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Сервисная инструкция
Счетчик банкнот серии

Banknote counter
Service manual

PRO-85 series

Ver.2.0. 29.08.08

CONTENTS

1. Brief

PRO-85 series cash counter is a front-loading and friction-force counting machine, which is an intelligent high-speed banknote counting & detecting machine controlled by CPU. With the elaboration of our engineers, the machine implements with high accuracy, reliability, practicality, convenience, and is a mechanic and electronic integrated unity. In addition, it has advantages such as good mechanical -structure, low noise, smooth feeding system, advanced electronic –line design, and unique signal management.

This manual provides necessary methods and advises for the engineers to maintain this machine.

2. Maintaining Tools and Instruments

1) Cross screwdriver 2) Flat screwdriver
3) Digital multimeter 4) Electric iron
5) M3 sleeve 6) Pipe clamp
7) Slanting clamp 8) 20M oscillograph

3. External Introduction

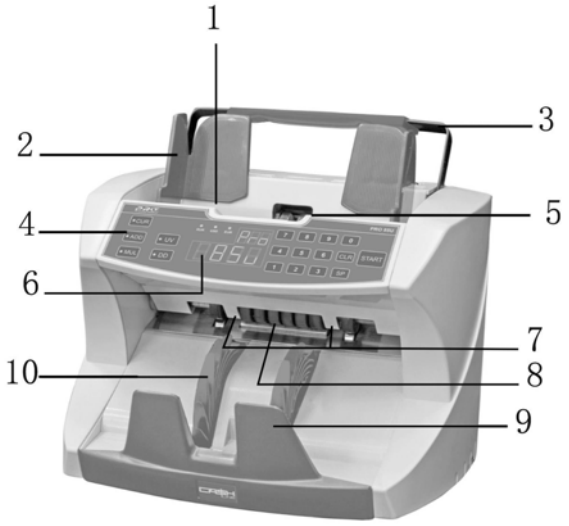


Fig 1

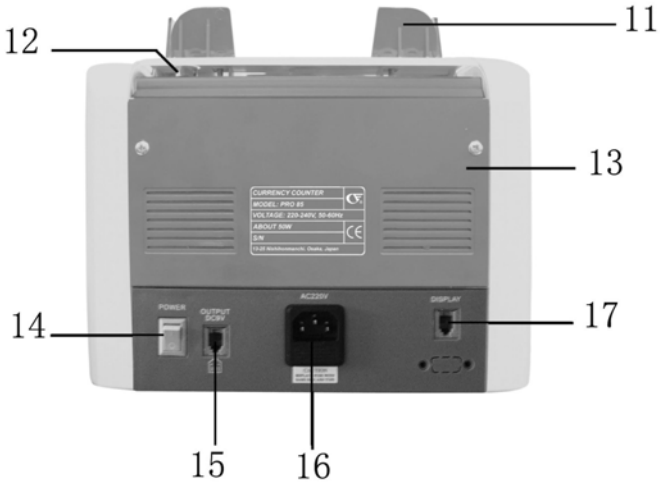


Fig 2

1.Hopper

2. Auxiliary Hopper Plate

3. Retractable Handle

4. Control Panel

5. Hopper Sensor

6. Display

7. Counting Sensor

8.Magnetic Sensor

9.Stacker

10. Stacker Vane

11. Auxiliary Hopper Plate

12.Adjustable Screw

13. Rear Cover

14. Power Switch

15. External Display Socket

16. Power Socket (with fuse)

17. External Display Socket

4. Unitary Introduction

This machine is a perfect mechanic and electric integrated unity, which consists of two parts the engine and the electric. The whole machine that has banknote loading system, feeding system and receiving system is composed by its frame, its banknote-loading part and its banknote-feeding part. The electric part is mainly included various kinds of sensors, signal manager-circuit, mini-SCM, power and motor system. The signal from the sensor that sent to the CPU after modifying by the relevant circuits will analyze the signal according to its internal process to control the banknote counter's running or stopping or result-displaying so as to realize automation and intelligent.

4.1 Technical Specification

1)	Ambient Temperature	0~40^{0}C
2)	Ambient Humidity	30~80%
3)	Counting Speed	1200 sheets/min
4)	Power	AC110V±10% 60Hz or AC 220V±10% 50Hz
5)	Working Consumption	≤60W
6)	Stand-by Consumption	≤18W
7)	Banknote Feeding System	Roller Friction System
8)	Size Scope of Countable Banknote	115 × 50 ~ 175 × 85 (mm)
9)	Thickness Scope of Countable Banknote	0.06 ~ 0.12 (mm)
10)	Counting Speed	900 ~ 1500 sheets/min
11)	Hopper & Stacker Capacity	200 sheets for Old Banknote 300 sheets for New Banknote
12)	Counting Number Display Batch Number Display	4 Digits LED 3 Digits LED
13)	Unit Size	248mm (L)× 270mm (W)× 245mm (H)
14)	N.W.	6.8Kgs

4.2 Note-separating and loading theory

The note-separating and loading system that works by the magnitude of friction-force includes feeding part and dividing part, which are the keys to the banknote counting accuracy.

Banknotes' feeding works through the mechanical running system, the 1/3 circle feeding-gear of the feeding-wheel produces the intermittence impelling force to the Banknotes.

The Banknotes' separating is a process of dividing a pile of Banknotes into single sheets. This process can be completed by the integrated work of the loading-wheel, the friction-wheel and the one-way-resistance-wheel. The frictional pulling strength produced by the 1/3 circle loading-gear of the loading-wheel on the Banknote is synchronous with the pushing strength produced by the feeding-wheel. The one-way-resistance-wheel and Banknote-loading-wheel composed the feeding gap that allows only one banknote to be passed. While the machine is running, the intermittence impelling force produced by the feeding-wheel and the loading-wheel will work together with the resistance of one-way-resistance-wheel to put the nethermost banknote into the machine. The main effect of the friction-wheel is to enhance the loading thrust.

4.3 Note transmitting system

The transmission system mainly contains the banknote convection part and the banknote acceptance part.

After dividing the Banknotes into single sheet and passing the one-way-resistance- wheel, there is a pair of rear-banknote-pressing wheels which press the Banknote to run together with the friction-wheel to accelerate the

speed. Meanwhile, the banknotes are transported into the gap between the upper and the downward wheels, and the direction of the banknotes is changed.

As the size of Banknote-loading bearing differs from the upper wheel bearing, their running speeds are different from each other. Since the Speed of upper wheel is faster than the loading wheel, the Banknote that sent to the upper and downward wheels will speed up the running speed. Then, the distance between the former and latter Banknotes will be kept to the maximum of 30 mm, so that the sensors' inspection and the signals' management can be conducted easily.

The banknotes' acceptance procedure is conducted by the receiving wheel and the Banknote-catch plate. The receiving wheels that are two turning-wheels with 16 vanes run at a low speed along with the machine's operation. The Banknote-catch plate locates at the back of the receiving wheels. The Banknotes that passed the upper and the lower feeding-wheels at a high speed are sent to the banknote receiving vanes with a low running speed. When the banknotes fall onto the catch plate, they will be stacked orderly.

4.4 Sensors & signal detection

There are six groups of sensors in PRO-85 series machine, among which three are Inspection Sensors, two are Controlling Sensors, and one is Measuring Sensor.

Inspection Sensors contains two groups of Infrared Counting Sensors that are installed at the two sides of the upper & downward feeding wheels for inspecting the quantity and quality. One group of UV sensors is installed in the middle of the upward counting-sensor bracket for inspecting the reflection of the banknote. A magnetic sensor which is installed in the middle of the down counting sensor bracket for inspecting the magnetic ink of the banknotes. A couple of measuring sensors are installed at the left side of the upper feeding wheel bearing for measuring the width of the Banknote.

Controlling sensors include banknote feeding controlling sensors and receiving controlling sensors. The first one is a group of reflect infrared photo electricity parts, installed on note sliding plate. The receiving sensors are a group of face to face reflects infrared photo electricity parts, installed in the middle of hopper plate (Seeing Fig.1).

It has three groups of magnetic sensor in PRO –85UM,which installs in the two sides of each group of counting sensor. (Seeing Fig.1) While there has one group of magnetic sensor in PRO-85UM/S, which installs in the middle of two groups counting sensor..(Seeing Fig.1)

4.5 CPU's signal treatment & unitary control

Signals detected by groups of sensors and disposed by relevant circuit are sent to CPU. CPU analyzes and deals with the sensor signals under the internal preprogram procedure, then control the machine and display relevant content after analyzing the result and operational requirements.

Banknote Counter controlled by CPU operates according to the preprogrammed procedure. So, the operation of the machine must be strictly accorded to requirements of the operation manual and this manual.

4.6 Power supply and motor system

The power supply is a device that transforms 110V AC into DC power for any usage of the counter.

(1) The DC voltage for every part of the Counter in PRO85, PRO85U includes –5, +5V, +9V, +32V.

(2) The DC voltage for every part of the Counter in PRO85UM, PRO85UM/S includes –5V, +14V, +24V, +32V.

The +5V supply is for the CPU and relevant circuit, +9V for the small motors, +32V for the main motor, ±5V ,

+24V for the magnetic inspection circuit.

The motor system of the counter is provided by the 220v AC motor (big motor) and DC speed-down motor (small motor). The small motor supplies power to the receiving wheel, while the big motor supplies power to all others.

5. Operation and Maintenance

5.1 Functions

- START : Start the machine again after having been given an alarm for stop; affirm or quit the parameter set and detecting states.
- CLR : Clear the number in the counting number display.
- ADD : Cumulate the total counting number and you can preset the parameter
- SP : Select one of the three speeds to turn the unit and the speed is 900/1200/1500 level.
- DD : Press the button with the indicator; it can detect the width of banknotes. When pressing it all the time, there will display width level code ”dd” after three or five seconds, you can press number button “4-9” to choose the width level, then pressing the “ START “ with the confirmation to finish the setting of width level.
- MUL :The machine will not start working unless the operator press “ START “button again when it enters manual operation state.
- UV :Press this key to turn on or off the UV detecting function.(for UV or UV/MG model),which detects all kinds of the banknotes. When pressing this button all the time, it will display UV level code ”EU” after three to five seconds, you can press number button”1-9” to choose the different level, then press the button” START ’ to finish the UV level setting.
- MG : Press this key to turn on or off the MG detecting function. (for PRO85UM or PRO85UM/S model), which detects banknote with magnetic ink. When pressing this button all the time, it will display MG level code ”EN” after three to five seconds, you can press number button”1-9” to choose the different level, then press the button” START ” to finish the MG level setting.
- CUR : Press this key when detecting the banknote of different currencies (RUR, USD, EURO). The machine could transform the optical density self-motion for the detecting with the indicator.

5.2 Function Buttons

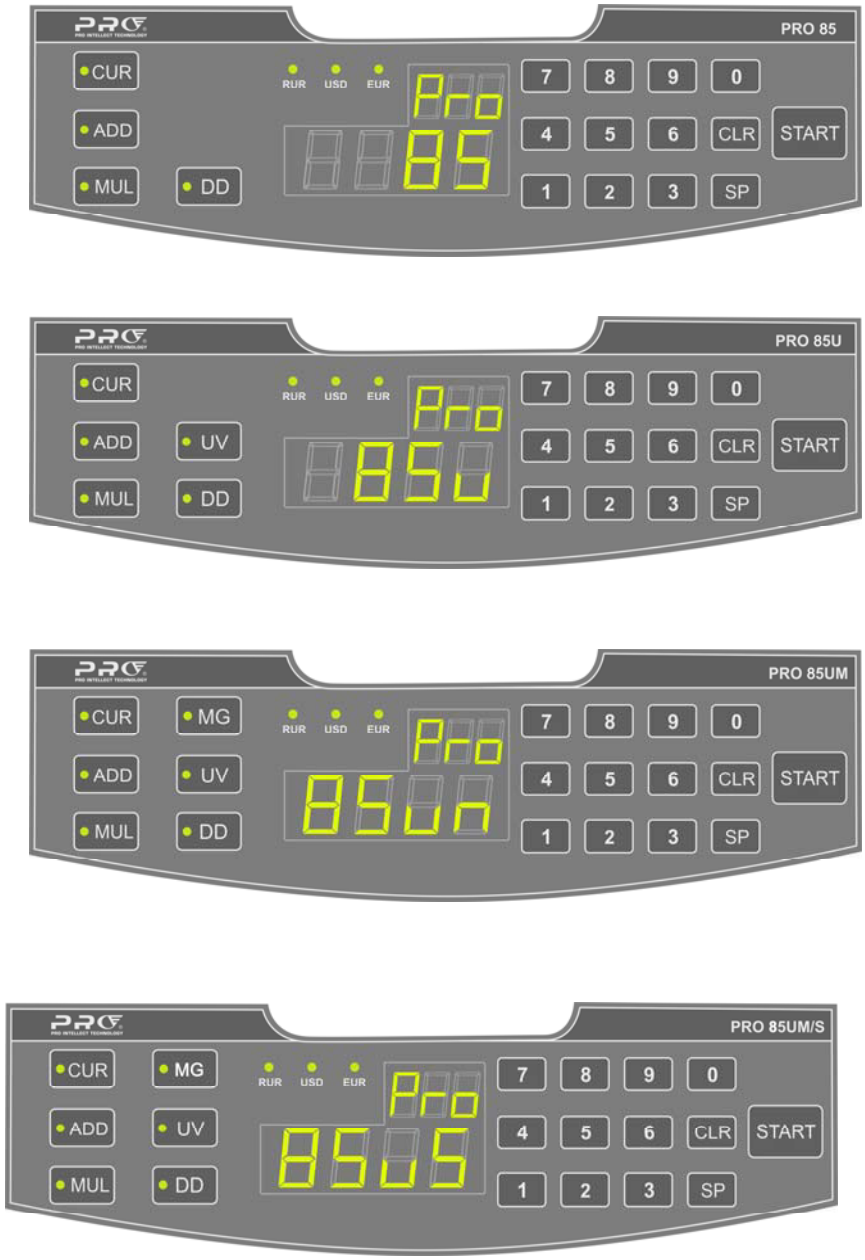


Fig. 3 Control display diagram

5.3 The Adjustment

5.3.1 Testing Methods for the Parameter Detecting of sensors

The machine can test the detecting parameter of the sensors by the combined function keys through the following operation. Press the ADD and SP button together at the same time, and then press the power switch, do not release the buttons until the counting number display showing “TEST”. At this time, loosing the button, the machine is on the testing state and you can choose relevant testing parameter.

a) Ultraviolet sensor detecting parameter testing (for PRO85U, PRO85UM, PRO85UM/S model)

Press the UV button, the counting number display will show “ Uu ”, press UV button again, the batch number display will show “ on ” or “ oFF”. “ on” means open the testing function, “ oFF” means close the testing function. When it is showing “ on ” with “UV” indicator on, press the button to confirm of entering into the testing state for ultraviolet sensor detection. When you put the banknote into the machine to start

testing, the single and ten digits of counting number display will show the width detecting parameter. The hundred and thousand digits will show the confirmed standard width value after modifying the slanting passing rate, the batch number display will show the ultraviolet sensor parameter value after having tested ultraviolet reaction of the banknotes. If the value is bigger, the UV reaction will be stronger and normally the value is 0.

b) Magnetic sensor detecting parameter testing (for PRO85UM, PRO85UM/S model)

Press the MG button, the counting number display will show "MG", and the batch number display will show " ON " or "OFF". "ON" means open the testing function, "OFF" means close the testing function. When it shows "ON" with "MG" indicator on, at this time press " START " to confirm that the machine has entered into the testing state of the Magnetic state. When you put the banknote into the machine to detect, the counting number display shows "0", the batch number display will show the parameter value detected by the MG sensor. If the value is bigger, the MG reaction of the banknote will become more tension. Normally the parameter value of counterfeit banknote is 0. If the detecting banknote which has been confirmed has no MG ink, but the batch number display is not 0, it may the MG sensor was disturbed or having problems on the MG circuit.

5.3.2 Ultraviolet Detecting (for PRO85U, PRO85UM, PRO85 UM/S model)

Switch on the machine and pre-head for 2 minutes, pressing UV and MUL function, and then use some pieces of paper to cover the hopper sensor and observe the shining light of the Ultraviolet LED. Then, we slide one piece of ultraviolet-detecting paper (a piece of paper without ultraviolet reaction) through the exit and put it under the ultraviolet sensor, please use the digital multimeter (DC level, 20V) for the detection.

(1) For PRO85U model (Old Main board BJ-21-MB)

To detect the 7Pin voltage of $U_{6,}$ if you adjust P7 clockwise, the voltage u6 of 7pin will be increased, however if you adjust it anticlockwise, the voltage will be reduced. When the ultraviolet sensitivity sets at low-level position, if there is a false judgment, you should adjust P7 anticlockwise，which will make the voltage 7pin lower in 1.6.V; while the ultraviolet sensitivity sets at high-level position, if there is a leak judgment on the counterfeit; you should adjust P7 clockwise, which will make the voltage 7pin higher in 1.6.V,

(2) For PRO85U model (New Main board BJ-21-EUR02)

To detect the 7Pin voltage of $U_{6,}$ if you adjust P7 clockwise, the voltage u6 of 7pin will be increased, however if you adjust it anticlockwise, the voltage will be reduced. When the ultraviolet sensitivity sets at low-level position, if there is a false judgment, you should adjust P7 anticlockwise, which will make the voltage 7pin lower in 1.6V, while the ultraviolet sensitivity sets at high-level position, if there is a leak judgment on the counterfeit, you should adjust P7 clockwise, which will make the voltage 7pin higher in 1.6V.

(3) For PRO85UM, PRO85UM/S model (Main board BJ-21DC-MB2)

To detect the 7Pin voltage of $U_{7,}$ if you adjust P4 anticlockwise, the voltage U7 of 7pin will be increased, however if you adjust it clockwise, the voltage U7 of 7pin will be reduced. When the ultraviolet sensitivity sets at low-level position, if there is a false judgment, you should adjust P4 clockwise, which will make the voltage 7pin lower in 1.6V; while the ultraviolet sensitivity sets at high-level position, if there is a leak judgment on the counterfeit, you should adjust P4 anticlockwise, which will make the voltage 7pin higher in 1.6V.

