

Refrigerator Service Manual

Applicable to: FBM228NE4D(BCD-231W)

BCD-250, BCD-231(C18113 etc.)

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I. Product features

This is a frost-free bottom-mounted fridge-freezer. Its upper part is the fridge compartment for fresh food storage, such as fruits, vegetables, eggs, milk, cooked foods, etc.; and its lower part is the freezer compartment where fish, meat, etc. can be frozen for the long-term storage.

- ✧ Real-time monitoring; The states of compartments are monitored in the real-time manner to ensure they are operating under the optimal conditions with the best humidity maintained, so that the food preservation time can be extended.
- ✧ Stylish appearance; Adopting the optimized man-machine engineering design, this refrigerator has an elegant and novel appearance. It is designed with the helping handle, making it easy to open the door.
- ✧ Multi-airflow; The stereo multiple air outlets are adopted by the refrigerator, which guarantees uniformity of the storage temperature.

II. Outer appearance and structure



Note: Due to technological innovation, the product descriptions in this manual may not be completely consistent with your refrigerator. Details are in accordance with the real product.

III. Operating instructions



- 1) "SET" is the key to set temperature mode. Every time when this key is pressed, the current indicator light will be off, with the next indicator light illuminated; and if no key operation within 3s, the temperature mode setup will be validated, otherwise it will be invalid. Once the setting takes effect, the temperature will be controlled accordingly, and the corresponding indicator light goes off in 3s.

The temperature setting progresses through the following cycle: 2°C→4°C→6°C→8°C

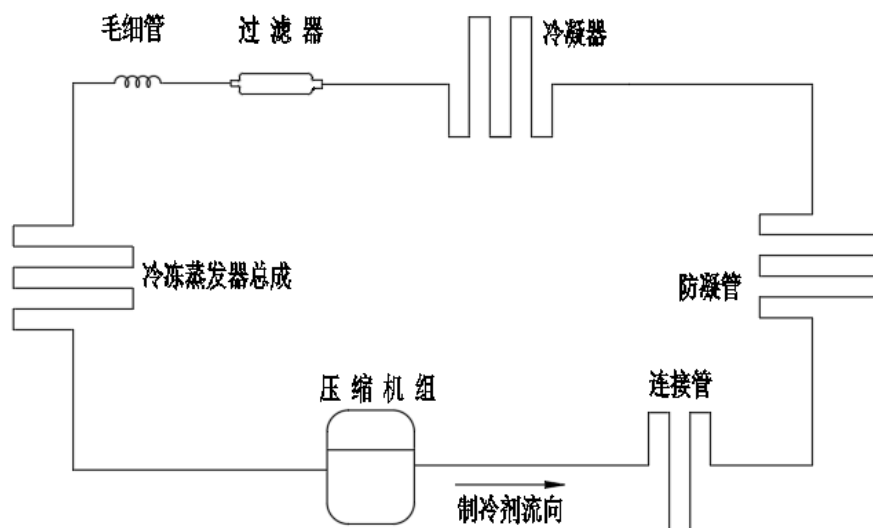
→FAST COOL→2°C

- 2) When the 'Fast Cool' mode is selected, the fast cooling function will be enabled immediately, with the temperature controlled at 2°C. When the fast-cooling function is completed, the refrigerator restores to the temperature mode set before the 'Fast Cool' mode is enabled. If the "SET" key is pressed when the "Fast Cool" function is running, the fast-cooling function will be disabled immediately, with the normal cooling resumed. The maximum running time (power-on time) of the fast-cooling function shall not exceed 3h.
- 3) The default factory setting is at the mode of 4°C.

IV. Cooling system

- Schematic diagram of the cooling system

制冷系统原理图



V. Control system

(Including the control system diagram, main control board circuit layout diagram, each component control)

1. Schematic diagram of the control system

Components output:

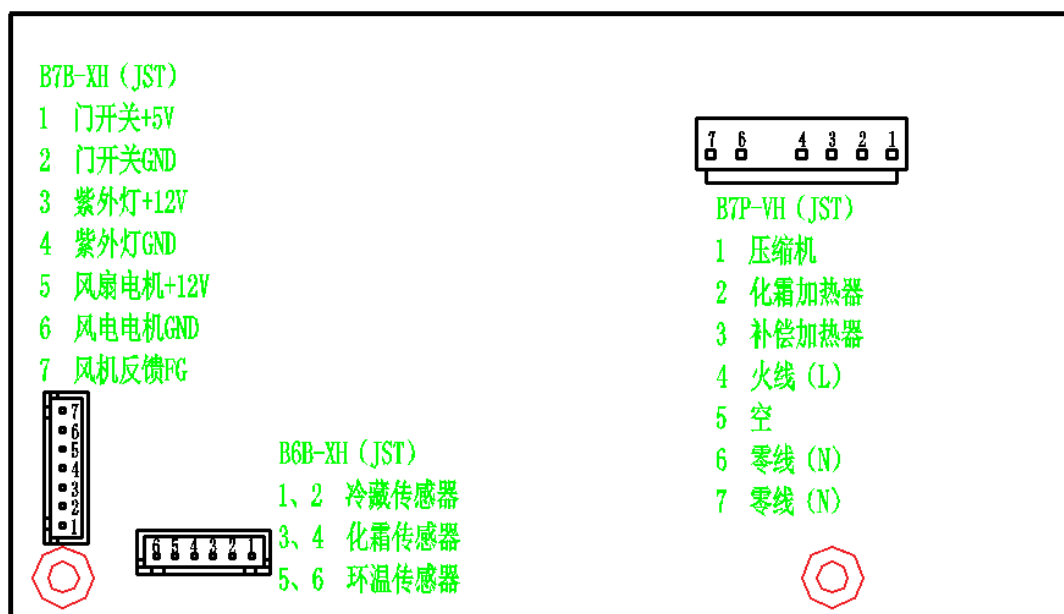
High-voltage:

- Compressor
- Fridge lamp (12V, MAX 1W)
- Freezer fan (12VDC, 3W)
- Freezer defrosting heater (~230V / 50Hz, 200W)
- Compensating heater (~230V / 50Hz, 3W)

Low-voltage:

- Compressor
- Fridge lamp (12V, MAX 1W)
- Freezer fan (12VDC, 3W)
- Freezer defrosting heater (~100V / 60Hz, 200W)
- Compensating heater (~100V / 50Hz, 3W)

2. Diagram of the control board



3. Components control rules

1) Compressor

Make sure to wait for at least 5 minutes before you start it again after it is shut down.

2) Lamp

- a) If any refrigerator door switch is detected to be on, the corresponding compartment lamp gets switched on.
- b) If any refrigerator door switch is detected to be off, the corresponding compartment lamp gets switched off.
- c) The lamp gets switched off after keeping illuminated for more than 10 minutes.

3) Freezer fan motor

- a) When the fridge and the freezer are cooling, the fan motor gets started.
- b) When the fridge and the freezer are not cooling, the fan motor gets stopped.
- c) When the fridge door or the freezer door is opened, running of the fan motor gets suspended for 10 minutes.

VI. Maintenance guide

Note: Live working is forbidden in the course of maintenance and repair, and make sure to cut off power supply before servicing.

1. Fault alarms

- a) Sensor fault alarm

In the case of the fridge sensor fault, the indicator light '2°C' gets flashing for alarm purpose;

In the case of the freezer defrosting sensor fault, the indicator light '5°C' gets flashing for alarm purpose.

b) Door open alarm

When the fridge door is open for more than 3 minutes, the buzzer starts beeping for alarm purpose. The alarms can be suspended for 3 minutes by pressing any key, which, however, will not be lifted until the said fridge door is closed.

2. Fault troubleshooting

(How to detect the fault is presented here only, and for details about disassembly and assembly, see the next chapter.)

Note: Live working is forbidden in the course of maintenance and repair, and make sure to cut off power supply before servicing.

(1) Fridge sensor fault

- a. Cut off power supply, remove the temperature control box cover, check whether the temperature sensor terminal on the control board is well connected, insert it again, and then power on the system to observe whether there is alarm or not.
- b. If the alarm continues, cut off power supply, remove the fridge air duct assembly, check whether the temperature sensor terminal is well connected, insert it again, and power on the system to observe whether there is alarm or not.
- c. If the alarm continues, cut off power supply, connect a new fridge temperature sensor to the terminal inside the cabinet, and power on the system to observe whether there is alarm or not; If the alarm gets stopped, replace the temperature sensor of the fridge air duct with a new one, insert the terminal well, and then restore the assembly.
- d. If the alarm continues, cut off power supply, change the control board, and power on the system to observe there is alarm or not on the display panel.

