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Chapter 1 General Introduction for H-500 Urine Analyzer

1.1 General Description and Intended Use

DIRUI H-500 Urine Analyzer is a kind of semi-automatic photoelectric colorimeter that can be used together with the DIRUI H8, H10, H11, H11-MA(N) for urine analysis reagent strips manufactured by Dirui Industrial Co., Ltd.. It can provide a qualitative or semi-quantitative result for Urobilinogen, Bilirubin, Kentone, Blood, Protein, Nitrite, Leucocytes, Glucose, Specific gravity, PH and Vitamin C of the urine sample according to the color change caused by the interaction between the reagent areas and the biochemical components in urine.

Adopting the advanced “High luminosity cold light source reflection determination” technology, H-500 Urine Analyzer gets the specialties of resisting the interference of the ambient light and has longer lifespan. It can finish the testes on 11 kinds of biochemical components in urine within 7 seconds, and it also can revise the affects toward the test result which is caused by ambient temperature, ambient light, acid-base scale and abnormally colored sample. It can also connect with the urine sediment analyzer. H-500 Urine Analyzer is a kind of in-vitro diagnostic device (IVD) used by professionals.

1.2 Technical Specifications

Wavelength	525nm、572nm、610nm、660nm
Test items	Urobilinogen（UBG）Bilirubin（BIL）Ketone（KET）Blood（BLD） Protein（PRO）Nitrite（NIT）Leucocytes（LEU）Glucose（GLU） Specific Gravity（SG）PH（PH）Vitamin C (VC)
Test speed	514 specimens/hour
Data Memory	2,000 patient results, 50 quality control records
Language	Chinese, English, Italino, Español, РУС, Angielski, İngilizce, Português, Deutsch, Français, Magyar
Environment requirements	Temperature 15℃-35℃, Optimal temperature 20℃-25℃ Relative humidity ≤80%
Communication interface	RS-232serial port, parallel printing interface
Baud rate	1200 bps、9600bps、56000 bps、115200 bps
Power supply	100~240VAC, 50/60Hz
Fuse	250V 1.5A
Power	40VA
Net weight	6.8 kg
Dimensions	380mm(L)× 378mm(W) × 275mm(H)
Printer	internal thermal printer
Appropriative reagent strip	DIRUI H8, H10, H11, H11-MA(N) reagent strips

1.3 Working Principle

H-500 Urine Analyzer adopts the principle of photoelectric color comparison to test the quantity of biochemical component according to the color change caused by getting the urinalysis strips react with the biochemical components in urine.

The instrument uses four kinds of monochromatic light to scan the reagent areas one after another, and the scanning system converts the optical signal to electric signal. After treatment, the reflection rate of the reagent area can be calculated according to the strength of the electric signal. The amount of the biochemical component in the urine sample can be calculated according to the reflective rate. Optics system principle is as follows.

$$R = \frac{T_m \times C_r}{T_r \times C_m}$$

In the principle:

R — The reflection rate.

T_r — The reflected intensity of the blocks on the strips under the reference light.

C_r — The reflected intensity of the blank block under the reference light.

T_m — The reflected intensity of the blocks on the strips under the predetermined light.

C_m — The reflected intensity of the blank block under the predetermined light.

1.4 Structure of the analyzer

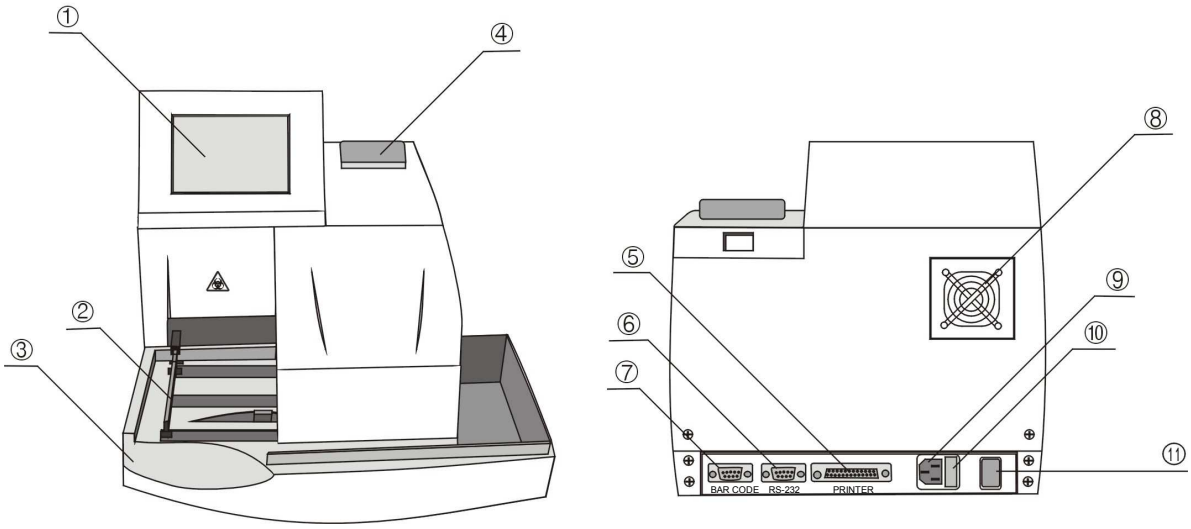


Figure 1-1

①Touch screen ②Pusher ③Work table ④ Internal printer ⑤Parallel printing port
⑥Serial port ⑦Interface to barcode reader ⑧Fan ⑨Power inlet ⑩Fuse holder ⑪Power switch

1.5 Biological Hazard Symbol

 is a biological hazard symbol, which can be seen in the Figure 1-2①②.

Note:

- The urine sample may have potential infectivity, protective measures should be taken when testing, cleaning or doing maintenance to the analyzer.
- Please dispose urine samples and the waste strips according to the local laboratory regulation.

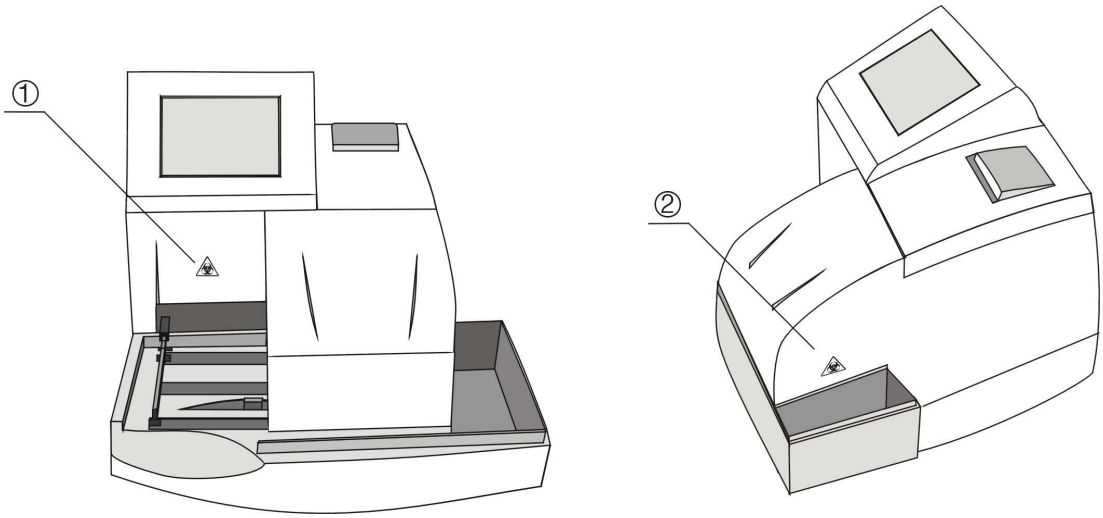


Figure 1-2

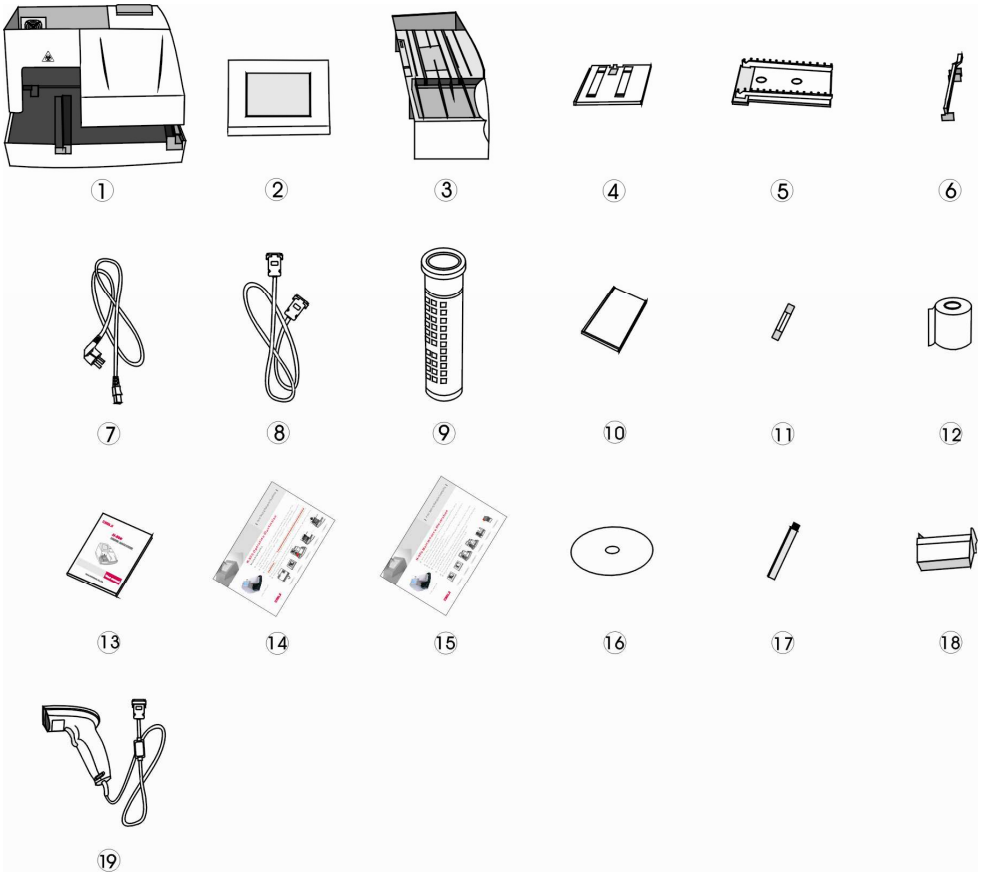
Chapter 2 Installation of H-500 Urine Analyzer

2.1. Environment requirements

- Please put the instrument on a stable and flat table, do not put it together with vibrating source such as the centrifuge.
- Please do not put the instrument in the place where it can be affected by chemical stuffs, corrosive gas or strong electromagnetic interference.
- Please don't put it in place with direct sunlight, high temperature and high humidity.
- The temperature range for operating the analyzer is 15℃～35℃, the optimal temperature range is 20℃~25℃, the relative humidity range is ≤80%.