5.3.3 Magnetic Detecting Adjustment (For PRO85UM, PRO85UM/S model)

The Magnetic Sensor adopts the friction magnetic sensor; it is installed in the middle of the support for downward wheel on which there is a magnetic-pressing wheel turning with the upper Banknote-feeding wheel. The banknote, which was pressed by the magnetic-pressing wheel, passes from the surface of the magnetic sensor. In order to read out the magnetic signals accurately, the gap between the magnetic-pressing wheel and magnetic sensor that must be 0.2mm,which is equal to the thickness of two-sheet banknotes, as if the gap is too small the magnetic-pressing wheel will disturb the signal reading of the magnetic sensor readable signal. If too big, it will affect the touch between the magnetic sensor and banknotes to lose the magnetic signal, which will cause the

wrong judgment. So you can adjust the height of the magnetic head support to make the gap be suitable.

5.3.4 Double Detecting Adjustment (For PRO85, PRO85U, PRO85UM, PRO85UM/S model)

Double signal is sent by Infrared emitting sensor and Infrared receiving sensor, because of the different thickness of banknotes, the signal received from infrared receiving tube will change when detecting the banknotes, after magnifying and processing the signal, which will occur the different voltage to judge.

(1) The adjustment for PRO85, PRO85U model (The adjustment of Old Main board BJ-21-MB and Main board BJ-21-EUR02 is similar.)

When turning on the machine, pressing the MUL function and using the banknotes to ward off the hopper sensor, use the testing paper to cover between the Infrared emitting sensor and Infrared receiving sensor, then use a multimeter to detect the 1Pin and 7Pin of U14 voltage, if occurring the double error alarming when counting the banknote, you can adjust P8 and P9 to make the 1Pin and 7Pin of U14 voltage increase. If it will not occur the double error alarming, please adjust the voltage of P8 and P9 lower. After these operations, the voltage of 1Pin and 7Pin in U4 must be equal.

(2) The adjustment for PRO85UM, PRO85UM/S model (Main board BJ-21DC-MB2)

When turning on the machine, pressing the MUL function and using the banknotes to ward off the hopper sensor, use the testing paper to cover between the Infrared emitting sensor and Infrared receiving sensor, then use a multimeter to detect the 1Pin and 7Pin in U2 voltage, if occurring the double error alarming when counting the banknote, you can adjust P1 and P2 to make the 1Pin and 7Pin in U2 voltage increase. If it will not occur the double error alarming, please adjust the voltage of P8 and P9 lower. After these operations, the voltage of 1Pin and 7Pin in U4 must be equal.

5.3.5 Inspection for Connection-port of Main Controlling Circuit Board

(1) PRO85, PRO85U (Old Main board BJ-21-MB)

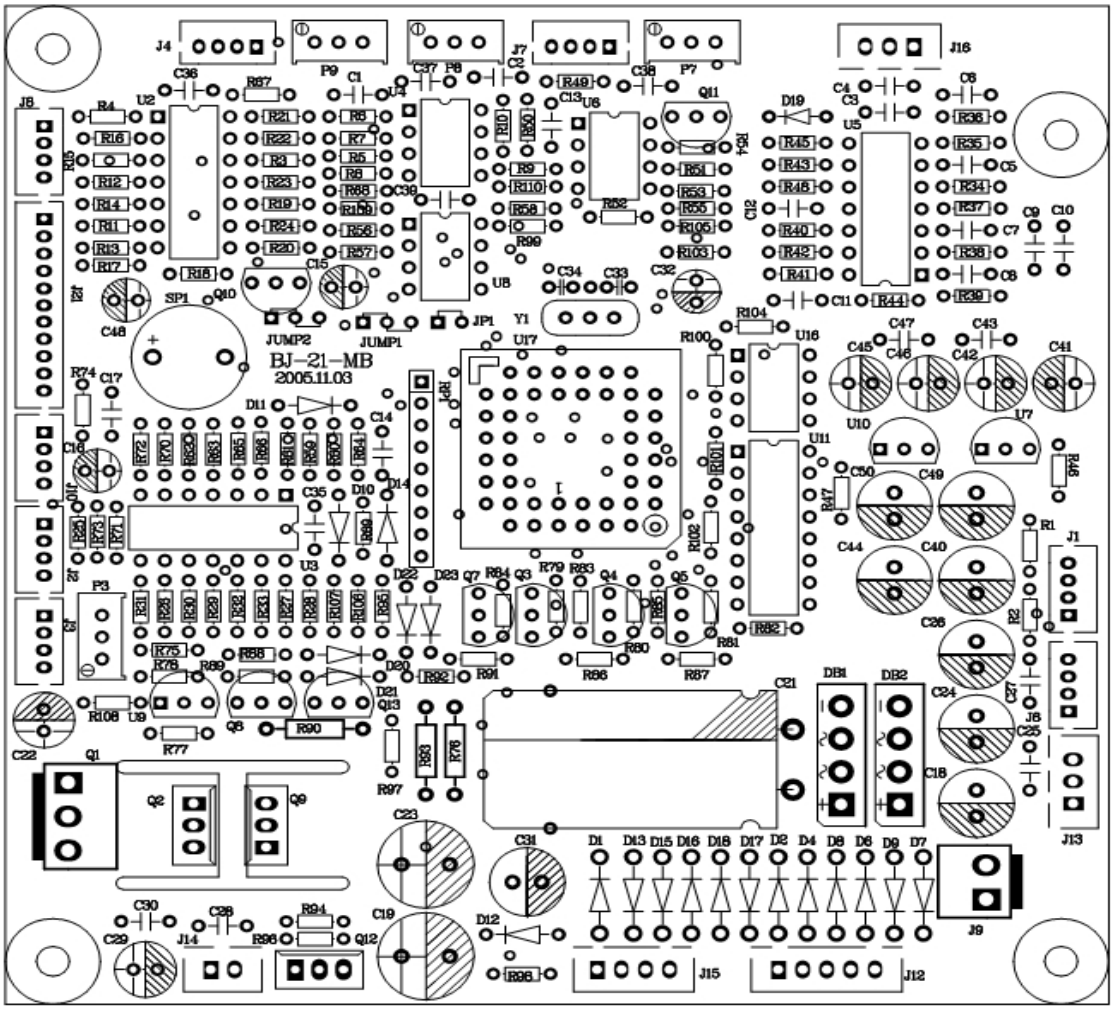


Fig.4 The Old Main Controlling Circuit Board Diagram(BJ-21-MB)

- J1: Port for Infrared counting sensor. The voltage of 1Pin and 3Pin is usually around 1.90V. (When the banknote are in the hopper with operating the machine.)

- J2: Port for width sensor. When the machine is operating，the 3Pin voltage will be outputted in pulse.
- J3: Port for stacker sensor. If there is Banknote on the stacker, 2Pin is below 0.5V, if no Banknote on the stacker, the voltage will be above 2V.
- J4: Port for hopper sensor. The 2Pin is +5V, if there is Banknote on the stacker, 4Pin is above 2.2 V, while if there is no Banknote on the stacker, the voltage will be below 0.1V.
- J6: Port for outer display.
- J7: Port for ultraviolet sensor. When the UV function is on and there are banknotes on the hopper, the electrical level of 1Pin should be above 3.5V.
- J8: Port for the Counting Sensor (Infrared acceptance sensor). 2Pin and 5Pin are 5V, if there is no banknote ward off the sensor, the 1Pin and 6 Pin are above 4.5V, but if there is banknote warding off the sensor, they would be below 1 V (when the banknote is on the hopper).
- J9: AC input port for the main motor before rectifying and voltage stabilizing. AC30V.
- J10: Port for main board and display panel. The voltage of 1Pin is +5V.
- J12: AC input port for the transformer after transformation. AC voltage of 1Pin and 2Pin, or 2Pin and 3Pin is 9.5V, while the 4Pin and 5Pin is 14.5V.
- J13: Port for L7805 manostat. The voltage of 3Pin should be above 8.5V, while the voltage of 1Pin should be at stable +5V.
- J14: Port for small motor. The Voltage of 2Pin should be +9V while the voltage of 1Pin should be less than 1V when the small motor is working.
- J15: Port for main motor. The voltage of 1.2Pin and 3.4Pin should be +20V.(As the different speed level, the voltage will be different.)
- J16: Port for magnetic sensor

(2) PRO85, PRO85U (New Main board BJ-21-EUR02)

Fig.5 The Main Controlling circuit Board Diagram

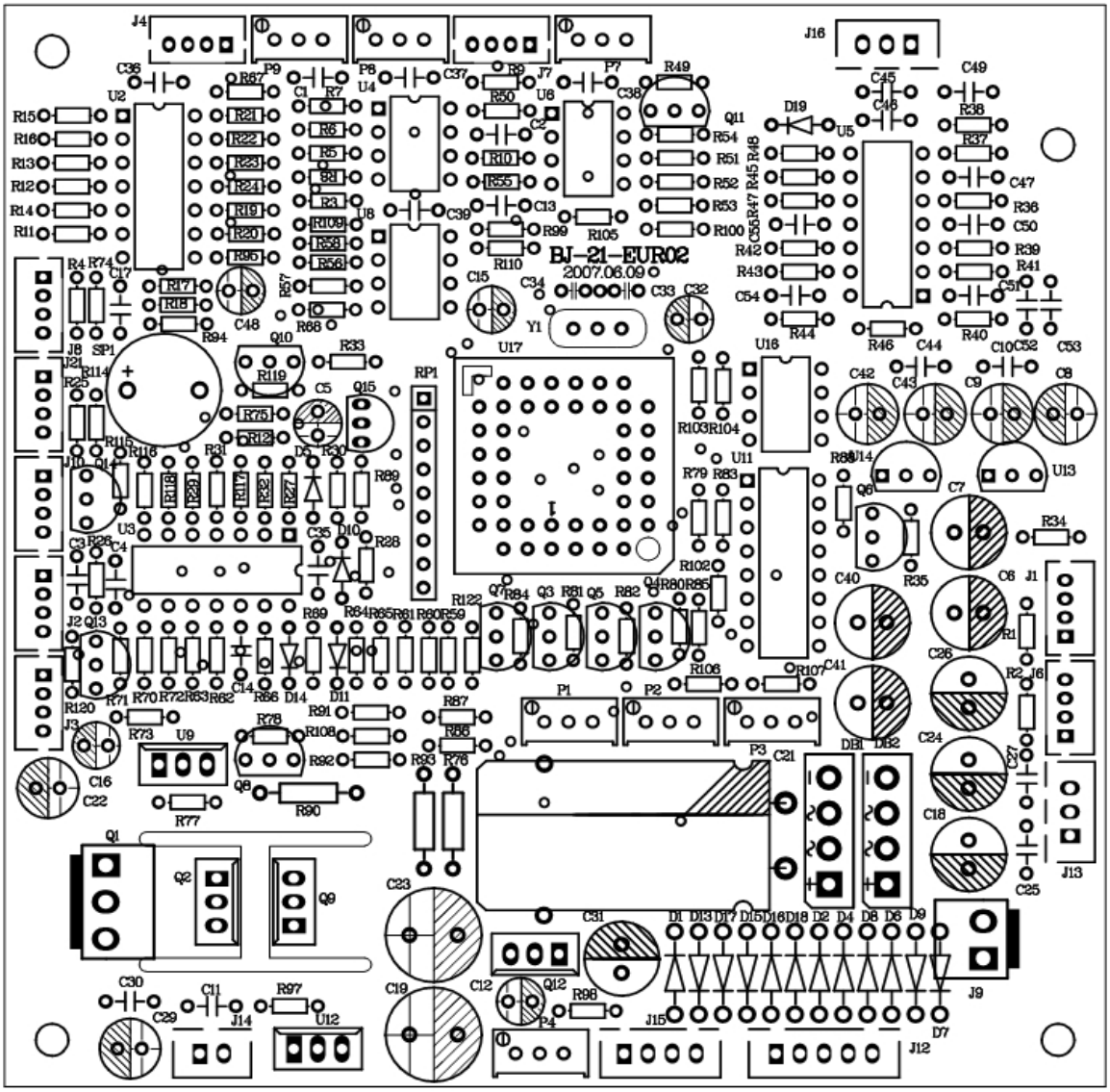


Fig.5 The New Main Controlling Circuit Board Diagram(BJ-21-EUR02)

- J1: Port for Infrared counting sensor. The voltage of 1Pin and 3Pin is usually around 1.90V. (When the banknote are in the hopper with operating the machine.)
- J2: Port for width sensor. When the machine is operating，the 3Pin voltage will be outputted in pulse.

- J3: Port for stacker sensor. If there is Banknote on the stacker, 2Pin is below 0.5V, if no Banknote on the stacker, the voltage will be above 2V.
- J4: Port for hopper sensor. The 2Pin is +5V, if there is Banknote on the stacker, 4Pin is above 2.2 V, while if there is no Banknote on the stacker, the voltage will be below 0.1V.
- J6: Port for outer display.
- J7: Port for ultraviolet sensor. When the UV function is on and there are banknotes on the hopper, the electrical level of 1Pin should be above 3.5V.
- J8: Port for the Counting Sensor (Infrared acceptance sensor). 2Pin and 5Pin are 5V, if there is no banknote ward off the sensor, the 1Pin and 6 Pin are above 4.5V, but if there is banknote warding off the sensor, they would be below 1 V (when the banknote is on the hopper).
- J9: AC input port for the main motor before rectifying and voltage stabilizing. AC30V.
- J10: Port for main board and display panel. The voltage of 1Pin is +5V.
- J12: AC input port for the transformer after transformation. AC voltage of 1Pin and 2Pin, or 2Pin and 3Pin is 9.5V, while the 4Pin and 5Pin is 14.5V.
- J13: Port for L7805 manostat. The voltage of 3Pin should be above 8.5V, while the voltage of 1Pin should be at stable +5V.
- J14: Port for small motor. The Voltage of 2Pin should be +9V while the voltage of 1Pin should be less than 1V when the small motor is working.
- J15: Port for main motor. The voltage of 1.2Pin and 3.4Pin should be +20V.(As the different speed level, the voltage will be different.)
- J16: Port for magnetic sensor.

(2) PRO85UM, PROUM/S MODEL (Main board BJ-21DC-MB2)

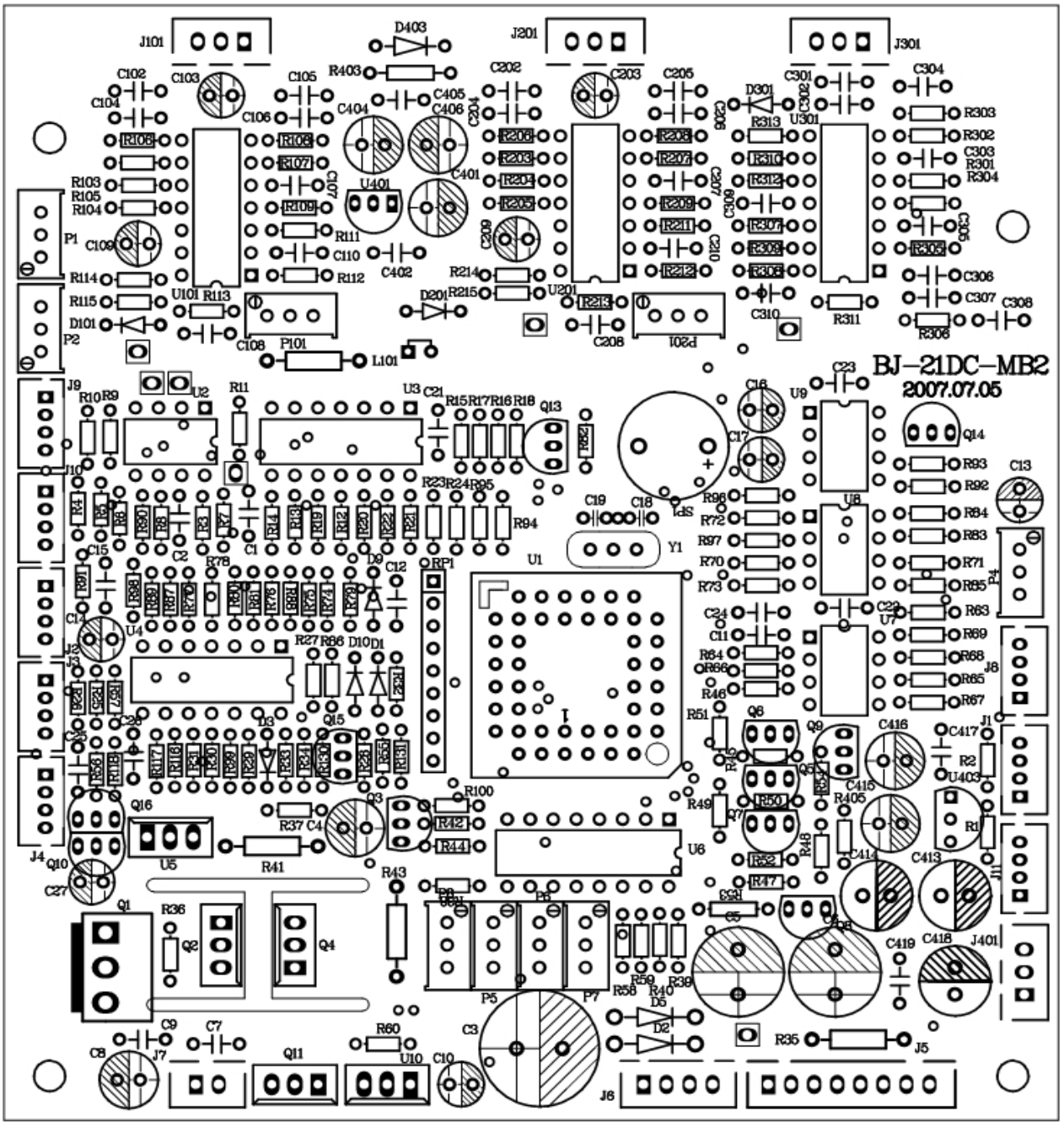


Fig.5 The Main Controlling Circuit Board Diagram (BJ-21DC-MB2)

- J1: Port for Infrared counting sensor. The voltage of 1Pin and 3Pin is usually around 1.90V. (When the banknote are in the hopper with operating the machine.)
- J2: Port for Counting Sensor (Infrared acceptance sensor). The 2Pin and is 3Pin +5V, if there is no Banknote on the stacker, 1Pin and 4Pin is above 4.5 V, while if with Banknote on the stacker, the voltage will be below 1V. (When banknote are in the hopper with detecting)
- J3: Port for width sensor. When the machine is operating，the 3Pin voltage will be outputted in pulse.
- J4: Port for stacker sensor. The 2Pin is below +5V, if there is no Banknote on the stacker, it will be above 2V.
- J5: AC input port for switch power and main board voltage. 1Pin is +5V, 3Pin is +14V, 4Pin is +24V, 7Pin, 8Pin is +5V,
- J6: Port for main motor. The voltage of 1.2Pin and 3.4Pin should be +20V with the operating motor. (As the different speed level, the voltage will be different.)
- J7: Port for small motor. The Voltage of 2Pin should be +9V while the voltage of 1Pin should be less than 1V when the small motor is working.
- J8: Port for ultraviolet sensor. When the UV function is on and there are banknotes on the hopper, the electrical level of 1Pin should be above 3.5V.
- J9: Port for hopper sensor. The 2Pin is +5V, if there is Banknote on the stacker, 4Pin is above 2.2 V, while if there is no Banknote on the stacker, the voltage will be below 1V.
- J10: Port for main board and display panel. The voltage of 1Pin is +5V.
- J11: Port for outer display.
- J401: Port for L7805 manostat. The voltage of 3Pin should be above 8.5V, while the voltage of 1Pin should be on stable +5V.
- J101: Port for the left RUR magnetic sensor.
- J201: Port for the right RUR magnetic sensor.
- J301: Port for USD and EURO signal magnetic sensor.

