

Fully Auto Hematology Analyzer

Service Manual



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Chapter 1 INTRODUCE

1.1 Name :

SK8800 fully auto hematology analyzer.

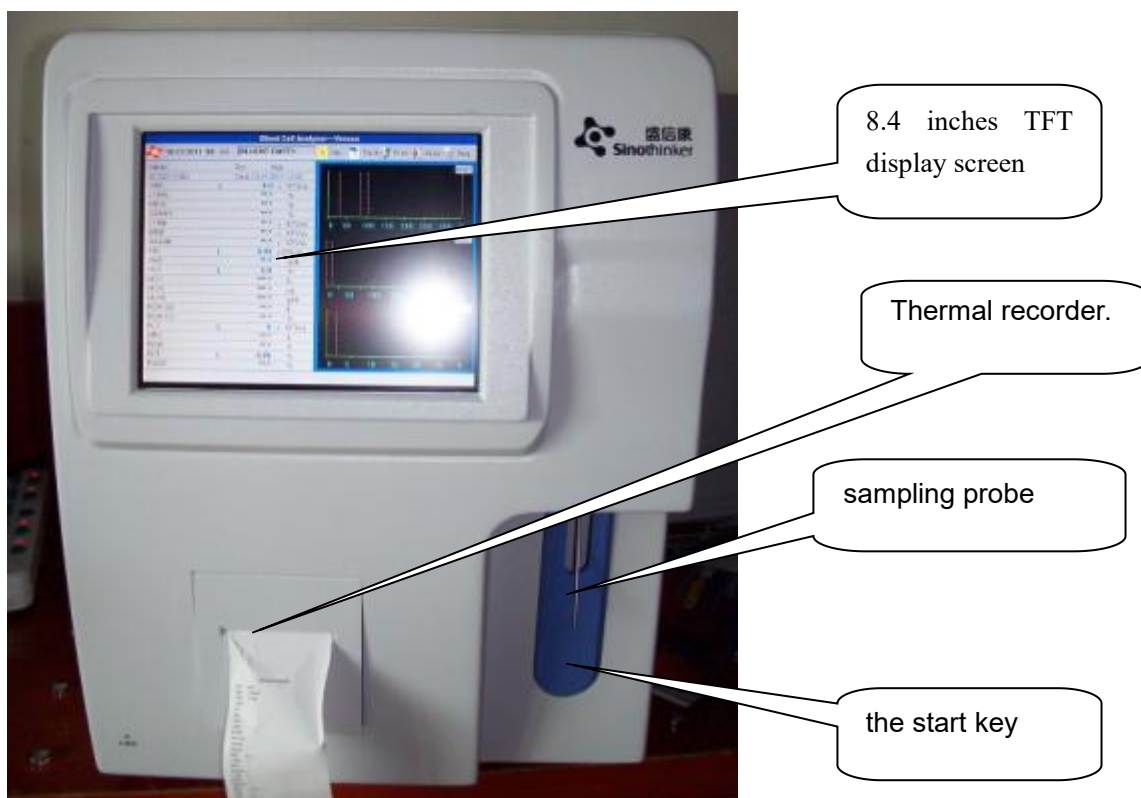
1.2 Structure:

Host and accessories.

1.2.1 Host

Control the process of sample gather, dilution and analysis, include following units:

1. Power Supply.
2. Central control circuit.
3. Dilution unit
4. Display unit.
5. Thermal recorder.在



1.2.2 Accessories

Include the follows:

1. PS/2 mouse.
2. PS/2 keyboard.
3. Printer (Optional)

1.2.3 Rear panel

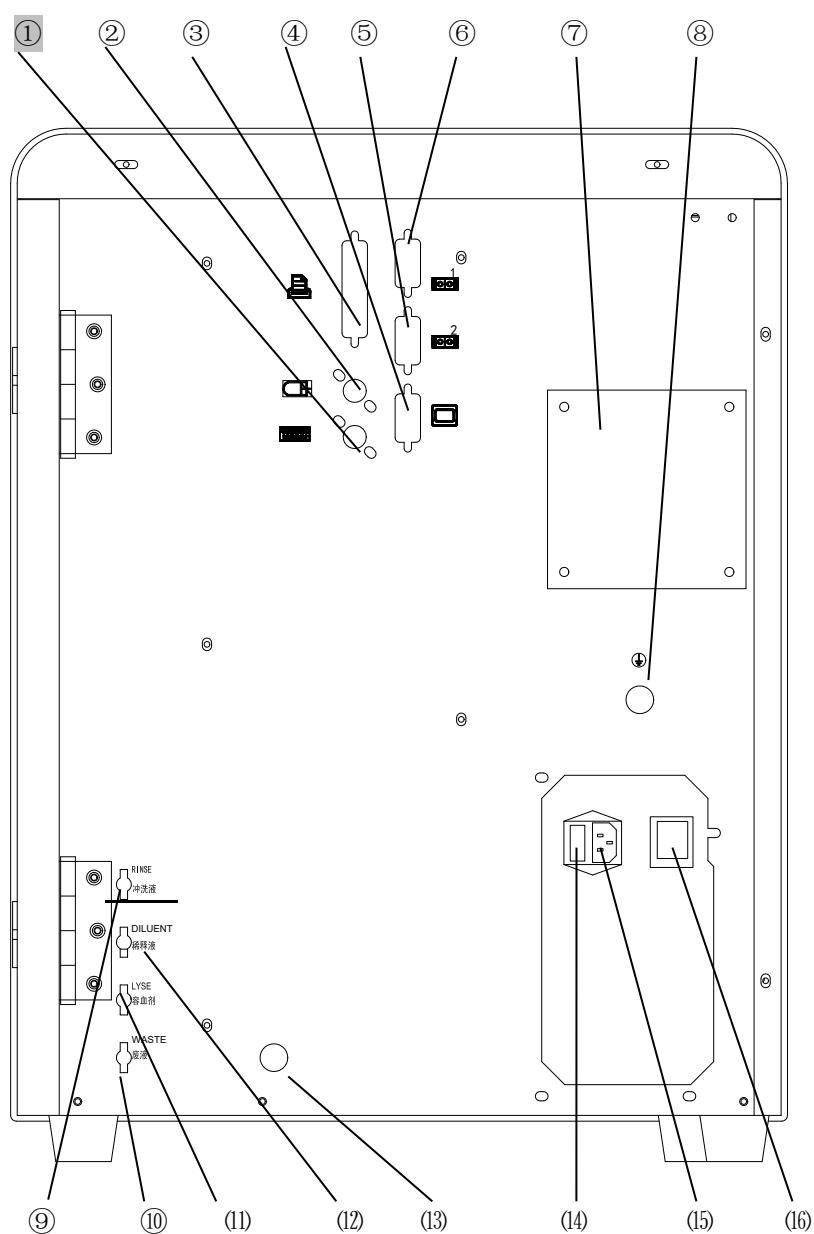


Figure 1-2

- | | | |
|-------------------------|----------------------------------|---------------------------|
| ①: PS/2 keyboard socket | ②: PS/2 mouse socket | ③: Printer socket |
| ④: RS-232 socket 2 | ⑤: RS-232 socket 1 | ⑥: VGA socket |
| ⑦: Air filter | ⑧: Equipotential ground terminal | |
| ⑨: LYSE connector | ⑩: WASTE connector | |
| ⑪: DILUENT connector | ⑫: RINSE connector | ⑬: WASTE sensor connector |
| ⑭: Fuse holder | ⑮: Power source socket | ⑯: Power switch |

1.2.4 Right Door

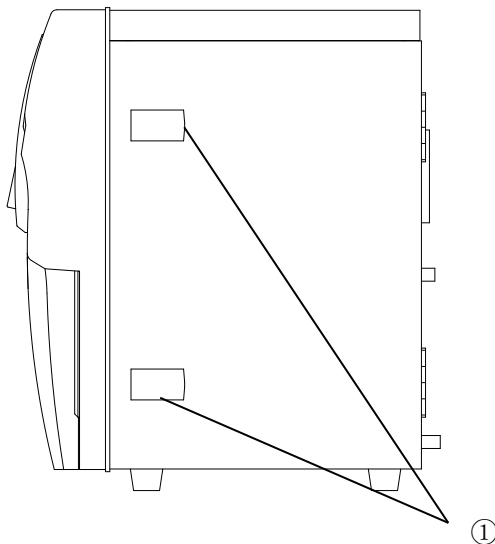


Figure 1-3

①: Side door fastener.

1.3 Detection principle:

Blood cell count: Electrical resistance detection

Hemoglobin: Cyanmethemoglobin optical detection

Sample Volume:

Venus mode: 9.6μL Venus

Capillary mode: 9.6μL Capillary

Prediluted mode: 9.6μL Capillary

Single Sample Use Volume:

DILUENT: 20 mL

RINSE: 4 mL

LYSE: 0.35 mL

1.3.1 Detection principles of WBC,RBC,PLT

The instrument method accurately counts and sizes cells by detecting and measuring changes in electrical resistance when a particle (such as a cell) passes through a gem aperture sensor.

a) Sample is diluted in a conductive liquid, blood cell is badness conductor, but diluent is well conductor, there are big difference between them.

b) As each cell goes through the gem aperture sensor, current goes through the two electrode nearby.

c) When cell goes through the aperture, the resistance is increase as cell volume increase. As figure1-4. According to the Ohm formulary: $U=RI$ (U =Voltage I =Current R =Resistance), If I is invariableness, U is increase as cell volume increase.

d) Treat by magnify circuit, the voltage signal is amplificatory and background noise is removed, then can receive the signal to analysis. As Figure 1-5.

e) WBC is analyzed by the test counter and detect circuit, RBC and PLT are analyzed by another test counter and detect circuit. The MPU analyze and calculate the cells, then give the histograms.

f) The count of PLT adopt the advanced liquid, electron and soft system, it's can settle the repetitive count of the cells. If RBC enter the analysis area, they will have a similar pulses with PLT, it may cause confusion as repetitive count.