2.2. Open carton

Please take out the H-500 Urine Analyzer and its accessories, and then check them with packing list to see whether the following parts have been damaged or not. If there are some damages please contact the supplier immediately.



①Main body ②Screen ③Worktable ④Cover board ⑤Conveyer board ⑥Pusher ⑦Power wire ⑧Communication cable ⑨ Reagent strip sample ⑩Calibration strip box（with two calibration strips）⑪Fuse ⑫Printing paper ⑬User manual ⑭Operation illustration ⑮Maintenance illustration ⑯CD ⑰Brush ⑱Waste box ⑲Bar code Reader (optional fitting(s))

Figure 2-1

2.3 Installation of analyzer

2.3.1 Install screen（Figure2-2,2-3）

(a) As Figure 2-2, connect the wire of the screen with the corresponding socket on the main body.

(b) As Figure 2-3, insert the screen into the main body.

(Block the lock slot in front of the screen to the corresponding fix site on up-shell of the main board, then make the corresponding site of the site-limiting card behind the screen, push the up-shell of the main board.)

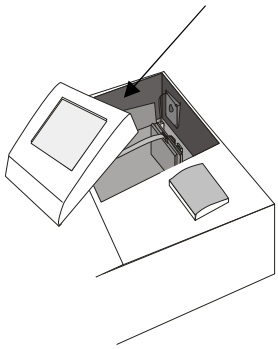


Figure 2-2

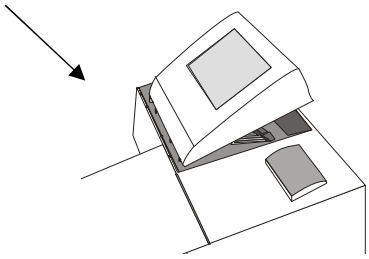


Figure 2-3

2.3.2 Install the conveyer board（Figure2-4）

Hold the conveyer board with the saw tooth upside, and connect the board with the side with rectangle overhang facing the instrument. Push the guide slot parallel on the two sides of the lower part of conveyer board to the locked sides through the guide on the two sides of connecting board.

2.3.3 Install cover board（Figure2-5）

(a) Insert the below-extrude of the cover board into the circularity hole of the work table.（Figure2-5 ②）

(b) Press the up-extrude of the cover board into the lock slot of the worktable. Push the table slowly to pass the micro blocker at the back of the support.（Figure2-5 ①）

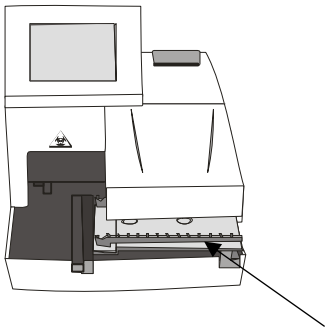
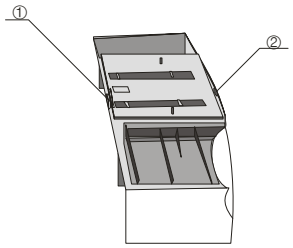


Figure 2-4



①Lock slot ②Circularity hole

Figure 2-5

2.3.4 Install worktable（Figure2-6，Figure2-7）

Before installing the working table, please nip nylon string around the frame of pusher and take down the safety holder, then follow the manual to install others（Figure 2-6）.

Please check the picture belowed.

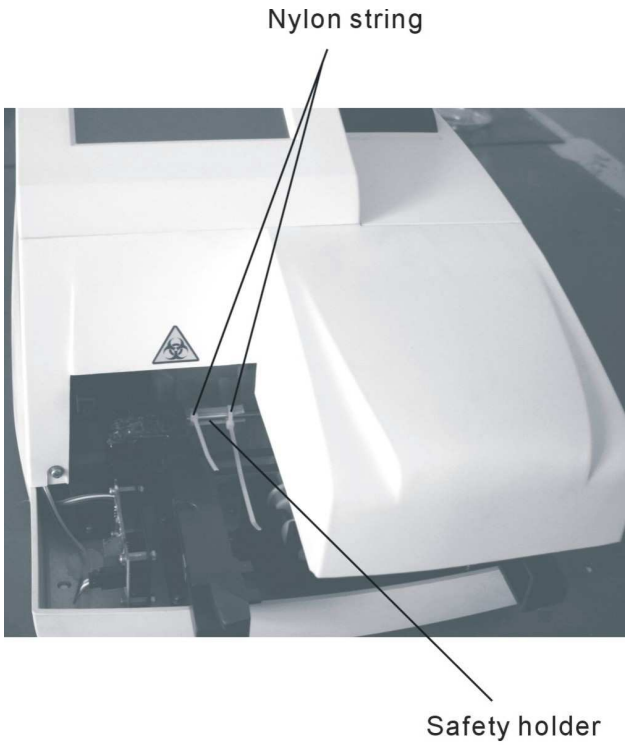


Figure 2-6

Insert the right guide of work table into the slots of the support of the table on the main board, push the work table with the cover board parallel into the main board, just near the main board (Figure 2-7).

Note:

Worktable can't be taken down only when the conveyer board reaches the lowest point.

2.3.5 Install pusher（Figure2-8）

Hold the end of the pusher; Insert the pusher into the hole for fixing of pusher on the slide support. Press the end of the pusher to the horizontal position.

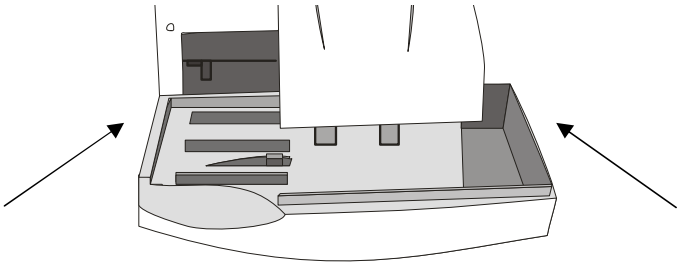


Figure 2-7

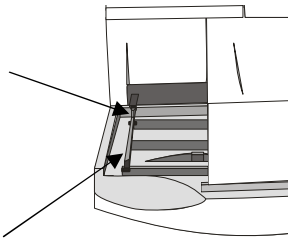


Figure 2-8

2.3.6 Install printing paper（Figure2-9）

(a) Choose the thermal printing paper with 57mm width and diameter less than 45mm.

(b) Press the hook at the back of the cover of printer, and then lift the cover and take it off.

(c) Unfold the printing paper to extrude for certain centimeters in order to form type.

(d) Pull the hand of installing paper; insert the U type part of the paper into the entry of the printer. Make the part go over the roll of the printer (Don't change the bending direction of the paper).

(e) Put the part through the outlet of the cover of printer. Close the cover of printer.

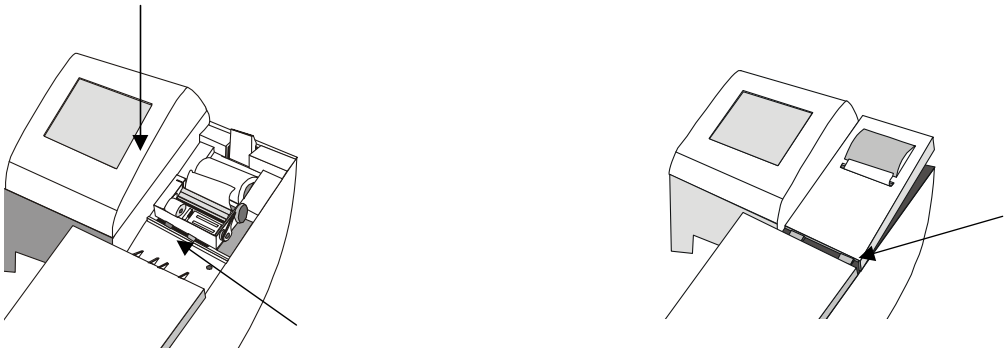


Figure 2-9

2.3.7 Connect with barcode reader（Figure 2-10, Figure 2-11,）

Take out the barcode reader from the box, as shown in Figure 2-10, connect the data cable of bar code reader, and connect the other end of the data cable (RS-232 port) with the barcode reader port of urine analyzer.

As shown in Figure 2-11, Connect the barcode reader plug with the serial port at the back of the analyzer.

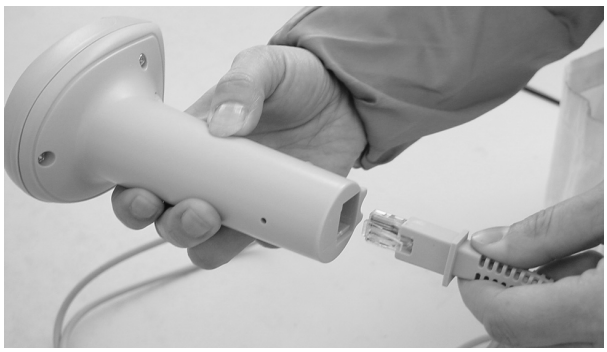


Figure 2-10

2.3.8 Connect with Computer（Figure 2-12）

Insert one end of the communication cable into the serial port at the back of the analyzer, with the other end into the serial port of the computer.

2.3.9 Connect with external printer（Figure 2-13）

Connect one end of the printer wire with the printer, and the other end with the external serial port of the instrument.

2.3.10 Install power wire（Figure2-14）

（a）Connect the input terminal of the power wire with the instrument.

（b）Insert the entry terminal of the power wire into the power socket.

