HL-380P High Pressure Steam Sterilizer

Operation Manual

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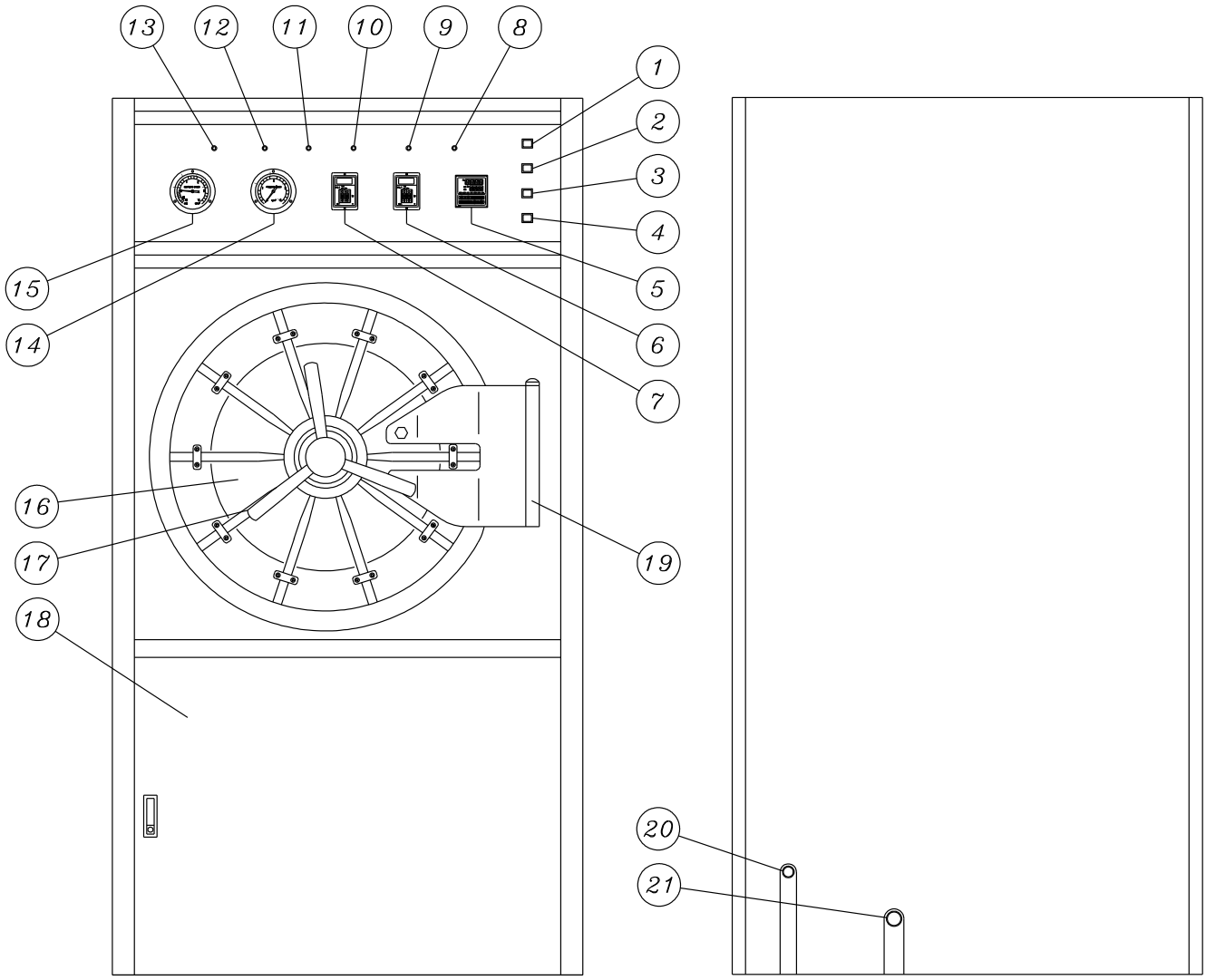

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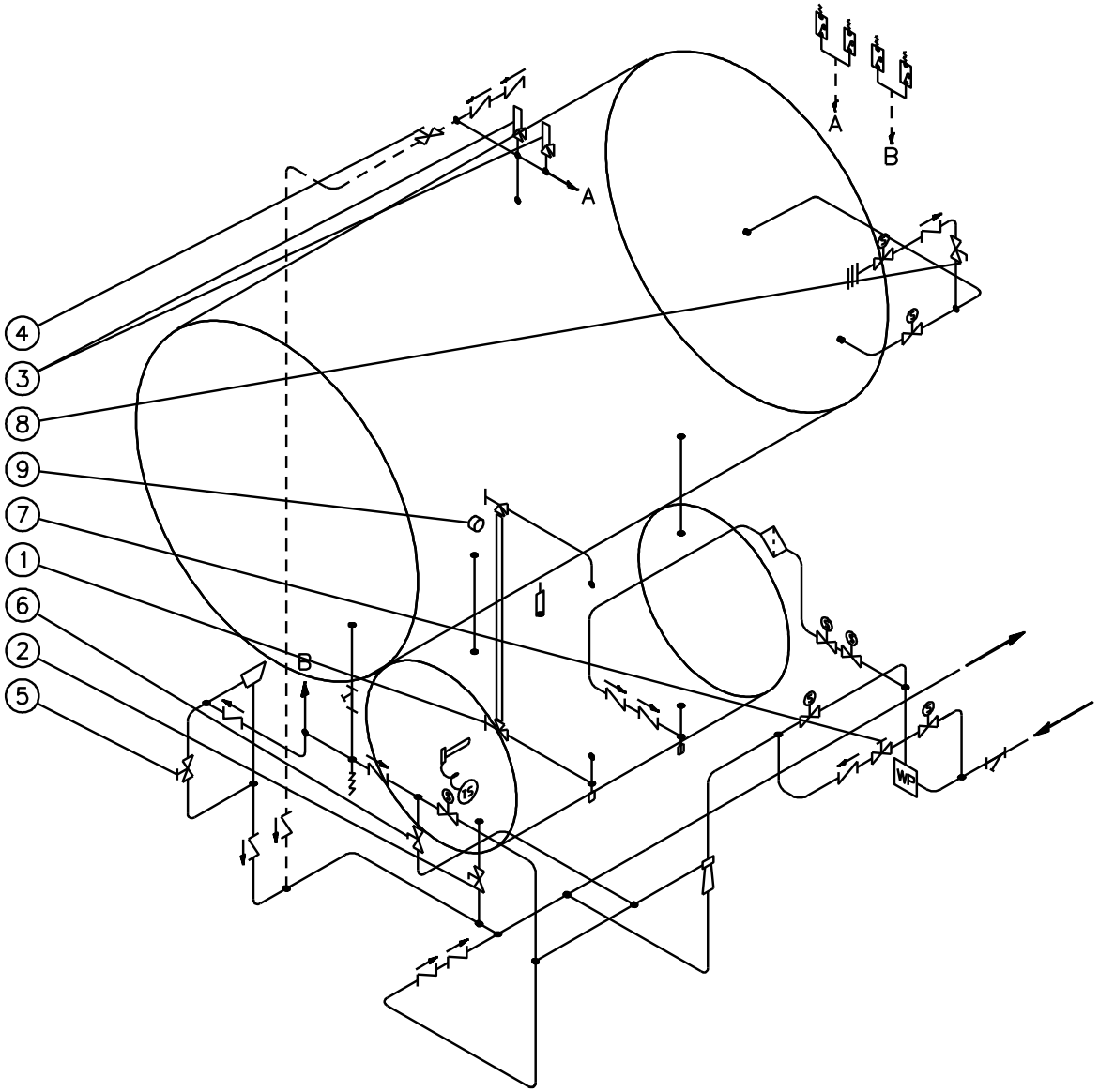