(2) Freezer evaporator fault

- a. Cut off power supply, remove the temperature control box cover, check whether the temperature sensor terminal on the control board is connected in sound condition, insert it again, and then power on the system to observe whether there is alarm or not.
- b. If the alarm continues, cut off power supply, change the control board, and power on the system to observe there is alarm or not on the display panel.

(3) LED lamp fault

- a. Cut off power supply, remove the temperature control box cover, check whether terminals on the control boards are inserted well, insert them again, and power on the system to observe whether the LED lamp lights up or not; If the LED lamp gets illuminated, connect/disconnect the door lamp switch manually to check whether the LED lamp gets switched on/off; If yes, it is judged as qualified; and if the LED lamp keeps normally ON, it is judged as the door lamp switch breakdown. In such case, replace the door lamp switch.
 - b. Cut off power supply, remove the temperature control box cover, replace the control board, and then carry out the operations of **Step a**.
- (4) The refrigerator does not work. (The whole machine is not working, with the compressor not started, and the LED lamp OFF when the door is opened.)
- a. Check whether the refrigerator plug is properly plugged in; whether the socket is electrified; and whether the socket voltage is normal.
 - b. Cut off power supply, remove the temperature control box cover, observing whether the terminals are properly connected, reinsert the terminals, and then power on the system to observe whether the refrigerator can work normally.
 - c. Cut off power supply, change the control board, insert the terminal well, and power on the system to observe whether the refrigerator can work normally.
- (5) The compressor cannot start. (Other devices are working normally)
- The compressor shutdown during the normal operation of the refrigerator does not belong to this type of failure. Be sure to wait for at least 5 minutes before starting the compressor again in the case of compressor shutdown. During the following maintenance operations, if a power failure occurs, please wait for 5 minutes, and then power on the system to observe the compressor working, or wait for 5 minutes after the system is powered on to observe whether the compressor can work normally or not.
- a. Cut off power supply, remove the temperature control box cover, check whether the terminals are properly connected, insert them again, and then power on the system to observe whether the compressor can start normally.
 - b. If it still cannot start, cut off power supply, remove the compressor cover, check whether the compressor protector and starter are properly plugged in, reconnect them, and then power on the system, observing whether the compressor can start normally or not.
 - c. If it still cannot start, cut off power supply, replace the control board, and

power on the system after inserting well the terminal, observing whether the compressor can start normally or not.

- d. If it still cannot start, it is judged as the compressor fault, then replace the compressor.
- (6) The freezer is cooling while the fridge is not cooling.
- a. Check whether the fridge and freezer air duct covers are assembled properly; If not, assemble them in place.
 - b. Cut off power supply, dismantle the freezer air duct assembly, checking whether there are heavy frosts inside blocking the air duct; if yes, refer to the Item "The refrigerator does not defrost" for maintenance.
 - c. Open the freezer door, wait until the compressor gets started; when the compressor is switched on, check whether the fan motor starts normally (with the fridge door not opened); If not, refer to the Item "The fan motor cannot start".
 - d. Cut off power supply, remove the temperature control box cover, replace the control board, and power on the system to repeat the above **Step c** operations.
- (7) The refrigerator is not cooling.
- e. Cut off power supply, remove the temperature control box cover, check whether all terminals on the control board are connected in sound condition, unplug the terminals and insert them again, and then power on the system to observe whether the refrigerator compressor can be started after 10 minutes. If not, refer to Item (3); if yes, touch the right and left side plates with hand to check whether they feel hot or not; if not, it is judged as the refrigerant leakage fault, then conduct vacuum pumping for refrigerant charging again.
- (8) The refrigerator air fan is not running.
- a. Open the freezer door, and wait until the compressor gets started; when the compressor is switched on, check whether fan motor starts normally or not (with the fridge door not opened).
 - b. If not, cut off power supply, remove the freezer air duct assembly, and check whether there are heavy frost or other foreign objects blocking the air fan; if yes, check the defrosting heater terminal or clear off the foreign object, insert the terminal well, and power on the system to check whether the fan motor starts or not by referring to the **Step a** operations.
 - c. If not, cut off power supply, remove the temperature control box cover,

check whether terminals on the control board are well connect, insert them again, and power on the system to check whether the fan can be started or not.

- d. If not, cut off power supply, replace the fan, and power on the system again to check whether the fan starts normally or not.
- e. If not, cut off power supply, replace the control board, and power on the system again, checking whether the fan can be started normally.

