

User Manual

DW-FD Autoclave Operation Manual



DRAWELL
Artist of Science

Drawell International Technology Limited
Chongqing Drawell Instrument Co., Ltd.
Shanghai Drawell Scientific Instrument Co.,Ltd.

Chongqing Center : Suite 2705,Building No.12,Shiyou Road No.1, Yuzhong District, Chongqing, China.

Shanghai Office : Suite 1117,Lane561 XiuChuan Rd.,PuDong New Area,Shanghai,China

Homepage : www.drawell.com.cn

Tel : 0086-023-63268643

Email : sales05@drawell.com.cn

Content

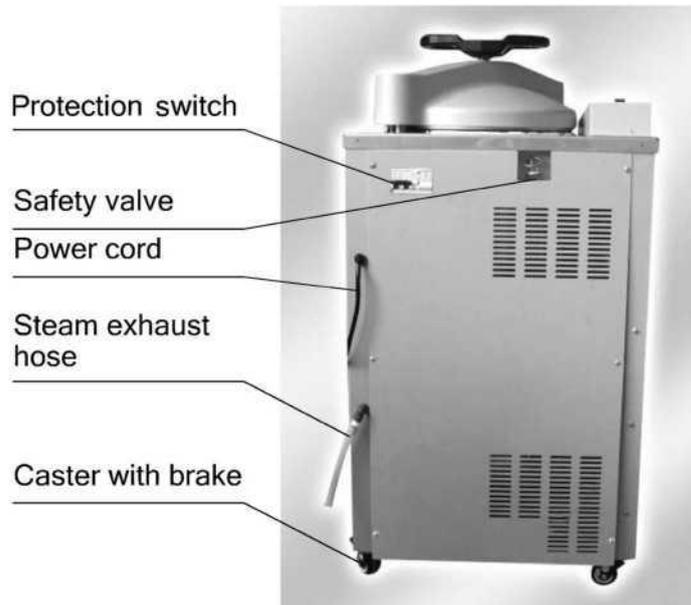
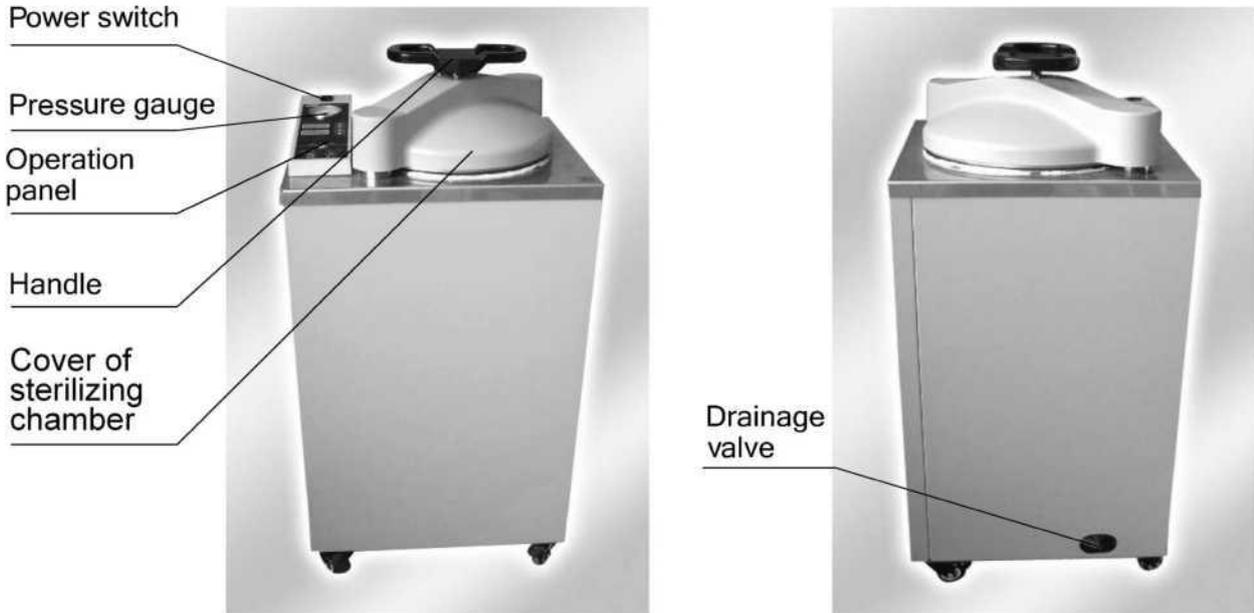
Precautions on Safe Operation-----	02
Chapter 1 External Features&Controller-----	03
1.External Features-----	03
2.Introduction of the controller-----	04
Chapter 2 Technical Specification-----	05
1.Technical Specification-----	05
Chapter 3 Installation of Instrument-----	06
1. Placement of Instrument-----	06
2. Connection-----	06
3. Setting-----	06
Chapter 4 Operation Instruction-----	07
Basic Sterilization Illustration & Operation Instruction-----	07
1. Turning on the power-----	07
2. Opening the sterilizer chamber cover-----	07
3. Adding distilled water-----	08
4. Loading articles to be sterilized-----	08
5. Closing the sterilizer chamber cover-----	09
6. Selecting sterilizing program-----	09
7. Starting sterilization-----	10
8. Opening the cover & Program finished-----	10
9. Taking the sterilized articles out-----	11
10. Turning off the power-----	11
Chapter 5 Troubleshooting-----	11
Chapter 6 Maintenance & Care-----	12
Chapter 7 Setting of Administrator-----	13