① *Water Gauge Valve (N.O)*
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Safety Precautions

1. The following is safety precautions to be observed when operating or servicing this unit.
2. Please read the instruction manual thoroughly before operation.
3. We recommend the use of R.O. water or filtered water to prevent water scale build up in the chamber and steam generator.
4. Don't use the sterilizer when there is no water supply, the motor might be overheated and damaged.
5. To avoid slippery floor conditions, immediately wipe up any spillage or condensation in sterilizer loading area.
6. The machine is hot after heating. Always wear protective gloves and goggles when taking out the sterilizing items to avoid burnt injury.
7. Allow sterilizer and accessories to cool to room temperature before performing any cleaning or maintenance procedures.
8. Disconnect from power supply before maintenance and servicing to avoid electrical shock hazard.
9. Pull the lever of safety valve per month to prevent blockage when jacket filled with steam.
10. Only qualified service technicians should perform sterilizer repairs and adjustments. Use of inexperienced, unqualified persons to work on this sterilizer or the replacement of unauthorized parts could cause personal injury or result in costly damage.
11. This sterilizer is not designed to process flammable liquids.

Prepare For Operation

1. Replace water filter every 3 months to prevent water scale build up in the chamber and steam generator.
2. Replace HEPA air filter about 3 ~ 6 months to prevent contaminated air from entering into the chamber.
3. Check that chamber drain strainer is clean and in place and that chamber interior is clean.
4. Always make sure the manual chamber exhaust valve and steam generator drainage valve inside the access door are closed.
5. Cold water line supplies water to sterilizer and that pressure must between 1 kg/cm^2 to 3 kg/cm^2.
6. Position the main electric power (circuit breaker) to ON.
7. Ensure electrical power and water utilities are ON.
8. Become familiar with all control locations and functions before operating the sterilizer.

Operating Instructions

1. Pushing power switch on to provide power to the sterilizer.
2. Heating system begins to warm the jacket. For the first time heating, it will take about 30 minutes to 1 hour to build up the jacket pressure.
3. Turn door handle anticlockwise and swing door open by hand.
4. Load the chamber with items to be sterilized. (Do not overload sterilizer. Allow for steam penetration between packs. Avoid contact of load components with the walls of the chamber.)
5. Swing door close by hand and rotate door handle clockwise until the door indicator is off. Rotate door handle 1/2 turn extra to ensure full closure of the door.
6. Set sterilize time on sterilizing timer. (Refer to **P.9** & **P.10**)
7. Set dry time on drying timer. (Refer to **P.9** & **P.10**)
8. Choose the cycle to suit different needs, press one of cycle buttons (Unwrapped Cycle; Wrapped Cycle; Solution Cycle) on control panel to begin sterilizing cycle, the sterilizer will automatically progress through cycle.
9. Cycle status

   9.1 Unwrapped Cycle (134°C): CHARGE→ STERILIZE→ FAST EXHAUST → DRYING→ AIR INTAKE→ COMPLETE

   a. CHARGE – Chamber is charged with steam until set sterilize temperature is reached.
   b. STERILIZE – Start of sterilize phase and counts down sterilize time remaining.
   c. FAST EXHAUST – After sterilize phase finished, chamber is exhausted.
   d. DRYING – Chamber is evacuated to start of drying phase and counts down dry time remaining.
   e. AIR INTAKE – Chamber is vented to atmospheric pressure.
   f. COMPLETE – Complete buzzer sounds.

9.2 Wrapped Cycle (134°C): CHARGE → VACUUM → CHARGE → STERILIZE → FAST EXHAUST → DRYING → AIR INTAKE → COMPLETE (VACUUM → CHARGE: 3 times)

a. CHARGE – Chamber is charged with steam.
b. VACUUM – Chamber is evacuated.
c. CHARGE – After last vacuum finished, chamber is charged with steam until set sterilize temperature is reached.
d. STERILIZE – Start of sterilize phase and counts down sterilize time remaining.
e. FAST EXHAUST – After sterilize phase finished, chamber is exhausted.
f. DRYING – Chamber is evacuated to start of drying phase and counts down dry time remaining.
g. AIR INTAKE – Chamber is vented to atmospheric pressure.
h. COMPLETE – Complete buzzer sounds.

9.3 Solution Cycle (121°C): CHARGE→ STERILIZE→ SLOW EXHAUST→ VENTING→ COMPLETE

a. CHARGE – Chamber is charged with steam until set sterilize temperature is reached.
b. STERILIZE – Start of sterilize phase and counts down sterilize time remaining.
c. SLOW EXHAUST – After sterilize phase finished, chamber is slow exhausted.
d. VENTING – Chamber is vented to atmospheric pressure.
e. COMPLETE – Complete buzzer sounds.

10. Sterilize temperature can be changed after press cycle button. Reset sterilize temperature on temperature controller. (Refer to **P.9 & P.10**)