(9) The refrigerator does not defrost.

- a. Cut off power supply, remove the temperature control box cover, and check whether the terminals on the main board are properly connected.
- b. Cut off power supply, and remove the freezer air duct assembly, checking whether the defrosting heater terminal is properly connected.
- c. Cut off power supply, check whether the defrosting heater is damaged, and replace it with a new one.

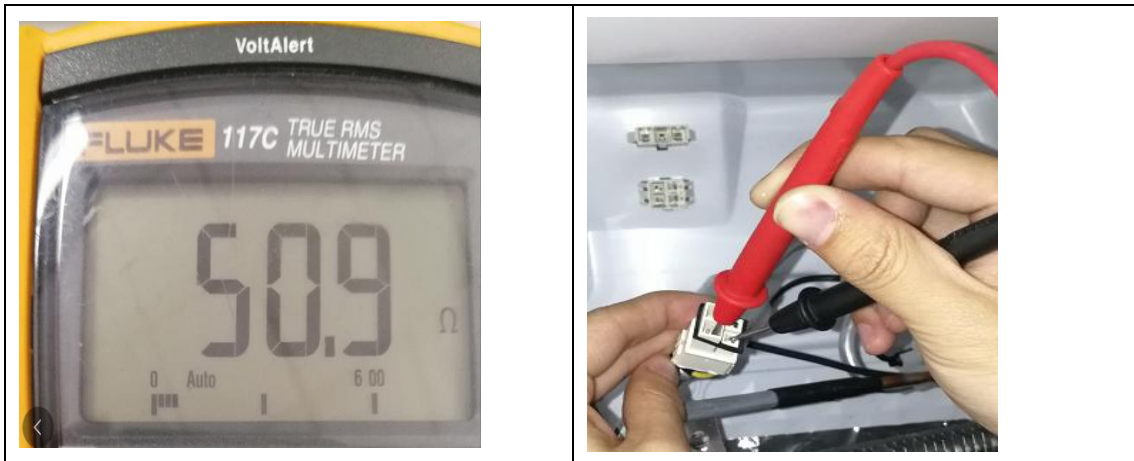
● **How to check the heater.**

- 1) Dismantle the freezer air duct assembly, unplug the heater terminal, and set the multimeter as illustrated below to test the heater resistance; Test results should be between $251\Omega \sim 278\Omega$ (for high-voltage product) or between $47\Omega \sim 53\Omega$ (for low-voltage product), beyond which the heater is judged as damaged and should be replaced.

High-voltage:



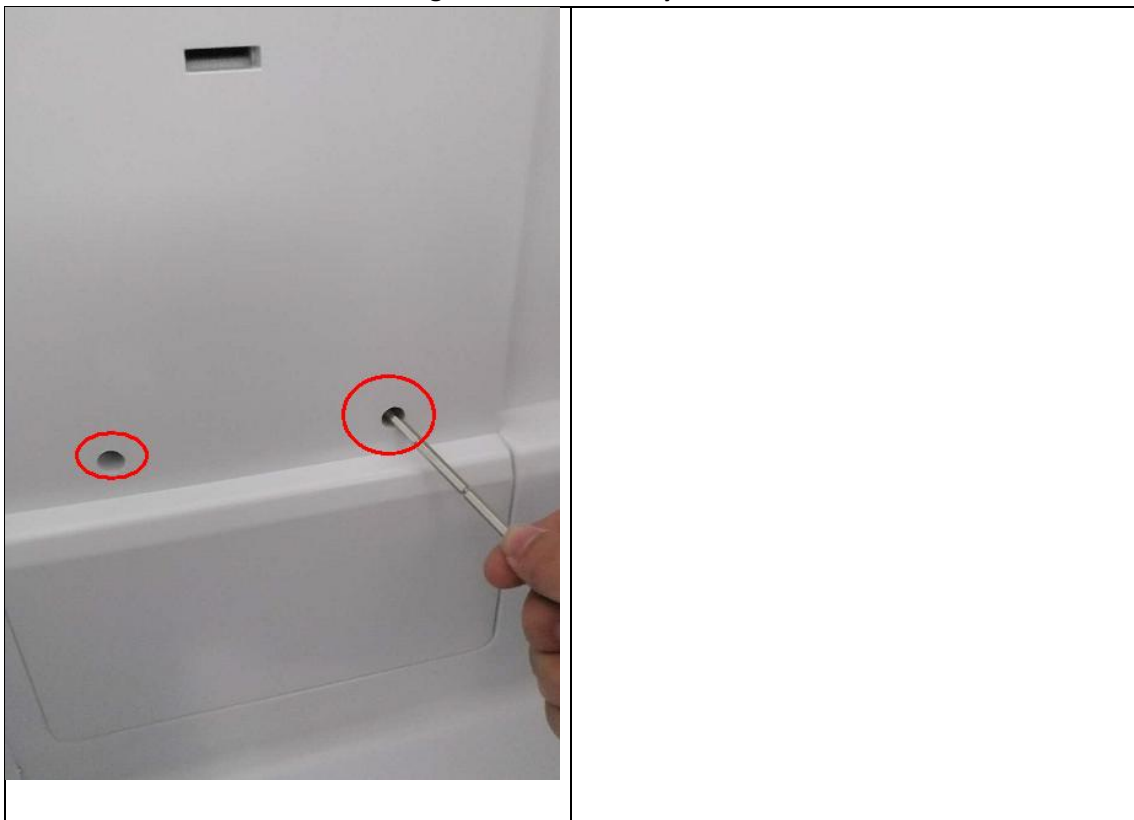
Low-voltage:



3. Disassembly instructions for key components

Note: Live working is forbidden in the course of maintenance and repair, and make sure to cut off power supply before servicing.

✓ How to dismantle the fridge air hood assembly.



(a) Pry Screw off the screw using a small slotted screwdriver, screw off the screws, and then take out the fridge air hood.



✓ **How to dismantle the freezer air hood assembly.**



life of the fan motor is generally long, so no detailed demonstration about dismantling the freezer air duct assembly is made to avoid damaging the air duct during the disassembly process, which affects the refrigerator performance and service life. If any problem with the freezer air duct, it is recommended to replace the assembly component directly)

✓ **How to dismantle the fridge top LED lamp.**

(a) Take out the lampshade.



(b) Use a screwdriver to unscrew the fixing screws from the right and left cylinder structures, and remove them gently.

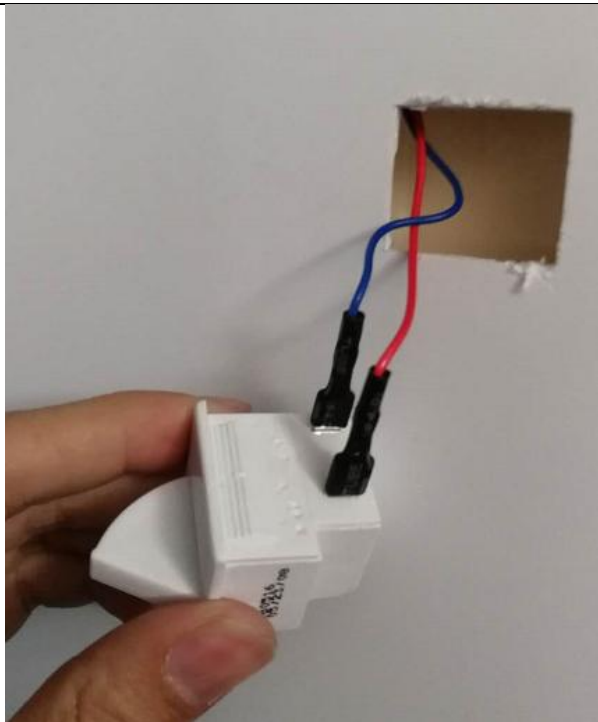


(c) Remove the screws securing the control panel and lamp shade, detach the lamp shade from its clamping position, and disconnect the terminal; In this way can the control panel be replaced.