Precautions on Safe Operation

Precaution:

- ◆ For your safety and to operate the instrument properly, please read this operation instruction carefully before using and operate the following requirements in this manual. Where you violate the instruction of manufacturer in this manual, it is possible to damage the protection of this instrument.
- ◆ This instrument can be used in labs for sterilization purpose, shall not be used for purposes other than sterilization , drying , and it shall also not be used for sterilizing the flammable, explosive and readily oxidization products or strong acid, alkali and saline solutions to avoid explosion and corruption of sterilizer chamber or pipelines.
- ◆ The power supply of sterilizer should be properly connected according to nameplate on the instrument. In case of excessive voltage fluctuation, the regulated power supply shall be used to ensure optimum performance of the instrument. IF you are using other types of voltage, a transformer must be used to prevent the instrument from being damaged.
- ◆ It is necessary to ground the instrument properly, and never connect the ground wire to plastic pipeline, gas pipe, telephone ground wire and lightning rod.
- ◆ Never block the steam exhaust hole on the safety valve with articles, so that the safety valve may work properly under abnormal conditions.
- ◆ Always ensure that the reading of pressure gauge is "0Mpa" before opening the chamber cover. Never attempt to open the chamber cover and drainage valve, or draw out the steam trapping bottle when the pressure inside the sterilizer chamber is over "0Mpa" to avoid injury from ejected pressurized steam.
- ◆ Avoid dripping water to the control circuit when adding distilled water to the sterilizer chamber to against electric shock or other faults.
- ◆ When using waste processing bags or other type of bags, please put the bags into the stainless steel basket before put into the sterilizer chamber to avoid affecting the precision of temperature.
- ◆ If the handle is turned by mistake during sterilization, it will not continue turning as it has been locked by the interlocking device, and there will be a little steam exhausted to release. In this case, press the "STOP" button to stop the instrument immediately. When opening the chamber cover, turn the handle slightly toward the opposition direction that it is wrongly operated, and then turn the handle counter-clockwise until the cover is released.
- ◆ Observe the temperature variation inside the sterilizer chamber. The temperature is relatively high when operation has been finished, keep the face and hands away from the sterilizer chamber when opening the cover to avoid injury from ejected pressurized steam. Gloves must be used when taking articles out of the sterilizer chamber.
- ◆ Liquid does take some time to get cooling, verify whether the temperature is low enough or not, when taking the liquid after sterilization out of the chamber to avoid scalding.
- ◆ Use only distilled water as sterilizing water to avoid affecting the service life of sterilizer.
- ◆ When using the instrument continuously, 15 minutes and above interval is required before next operation to allow the instrument to cool down, so that it will be able to produce adequate saturated steam.
- ◆ In case of abnormal conditions, such as noise, odor and smog, please turn off the power immediately, and observe until the abnormal condition stops, and then contact the local dealer or customer service department of our company.
- ◆ The user shall observe the local regulations related to the pressurized vessels.