11. During the operation, there are indicators to state each stage of cycle.

12. When cycle is complete, completion indicator displays and buzzer sounds.

13. Verify chamber to reach atmospheric pressure as indicated by a zero reading on chamber pressure gauge.

14. Unlock and open chamber door.

15. Remove load from chamber.

16. Pushing power switch off if not continuing to use sterilizer.

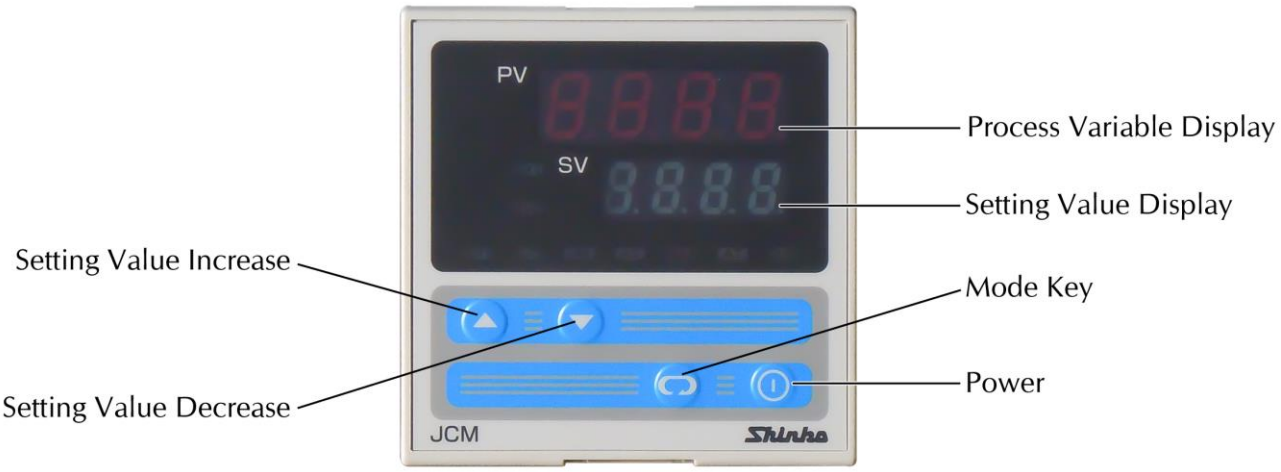
Reference of Sterilize and Dry Time

Cycle	Vacuum Times	Sterilize Temperature (°C)	Sterilize Time (Minute)	Dry Time (Minute)
Unwrapped Cycle	0	132	4~6	6~10
		134	3~5	
Wrapped Cycle (Thin wrapped goods)	3	132	4~8	15~20
		134	4~6	
Wrapped Cycle (Thick wrapped goods)	3	132	4~10	20~40
		134	4~8	
Solution Cycle	—	121	20~40	—

* Sterilize & Dry time can vary depending on pack density type of wrapping material used and sterilizer loading procedures.

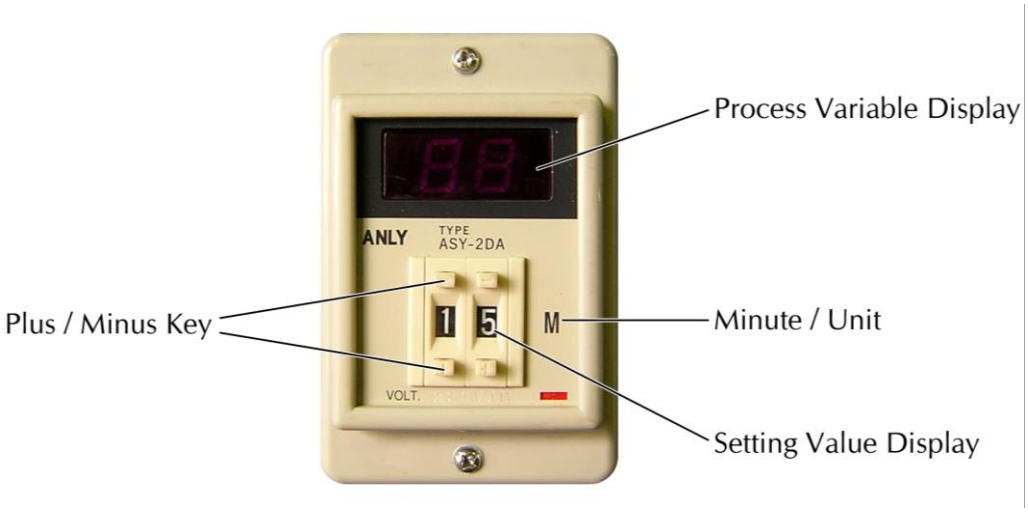
Sterilize Temperature & Time Setting

Temperature Controller



1. Press Mode Key, process variable display shows  .
2. Set sterilizing temperature, press Δ / ∇ to increase/ decrease temperature.
3. Press Mode key twice that the setting value is completed.

Sterilizing & Drying Timer



1. Plus / Minus key for each digit. The sterilize & dry time are increased or decreased with the Plus / Minus keys.

Routine Maintenance

Daily

1. Wash inside of chamber and loading equipment with a mild detergent solution, rinse with tap water and dry with a lint-free cloth.
2. Remove chamber drain strainer to clean out lint and sediment and reverse flush under running water. Place strainer back in chamber drain after cleaning.
3. Wipe door gasket clean with a damp cloth.

Weekly

1. Flush steam generator (if equipped with sterilizer)
2. Position power switch to ON.
3. Open the access door.
4. Wait until jacket pressure gauge indicates 1kg/cm^2, then open steam generator drain valve by turning valve handle anti-clockwise 90 degrees.
5. Flush steam generator for 3 minutes.
6. Close drain valve, the steam generator will refill with clean water.
7. Position power switch to OFF.
8. Close access door.

Monthly

1. Apply silicon oil on door gasket to maximize its usable time. If it is brittle or has cracks, replace it.
2. Place a few drops of heavy machine oil on chamber door hinge pin. Work oil into hinge by opening and closing the door several times.
3. Pull the lever of safety valve to prevent blockage when jacket filled with steam.

Quarterly

1. Replace water filter every 3 months to prevent water scale build up in the chamber and steam generator.
2. Replace HEPA air filter about 3~6 months to prevent contaminated air from entering into the chamber.
3. Clean strainer to prevent blockage.
4. Clean steam trap to prevent blockage.
5. Remove the heater to cleanse water scale deposition in order to maintain heat efficiency.

Repair

1. Check copper pipe and joints periodically. Fix any leakage and repair any damaged parts immediately.
2. If manual valve leaks, loosen the screw on the handle and tighten the hexagonal nut inside.
3. Cleanse the solenoid valve if it functions slowly or sounds abnormally. If it's internal component is worn excessively, replace the solenoid.
4. To replace door gasket, simply remove the old one with a flat-head screw or other tools and fit the new one into the groove.

＊Never permit unqualified persons to work on the sterilizer.

