

Safety Warnings and Guidelines

1. Important operation information of the security:

Before the users' operation, they should have a perfect conception of how to use the Instrument. Therefore, read this Manual carefully before using it.



Operation before reading the Manual is forbidden. Read the guidelines and directions below and carry out the countermeasure according to them.

2. Security:

The operation, maintenance and repair of the Instrument should comply with the basic guidelines and the remarked warning below. If you don't comply with them, it will have effect on the scheduled using life of the Instrument and the protection provided.



This product is a normal and an indoor Instrument.



Read the Manual carefully before operation, The expert of wiring equipment can operate this Instrument.



The operator should not open or repair the Instrument by himself, which will result in losing the qualification of repair guarantee or occur accident. If there is some wrong with the Instrument, the company will repair it.



A.C. power's grounding should be reliable to safeguard against an electric shock. The 3-pin plug supplied with thermo-shaker's power cable is a safety device that should be matched with a suitable grounded socket.



During the normal operation, the temperature of metal block will be very high. There will be scald or boiling of the liquid. Therefore strictly prohibit any part of the body to touch the Instrument from scald.



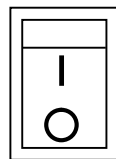
Close the test tube lids before put the test tubes into the block. Liquids maybe spill in the block or onto the device if tube lids opened, that will damage the block or the device.



Before power on, guarantee the voltage used should be accordant to the voltage needed, and the rated load of electrical outlet should not lower than the demand. If the electric line is damaged, you should replace it with the same type. You should assure there's nothing on the electric line and you should not put the electric line in the ambulatory place. Hold the jack when you pull out the electric line, and don't pull the electric line.



The Instrument should be put in the place of low temperature, little dust, no water and no sun or strong lamp. What's more, the place should be good aeration, no corrosively gas or strong disturbing magnetic field, far away from central heating, camp stove and other hot resource. Don't put the Instrument in wet and dusty place. The vent on the Instrument is designed for aeration. Don't wall up or cover the vent in order to keep from high temperature. If you use the more than one Instrument the same time, the distance between them should be more than 100cm.



Mains switch is on the rear of the device, push "I" to power on the device, and push "O" to power off the device.



Power off when you finish your work. Pull off the connector plug when there's long time no use of the Instrument and cover it with a cloth or plastic paper to prevent from dust.



Pull the connector plug from the jack at once in the following case, and contact the vendor:

- There is some liquid flowing into the Instrument;
- Drenched or fire burned.
- Abnormal operation: such as abnormal sound or smell.
- Instrument dropping or outer shell damaged.
- The function has obviously changed.

3. The maintenance of Instrument

The well in the block should be cleaned by the cloth stained with alcohol to assure good heat translation between the block and the test tube and no pollution. If there are smutches on the Instrument, clean them with cloth.



Power off when cleaning the Instrument.
When cleaning the well, don't drop the cleaning liquid in the well.
Corrosive cleaning liquid is strongly prohibited.

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Chapter 1 Introduction

The instrument consists of a base and stand assembly, sample holder and gas distribution system. Test tubes are held in the block. The gas at 0.02MPa passes through the distribution manifold. Depending on the test-tube size and solvent volume they can be individually raised or lowered to the correct height. Needles or glass pipets blow gas onto the surface of the solution resulting in rapid evaporation of the solvent. All materials used are laboratory quality and can withstand contact with organic solvents. Acid resistant models are available for corrosive applications.

Features:

- 1.High precision and wide range of temp control
- 2.Blowing a large number of samples at one time
- 3.Blowing each sample independently
- 4.Easy operation; safe and reliable to use

Chapter 2 Specifications

1. The normal operating condition:

Ambient temperature: 5°C ~ 30°C

The relative humidity: ≤70%

Power supply: 200V-240V~ 2.0A 50-60Hz

2. The basic parameters and the function.

Type Parameter	MD200-1	MD200-1A	MD200-2
Temperature range	RT+5°C ~ 150°C		
Timing time	1min ~ 99h59min		
Display	LED		
Temperature control discrepancy @100 °C	≤ ±0.5 °C		
Temperature control discrepancy @150 °C	≤ ±1 °C		
Heating time (40-150°C)	≤30 min		
Maximum vertical travel	285mm		
Maximum gas pressure	0.02Mpa (using needles ≤16) 0.05Mpa (using needles >16)		
Maximum gas usage	15 litres /min		
Gas intake nozzle diameter	Φ7mm		
Needles length	150mm(tube diameter ≥ Φ10mm) 80mm(tube diameter < Φ10mm)		
block	1	1	2
Power supply	200W	200W	400W
Fuse	250V 3A Φ5×20	250V 3A Φ5×20	250V 4A Φ5×20
dimension(mm)(L×W×H)	280X240X500	280X240X500	280X240X500
weight(kg)	7.0	7.0	8.0

