



AIR JACKETED CO2 INCUBATOR

INC91-080



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1. Scope

CO2 incubator is the essential apparatus for immunology, oncology, genetics and bio-engineering. Widely used in microorganisms, agricultural science, drug research and production.

2. Structure

The CO2 incubator is made of SUS304 stainless steel cavity and microcomputer PID control system. The pure CO2 cylinder and stable CO2 reducing valve is required when using the machine. CO2 cylinder needs to be prepared by users. The reducing valve will be involved in the machine, it is a special CO2 reducing valve, which can affect the accuracy of the CO2 concentration.

- 1) adopting new style carbon fiber yarn heating technology, heating fast and uniformity.
- 2) PT100 temperature sensor
- 3) Microcomputer PID control system, LED digital display.
- 4) Temp control circulation adopts over-temp alarm and cavity temp. Control. When the main control is out of work, the alarm circulation will work with an acousto-optic alarm and prompt hint.
- 5) The special design for CO2 circuit can provide fast recovery after opening the door (eg. When setting 5% CO2 concentration, the recovery time ≤ 6 mins; setting 10% CO2 concentration the recovery time ≤ 12 mins)
- 6) Double door design, the outdoors is a magnetic seal structure, and the glass door is with a separated heating system to prevent frost on the glass door.
- 7) High quality silicone door seals ensure excellent tightness.

3. Technical Parameter

1. Chamber size: 500×400×400 (80L) ; 650×550×500 (160L) ;
2. Temperature range: $\pm 5.0 \sim 50.0^{\circ}\text{C}$
3. temperature fluctuation: $\pm 0.5^{\circ}\text{C}$
4. temperature uniformity: $\pm 1^{\circ}\text{C}$
5. setting value: $+1^{\circ}\text{C}$ tracking alarm, cut off heating power
6. temp. recovery time: ≤ 15 min (37°C)
7. CO2 control range: 0~20%
8. flow meter: air 100-1000ml/min, CO2 10-100ml/min
9. CO2 density recovery time: concentration×1.2min
10. power: 220V/50Hz
11. power: $\leq 350\text{W}$ (80L) , $\leq 550\text{W}$ (160L) ;
12. external size: 835×550×550 (80L) ; 985×700×650 (160L)

13.weight: 36kg (80L) ; 57kg (160L)

14.working environment: temp.:5℃~50℃; humidity:≤85%RH

4. Diagram

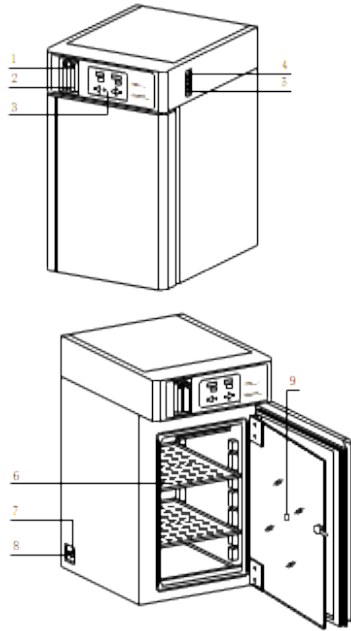


Figure 1

1. CO2 flowmeter
- 2.air flowmeter
3. controller
4. power switch
5. CO2 switch
6. shelves
7. water outlet
8. overflow
9. test hole

5. Operation

1. Install co2 reducing valve on the cylinder, ensure the connector is not leaking. Putting the rubber hose to the output connector of the reducing valve, then tightening it with a retainer. the valve of the cylinder needn't turn on.

2.before power-on, you need to clean up the chamber with alcohol, then sterilize it with an ozone disinfectant.

3.connecting the water pipe to the water inlet on the left bottom of the machine, watch the water level in the chamber to 10-15mm.

4. Power on

Power switch to "1",power light is on.

1) Temperature and parameter setting.

After power is connected, it will access normal mode after 3s.press main temp. setting button"Test",it will access to setting mode, in the bottom line of the co2 density window, it will display prompt "SP" of temperature, the setting values in the upper line can be adjusted, and re-press the button to log out the setting mode. the setting value will be saved automatically. long press temp setting key "Tset" for 3s, it will access the setting mode of the inner parameter, long press for 3s again, log out the mode.

