

Common faults and troubleshooting of electromagnetic guns

Description: For the installation of the electromagnetic gun, please refer to the following two video links. This document mainly describes how to troubleshoot the problems.

Electromagnetic gun B installation video: <https://56dz.com/p/2048.html>

Electromagnetic gun A installation video: <https://56dz.com/p/2911.html>

Brief introduction of principle:

The circuit mainly consists of power supply (two dry batteries), self-excitation oscillation, pressure boost, rectification, voltage stabilization, and energy storage.

In the circuit below, the coil 1, coil 2, triode BG (9013) and resistance R1 (5.1K) form a self-excited oscillation circuit.

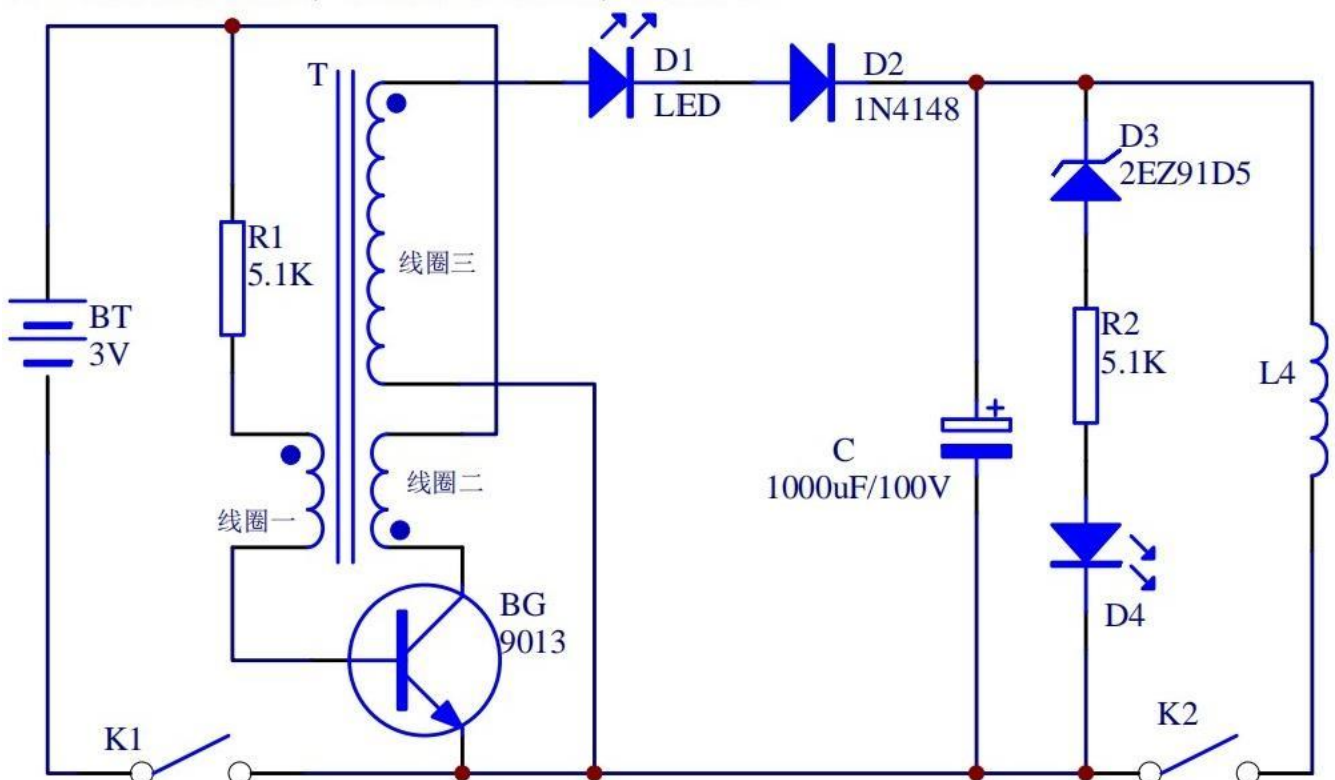
Close the switch K1 (button switch), the circuit is energized, the circuit vibration, the high frequency alternating magnetic field on the magnetic ring, the coil wrapped on the magnetic ring three will thus sense the high frequency AC (the more the coil three wrapped in the magnetic ring, the higher the AC voltage).

After the rectification of the light-emitting diode D1 (green) and the high-speed switch diode D2 (1N4148), the polar electrolytic capacitor C (1000 uF / 100V) is charged. The voltage of the pin at both ends of the capacitor C will slowly increase with the charging, and the charging current will gradually decrease with the increase of the voltage. The phenomenon reflected in the light-emitting diode D1 is a slow decrease in the light-emitting brightness.