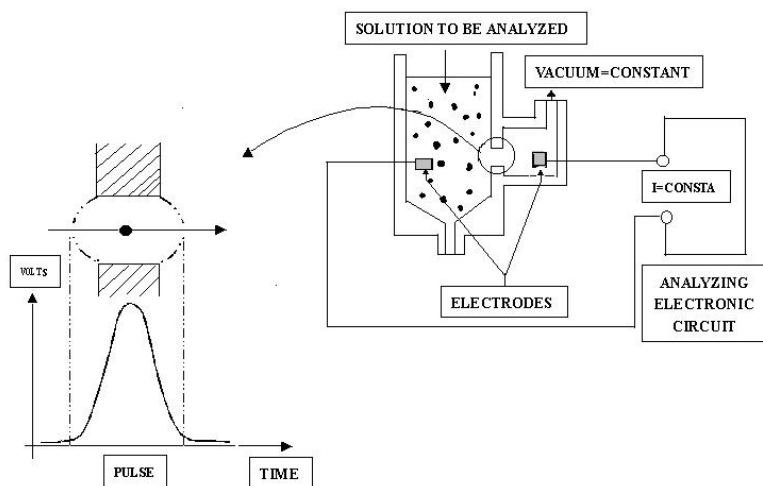


Figure 1-5

1.3.2 Measurement Principle of HGB

Lyse added into the blood sample would crack the membrane of red blood cell promptly and transfer into a kind of compound which can absorb the wavelength of 540 nm. Through the comparison of the absorbance between the pure diluent and the sample, the density of sample hemoglobin is calculated.

1.3.3 Volume of Blood Cell

For the correspondence between the quantity of pulse and the cell across the aperture, also the amplitude of the pulse and the volume of the cell, the instrument measures each cell and classifies it according to its volume by a pre-set classification program. All the cells fall into categories (WBC, RBC, PLT etc.) as follows:

WBC	120—1000	fL
RBC	82—98	fL
PLT	2—35	fL

According to the volume, leucocytes handled by lyse can be subdivided into three categories: lymphocyte(LY) median (MO), granulocyte (GR).

LY	35—90	fL
MO	90—160	fL
GR	160—450	fL

1.3.4 Methods for Parameter Measurement

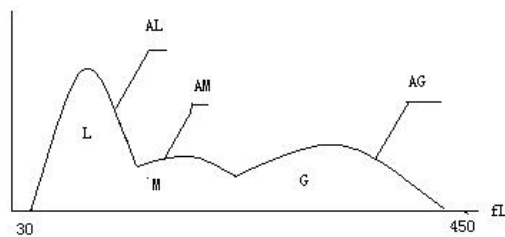
The parameters of blood test are expressed in 3 ways :

- Direct way, such as WBC, RBC, PLT, HGB.
- Histogram, such as LYM%, MID%, GRAN%, MCV, RDW-SD, RDW-CV, MPV, PDW, P-LCR.
- Derivation from certain formula, such as LYM#, MID#, GRAN#, HCT, MCH, MCHC, PCT.

The derivation formulas are as follows:

- MCV is determined by measuring the average volume of individual erythrocytes. This number is multiplied by a coincidence correction factor and a calibration factor. The reported value expresses MCV in femtoliters.
- RDW represents the size distribution spread of the erythrocyte population derived from the RBC histogram. It express the coefficient of variation as RDW-CV, the units is %, and express the standard difference as RDW-SD, the units is fL.
- MPV is the average volume of individual platelets derived from the PLT histogram. It represents the mean volume of the PLT population and expressed in femtoliters (fL).
- PDW is derived from the PLT histogram, It represents the geometry standard difference (10 GSD) of the volume of the PLT population.

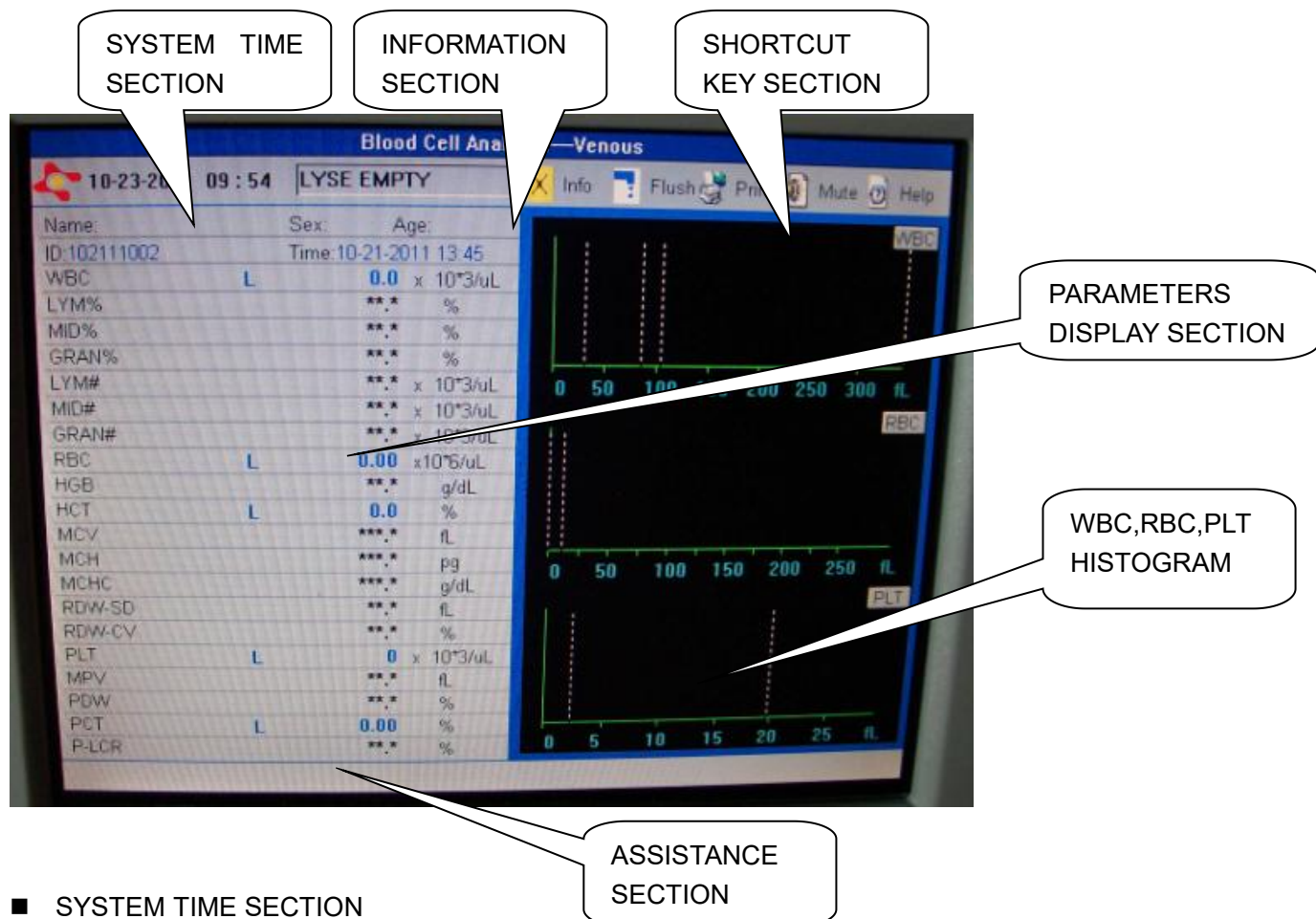
- P-LCR is derived from the PLT histogram, It represents the ratio of the bigger PLT and expressed in %.
- $HCT(\%) = RBC \times MCV / 10$
- $MCH(pg) = 10 \times HGB / RBC$
- $MCHC(g/L) = 100 \times HGB / HCT$
- $PCT(\%) = PLT \times MPV / 10$
- $LYM\% = 100 \times AL / (AL + AM + AG)$
- $MID\% = 100 \times AM / (AL + AM + AG)$
- $GRAN\% = 100 \times AG / (AL + AM + AG)$
- $LYM\# = LYM\% \times WBC / 100$
- $MID\# = MID\% \times WBC / 100$



- $GRAN\# = GRAN\% \times WBC / 100$
- AL: Number of cell in area of LYM;
AM: Number of cell between area of lymphocyte and area of granulocyte;

1.4 Display Screen introduce

Classed by following area:



Show the date and time of system

■ Information SECTION

Show the prompt information.

■ SHORTCUT KEY

Show the shortcut key.

■ WINDOWS DISPLAY SECTION

■ Show the result.

■ ASSISTANCE SECTION

You can operate this Instrument by menu, press right key of the mouse direct the function

Menu: move the mouse to the textbox, choose the function you want. Click left key of the mouse to cancel this operation.

The common function shows at the top right corner of the screen as shortcut key, click the shortcut key to choose the function you want.

Function is as follows:

Sample Mode: Choose the sample modes. There are three modes: venus, capillary, prediluted .

Add Diluent: Add the diluent through the probe. It's on the state of predilutions.

Info edit: Enter the new sample information window, input or modify the information.

Adjust graphics: Enter the histograms window, handle the histogram.

Print: Export currently sample data to the appointed printer.

Function: enter the function menu.

Mute: Stop the alert.

Help: Directs to system help window

About: Direct the edition and copyright of instrument.

Shutoff: Startup the shutoff program to rinse the measurement units automatically. Please switch off the power supply after the display of "Please Switch Off".

Review: Direct the review window, review, inquire and change the measurement data.

Calibration: Direct the calibration window to calibrate the instrument.

Quality Control: Directs to quality-control window to process QC.

Setting: Directs the setting menu.

Service: Directs the service menu.

Manual Adjust: Direct the manual adjust window.

Auto Adjust: Direct the auto adjust window.

QC Edit: Direct the QC edit window, edit the QC parameters.

QC Run: Direct the QC running window, running the select file.

QC Graphs: Direct the QC figure window, display the QC file in figures.

QC Table: Direct the QC list window, display the QC file in list.

Time: Direct time setting window, setting the time of instrument.

Print: Direct the print window, setting the equipment or report forms.

Department: Direct reference data window, rewrite the reference data.

Doctor: Direct doctor information setting window, setting the information of doctors such as name, input, department and states.

Flush: Get rid of the aperture clog.

Enhanced Flush: get rid of the hard aperture clog.

Rinse: running the normal process, rinse the measurement units.

Enhanced Rinse: Rinse the measurement units with RINSE.

Drain Chambers: Empty the liquid of counter.

Park: Running the Park program, rinse and empty the tubing.

Prime diluent: Fill the diluent into appointed tubing.

Prime lyse: Fill the diluent into appointed tubing.

Prime rinse: Fill the rinse into appointed tubing.

Maintenance: Running the MAINTAIN program to maintain the instrument.