Chapter 1 External Features & Controller

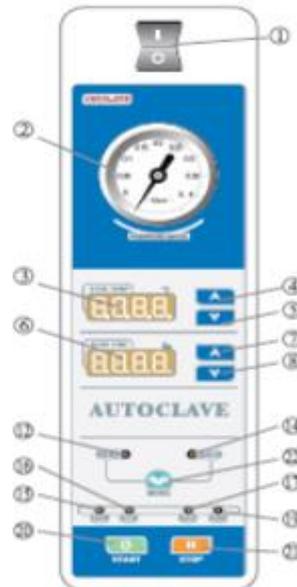
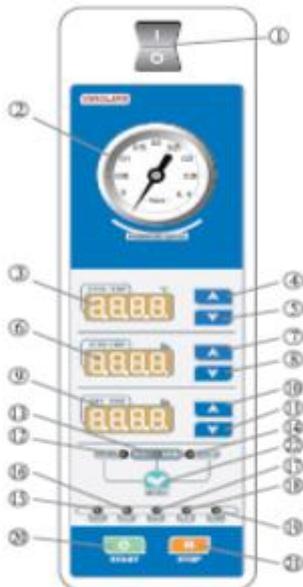


I. External Features

II Introduction of Controller

FD29SR/FD50SR/FD80SR/FD100SR
operation panel(SR series)

FD29SA/FD50SA/FD80SA/FD100SA
operation panel(SA series)



- 1.power switch :press " 1" to turn on the power ,press " 0" to turn off the power
- 2.pressure gauge
- 3.sterilizing temperature screen: ℃
- 4.sterilizing temperature up button
- 5.sterilizing temperature down button
- 6.sterilizing time screen: min
- 7.sterilizing time up button
- 8.sterilizing time down button
- 9.drying time screen: min
- 10.drying time up button
- 11.drying time down button

- 12.solid mode indicator
- 13.solid&drying mode indicator
- 14.liquid mode indicator
- 15.interlocking indicator: on means cover is secured
- 16.sterilizing indicator
- 17.exhausting indicator
- 18.drying indicator
- 19.complete indicator: on means work finished
- 20.button:press to start sterilizing
- 21.button:press to stop sterilizing
- 22.button:press to choose sterilizing mode.

Chapter 2 Technical Specification

I. Technical Specification				
Model	DW-FD29A DW-FD29E	DW-FD50R DW-FD50A DW-FD50E	DW-FD80R DW-FD80A DW-FD80E	DW-FD100R DWFD100A DW-FD100E
Capacity	29(L)	50(L)	80(L)	100(L)
External dimension(mm)	580x490x1080	580x490x1080	730x625x1100	730x625x1200
Size of sterilizer chamber mm	φ 325x381	φ325x670	φ400x709	φ400x809
Power supply	220V 50/60HZ			
Rated power	2600W	2600W	4600W	4600W
Range of pressure gauge	-0.1-0.5Mpa			
Working environment	5-40℃ relative humidity 10-85%			
Rated working pressure	0.25Mpa			
Designed pressure	0.3Mpa			
Sterilization temperature	105-135℃			
Sterilization timer	1-300min			
Drying timer	1-300min ①			
Operation mode	Solid Mode. Solid& Drying Mode ②、 Liquid Mode			
safety equipment	Safety valve, over temperature and temperature abnormal protection system, over pressure protection system, electric leakage protection equipment, chamber cover checking system, self- induction interlocking device			
Accessories	Stainless steel baskets, water plate, waste water tank			

①② R series have drying mode for solid, drying time can be pre-set

Chapter 3 Installation of Instrument

Placement of Instrument

1. Place the instrument on the level ground with the brakes of four casters pressed down before installation. Do not place any objects within 10cm around for ventilation.



2. Connect the drainage pipe between machine and wastewater receiving bottle or pipe.

3. Take out the water plate, remove the packaging, place it in the bottom of the chamber in a horizontal position.



Connection

1. The instrument must be grounded reliably, if the power socket does not have the ground terminal, it is required to connect the instrument with independent ground wire before powered on.

