# THCD-9 多功能管道全位置焊接小车

# THCD-9 Multifunctional all-position pipe welding trolley

## 一、概要及特点：

## I. Summary and features:

1、概要：

1. Summary:

1.1、THCD-9 是采用齿轮、链条驱动方式的行走焊接装备、内置高性能永磁体。焊枪夹持机构能互换可装夹气保焊枪和氩弧焊枪，用于管道对接焊、管道与法兰或弯头的角接焊缝等，夹持氩弧焊枪可作氩弧焊机使用。

1.1、THCD-9 is a walking welding equipment driven by gears and chains, with built-in high-performance permanent magnets. The welding gun clamping mechanism can exchange clamping gas shielded welding guns and argon arc welding guns, which are used for butt welding of pipelines, fillet welding of pipelines and flanges or elbows, etc. The clamping argon arc welding guns can be used as argon arc welding machines.

1.2、整机结构小巧、轻便、稳定；采用蓄电池供电，特别适用于野外及不便于提供小车电源的焊接场合，杜绝现场电源电缆破损触电产生的安全隐患。

1.2、The whole machine is compact, light and stable in structure; The battery is used for power supply, which is especially suitable for outdoor and welding occasions where it is not convenient to supply trolley power, so as to prevent the potential safety hazard caused by electric shock caused by the damage of power cable on site.

1.3、小车焊枪夹持机构具有摆动功能，适用于宽、厚焊缝的焊接；无论是上焊还是下焊，均可保持爬行焊接的定位精度和速度恒定，即便是无专业技术的操作人员也能获得良好的焊接效果。

1.3 、 The clamping mechanism of welding gun has swinging function, which is suitable for welding wide and thick welds. The positioning accuracy is assured and the speed of crawling can be kept even and constant in both up-slope or down-slope welding , and even operators without professional skills can get good welding results.

2、特点：

2. Features:

1)、采用 DC24V 锂电池供电，免除了车体高压电源供电工作，提高了小车安全性能。

1) The DC24V lithium battery is used for power supply, which eliminates the high-voltage power supply of the car body and improves the safety performance of the car.

2)、数码管数字化显示，方便调整各项参数、体积小、重心低、便于携带。

2) Digital display of digital tube is convenient for adjusting various parameters, small in size, low in center of gravity and easy to carry.

3)、采用程序精密控制行走速度、摆动速度、摆动角度、左、右停留时间等。

3) The walking speed, swing speed, swing angle, left and right residence time, etc. are precisely controlled by program.

4)、摆动器受程序控制，摆动具有左停、右停功能，防止摆动焊接时出现熔池不足的现象；同时焊接时可对焊缝中心进行调整，防止偏焊。

4) The swinging device is controlled by the program, and the swinging device has the functions of left stop and right stop, so as to prevent the phenomenon of insufficient molten pool during swinging welding; At the same time, the weld center can be adjusted during welding to prevent partial welding.

5)、摆动功能始终从中心开始并自动回中，方便二次启动焊接调整。

5) The swing function always starts from the center and automatically returns to the center, which is convenient for the second start of welding adjustment.

## 二、适用范围：

## II. Scope of application:

2.1、适用材料：碳钢、不锈钢、合金钢、低温钢（不可磁力吸附的材料应另配小车轨道），

2.1. Applicable materials: carbon steel, stainless steel, alloy steel and low-temperature steel (materials that cannot be magnetically adsorbed should be equipped with trolley rails).

2.2、适用焊缝：管子--管子环缝内处焊，管子--弯头，管子--法兰，罐体的横焊与竖焊，管桩的横焊等，

2.2. Applicable welds: pipe-pipe girth welding, pipe-elbow, pipe-flange, horizontal welding and vertical welding of tank body,Horizontal welding of pipe piles, etc.,

2.3、适用管径：外圆管道¢≧140mm，内径¢≧450mm，适用壁厚度 3-100mm，

2.3. Applicable pipe diameter: cylindrical pipe ≧ 140mm, inner diameter ≧ 450mm, applicable wall thickness 3-100mm,

2.4、焊接小车行走宽度应大于 300mm， 焊缝母材间隙应一致，否则影响焊接效果；

2.4. The walking width of the welding trolley should be greater than 300mm, and the gap between the weld base materials should be consistent, otherwise the welding effect will be affected;

2.5、 工件（或固定式导轨）应为导磁材料，若不具导磁性则小车磁体无法吸附于工件上，会造成小车运行不稳甚至掉落损毁（不可磁力吸附的材料应另配小车轨道），

2.5. The workpiece (or fixed guide rail) should be made of magnetic conductive material. If there is no magnetic conductivity, the trolley magnet can't be adsorbed on the workpiece, which will cause the trolley to run unsteadily or even fall and be damaged (materials that can't be magnetically adsorbed should be equipped with trolley rails).