When the voltage rises above 91V, the reverse breakdown voltage of the regulator diode D3 (2EZ 91D5) is exceeded, causing D3 to conduct in the circuit, R2 (5.1K in series on D3) and the light emitting diode D4 (red) is through, D4 is light, indicating the capacitor C is charged.

Press the switch K2 (touch the button), the electric energy stored on capacitor C will form a large instantaneous current through L4, forming an instantaneous strong magnetic field on L4, acting on the shell, make the shell out.

After the electricity stored on the capacitor C is discharged, the charging cycle is repeated again.

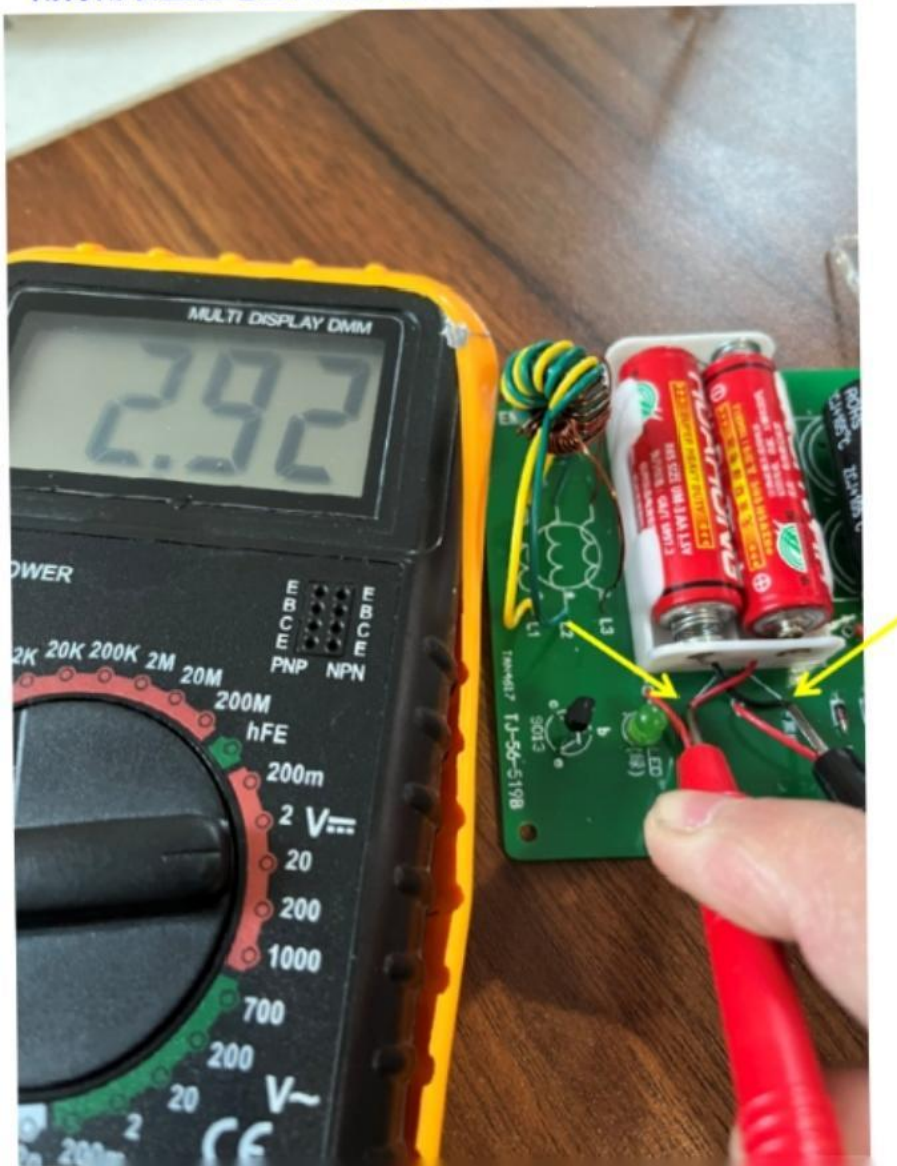


Common troubleshooting

● First check whether the battery box is normal power output, whether the battery is installed, and whether the positive and negative line of the battery box is connected. The battery installation direction is shown below



Measure whether the two red and black lines drawn by the battery box have 3V voltage.



Note that the two red and black lines of the battery case are measured, not the metal contacts on the battery case, so the measurement result is unreliable. As measured in the figure above, 2.92V is the normal voltage. Generally, 2.8–3.2V can be used.

