

Chapter 9 Troubleshooting

9.1 Lead Fault

1. Data saturation or overflow happens.

Solution:

Ensure that all leads are in good contact, and wait for half minute or the waveforms on the screen are stable, and then start printing.

2. Straight line is printed in some leads.

Solution:

- 1) Check if the metal piece of limb electrode contacts with the body properly; if not, adjust the position of the limb electrode, and adjust the tightness if necessary.
- 2) Check if the limb electrodes and chest electrodes are oxidized or faded, and clean the accessories or replace with new ones. Oxidation and aging cause conductive deterioration of the electrodes, resulting in poor signal transmission.
- 3) Treat the skin of the patient with alcohol; because dry skin causes skin resistance to become larger, which will impact the signal collecting.
- 4) Please clean the joints of lead wires, suction ball and limb clip, reinstall and tighten all joints. After long-term use, the joints will have dirt or become loose, resulting in poor signal transmission.
- 5) Check if the appearance of the lead wires has obvious fracture; if yes, replace with new lead wire. If not, connect a proper lead wire to the device. If the waveforms are stable, the lead wires have problem and have to be replaced.
- 6) If there is no lead wires available, check if the lead wires conduct with a multimeter. First check if the inner conductors of the lead wires are conductive. Generally speaking, the acceptable resistance shall be about 10 k Ω . Then check if there is a short circuit between the outer shield and inner conductor. The resistance shall be infinity. If the lead wires have a problem, please contact our customer service to replace new lead wires.

3. The other reason for lead fault can be caused by failure in signal communication. Please exclude other causes for lead fault problems first, and then contact customer service if necessary.

9.2 Printer Failure

1. Unclear printing.

Solution:

- 1) Whenever a printer fault occurs, such as poor or incorrect ECG recording, you may try to clean the thermal printer head with soft cotton dipped with medical alcohol.
- 2) If the quality of the thermal paper is poor or the paper is not used for a long time, which may result in reduced performance of thermal layers. Please replace with provided or specified recording paper.
- 3) If the above methods are not applicable, guide the user to test the print head and check if the print head has breaking point; if yes, contact the customer service to replace the thermal print head.

2. Upper half or lower half is blank.

Solution:

Check if the bearing on both ends of the rubber shaft of the paper compartment cover is worn, and replace with new bearing if yes.

3. All paper or most part is blank.

Solution:

- 1) Make sure that the thermal recording paper is not installed backwards.
- 2) Check if the print head is stuck by dirt (such as adhesive tape); this often occurs when new print paper is replaced.

9.3 Keyboard Failure

If key failure happens, the professional maintenance staff can locate the failure by “Key Test” in **[Factory Maintain]**.

Keyboard failure is probably caused by loose connection between the keyboard panel and the System Control Board due to shocking or vibration during transportation. If necessary, a professional service engineer will disassemble the ECG machine and reconnect the inner cable. At the same time, check keyboard, if key may be stuck for aging.

9.4 Indication of Lead Off

This ECG machine can detect the lead connecting status continuously. When the leads are not well connected to the main unit, it means that the signals can not be transferred correctly, thus there is “lead off:*” indication, accompanied by voice alarm. The symbol “*” represents the fault lead, the waveform of which will display as a straight line. Please check carefully whether the connection among the related electrodes, human body, patient cable and the main unit remains well.

9.5 AC Interference

Apparent and regular trembling of ECG waveform in the process of recording due to AC interference is shown as below.



Causes of baseline wander are varied, please do following checks one by one:

1. Make sure the ECG machine is properly grounded according to the instructions.
2. Make sure the patient cable and electrodes are properly connected.
3. Make sure the electrodes and the patient skin have been covered with ECG gel.
4. Make sure the exam bed is properly grounded.
5. Make sure the patient is not in touch with the wall or the metal part of the bed.
6. Make sure the patient is not in touch with anybody else.
7. There shall be no large power electric equipment (such as X ray machine, ultrasound scanner and etc.) operating nearby.
8. The patient shall not be wearing some jewelry like diamond.

 **CAUTION**

Set AC filter to ON if AC interference still exists after the above checks are completed.

9.6 EMG Interference

Irregular trembling of ECG waveforms due to EMG interference is shown as below.



