam generator silicon.

Note: Indicator light status referred to the appendix of the circuit diagram and the working status indicator table.



→ Steam generator silicon

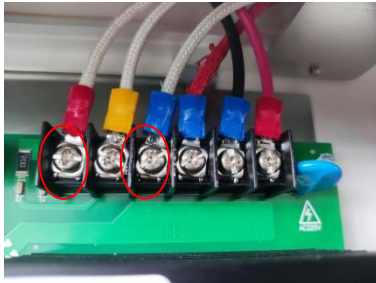
8、E10——Heating ring preheat speed slow

Description:

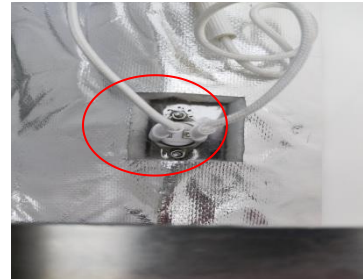
The temperature of chamber (T3) is less than 85°C after 6 minutes of preheating.

Solution:

(1) Check the connection of the chamber heating ring and the PCB.



Connection port
(chamber heating ring-PCB)



Connecting line
(Chamber heating ring- heating protector)



Using the digital multimeter to check whether the temperature protector work properly, replace the temperature protector if not.



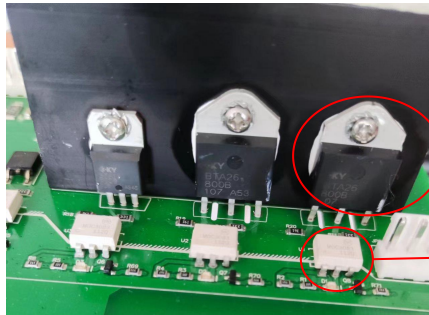
Using the multimeter gear of 200Ω to check the resistor of the heating ring if the temperature protector is normal. The resistor of the heating ring should be around 31-35Ω. If the result is abnormal, please replace the heating ring with the power off.

(2) Check the voltage between the connection port during the cycle.



During the cycle, use the multimeter gear of AC 750V to check whether the heating ring has voltage when the heating ring LED indicator lights up (mainboard D1). If there is no voltage, please replace the heating ring silicon.

Note: Indicator light status referred to the appendix of the circuit diagram and the working status indicator table.



Heating ring silicon

Heating ring LED indicator light

9、E11—— Temperature out of set range during sterilization

Description:

Inner chamber temperature exceeds the set range by 4°C during the sterilization.

Note: 134°C allowable error range is 134°C to 138°C, 121°C allowable error range is 121°C to 125°C.

Solution:

- (1) Restart the steam sterilizer and run the cycle till the chamber is cold.
- (2) Increase the load.
- (3) Tighten the the joint of heating ring silicon and radiator.

10、E12—— Temperature do not reach set range during the sterilization

Description:

Inner chamber temperature (T1) do not reach the set range (134°C or 121°C) during the sterilization.

Solution:

- (1) Power off the steam sterilizer, restart and run the cycle.

- (2) Reduce the load.
- (3) Check the sealing gasket and the sealing gasket, and replace it if necessary.
- (4) Check whether there is a leakage of V1 normally open solenoids.
- (5) Check whether there is enough water in the clean water tank.

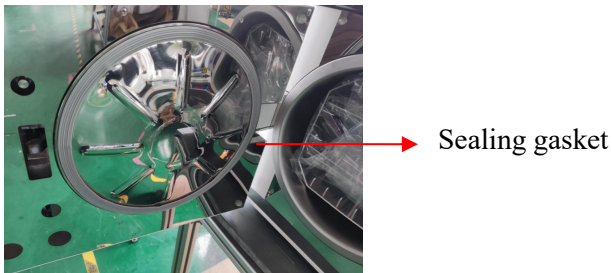
11、E27——Excessive leakage

Description:

The leakage over 1.3Kpa during the Leak and Vacuum test.

Solution:

- (1) Check whether the sealing gasket need a replacement. Steps referred to page 6.



- (2) Check, clean or replace the V1 normally open solenoid valve.



V1 normally open solenoid valve



Exploded view (V1 normally open solenoid valve)

- (3) Check, clean or replace the V4 normally closed solenoid valve.

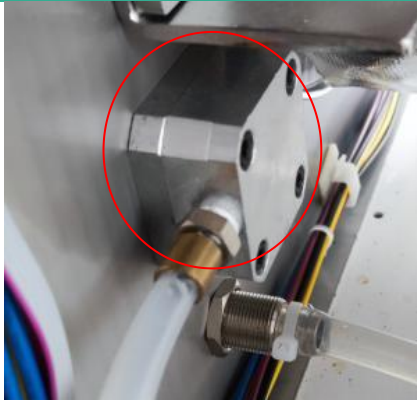


V4 normally closed solenoid valve



Exploded view (V4 normally closed solenoid valve)

- (4) Check the air lock in case there is a leakage.