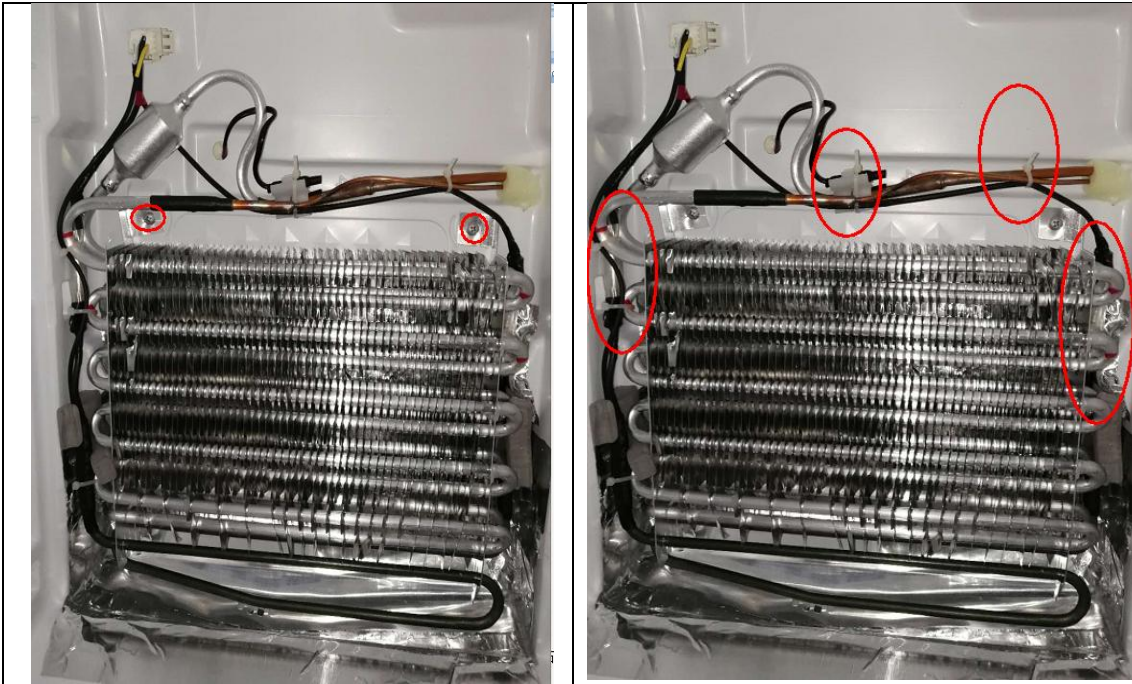
✓ **How to dismantle the door lamp switch.**

(a) Use a flathead screwdriver to pry off the door lamp switch as illustrated by the left Figure, take out the door lamp switch, and unplug the terminal of the switch.



✓ **How to dismantle the heater.**

(a) Disassemble the freezer air duct assembly by reference to the Instructions for dismantling the freezer air duct assembly.



(b) Unplug the heater terminal, screw off the fixing screws with a screwdriver, remove the evaporator, and cut off the cable ties as illustrated by the left Figure.



(c) Cut off the cable tie as illustrated in the above Figure, and loosen the bracket fixing plates at both ends to remove the heater.



✓ **How to remove the hinge.**

- (a) Pry off the hinge cover, unscrew the three screws fixing the hinge, then the hinge can be removed.

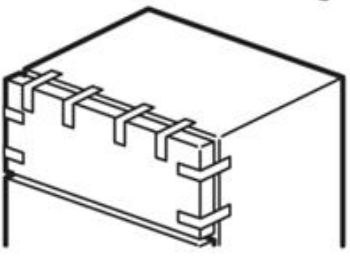
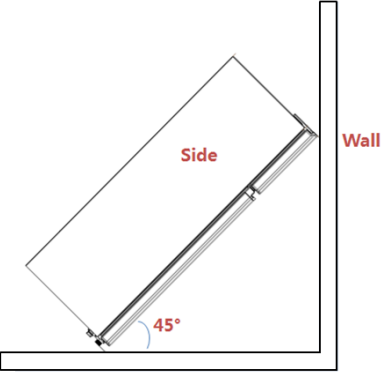
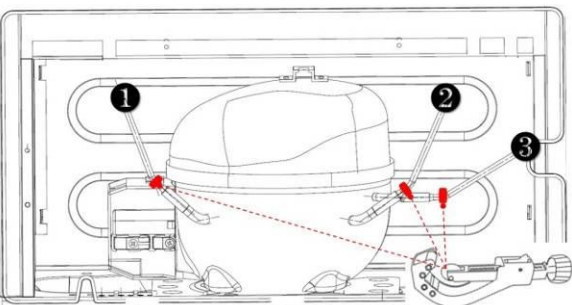