## 三、规格及技术参数：

## Specifications and technical parameters:

| 序号 | 项 目 | | 参 数 内 容 |
|---|---|---|---|
| 1 | 适用工件 | | 铁质工件、角焊缝、对接焊缝 |
| 2 | 驱动方式 | | 四轮驱动（橡胶轮） |
| 3 | 吸附力（钢板测试） | | ≥30KG |
| 4 | 垂直行走速度 | | 35 — 900 (mm/min) |
| 5 | 摆动速度 | | 0—40 周/分 |
| 6 | 左/右停留时间 | | 0—2.5S |
| 7 | 摆动角度 | | 0—±8° |
| 8 | 满足圆弧外径 | | R≧170mm |
| 9 | 满足圆弧内径 | | R≥450mm |
| 10 | 焊枪调节范围 | 横向 | 40mm |
| | | 垂直 | 40mm |
| | | 焊枪绕 X 轴转动 | ±45° |
| | | 焊枪绕 Y 轴转动 | ±30° |
| 11 | 主体材质 | | 铝合金 |
| 12 | 输入电源 | | 24V-4AH 锂电池 |
| | | | 一次充电工作时间不低于 10 小时 |
| 13 | 小车尺寸 | | 长×宽×高：200×285×242 |
| 14 | 小车重量 | | 12kg |

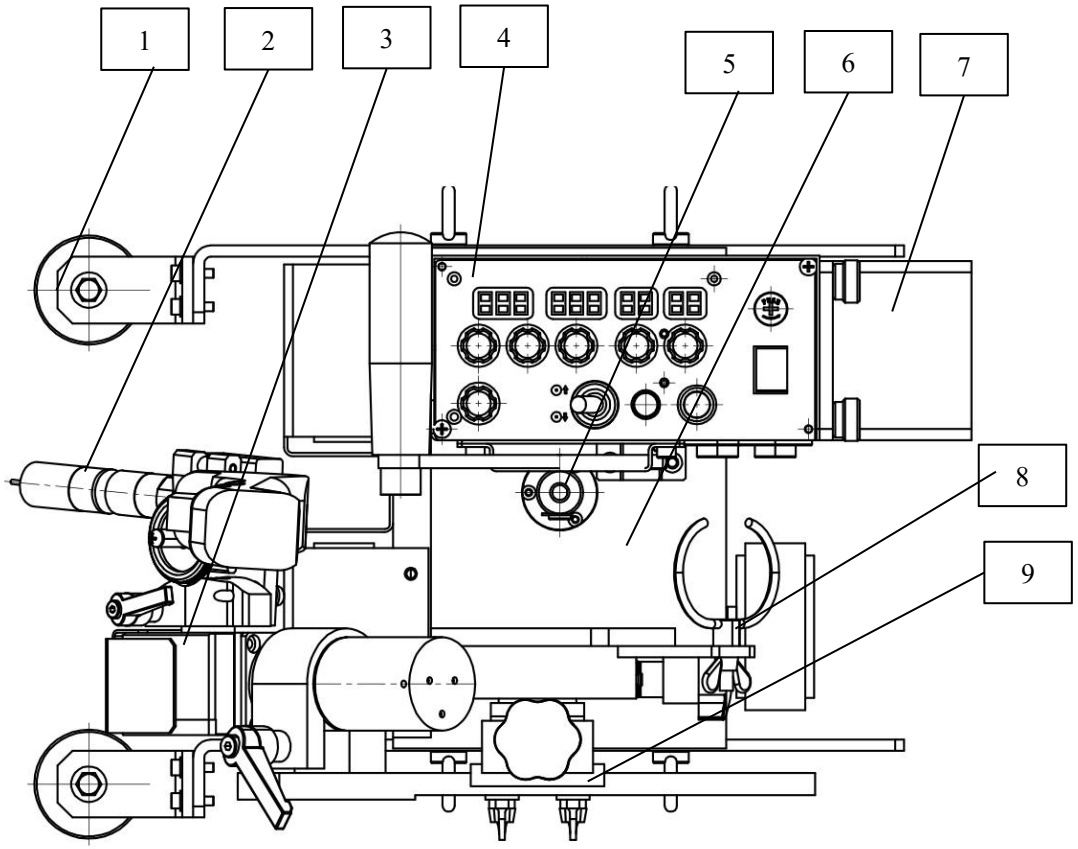
| serial number | Item | | Parameter internal capacity |
|---|---|---|---|
| 1 | Applicable workpiece | | Iron workpiece, fillet weld, butt weld |
| 2 | type of drive | | Four-wheel drive (rubber wheel) |
| 3 | Adsorption force (steel plate test) | | ≥30KG |
| 4 | Vertical walking speed | | 35 — 900 (mm/min) |
| 5 | Swing speed | | 0-40 cycles/min |
| 6 | Left/right dwell time | | 0—2.5S |
| 7 | Swing angle | | 0—±8° |
| 8 | Meet the arc outside diameter. | | R≧170mm |
| 9 | Meet the inner diameter of arc. | | R≥450mm |
| 10 | welding gun regulate range | crosswise | 40mm |
| | | be on the perpendicular | 40mm |
| | | Rotate around x axis of welding gun. | ±45° |
| | | The welding gun rotates around the Y axis. | ±30° |
| 11 | Material | | aluminium alloy |
| 12 | Input power supply | | 24V-4AH lithium battery<br>The working time of one charge shall not be less than 10 hours. |
| 13 | Trolley size | | Length× width× height: 200×285×242 |
| 14 | Weight | | 12kg |