2. Power supply: single-phase AC 220V \pm 22V,(50/60)Hz \pm 1Hz.

3. Requirement for current intensity:

DW-FD29A/DW-FD29E	$\geq 14A$
DW-FD50A/DW-FD50R/DW-FD50E	$\geq 14A$
DW-FD80A/DW-FD80R/DW-FD80E	$\geq 25A$
DW-FD100A/DW-FD100R/DW-FD100E	$\geq 25A$

III. Setting

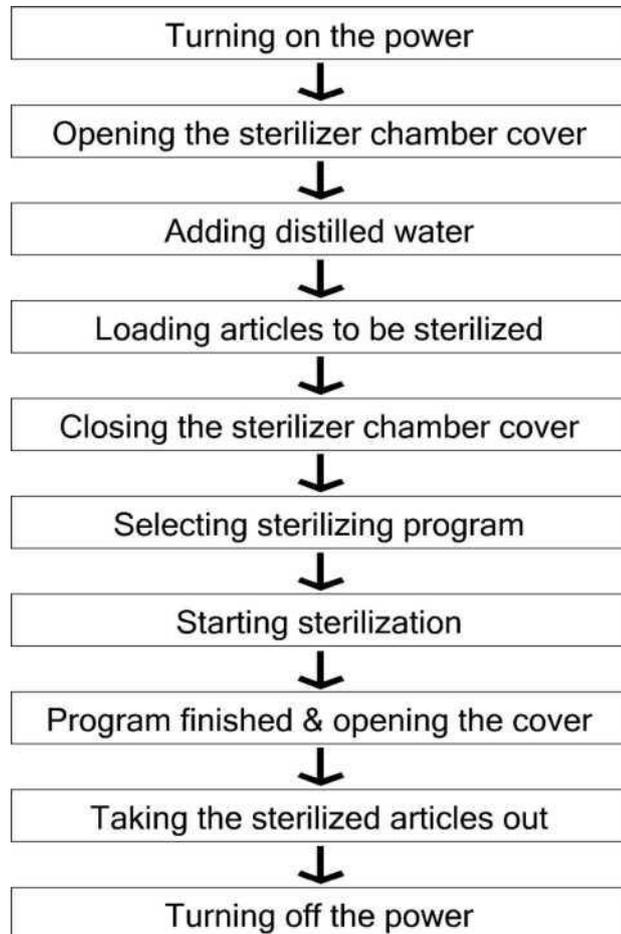
When shipped from the factory, the unit is set for an elevation of between 0 and 300m. If the elevation of the installation location is higher than 300m, please ask your dealer to change the setting to avoid affecting normal work of sterilization.

★Caution :

If the elevation is not set properly, machine can not work normally.

Chapter 4 Operation Instruction

I. Basic Sterilization Illustration & Operation Instruction



1. Turning on the power

Turn on the leakage protection switch and the power switch on the control panel

2. Opening the sterilizer chamber cover

- 1) Turn the handle counter-clockwise until the chamber cover is loosened
- 2) Push the handle rightward slightly to move the cover to one side

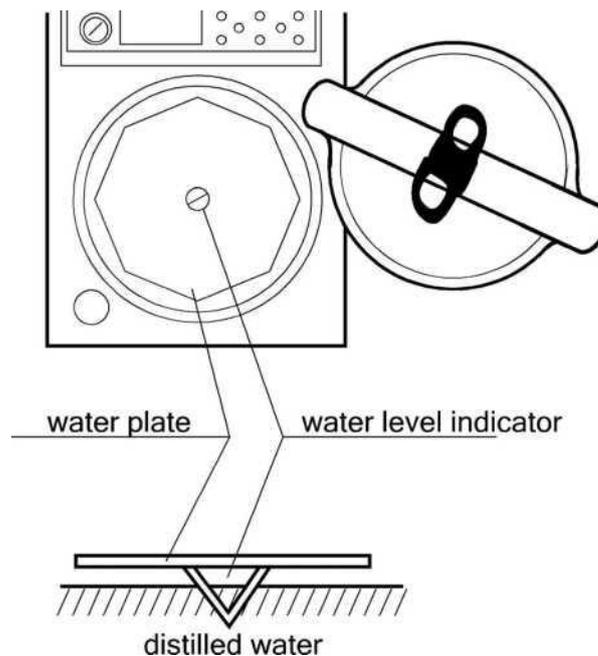
★Note:

○ The indicator "locked" is off at this time, and the sterilizer will not be able to work until the chamber cover is closed and secured.

○ Do not open the chamber cover too fiercely, so that it will not be extruded and broken.