Trouble-Shooting

Problem	Possible Cause	Correction
No power to sterilizer	1. Loss of electricity 2. Power switch failed 3. Circuit breaker has tripped 4. Fuse burned out	1. Wait until power is restored to sterilizer 2. Replace power switch 3. Switch on circuit breaker 4. Replace fuse
Unable to start cycle	1. Chamber door open 2. Door switch loose or misadjusted	1. Close and lock door 2. Adjust and tighten switch
Buzzer sounds continually	1. Insufficient water 2. Steam generator drain valve didn't close 3. Check valve failed 4. Water intake solenoid valve failed	1. Check water source 2. Close drain valve 3. Replace check valve 4. Replace solenoid valve
Jacket can't reach set pressure	1. Jacket pressure gauge failed 2. Insufficient water 3. Steam from jacket to chamber solenoid valve jam 4. Heater failed	1. Replace pressure gauge 2. Check water source 3. Replace solenoid valve 4. Replace heater

Problem	Possible Cause	Correction
Chamber can't reach set pressure	1. Chamber pressure gauge failed 2. Steam from jacket to chamber solenoid valve failed 3. Chamber exhaust solenoid valve failed 4. Chamber vent valve didn't close	1. Replace pressure gauge 2. Replace solenoid valve 3. Replace solenoid valve 4. Close valve
Chamber can't reach set temperature but set pressure was attained	1. Steam trap jam	1. Clean steam trap
Chamber pressure can't release but cycle was completed	1. Chamber exhaust solenoid valve failed	1. Replace solenoid valve
Unable to open chamber door	1. Air intake solenoid valve failed 2. Hot air inside the chamber cool down cause vacuum status	1. Replace solenoid valve 2. Open chamber vent valve and for chamber to reach atmospheric pressure

∗If you are unable to correct the problem or if a problem occurs that is not on the Trouble-Shooting, contact your dealer representative.

∗Never permit unqualified persons to work on the sterilizer.

Specifications

1. Door operation: manual single door
2. Chamber size: ∅600×D1000 (mm)
3. Overall dimensions: W920×H1800×D1700 (mm)
4. Volume: 283L
5. Weight: 500kg
6. M.A.W.P.: 2.5kg/cm^2
7. Design temperature: 138°C
8. Maximum working temperature: 134°C
9. Temperature controller: LED digital control
10. Sterilizing & drying timer: 0～99minutes
11. Chamber pressure gauge: 76cmHg～6kg/cm^2
12. Jack pressure gauge: 0～6kg/cm^2
13. Water pump: 1/2HP, 0.37kw
14. Safety valve: 2.5kg/cm^2
15. HEPA air filter: efficiency 99.999% at 95L/min
16. Heater element: 9kw×2＝18kw
17. Power: AC 380V 3 Ph, 50/60Hz, 40A
18. Chamber material: stainless steel SUS316L
19. Jacket, chamber door & shell material: stainless steel SUS304
20. Piping: water inlet: ∅3/4" galvanized steel pipe.

    waste outlet: ∅1" galvanized steel pipe.