3. Insert block

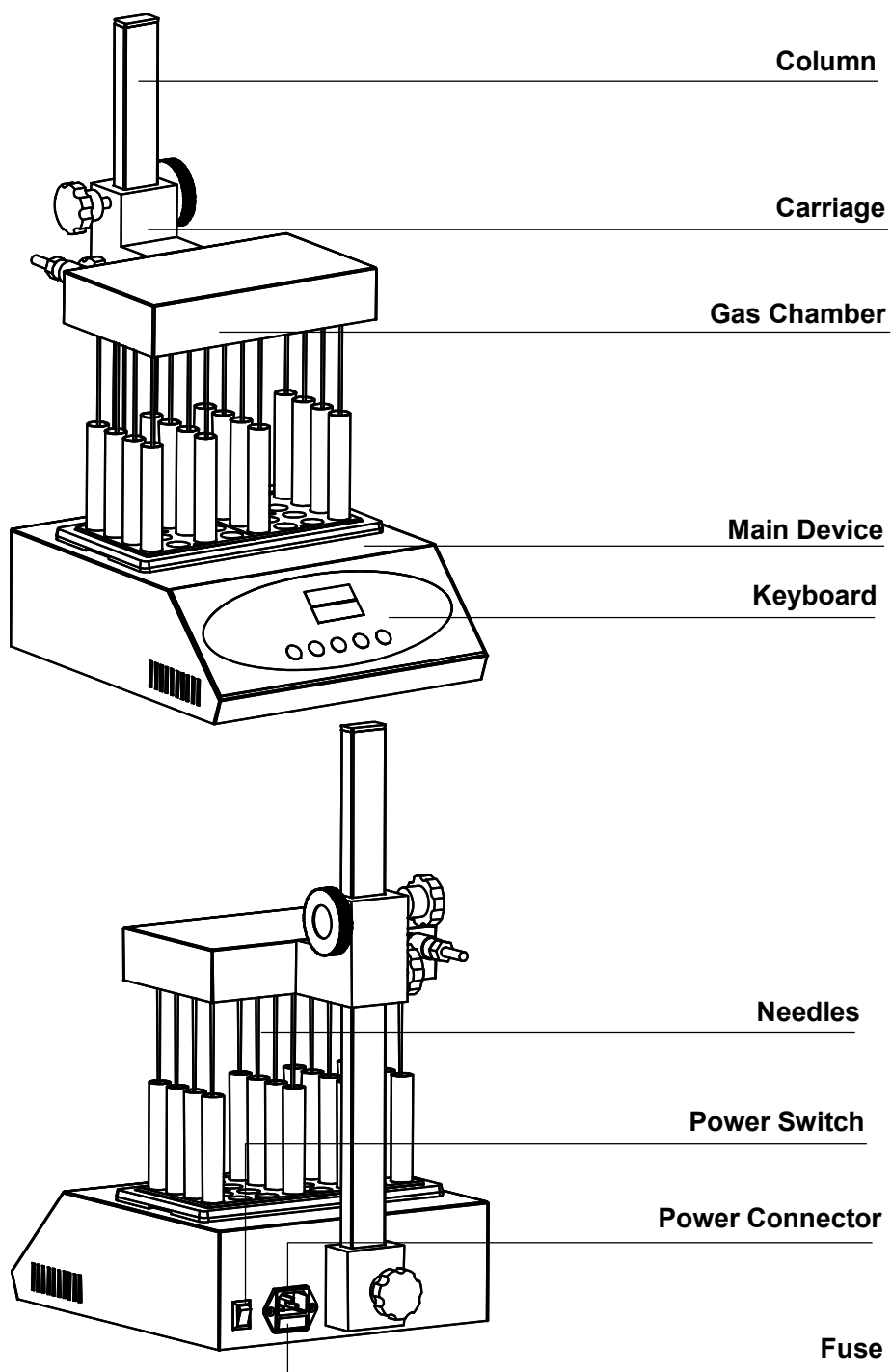
Type	Tube diameter	Capacity	Dimension (mm)
BK01	6mm	49	96X96X49
BK02	7mm	49	96X96X49
BK03	10mm	25	96X96X49
BK04	12mm	25	96X96X49
BK05	13mm	25	96X96X49
BK06	15mm	12	96X96X49
BK07	15mm	16	96X96X49
BK08	16mm	12	96X96X49
BK09	16mm	16	96X96X49
BK10	19mm	12	96X96X49
BK11	19mm	16	96X96X49
BK12	20mm	9	96X96X49
BK13	26mm	9	96X96X49
BK14	28mm	4	96X96X49
BK15	40mm	4	96X96X49
BK16	0.5ml	49	96X96X49
BK17	1.5ml	25	96X96X49
BK18	2.0ml	25	96X96X49
BK19*	0.2ml	96	78X114X26
BK20*	plate	microplate	81X123X19

Note: Block BK19 or BK20 only can use in MD200-1A.