Function of parameters of temperature as below :

Parameter	Name	Function	Range
Lc-	code	When Lc=3,the parameter can be checked and adjustable	
AL-	temp. deviation alarm	When $PV \geq SP + AL$, beeper beeps.	(0.0~5.0) 1. 0°C
Pb1	Temperature(zero) deviation	Modify the errors coming from temp. sensor measuring the low temperature. $Pb1 = (\text{actual temp. value}) - (\text{meter measurement value})$	(-9.9~9.9) 0.0
PK1	Temperature(full) deviation	Modify the errors coming from temp. sensor measuring the high temperature. $PK1 = 1000 * [(\text{actual temp. value}) - (\text{meter measurement value})] / (\text{meter measurement value})$	(-99~999) 0

Table 1

Note: modify"Pb1"firstly, then "PK1"

2) Setting for CO2 density

Press the CO2 density button"Cset",it will access to setting mode, in the bottom line of the co2

concentration window, it will display prompt "SP "of co2 concentration set, the setting values in the upper line can be adjusted, re-press the button to log out the setting mode.

Functions parameters :

Parameter	Name	Instruction	(range)factory default
Lc-	code	When Lc=9, the parameter can be checked and adjustable	
T2-	Water temp. test value	Display water temperature test value	
T3-	Door temperature test value	Display door temperature test value	
Ot2	The difference in water temp. test value and chamber temp. setting value	If "water test temp. $\geq$ chamber setting value +ot2", shut off water and heating output	(0.0~5.0) 3.0°C
Ot3	The difference in value from door temp. setting value and chamber temp. setting value.	door temp. setting value = chamber temp. setting value +ot3;	(-5.0~5.0) 0. 0°C
Pb2	Water temp. zero adjustment	Modify the deviation of water temp. sensor measurement (when low temp.) $Pb2 = (\text{water temp}) \text{ actual temp. value} - (\text{water temp.}) \text{ display's temp. value}$	(-9.9~9.9) 0.0
PK2	(Water temp.) full scale adjustment	Modify the deviation of water temp. sensor measurement (when high temp.) $PK2 = 1000 * [\text{water actual temp. value} - \text{water test value from display}] / \text{water test value from display}$	(-99~999) 0
Pb3	Door temp. zero adjustment	Modify the deviation of door temp. sensor measurement (when low temp.) $Pb3 = (\text{door temp.}) \text{ actual value} - (\text{door temp.}) \text{ test value}$	(-9.9~9.9) 0.0
PK3	Door temp. full scale adjustment	Modify the deviation of door temp. sensor measurement (when high temp.) $PK3 = 1000 * [(\text{door temp.}) \text{ actual value} - (\text{door temp.}) \text{ test value}] / (\text{door temp.}) \text{ test value from display}$	(-99~999) 0

Table 2

Remark: modify "Pbx" firstly, then modify "PKx".

At setting conditions, if there are no actions in 30s, the controller will exit the setting menu without a data store.

1) The heating lamp is on with green color, that means it is heating.

2) Put the co2 valve to "0". (shut valve, because when the valve is on in no culture condition, their lifetime will be reduced), then put co2 concentration to "0".

3) When the temperature reaches the setting value, open the co2 cylinder. (before open, loose the pressure reducing valve, avoid the high pressure on valve).The pressure gauge on the inlet of the pressure gauge indicates the pressure of co2 in the cylinder, and the pressure reducing valve knob is slowly clockwise rotating.The pressure value in reduce valve is indicated as 0.05Mpa, and the pointer is in the middle of the line.At this point, the co2 inlet switch is opened by setting the required co2 concentration (for example, 5%).Open the co2 inlet switch, when there is carbon dioxide coming into the room.As the concentration increases, LED shows the concentration of co2. When reach to set value, the solenoid valve is cut off to air and co2 supply.At this time the air flow meter float should be indicated at 760ml/min, co2 meter float should be indicated at 40ml/min,If the float deviates from the above value,use metering pin valve to regulate fine 760ml/min (air) and 40ml/min (co2).