● Check the installation direction of the triode

When installing the triode, the pin should not be cut, and the welding is conducive to heat dissipation.

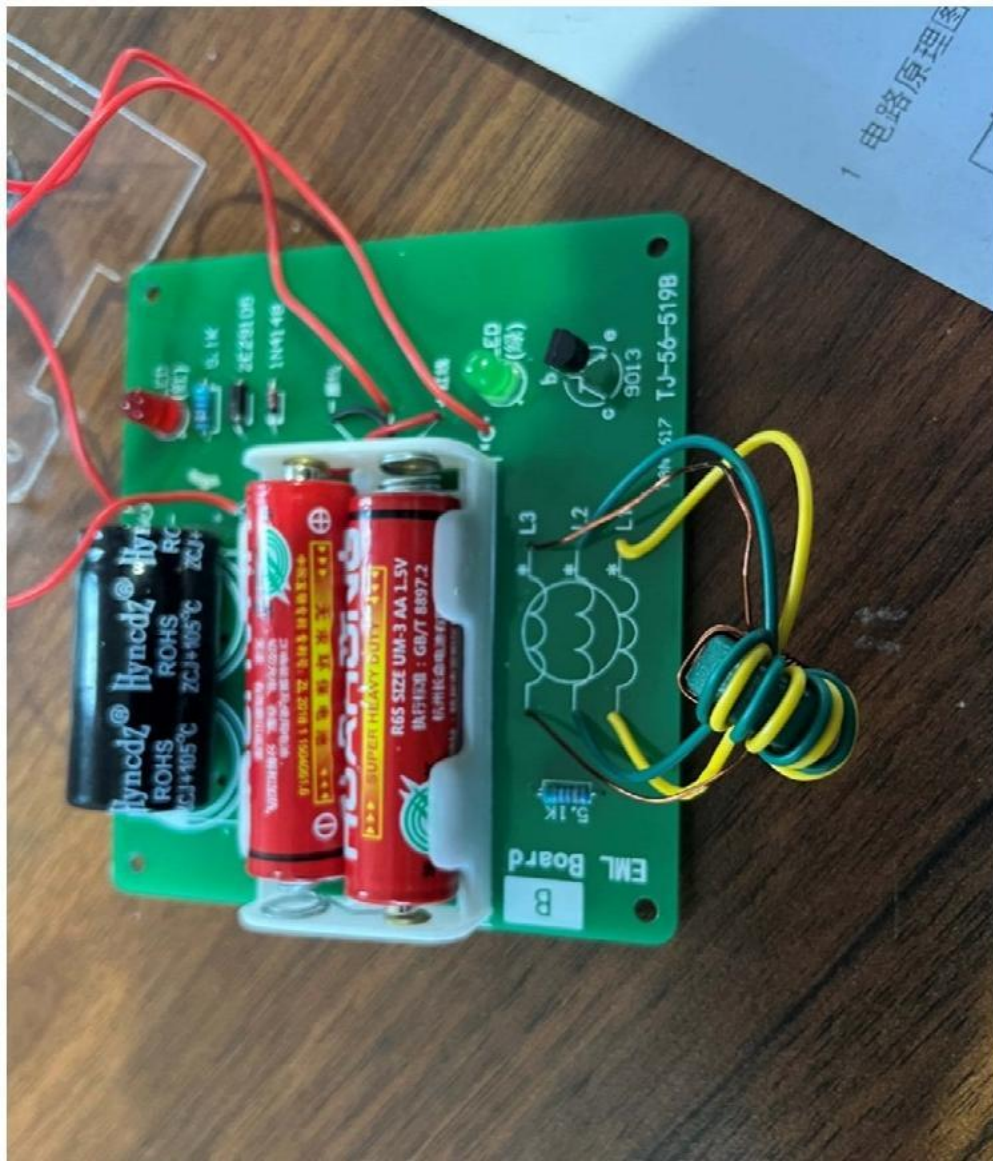


The pin of the triode is defined in the figure below



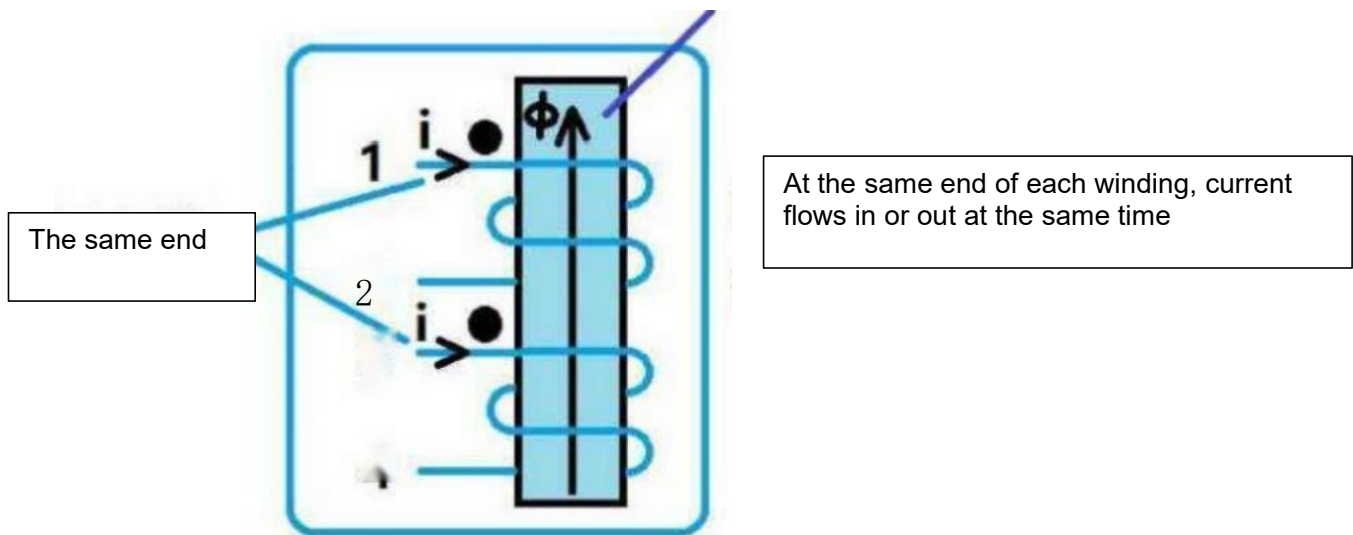
Check the installation of the ring transformer and the installation direction of the three-group coils of the transformer.

The ring transformer has three groups of coils, two of which are made of plastic sheath wire with 4 laps, and the other group is made with about 20 laps.



First, identify the same name end of the three sets of coils. See the meaning of the same name as described in the figure below