Chapter 3 Preparations

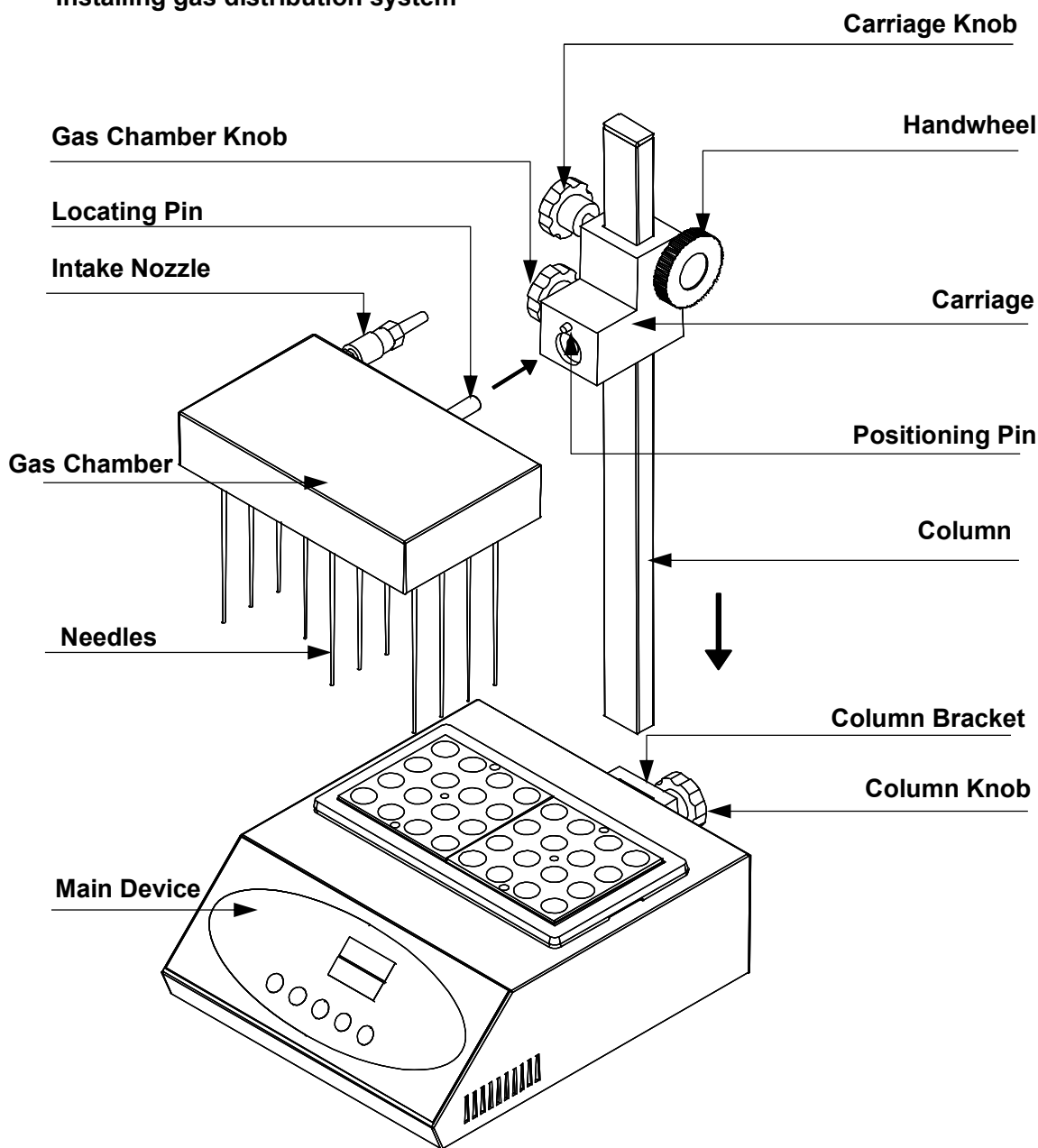
This chapter introduces Sample Concentrator's mechanical structure, the keyboard and each key's functions and some preparations before power-on. You should be familiar with this chapter before the Sample Concentrator is first operated.

1. Structure Description



2. Installation

Installing gas distribution system



Installing Setp:

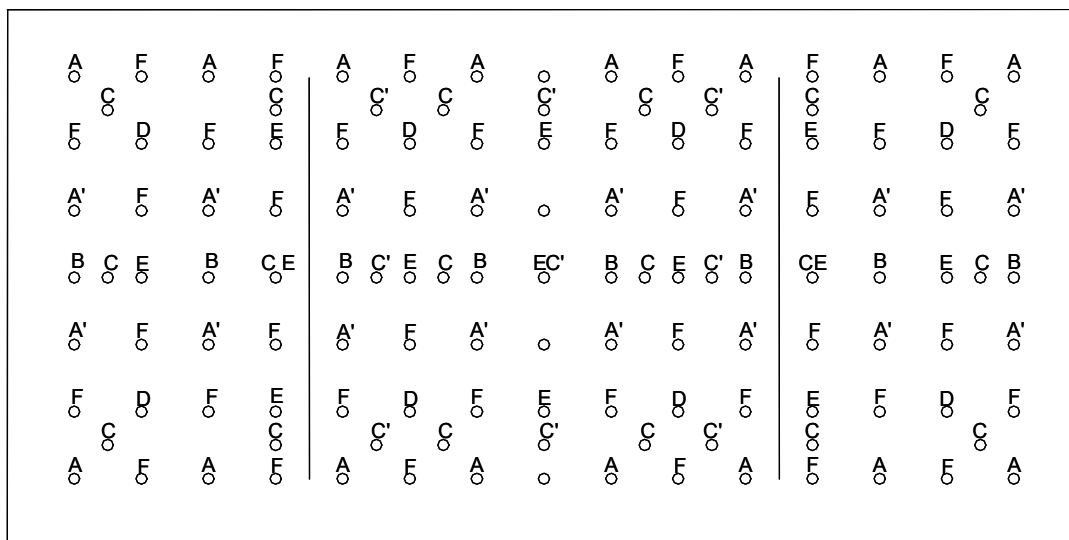
- 1) Place the main device on the working desk.
- 2) Insert the column into the column bracket, then screw down the column knob, fasten the column.
- 3) Screw the carriage knob into the carriage, don not screw down it first, then handhold the carriage knob with left hand ,turn the handwheel counter-clockwise with right hand, the carriage lift up, when lift up to the appointed position ,fasten the carriage knob. If turn the handwheel clockwise, lower the carriage.

Note, when lift up or lower the carriage, must operating with left hand and right hand simultaneous.