4) For CO2 concentration, please refer to Appendix 2. .

5) When the temperature reaches the setting value, fluctuates $\leq 0.5^{\circ}\text{C}$, and the CO2 concentration is also up to the requirement, cell culture can be carried out, and put into the water tray, so that the humidity meets the requirements, and the natural evaporation can generally reach.

6) After the first use of this machine or a longer period of use, it should be operated according to the above requirements and should be examined for the inspection of the inside of the chamber before the official training.

Diagram :

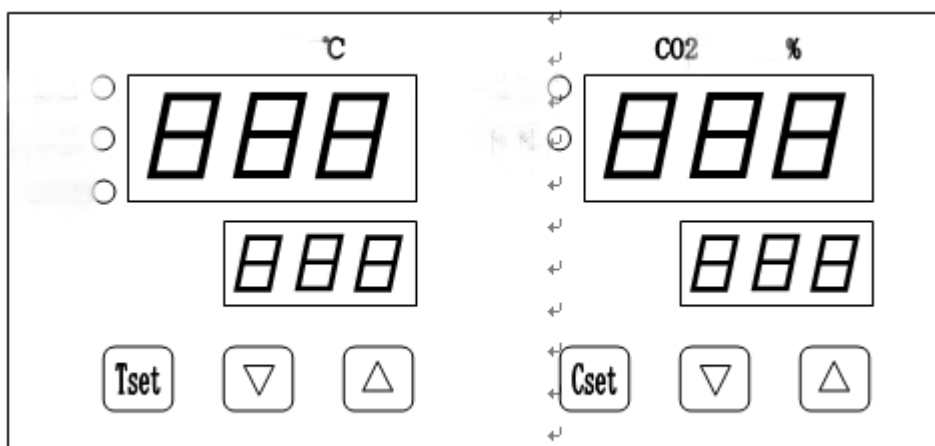


Figure 2

Keys and indicator lights,

- 1) "Tset": press this key to set temperature ,co2 concentration and relative parameters,
- 2) "▽": in setting interface, press this key to decrease, long press this key to continuously decrease;
- 3) "△": in setting interface, press this to increase, long press this key to continuously increase
- 4) "Cset": setting key for CO2 concentration;
- 5) "heating"light: it is on when water heating is on.
- 6) "alarm" light: it is on when the temperature is over.
- 7) "water level"light: it is on when there is a lack of.

- 8) "inlet"light: the light is on, when co2 is filling.
- 9) "supply"light: the light is on, when co2 is supplying.

1. Alarm

- A. When chamber temp. display is over 1°C compared to setting temp., the controller will alarm visually and audibly, and electricity will be cut down.
- B. When the alarm beeps, press any key to muse. But the alarm indicator will still be on.

2. Setting for Co2 concentration display when filling the Co2.

Press Cset", it will access to Co2 density setting, the bottom window shows "SP"(Prompt for setting value of Co2 concentration), the upper window shows the display value of Co2 concentration.users can adjust the parameter, after adjustment, press the key"Cset"to exist. Co2 concentration should be in accordance with flow meter ratio, pls refer to the appendix 2.

Appendix 1

Examination to chamber pollution: using 2 culture dishes with culture, one is polluted, then covered and put into the chamber: the other is without pollution, covered half and put into the chamber. The polluted one will cause bacteria. The other one without being polluted has no bacteria. In that condition, it means the chamber has been cleared, the gas injected won't bring bacteria.