transformer core

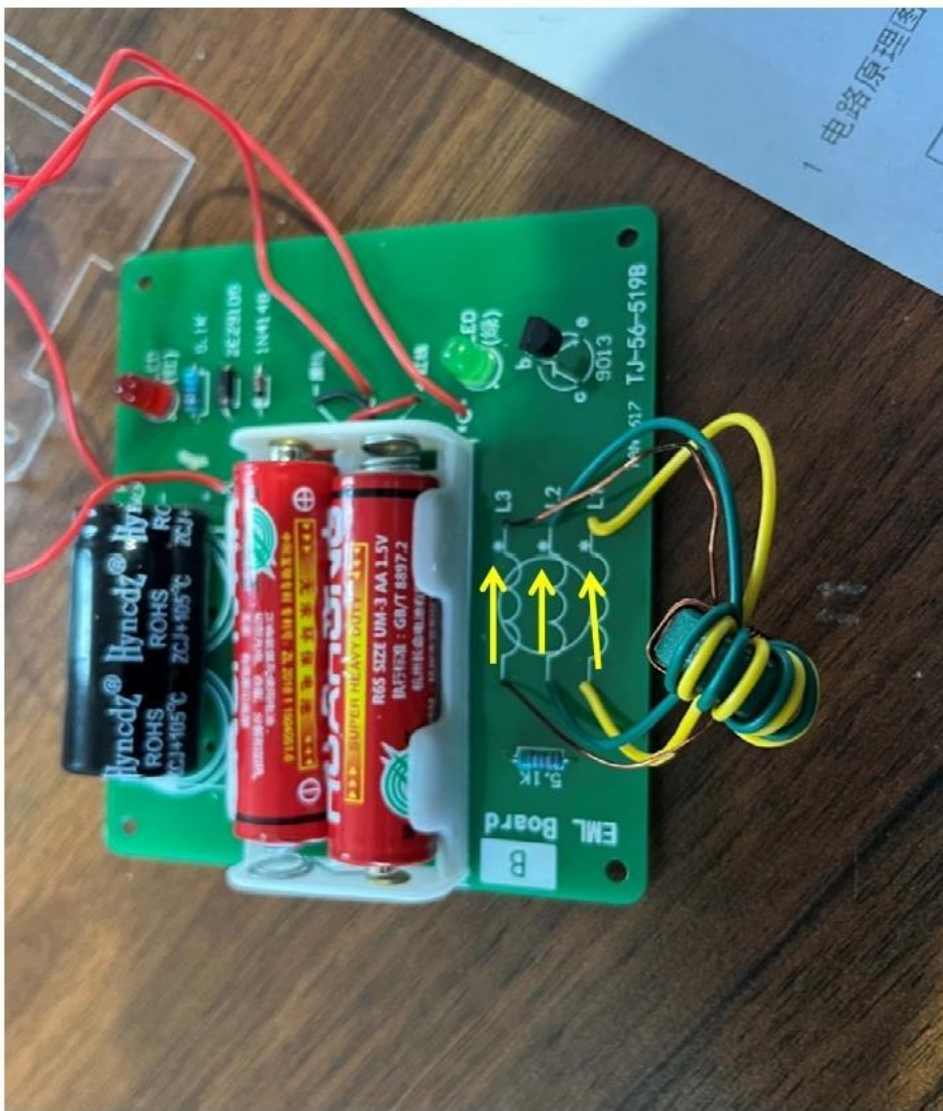


There are two sets of coils in the figure above. Our transformer has three sets of cores, and the figure above uses an iron core, and our transformer is a ring magnetic core, but it does not affect the understanding of the same name.

The identification of the same end is very important, if the coil one and the second end of the coil are reversed. The self-excitation circuit will not work normally, the coil three will not produce high frequency AC, but also easy to damage the triode. If the coil is installed in reverse, the rectified voltage is low, the capacitor C is not charged, and the emission distance is short.

The yellow arrow in the figure below has a "*" symbol on the circuit board, which represents the same name end of each winding of the transformer

Special tips, first carefully observe the winding of each group of coil, and then identify the same name of each group of coil end!



Add a sentence, if you don't understand the description of the same name above, you can also use the exclusion method. If the coil one and the coil two names are installed wrong, the circuit will not vibrate, and the green light-emitting diode will not shine. You can take down the two heads of one of the coil and exchange them and then put them back. Coil one and coil two are optional

One, the rest stays still.

● The green luminous diode is not bright after energizing.

Possible reason 1: Triode (9013) in reverse.

Possible reason 2: the coil one of the coil and the second end of the coil are connected to the circuit board (because the transformer is purely handmade,

Each group of coils may circle differently, which is possible).

Possible reason 3: The green light-emitting diode is reversed.

Possible reason 4: The high speed switch diode D2 (1N4148) is reversed.

Possible reason 5: capacitor C has false welding. D3, R2 and D4 have virtual welding. Or D4 in reverse, coil three no current circuit green light emitting diode will not light

Possible reason 6: broken components, such as broken triode, broken light emitting diode, electromagnetic gun has spare components, can be replaced components screening.