Mechainc: Direct the Mechainc window, detect the function of instrument.

Special: Direct the special window, service the instrument.

Chapter 2 INSTALLATION

2.1 Pack

When you receive your instrument, carefully inspect the carton. If you see signs of mishandling or damage, file a claim with the carrier immediately. Make sure the unbroken packing, install it as follows:

2.2 Pre installation Checks

Take instrument and accessories from the carton, conserve the packing material for future transport. check accessories according to packing list. Check the state of instrument and accessories.

2.3 Installation requirements

2.3.1 Ambient Requirements

Put instrument at flat and clean platform. Avoid of sunshine and dust.

Keep ambient operating temperature between 18~35 ° C, and humidity no higher than 70%, atmospheric pressure between 86.0~106.0Kpa.

CAUTION:

Keep avoid of sunshine.

CAUTION:

Keep avoid of high-power equipment such as Centrifuge, CT, MRI, X-ray.

CAUTION:

Do not use radiate equipment nearby, it may cause interferon.

2.3.2 Space Requirements

At least 20cm on each side is the preferred access to perform service procedures.

NOTICE:

Put reagent at the same high.

2.3.3 Power Requirements

Check for the availability of a power connector:

- 220(1±10%)VAC
- 50 Hz
- 150VA

WARNING:

An independent grounded power socket, grounding voltage is no more than 0.5V.

WARNING:

A grounded outlet is required to connect with the grounding pole on the rear panel. Be sure to guarantee the security of the work site.

CAUTION:

Power will seriously decrease the performance and reliability of the instrument. Proper action such as the installation of UPS (not provided by manufacturer) should be taken before operation.

2.4 REAGENT CONNECTIONS

There are three tube connectors in the back panel with color of red, green, blue. each of which is wrapped with a cap to avoid contamination. Uncover and store the caps carefully on first installation.

2.4.1 LYSE CONNECTIONS

Place the LYSE packs (red) at the reagent storehouse nearside instrument.

Tubing the tube marked LYSE into LYSE packs, then screw down the cover.

2.4.2 DILUENT CONNECTIONS

Take out the DILUENT tube (green) with green connector, attached it to the connector with the same color in the back panel.

Put the other side of the tube in the DILUENT packs, then screw down the cover.

2.4.3 RINSE CONNECTORS

Take out the RINSE tube (blue) with blue connector, attached it to the connector with the same color in the back panel.

Put the other side of the tube in the RINSE packs, then screw down the cover.

2.4.4 WASTE CONNECTOR

Take out the WASTE tube with black connector, attached it to the connector with the white color in the back panel.

Connect BNC plugs with BNC socket marked "WASTE" in the back panel.

Screw down the WASTE collection container cover.

 **CAUTION:** Ensure all the tube in a natural condition, without distortion.

 **CAUTION:** Install the tubes with hand working, do not use tools.

 **CAUTION:** Use the suitable reagent with instrument. Otherwise it may cause inaccurate result or damage the instrument.

 **CAUTION:** Keeping reagent from sunshine.

 **CAUTION:** Abandon the residual reagent when change reagent pack, do not pull it into new reagent pack, it may cause pollution.

 **CAUTION:** Keeping the tube away from other things, avoid of pollution.

 **CAUTION:** Do not use the frozen reagent.

 **CAUTION:** Do not use the expired reagent.

 **WARNING:**

The waste must be handled with biochemical or chemical methods before outlet to the drainage, or it will cause contamination to the environment. Hospital and laboratory have obligation to follow the environmental regulation of municipal government.

2.5 recorder paper Installation

- a) Rip the adhesive tape of the recorder door.
- b) Gently press the recorder door and open it.
- c) Insert the new paper (Paper width: 57.5mm, diameter: < 50mm) against the paper mouth, let the print side towards the thermal head.
- d) Pull the paper in the other side of the printer, keep it straight.
- e) Pull the paper through the paper exit.

As follows:



2.6 Keyboard and Mouse Installation

Remove keyboard, mouse from the shipping container.

Plug keyboard cable into a socket marked  in rear panel.

Plug mouse cable into a socket marked  in rear panel.

The keyboard and mouse can place on the convenient place your thinking, we propose laying under the display screen of the instrument, the mouse cushion is laid in the right side of the keyboard, the mouse is put on the mouse cushion.

2.7 Printer Installation(Optional)

Remove the printer from the shipping container along with the manual. Install the printer according to the printer's manual.

NOTICE:

Plug printer cable into a socket marked  in rear panel.

Plug printer cable into a socket marked  in rear panel.

2.8 Cable Connection

The switch which guarantees the instrument back plate is in the state of closing (0), inserts the hole end of the cable plug in the instrument outlet, insert another end of the cable in a power socket. Connect the earth post of the back plate of host computer with earth connection directly.



WARNING:

Ensure the power is suitable for the requirement.

Chapter 3 Sample Analysis and daily use

3.1 Before Start

Check the instrument as follows:

- Check the tubing is in good place without distortion.
- Check the cable and socket.

c) Check the connection of the accessories.

3.2 Start The Instrument

Open the power of printer

Turn on the power switch, the indicator lamp in the front panel light , the instrument begins initializing. Then the instrument direct the examine window, detect the reagent volume, and clean the liquid way. Since examining and finishing, the instrument has entered the blood cell analyzing window. As follows:

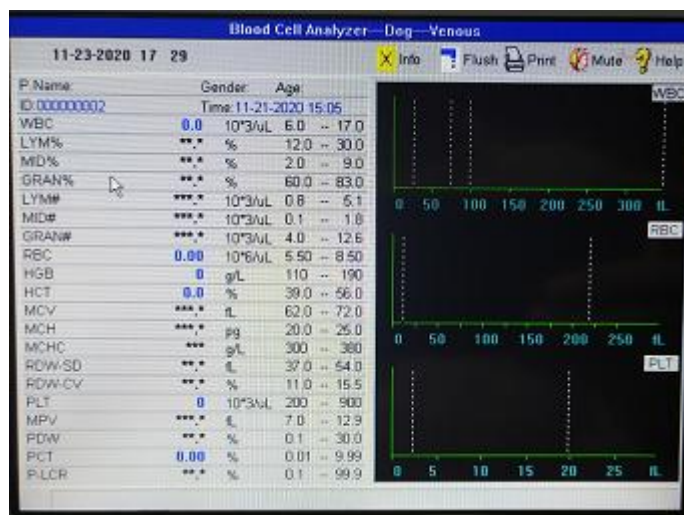


Figure 3-1

3.3 Background Test

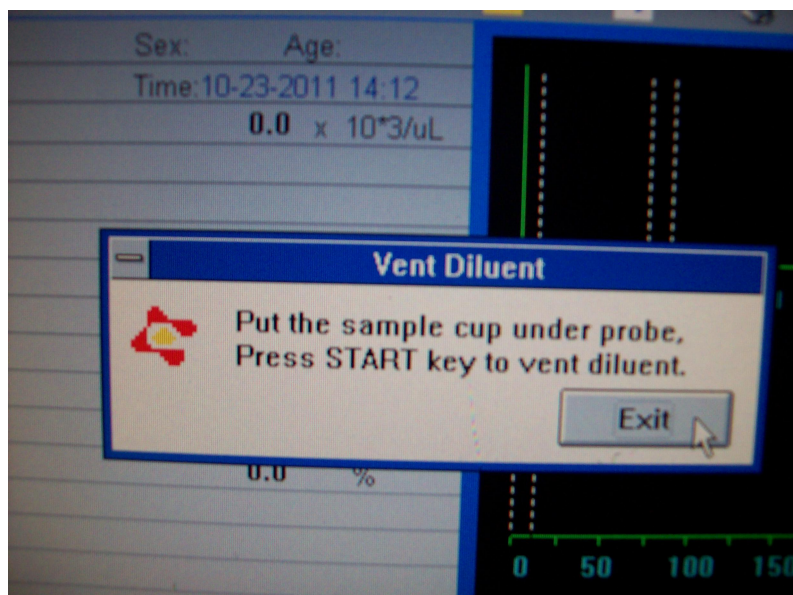
After the instrument starts normally, must carry on the background test before testing the blood sample, the step is as follows:

a) In the main interface, press the mouse right key, press “Information”, enter the edit window, click the textbox, change the ID. to 999, then press OK, return to blood cell window.



b) Directly click the start key to start background test in the mode of venous or capillary. If the mode is prediluted, it needs suck the diluted first. The method is as follows:

- 1) Press the mouse right key in the main interface, choose “Sample Mode” as “Prediluted ”
- 2) Press the mouse right key in the main interface, then click the “Diluent”, display an follows:



- 3) Put a clean sample cup under sampling probe, press the Start key, the instrument discharges the diluent into the sample cup (The volume is enough for twice background test)
- 4) Press EXIT key, return to the main interface.

c) The accept range of the background data shows as table 3-1.

Parameters	Data	Unit
WBC	≤ 0.3	103/uL
RBC	≤ 0.03	106/uL
HGB	≤ 2	g/dL
HCT	≤ 0.5	%
PLT	≤ 25	106/uL

Table 3-1

If this background test data exceeds this range, repeat the above test step, until it can be accepted. If carry on five times, the data didn't reach the requirement still, please according to this manual of chapter 10 "troubleshooting".

Notice:

Input the serial number (999)instrument can only test WBC , RBC , HGB , HCT , PLT five parameters .

Notice:

The serial number for the background test that the systems soft ware established is: 999.

3.4 Quality Control

At first installation or before testing the blood sample every day, Please test quality control blood, if the result is correct, you can test sample. If the result is not correct, refer to look at user manual chapter 4 " Quality Control ".

3.5 Counting and analysis

Counting and analysis as follow steps.

3.5.1 Manual input

In the main interface, click **Info**, spring data editor window, click the input text frame or checkbox with mouse. Click **OK**, the instrument keeps the data and returns to the main interface. Click cancel, the instrument cancels the data and returns to the main interface.

Name:Can input 12 letters at most.

Sex: Can choose ladies or gentlemen, if has not chosen, the default is blank.

Age: Can choose year, month and day. Can input 3 figures at most while choosing year. Choose the month and day, can input 2 figures at most.

Blood: Can choose A, B, O, AB, Rh +, Rh- . If has not chosen, the default is blank.

Sample:The currently sample type.

Case NO.: Can input 12 letters at most.

Bed NO.: Can input 12 letters at most.