5.4 Stop display & problem solving

1) If the following codes appear during self-checking, do check the relevant sensors whether there is dust on their surface or their positions moved or not, and make sure the circuits are well.

- E1 : Right Counting Sensor and circuit.
- E2 : Left Counting Sensor and circuit.
- E3 : Magnetic Sensor and circuit.
- E4 : Ultraviolet Sensor and circuit.
- E5 : Hopper Sensors and circuit .
- E6 : Stacker Sensors and circuit .

After above codes appeared, you should repair the machine according to the above instructions.

2) Codes of abnormal stopping and the meaning

- EU : Ultraviolet detection suspect alarm
- En : Magnetic detection suspect alarm
- EC : Chain detection suspect alarm
- Eh : Half detection suspect alarm
- EJ : Banknote jammed alarm
- Ed : Double detecting alarm
- dd : Width detecting alarm

3)After the machine stopped with alarm, you should not press START to restart the machine again. The first

banknote on the stacker is a suspect one which won't be counted in the counting number. If it stopped with alarm because of abnormal Banknote (half、chain), you should take away the banknotes on the stacker , press the to clear the detection code and counting value , then the machine will start-up to count from " 0 " again.

6. Disassembly Process

This chapter mainly states the disassemble procedure of the complete machine and the main parts. The assemble procedure is just the reverse of the disassemble procedure. Before disassemble the machine, please make sure the power is off. And about the installation requirement and adjusting method, please refer to the next 2 chapter.

1) Tear down eight **M4x 8** fix-screws of the left and right cover (there are 2 on the bottom of each side while 1 on the back) ,then take down the left and right cover.

2) Tear down two M**4x8** fix-screws of the upper cover, and then take it down.

3) Pull out the connection plugs of main controlling board and tear down four pieces of nylon fastener on the circuitry board, then get down the main controlling board.

4) Tear down four **M3x 8** fix- screws at the two sides of the controlling panel assembly, and then take it down.

5) Tear down the clip-spring at the right side of the Banknote-feeding wheel and Hopper wheel with the cross screwdriver , pull out the cord of the Counting Sensor ,and tear down four **M3×8** fixed-screws at the two sides of the upper Counting Sensor bracket, take down the Counting Sensor bracket.

6) Loosen two M**4 x 8** fixed-screws of the Banknote-catch Plate, get out the Banknote-catch Plate and Cover for the Banknote-accept wheel.

7) Tear down the fix-screws at the bottom of Rear Cover, weld off the connecting wire of the power switch and the plug, get out the Rear Cover assembly.

8) Tear down three **M4×8** fix- screws of the Banknote-accept wheel Bracket , and then take out the assembly.

9) Tear down two **M4×16** fix- screws of the Resistance-wheel Bracket (behind the Resistance-wheel Bracket),get out the Banknote-accept Bracket assembly.

10) Loosen the fix-screw for pressing piece of adjusting. Use a Cross screwdriver to get out the clip-spring at the two ends of the Adjusting axle, get out the axle-cover and get it out.

11) Firstly tear down the Synchronized belt of the Hopper Wheel and the Banknote-feeding Wheel axle, then get out the clip-spring of the driving gear with Cross screwdriver , get out the driving gear. After get out the clip-spring then get out the Bearing, so you can get out the Hopper Wheel and Banknote-feeding Wheel assembly.

12) Tear down fix- screws of the Disk, get out the Disk , and get out the clip-spring of the driving gear with cross screwdriver, and get out the driving gear .Tear down the clip-spring at two sides of the Upper Wheel axle and get out the Upper Wheel assembly.

13) Tear down four **M3×8** fix-screws of the downward Counting Sensor bracket , get out the downward Counting Sensor assembly.

14) Tear down four **M4×8** fix-screws of downward Hopper wheel bracket on the left and right side-board, get

out downward Hopper wheel bracket assembly.

15) Tear down four **M3×12** fix-screws of the big motor, get out the big motor.

16) Tear down four **M4×10** fix-screws of the Transformer and **M4** nuts, get out the Transformer.

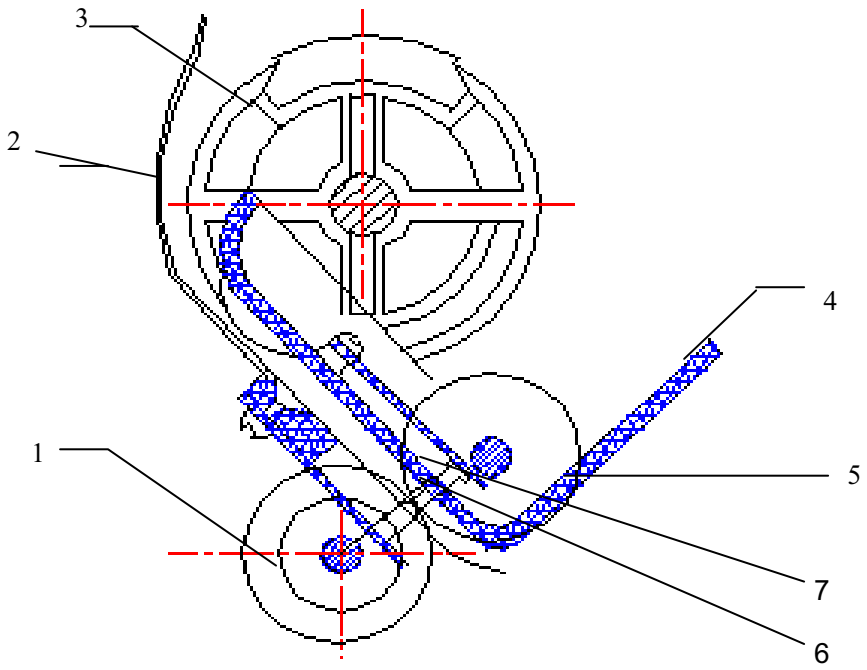
17) Loosen those fix- screws of the rest parts, get down the rest parts.

7. Installation Requirements and Adjustments of main assembly

7.1 Counting-sensor Installation & downward Wheel Inspection

a) The task of Downward Wheel is pressing the Banknote tightly and then driving the Banknotes pass each sensor at a constant speed. If the Downward Wheel pressing the Banknotes too tight, it will increase the difficulty of the driving and affect the machine's working, but if the pressure is too small, it will cause the Banknotes glide on the surface of the wheel and influence the parameter of the sensors. Therefore it is required that the pressure of the Downward wheel should be suitable. The left and right pressing -wheel pressure should be equal and turn flexibly.

b) The effect of the Counting Sensor is to detect the difference of the infrared light when the banknote passing in order to check the banknote feature. As the installation of the sensor will influence the parameter detecting, so the output voltage of the Counting Sensor Receiving Tube should be above 4.5V.



1. Downward Wheel
2. Downward Wheel Bracket
3. Banknote-feeding Wheel
4. Upper Wheel Bracket
5. Upper Wheel
6. Counting Sensor Launching Tube
7. Counting Sensor Receiving Tube

Fig.6

7.2 Installation and Adjustment of Banknote- Separating System

1) The task of the Note-Separating System is to separate one pile of Banknotes into single sheets and send them into the machine. It finished by a interim pull-push power which was produced by the turning of the

Hopper Wheel and Feeding Wheel, and a reversed resistance which was produced by the Resistance Wheel.

2) During this course, the side-gaps "**h**""**h1**" between the Feeding Wheels and the Resistance Wheels will influence the friction impetus. Therefore it requires **h=h1** during the adjusting course, the other side also the same. And the gaps "**G**" and "**G1**" between the Feeding Wheels and the Resistance Wheels will influence the resistance of separation, if "**G**" is unequal to "**G1**", it will cause the Banknote slanting or broken. Therefore the gaps of the smooth parts of the left and right Feeding-wheels and the separating –wheel should be equal i.e. **G=G 1.**

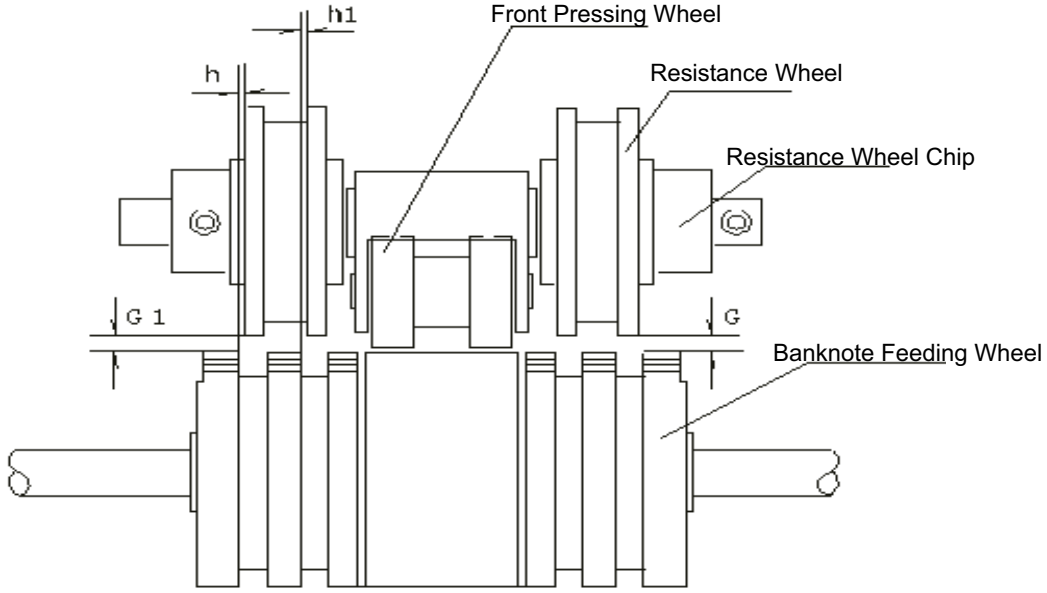


Fig.7

Installation and Adjustment Methods：

1) Gasket Adjustment：

Loosen the adjusting gasket fix-screw, adjust the thickness-adjusting knob to make the gasket on the horizontal position, and then turn the Resistance Wheel Bracket to make the banknote feeding entrance just for one sheet passing, and fix the adjusting gasket fix-screw. In this way, the adjustable screw cap is just in the adjusting hole of the Upper Cover.

2) The Side-gap Between Resistance wheel and Friction Wheel Adjustment:

Loosen the fix-bolt of the Resistance Wheel, turning the Resistance Wheel left and right to make the Gear-circle part of the Feeding-wheel be equal to the side-gap of the Resistance Wheel (**h=h1**), then fix tightly again.

3) The Gap of the Left & right banknote feeding entrance should be equal.

Turning the feeding thickness-adjusting knob to make the banknote feeding entrance just for one sheet passing, test the left and right gaps, and adjust the bolt above the fixed–bracket according to the testing result (normally adjusting clockwise to enlarge gap to balance the gap at the other side) to reach the installation requirement (**A=A**，) . Special skills are required for the above operation. So times of adjusting practices are needed.

7.3 Synchronized belt installation

1) The task of the Hopper Wheel is to supply a auxiliary friction pull for the separating system and to make the Banknote enter into the separating system orderly. It was realized by the gear ring of the hopper wheel.
2) If the thrust of the Hopper Wheel happens in advance, the Banknotes cannot be separated well and chain Banknotes will be caused easily. While if the thrust delay, the Banknote cannot enter into the machine smoothly. So the position of the Gear ring of t Hopper Wheel has is a key to adjust the friction thrust.

Adjusting Method：

Turning the Hopper Wheel following the Banknote-enter direction until the platform in front of the gear ring of the hopper wheel is paralleled with the Hopper. The distance between the gear ring of the feeding wheel and the point between Resistance Wheel and Feeding Wheel should be 3~5mm. By adjusting position of the driving gear and the synchronized belt, the above requirements can be reached.

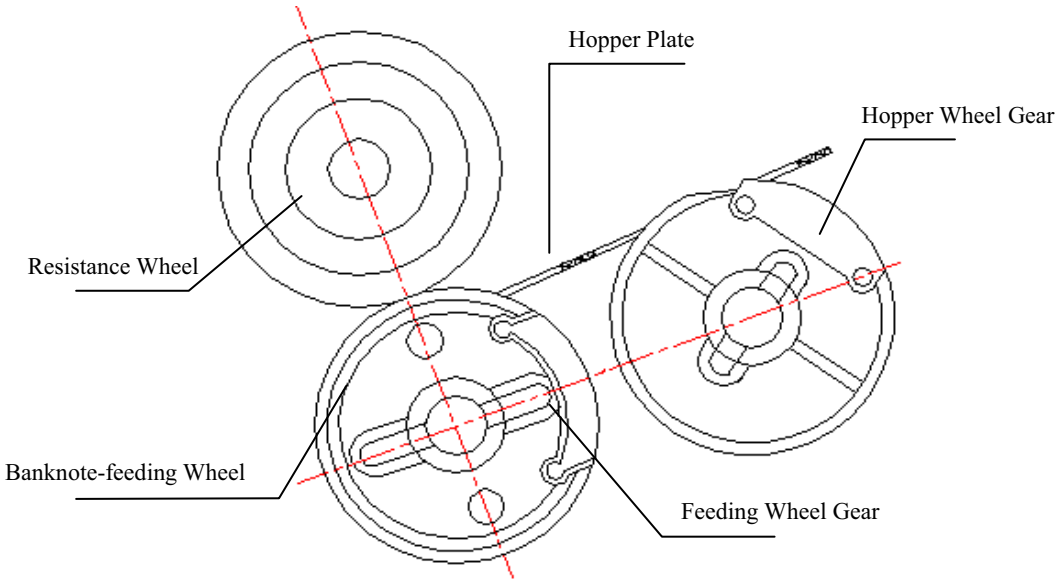


Fig.8

7.4 Locating of the feeding gap adjusting knob.

The function of the fix-screw of the feeding gap is to make sure the position of the feeding gap and the adjustable range of knob. When the machine needs to be reset again or has been used for a certain time and the parts have wore and tore, the adjusting range of the knob would be changed, therefore it need to be adjust again.

Adjustment Method ：Firstly, fasten the fixed screw of the adjusting knob. Adjust the gap of the banknote-entrance until feeling that there is obvious resistance when a piece of Banknote passing, then loosen the fix-screw and site the small point of the knob on the most top. After that, fix the screw again.After installed the Upper Cover, it needs some adjustment if the position has changed.

7.5 Upper &Down Counting Sensor Bracket Installation and Adjustment

The Downward Counting-sensor bracket is the fixed- bracket of the Counting-sensor (Infrared Launching Tube). When installing, pay attention to the front and back position. The fixed hole on the rear support stick of the Downward Counting-sensor bracket I is oval, you should push the Downward Counting-sensor bracket forward and fix it, so that the infrared-accepting sensor point at it. The Upper Counting-sensor bracket is the fixed- bracket of the Counting Sensor (Infrared Accepting Sensor), which is fixed by 4 screws. When installing, pay attention to prevent the Upper Counting-sensor and Connection-lines touching the Upper Wheel axle.

8.Electronic System Adjustment

The electronic system consist of power system、sensor detecting system、signal management、displaying and operation system and CPU information management system, their relationships as shown as Fig.9.

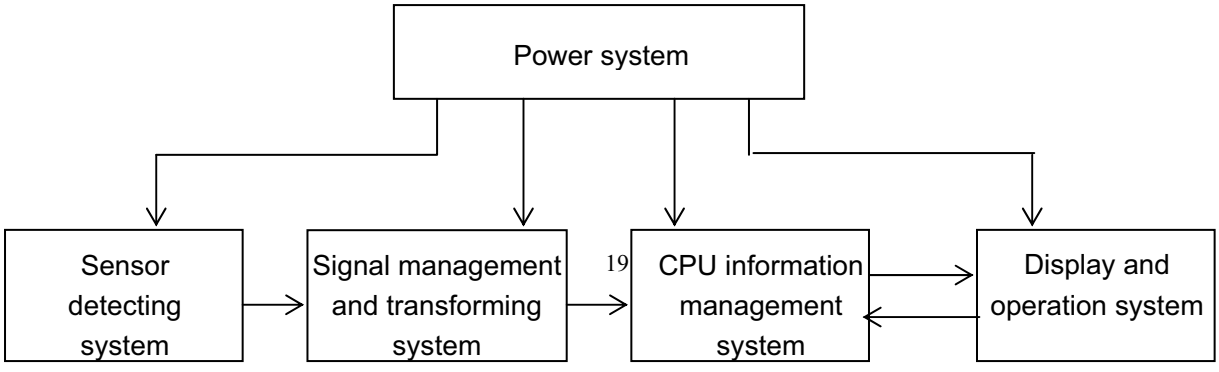


Fig. 9 the discompose diagram of the electronic system

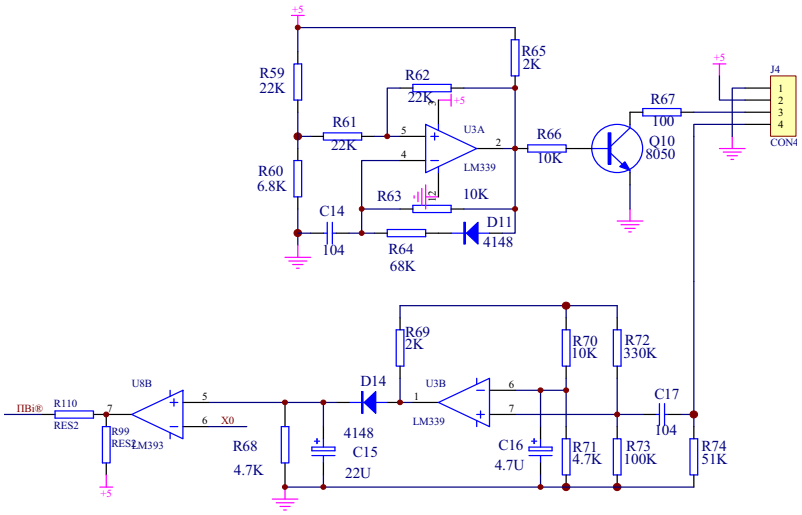
The power system is mainly to supply the working power for the other four system, it guarantees other systems working normally, so please check whether the working power is well or not when repairing. The sensor detecting system is to supply all kinds of signals for signal management and transforming system, which is the original signal to assure the machine working normally. The signals after being managed and transformed then offer to CPU. The CPU analyzes those signals with its inner process so as to control the working of the whole machine and send display signal to display system. Meanwhile, the operation system also supplies operation signals to the CPU so that the machine can work according to user's instruction. So when repairing, you can check whether these systems work normally in this order following the electronic discompose diagram. The unitary theory and adjustment can be well understood from the following content.