Possible reason 7: the three two ends of the coil wire head did not scrape off the insulation paint, directly welded or connected up, resulting in no electrical contact.

●The green and red LED come together.

Possible reason 1: In normal circumstances, the green light-emitting diode is bright after electrification, and then dim very slowly with the extension of time. When the capacitor is charged to 91V, the red light-emitting diode begins to shine. If the electrification is red and green together, generally the electrolytic capacitor C is not installed, and there is false welding. capacitor C does not have access to the circuit. After D2 is rectified, the highest voltage results in the reverse breakdown of D3, and the red light-emitting diode will light up immediately. (Note that D3 reverse breakdown conduction is in a normal working state, not that it is broken, when the voltage at both ends of the D3 pin is lower than its reverse breakdown voltage, D3 returns to the cutoff state)

Possible reason 2: Diode D3 direction is reversed. When the diode D3 is installed in the reverse direction, it is positively biased in the circuit. It only needs about 1V voltage can be turned on, and a red-green light-emitting diode will be lit together.

●The launch distance is too small

Reason: The third direction of the coil is reversed. The voltage of the positive and negative cycles of AC in coil 3 is not the same, where the peak voltage of one cycle is higher than the other,

The rectifier circuit is half wave rectification. If the coil is fully reversed, the high voltage cycle will be cut off, and the low voltage cycle output. The electrolytic capacitor does not have enough charging voltage, and the capacitor has not be charged, so the transmitting distance will not be far.

Method to judge the low charging voltage: after turning on the power switch, the green light-emitting diode is lit, first press the launch button to complete the discharge, after the discharge, the green light-emitting diode brightness is the highest, and then the brightness will decrease very slowly with the charging. If the green light-emitting diode is only high for 1-2 seconds, and then it quickly fades down, then the charging voltage is low.