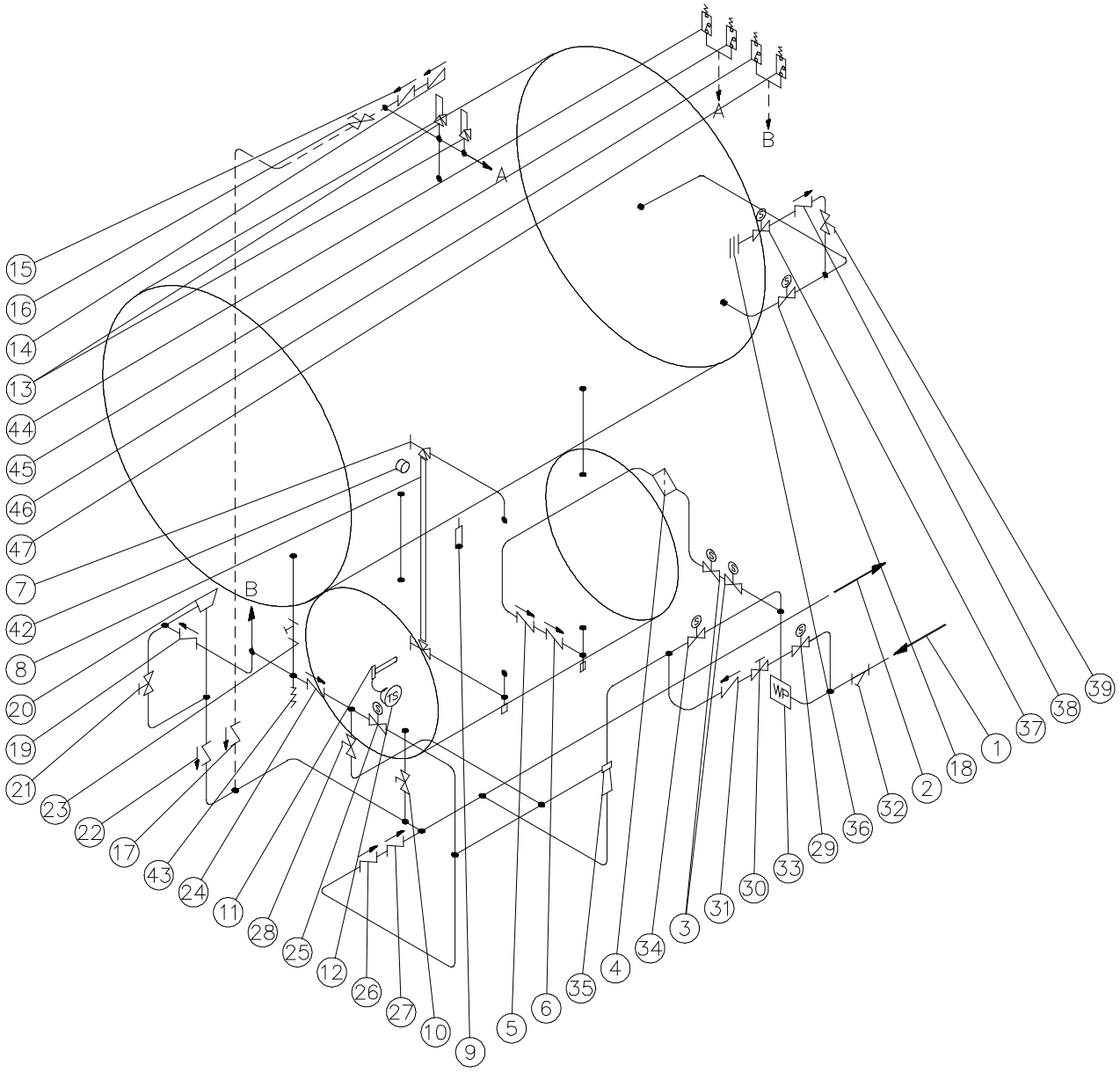
Appendix

1. Piping diagram
2. Circuit diagram
3. Control Box diagram
4. Control Panel Diagram

Piping diagram

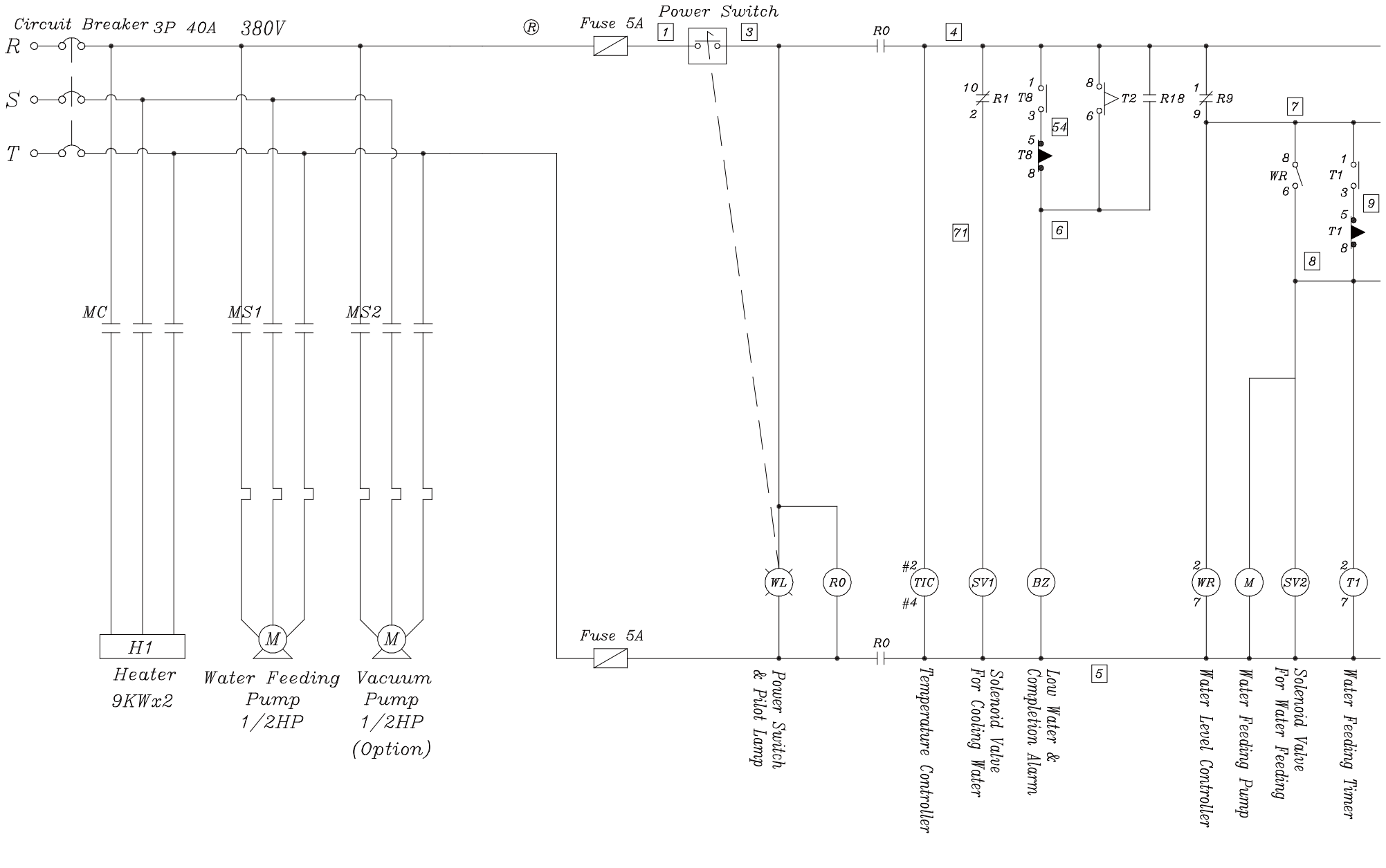
Working Number: A180704				
Serial Number: S1807004				
Model: HL-380P High Pressure Steam Sterilizer				
Chamber Size: Ø600×D1000mm				
Overall Dimensions: W920×H1800×D1700mm				
Volume: 283L				
Net Weight: 500kg				
Power: 380V 3Ph, 40A				
Functions: Manual Hinge Door, Steam Generator				
PIPING DIAGRAM BOM				
No.	**Component**	**Specification**	**Quantity**	**Manual Valve**
1	Water Intake Piping	3/4"	1	
2	Waste Exhaust Piping	1"	1	
3	Solenoid Valve	3/8", (W), N.C., 220V 1Ph	2	
4	Water Filter	L20"	1	
5	Ring Check Valve	1/2"	1	
6	Y-Pattern Swing Check Valve	1/2"	1	
7	Water Gauge Valve	1/2"	2	Water Gauge Valve(N.O.)
8	Water Gauge	380mm	1	
9	Electrode Holder	M18×1.5P, L130mm	1	
10	Ball Valve	3/4"	1	Steam Generator Drain Valve(N.C.)
11	Immersion Heater	3U Type, (W), 2"×L450(mm), 9kw, 220V	2	
12	Temperature Switch	50~300℃, 3P, without thread	1	
13	Safety Valve	3/4", 2.5kg/cm² with handle	2	Safety Valve
14	Ring Check Valve	1/2"	1	
15	Y-Pattern Swing Check Valve	1/2"	1	
16	Needle Valve	1/4"	1	Jacket Exhaust Regulator
17	Ring Check Valve	1/2"	1	
18	Solenoid Valve	1/2", (S), N.C., 220V 1Ph	1	
19	Y-Pattern Swing Check Valve	1/2"	1	
20	Steam Trap	1/2"	1	
21	Needle Valve	1/4"	1	Condensation Water Drain Regulator
22	Ring Check Valve	1/2"	1	
23	Y-Pattern Strainer	1", SUS316	1	
24	Y-Pattern Swing Check Valve	1/2"	1	
25	Solenoid Valve	1/2", (S), N.C., 220V 1Ph	1	
26	Y-Pattern Swing Check Valve	1/2"	1	
27	Ring Check Valve	1/2"	1	
28	Ball Valve	1/2"	1	Chamber Exhaust Valve(N.C.)

29	Solenoid Valve	1/4", (A&W), N.C., 220V 1Ph	1	
30	Needle Valve	1/4"	1	Chamber Exhaust Cooling Regulator
31	Ring Check Valve	1/4"	1	
32	Y-Pattern Strainer	3/4", SUS316	1	
33	Water Pump	3/4", 0.37kw, 220/380V 3Ph	1	
34	Solenoid Valve	3/4", (W), N.C., 220V 1Ph	1	
35	Water Injector	3/4"	1	
36	HEPA Air Filter	1/2"	1	
37	Solenoid Valve	1/2", (S), N.O., 220V 1Ph	1	
38	Ring Check Valve	1/2"	1	
39	Ball Valve	1/2"	1	Vacuum Leak Test Valve(N.O.)
40	Limit Switch	5A, 240VAC	1	
41	Door Gasket	Ø600mm, Hardness 45	1	
42	TT	1"	1	Temperature Calibration Valve
43	Thermal Couple	1/2", Ø6.3×L120(mm), 2M, TPFE, PT100	1	
44	Pressure Switch	7/16"×20, -20cmHg~3kg/cm²	1	
45	Pressure Switch	7/16"×20, -20cmHg~3kg/cm²	1	
46	Pressure Switch	7/16"×20, -20cmHg~2kg/cm²	1	
47	Vacuum Switch	ON/OFF 80/87 KPa, 250VAC/100VDC 2.5/0.5A	1	