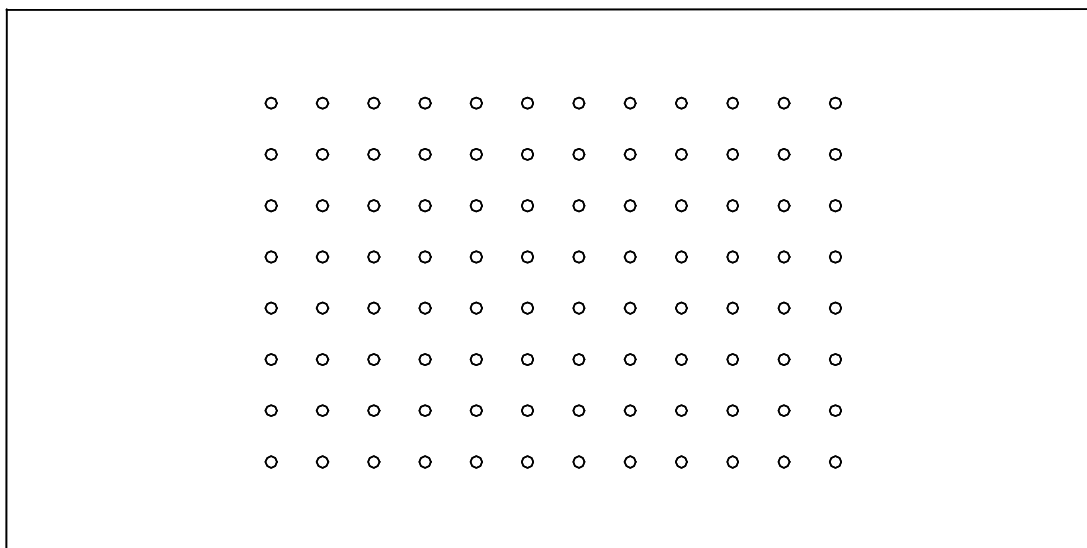
- 4) Screw gas chamber knob into the carriage, don not screw down it first, then insert the gas chamber onto the carriage, and fasten the gas chamber knob.

Installing the needles

- 1) Loosen the gas chamber knob , take out the gas chamber ,overturn the gas chamber, and place the gas chamber on the working desk.
- 2) Different block corresponding with different hole on the gas chamber, the needles hole of MD200-1 and MD200-2 see following Fig.



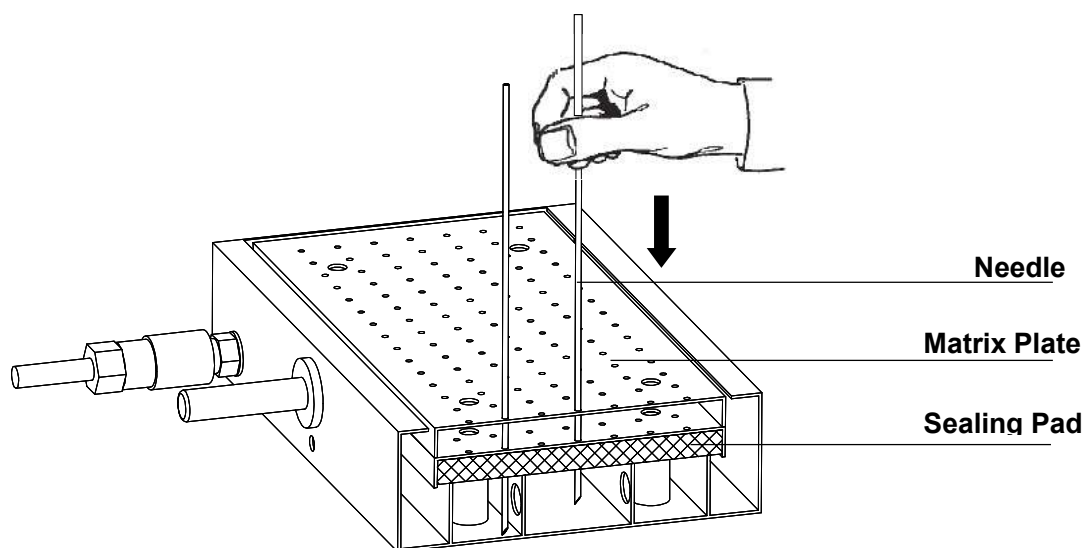
If the main device is MD200-1, please select the needle hole between two lines. If the main device is MD200-2, please select the needle hole all of on the Fig. MD200-1A is 96 well hole array (12X8 matrix),see following Fig.



3) Needles hole label with different insert block

Block Type	Tube Size	Hole Label
BK01	6mmX49	A, A', B, D, E&F
BK02	7mmX49	A, A', B, D, E&F
BK03	10mmX25	A, A', D& E
BK04	12mmX25	A, A', D& E
BK05	13mmX25	A, A', D& E
BK06	15mmX12	A & B
BK07	15mmX16	A & A'
BK08	16mmX12	A & B
BK09	16mmX16	A & A'
BK10	19mmX12	A & B
BK11	19mmX16	A & A'
BK12	20mmX9	C (MD200-2) C' (MD200-1)
BK13	26mmX9	C (MD200-2) C' (MD200-1)
BK14	28mmX4	D
BK15	40mmX4	D
BK16	0.5mlX49	A, A', D, E&F
BK17	1.5mlX25	A, A', D& E
BK18	2.0mlX25	A, A', D& E
BK19*	0.2mlX96	12X8 matrix
BK20*	plate	12X8 matrix

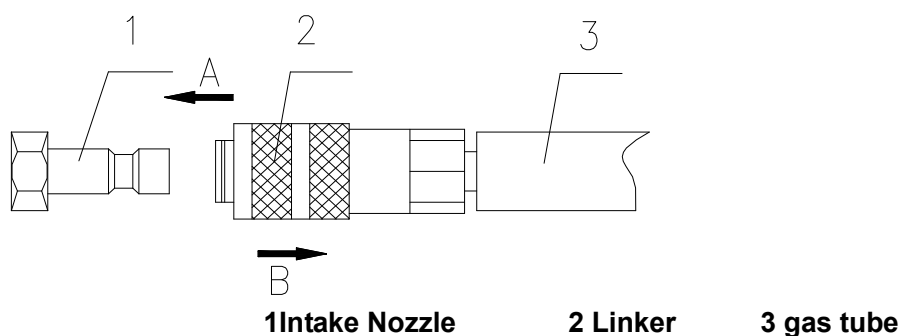
- 4) According to hole label, insert the needles into the gas chamber, if some hole in the block do not use, please do not insert the needle into the gas chamber ,otherwise it will waste the gas.