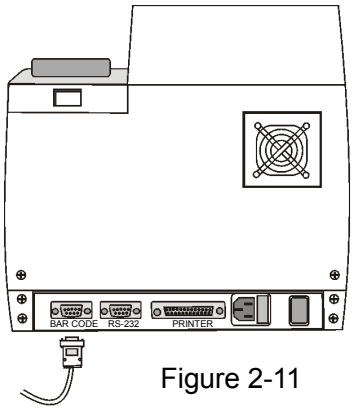


Figure 2-11

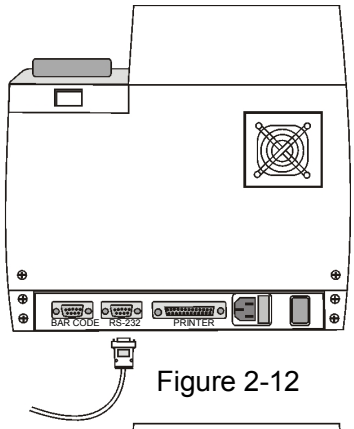


Figure 2-12

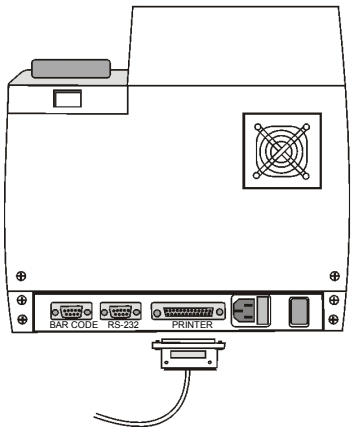


Figure 2-13

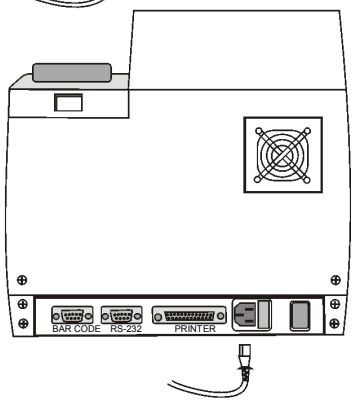


Figure 2-14

2.4 Inspection for the first use

After installation, the first inspection should be done. Please contact the supplier if there is any problem or error.

2.4.1 Power on the analyzer, the fan and the pusher work. Screen will display “System Initializing”. The system is self-testing. (If printer have not install the paper, the instrument will display “NO PRINTER PAPER” when the system is self-testing.)

2.4.2 Main menu (figure 2-15) will appear after self-testing.

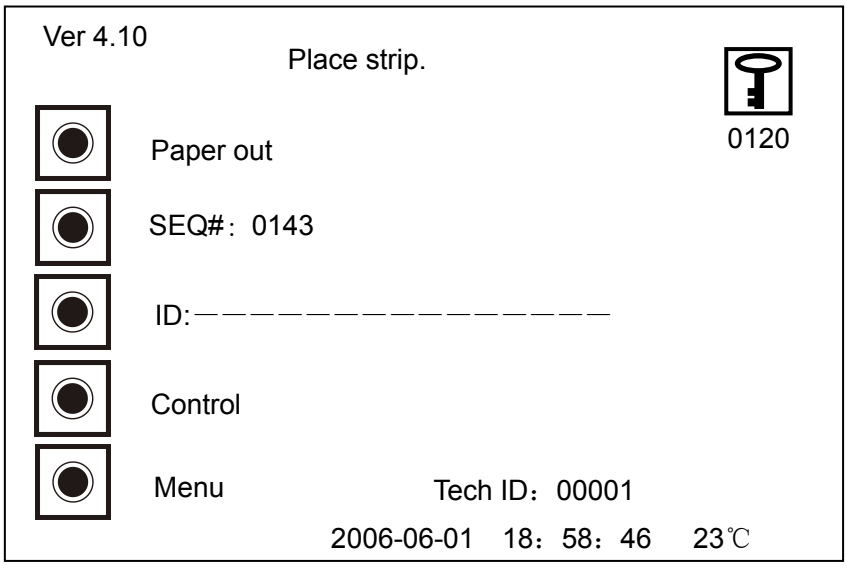


Figure 2-15

2.4.3 Immerse a strip into a urine sample, and then take it out by running the edge of the strip against the rim of the container to remove excessive urine.

2.4.4 Put the strip in the test area of the analyzer (Figure 2-16), and make the reagent areas upward; it will be sensed by the analyzer and pushed to the testing area. Testing result will be printed out after test.

Note:

Do not touch any part of the screen when testing, otherwise errors will occur.

2.4.5 Please reset the relavant items according to instruction if the display does not show as expected or the results do not accord with the anticipant value.

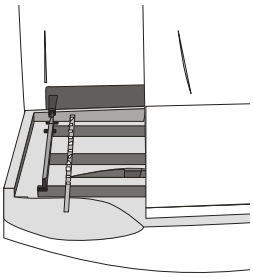


Figure 2-16

Chapter 3 Functions and Setup of H-500 Urine Analyzer

3.1 General Description

Operator can touch the main screen to control and use H-500 Urine Analyzer. Relative options, parameters for setup and touch-keys will display on the main screen. Operator just need to touch the keys to operate this analyzer.
Do not use hard or sharp articles to touch the screen.

3.2 Function of keys

For every display on the main screen, there are several functional keys. The functions are explained as follows:

3.2.1 

Name: Return key
Function: Make the display return to the upper menu or to ignore the current correction.
Location: Up right of the screen
Note: If there is no  key on the screen, the function for  is to return to upper menu;
When there is , the function for  is to ignore the current correction and return to the upper menu.

3.2.2 

Name: Page down key
Function: Go forward to next page. It is effective only when there is a next page, otherwise, it will only make a twinkling on the current page.
Location: Down right corner of the screen

3.2.3 

Name: Page up key
Function: Go back to the former page. It is effective only when there is a former page, otherwise, it will only make a twinkling on the current page.
Location: Right bottom corner

3.2.4 

Name: Enter key

Function: Confirm the current correction and exit from the current page.

Note: It appears on the screen with number keys, being used together with the key . Touch the key  to store the current correction (i.e. sequence no., date, time) and exit from this current screen. Touch the key  to ignore the current correction and exit from the current screen. The original setup remains.

Location: Bottom of the screen

3.2.5 

Name: Left-moving key for cursor

Function: Be used to get the cursor move left to one letter distance. It appears on the screen of number key. It is void when it stays at the end of the left side.

Location: Right side of the screen

3.2.6 

Name: Right-moving key for cursor

Function: Be used to get the cursor move right to one letter distance. It appears on the screen of number key. It is void when it stays at the end of the right side.

Location: Right side of the screen

3.2.7 

Name: Up-moving key for cursor

Function: Be used to get the cursor move up one line. It appears on the screen of number key. It is void when it stays atop line.

Note: It is used to search last record (the record corresponding with Sequence No. one less than the current number) in the menu of research key.

Location: Right side of the screen

3.2.8 

Name: Down-moving key for cursor

Function: Be used to get the cursor move down one line. It appears on the screen of number key. It is void when it stays at the bottom line.

Note: It is used to search next record (the record corresponding with Sequence No. one more than the current number) in the menu of research key.

Location: Right side of the screen

3.2.9 

Name: Delete key

Function: Be used to delete the number where the cursor is.

Location: Bottom of the screen

3.2.10 

Name: Number key

Function: Be used to input corresponding numbers.

3.2.11 

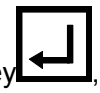
Name: Printing key

Function: Be used to print the current test records on the screen.

Location: Right side of the screen

3.2.12 

Name: Research key

Function: Be used to search test records stored in the machine. Press this key, the screen turns to the screen of number key and shows the sequence number of current record. The user can change the sequence number between 0001 and 9999. Press the key , the screen will show corresponding record matched with the input sequence number; if there is no record, the screen will show blank record.

Location: Right side of the screen

3.2.13 

Name: Sub-menu key

Function: Be used to enter a sub-menu of the selected item. Press this key, the screen will show content of the sub-menu selected.

3.2.14 

Name: Cycling key

Function: Touch it to display next setup data under current setup item. It can be used to switch corresponding setup items circularly among internal setup selection items.

3.2.15 

Name: Confirm key

Function: Be used to confirm the current operation. It appears when some important operation (e.g. storing a corrected value or abbr. value) is made to remind the user to make sure of the correction.

3.2.16 

Name: Cancel key

Function: Be used to cancel the current operation. When it appears together with  on the same screen, touching it means to cancel the selected operation.

3.3 Menu

3.3.1 Main menu

The screen shows as follows after self-testing:

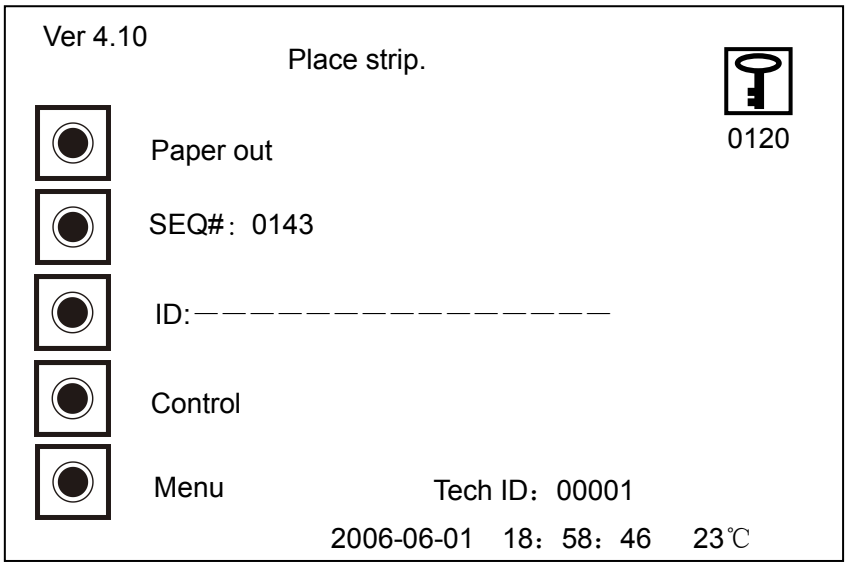


Figure 3-1

In the figure,

- “medical No.: 00005” is the code of operating doctor. Operator could change the No. (figure 3-6) or switch the “on” “off” mode(Figure 3-30). If it is “on”, Medical No. shows as figure 3-1. If it is “off”, nothing displays after “Medical No.”.

- “2006-06-01 18:58:46” is the current date and time. Operator could change them in the corresponding sub-menu. Date and time will be printed in test reports.