8.1 Hopper Sensor Adjustment (Fig.10)

The hopper sensor is installed in the hopper and make up of infrared transmitter and infrared acceptor. With function of checking the banknote situation in the hopper, the hopper sensor sends out interrupted infrared light by the control of the main circuit board. Infrared acceptor check whether there are banknotes on the hopper by detecting the infrared modulating light which sent out from the transmitter.

Under the natural light, if there is no banknote on the surface of the hopper sensor, the 4Pin of J4 (Fig.10A) or the 4Pin of J9 (Fig.10B) should be below 1V. But if there is any banknote on its surface , it requires that the sensor sent out the reaction signal and after arranging the signal until Vc≥3V.

(1) OLD PRO85, PRO85U (Fig.10A)



(2) NEW PRO85, PRO85U (Fig.10B)

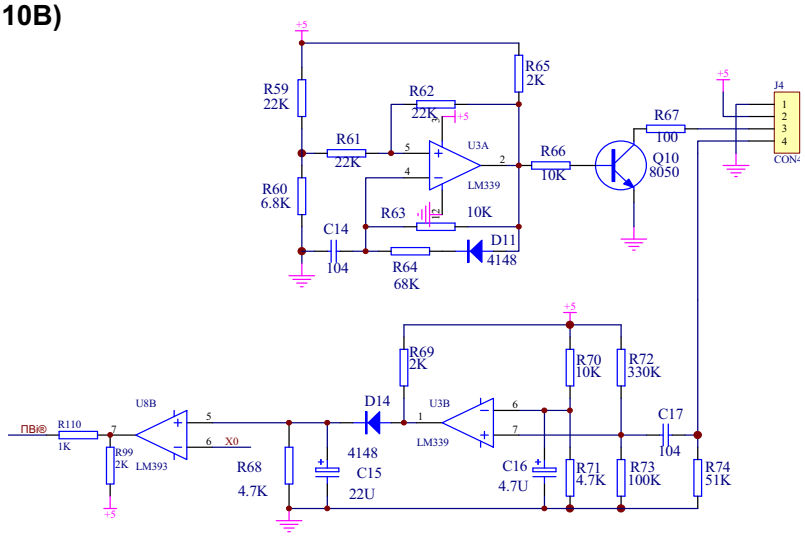


Fig. 10B Circuit Diagram of Hopper Sensor

(3) PRO85UM, PRO85UM/S (Fig.10 C)

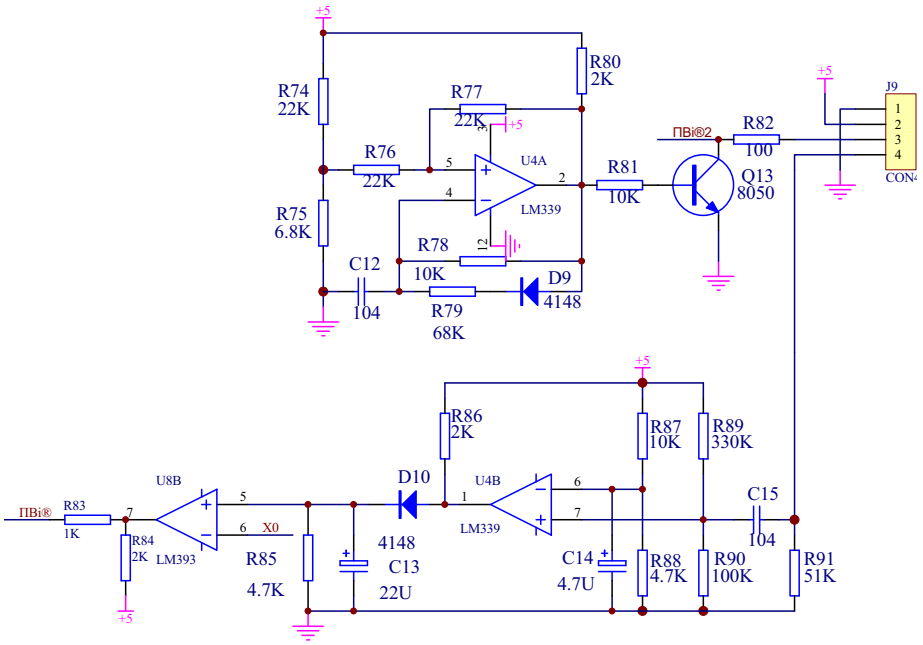


Fig. 10C Circuit Diagram of Hopper Sensor

(3) Hopper Sensor Signal

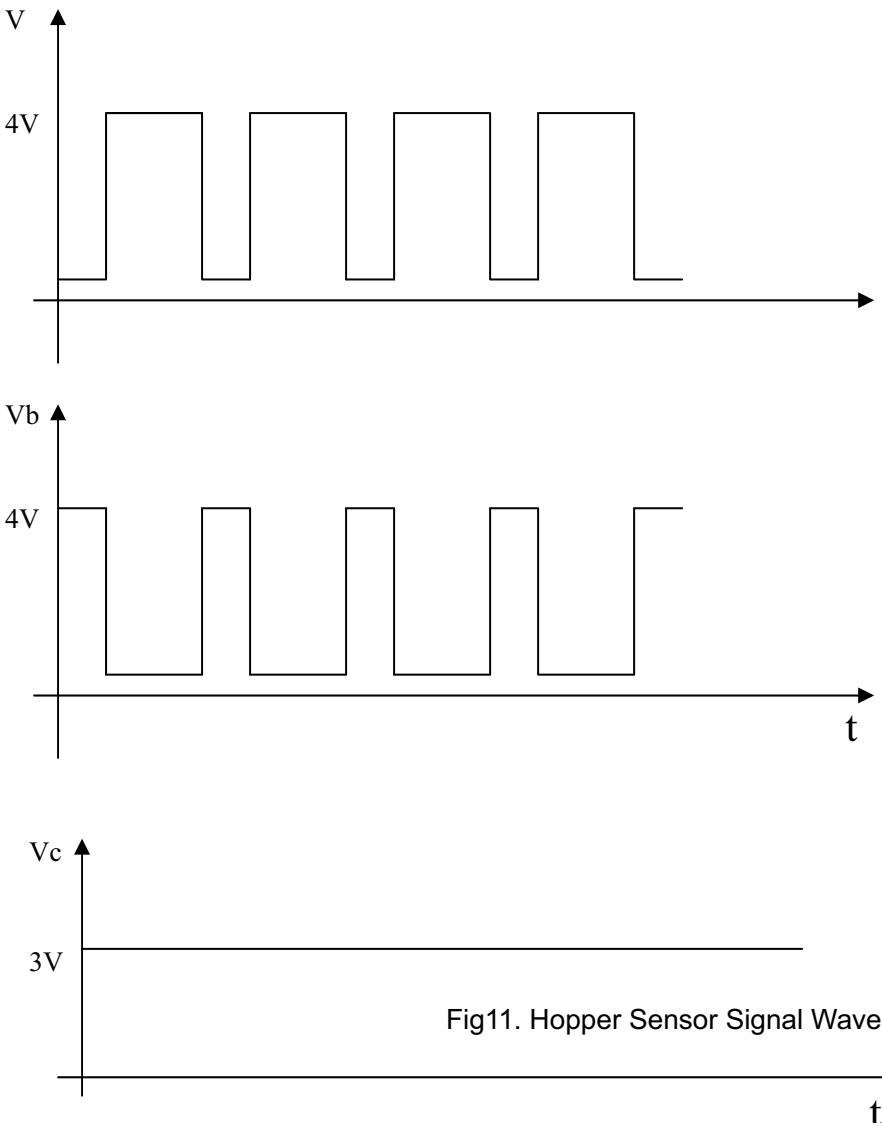


Fig11. Hopper Sensor Signal Wave Sketch Diagram

Fig.12 The exterior and elements diagram of the Hopper Sensor

The Hopper Sensor was made up of Transmitter and Receiver (refer to Fig.11) . 1Pin and 2Pin is the down-lead of the Transmitter, 3Pin and 4Pin is the down-lead of the Receiver. When install them in the machine, please connect the 1Pin and 3Pin with the +5V(red wire) of the CN1. 2Pin is transmitting signal which should be connected with the yellow wire, 4Pin is the receiving signal which should be connected with the white wire. A digital Multimeter can detect whether the Hopper Sensor is working normally or not.

Set the digital Multimeter in the Diode detecting level ( ). Make the anode electric pen connect with 1Pin and the cathode electric pen connect with 2Pin, the normal value should be 1.050. If the value is 1 or 0, it means the transmitter has been damaged. Set the Multimeter in the resistance detecting level(200KΩ), make its anode electric pen connect with 3Pin and the cathode electric pen be connected with 4Pin, the normal value should be below 1 MΩ(the resistance value will be larger if the natural light is warded). If the resistance value is 1 or 0, it means the receiver has been damaged, if interchange the anode pen and cathode pen to detect again, the value should be 1,otherwise the receiver has been damaged.

8.2 Left &Right Counting Sensitivity Adjustment

(1) OLD PRO85, PRO85U (Refer to Fig.13A)

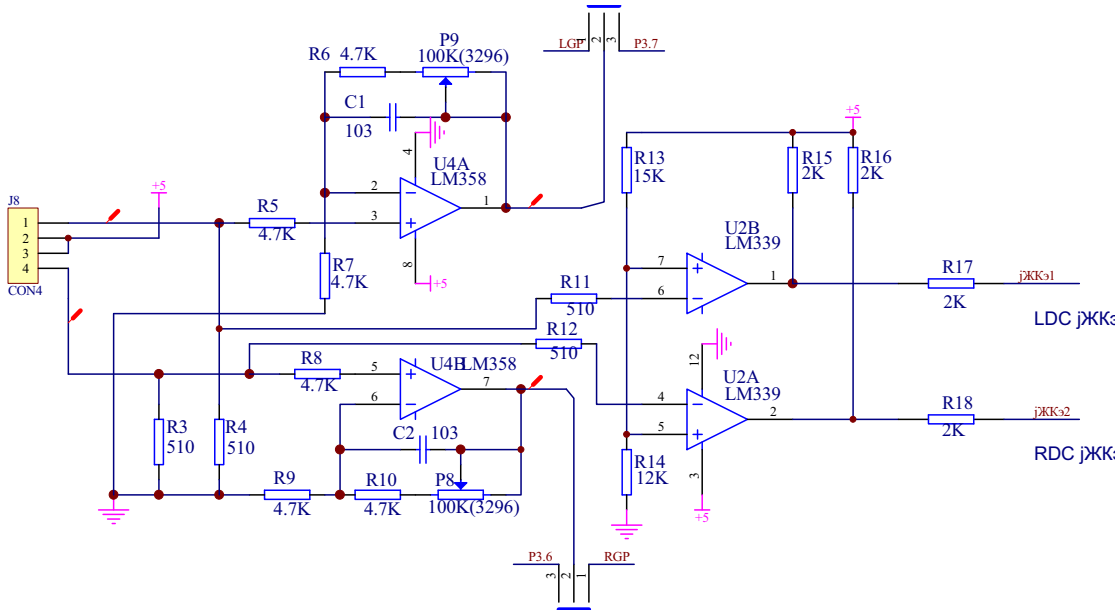


Fig.13A Left and Right Counting Sensor Circuit Diagram

(2) **NEW PRO85, PRO85U (Refer to Fig.13B)**

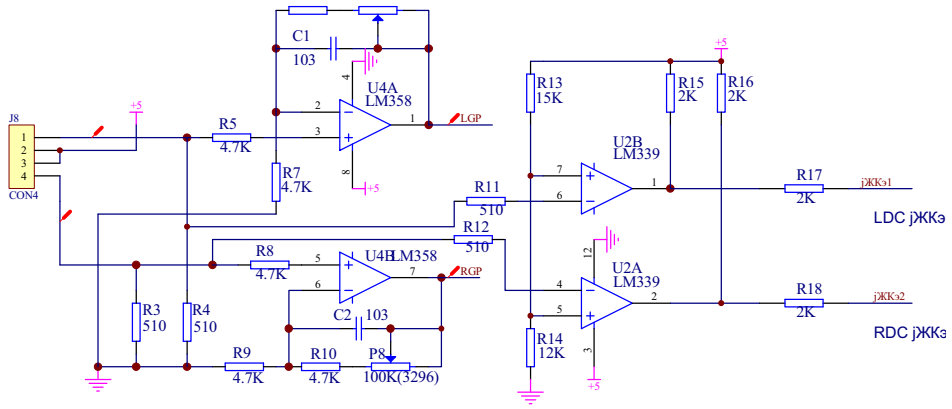


Fig.13B Left and Right Counting Sensor Circuit Diagram

(3) PRO85UM, PRO85UM/S (Refer to Fig.14)

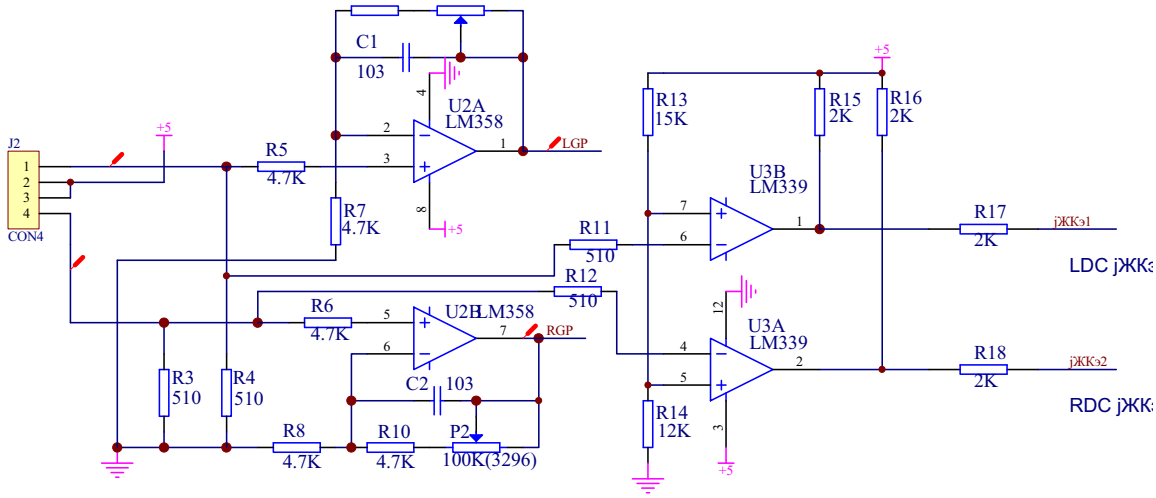
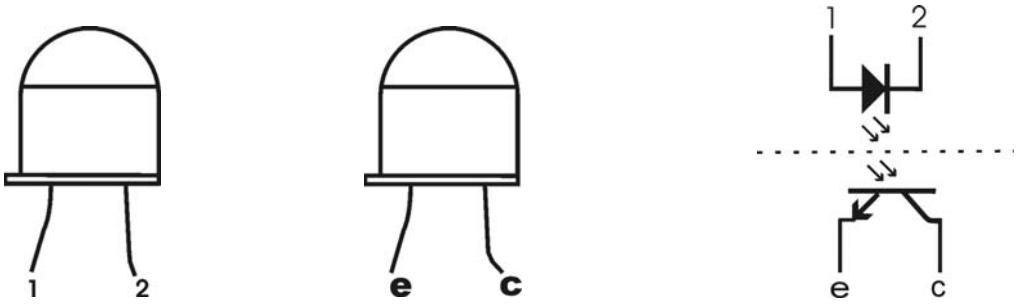


Fig.14 Left and Right Counting Sensor Circuit Diagram

The left and right counting sensors are installed in the two sides of the banknote-transferring channel. When the banknotes passing the sensor, the parameter will be changed as well as the electric signal in order to count the banknote and check out those double banknotes.

The normal voltage of 1Pin and 4Pin of J_8 should be less than 4.5V. If the counting sensors axle is not on the same line, you should adjust their relevant positions of the sensors. Or it is because the aging of the sensors, you should replace it with a new one.



Infrared lighting diode Photosensitive Dynatron

Fig.15 Counting sensor external and elements diagram

The counting sensor is made up of infrared lighting diode and photosensitive dynatron which situate in the two sides of the banknote-transferring channel and work as a couple. The infrared lighting diode is in gold yellow which was installed on the upper, the color of the photosensitive dynatron is silver white which was installed on the downward. You can check whether the counting sensor is well or not by using a digital multimeter, To check the infrared lighting diode, you should observe it carefully and find out a prominent mark point which means anode (i.e. 1Pin). Adjust the digital multimeter at the anode level (), connect the diode pen with 1Pin, and the cathode with 2Pin , the normal value is 1.050. If the value is 1 or 0,that means the infrared lighting diode has been damaged. To measure the photosensitive dynatron, you should also find out a prominent mark point, that is “e” pole, adjust the digital multimeter at the resistance measuring level (20K), connect the anode pen with “c” pole and connect the cathode pole with “e” pole, if the sensor is facing to the natural light, the normal value is several thousand ohm (the resistance will larger if the natural light is warded). If the value is 1 or 0, it means the photosensitive dynatron has been damaged, interchange the anode and cathode pen to measure again, the normal value should be 1, other wise the photosensitive dynatron has been damaged.