3. Adding water

Adding distilled water into the sterilizer chamber until the water flows into the observation hole in the middle of the water plate.



4. Loading articles to be sterilized

- 1) Put the articles to be sterilized into the baskets and close the cover
- 2) Make sure the water plate is placed well, in case baskets place on the heater directly.
- 3) Put the baskets lightly into the chamber

★Note:

- Verify whether the water plate is in place or not before putting the baskets back into the sterilizer chamber, so that they will not be put on the heater directly.
- When plastic bag is used for sterilizing, please put some water into the bag and keep the bag open, and make sure the bags do not contact with the inner wall of the sterilizer. Sealed bags will result in inefficient sterilization. If the sterilization chamber is over crowded, steam can not reach every corner, will result in incomplete sterilization.
- When sterilizing the glassware like beaker, conical flask and test tube, the vessel must be put up side down or across. If the vessel can only be in vertical direction, put a little water in the vessel before sterilizing.

- When sterilizing the liquids like chemical reagent or menstrual, care must be taken to the volume of liquid inside the container (3/4 of total volume of flask, and 1/2 of total volume of test tube), so that the liquid will not overflow from the container during sterilizing.
- The cover of container to be sterilized should be loosened for air exhaust to prevent container broken.
- When melting the agar, each container should be less than 2 L, otherwise the melting may not be completed thoroughly.
- The DURHAM TEST TUBE with over 6mm caliber should be used, otherwise air bubble may stay in the tube.
- Please put article temperature sensor properly if the instrument is attached article thermometer.

5. Closing the sterilizer chamber cover

- 1) Push the handle leftward slightly until the arm leans against the arm stopped.
- 2) Turn the handle until it is secured and the cover closed indicator “ Locked” is on. The cover closed indicator may change repeatedly in course of tightening. When it is nearly secured, turn the handle slowly while observing whether the cover closed indicator is on or not.

6. Selecting sterilizing program

Select the sterilization mode, set up the Sterilization time and drying time according to your needs.

Model	Serilization Parameter	Setting Way
FD-SAVE	Sterilizing mode 3) Solid mode 4) Liquid mode	Press"MODE"button to switch between solid mode and liquid mode
	Main Parameter 1) Sterilizing temperature 105-135°C 2) Sterilizing time 1-300min	Press sterilizing temperature up or down button to set Press Sterilizing time up or down button to set
FD-SR	Sterilizing mode 1) Solid mode 2) Solid&drying mode 3) Liquid mode	Press"MODE"button to switch between solid mode, solid&drying mode and liquid mode
	Main Parameter 1) Sterilizing temperature: 105-135°C 2) Sterilizing time : 1-300min 3) Drying time:1-300min	Press sterilizing temperature up or down button to set Press Sterilizing time up or down button to set Press drying time up or down button to set

★Note:

○ For sterilization of liquids, set a sterilization time longer than desired, taking a delay time into account: For example, if the volume of water in the flask is 3L , when the internal temperature of the sterilizer chamber reaches the set value, another 33 minutes shall be required for the water in the flask to reach this temperature, therefore, the sterilizing time must be set to 53 minutes.

Actual required sterilizing time (53min)=Delay time(33min) + Normal sterilizing time(20min)

FD50SA Sterilizing Delay Time Reference Value (Every Flask)	
Liquid Volume	Delay Time
3L	30min
2L	25min
1L	20min
500cc	15min

○ Never press the "STOP" button casually to stop the running program during sterilizing of liquids to avoid the liquid overflowing into the sterilizer chamber and even blocking the valve and pipe lines.

7. Starting sterilization

After setting the sterilization parameter, press "START" button to start work, "STER" indicator will start to blink, when reaching the setting sterilization time, the sterilizing time on the screen start to count down.

★Note:

○ In order to prevent misuse, "START" and "STOP" button have a delayed response function. Keep the button for 2 seconds to start work.

8. Opening the cover & Program finished

1) When the set sterilizing time is up, the system will send out a sound alarm, and the steam will be exhausted to release automatically "EXHT" indicator starts to blink.

2) Under solid mode with drying, when the temperature is lower than the boiling point, the system will send out a sound alarm, and the screen will show "OPEN" to indicate the opening of the cover. After opening the cover, system will start drying function, "DRY" indicator starts to blink, drying time on the screen starts to count down.