In main menu (figure 3-1), operator can make the following four operations:

3.3.1.1 Test Strip Security Barcode Instruction

Press “” key at upper right side of main interface, as shown in figure 1 shows:

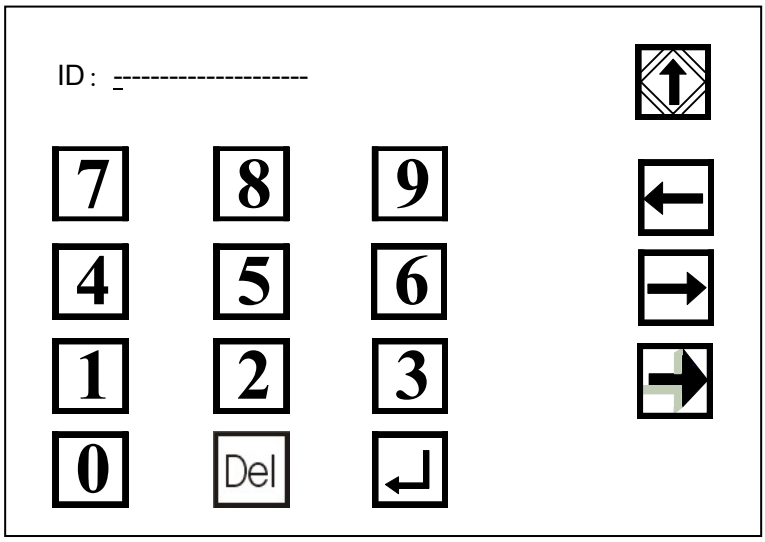


Figure 3-2

Enter the valid barcode on the test strip canister manually or by scanning, and test can be proceeded to be tested after a prompt “CHECKCODE OK” pops up.

The existence of the following situations may occur in the process of entering the barcode:

（a）The barcode on the reagent strip bottle can only be used once . If it is re-entered, press “↵” key and a prompt “USED CHECKCODE” will pop up, re-enter after checking.

（b）When entering manually, if entering barcode error occurs, press “↵” key and a prompt “UNKNOWN CHECKCODE” will pop up.

（c）If the reagent strips in the bottle is expired, press “↵” key and a prompt “OVERDUE CHECKCODE” will pop up when input the barcode.

Note：

1、The security code can be input singly or continuously.

2、120 test strips can be tested by input a security bar code. The number of test paper is displayed on the right side of the main interface. The number will increase by continuous input.

3、If the right side of the main interface displays 0000, the instrument can not test. A new security bar code should be input before testing.

3.3.1.2 Paper out

Touch the key  before “paper out”, the printer will get the paper moving out according to setted value (See figure 3-4 for the space of paper out moving).

3.3.1.3 Set sequence number

Touch the key  before “SEQ#”, the screen shows as below (figure 3-3).

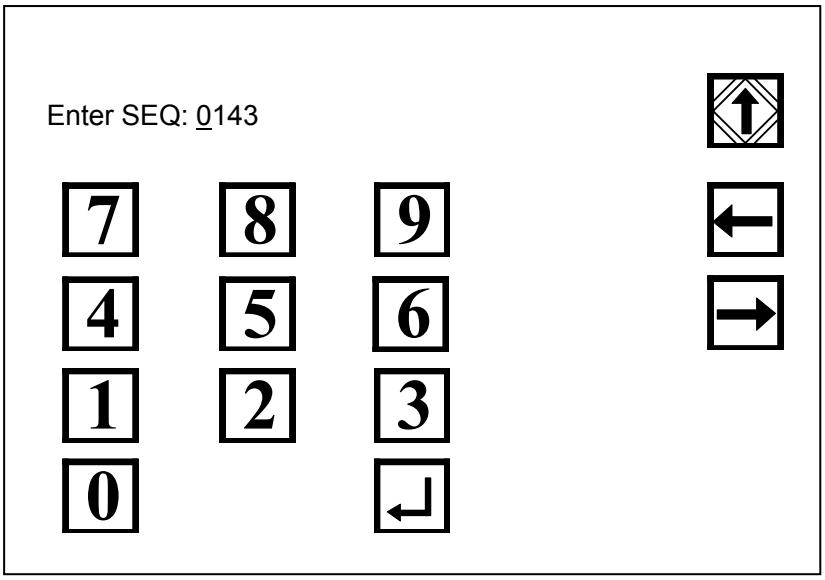


Figure3-3

Operator can set sequence number in figure3-3.

Press number key to input sequence number. Touch  to confirm and return to upper menu. System apply new sequence number. Touch  to cancel the modification of sequence number. System will remain original sequence number.

The sequence No. showed on the screen indicates the next testing strip number Every time after finishing testing one strip, the sequence number will add one.

3.3.1.4 ID number

ID number is a sample code scanned by bar code reader. H-500 Urine Analyzer could connect bar cord reader through the RS-232 port. ID number will be showed in the output report. ID number can be scanned by bar code reader or input manually.

Input method:

Touch  in front of “ID” in figure 3-1，screen shows as follows:

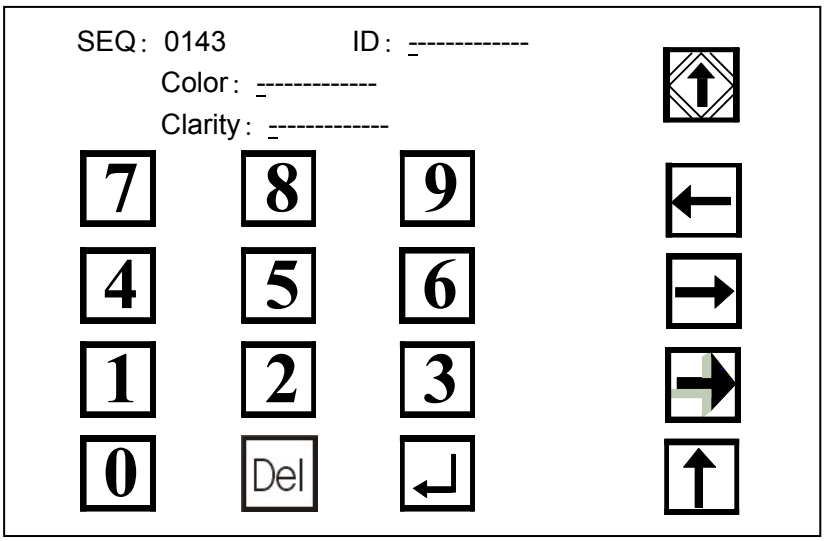


Figure 3-4

Press number key to input relavant numbers. Press ,  to move the cursor, touch  to enter figure3-5.

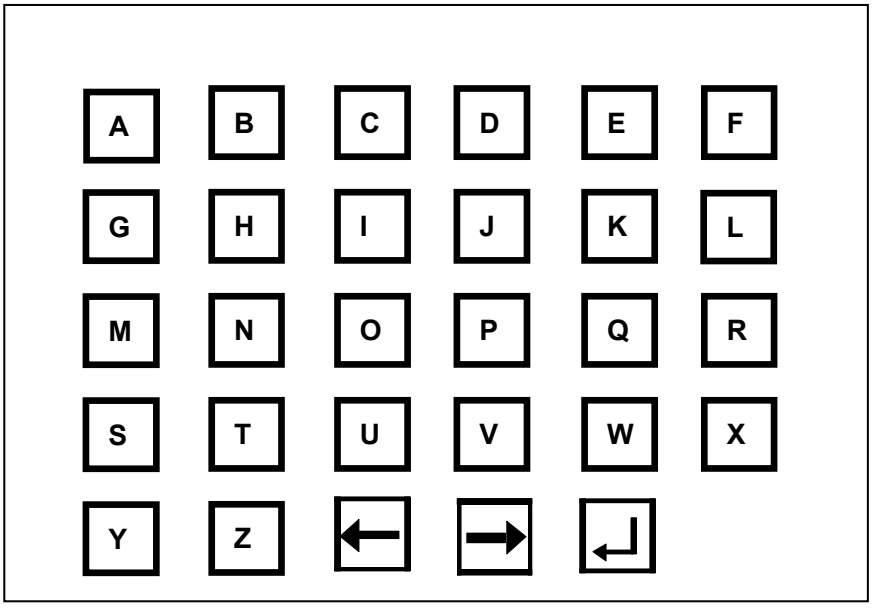


Figure 3-5

Press letter key to input relavant letters, touch ,  to move the cursor, press  to confirm.

3.3.1.5 QC liquid test

Touch the key  in front of “Control” in figure 3-1 to enter into the sub menu of control liquid test. This function will be introduced in “chapter 4 Quality Control Monitoring”.

3.3.1.6 Set Menu

Enter the key  in front of “Menu” in figure 3-1 to enter the sub-menu (figure 3-6). Operator can set all the options.

3.3.2 Set menu

Touch  in front of “Menu” in Main menu (Figure 3-1), the screen shows as follows:

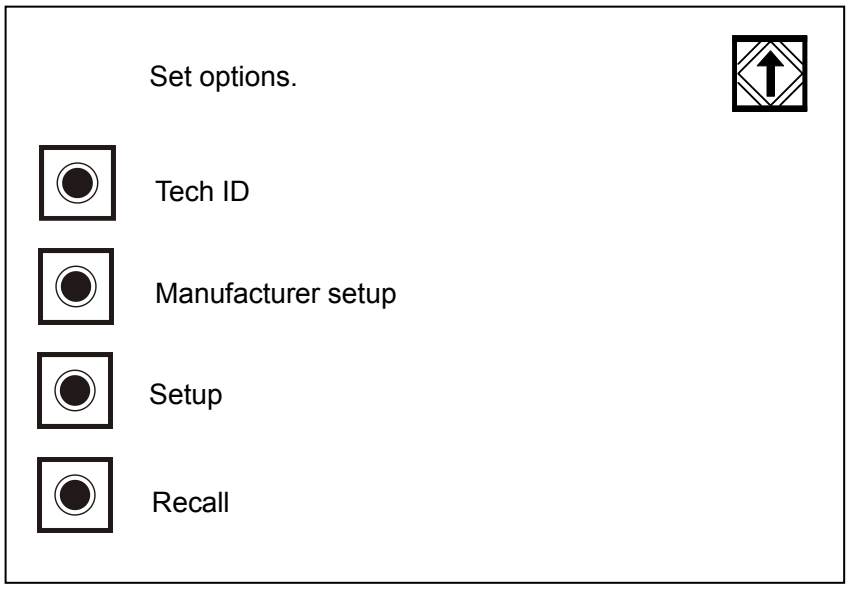


Figure 3-6

This interface includes four operations: Tech ID, Manufacturer setup, Setup, Recall.