Serial NO. The introduction range can be: 001 --998. System has a intelligent number manager that will add the date number to the input number then form a final number. If has not input the serial number , the instrument will add one serial number as this sample automatically on the basis of previous serial number everyday begin as 001 .

Department: Can input 12 letters at most, or choose the information recorded, or input the code of the department.

Send by : Can input 12 letters at most. or choose the information recorded, or input the code of the doctor.

Inspector: Can input 12 letters at most. or choose the information recorded, or input the code of the doctor.

Operator: Can input 12 letters at most. or choose the information recorded, or input the code of the doctor.

Reference: Can choose current and men, woman, child, neonate , a self-defining 1 , self-defining 2 , self-defining 3 , automatic . While choosing automatic, the instrument provides the reference value automatically by table3-2.

Reference value	Age	Sex
current	Not input	Blank ,Man, Woman
current	>13 years old	Blank
current	>13 years old	Man
woman	>13 years old	woman
child	>1 month and<=13 years	Blank ,Man, Woman
neonate	< 1month	Blank ,Man, Woman

Table 3-2

Notice:

No.999 is the special number of background test, please don't input this number when test the formal blood sample.

3.5.2 Count and analyze

- Put the sample cup under the probe, press the START key.
- The instrument begins to analyze samples automatically, please wait for the analysis result.
- After this processing, the result will display on the window with the histogram of WBC, RBC, PLT. If the operator sets up the automatic record " on " or autotypes " on", the recorder or printer will type the test result automatically .

If there has clog or bubbles in the process, the information section would display the flag of “Clog failure” or “Bubble”.

3.6 Turn Off

Please carry out the Shut Down procedure after test the blood sample or off duty every day, the instrument will carry on the maintenance and wash the measuring tube.

The step is as follows:

- a) At the **blood cell analyzer** window press the right key of the mouse, click **SHUTDOWN** in the menu, the screen springs the close window, as Fig. 3-3 shows.
- b) Click **Cancel** then can return to the **blood cell analyzer** window.
- c) Click **OK**, the instrument would carry on the maintenance and wash the measuring tube. When finished the Shut Down procedure, the screen shows” Thank you for use, please Turn off the instrument now” turn off the power on the back panel.
- d) Turn off the printer power, clean the workbench and dispose the waste.



Figure 3-3

NOTE:

Do not turn off the power switch directly without carry on the Shut Down procedure.

Chapter 4 Notice of daily use

4.1 Blood Sample Collection

The sample have two kinds of vein blood and Preipheral Blood.

 WARNING:

Don't touch sample, controls and calibrators in any condition and must according the laboratory or clinical operational procedure that has been already set up while dealing with these articles

4.1.1 Vein Blood (Total Blood) Collection

Utilizes vein puncture to adopt the vein blood, put to the sample cup containing anticoagulant EDTA two potassium (EDTA-K₂•2H₂O), anticoagulant EDTA two potassium can keep the shapes of red blood corpuscles , leucocyte not changing , at the same time , can suppress the blood platelet to assemble . The blood volume is 1.5—2.2mg/ml.

4.1.2 Capilllary Collection

■ Sampling Position:

Adult: Inner middle finger or ring finger of left hand.

Child: Middle finger

Infant: Outer of the thumb or foot

■ Sampling method:

1. Massage the sampling position gently for congest, wipe the position skin with tampon contains 75%ethanol, then airing it.
2. Puncture the position with sterile probe as pinch the position, the depth is about 2-3mm.
3. Wipe off the first glob of blood, then start collection.
4. Press the wound when finish it.

NOTICE:

Collect the blood as criterion. The normal method is part puncture as fingertip puncture.

 Caution:

It is suggest that give a pressure far from the wound if the blood is not smoothly. Do not give a pressure around the wound, otherwise the histiocyte may mixed in the blood and the result would not

correct.

4.1.2.1 Prepare the Sample in the Pre-diluted Mode

At the blood cell analyzer windows, choose Sample type in the main menu, select **Pre-diluted** mode. Then select **Prime Diluted**, it will spring a add dilution windows, Put a clear sample cup under the probe, press START key, the instrument will add diluent 2mL.

Adopt 20 μ L capillillary into 20 μ L blood cup, wipe the outer of the cup, then fill the blood in to sample cup.

Caution:

Put the sample cup under the probe acclivitous, the liquid would flow along the cup wall, avoid of bubbles.

Caution:

If the sample need prepare in a batch, user can use the Add dilution function fill the dilution continuously.

4.1.2.2 Prepare the sample in the Capillillary Mode

Adopt 40 μ L capillillary into 40 μ L blood cup, wipe the outer of the cup, then fill the blood in to sample cup. Fill the blood into the bullet sample cup is admitted.

4.1.2.3 Mix blood

Shake up the blood sample before test, the suggest method is: shake up the cuvette up and down 3-5 minute. Sinothinker company recommend to use the blood mixer, it could make sure the blood is mixed very well and ensure the correct of result.

Caution:

If the blood sample placed long time or mixed not really, it will cause a incorrect result.

Caution:

Do not shake up the blood cup.

Caution:

The sample can store in 4 hours in the room temperature, the test must be finished in 4 hours.

4.2 Flag

4.2.1. prompting Flag

“**B**” means bubble in the test.

“**C**” means clog in the test

“**L**” means the result is lower than the limit.

“**H**” means the result is higher than the limit.

“***” means inefficacy data.

NOTICE:

When PLT histogram presents PM alarm, the parameter test value of PDW is ***.

NOTICE:

If the test value of WBC is smaller than $0.5 \times 10^9 / L$, the instrument is not classify the leucocyte, all parameter value correlated with WBC would show ***.

4.2.2 Histogram Flag

“**R1**” means the left side of the lymphocyte is unusually, possible reason: RBC haemolysis is not complete , platelet condenses , enormous platelet , plasmodium , nuclear red blood cell , unusual lymphocyte , condensation globulin,etc.

“**R2**” meas the area among the lymph and monocyte is unusually , possible reason: Heteromorphic lymphocyte, unusual lymphocyte, plasmacyte, eosinophilic granulocyte, basophilic granulocyte

increase, erythroblast .etc

“**R3**” means the area between the monocyte and granulocyte is unusually , possible reason: There are immature cells , unusual cell and eosinophilic granulocyte exist.

“**R4**” means the right side of the granulocyte unusually, possible reason: granulocyte number increases

“**RM**”: Many area exist unusually , possible reason: The above many kinds of reasons exist together.

“**PM**”: Brief on the intersection of platelet and red blood cell unusually, possible reason: platelet condense , big platelet , small red blood cell , cell chip and fibrin exist.

4.3 Result Modification

If the auto division can not meet the demand of special sample of clinic or laboratory, user can adjust the histogram by himself.

Operate as the follows steps:

- At the **blood cell analyze** window, select **Figure adjust** function in the menu, enter the Figure adjust windows, as figure 3-2 shows. Press Figure, select the histogram you want to adjust.
- Press **Line** button, select the line you want to adjust.
- Press **Left** or **Right** key, remove the line left or right, the data of line would be showed on the top right corner of the screen.
- Press **Exit** button when finished the adjust. If this operation did not change any data, the system would back to the **blood cell analyzer** windows directly. Otherwise the it will spring a affirm dialog, click Cancel button, cancel the current result, click OK button, save the current result.

⚠Caution:

The improper adjust action may cause incorrect result. Please ensure the necessary of the action.

Notice:

When the test result of WBC is less than $0.5 \times 10^9/L$, the system would not class the WBC automatically.

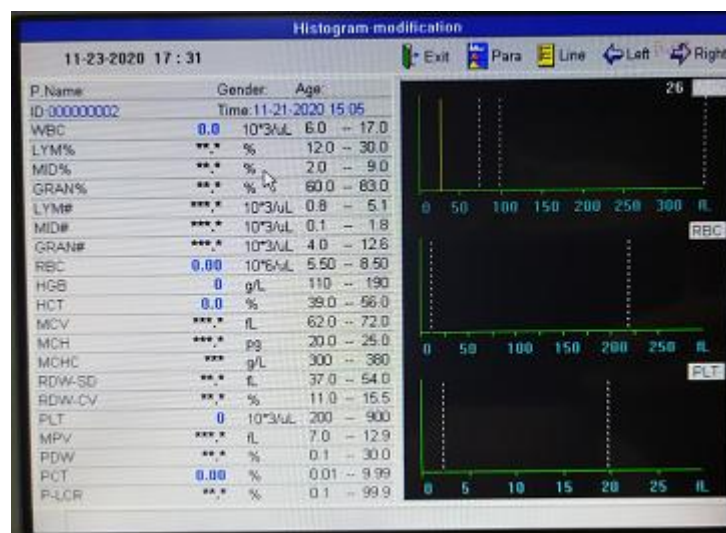
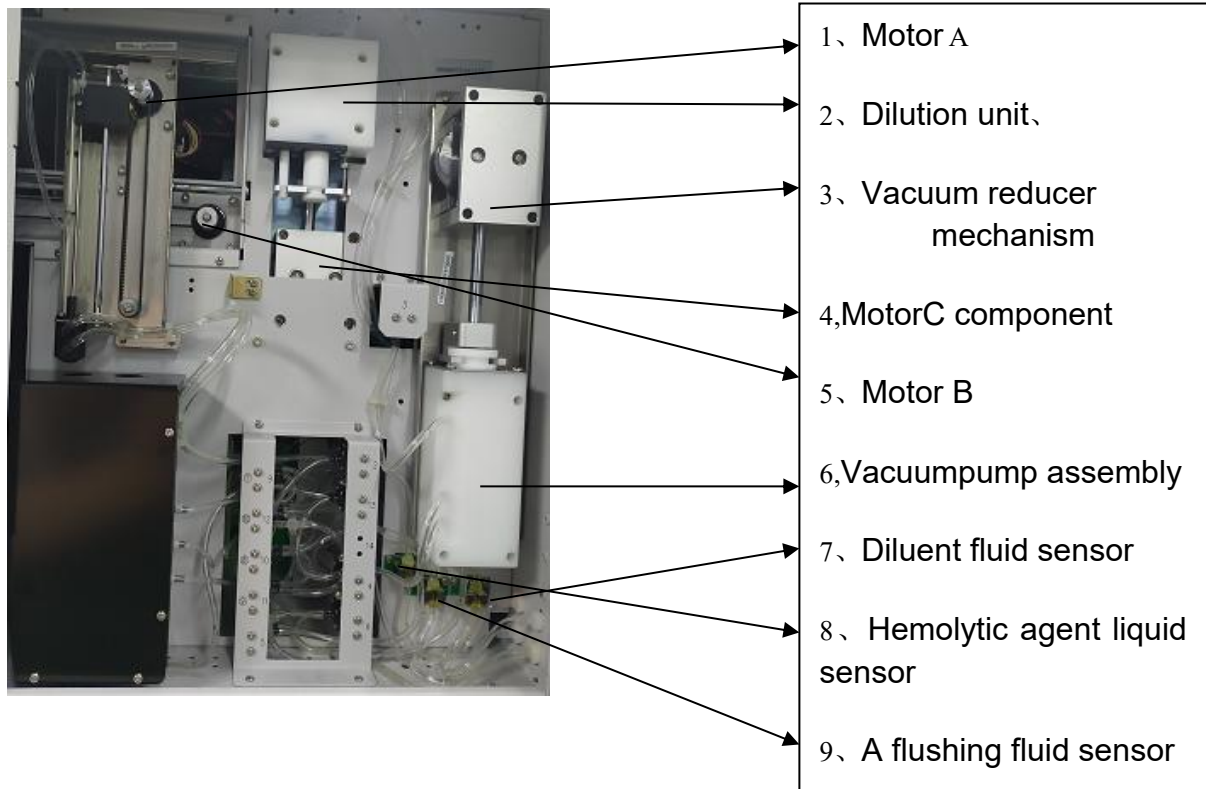