# 四、产品的主要部件：

# IV. Main components of the product:

4.1：THCD-9 管道全位置机示意图（图片仅供参考，以产品实物为准）

4.1: Schematic diagram of THCD-9 pipeline all-position machine (the picture is for reference only, subject to the actual product)



## 4.2 结构名称：

## 4.2 Structure name:

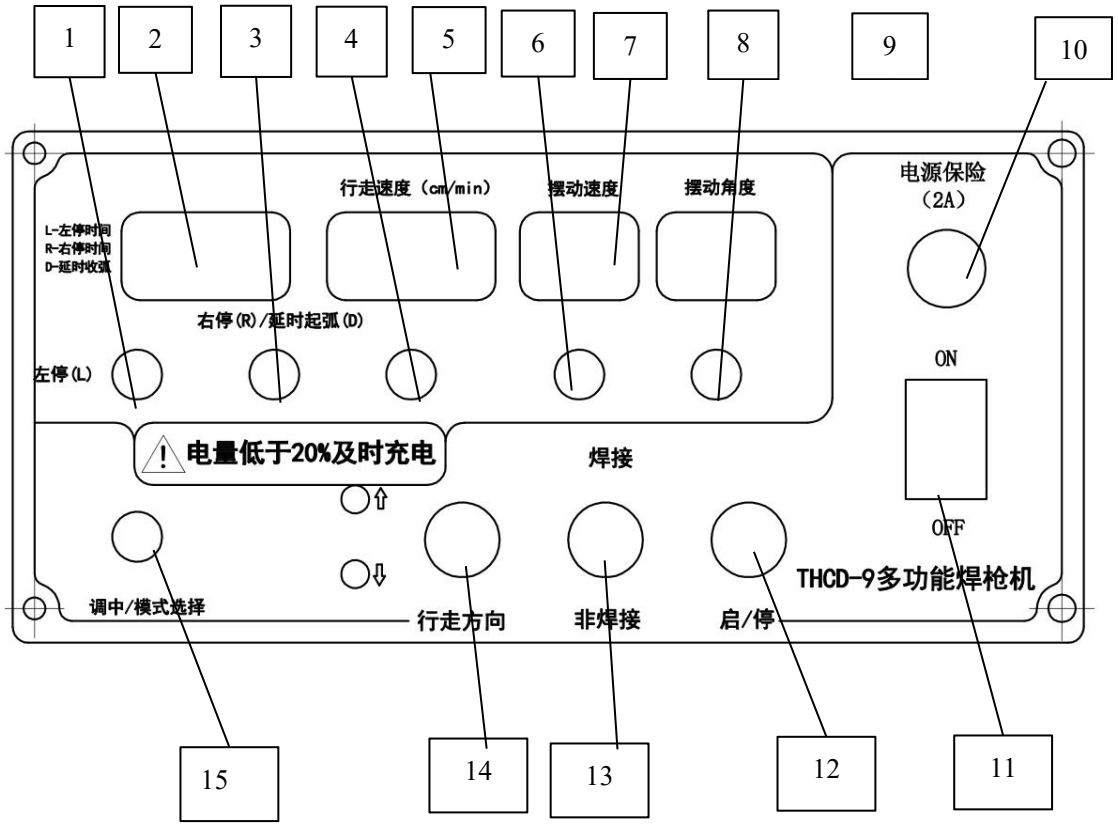
| 编号 | 名 称 | 功 能 |
|---|---|---|
| 1 | 左、右导向轮部件 | 导向轮应紧靠立板，通过螺钉固定调节、导轮行走方向比后推动短 5-10mm，起仿形导向作用。 |
| 2 | 焊枪夹持部件 | 用于夹持焊枪及仿形焊枪对中 |
| 3 | 摆动器 | 带动焊枪对焊缝方向摆动，通过电气旋钮调节摆动角度大小，满足宽缝宽度需要。 |
| 4 | 控制盒 | 用于小车的电气操作，具体操作内容见 4.1 条 控制盒 |
| 5 | 磁控手柄组件 | 磁铁的吸合由此手柄控制，往上为离，往下为合。（注：如果将小车靠近钢板，小车有可能会自动吸附在钢板上，注意手及衣物不要插入其中） |
| 6 | 车体部件 | 小车主体、及行走装置。 |
| 7 | 24V-4AH 电池组 | 蓄电池供电装置 为小车运行提供动力，减少对外界电源依赖。 |
| 8 | 焊枪电缆夹持组件 | 用于夹持焊枪电缆 |
| 9 | 十字调节机构 | 用于调节焊枪的工作位置 |

| number | Naming | Gongneng |
|---|---|---|
| one | Left and right guide wheel parts | The guide wheel should be close to the vertical plate, fixed and adjusted by screws, and the walking direction of the guide wheel is 5-10mm shorter than that of the rear push, thus playing the role of profiling guide. |
| two | Welding gun clamping part | Used for centering clamping welding gun and copying welding gun. |
| three | oscillator | Drive the welding gun to swing in the direction of welding seam, and adjust the swing angle through the electric knob to meet the needs of wide seam width. |
| four | control box | Used for the electric operation of the trolley. See Article 4.1 Control Box for specific operation contents. |
| five | Magnetic control handle assembly | The attraction of the magnet is controlled by this handle, with upward separation and downward engagement. (Note: If the trolley is close to the steel plate, the trolley may be automatically adsorbed |

| | | |
|---|---|---|
| | | on the steel plate. Be careful not to insert hands and clothes into it) |
| six | Car body parts | The main body of the trolley and the traveling device. |
| seven | 24V-4AH battery pack | The battery pow supply device provides pow for that running of the trolley and reduces the dependence on external power supply. |
| eight | Welding torch cable clamping assembly | Used for clamping welding torch cable |
| nine | Cross adjusting mechanism | Used to adjust the working position of welding gun. |

## 五、控制面板操作说明：

## Five, the control panel operation instructions:



控制盒 功能键名称功能：

Control box function key name function:

| 编号 | 名 称 | 功能 |
|---|---|---|
| 1 | 焊接工艺时间<br>调节电位器 | 电位器旋轴带按下功能，用于显示参数标记的切换；<br>旋转电位器旋轴以调节与显示参数标记相对应的时间参数，顺时针参数增加，逆时针参数减小； |
| 2 | 显示数码管 | 常规模式下，显示焊接工艺时间，格式为为 X Y.Z，其中：<br>X 为显示标记<br>L — 摆动左极限位置停留时间；R—摆动右极位置停留时间；d — 焊接收弧时间。<br>Y.Z 为上述标记对应的时间具体数值，显示范围：0 – 2.5。显示格式为X Y.Y |
| 3 | 调速电位器 | 旋转电位器旋轴以调节行走速度值 |
| 4 | 行走速度<br>显示数码管 | 显示格式为XX.X，用于实际显示行走速度大小; |
| 5 | 摆动速度<br>调节电位器 | 旋转电位器旋轴以调节摆动速度大小，顺时针数值增加，逆时针数值减小。 |
| 6 | 摆动速度<br>显示数码管 | 显示格式为XX，用于比例显示摆动器摆动速度； |
| 7 | 摆动角度<br>调节电位器 | 旋转电位器旋轴以调节摆动角度大小，顺时针增加，逆时针减小； |