8.3 UV sensitivity adjustment

(1) OLD PRO85, PRO85U (Fig.16A1)

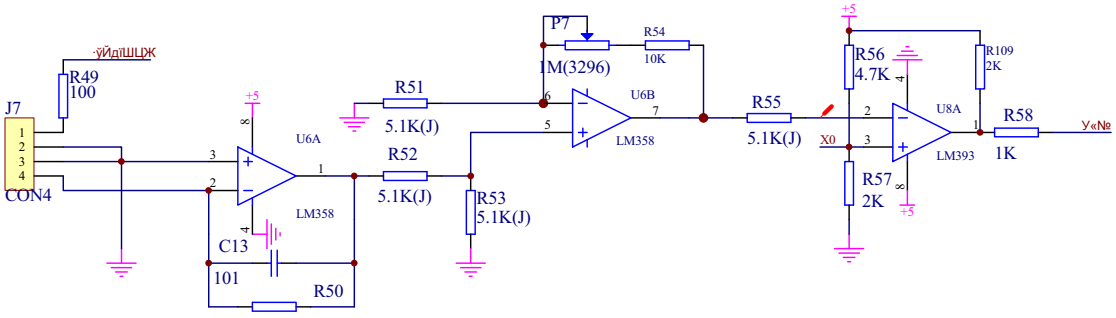


Fig.16A1 UV Sensor Circuit Diagram

(2) NEW PRO85, PRO85U (Fig.16A2)

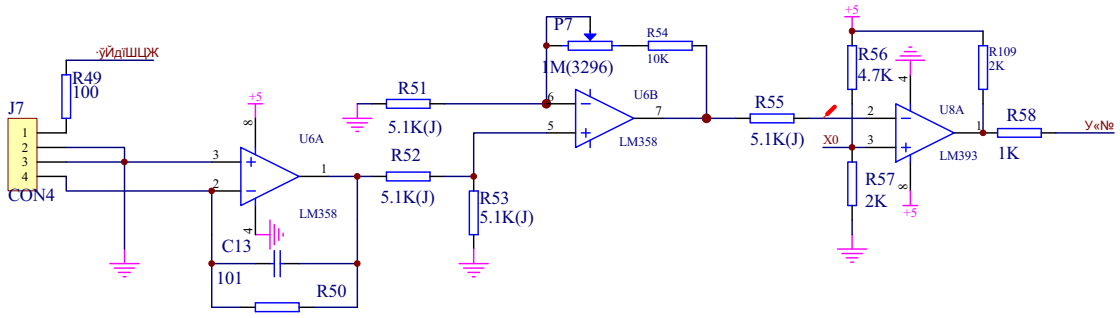


Fig.16A2 UV Sensor Circuit Diagram

(2) PRO85UM, PRO85UM/S (Fig.17)

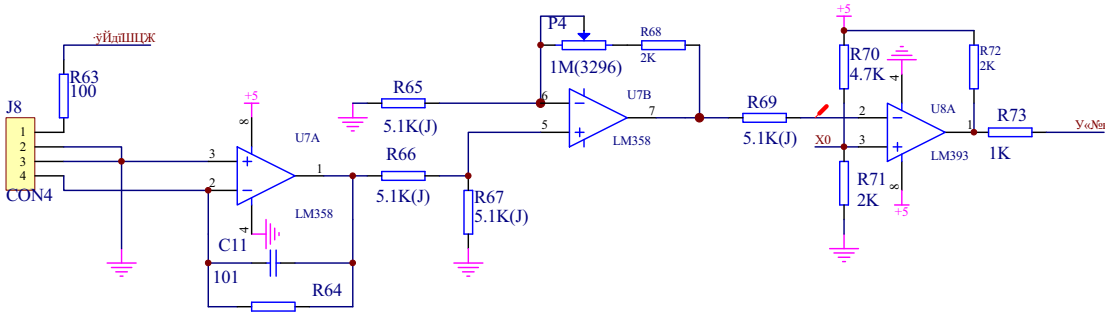


Fig. 17 UV Sensor Circuit Diagram

The UV sensor is installed in the middle of banknote-transferring channel. When the banknotes passing the sensor, the reaction parameter of the sensor will be changed and then transfer the light signal into electric signal to detect the authenticity of the banknotes.

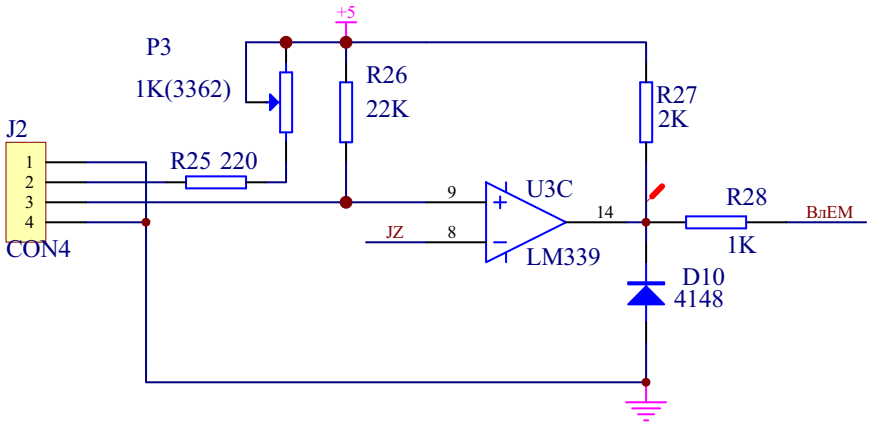
The ultraviolet sensor is made up of LED ultraviolet radiation subassembly and fluorescence acceptor subassembly. The LED ultraviolet tube is installed between the banknote-feeding wheel and the ultraviolet acceptor sensor is made up of multiplayer light-filter glass and silicon battery to detect the banknote ultraviolet signal.

Feed a testing paper (without ultraviolet reaction) into the machine through banknote feeding wheel slowly to detect the 7Pin of U6 and 2Pin of U8, the voltage should be less than 200mv. Set the UV sensitivity on high level and adjust P7 to make 7Pin (of U6) =2Pin (of U8) ＜200mv. If the UV sensitivity is on low level and there are detecting mistake, adjust the P7 counterclockwise to lower the detecting sensitivity. If the UV sensitivity is on high level and there is detecting missing, you should clockwise adjust the P7 to heighten the detecting sensitivity.

When press UV button three seconds, the display will show Uu, and could choose the detection level from 0～9 for adjusting the UV sensitivity. The numerical value bigger, the UV more sensitive.

8.4 Width sensitivity adjustment (Refer to Fig.16)

(1) OLD PRO85, PRO85U (Fig.18A)



(2) NEW PRO85, PRO85U (Fig.18B)

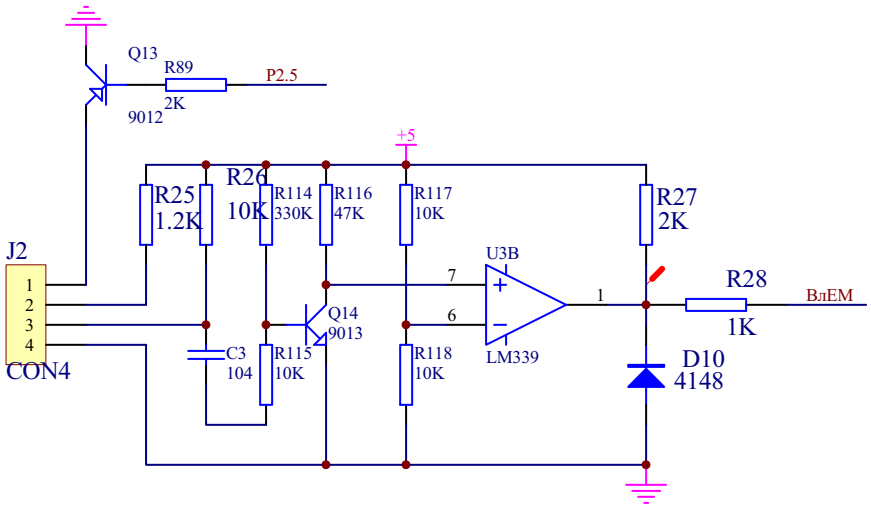


Fig.18B The circuit diagram of width sensor

(2)PRO85UM, PRO85UM/S (Fig.19)

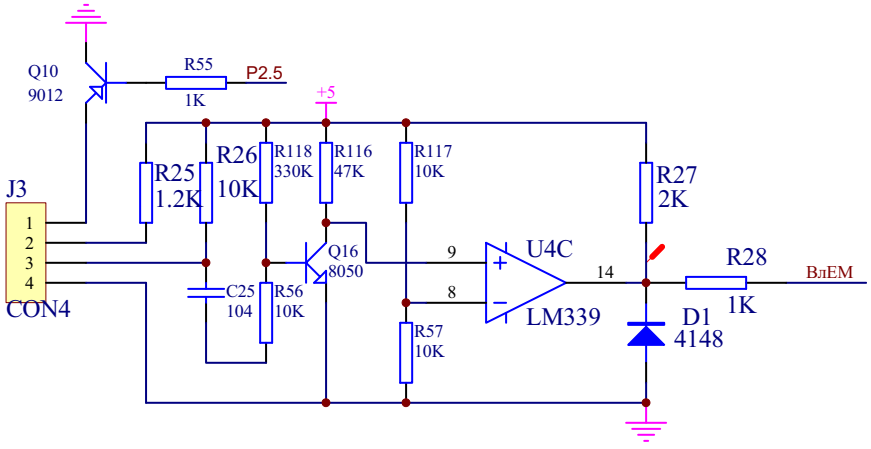


Fig.19 The circuit diagram of width sensor

The width sensor is installed at the right side board, the disk was installed on the right side of the upper wheel axle and turning with the upper wheel. The width sensor is designed to detect the signal of the disk bar. It is is mainly made up of infrared transmitter and receiving tube. It senses the disk bar and forms different signal voltage, then produces and outputs the impulse square waves which have the same height and width, and then the waves will be send to 17Pin of CPU to deal with data so as to realize the function of counting and width measuring.

Adjust the oscillograph at 0.1ms level to detect the signal of 14Pin of U2. When machine works normally, can get the wave graph as Fig. 16. You can change the length of the T_A and T_B by adjusting P3, adjust it clockwise the T_B will increase while the T_A decrease; adjust it counterclockwise the T_B will decrease while the T_A will increase, until T_A=T_B which is the normal state.

Easy adjusting method: Adjust the digital multimeter at DC level (20V) to measure the 14Pin of U2, when the machine turns normally, just adjust the P3 to make Vg= 2.5 V.

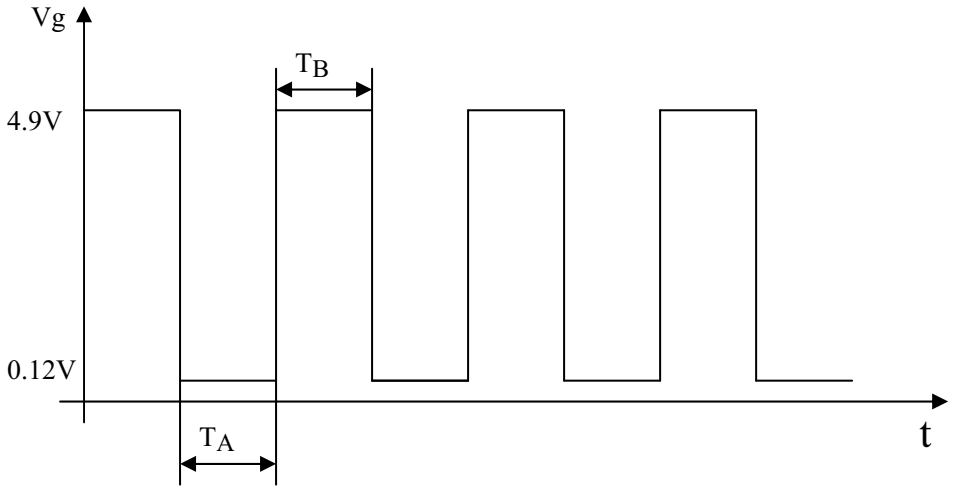


Fig.20 The signal wave shape diagram of the width sensor

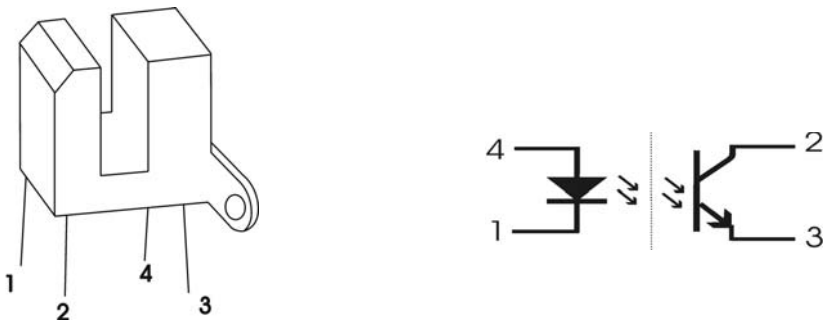


Fig.21 The external and elements diagram of the width sensor

The width sensor is mainly made up of infrared transmitter and acceptor (refer to Fig.17). The transmitter lighting is sent into the acceptor from very small gap so as to accurately measuring the disk bar. 1Pin and 2 Pin are the connections for the transmitter, 3Pin and 4Pin are the connections for the acceptor. Make 2Pin connect with 4Pin, and then make them connect with the floor wire of CN3.

Use the digital multimeter to check whether the width sensor is well or not by adjust its level at ), connect the anode pen with 1Pin, and the cathode pen with the 2Pin,the normal value should be 1.050, but if the value is 1 or 0 ,that means the transmitter has been damaged. Adjust the digital multimeter at resistance detecting

level (2M), connect the anode pen with 3Pin, and the cathode pen with the 4Pin, the normal value should be below 1 megohm, if it is 1 or 0, that means the acceptor has been damaged. If there is dust in the gap you should clean it first as the dust will influence the measuring result.

In addition, if there is any dust on the disk, that would influence the detecting signal of the width sensor, therefore you should check whether has dust the disk or not.

8.5 Stacker Sensor Sensitivity adjustment

(1) OLD PRO85,PRO85U Circuit (Fig.22A)

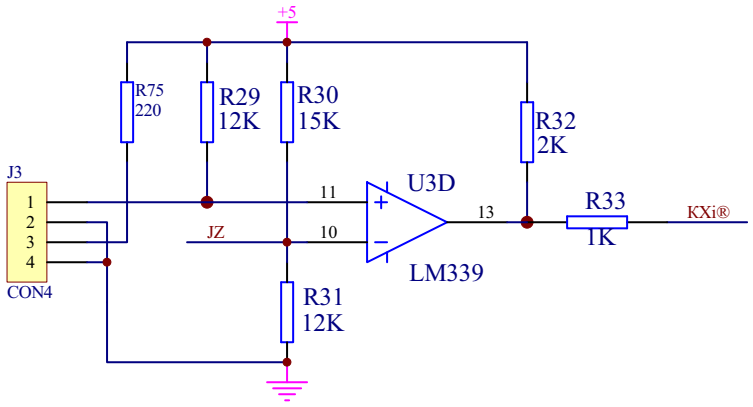


Fig.22A Stacker Sensor Circuit Diagram

(2) NEW PRO85,PRO85U Circuit (Fig.22B)

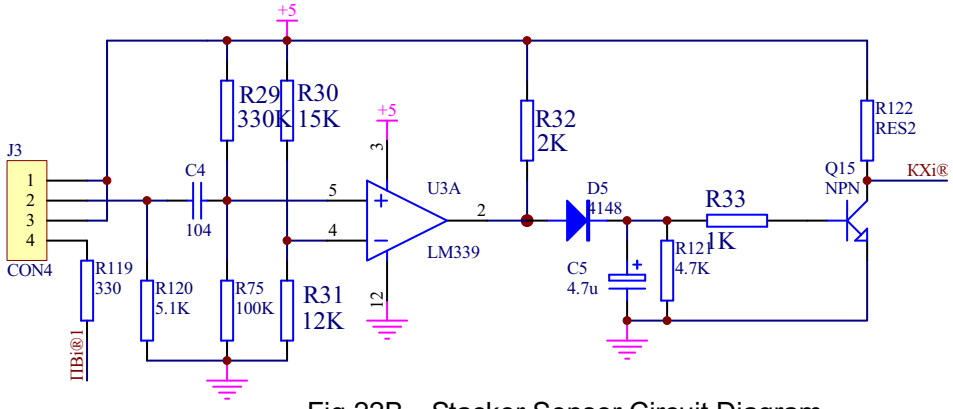


Fig.22B Stacker Sensor Circuit Diagram

(2) PRO85UM, PRO85UM/S Circuit (Fig.23)

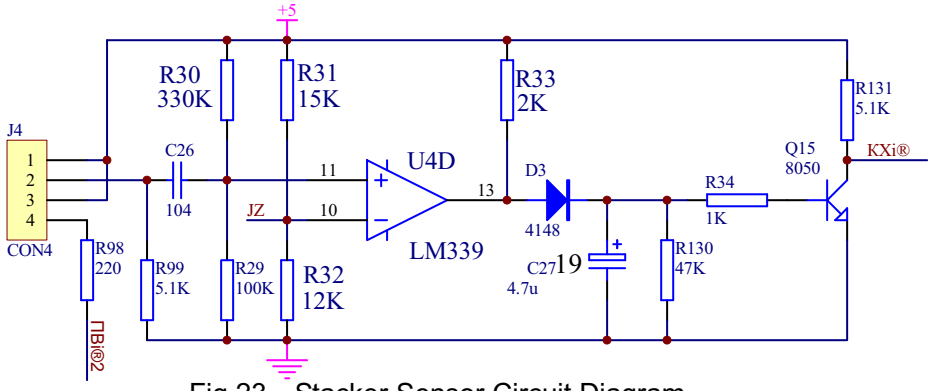


Fig.23 Stacker Sensor Circuit Diagram

The stacker sensor was installed on the stacker support of the stacker cover, it was made up of infrared transmitter and acceptor tube. With functions of detecting whether there are banknotes on the stacker, clearing

automatically and batch presetting. Measuring 11Pin of U3 when the light axles of infrared transmitter and acceptor sensor are on a same line, if there are banknotes on the stacker, the voltage of 11Pin would be above 4v; if there isn't any banknote, it would be below 0.2v.If the measuring result is not accordant to the above value, it could be because the light axles of infrared transmitter and acceptor sensor are not on a same line, so that you should adjust their relevant positions. If it because of the sensor has been damaged, you should change to a new one. The stacker sensor is the same as counting sensor; you can check whether it is well refer to the relevant content of counting sensor.