3) When program finished and the temperature is below 97 °C (Solid mode or solid+drying mode) or below 80 °C (liquid mode), the "COMP" indicator will blink, which means the sterilization is finished.

9. Taking the sterilized articles out

1) Always wear the heat insulation gloves when taking articles after sterilizing out of the sterilizer chamber, and wait until the steam disperses before reaching into the sterilizer chamber.

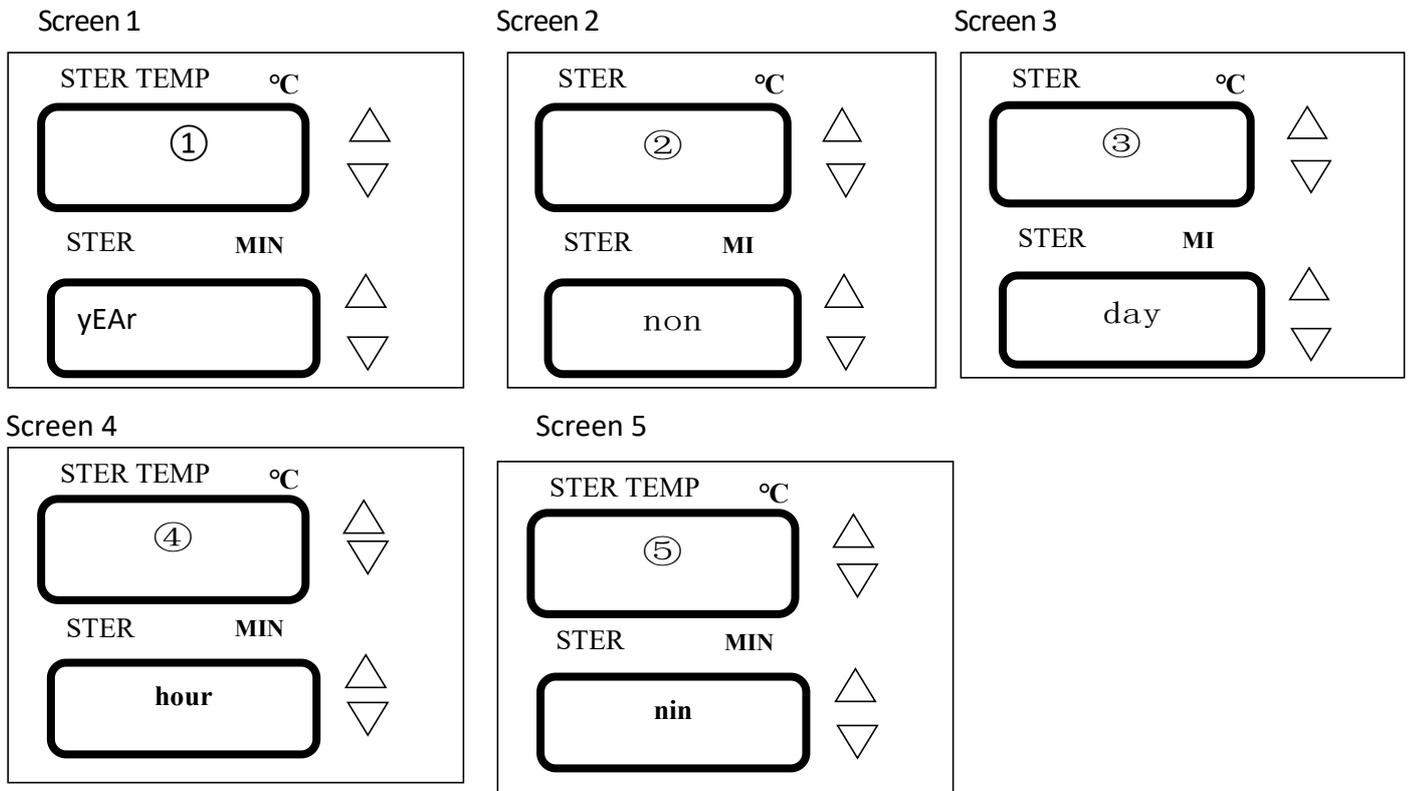
2) When sterilizing the liquids, verify the temperature is low enough before taking it out to avoid scald due to low cooling speed of liquid.