- 5) After installing the needles, overturn the gas chamber, insert the gas chamber onto the carriage again ,and screw down the gas chamber knob, fasten the gas chamber.

- 6) Put the linker into intake nozzle of gas chamber and connect the gas tube

To the gas supply, see following Fig.



- 7) Place the test tubes in the insert blocks ,then handhold the carriage knob with left hand, loosen the carriage knob first, then turn the handwheel clockwise with right hand, lower the gas chamber so that the tips of the needles enter the test tubes, position them at the required height above the liquid surface.

- 8) Turn-on the gas switch.

Note, the Maximum gas pressure is 0.05MPa, too large gas pressure will waste the gas, so remember not to exceed 0.05MPa. And if using needles less than 16 pieces , please adjust the maximum gas pressure less than 0.02MPa.

3. Keyboard and display panel



4. Key functions

TEMP

Setting temperature key: used together with increasing button and decreasing button to set the operation temperature required.

TIME

Setting time key: used together with increasing button and decreasing button to set the operation time required. The time is count down while operating.



Decreasing key: decrease the figure set;



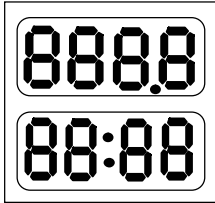
Increasing key: increase the figure set;

START/STOP

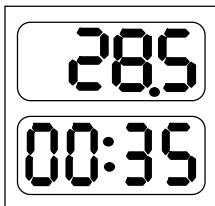
Start/stop button: Run when you press the button once after setting the temperature and the time. Stop when you press this button for 2s.

Chapter 4 Operation Guide

1. Temperature and time set



- a). The LED will display “ 8 ” as the chart when the Instrument powers on and the Instrument goes into the initial state with the sound of “du...”.



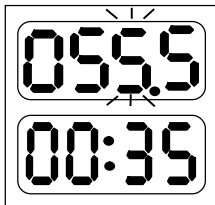
- b). About 2s later, the figure 28.5 is the block's current temperature; 00:35 in the time display is the last set time.



- c). Press the button of “TEMP” and keep off at once. Now, the value in the temperature display is the former setting temperature. As shown in the left drawing, the last digital of the setting temperature is flickering. If you want to set the temperature to 55.5°C, do as follows:

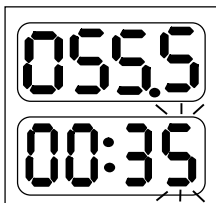
The flickering digital can be changed. Press “▼” or “▲” to turn “0”to“5”. Then press “TEMP”once and the flickering digital skip to first one.

Pressing “TEMP”another time, then the flickering digital skips to the second one, and you can turn“4”to“5”by pressing “▲” Press “TEMP” a third time. After the flickering digital skip to the third one, you can change “0”to“5”. Here the setting temperature is 55.5°C. The system will accept the new setting temperature after 8s.

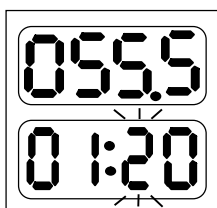


- d). Press “TIME” and keep off at once, the value in the time display is the former setting time. Shown in the left drawing is 00:35(35minites). At same time, the last digital is flickering. If you want to change the time to 01:20, do as follows:

The flicker digital can be changed. Press “▼” or “▲” to chage the last digital from “5” to “0”.



Press “TIME” once and the flickering digital skips to the first one. Press “TIME” once more and the flickering digital skips to the second one. Then press “▲” to turn “0” to “1



Press “TIME” a third time, and the flickering digital skips to the third one. Then you can turn “3” to “2” by pressing the button of “▼” , Now the setting time is 01:20(1 hour and 20minites). The system will accept the new setting after 8s.

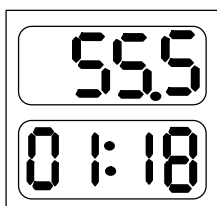
Notes: If the time setting is 00:00, meaning the time of operation is forever, the Instrument run constantly in setting temperature.

2. Operation and stop



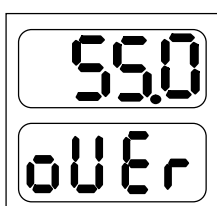
a) After the accomplishment of the temperature and time setting, press the button of “START/STOP” and keep off at once, and the Instrument begins to operation. The temperaturerises with the sound of the “du...”.

Meanwhile, there is current temperature in the temperature display, and the radix point is flickering regularly during the rise process.



When the temperature stops to rise, the flickering also stops. “: ”in the time display begins to flickering, then the counting down starts.

When the timing is stopped, the operation is also stopped. The buzzer alarms. Current temperature in the temperature display and “oUeR” in time display mean “over”, the accomplishment of the operation.



Notes : Press “TEMP” or “TIME” during operation, you can look up the setting temperature and time but can't change them.

b). After the accomplishment of the operation, the Instrument is in over mode waiting for new declartion.

Then pressing “TEMP” and “TIME” an reset the temperature and the time. Pressing “START/STOP”it will operate according to last setting.

c). Press “START/STOP” for 2s during the operation, it will stop to run. Press this button again, then it will continue.