Appendix 2

Co2 concentration formula

$$\text{Co2 concentration} = \text{co2 flux/min} / (\text{co2 flux/min} + \text{air flux/min})$$

Eg. 5% air 760ml/min co2 40ml/min

10% air 720ml/min co2 80ml/min

15% air 510ml/min co2 90ml/min

20% air 400ml/min co2 100ml/min

6. Wiring

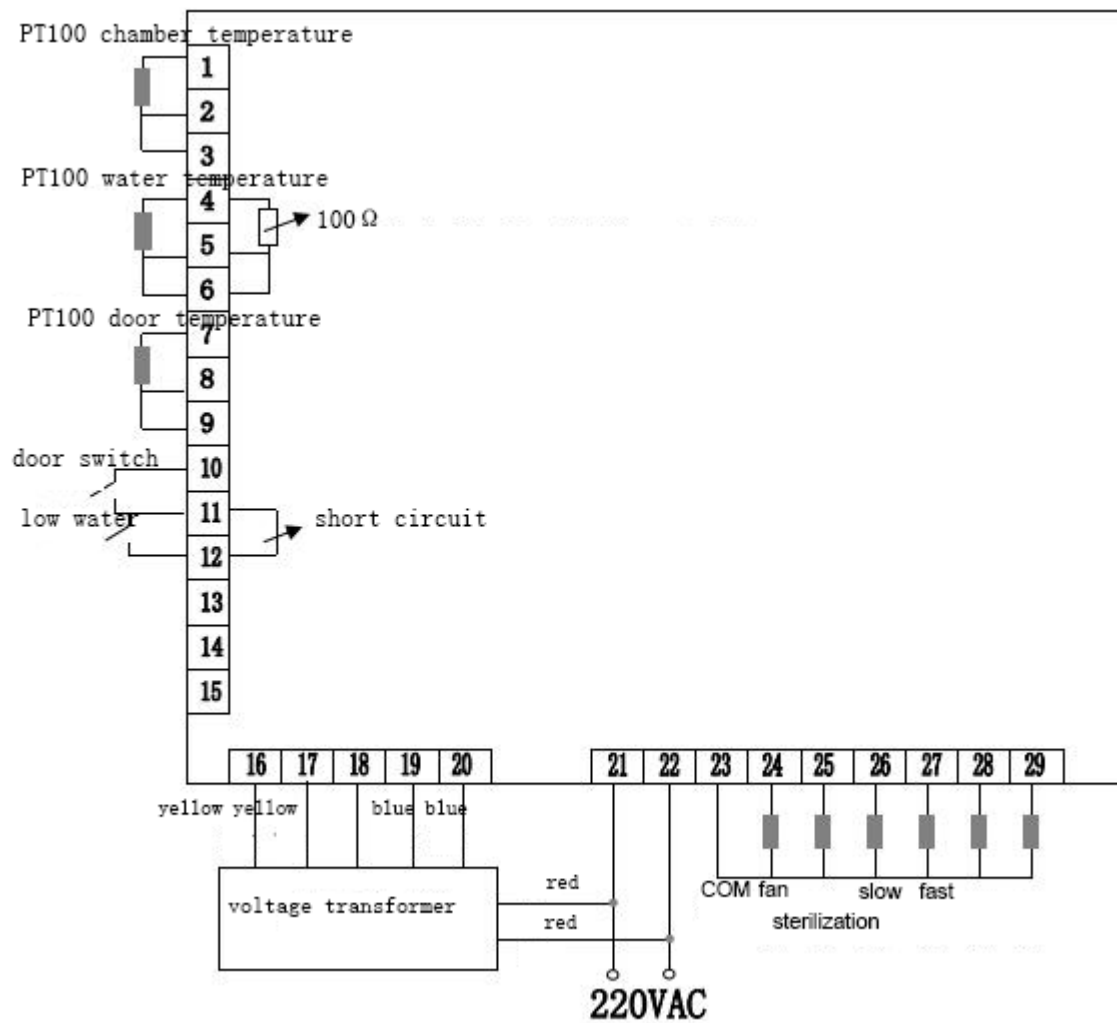


Figure 3

7. Packing list

Serial	Name	Qty	Remark
1	machine	1 set	
2	manual	1 pcs	
3	CO2 reducing valve	1 set	
4	Water pan for supply	1 pcs	1m water pipe
5	shelves	2 pcs	
6	Gas pipe	2m	
7	Water pipe	1 pcs	

8	Power cord	1 pcs	
9	Water basin	1 pcs	0.2m water pipe

Table 3

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