Figure 3-2

Chapter 5 inner Structure introduce

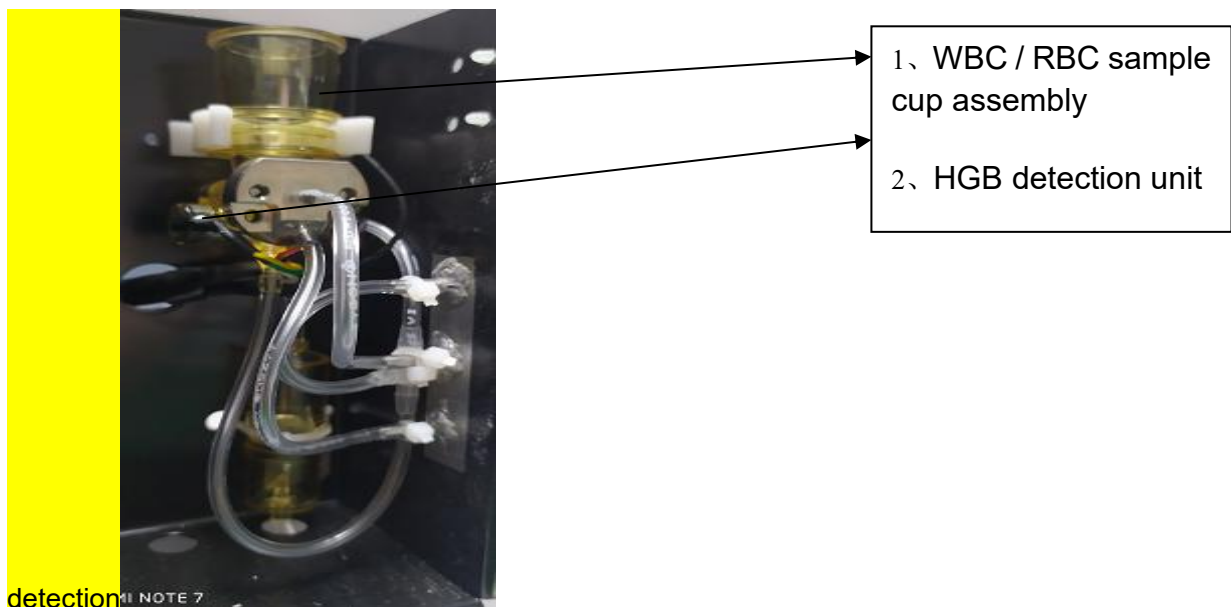
5.1 fluid and Mechanical

5.1.1 Hydraulic unit mainly consists of hydraulic and mechanical parts, complete with sample lessons, dilution and measurement process, and automatically complete the liquid road cleaning.



5.1.2 The detection unit

The detection unit is composed of WBC / RBC sample cup assembly and HGB



detection MI NOTE 7

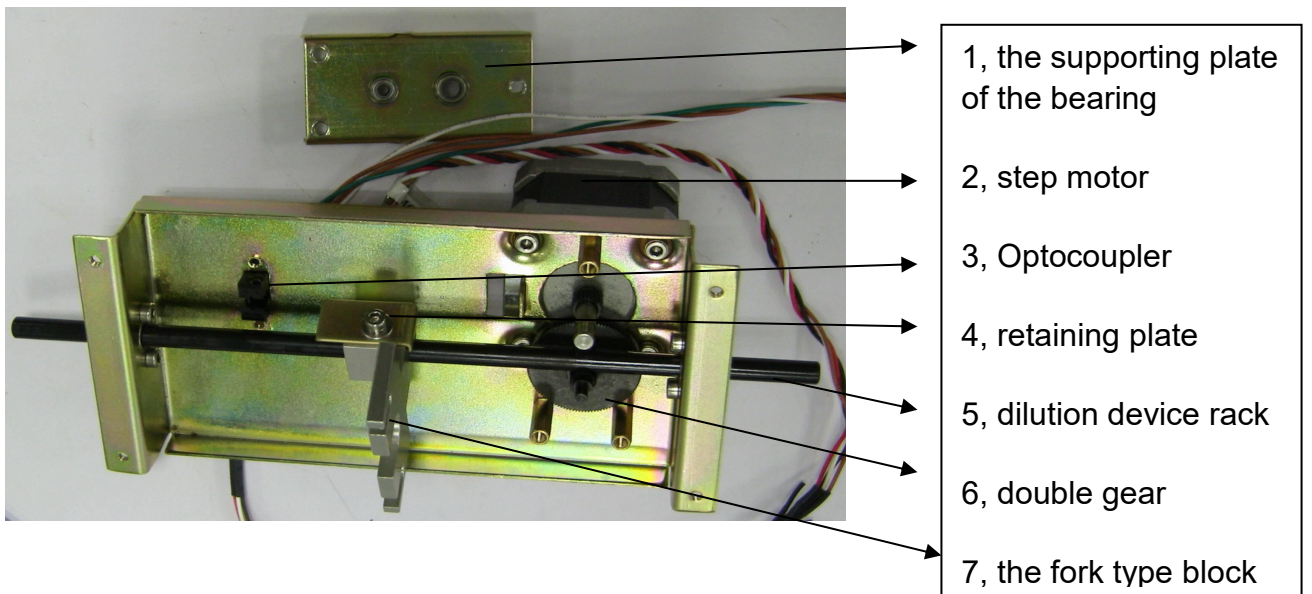
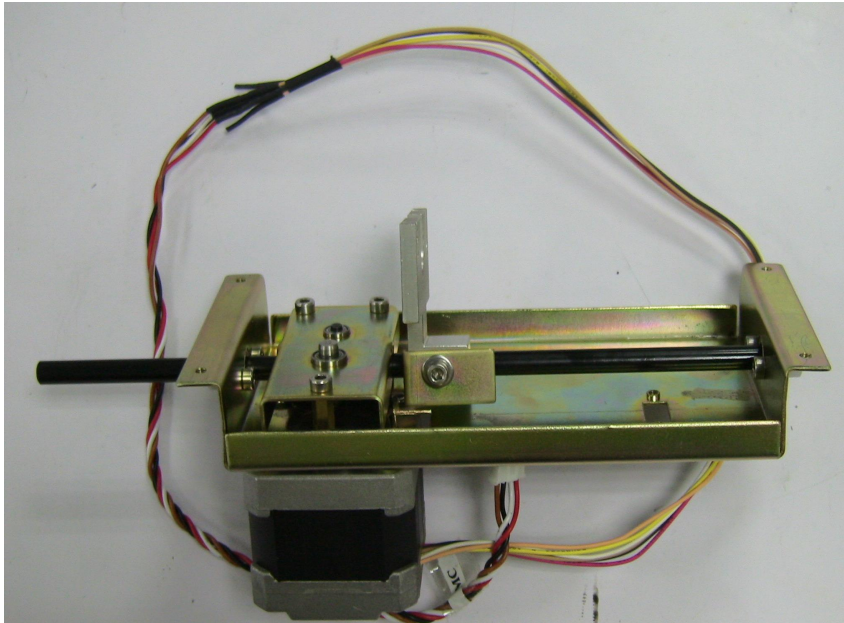
5. 1.3 Dilution device assembly



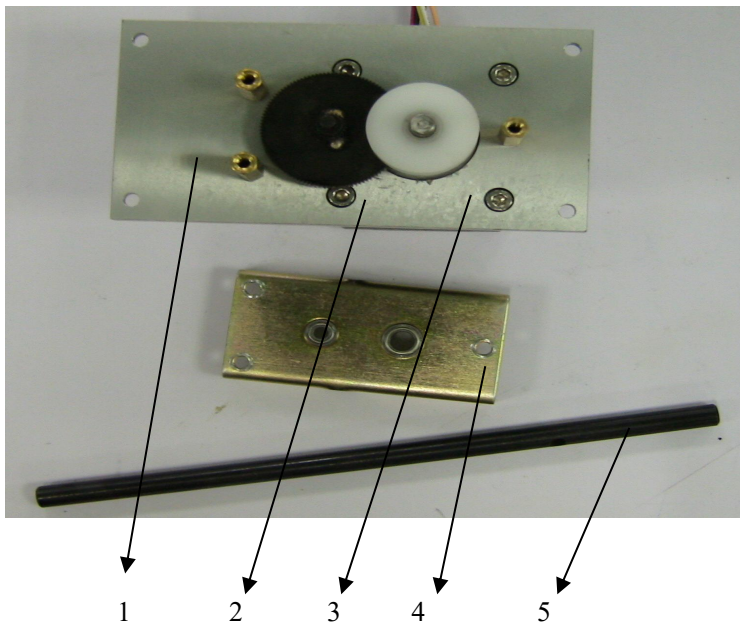
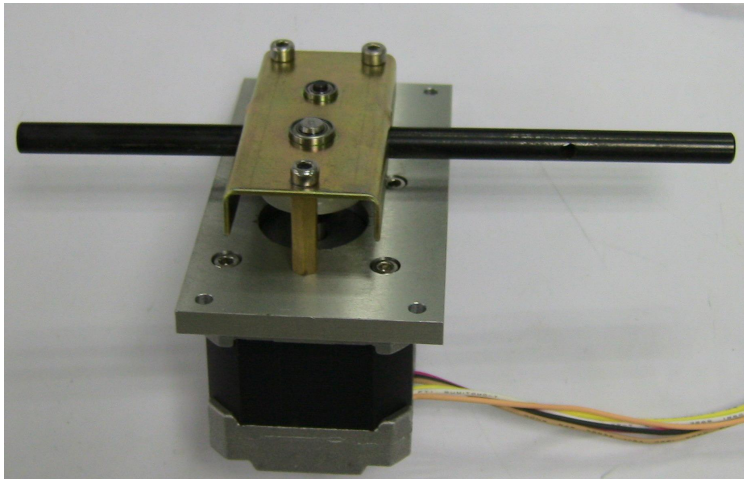
5. 1.4 Vacuum pump assembly