3.3.2.1 Tech ID

Touch  in front of “Tech ID” and screen shows as follows:

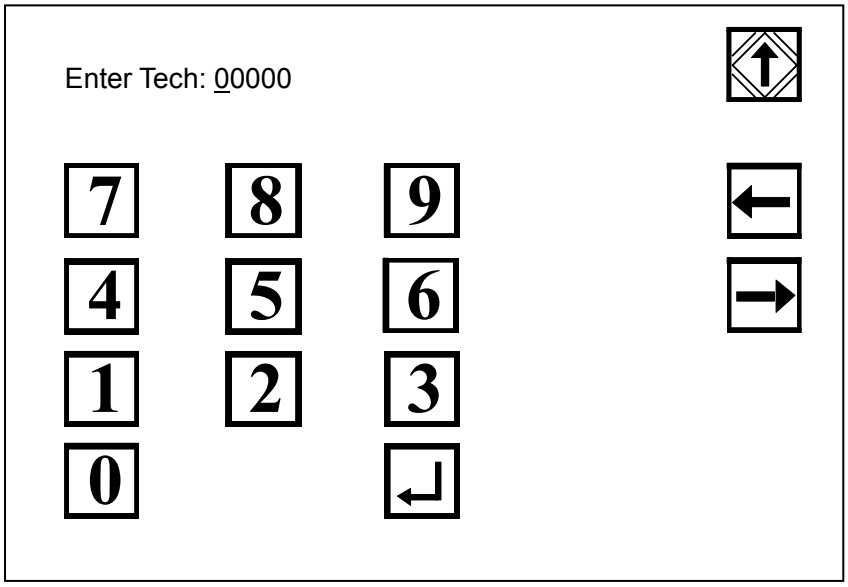


Figure 3-7

Press number key to input medical number. Touch  to confirm and return to upper menu. System apply new medical number. Touch  to cancel the modification of medical number. System will remain original medical number.

3.3.2.2 Manufacturer setup

"Manufacturer setup" is used for manufacturer only. Operator can not use it, nor change the setup. Touch it to enter the screen as follows:

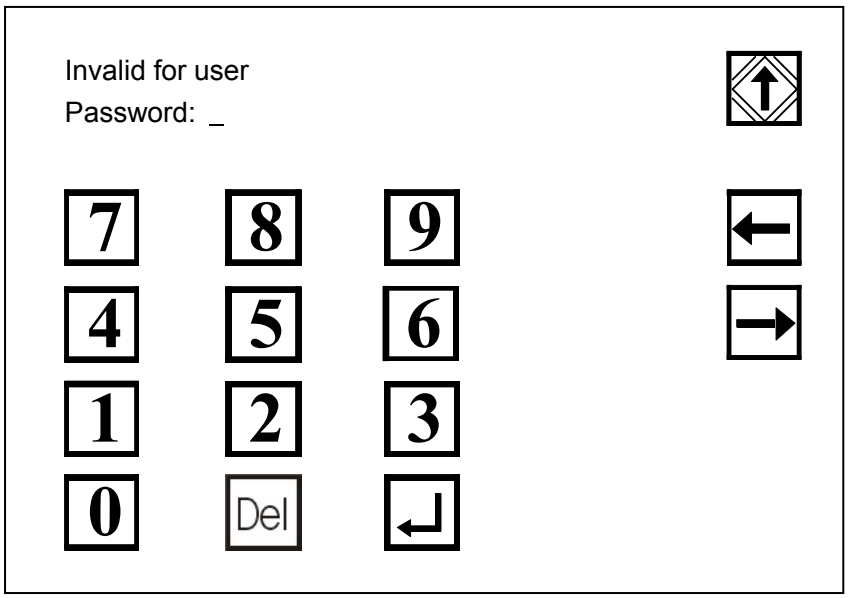


Figure 3-8

Operator can touch  to exit and return to upper menu.

3.3.2.3 Recall

Touch  in front of “Recall” in figure 3-6, the screen shows as follows:

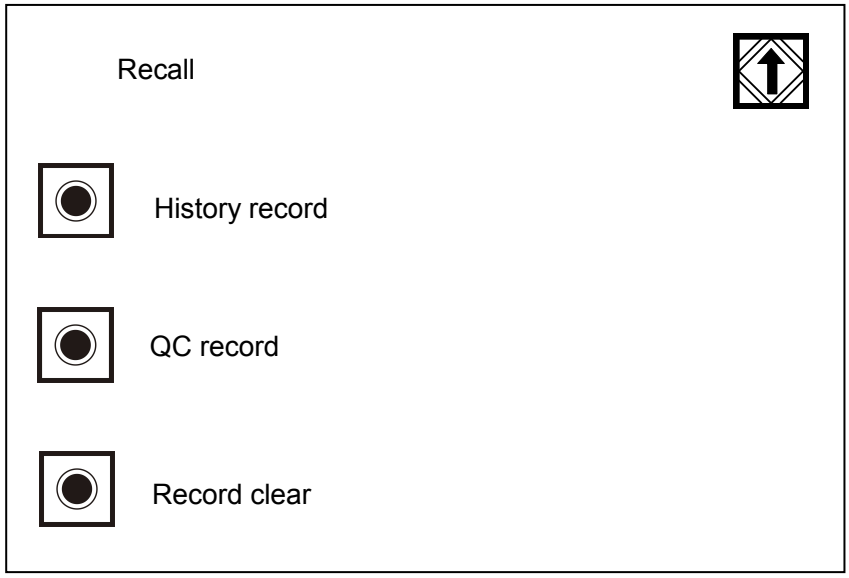


Figure 3-9

Touch  in front of “History record” in figure 3-9, and screen shows as follows:

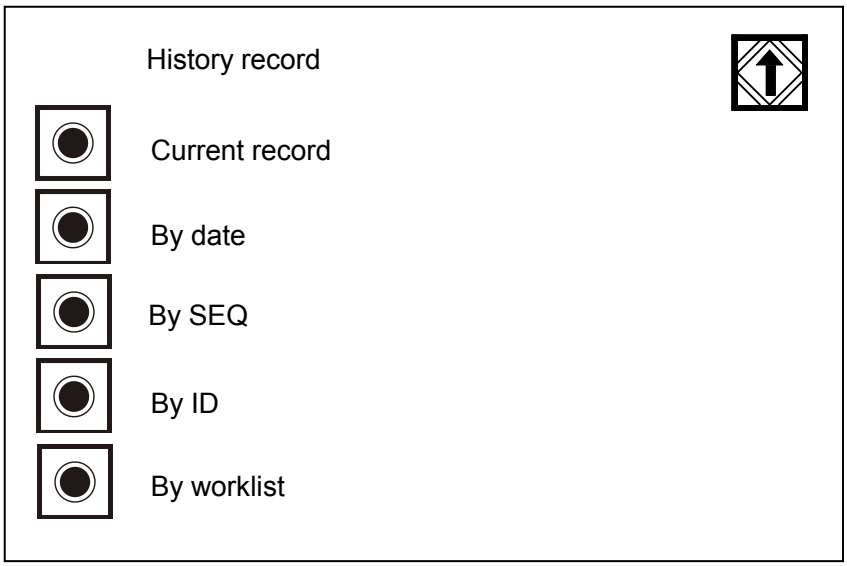


Figure 3-10

- **Current record**

Touch  in front of “Current record” in figure 3-10, and screen shows as follows:

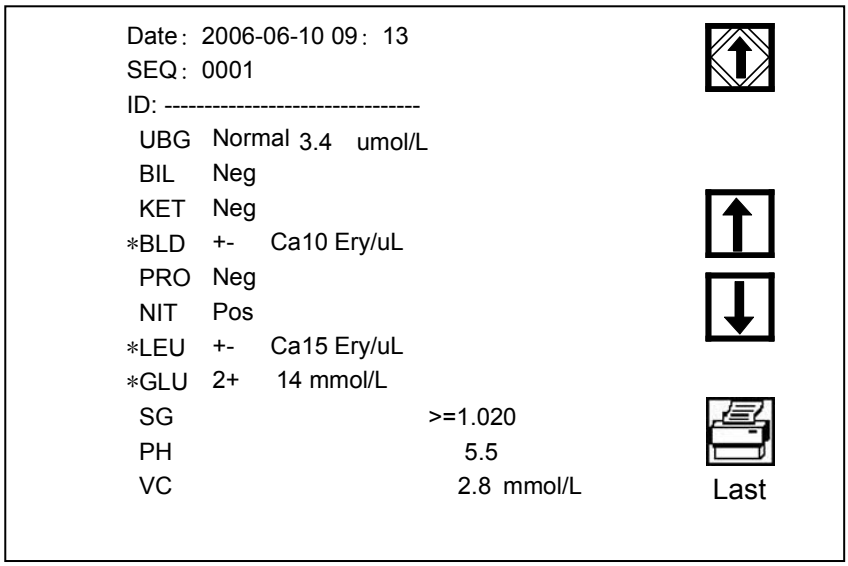
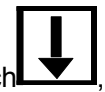


Figure 3-11

Touch  to return to the upper menu.

Touch , screen will show previous test record (the present number minus one is its number).

Touch , screen will show next test record (the present number plus one is its number).

Touch  to print the record showed on the screen.