Air lock

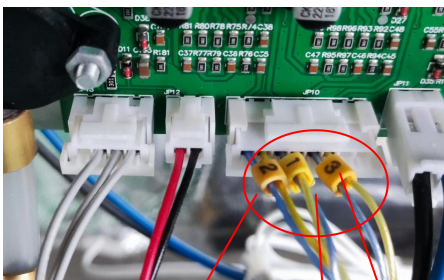
12、 E31——Inner chamber temperature out of the set range

Description:

Inner chamber temperature(T1) is above 140°C.

Solution:

- (1) Check the connection of the temperature sensor(T1) on the mainboard.



T1 T2 T3

- (2) Use the multimeter to check the temperature sensor (T1) at normal temperature(normal value should be around 1K Ω).Please replace the temperature sensor if the result is abnormal.
- (3) Restart the steam sterilizer and run the cycle.

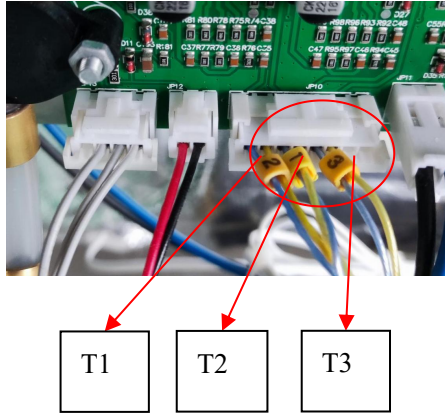
13、 E32—— Steam generator temperature out of set range

Description:

Steam generator temperature (T2) is above 220°C.

Solution:

- (1) Check the connection of the temperature sensor(T2) on the mainboard.



(2) Use the multimeter to check the temperature sensor (T2) at normal temperature(normal value should be around $1K\Omega$).Please replace the temperature sensor if the result is abnormal.

(3) Restart the steam sterilizer and run the cycle.

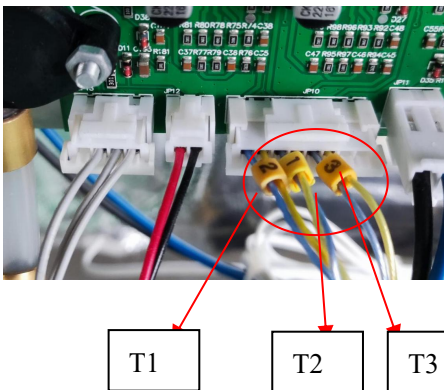
14、E33——Chamber temperature out of set range

Description:

Outer chamber temperature (T3) is above 180°C .

Solution:

(1) Check the connection of the temperature sensor(T3) on the mainboard..



(2) Use the multimeter to check the temperature sensor (T3) at normal temperature(normal value should be around $1K\Omega$).Please replace the temperature sensor if the result is abnormal.

(3) Tighten the joint of heating ring silicon and radiator.

(4) Restart the steam sterilizer and run the cycle.

15、 E41——Inner chamber temperature sensor damaged

Description:

Inner chamber temperature (T1) is above 230°C.

Solution:

(1) Solutions referred to E31.

16、 E42——Steam generator temperature sensor damaged

Description:

Steam generator temperature (T2) is above 230°C.

Solution:

(1) Solutions referred to E32.

17、 E43——Chamber temperature sensor damaged

Description:

Chamber temperature (T3) is above 230°C.

Solution:

(1) Solutions referred to E33.

18、 E51——Poor contact inner chamber temperature sensor

Description:

Inner chamber temperature (T1) is out of set range before the cycle.

Solution:

(1) Solutions referred to E31.

19、 E52——Poor contact steam generator temperature sensor

Description:

Steam generator temperature (T2) is out of set range before the cycle.

Solution:

(1) Solutions referred to E32.

20、E53——Poor contact chamber temperature sensor

Description:

Chamber temperature (T3) is out of set range before the cycle.

Solution:

(1)Solutions referred to E33.

21、Warning! ! !

Steam sterilizers require distilled water to generator steam for sterilization process. Water of too high mineral content will produce scale which lead to the leakage of the solenoid valve, the fault of sensors, the blockage of tiny pipelines, the pressure sensor and the steam generator and so on. The scale will also block the small pipes and bearing in the chamber, reduce the performance of the instrument and shorten the service life. Therefore, it's essential to use distilled water. In addition, users should pay more attention to routine maintenance, like the cleaning of the chamber filter, the door gasket and the water tank, the correct use method and so on.