5. 1.5 Dilution mechanism assembly

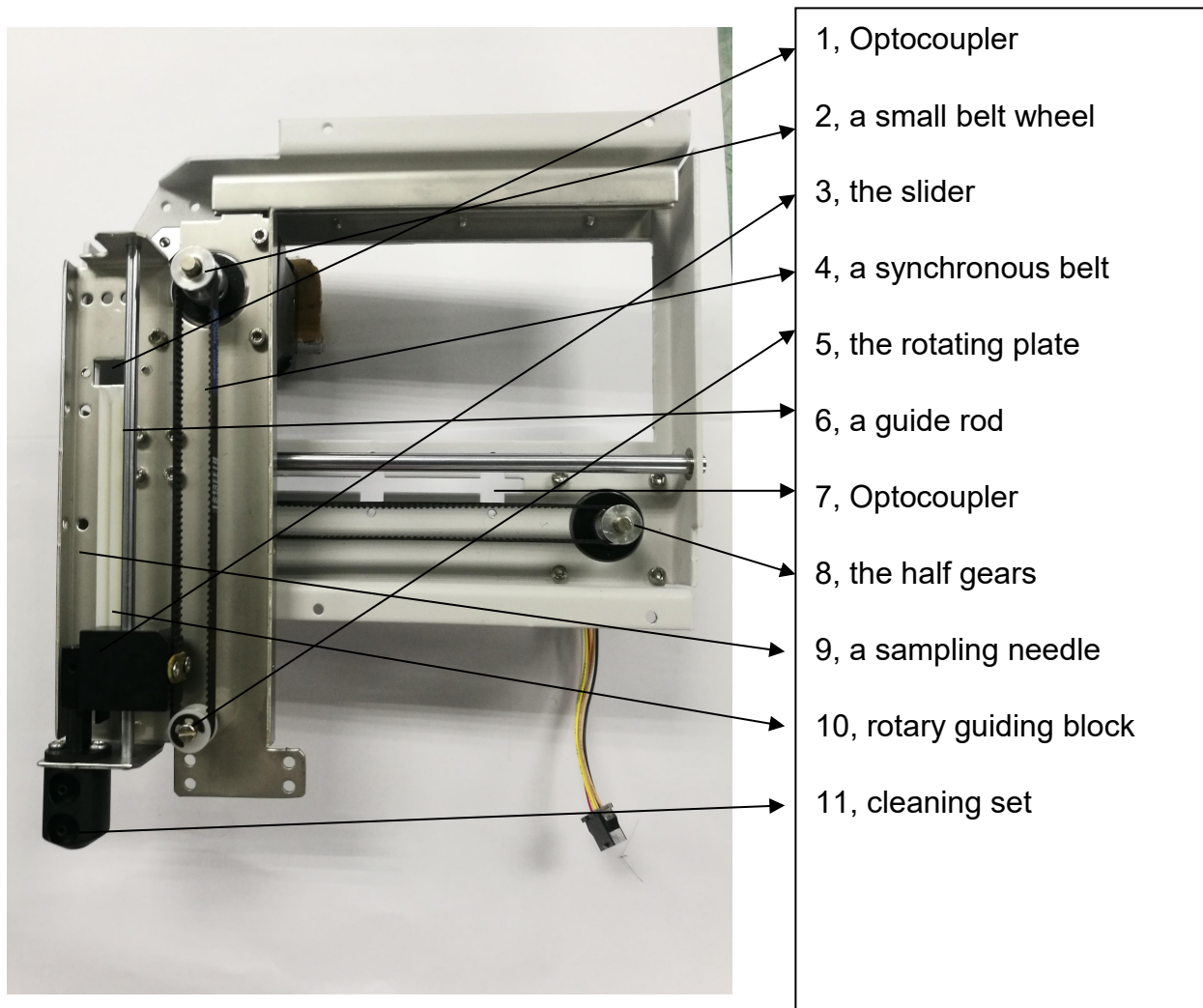


5. 1.6 vacuum reduction mechanism



- 1, a vacuum mounting plate 2, duplex gear
 3, 4, the supporting plate of the bearing pressure swing
 5, a vacuum pump rack

5. 1.7 Sample feeding mechanism



5.2 the central control circuit units

5.2.1 CCU board

5.2.1.1 Function

CCU board is mainly analog / data processing board, includes a preamplifier, waveform processor and HGB detection circuit, and an electromagnetic valve driving circuit and the control of stepper motor drive circuit.

5.2.1.2 Description

(1) WBC, RBC / PLT detection circuit

Amplifier detector came from blood signal, the distinction between WBC, RBC / PLT signal, and then to the data recorder by A / D conversion to maintain peak signal.

(2) the Hgb detection circuit

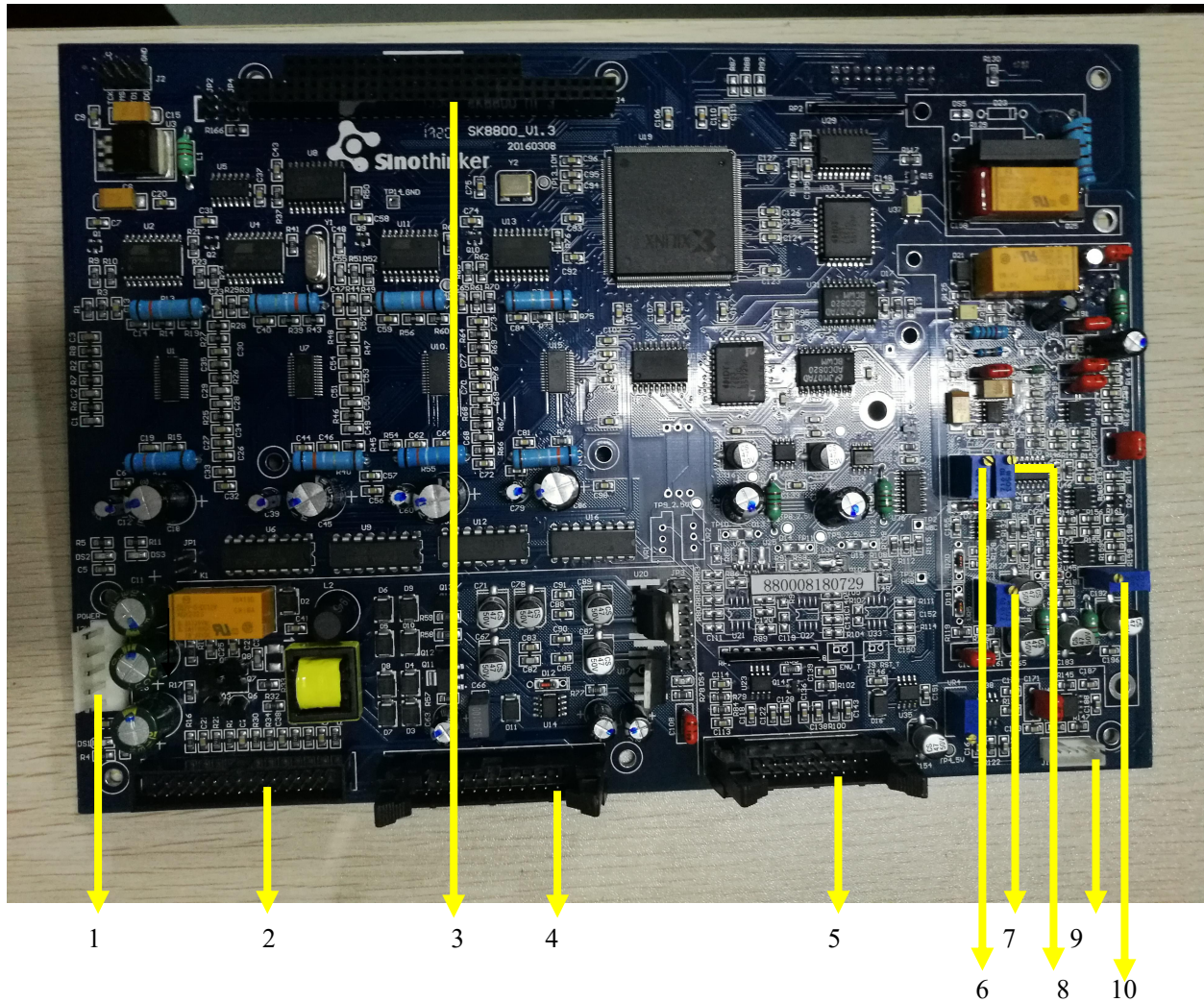
From the Hgb unit LED current signal by the current - voltage converter converts the pulse signal.