● **Search result by date**

Touch  in front of “By date” in figure 3-10, and screen shows as follows:

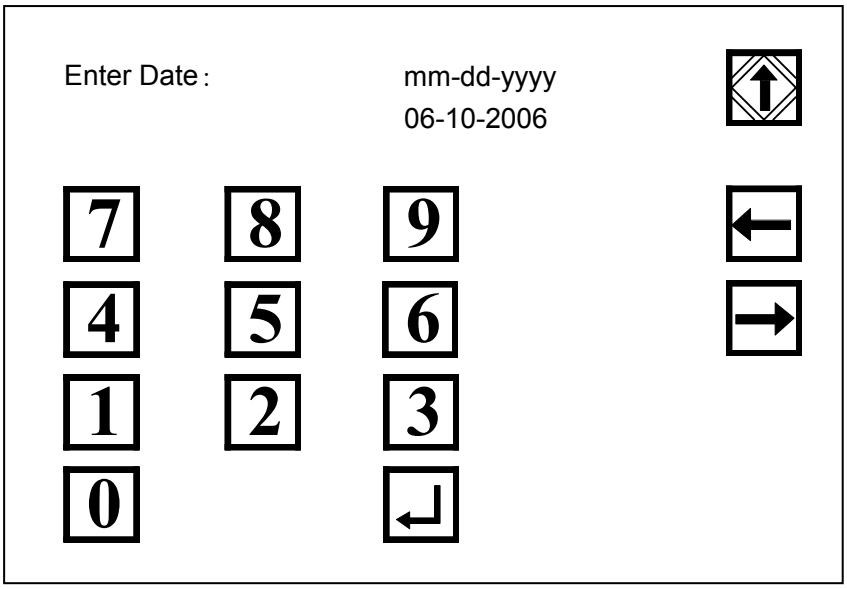


Figure 3-12

Press  in figure 3-12 after date input, as the following figure shows:

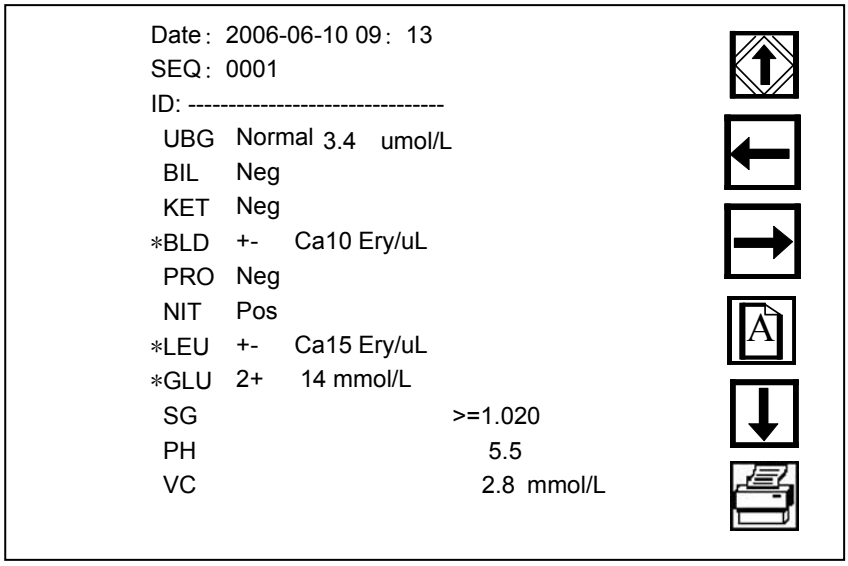


Figure 3-13

- **Search result by SEQ**

Touch  in front of “By SEQ” in figure 3-10, and screen shows as follows:

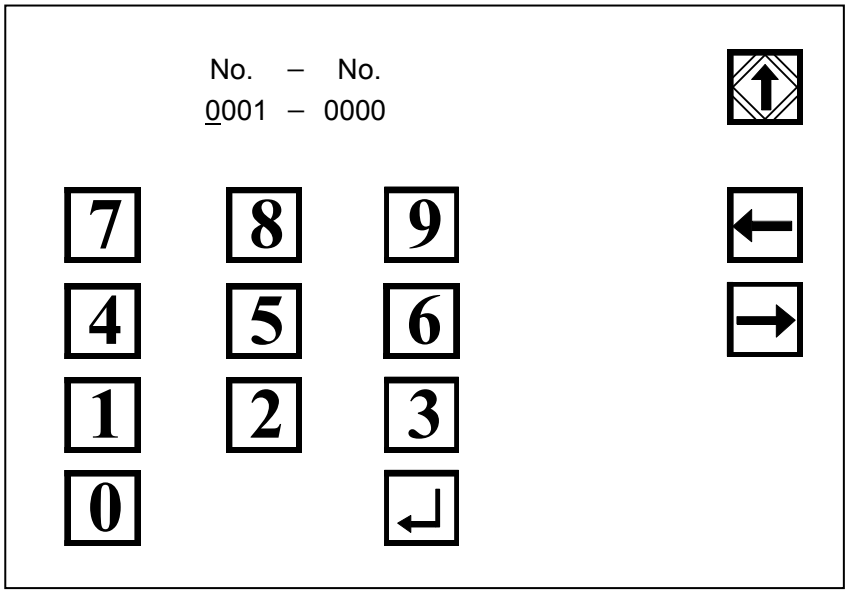


Figure 3-14

The number displays on the screen is the next testing record number. Operator can input the number by touching number key, the range is between 0001 and 9999. After inputting, enter  to confirm，the screen displays the record corresponding to inputted number（Figure 3-13）, enter  to print the

result.

● **Search result by ID**

Touch  in front of “By ID” in figure 3-10, and screen shows as follows:

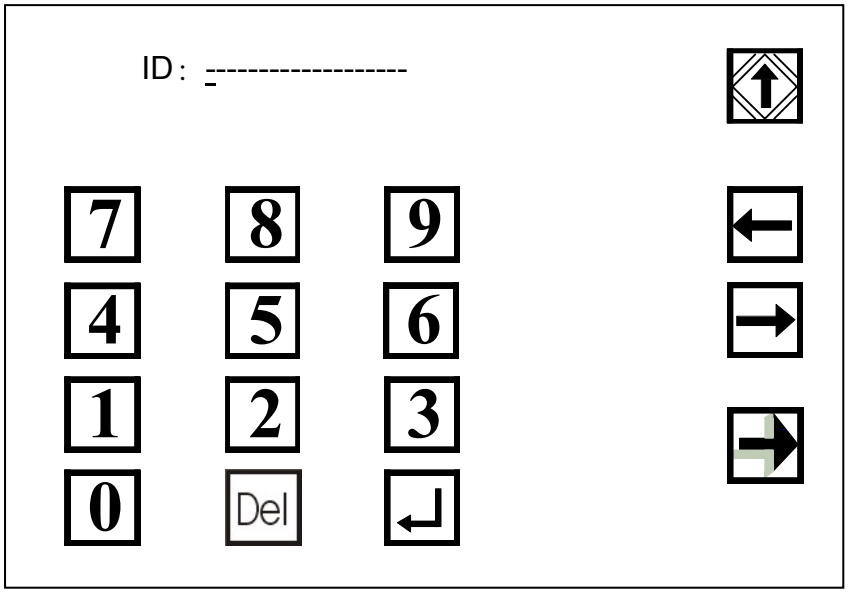


Figure 3-15

Touch number key to input ID number, enter  to confirm, and screen shows as follows:

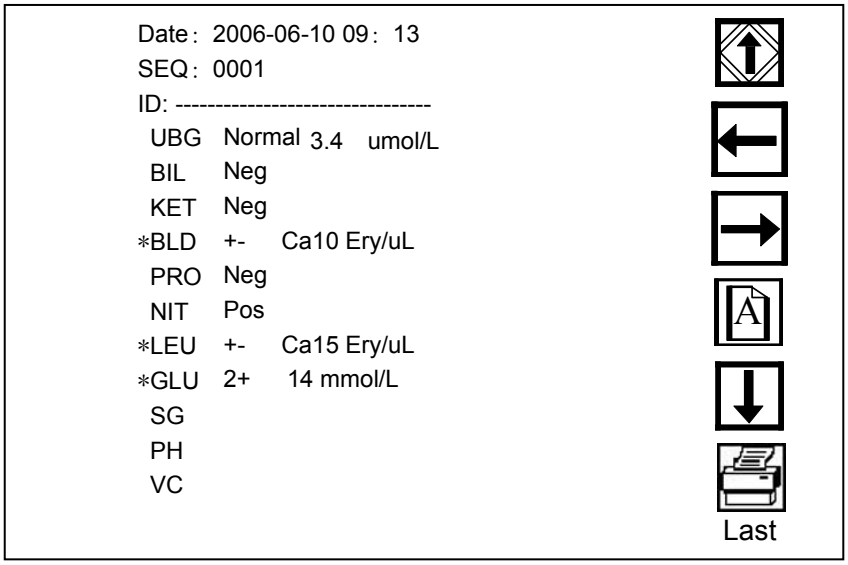


Figure 3-16

If the analyzer has the record, the screen displays the relavant record, On the other hand it displays “blank record”.

● **Search the record by worklist**

Touch  in front of “By worklist” in figure 3-10, and screen shows as follows:

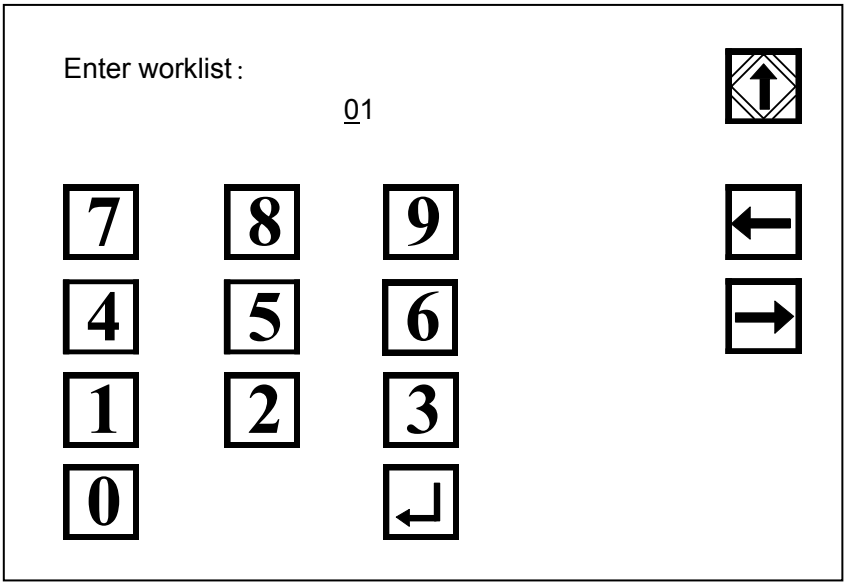


Figure 3-17

It can be queried according to the set work group. After work group input，press  in figure 3-17, and screen shows as follows 3-16.

● QC record recall

The analyzer could memorize 200 QC record.