3. Temperature Calibration

The temperature of the Instrument has been adjusted before it is sold out. But if there is deviation between the actual temperature and the displayed temperature due to some reasons, you can do as follows to correct the error.

Notes: The Instrument uses double temperatures adjustment to ensure its veracity. This means it is linearly adjusted on 40°C and 100°C two points. The temperature veracity will be within $\pm 0.5^{\circ}\text{C}$ after the double temperature adjustment.

Both the circumstances and the block temperature should be lower than 35°C.

Adjustment methods as follows:

- a). After the startup of the Instrument, it enters waiting interface. Make sure the temperature in display is below 35°C. If the temperature is higher than 35°C, you should wait until the temperature is below 35°C.
- b). Inject olefin oil into one of the cone-shaped wells, and then put a thermometer into this well (Make sure the precision of the thermometer should be within 0.1°C and the temperature ball should be absolutely immersed into the cone-shaped well). Heat insulation material is needed on the block to separate it from the circumstance. Seeing from Fig a.

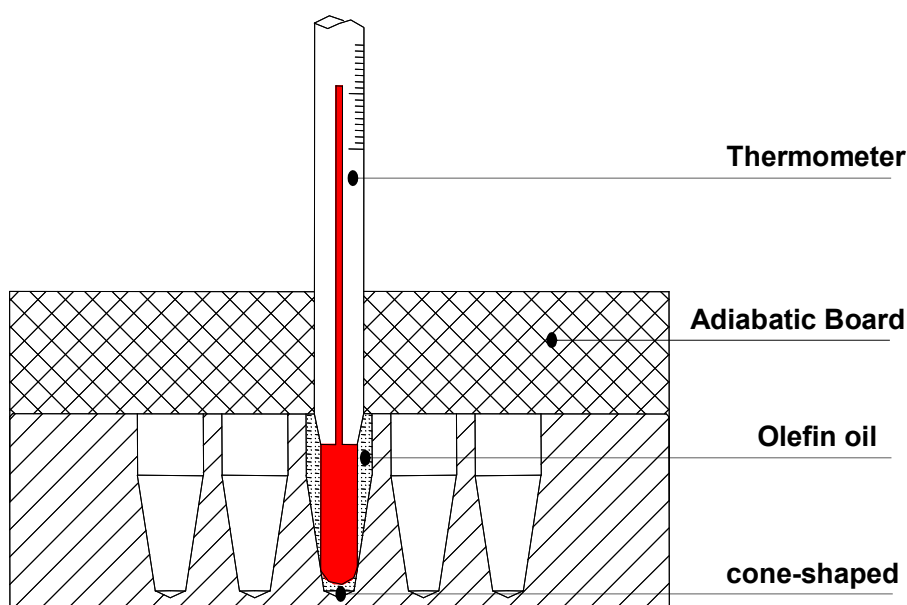
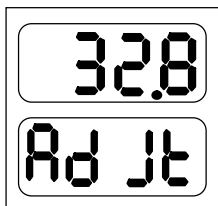
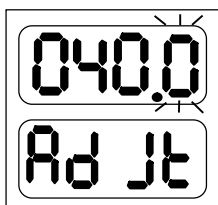


Fig a

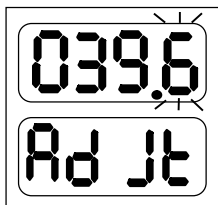


c). Press “▼” and “▲” contemporary to enter the temperature adjustment interface as the left drawing. Now the “ Ad Jt ” in the time display means it has been in adjustment procedure; the temperature displayed is current temperature and begins to rise to 40.0°C automatically.



When the temperature reaches to 40°C, the decimal digit begins to flicker, waiting for the calibrated value of 40°C. Read out the actual value from the thermometer after 20 minutes.

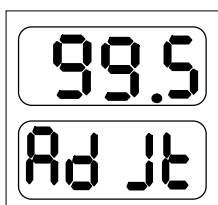
Notes: Please read the actual value after 20minutes’ constant temperature to ensure the adjustment precision.



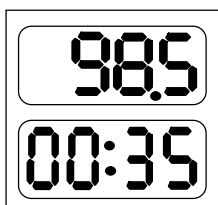
If the actual readout is 39.6°C, you can input 39.6 in the temperature display by pressing “TEMP” and “▼” or “▲”. Then press “START/STOP” to confirm the input.

d). After the confirmation the Instrument rises to 100°C automatically. In the same way, the temperature reaches to 100°C waiting for the adjustment. After 20minutes’ constant temperature you can read the actual value from thermometer and input to the temperature display.

Notes: Please read the actual value after 20minutes’ constant temperature to ensure the adjustment precision.



If the actual readout is 99.5°C, you can input 99.5 in the temperature display by pressing “TEMP” and “▼” or “▲”. Then press “START/STOP” to confirm the input.

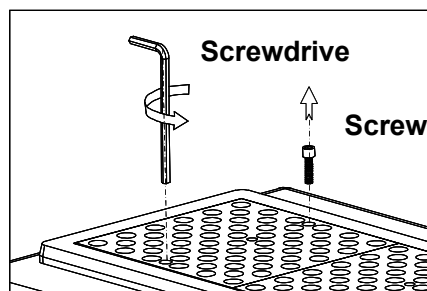


e). After both of the temperatures have been adjusted, press “▼” and “▲” simultaneously to escape the temperature adjustment interface and return to waiting interface.