10. Turning off the power

- 1) Power must be switched off after the completion of daily operations or the instrument will not be used for a long period of time.
- 2) When sterilization is completed of a day, it is recommended to drain out all water in sterilization chamber.

11. Clock Setting(DW-FD-E/R)

1. Under standby condition, press the STOP+ ▾ (beside STER TIME) , enter into clock setting and calibration mode, the screen will show below content:



○ F05 default specification and the adjustable range

Name	No.	Default setting	Adjustable range
yEAr (year)	①	2011	2000--2099
Non (month)	②	1	1-12
Day (day)	③	1	1-31
Hour (hour)	④	1	0-23
Nin (minute)	⑤	1	0-59

- 1) If you set the time correctly, press STOP to exit
- 2) If you didn't set the time correctly, press MODE to enter into data changing screen: screen 1 will blink 2011 or the current year setting, screen 2 will show yEAr, means you can change the year, press the ▲ or ▼ to change the setting. Press the MODE to save the change, if you do not want to save the change, you can press STOP to exit to standby condition. You can change the month, day, hour and minute in this way.

Chapter 5 Troubleshooting

1.The automatic control system of the sterilizer monitors the real time operation of the instrument. Whenever any failure occurs, the system may send out alarm and display the error code, then, please press the STOP button to return to standby status, and turn off the power, check the error code and handle on time.

2.To insure the safety, the chamber cover can be open under the circumstance that no pressure in the chamber and the temperature is below 80° C at the same time

3.Under liquid mode, do not press STOP button before the temperature is lower than the boiling point,so as to avoid the liquid loads overflowing.

Error code	Possible causes	Suggested solution
E01	Lid lock error	Check the handle is placed well(either horizontally or vertically)
E02	Local altitude is not set correctly	Reset the local altitude(P009)
	The temp. sensor is blocked by articles	Read the articles loading part of manual
	Heating system problem	Check the heater, wires
E03	Water level sensor is dirty	Clean the water level sensor
	Pressure gauge display doesn't match temperature	1.Check if solenoid valve and pipe is blocked 2.Check temp. sensor and wires 3.Check pressure switch and its wires
	Temperature control switch is abnormal	Change the temperature control switch
E04	Temp. floating due to abnormal power floating	Check the power voltage, must be 198V-242V
	Cold air is not purged out completely	Check if the pipe is blocked, or the articles put in a right way
E06	The temp.sensor is not connected well to the electronic board	Re-plug the temp. sensor to the board
	Chamber temp. sensor is having problem	Change the temp. sensor
E07	Short circuit on chamber temp. sensor	Change the chamber temp. sensor
E10	Sudden power off during sterilization	Start the cycle again
E14	Drying system or temp. control problem	Contact local dealer
E18	Solenoid valve and piping blocked	Clean the solenoid valve and piping
	Temp. /pressure sensor is abnormal	Re-plug the temp./pressure sensor
E20	Safety valve testing wires problem	Contact local dealer
E26	The pressure sensor is not connected	Re-plug the pressure sensor

	well to the electronic board	
	Chamber pressure sensor is having problem	Change pressure sensor
E27	Short circuit on chamber pressure sensor	Contact local dealer or change pressure sensor
E36	Open circuit or short circuit for heating prevention sensor	Re-plug the temp. sensor
E37	No enough water in chamber	Add water to chamber
	Water level sensor is dirty	Clean the water level sensor
	Water level sensor is having problem	Contact local dealer

Below is the note code, you can press STOP very shortly(just touch and go) to go back to standby condition:

Note code	Display content	Suggested solution
N02	The temp. is over boiling point when start	Re-start when temp. is lower
N06	Chamber lid is not locked when start	Re-lock the chamber lid
N05	Safety valve test reminder	Test the safety valve

The above chart covers the simple problems, if you can not handle them by yourselves, please contact the local dealer and provide the following information:

- 1)Model and Number of Machine
- 2)Broken part and symptom of failure (or Error code)
- 3)Purchasing date of machine
- 4)Operational information (including sterilizing articles)
- 5)Better to provide video or pictures when error

Chapter 6 Maintenance&Care

1 .Daily care:

Sterilization chamber and chamber cover should be cleaned with soft cloth every day.