| 8 | 摆动角度<br>显示数码管 | 显示格式为XX，用于比例显示摆动角度。 |
| 9 | 小车电源开关 | 控制小车电源通断； |
| 10 | 电源保险丝 | 对小车电源电路进行过电流保护，熔断电流为 2A; |
| 11 | 启停开关 | 用于切换小车的启停状态，每按动一次开关，则小车在启停状态间切换一次； |
| 12 | 焊接/非焊接控制开关 | 用于控制焊接状态，将开关拨到“焊接”，则焊接与小车同步，启动小车时焊接电源同步动作（起弧延时时间仍然有效，同时需小车焊枪端口与电源送丝机正确连接） |

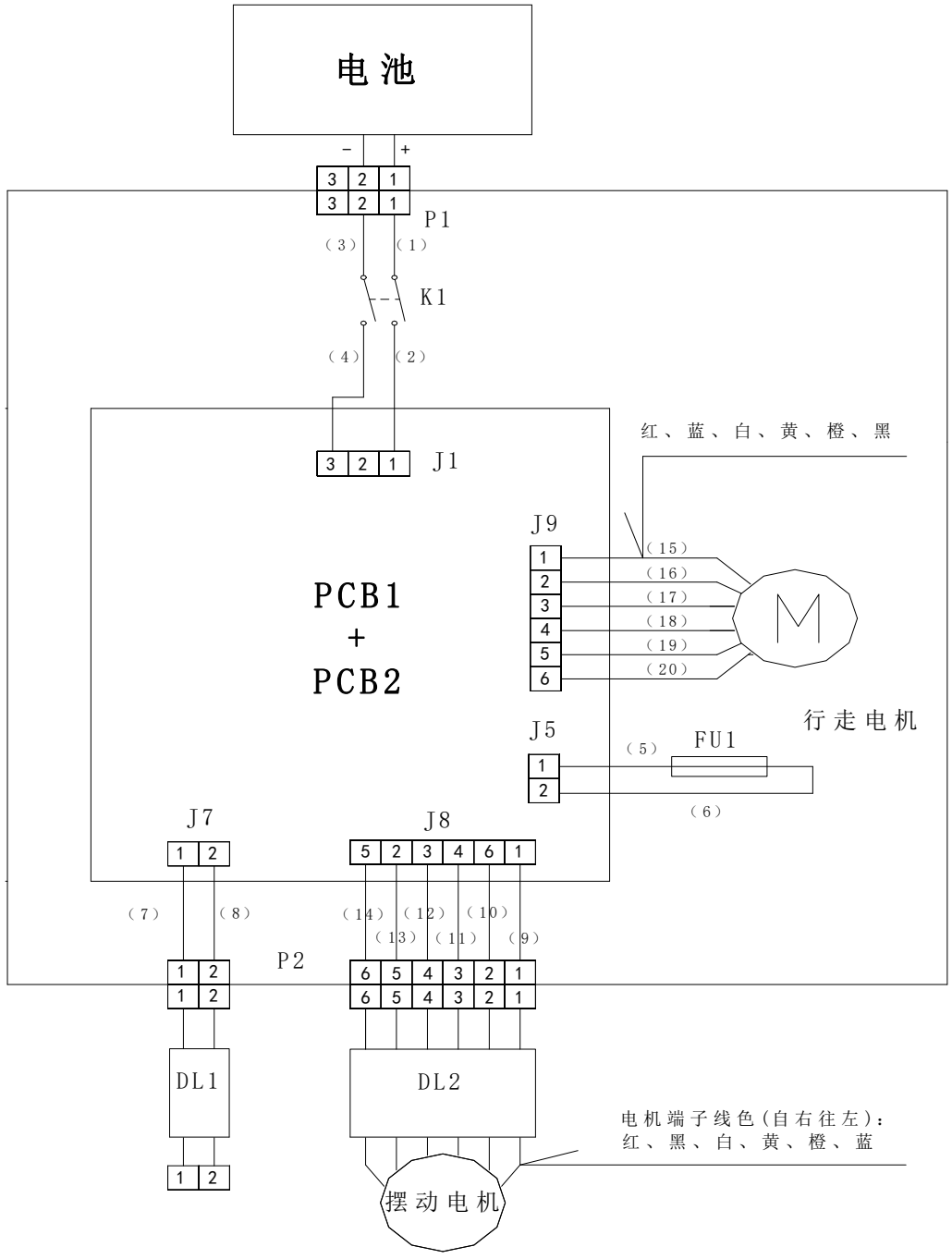
| | | |
|---|---|---|
| 13 | 行走方向控制开关 | 用于切换小车的行走方向，每按动一次，小车行走方向在左右方向间切换一次，同时行走方向灯完成对应显示切换。 |
| 14 | 行走方向指示灯 | 显示小车的行走方向，灯亮小车右行，灯灭小车左行； |
| 15 | 调中电位器 | 用于调节摆动器摆动中心的位置，顺时针右偏，逆时针左偏； |