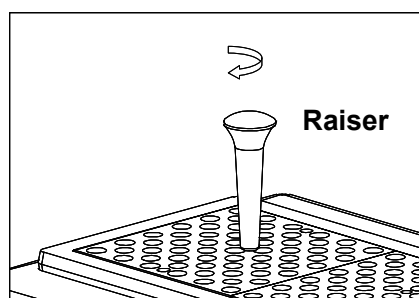
Notes: Press “▲” and “▼” simultaneously during the adjustment to escape the adjustment procedure. The changed value is of no effect.

4. The exchange of the metal module

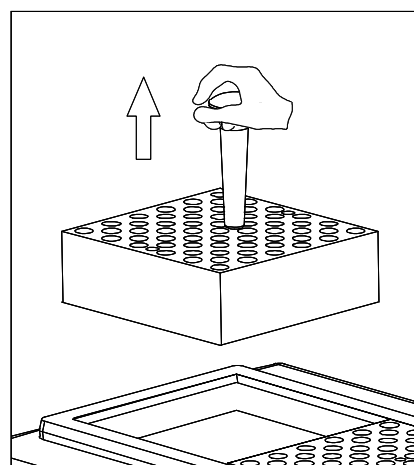
- a) Pull out the two screws which fix the block to the heating board with the screwdriver.



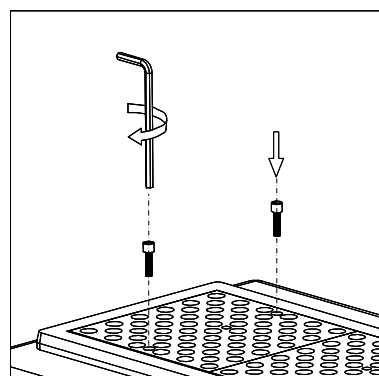
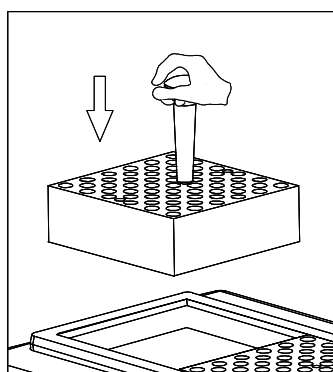
- b) Fix the raiser in the center well of the module.



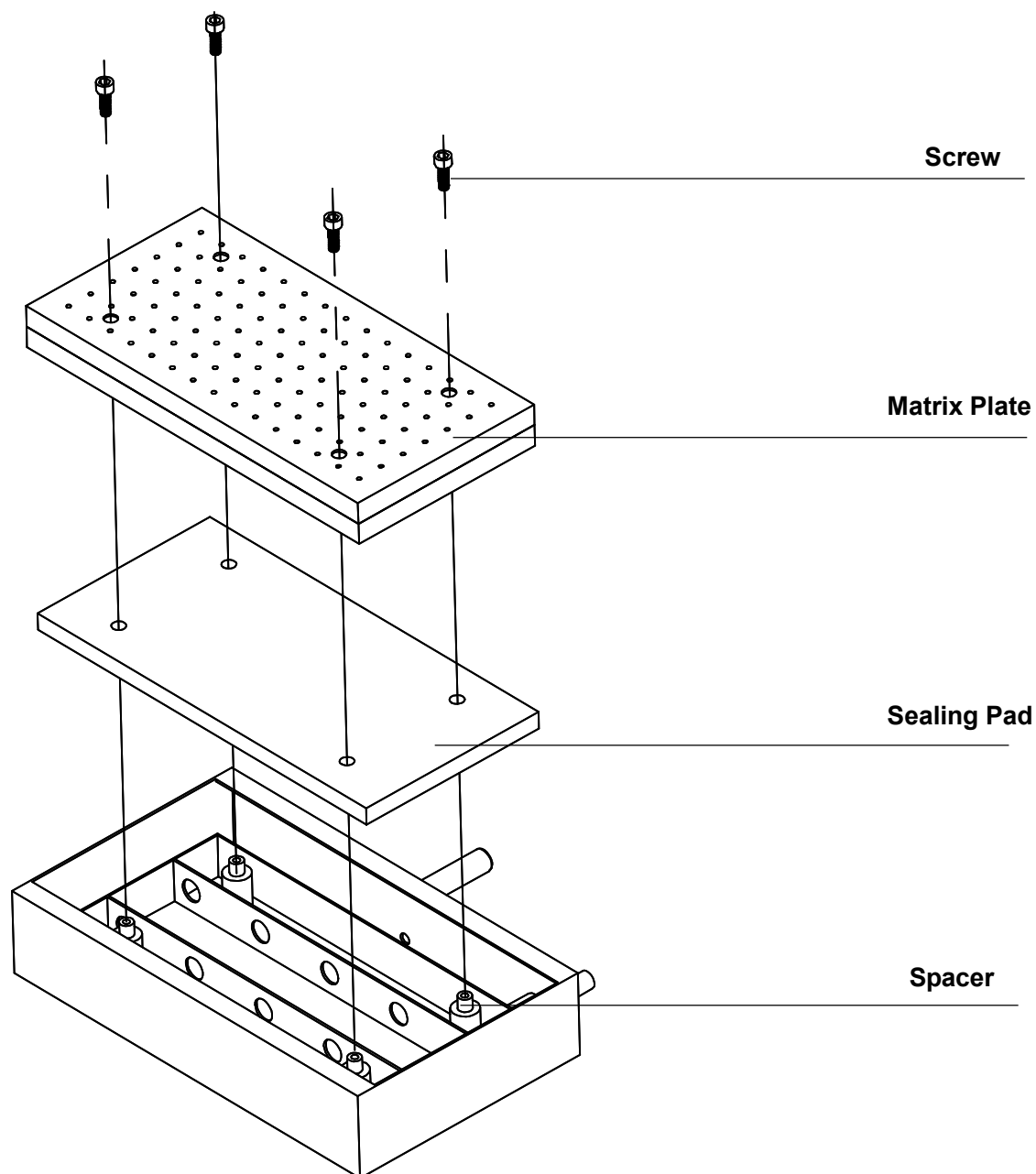
- c) Pull out the raiser with the module.