2.Weekly care:

- 1) The water in the sterilizer chamber must be changed every week, or change at any time within one week if the water is dirty.
- 2) When changing the water, connect one end of the drainage hose with the drain port of sterilizer chamber, and put the other end into a water collector, release the drainage valve to drain, and turn off the valve counter-clockwise after the drainage.

★ Note:

- Make sure that the water in the sterilizer chamber is at room temperature before changing the water.
 - If the sterilizer will not be used for a long period of time, the water in the sterilizer chamber must be emptied to avoid blocking the pipeline.
- 3) Wipe the surface of the sealing ring and its contact parts with soft and clean cloth at least once a week.

3.Monthly care:

Take out the water plate to check the heating pipe. If dirt can be gently scrub with a soft brush and flush, and then discharge the dirty water.

4.Yearly care:

- 1)Check the wires damage and problem of fuse and connector.
- 2)Check the pipe for leaks .
- 3)Check if there is leaking of the solenoid valve or lose of coil.
- 4)Check the indicator and process indicators (check the security of cover)
- 5)Press the testing button of leakage protection switch, if the leakage protection switch trips means everything is normal, otherwise turn off the power switch and contact local dealer. Press the reset switch, make the position up right, the power will be on.

5.Spare parts list offered by manufacturer or agents

No.	Spare parts	No.	Spare parts	No.	Spare parts	No.	Spare parts
1	Mainboard	2	Control panel	3	Safety valve	4	Solenoid valve
5	Gasket ring	6	Heater	7	Temperature sensor	8	Temperature switch
9	Pressure gauge	10	Voltage transformer	11	Power switch	12	Leakage protector
13	Pressure switch	14	Beam micro switch	15	Chain switch	16	Solid state relay
17	Heating relay	18	Solenoid valve relay	19	Drying plant		

Chapter 7 Setting of Administrator

1.Under standby condition, press and hold MODE and STOP buttons, then screen A will show “ 0000” . Among these, the first “ 0” flashing means it is changeable. And press of ▲ or ▼ button may adjust the first digit to “ 6” , and then press the ▼ button at the ster. time screen to save the first number. At this time, the second “ 0” flashing means it is changeable, you could input the password by analogy.

2.After entering into the parameter modification menu, press the ▲ or ▼ button to select the menu you want to modify.

3.Administrator menu:

P001 Printer enabled or not (Yes: enabled No: disabled)

P002 Button sound enabled or not (Yes: enabled No: disabled)

P003 Setting of pressure unit: 1: Kpa; 2: bar; 3: psi; 4: No (Not available or no operation for pressure sensor,do not choose the pressure unit if the equipment is not added with pressure sensor, it will cause alarming)

P005: Printing language: 0: English 1: Chinese

P006: Safety valve test enabled or not (Yes: enabled No: disabled)

P007: Chamber temp sensor,temp compensation: the temp compensation scope is -5°C - +5°C

P008: Setting of max working temp: the temp range is 135°C-145°C

P009: Setting of local altitude: (0-3000m)

P010: Boiling point temp corresponding to altitude (according to P009)

P011: Version of system, unmodified

P012: Solid mode: exhaustion temperature setting (105°C-130°C)

P016:Does it need a password to create, modify or delete the program (Yes: enabled No: disabled,only for FD-SE/R, same as P017 Admin password)

P017: Adminitrator menu password

P018: Total cycle number,each time you press START will adding one cycle number

P019: Pressure sensor compensation , compensation scope is -5-5kPa.

P022: Drying temperature setting, scope: 80°C-160°C

P030: Pulse times setting, P+ numbers, range: 0-9 times

P031: Exhaust temperature scope for liquid mode: 73°C-104°C

P032: Water drainage scope for solid mode: 105-135°C , or OFF. (Only for R)

P033: YES: open lid drying, NO: closed lid drying (Only for R, closed lid drying require extra setting by manufacturer)

Drawell International Technology Limited



Chongqing Drawell Instrument CO.,Ltd

Add: Suite 2705, Building No.12, Shiyou Road No.1, Yuzhong District, Chongqing, China
Tel: 0086-023-63268643

Shanghai Drawell Scientific Instrument Co.,Ltd

Add : Suite 1117, Lane561 XiuChuan Rd., PuDong New Area, Shanghai, China

Web : www.drawell.com.cn

Email : sales05@drawell.com.cn