Verified By	梁意中	Checked By	洪文涛	Drawn By	Lee	Dwg. Name.	Piping Diagram	Dwg. No.	2H1120601000002401	Date	2018.03.08

Circuit diagram



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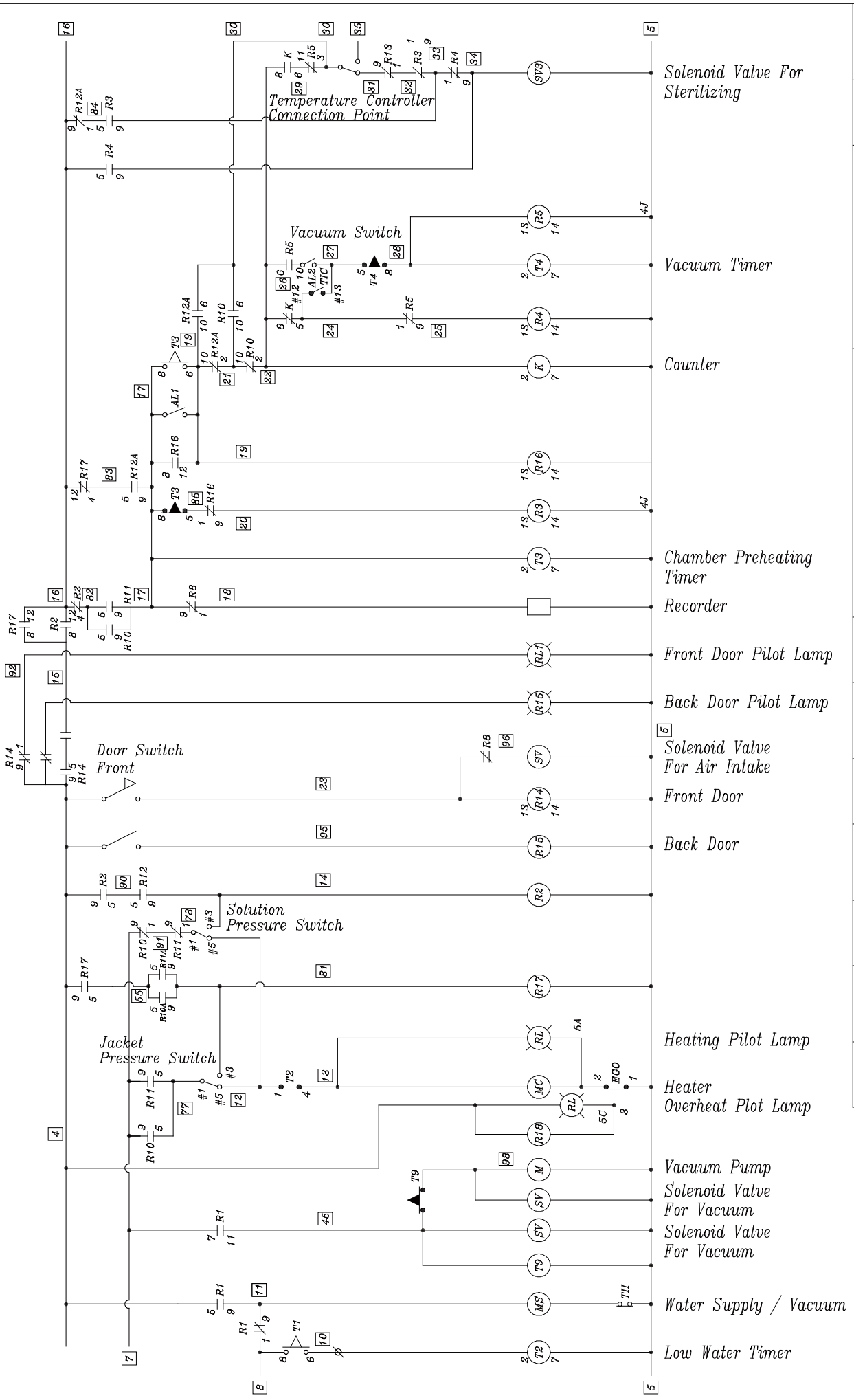

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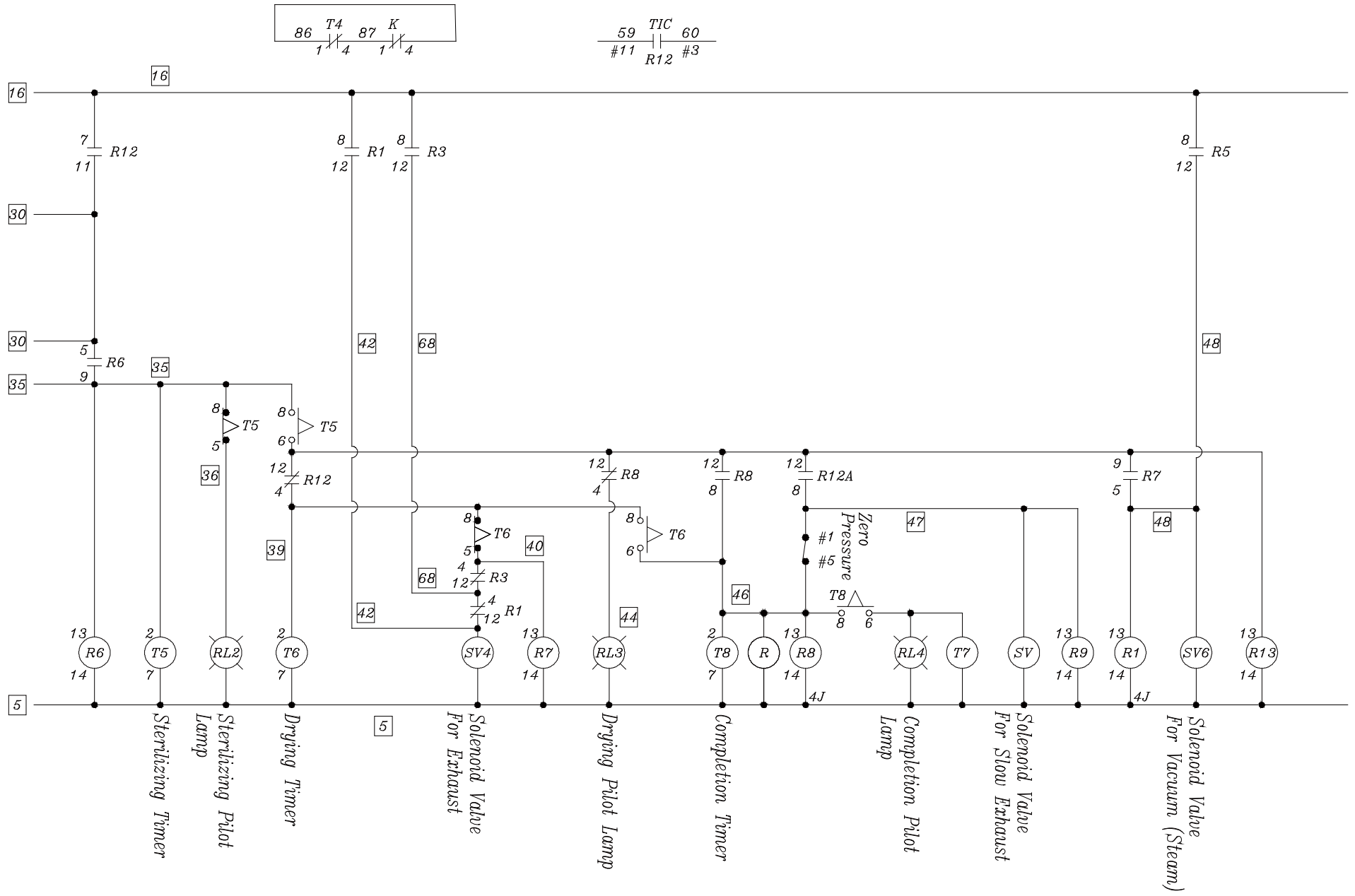