Touch  in front of “QC record” in figure 3-9, and screen shows as follows:

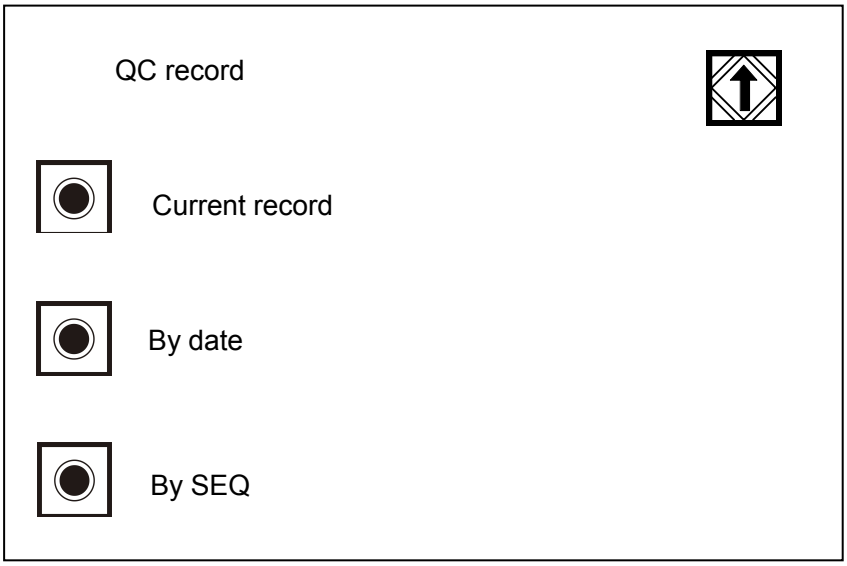


Figure 3-18

If the analyzer has the record, screen will display the relavant record, on the other hand it displays “blank record”. Touch “”、“” to check previous and next record. Touch  to print out the showed

record. Touch  to return.

3.3.2.4 Record Clear

Touch  in front of “Record clear” in figure 3-9, and screen shows as follows:

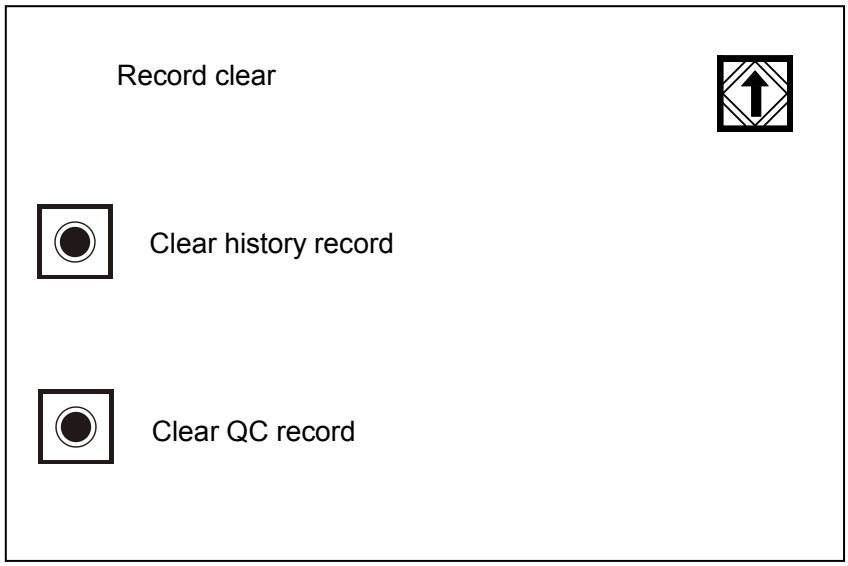


Figure 3-19

Touch  in front of “Clear history record” or “Clear QC record” in figure 3-19, and screen shows as follows:

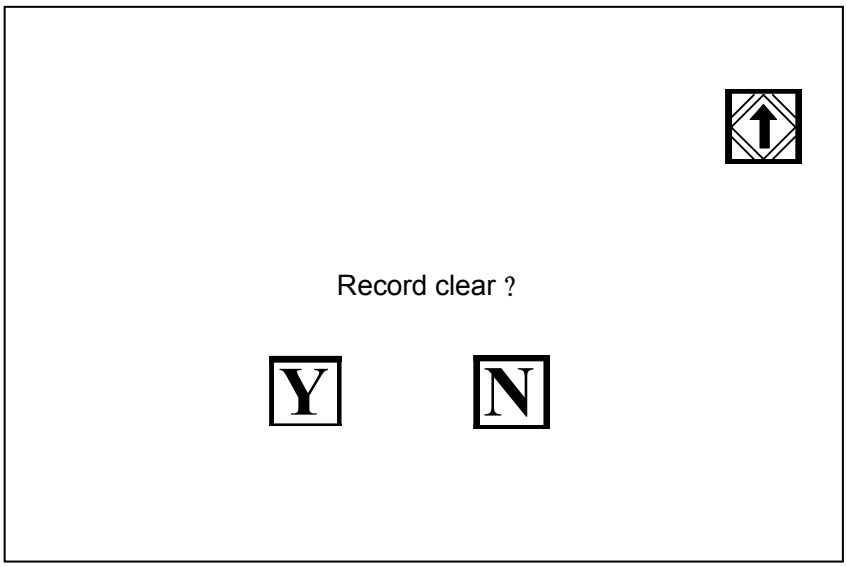


Figure 3-20

Touch , the screen will show “please wait…”, the system deletes the record and returns to the main menu.

3.3.3 Set sub-menus

There are six sub-menus under setup. Operator could change the setup of date, time, communication ports, printer, worklist and ID mode. Other options can be protected by password. The operator could change the password.

3.3.3.1 Set sub-menu1

Touch  in front of “Setup” in figure 3-6, the screen shows follows.

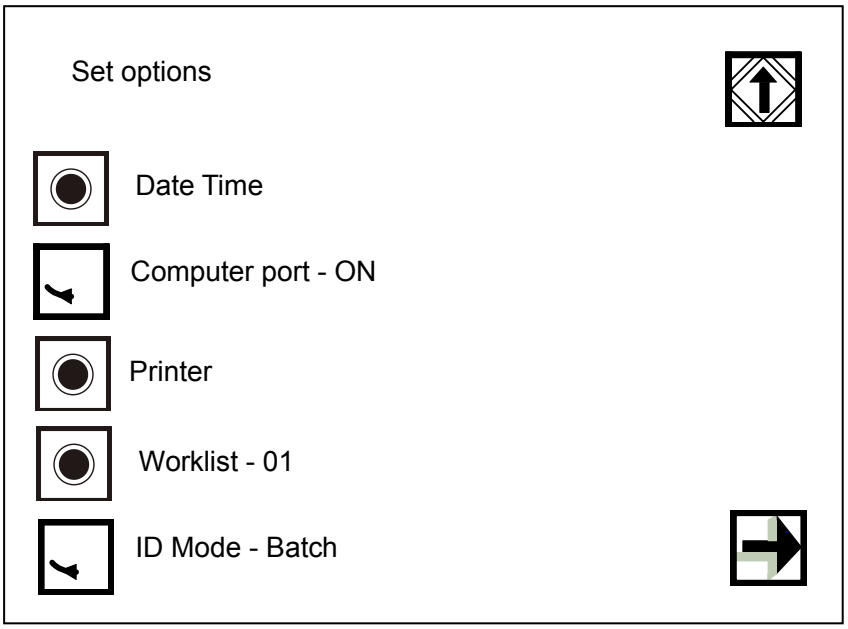


Figure 3-21

User could change the setup of date, time, computer ports, printer, worklist and ID mode.

3.3.3.1.1Date Time

Touch  in front of “Date Time”, screen shows as follows:

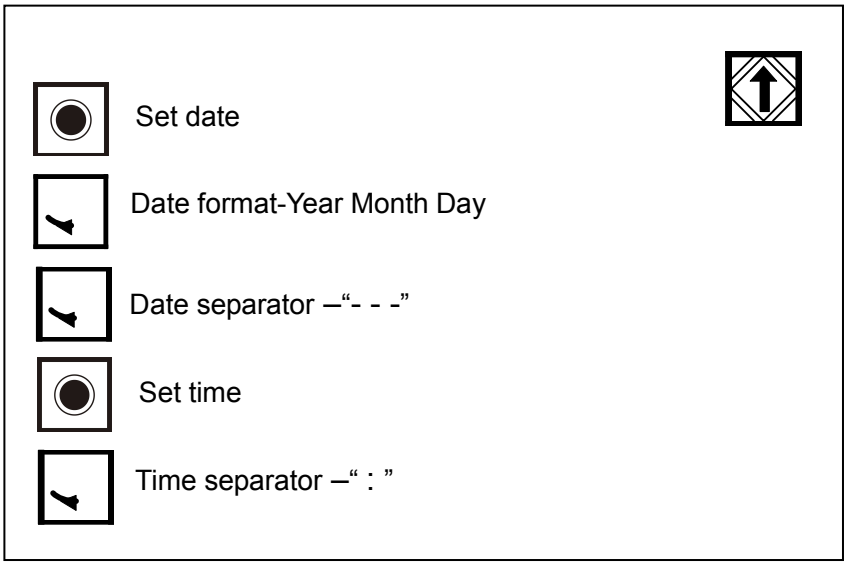


Figure 3-22

- **Set date**

Touch  in front of “Set date” in figure 3-22, screen shows as follows:

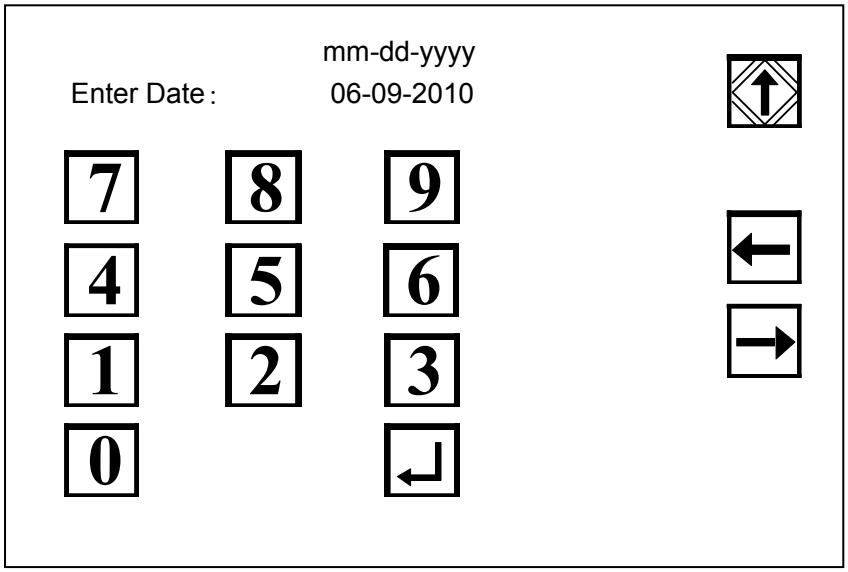


Figure 3-23

“06-10-2006” in figure 3-23 means the current time. Operator could change the date through number key by entering corresponding numbers or moving the cursor , to the place need change to modify the date, press  to confirm and return to upper menu, the system will show new date. Press  to cancel the modification and return to upper menu, while the original date is effective.