- d) Screw the raiser from the module, and fix it to another block you needed. Then put it onto the Instrument and fix it with the screws.



5 The exchange of the sealing pad



After many repeated needle insertions the self sealing property of the sealing pad may start to degrade. Spare pad can be obtained from your supplier.

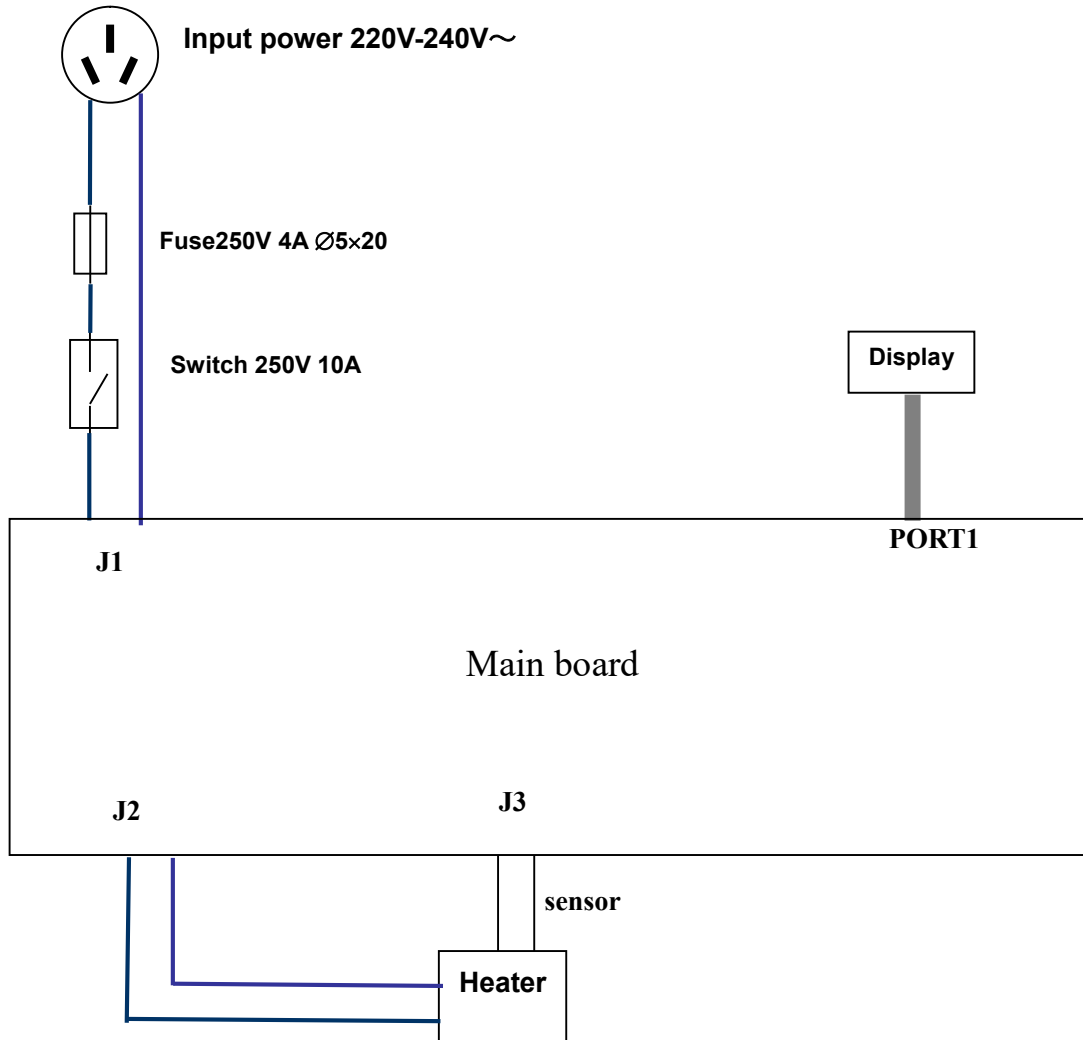
- 1) Remove the gas chamber from the carriage, disconnect the gas pipe and place upside down on a suitable work surface.
- 2) Remove the four screws from the matrix plate.
- 3) Lift off the matrix plate leaving the gas chamber.
- 4) Lift off the sealing pad. Ensure that the support strip underneath the sealing pad and with the new one. Reassembly is the reverse of the above procedure.

Chapter 5 Failure analysis and troubleshooting

Error analysis and recovery processing:

NO.	Fault phenomenon	Cause analysis	Recovery processing
1	No signals on the display when the instruction is powered on.	No power	Check the connection of power
		Broken Fuse	Exchange fuse
		Broken switch	Exchange the switch
		Others	Contact to the seller
2	The actual and displayed temperatures are quite different.	Broken sensor or loose contact of the block	Contact to the seller
3	“ ERR ” in the display with the alarm of “du...”	Broken sensor or the environmental temperature is below zero.	Contact to the seller
4	no heating of the block	Broken sensor.	Contact to the seller
		Broken heater	
5	No gas through from the needle	No gas supply	Turn-on the gas supply
		Needle do not insert completely	Insert the needle again
		Block up in the needle	Check the needle
6	Gas leak out	Sealing pad aging	Please change the sealing pad

Annex 1: Wiring Diagram for MD200 Sample Concentrator



Note