8.6 Magnetic Sensitivity Adjustment

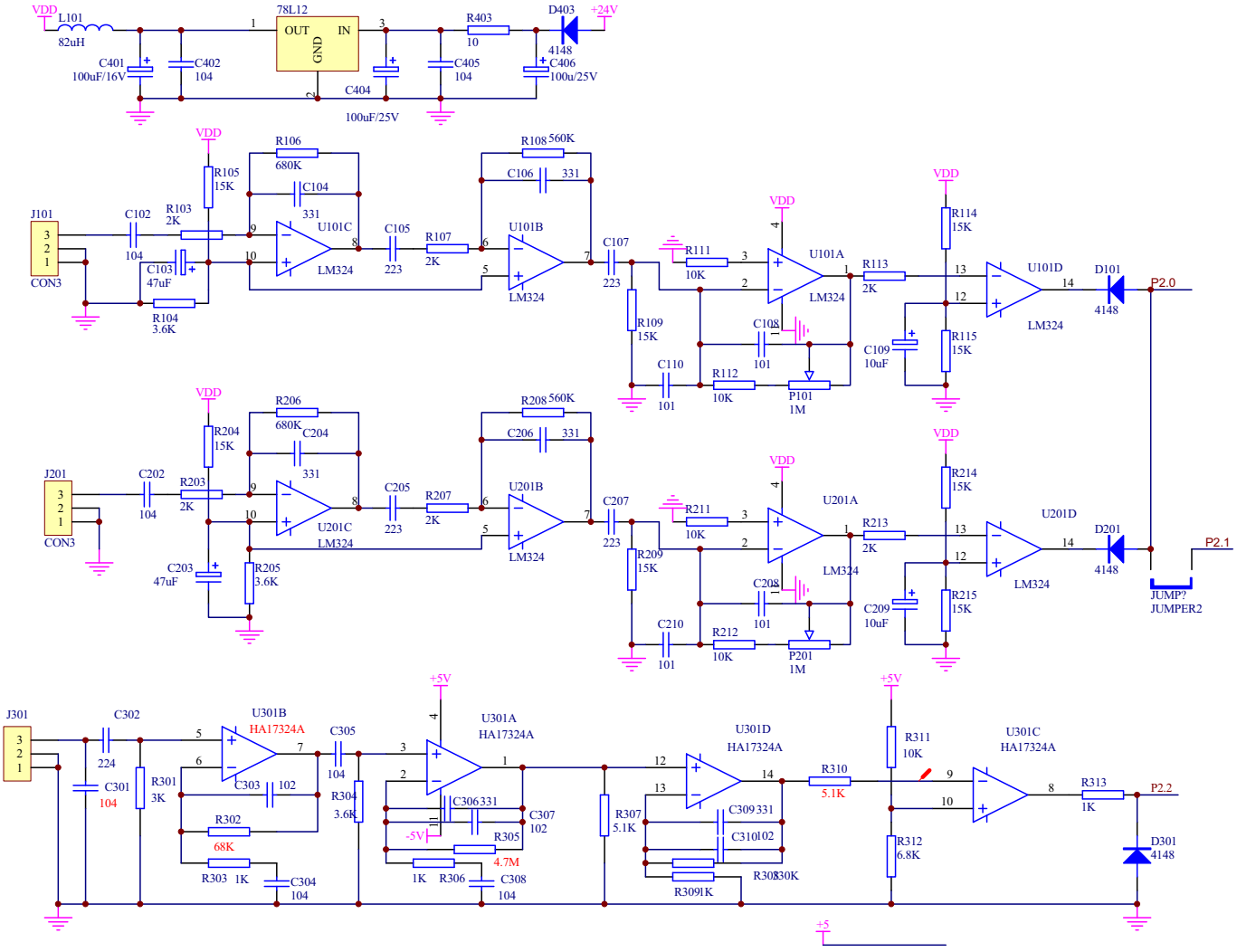
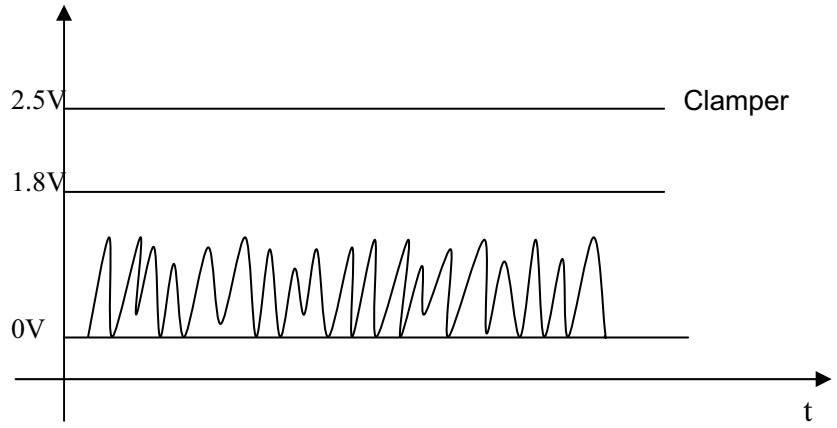
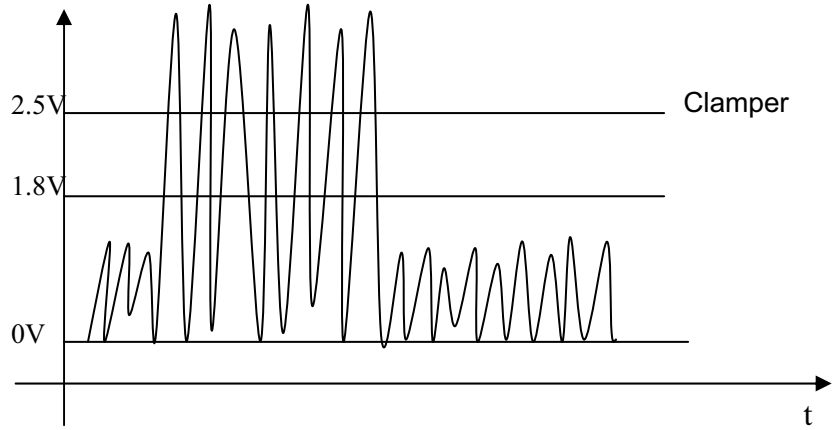


Fig.24 Magnetic sensor circuit diagram



Wave diagram when banknotes (without magnetic ink) passing



Wave diagram when banknotes (with magnetic ink) passing

Fig.25 The signal wave shape of Magnetic sensor

The friction magnetic sensor is installed in the middle of the down sensor support to catch the MG signal of banknotes.

On the upper of MG sensor, there is a group of MG pressing wheels rolling with upper feeding wheel, which press the banknotes passing through the surface of the magnetic sensor to the magnetic signal more accurate. The clearance is very important between the magnetic wheel and magnetic sensor, it requires to be 0.2mm which is equal to the thickness of two pieces of notes.

Loose the two side fuses of the down sensor support to adjust the forehead height so as to let the clearance meet the requirement. The MG signal adjustment is to adjust the magnify power. When press MG button three seconds, the display will show MG, and could choose the detection level from 0～9 for adjusting the UV sensitivity. The numerical value bigger, the UV more sensitive. Pull out the connecting plug of MG sensor, and then measure the resistance of MG sensor with multimeter at DC level. At the same time make sure the shield line doesn't touch the metal parts. The resistance should be between 1.2kΩ, if it is infinite or zero, it maybe the connect line has been

disconnected or the MG sensor has broken.

REMARK: Please refer to the true machine if there is any improvement on MG detecting.

8.7 The Counting-display Circuit Diagram (refer to Fig. 21)

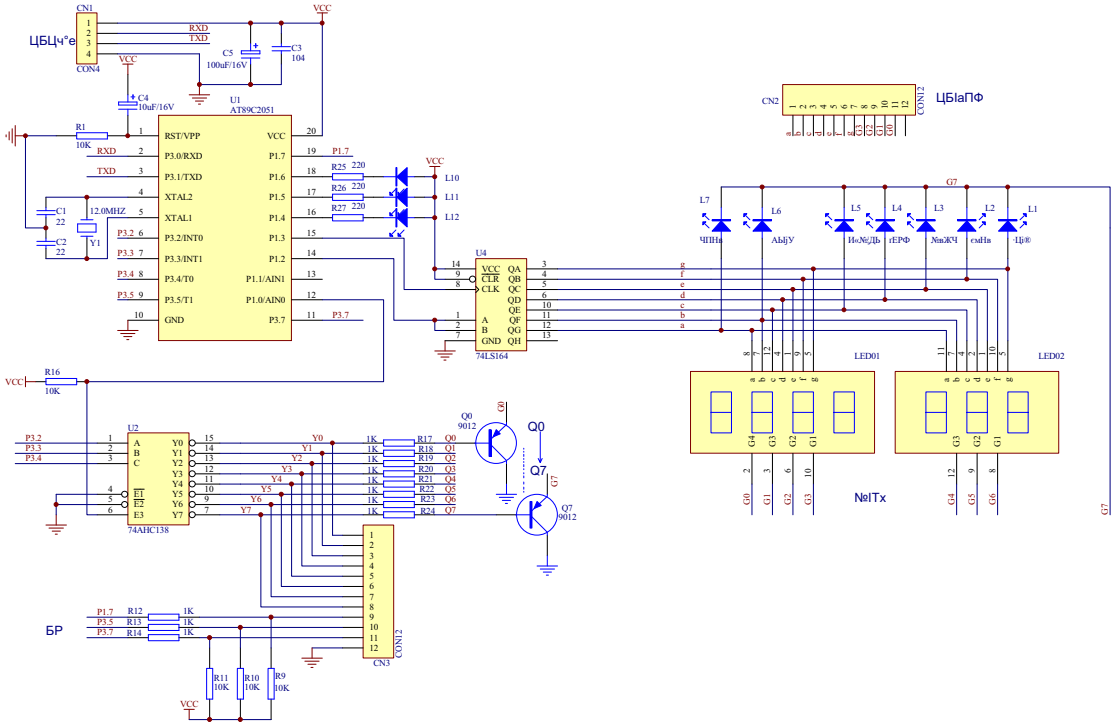


Fig. 26 The Circuit Elements Diagram of Display

The display adopts the microcomputer to control and deal with the displaying, it communicates with the chip piece of the main controlling board through series connections, then accept the signal of the main controlling board and showing relevant characters , the operation impulse of accept membrane was sent to the chip piece of the main controlling board and make out relevant action. The driver drives the 7 number diode tube lighting to form as section signal, the digits signal was controlled by the circuitry –separator after dividing the circuit line into 8 then control the diode tube and the indicator on or off, so that forms the digit signal. If there is no displaying, you should check the connection of communicate line, the crystal oscillator also is a key part. If there is one section or one digit doesn't light, first you should check whether the driver, circuitry –separator and circuit board are well or not.

8.8 Stacker motor controlling circuit (refer to Fig.27)

(1) PRO85, PRO85U Circuit (Fig.27A)

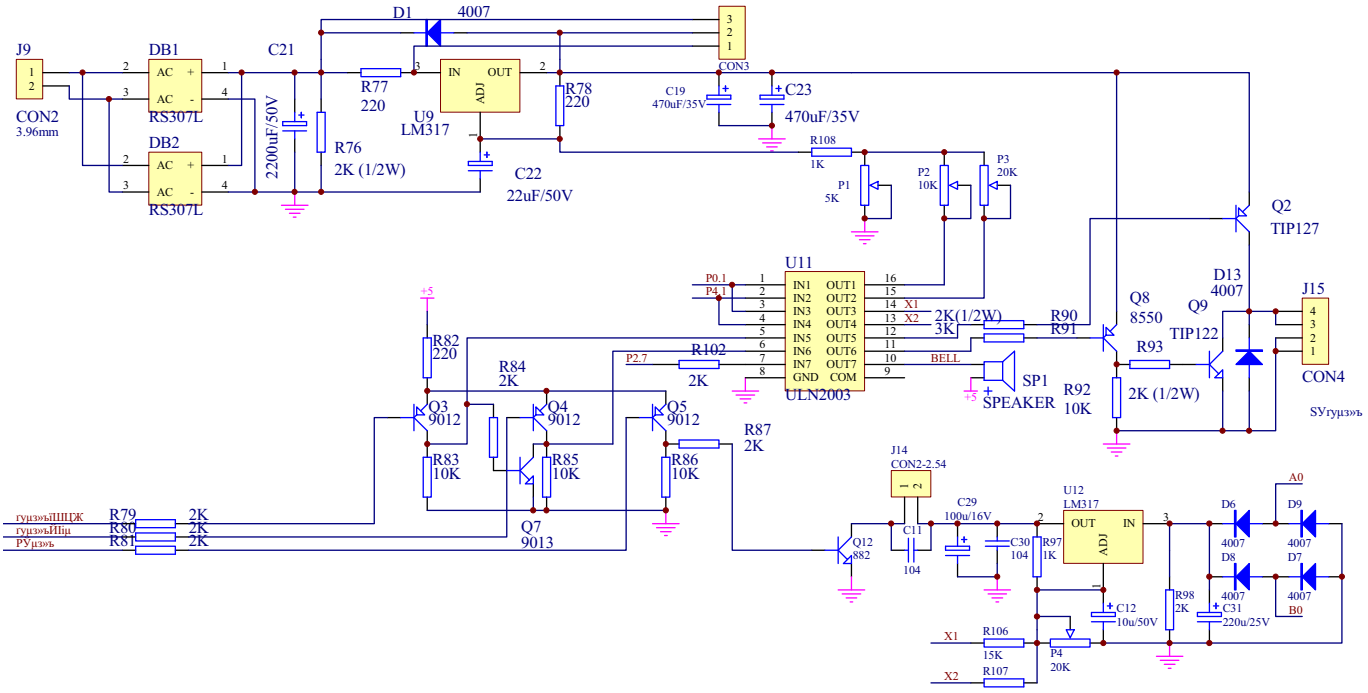


Fig.27A The Controlling Element Diagram of Small Motor

(2)PRO85UM, PRO85UM/S Circuit (Fig.27B)

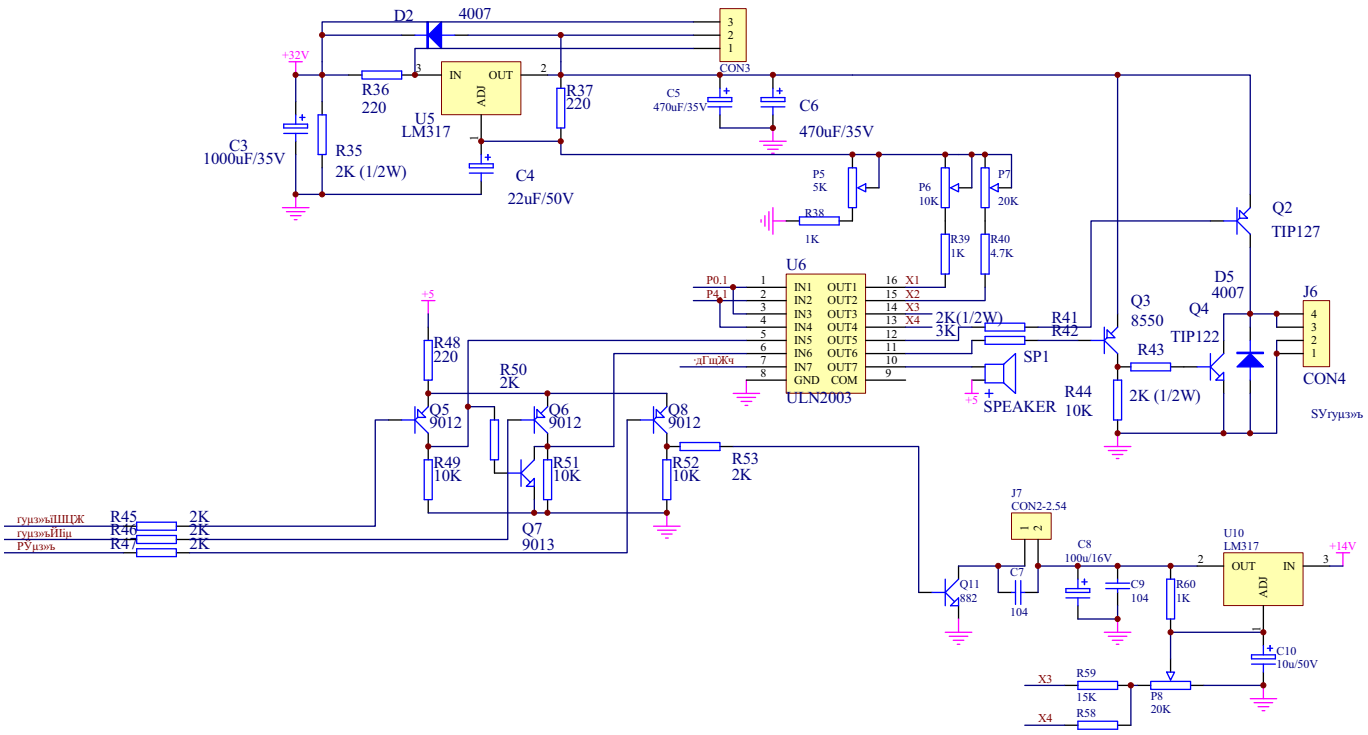


Fig.27B The Controlling Element Diagram of Small Motor

The 14.5V voltage which was outputted by transformer, after commutated, rejected and stabilized ,then was transferred into direct current to supply power for the Small motor. The high or low voltage which sent out by main circuit board CPU controls the Small -motor ‘s turning .If the small motor works abnormally, you should first check the whether the circuit of power supply part is normal, then check the CPU controlling signal, the high voltage should be above 4.5V, the low voltage should be below 0.1V. At last, you should check the dynatron Q12,Q13 and optical synthesizer D12. If all the above parts are working normally, the small motor must have malfunctions.

8.9 Big motor controlling circuit (refer to Fig. 27)

(1) PRO85, PRO85U Circuit (Fig.27A)

(2) **PRO85, PRO85U Circuit (Fig.27B)**

The big motor is a Magnetic DC motor , its turning and stopping are controlled by high-power dynatron Q2 and Q9.When the CPU sends out high voltage to electrify Q3 , then triggers U11 or U6 electrified and electrifies Q2, the DC start working by the Big motor’s turning.

When the 9Pin of CPU sent out the high voltage, the 43Pin will immediately send out a short-time low voltage to electrify the Q4, then triggers U11 electrified and electrifies Q8 and Q9. so as to make the anode of the Big motor connect with the Land-line and release the electricity immediately, so the motor will stop at once . Otherwise the motor will continually turning because of inertia. Therefore add such stopping circuit can prevent the Banknotes slipping the Counting Sensor after alarming or having reached the preset number.