Appendix: Password for a trained technician

Burn flash: 222222

System update: 333333

Temperature: 123477

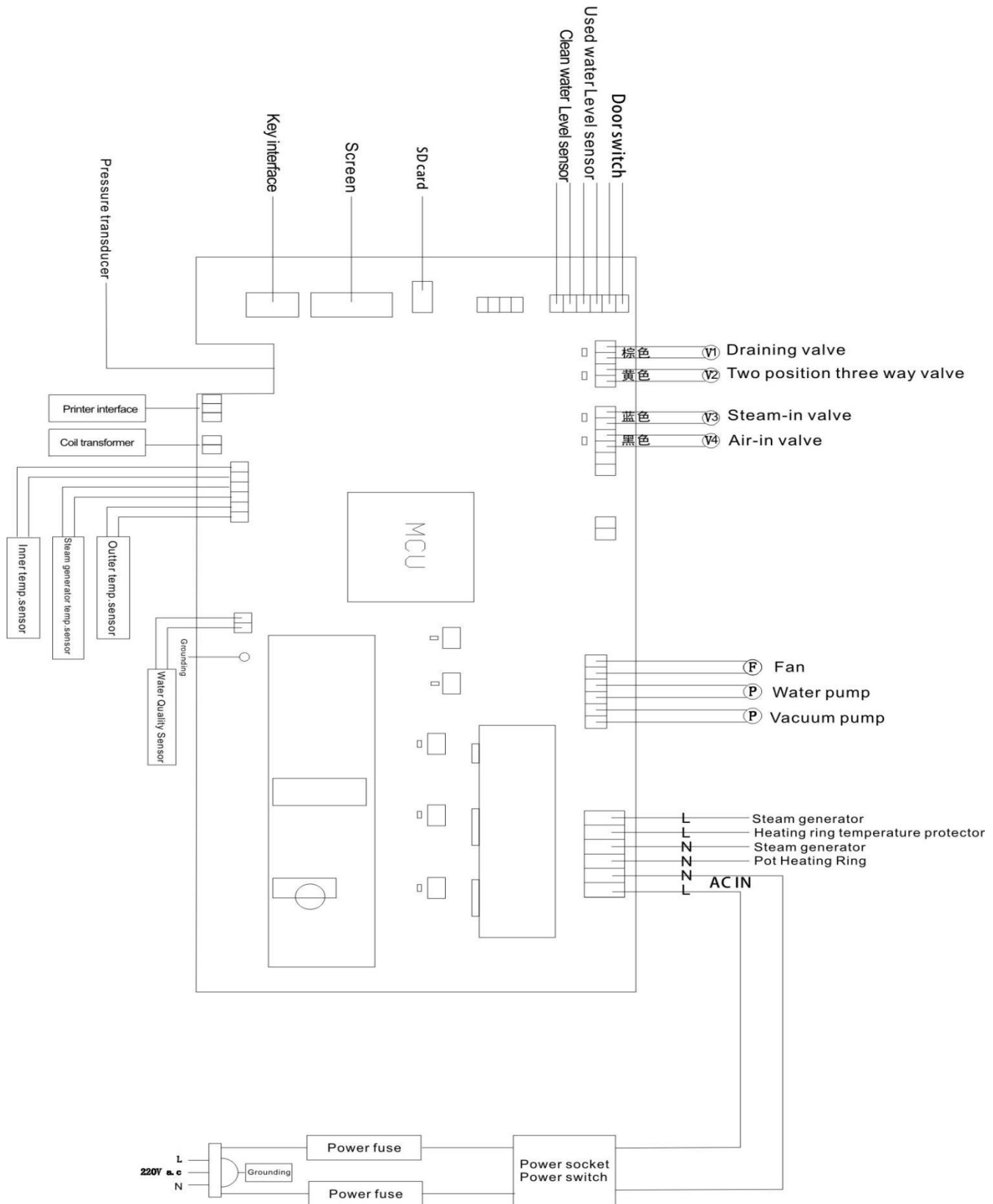
Automatic Detection: 123457

Cleaning procedure: 223456

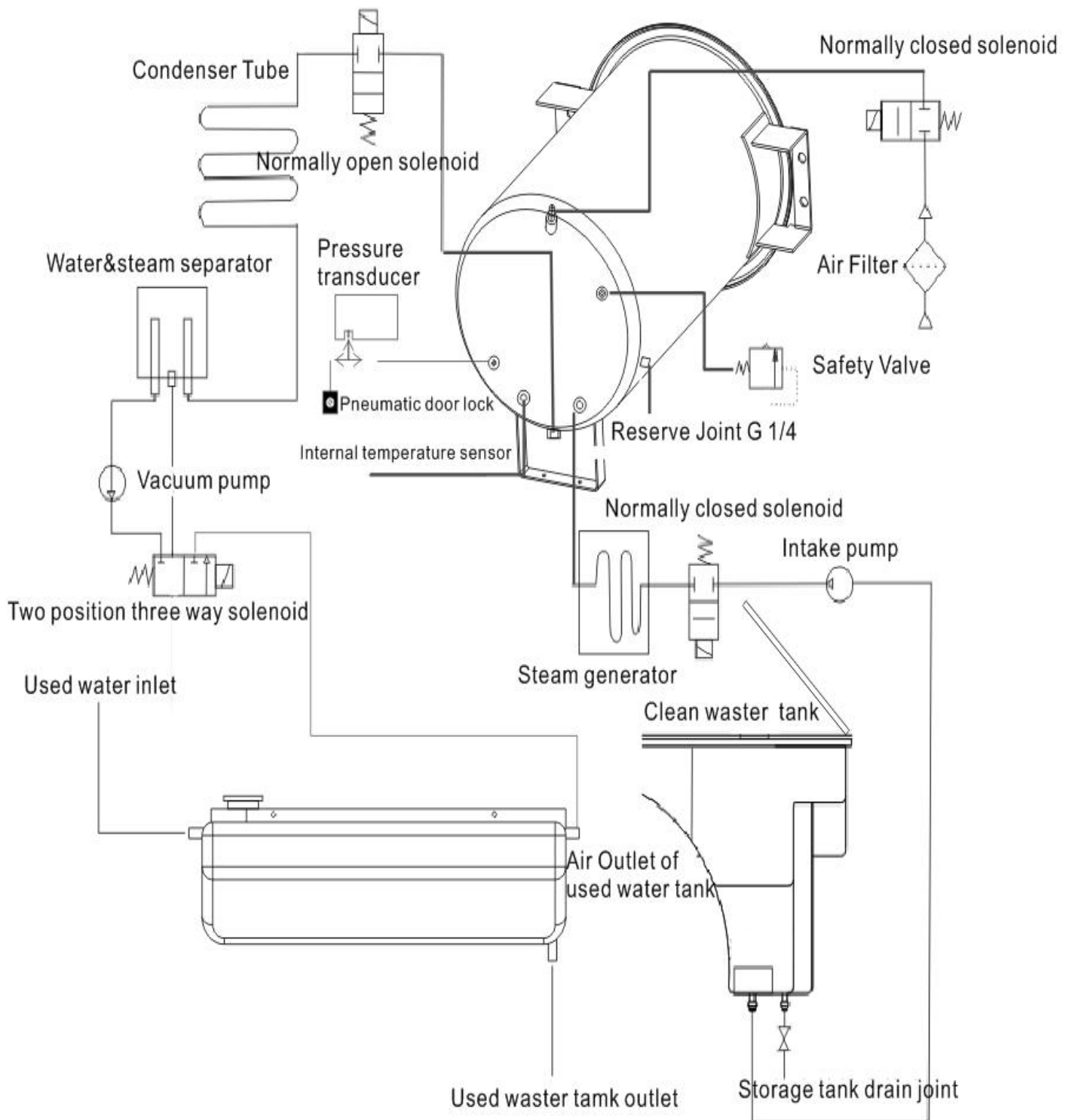
Pressure correction: 777777

II. Diagram

1.Circuit Diagram



2. Tube Connection Diagram



Appendix:

	V1 Normally open solenoid valve	V2 Two position three pass solenoid valve	V3 Normally closed solenoid Valve	V4 Normally closed solenoid valve	H2 Heating ring	H1 Steam generator	P1 Water pump	P2 Vacuum Pump	Fan
Preheating 1-2	0	0	0	0	0-1-0-1	1-0-1-0	0	0	1
Prevacuum 2-3	0	1	0	0	0-1-0-1	1-0-1-0	0	1	1
Heating up	1	0	1-0-1-0	0	0-1-0-1	1-0-1-0	1-0-1-0	0	1
Sterilization 3-4	1	0	1-0-1-0	0	0-1-0-1	1-0-1-0	1-0-1-0	0	1
Exhausting 4-5	0	0	0	0	0-1-0-1	1-0-1-0	0	0	1
Drying 5-6	0	1	0	0-1-0-1	0-1-0-1	0	0	1-0-1-0	1
Balance period 6-7	0	1-0	0	1	0	0	0	1-0	1

Note:

V1 normally open solenoid valve: 0, off (indicator light off, valve open); 1,on(indicator light on, valve closed).

V2 two position three pass solenoid valve: 0, off(indicator light off, Exhausting);1, on(indicator light on, Vacuuming).

V3/V4 normally closed solenoid valve: 0, off (indicator light off, valve closed); 1, on(indicator light on, valve open)

H1/H2/P1/P2: 0,off(indicator light off); 1, on(indicator light on). (H1 will automatically closed when T2 is more than 180°C,H2 will automatically closed when T3 reached the set sterilization temperature).

Fan: 1, on(indicator light on)