(3) the electromagnetic valve drive circuit

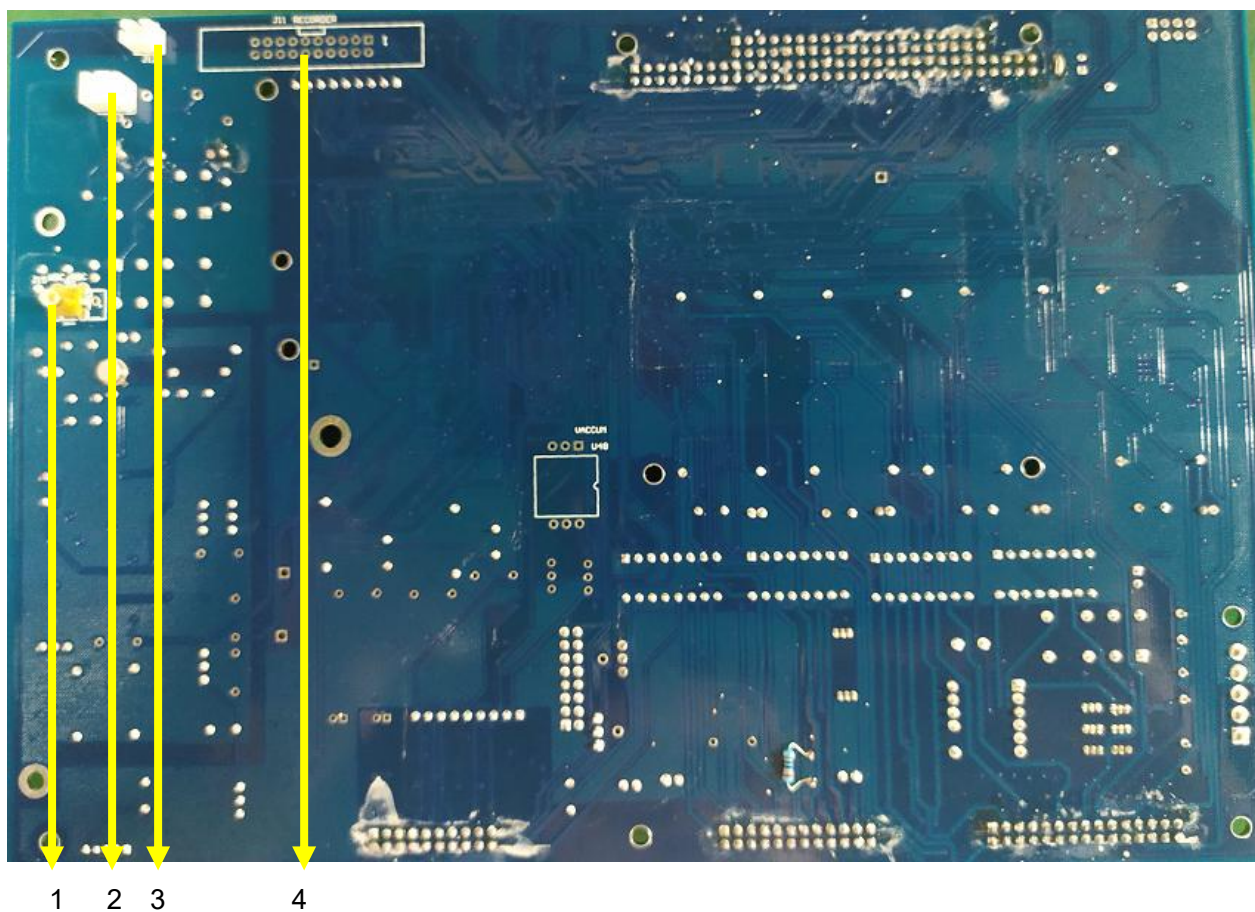
Control of electromagnetic valve.

(4) stepper motor drive circuit

Stepper motor control A, B, C, D action

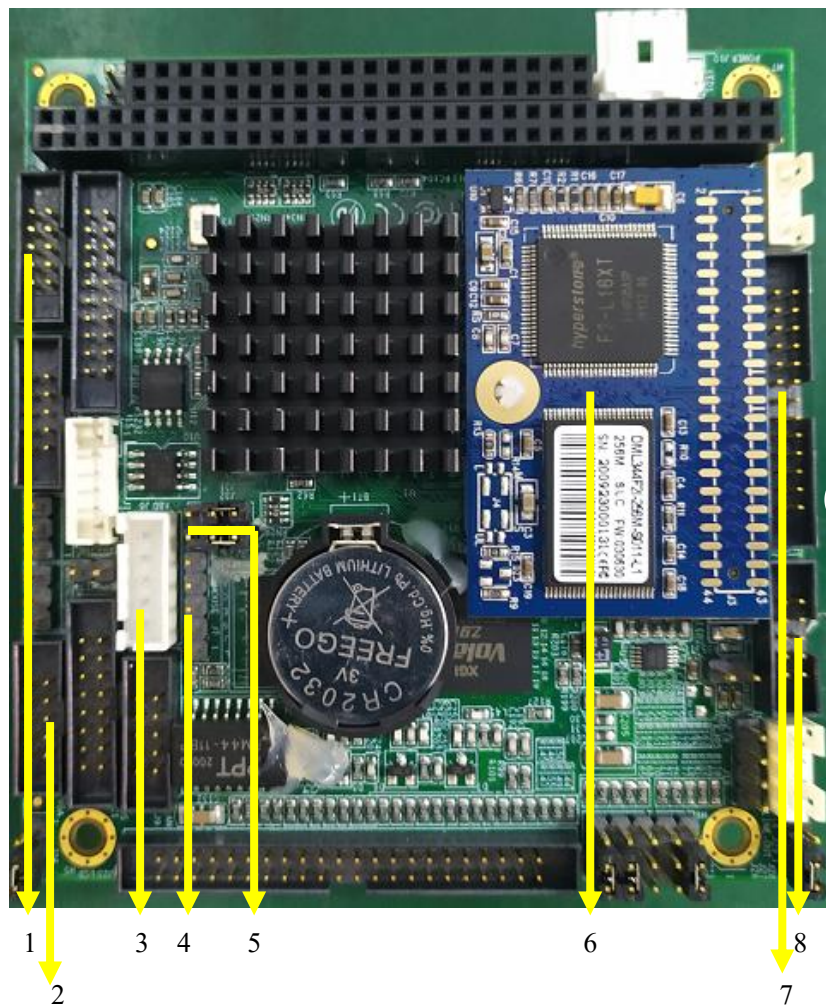


- 1: A power interface 2: Adapter board connection line interface 3: The IPC board interface
- 4: An electromagnetic valve power supply interface 5: Adapter board signal line interface
- 6: WBC gain potentiometer 7: HGB gain potentiometer 8: RBC gain potentiometer
- 9: Light power cord interface 10: PLT gain potentiometer



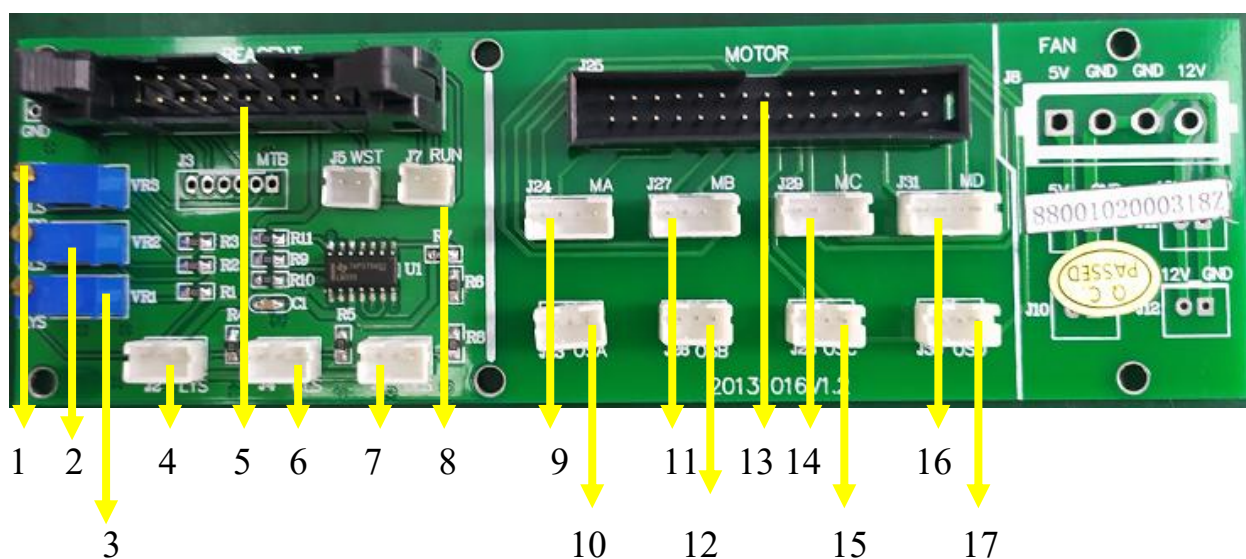
- | | |
|---|--------------------------------|
| 1: WBC / RBC signal line interface | 2: 110V power supply interface |
| 3: Power indicator interface interface. | 4: Built-in printer interface |

5.2.2 Industrial control board



- | | | |
|----------------------------------|---------------------------------|--------------------------|
| 1,: RS-232 serial line interface | 2: Screen and display interface | 3: Keyboard interface |
| 4: Mouse interface | 5:Buzzer interface | 6:Program card interface |
| 7:External printer interface | 8: USB interface | |

5.2.2.1 Adapter board



1: Diluent gain potentiometer 2: Clean gain potentiometer 3: Lyse gain potentiometer

4: Lyse sensor interface 5: Adapter board signal line interface 6: Clean sensor interface

7: Diluent sensor interface 8: Suction switch interface 9: motor A connection line interface

10: motor A sensor interface 11: motor B connection line interface 12: motor B sensor interface

13: Adapter board connection line interface 14: motor C connection line interface

15: motor C sensor interface 16: motor D connection line interface 17: motor D sensor interface