If the big motor doesn’t work, please check the controlling signal of CPU first, then check whether the important parts such as Q3, U11 and Q2 work normally. If you find that there still have several sheets sliding out the machine when have detected counterfeit or has reached to the batch-preset number, it may have problems on stopping circuit, so please check whether stopping –controlling signal of CPU is abnormal and then check if the Q4, U11,Q8 and Q9 or Q6, U6,Q3,Q4 are working normally.

8.10 Power Supply Circuit of the Big Motor (refer to Fig.28)

(1) PRO85, PRO85 Circuit (Fig.28A)

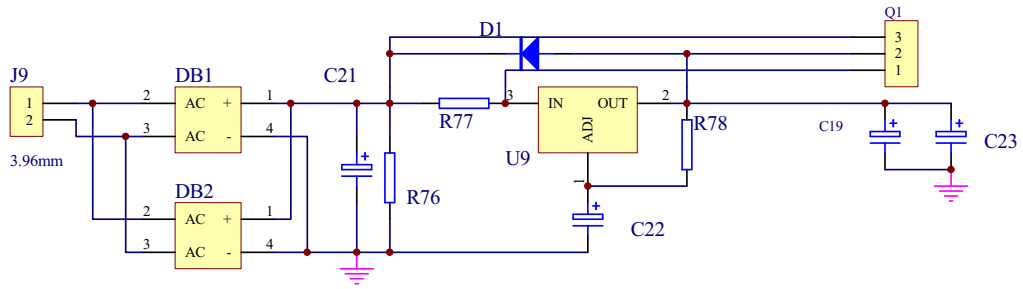


Fig.24A Voltage Regulator Circuit Diagram of the Big- motor Power Supply

(2)PRO85UM、PRO85UM/S 电路（图 28B）

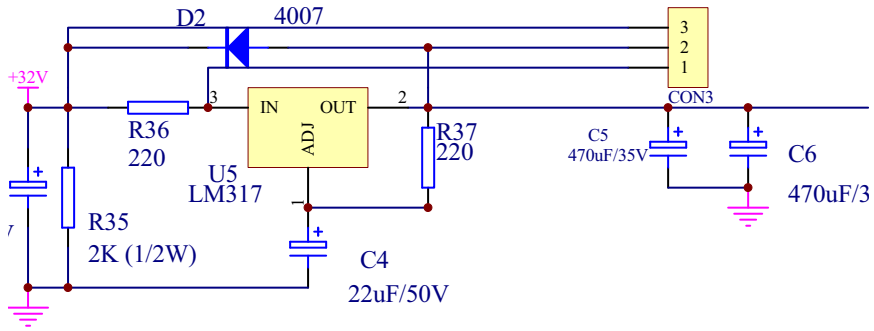


Fig.24B Voltage Regulator Circuit Diagram of the Big- motor Power Supply

After transformed into low –voltage AC by the transformer, the 110V/220V AC was then commutated, rejected, which will supply the direct power. While the switch power directly output the voltage, then being stabilized by TIP127, which can provide the power for main motor. After the hopper sensor received the signal and communicated with the CPU, the CPU will send out signal to control the big motor, which will operate the main motor.

8.11 Power Supply of Main Controlling Board and MG Board Circuit Diagram (refer to Fig.29)

(1) PRO85, PRO85U Circuit (Fig.29A)

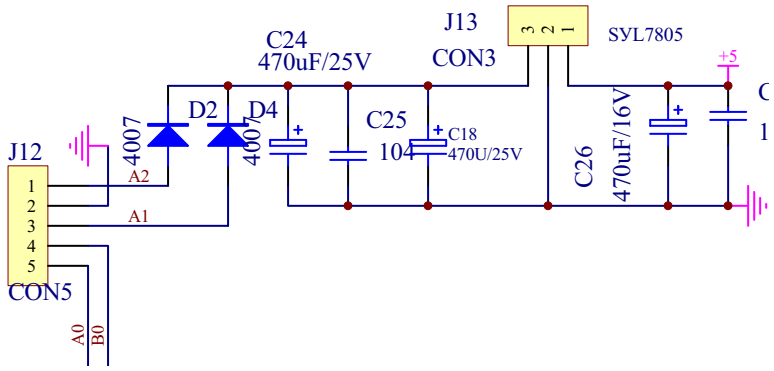


Fig.29A The Main Controlling Board Power Supply

(2) PRO85UM, PRO85UM/S Circuit (Fig.29B)

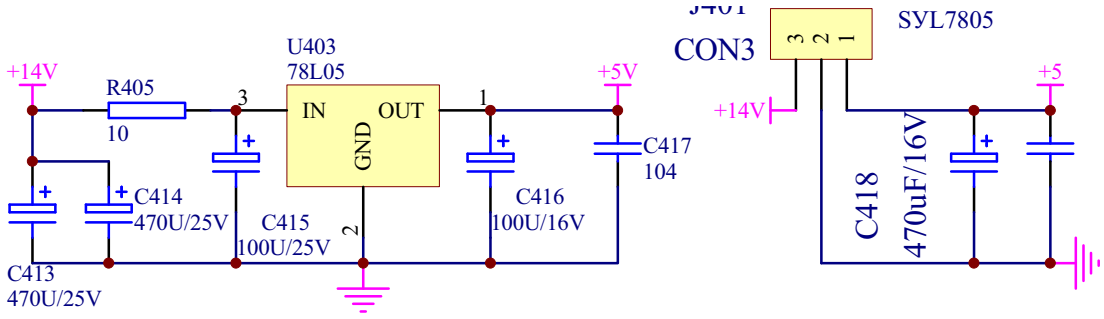


Fig.29B The Main Controlling Board Power Supply

After transformed by the transformer, the AC power source is then commutated, rejected and stabilized by the tri-end manostat, it outputs the +5V power for the Main Board.

9. Common malfunction detecting and resolving

Make sure the power id off and pull out the plug before you start to preclude the malfunctions.

9.1Common malfunction resolving of machinery

9.1.1The Banknote controlling part

Malfunction Case	Cause	Methods of Preclusion
Counting Number is Wrong	The friction between the banknote feeding rubble wheel and resistance rubber wheel is too tight	Turn the up and down adjustable screw counterclockwise to decrease the friction
	The tooth-tip of banknote feeding rubber wheel is wore and tore too much	Change new wheels
	Banknote-resistance rubber wheel is getting loose.	Fix the resistance rubber wheel in the suitable position (refer to 7.2)
	Banknote loading and feeding gear is not synchronizing.	Adjust the relative position of loading and feeding gear (refer to 7.3)
Banknote-drop isn't smooth	The friction between the banknote feeding rubber wheel and the resistance rubber tongue is too much.	Turn the up and down adjustable screw clockwise to reduce the friction
	Tooth-tip of banknote feeding rubber wheel is wore and tore too much	Change new wheels
	The position of the resistance rubber wheels swift.	Fix the rubber wheels in the suitable position (refer to 7.2).
	Banknote loading and feeding gear is not synchronizing.	Adjust the relative position of loading and feeding gear (refer to 7.3)
Banknote issuing is slanting	The gap of the banknote entrance is not balance.	Adjust the gap of banknote feeding entrance (refer to 7.2)
	The banknote feeding rubber wheel chip is not on the correct position	Adjust the chip to correct position to make it on the gap of the resistance rubber tongue (refer to 7.3).
Banknote issuing is jammed	There are damaged or hemmed banknote during counting	Pick out this kind of banknote and count again
	Pull or press on the banknote when feeding	Let the banknote slide in the hopper freely
	The notes is in disorder before feeding	Put the note in good order

9.1.2 The Driving Part

Malfunction Case	Cause	Methods of Preclusion
The motor runs,	The synchronized belt is parted.	Change a new one

but the driving wheels don't run or run slowly	The synchronized belt is aged or loose	Change a new one
There is noise among the driving wheels	The driving wheel got loose	Change the clip-spring or driving wheel
	The driving wheel axle is jammed	Check and adjust the jammed parts
	The driving wheel axle aging or damaged	Change a new one

9.2 Common malfunction resolving

9.2.1 Common malfunction detecting and resolving

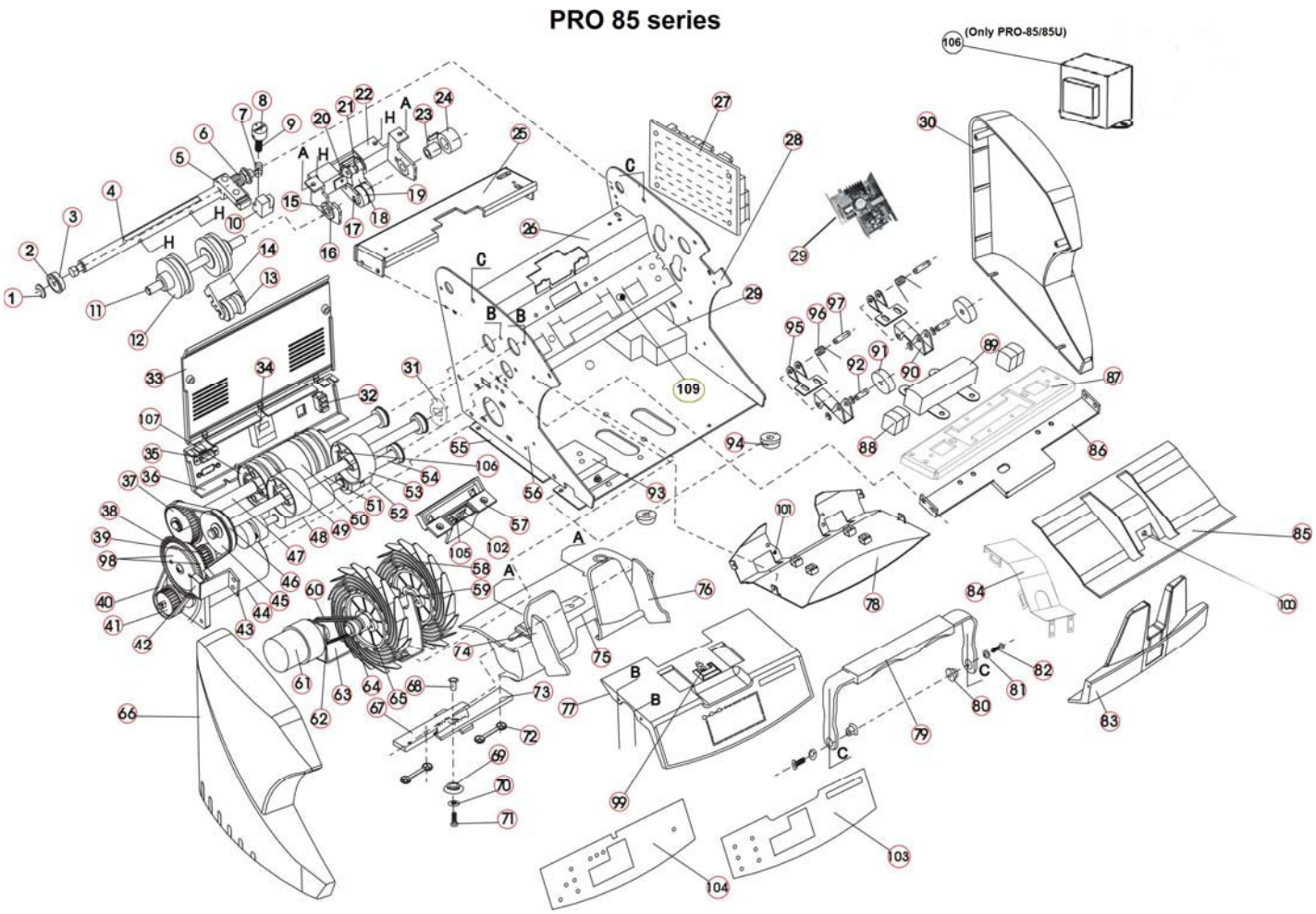
Malfunction Case	Cause	Methods of Preclusion
There isn't " 0 " to show and the motor doesn't run	The fuse tube has burned up	Change a new one
	The power cord connects unwell	Check the plug and lines
	The Power board is broken	Get out the power board, check the relevant elements or change the broken parts
There isn't " 0 " to show or showing abnormally but the motor runs	On the board there is no power for supplying	Check the plug and lines
	The + 5Vpower is connected with the Land-line	Check the relevant elements
	Showing the commission connection line is unwell and abnormal circuitry	Check the relevant elements and connection lines
After turning on, there is " 8 "showing but the motors don't run	The big motor is jammed	Turning the axle of the motors by hand, if they are jammed, please change a new one.
	The transmission Driving Wheel is jammed	The big motor can't startup after having installed the Synchronized belt, please check Whether the transmission driving wheels is clipped and repair them
	There is no voltage at the inputting end of the motor and has problems in controlling circuit	Check the inputting power whether is normal, check the relevant connections and components (refer to 8.9).
The Small motor doesn't run	The Small motor is jammed, the turning of resistance is big	Check the Banknote-accept wheel whether has been moved or clipped, if the Small motor was jammed please change a new one.
	There is no voltage or the controlling circuit is abnormal.	Check the inputting power of the Small motor whether is well or not, check the connections and components (refer to 8.8)
The hopper has Banknotes but the machine can't startup	There is too much dust on the Hopper Sensor or have problems on the circuit.	Clean the dust or check the relevant circuit (refer to 8.1)
Counts the Banknote in batch state, after getting away the Banknotes on the Stacker, the machine can't start.	There is dust on the Stacker or the Light Bearing is slanting or have troubles in the relevant circuit.	Clean the dust, and adjust the Light axle or check the circuit (refer to 8.4).

Counting number is not accurate or usually display " Eh " or " EC ".	Shows such cords and counts inaccurately.	Adjust the Hopper System (refer to 7.1 and 7.2),or change the serious tore and wore parts.
	The left and right Counting Sensor output the voltage abnormally.	Adjust the outputting voltage of the left and right Counting Sensor to abnormal level, and adjust the double detecting in the abnormal range.
	The disk is loosened or the signal of the Width Sensor is abnormal.	Fix the disk and clean the dust, adjust the signal of the Width Sensor in the abnormal level (refer to 8.3).

9.2.2 Self-checking error solution

Malfunction Case	Cause	Methods of Preclusion
After turning on, the Batch Preset Display shows " E1 "	The touching of the Counting Sensor or plugs is unwell.	Check the connections and plugs.
	The Right Counting Sensor outputs the voltage abnormally, or have dust or be damaged.	Adjust the outputting voltage of the Right Counting Sensor to abnormal level or clean the dust, or change a new sensor (refer to 8.2).
After turning on, the Batch Preset Display shows " E2 "	The touching of the Counting Sensor or plugs is unwell.	Check the connections and plugs.
	The Left Counting Sensor outputs the voltage abnormally, or have dust or be damaged.	Adjust the outputting voltage of the left Counting Sensor to normal level or clean the dust, or change a new sensor(refer to 8.2) .
After turning on, the Batch Preset Display shows " E3 "	There is no power supplying in the Magnetic Detecting Circuit and some component were damaged	Check the relevant connections and the +24V power supplying
	The Magnetic Detecting signal is abnormal	Adjust and repair the circuit (refer to 8.6)
	The Magnetic Sensor was interfered seriously.	Clean the dust and besmirch of the Magnetic Sensor and the Magnetic Wheel
After turning on, the Batch Preset Display shows " E4 "	The Ultraviolet Tube is aged and lights abnormally (has carnation light at the two ends)	Change a new one or check the starting circuit
	There is something wrong with the Ultraviolet Detecting Sensor.	Check the Ultraviolet Detecting Sensor or clean the dust on it.
	The Ultraviolet Detecting Circuit is abnormal	Check the Ultraviolet Detecting Circuit and change the relevant components (refer to 8.3)
After turning on, the Batch Preset Display shows " E5 "	There is dust and eye –winker on the Hopper Sensor.	Clean the dust and eye -winker
	The Hopper or Width Detecting circuits and connection lines are abnormal	Check and repair it (refer to 8.1)
	The Hopper Sensor and the Width Sensor are damaged.	Change a sensor
After turning on, the Batch Preset Display shows " E8 "	There is dust and eye –winker on the stacker Sensor.	Clean the dust and eye -winker
	The Stacker Detecting Circuit and connection lines are abnormal.	Check and repair it (refer to 8.4)
	The Stacker Sensor was departure or damaged.	Adjust the relevant position of the Stacker Sensor or change the damaged sensor.

10. Anatomical Chars of the Assembly



11. Remark for Maintenance

11.1 Weekly Maintenance

Cleaning the dust and besmirch on the surface.