| | Naming | function |
|---|---|---|
| one | Welding process time Adjusting potentiometer | The potentiometer has a pressing function, which is used to display the switch of parameter marks;<br>Rotate the potentiometer shaft to adjust the time parameter corresponding to the displayed parameter mark, and the clockwise parameter increases and the counterclockwise parameter decreases; |
| two | Display nixie tube | In the normal mode, the welding process time is displayed in the format of X Y.Z, where:<br>X is the display mark.<br>L-dwell time of swinging left limit position; R-dwell time of swinging right pole position; D—welding arc closing time.<br>Y.Z is the specific time value corresponding to the above mark, and the display range is 0–2.5. The format is X Y.Y |
| three | Speed regulating potentiometer | Rotate the potentiometer shaft to adjust the walking speed value. |
| four | Walking speed Display nixie tube | The format is XX.X, which is used to actually display the walking speed; |
| five | Swing speed Adjusting potentiometer | Rotate the potentiometer shaft to adjust the swing speed. The clockwise value increases and the counterclockwise value decreases. |
| six | Swing speed Display nixie tube | The display format is XX, which is used to proportionally display the swinging speed of the swinger; |

| | | |
|---|---|---|
| seven | Swing angle Adjusting potentiometer | Rotate the potentiometer shaft to adjust the swing angle, increasing clockwise and decreasing counterclockwise; |
| eight | Swing angle Display nixie tube | The format is XX, which is used to display the swing angle proportionally. |
| nine | Trolley power switch | Control the on-off of the trolley power supply; |
| ten | Power fuse | Carry out overcurrent protection on the power supply circuit of the trolley, and the fusing current is 2A; |
| eleven | Start-stop switch | Used to switch the start-stop state of the car. Every time the switch is pressed, the car switches between the start-stop states once; |
| twelve | Welding/non-welding control switch | It is used to control the welding state. When the switch is set to "Welding", the welding will be synchronized with the trolley, and the welding power supply will act synchronously when the trolley is started (the arc starting delay time is still valid, and the welding gun port of the trolley needs to be correctly connected with the power feeder). |
| thireen | Travel direction control switch | It is used to switch the walking direction of the trolley. Every time the trolley is pressed, the walking direction of the trolley is switched between the left and right directions, and at the same time, the walking direction light completes the corresponding display switching. |
| fourteen | Walking direction indicator | Show the walking direction of the car, the car goes right when the lights are on, and the car goes left when the lights are off; |
| fifteen | Medium potentiometer | Used to adjust the swing center position of the swinger, clockwise to the right and counterclockwise to the left; |

## 六、电气原理：

## VI. Electrical Principle:



## 七、产品图片

## VII. Product pictures