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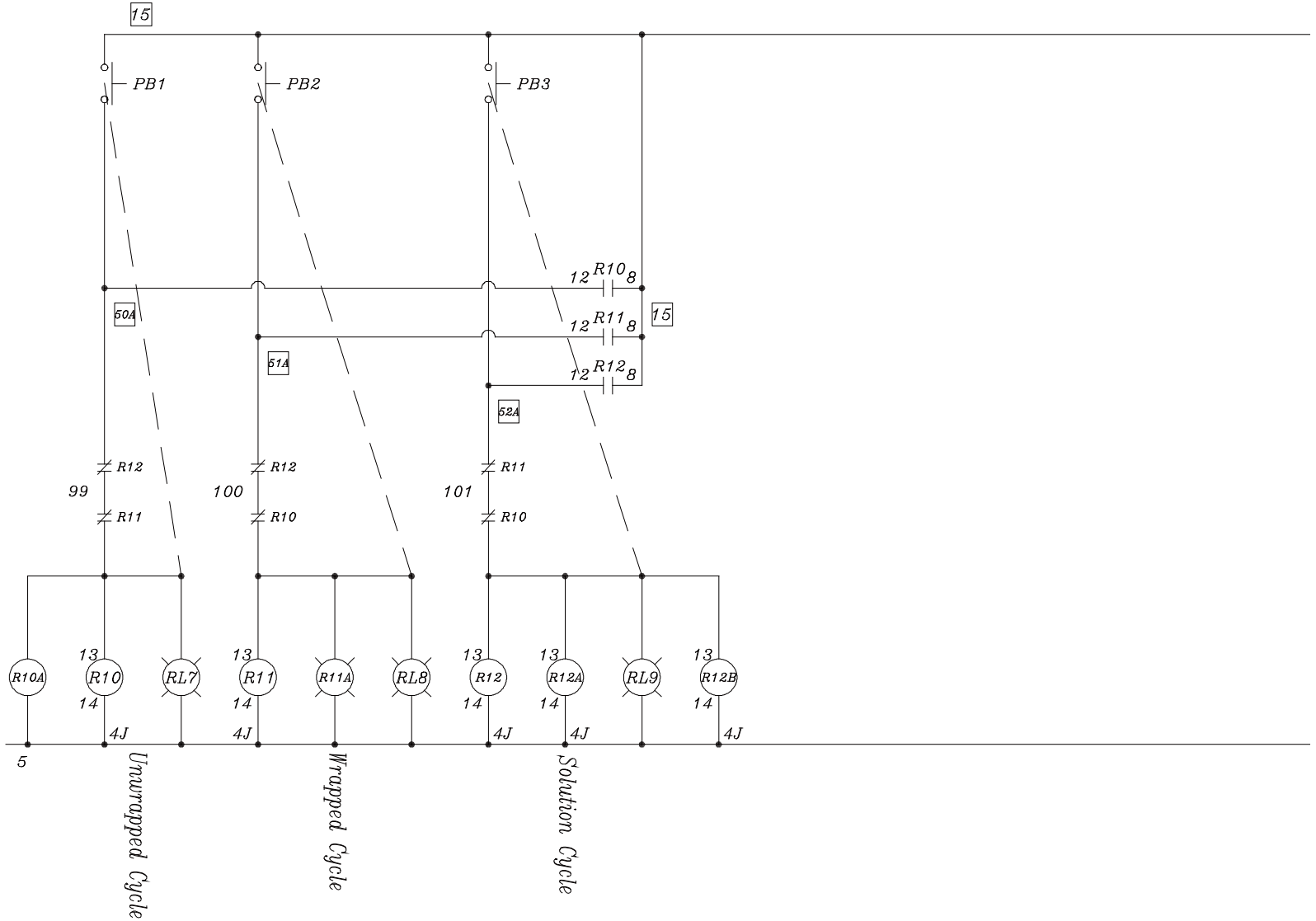