Causes of baseline wander are varied, please do following checks one by one:

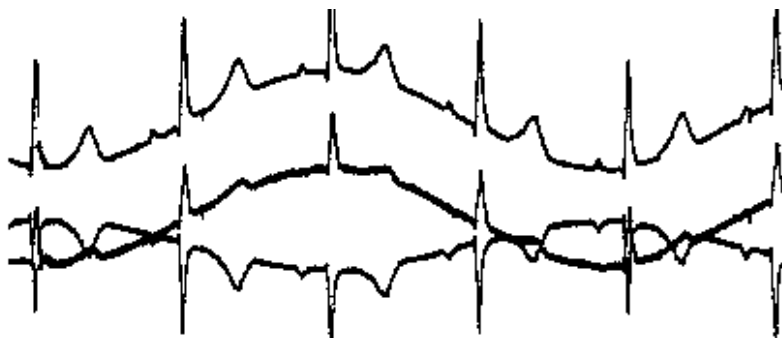
1. Make sure that the exam room is comfortable for examination.
2. Soothe the patient from irritation or excitement.
3. Make sure the exam bed is in suitable size.
4. Never have talks with the patient during ECG recording.
5. Make sure the limb electrode is too tight to make the patient uncomfortable.

⚠ CAUTION

Set EMG filter to lower value if EMG interference still exists after the above checks are completed, and keep in mind that the recorded ECG waveforms, particularly R wave, will be somewhat attenuated.

9.7 Baseline Wander

Irregular movement of ECG baseline due to baseline drift is shown as below:



Causes of baseline wander are varied, please do following checks one by one:

1. Make sure the electrodes are in good contact with skin.
2. Make sure the connection between the patient cable and electrodes.
3. Make sure the electrodes are clean and patient skin contacted with the electrodes has been well pretreated.
4. Make sure the electrodes and skin are covered with ECG gel.

5. Keep the patient silent and motionless, and keep the patient from hyperventilation.
6. Used electrodes shall not be utilized with new ones in patient examination.

 **CAUTION**

If the problem still can't be cleared, please turn up the baseline wander filter, keep in mind that the recorded ECG waveforms, particularly T wave and ST segment, will be somewhat distorted.

9.8 The ECG machine can not be turned on

1. AC power is not working properly and the battery is exhausted.

Solution:

First check if the power outlet connects properly, if the power line and the machine connect properly, then check if local AC voltage is good. If everything is ok, check if the fuse is proper. If everything is normal after above examination, return the machine to the manufacturer for repair, for it may be damaged.

2. After turning on, the machine turns off automatically after a few minutes.

Solution:


While working, if the screen displays the battery power, the machine is using the battery, but the battery power is insufficient, resulting in automatic shutdown. Please supply the machine with AC power, or charge the battery before working. If the user is using AC power and the machine still turns off automatically, please check according to step1.

9.9 Paper Feeding Failure

1. Press , but paper is not fed.

Solution:

Check if the keyboard has been damaged and replace damaged keyboard.

2. Press , the paper is not fed, and there is abnormal sound from recorder.

Solution:

First check if the recording paper is installed properly, and if the gear on the cover of paper magazine is in good condition.

3. Paper feeding isn't smooth, paper is stuck, or waveforms are compressed.

Solution:

First check if the thermal paper complies with the standard, then if the paper is installed properly, or replace a new roll of paper. Finally, replace the paper shaft.

9.10 Battery is quickly charged and discharged

If the battery is often not fully charged, the performance will be deteriorated.

Solution:

It is recommended to charge the battery continuously until the battery is fully charged and activated for the first two times. Supply the machine with AC power as far as possible.

9.11 Wrong Analysis Result

For the case for some special populations (such as pregnant women, the user of vascular drugs, etc.) or mixed by obvious interference in the recording process, the analysis result of the resting ECG analysis of this ECG machine may be inaccurate. The possible reason may be as followings:

- 1) Poor contact between electrode and patient skin, caused by improper skin treatment and incorrect connection.
- 2) The patient has relatively large movement in the recording process.
- 3) Gender or age isn't entered;
- 4) If there is too much AC, EMG and breathing interference, the identification of P wave and Q wave is not

reliable sometimes; if there is baseline wandering, the identification of ST segment and T wave is not reliable sometimes.

- 5) If QRS complex has low voltage, R-wave may be missed, and the electrical axis measurement and the identification of QRS dividing point can be unreliable. Or frequent ventricular contraction occurs or a variety of arrhythmias merge, the relevant detection parameters may be unreliable.
- 6) The filter settings are incorrect.

Solution:

- 1) Treat as *Apply Electrode* and wait until the waveforms are stable before reanalyzing.
- 2) Enter the patient gender and age correctly.
- 3) Exclude the interference as the methods described in *AC Interference*, *EMG Interference* and *Baseline Wander* before reanalyzing.
- 4) Reset to an appropriate filtering value.

9.12 File Uploading Failed

The most possible reason is that network settings have problems, please check the network connection and refer to *Network Connection* to re-set the network.

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