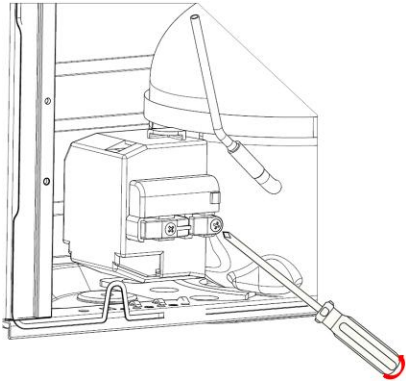
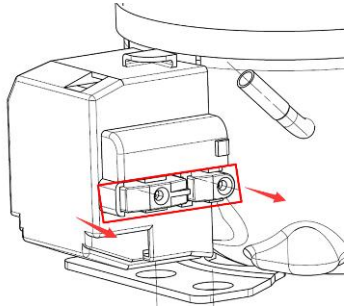
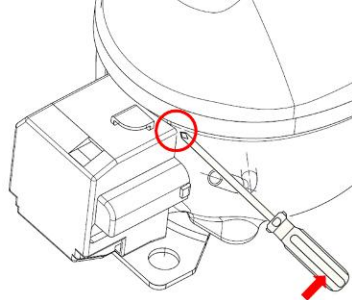
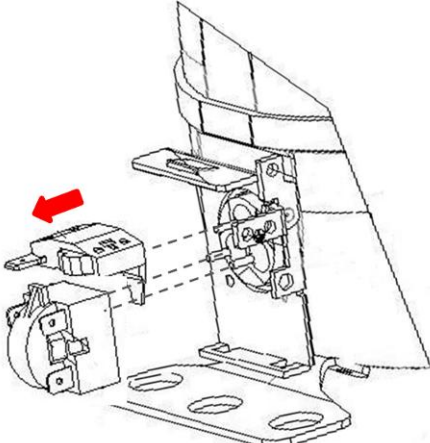
✓ **How to dismantle the compressor compartment.**

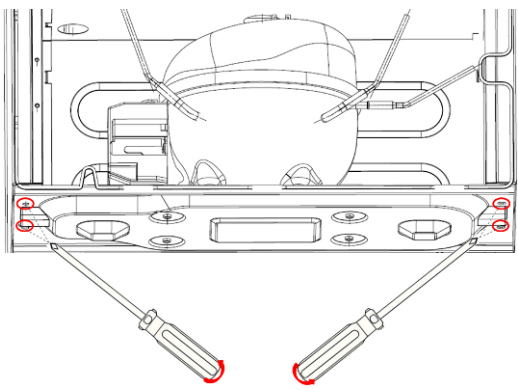
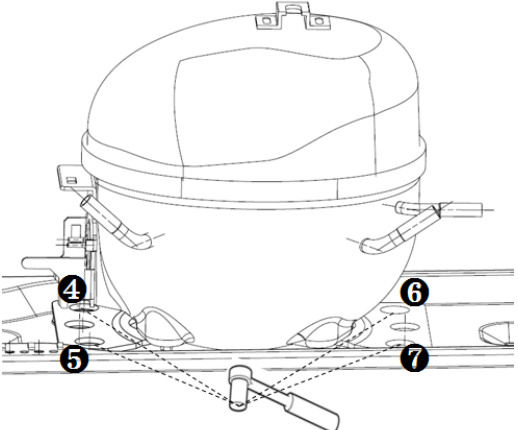
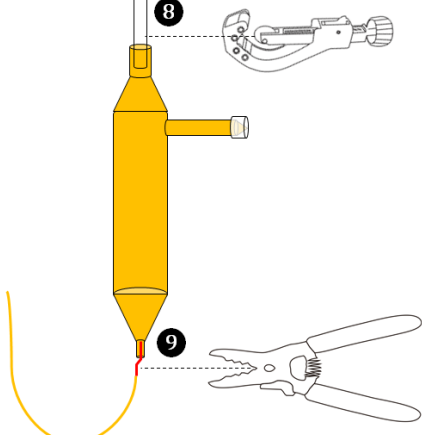
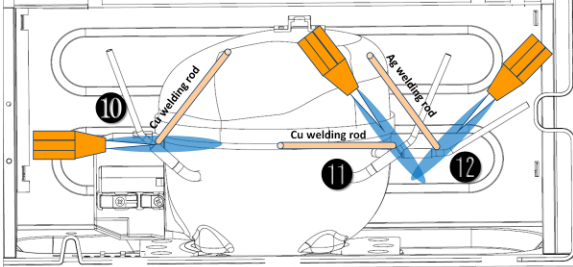
(a) Screw off the two screws as illustrated above to remove the two crimping blocks. Remove the compressor terminal box in the arrow direction, using the screwdriver as an assistant tool.	
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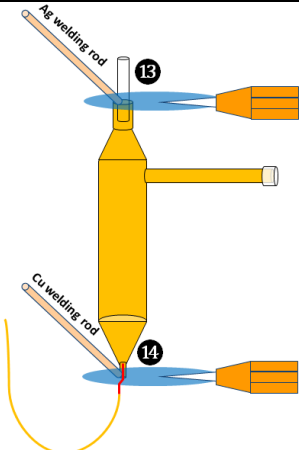
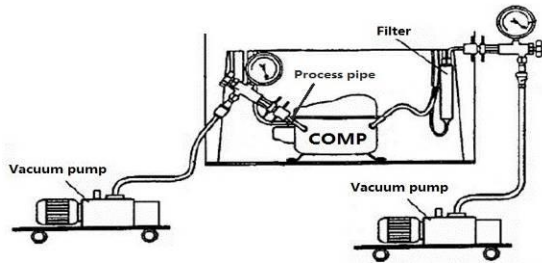
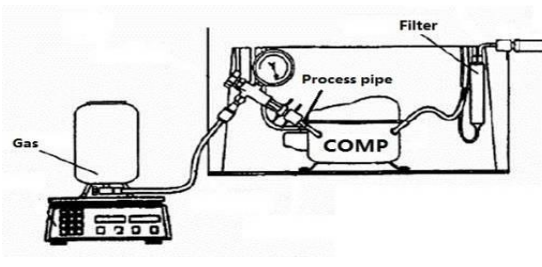
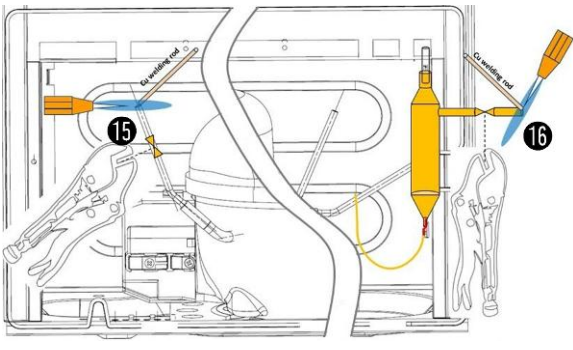
✓ **How to change the compressor and how to disconnect and weld the refrigeration system pipeline.**