11.2 Half-year Maintenance

1. Check the abrasion of the machine's parts
2. Check whether mechanical parts cooperate or not (following the content in 7.0)
3. Check the connection s of the machine are well or not
4. Check the parameter of the Electrical parts (following the content in 8.0)

No.	Part №	Название	Description
1	P85-001	Разрезная шайба	Spring
2	P85-002	Подшипник	Bearing (688AZ)
3	P85-003	Защитная крышка подшипника	Bearing Bushing
4	P85-004	Прижимной вал	Press Adjusting Bearing
5	P85-005	Блок настройки	Adjusting Block
6	P85-006	Пружина подшипника	Adjusting Bearing Spring
7	P85-007	Пружина блока настройки	Adjusting Block Spring
8	P85-008	Насадка регулировочного винта	Adjusting Nut
9	P85-009	Регулировочный винт	Adjusting Screw
10	P85-010	Держатель	Gasket
11	P85-011	Вал прижимного колеса	Resistance Wheel Bearing
12	P85-012	Прижимное колесо	Resistance Wheel
13	P85-013	Переднее прижимное колесо	Front Pressing Wheel
14	P85-014	Держатель переднего прижимного колеса	Front Pressing Wheel Support
15	P85-015	Подшипник	Bearing (688AZ)
16	P85-016	Защитная крышка подшипника	Bearing Bushing
17	P85-017	Втулка	Rear Pressing Wheel Bearing
18	P85-018	Держатель заднего прижимного колеса	Rear Pressing Wheel Support
19	P85-019	Заднее прижимное колесо	Rear Pressing Wheel
20	P85-020	Держатель заднего прижимного колеса	Rear Pressing Wheel Support
21	P85-021	Пружина заднего прижимного колеса	Rear Pressing Wheel Spring
22	P85-022	Основание держателя колес	Resistance Wheel Support
23	P85-023	Однонаправленный подшипник	Unilateral Bearing (HF0812)
24	P85-024	Однонаправленная втулка	Unilateral Bearing Bushing
25	P85-025	Пластина заднего держателя	Rear Support Stick
26	P85-026	Держатель нижних датчиков	Down Counting Sensor Support
27*	P85-027	Плата управления для моделей PRO 85 / 85	Master Circuit Board for model PRO 85/85U
27*	P85-027	Плата управления для модели PRO 85 UM	Master Circuit Board for model PRO 85UM only
28	P85-028	Правая часть корпуса	Right Side Board
29*	P85-029	Плата питания(только для модели PRO	Power Switch Box for model PRO 85UM only
30	P85-030	Правая крышка корпуса	Right Side Cover
31	P85-031	Стопорная шайба	Banknote Feeding Wheel Level cover
32	P85-032	Сетевой выключатель	Power Switch
33	P85-033	Задняя крышка,верхняя часть	Rear Cover (Upper)
34	P85-034	Сетевой разъем с предохранителем	Power Socket and Fuse Outlet
35	P85-035	Разъем	Switch Socket
36	P85-036	Задняя крышка,нижняя часть	Rear Cover (Downward)
37	P85-037	Зубчатое колесо вала подающих колес	Running Gear For Banknote Feeding
38	P85-038	Синхродиск	Disk
39	P85-039	Зубчатое колесо вала верхних колес	Upper Running Wheel
40	P85-040	Зубчатый ремень 246	Synchronized Belt 246
41	P85-041	Зубчатое колесо мотора привода	Synchronized Belt Wheel of Big Motor
42	P85-042	Датчик синхродиска	Disk Sensor
43	P85-043	Держатель датчика синхродиска	Disk Support
44	P85-044	Мотор привода	Big Motor
45	P85-045	Зубчатое колесо загрузочного вала	Banknote Feeding Wheel
46	P85-046	Зубчатый ремень 237	Synchronized Belt 237
47	P85-047	Вал подающих колес	Banknote Feeding Wheel Bearing
48	P85-048	Вехний напрвляющий ролик	Upper Leading Wheel
49	P85-049	Подающий ролик	Banknote Feeding Wheel
50	P85-050	Тормозящий ролик	Friction Wheel
51	P85-051	Вал загрузочных роликов	Banknote Feeding Bearing
52	P85-052	Верхнее колесо	Upper Wheel
53	P85-053	Загрузочный ролик	Banknote Feeding Wheel
54	P85-054	Вал верхних колес	Upper Wheel Bearing
55	P85-055	Основание корпуса	Bottom Board
56	P85-056	Левая часть корпуса	Left Side Board

57	P85-057	Корпус блока уф детекции в сборе с датчиками(P85-102 + P85-105)	Ultravoilet Detector box assy sensor (P85-102+P85-105)
58	P85-058	Веерное колесо	Wheel
59	P85-059	Вал	Bearing
60	P85-060	Зубчатый ремень 70	Synchronized Belt 70
61	P85-061	Мотор привода веерных колес	Stacker motor
62	P85-062	Зубчатое колесо мотора привода	Synchronized Belt Wheel of Stacker Motor
63	P85-063	Держатель веерных колес	Banknote-accept Wheel Support
64	P85-064	Втулка веерных колес	Banknote-accept Wheel Bearing
65	P85-065	Зубчатое колесо привода веерных колес	Banknote-accept Synchronized Belt Wheel
66	P85-066	Левая крышка корпуса	Left Side Cover
67	P85-067	Зубчатая рейка,левая	Synchro Gear (Left)
68	P85-068	Втулка	Synchro Gear Bearing
69	P85-069	Шестерня	Synchro Gear
70	P85-070	Шайба	Flat Gasket
71	P85-071	Винт	Cross Screwdriver Screw
72	P85-072	Зажимная пружина	Locating Gasket Spring
73	P85-073	Зубчатая рейка,правая	Synchro Gear (Right)
74	P85-074	Ограничитель банкнот,левый	Locating Gasket (Left)
75	P85-075	Верхняя крышка	Upper Cover
76	P85-076	Ограничитель банкнот,правый	Locating Gasket (Right)
77	P85-077	Крышка дисплея	Display Cover
78	P85-078	Держатель верхних датчиков счета	Upper Counting-sensor Support
79	P85-079	Ручка переноса	Retractable Handle
80	P85-080	Гайка	Retractable Handle Nut
81	P85-081	Шайба,D=4vmm	Flat Gasket (ø4)
82	P85-082	Винт,M4*8	Screw (M4*8)
83	P85-083	Уловитель банкнот	Stacker Plate
84	P85-084	Антистатическая пластина	Static Stick
85	P85-085	Приемный лоток	Banknote-accept Protector
86	P85-086	Основание нижних прижимных роликов	Downward Wheel Support
87*	P85-087	Пластина крепления датчиков толькл для	Sensor Board Support for model PRO 85UM only
88	P85-088	Магнитный сенсор	Magnetic Sensor for model PRO 85UM only
89	P85-089	Длинный магнитный сенсор	Long Magnetic Sensor for model PRO 85UM only
90	P85-090	Держатель подшипника	Bearing Support
91	P85-091	Нижние прижимные ролики	Downward Wheel
92	P85-092	Ось нижниж прижимных роликов	Downward Wheel Bearing
93	P85-093	Радиатор транзистора	Heat-way Support
94	P85-094	Ножка резиновая	Foot
95	P85-095	Держатель	Downward Wheel Support
96	P85-096	Пружина	Downward Wheel Spring
97	P85-097	Втулка	Bolt
98	P85-098	Накладка позиционирующая синхродиска	Locating Gasket of Disk
99	P85-099	Датчик автостарта	Hopper Sensor
100	P85-100	Датчик приемного лотка(поставляется в сборе:приемник и передатчик)	Stacker Sensor,assy receiver and transmitter
101	P85-101	Датчик счета,приемник	Counting Sensor
102	P85-102	Ультрафиолетовый датчик	Ultraviolet Sensor
103*	P85-103	Панель управления для модели PRO 85	PVC display panel for model PRO 85 only
103*	P85-103	Панель управления для модели PRO 85 U	PVC display panel for model PRO 85U only
103*	P85-103	Панель управления для модели PRO 85 UM	PVC display panel for model PRO 85UM only
104*	P85-104	Дисплейная плата для модели PRO 85	Display Circuit Board for model PRO 85 only
104*	P85-104	Дисплейная плата для модели PRO 85 U	Display Circuit Board for model PRO 85U only
104*	P85-104	Дисплейная плата для модели PRO 85 UM	Display Circuit Board for model PRO 85UM only
105*	P85-105	Ультрафиолетовая лампа	Ultraviolet Tube
106	P85-106	Трансформатор(только для моделей PRO-	Transformer for model PRO 85/85U only
107	P85-107	Резиновая накладка загрузочного ролика	Banknote transferring gear
108	P85-108	Резиновая накладка подающего ролика	Banknote feeding gear
109	P85-109	Датчик счета,передатчик	Counting Sensor,transmitter

Дополнение к сервисному мануалу счетчика банкнот PRO-85 UM.

Монтаж новой версии платы управления,ver. BJ-2021-MB-V1.2 2010-04-30

Завод-изготовитель внес изменения в конструкцию счетчика PRO 85 UM. Была модернизирована электрическая схема. Теперь плата управления сделана по технологии SMD монтажа.

Все разъемы на новой плате управления функционально идентичны разъемам на старой версии платы.

Порядок замены старой версии ver.BJ-21DC-MB1 2006-12-16. платы на новую версию BJ-2021-MB-V1.2 2010-04-30.

При возникновении неисправности, связанной с заменой платы управления или питания на счетчике банкнот в котором установлена старая версия платы необходимо:

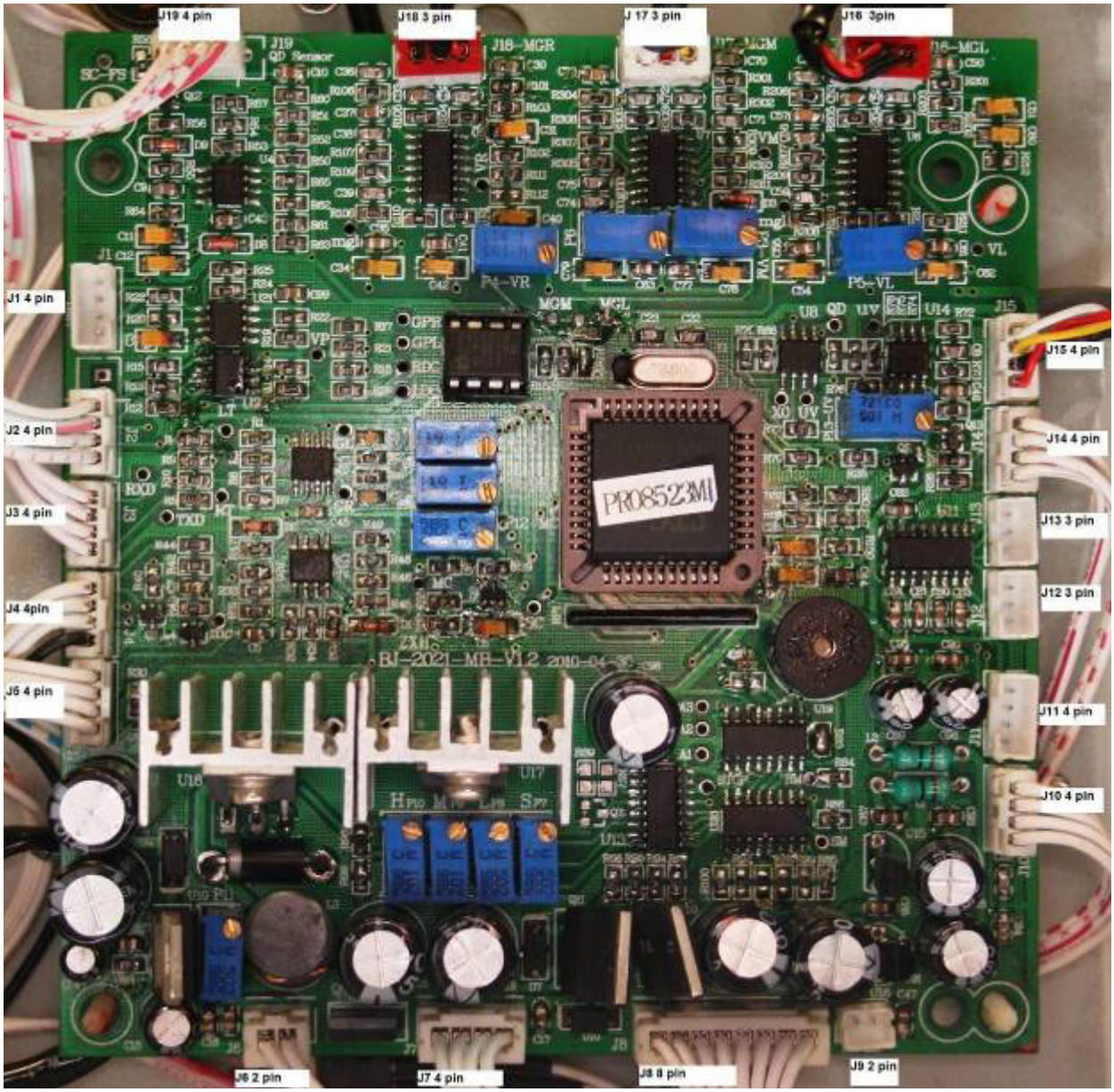
1. Инструменты: крестовая отвертка, пинцет, небольшие плоскогубцы .
2. Разборка счетчика

- Перед разборкой убедитесь в том, что счетчик отключен от напряжения в сети.
- Демонтируйте заднюю стенку. Для демонтажа необходимо открутить два винта, удерживающие ее.
- Демонтируйте правую боковую крышку корпуса. Для этого: открутите два винта на правой боковой крышке корпуса, винты расположены: один в приемном отсеке ,один за задней крышкой.. Также необходимо отвинтить да винта ,удерживающие крышку на основании корпуса.
- Отсоедините все разъемы кабелей .которые соединены с платой управления.
- Плоскогубцами необходимо сжать распорки пластиковых пистонов, которыми закреплена плата управления к корпусу и извлечь плату.

Маркировка и соответствие разъема.Обозначение разъема:**JXXX**(номер разъема) **X**(количество контактов)pin		Состояние	Функционал
Старая версия BJ-21DC-MB1 2006-12-16.	Новая версия BJ-2021-MB-V1.2 2010-04-30.		
J9 4PIN	J19		Датчики приемного лотка
J10 4PIN	J2		Дисплей
J2 4PIN	J3		Датчики счета
J3 4PIN	J4		МС датчики
J4 4PIN	J5		Датчики накопительного лотка
Q1	нет	Не используется в новой версии	Транзистор TIP127
J7 2PIN	J6		Мотор привода веерных колес
J6 4PIN	J7		Основной двигатель

J5 8PIN	J8		Питание на главную плату,выключатель.
Нет, или есть на некоторых версиях	J9		Разъем подключения питания выносной мыши
J401 3PIN	нет	Не используется в новой версии	Разъем для включения стабилизатора напряжения L7805CV
J11 4PIN	J10		Разъем включения внешного дисплея
нет	J11	Не используется	Для изменения программного обеспечения
J1 4PIN	J14		Разъем подключения ИК датчиков
J8 4PIN	J15		Разъем подключения УФ датчика
Нет	J12	Не используется	Для подключения принтера
нет	J13	Не используется	Для подключения компьютера
J301 2PIN	J17 3PIN	Необходим переходной кабель 2pin-3pin	Центральный магнитный датчик
J201 3PIN	J16		Левый магнитный датчик
J101 3PIN	J18		Правый магнитный датчик

3. Сборка и установка новой платы.
    - Установите новую версию платы в пластиковые пистоны, до щелчка.
    - Соедините все кабели так как указано в таблице.
    - Новые версии плат ,которые будут поставлять как запасные части ремонта счетчиков в которых были установлены старые версии плат будут комплектоваться все необходимы переходными кабелями. Если кабели по какой причине не поставлены то:
    - Для подключения разъема J17 необходимо изготовить переходной кабель с 2 pin разъема на 3pin или просто запаять кабель на плату.
    - Разъем J9 (разъем подключения питания выносной мыши) также просто запаять на плату.
    - Для удобства монтажа и тестирования все разъемы на новой версии платы подписаны по своему функциональному назначению.
    - Стабилизатор питания L7805 не демонтировать, просто разъем никуда не подключаем.
    - Транзистор Q1 демонтировать не нужно, просто разъем никуда не подключается.



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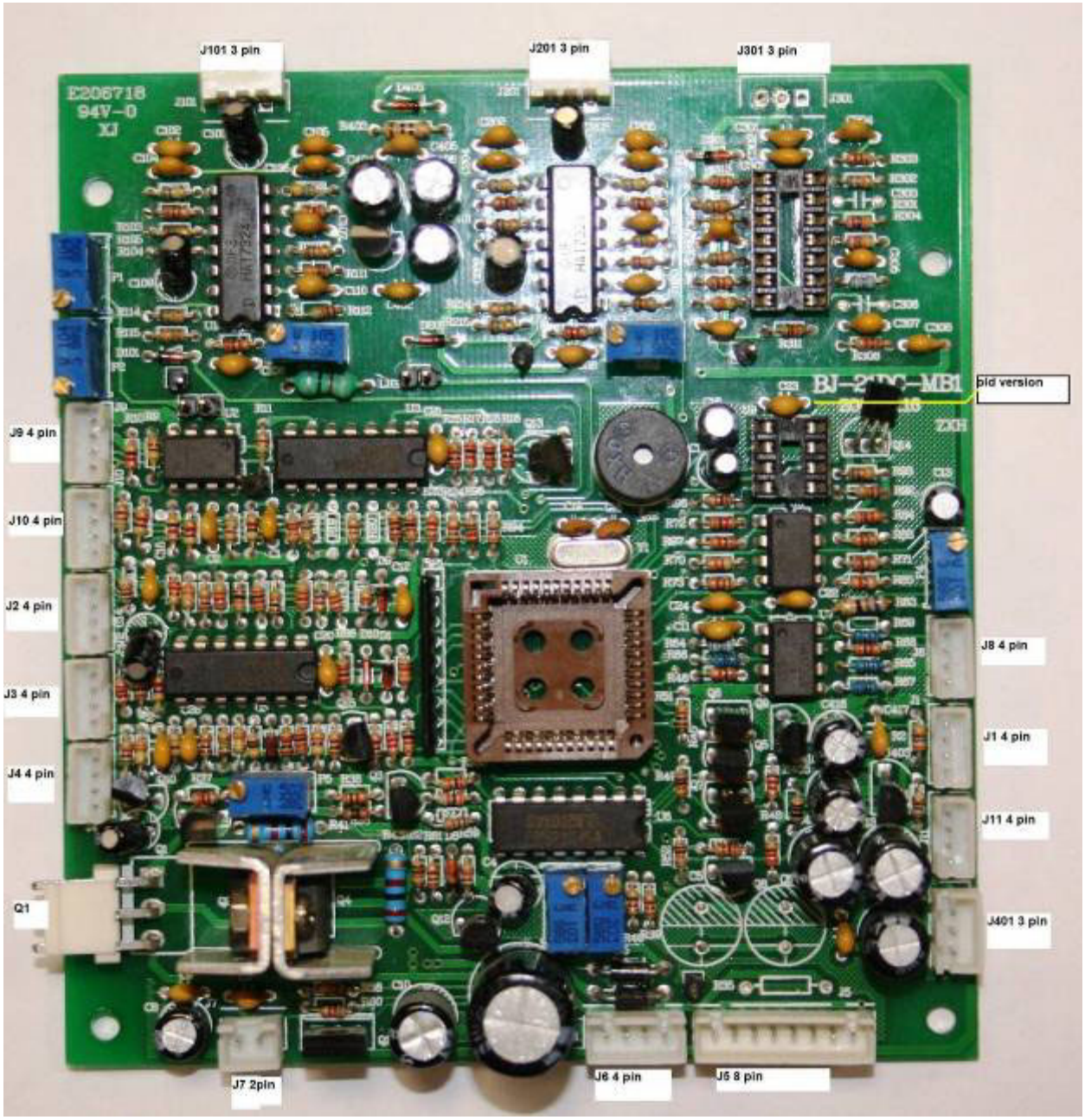

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После того как все разъемы правильно установлены, уложите аккуратно все кабели и установите пластиковую боковую крышку.

Установите заднюю крышку корпуса.