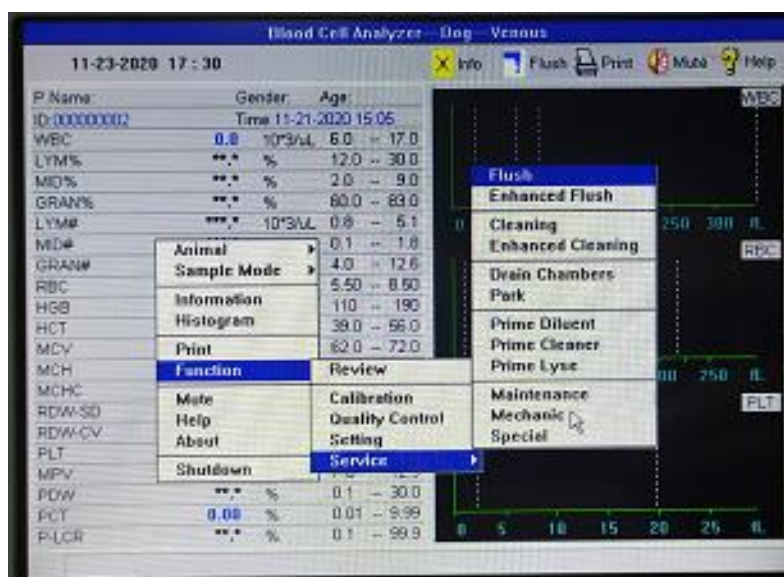
5.2.3 power supply unit



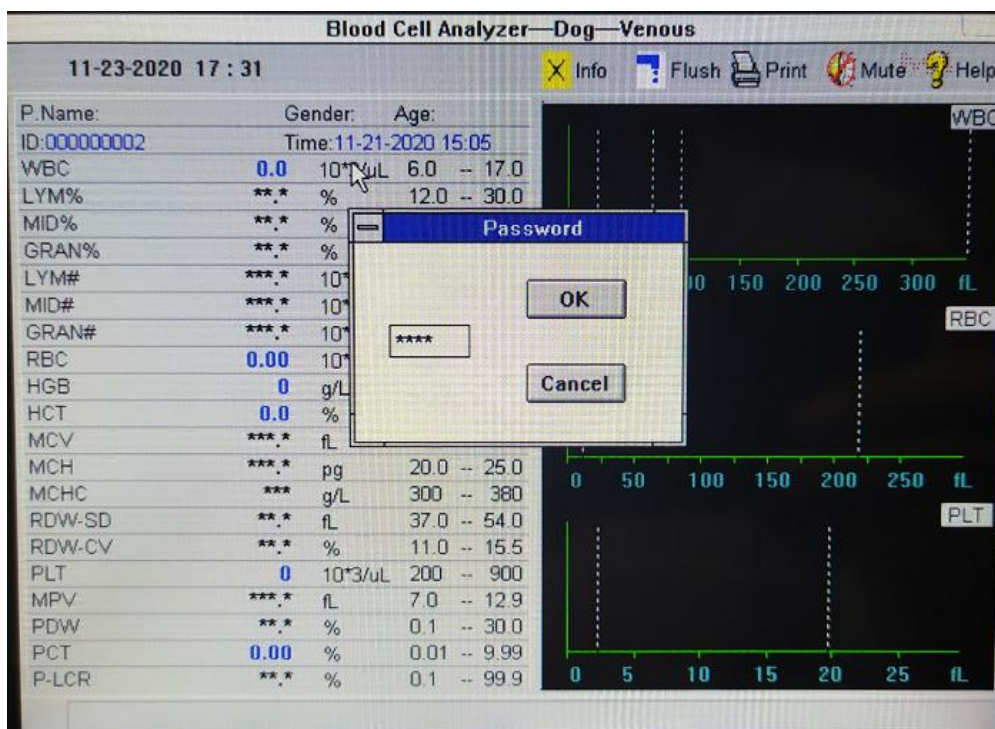
Chapter 6 Repair Procedures

The repair procedures, can detect the state of electromagnetic valve, motor, the working state of the circuit, and interface state.

In blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / detection



Then enter the password, 6800, click on" OK"



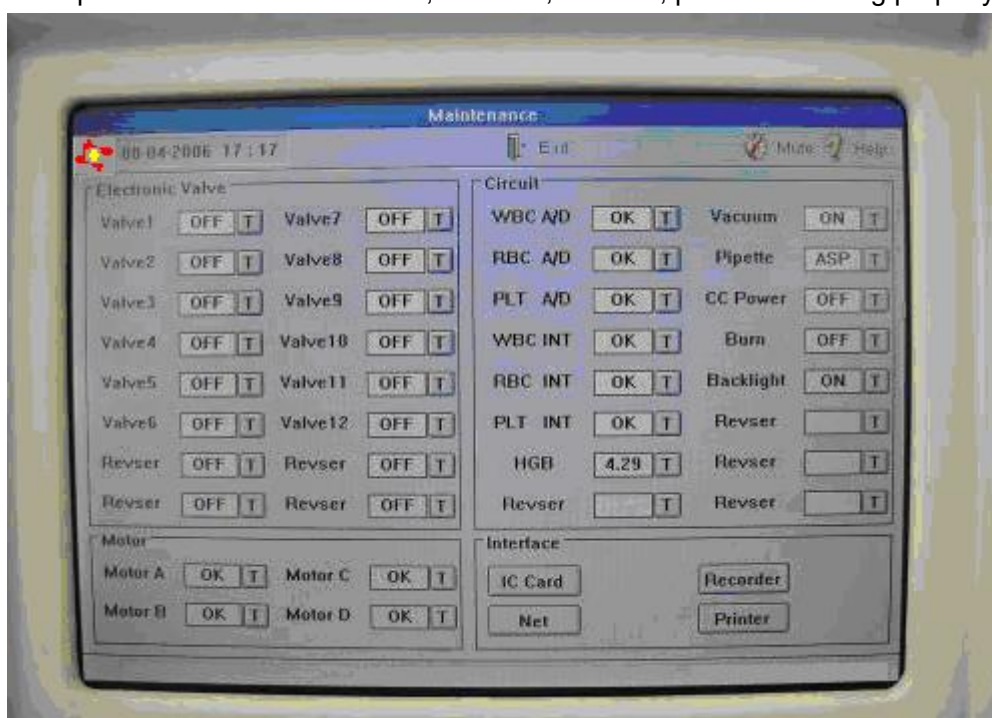
Enter the test interface, detection circuit, electromagnetic valve, motor, interface

1: detection, electromagnetic valve solenoid valve working condition.

2, electric road: detection circuit is in normal work.

3, Ma: detection of A, B, C motors, D is working properly

4, In then export: detection of smart card, recorder, network, printer is working properly



Chapter 7 Fault Information And Maintains

7.1 alarm information

- Full Of Waste Liquid
- No Dilution
- No Lyse
- No Rinse
- Wbc / Rbc Hole Plugging
- Wbc / Rbc Bubble
- Hgb Fault
- The Hgb Bubble
- The Recorder Paper Shortage
- The Recorder In High Temperature

7.1.1 Full Of Waste Liquid

Empty the waste barrel

7.1.2 No Dilution

1、Replacing the diluent

2, in blood cells analysis window, press the right mouse button pop-up menu, with the mouse left key to select

Function selection / service / dilution fluid perfusion

3, if the replacement of diluent, dilution liquid perfusion performed 5 times, in the information area of ' no dilution ' tips also exists, need to replace the diluent fluid sensor.

7.1.3 No Lyse

1, replacing the hemolytic agent

2, in blood cells analysis window, press the right mouse button pop-up menu, with the mouse left key to select

Function selection / service / hemolytic agent infusion

3, if the replacement of hemolytic agent, execute hemolysis agent infusion after 5 times, in the information area of ' no hemolytic agents ' tips also exists, need to replace the hemolytic agent liquid sensor.

7.1.4 No Rinse

1, replacing the hemolytic agent

2, in blood cells analysis window, press the right mouse button pop-up menu, with the mouse left key to select

Function selection / service / hemolytic agent infusion

3, if the replacement of hemolytic agent, execute hemolysis agent infusion after 5 times, in the information area of ' no hemolytic agents ' tips also exists, need to replace the hemolytic agent liquid

sensor.

7.1.5 WBC / RBC Hole Plugging

- 1, in blood cells analysis window click on the "block" shortcuts.
- 2, if the above methods can not solve, then in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / strong paidu according screen operation.
- 3, in the implementation of strong discharging more than 3 times, 'wbc / rbc plugging holes' message remains, replacing the mtb board.
- In 4, replacing the mtb board after the 'wbc / rbc plugging holes' message remains, replacing the sample cup assembly.

7.1.6 WBC / RBC bubble

- 1, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / cleaning
- 2, in the implementation of cleaning more than 3 times, 'wbc / rbc bubble' message remains, replacing the mtb board.

7.1.7 HGB fault

- 1, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / cleaning
- 2, if not rule out the possibility of failure, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / cleaning
- 3, if the above methods can not solve, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / detection, see hgb gap voltage, to ensure that the voltage at the $4.3\text{v} + 0.1\text{v}$ range, if not in range, adjusts the ccu board hgb gap voltage adjustment point (vr6)

7.1.8 HGB bubble

- 1, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / cleaning
- 2, if not rule out the possibility of failure, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / cleaning
- 3, if the above methods can not solve, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / detection, see hgb gap voltage, to ensure that the voltage at the $4.3\text{v} + 0.1\text{v}$ range, if not in range, adjusts the ccu board hgb gap voltage adjustment point (vr6)

7.1.9 No Recorder Paper

Light press recorder door, opened it.

In 1, the new paper is inserted into the inlet, print face to the thermal head, pay attention to the paper put, paper edge alignment.

In 2, when the paper from the other side of the door from the leakage of recorder paper outlet.

3, shut the door.

7.1.10 Recorder in high temperature

Suspended for 5 minutes

7.2 Trouble shooting

7.2.1 Unable to start

1, check whether the electric apparatus

2, check that the power plug is loosened

3, check the fuse. Such as damage to refer to chapter ninth" care and maintenance" in section 9.1.2 replacing fuses

7.2.2 Blank count is not qualified

1, if the blank count is not qualified, in blood cells analysis window, press the right mouse button pop-up menu with the mouse left key, select function selection / service / cleaning

2, if the cleaning after the blank count still unqualified, to check the grounding wire is connected, whether the use of mobile phones, the vicinity of the apparatus such as cordless telephone had a strong radiation field equipment, strong radiation field interference instrument blank count.

7.2.3 Display screen has not display

1, check whether the instruments on display, power supply is connected

2, if connected, fault or not excluded, replace the screen assembly.

7.2.4 display screen nothing signal

1, check the vga cable interface is loose.

2, if there is no loosening of replacement of the cables, fault still exist, replace the display screen assembly.

7.2.5 Recorder can not print

1, check the power line and data line interface is loose.

2, if there is no loosening to replace power line and data line, observer can print, if still can not print replace recorder assembly.

7.2.6 Instrument on not through the self-checking

1, check the ccu board power interface is loose

2, if the power interface is not loose, replace the ccu plate.

7.2.7 Cleaner liquid leakage

1, check whether the damaged cleaner

2, if not broken replace cleaner sealing ring.

7.2.8 Diluted liquid leakage

1, check whether the damaged dilution device

2, if there is no breakage replacement dilution device sealing ring.

7.2.9 liquid tube figure