(Note: If the refrigerant R600a is used, operations should be made in the environment where there is good ventilation and free from open fire.)

	1. Cut off power supply, take foods out of the refrigerator, and secure all doors with adhesive tapes to prevent the door from falling off when the refrigerator gets tilted.
	2. Tilt the refrigerator slowly forward, leaning it against the wall or the object that is strong enough, and leave sufficient space for operation. For safety reasons, you need someone to help support the refrigerator to prevent it from toppling down.
	3. Cut off the compressor pipeline - ① Truncate the process tube - ② Truncate the low-pressure air return pipe - ③ Truncate the high-pressure exhaust pipe.

	4. Remove screws: - 2 outside screws; - 1 inside screw;
	5. Remove the crimping block;
	6. Dismantle the protective cover;
	7. Disassemble the starter and protector Unplug the starter and protector in turn (you can use a screwdriver to slowly pry them off.)

	8. Loosen the fixing screws of the compressor on the bottom plate, and dismantle the compressor from the cabinet together with the bottom plate. .
	9. Use a wrench to screw off the bolts ④ ⑤ ⑥ ⑦ in turn, and install them in the reverse order after replacing the compressor.
	10. Cut off the condenser ⑧ with a pipe cutter, and cut off the capillary tube using the capillary pliers ⑨ .
	11. Replace the compressor and weld the pipes: - ⑩ Weld the process tube; - ⑪ Weld the low pressure air return pipe; - ⑫ Weld the high pressure exhaust pipe;

	12. Replace the filter, use the silver electrode for the copper-iron pipe ⑬ connection, and use the copper electrode for the copper-copper pipe ⑭ connection.
	13. Conduct vacuum pumping, with the vacuum degree reaching below 10Pa.
	14. Charge the system with refrigerant.
	15. Use the locking pliers to clamp the middle of the process tube, and then weld the process tubes ①⑤ and ①⑥ for sealing.