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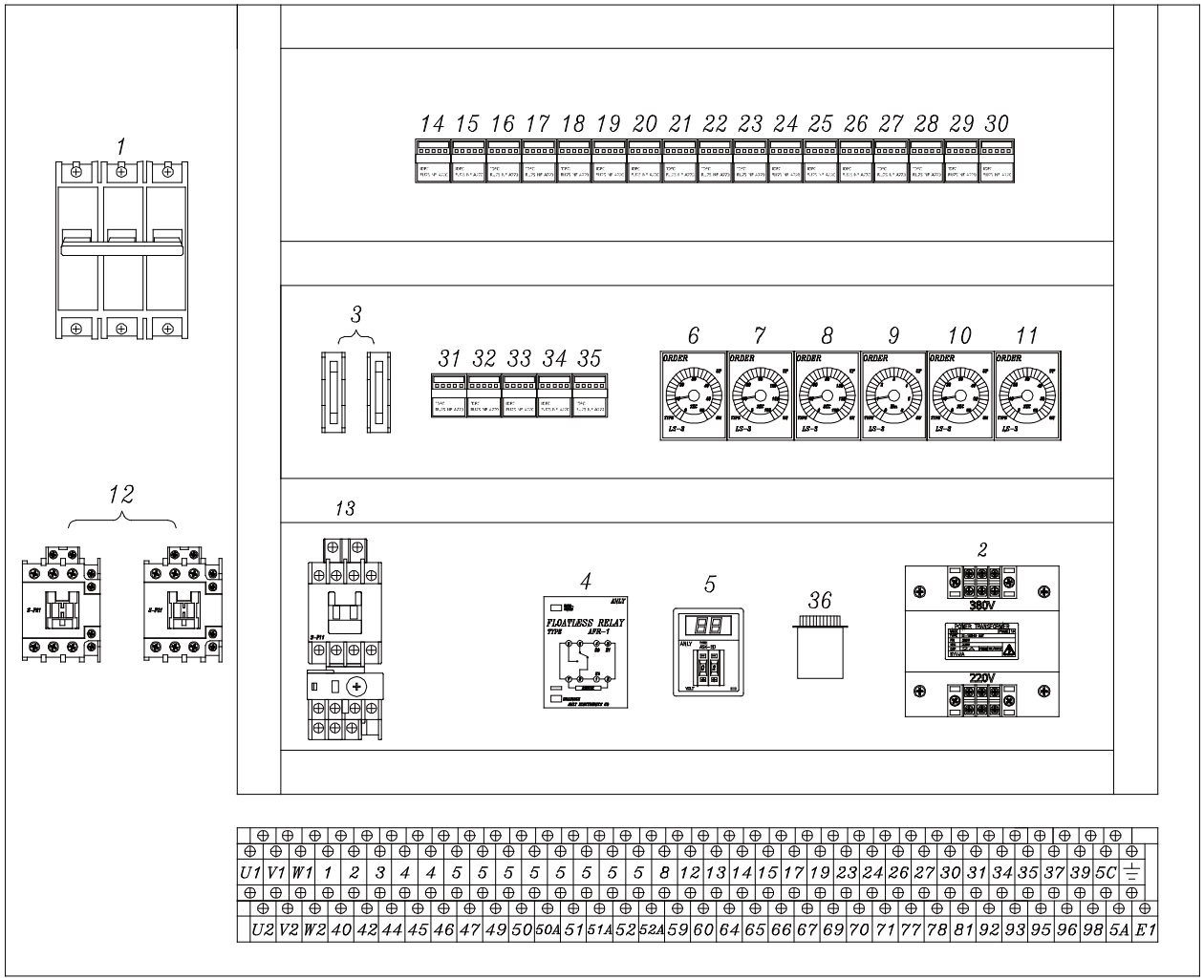
Control Box diagram

CONTROL BOX DIAGRAM BOM			
No.	**Component**	**Specification**	**Quantity**
1	Circuit Breaker	3P, 40A, 380VAC	1
2	Potential Transformer	PRI: 380V; SEC: 220V 2A	1
3	Fuse	5A	2
4	Floatless Level Relay	220VAC	1
5	Digital Counter	99P, 220VAC	1
6	Timer	60S, 220VAC	1
7	Timer	180S, 220VAC	1
8	Timer	180S, 220VAC	1
9	Timer	180S, 220VAC	1
10	Timer	180S, 220VAC	1
11	Timer	60S, 220VAC	1
12	Magnetic Contactor	1a1b, 21A	2
13	Magnetic Switch	1a/1b, 3.3A, 220VAC	1
14	Relay	220VAC	1
15	Relay	220VAC	1
16	Relay	220VAC	1
17	Relay	220VAC	1
18	Relay	220VAC	1
19	Relay	220VAC	1
20	Relay	220VAC	1
21	Relay	220VAC	1
22	Relay	220VAC	1
23	Relay	220VAC	1
24	Relay	220VAC	1
25	Relay	220VAC	1
26	Relay	220VAC	1
27	Relay	220VAC	1
28	Relay	220VAC	1
29	Relay	220VAC	1
30	Relay	220VAC	1
31	Relay	220VAC	1
32	Relay	220VAC	1
33	Relay	220VAC	1
34	Relay	220VAC	1
35	Relay	220VAC	1
36	Buzzer	220VAC	1



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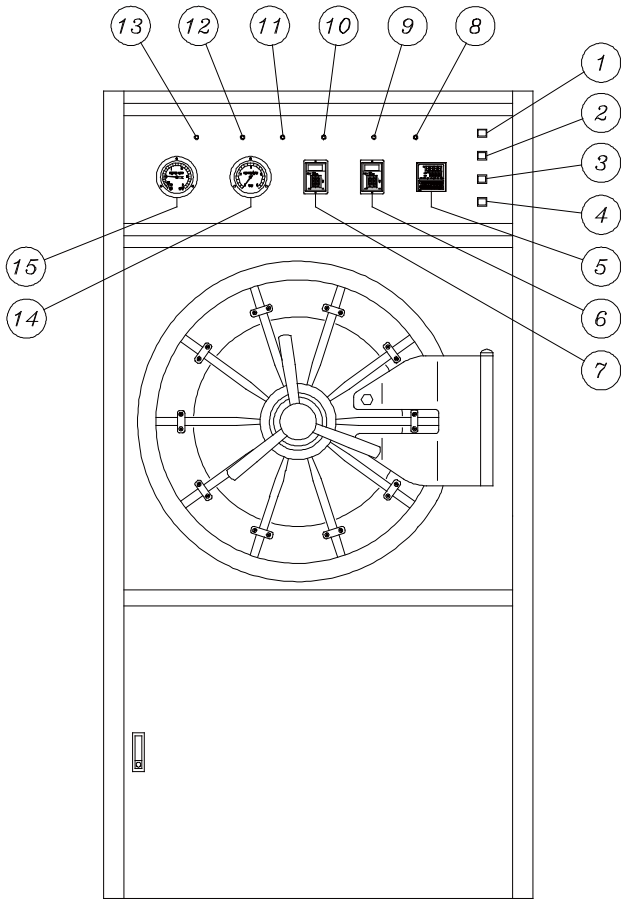
Control Panel Diagram

CONTROL PANEL DIAGRAM BOM			
No.	**Component**	**Specification**	**Quantity**
1	Command Switch	1a1b, Lock, White, 220VAC	1
2	Command Switch	1a1b, Non-lock, Red, 220VAC	1
3	Command Switch	1a1b, Non-lock, Red, 220VAC	1
4	Command Switch	1a1b, Non-lock, Red, 220VAC	1
5	Temperature Controller	0~150°C, PT100, 100~240VAC	1
6	Digital Timer	99M, 1a1b, 1c, 220VAC	1
7	Digital Timer	99M, 1a1b, 1c, 220VAC	1
8	Pilot Lamp	Red, 220VAC	1
9	Pilot Lamp	Orange, 220VAC	1
10	Pilot Lamp	Orange, 220VAC	1
11	Pilot Lamp	Orange, 220VAC	1
12	Pilot Lamp	Green, 220VAC	1
13	Pilot Lamp	Red, 220VAC	1
14	Pressure Gauge	DU 3/8"×75×6kg/cm²	1
15	Pressure Gauge	DU 3/8"×75×6kg/cm²~76cmHg	1



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