- **Date format**

Touch  in front of “Date format” in figure 3-22, the contents will be switched among the following table:

1	Year	Month	Day
2	Month	Day	Year
3	Day	Month	Year

Table 3-1

- **Date separator**

Touch  in front of “Date separator” in figure 3-20, the contents will be switched among the following table:

1	-
2	/
3	.

Table 3-2

Touch  to return to the upper menu.

- **Set Time**

Touch  in front of “Set Time” in figure 3-22, screen shows as follows:

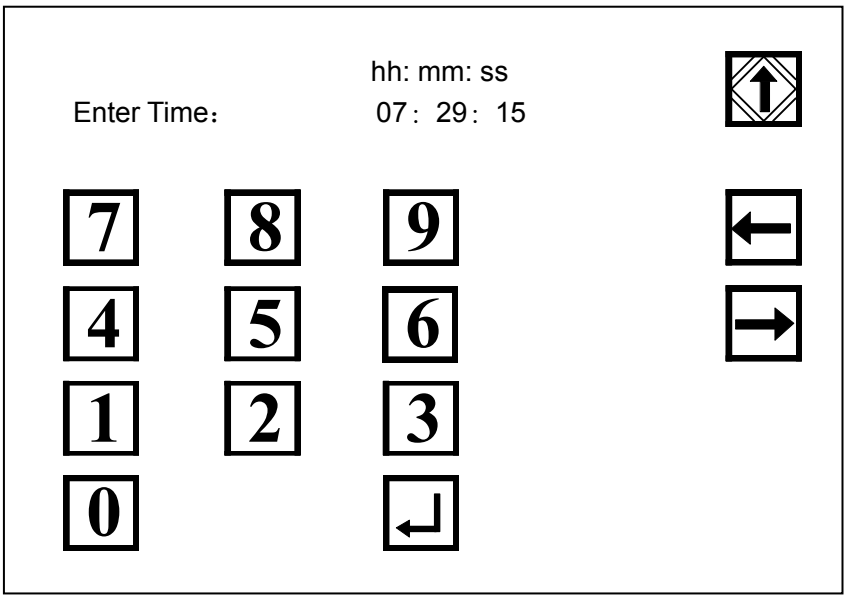


Figure 3-24

The time “07:29:15” is current time. Operator could change the time through number key by entering corresponding numbers or moving the cursor ,  to the place need change to modify the time, press  to confirm and return to upper menu, the system will show new time. Press  to cancel the modification and return to upper menu, while the original time is effective.

- **Time Separator**

Touch  in front of “Time separator”, contents will be switched among the following table:

1	：
2	，
3	.

Table 3-3

3.3.3.1.3 Computer port

Touch  in front of “Computer port”, contents against the port will be switched between “ON” and “OFF”.

When it is “On”, the analyzer will send data to computer through communication port. When it is “Off”, the analyzer stops transmitting test data.

3.3.3.1.4 Printer

Touch  in front of “Printer”，the screen shows as follows:

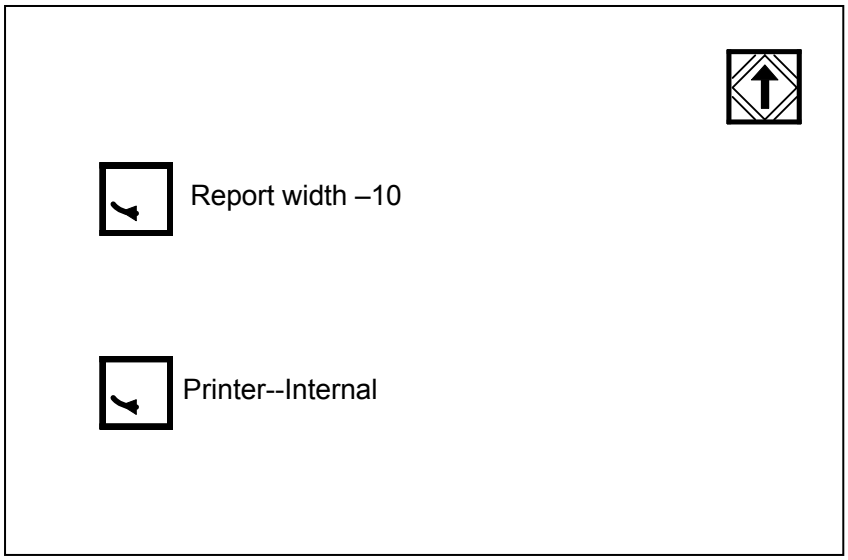


Figure 3-25

- Report width

Touch  in front of “Report width”, the contents will be switched among the following table. It is used to set the blank width between two records.

1	2
2	4
3	6
4	8
5	10

Table 3-4

- Printer

Touch  in front of “Printer”, the contents will be switched among the following table:

1	Internal
2	External
3	ALL ON
4	ALL OFF

Table 3-5

Internal ----internal thermal printer.
External ---external printer connected with the instrument.
ALL ON ---indicates the test result could be printed out both by internal thermal printer and external printer connected with the analyzer.
ALL OFF ---indicates the test result could not be printed out neither by internal thermal printer nor external printer connect with the analyzer.

3.3.3.1.4 Worklist

Touch  in front of “Worklist” in figure 3-20，the screen shows as follows:

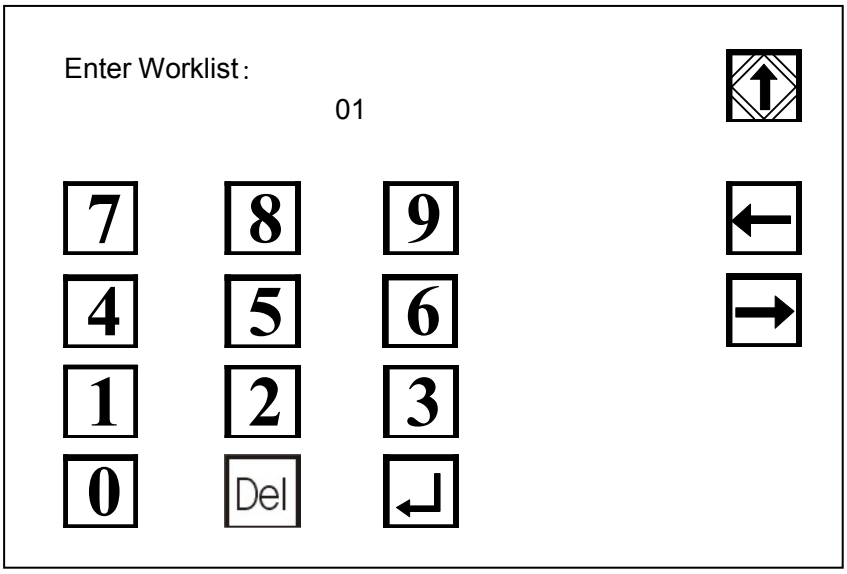


Figure 3-26

Different work group can be set, queried can be conducted according to the work group.

3.3.3.1.5 ID Mode

Touch  in front of “ID Mode”, the contents will be switched among the following table:

1	Batch
2	One by one

表 3-6

3.3.3.2 Set sub-menu 2

Touch page turning key “” in set sub-menu 1 in figure 3-21, the screen shows as follows:

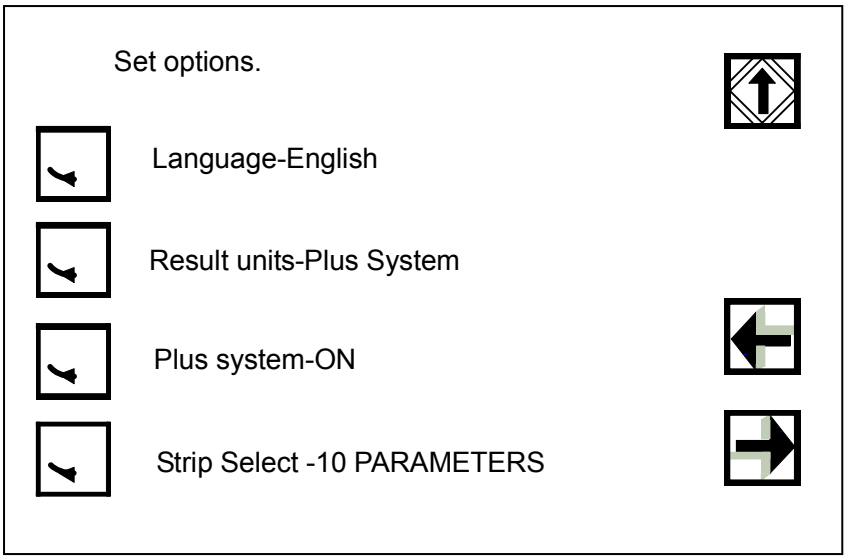


Figure 3-27

The operator could make setup to Language, test unit, Plus system and strip selection.

3.3.3.2.1 Language

Touch  in front of “Language”, the contents will be switched among the following table 3-7:

1	中文	2	English	3	Italiano
4	Español	5	РУС	6	Angielski
7	İngilizce	8	Português	9	Deutsch
10	Français	11	Magyar		

Table 3-7

Instrument language can be selected.

3.3.3.2.2 Unit

Touch  in front of “Result units”, the contents will be switched among the following table3-8:

1	SI
2	Conventional
3	Plus System
4	CT200
5	DR200

Table 3-8

Note：When unit system is DR200，the instrument can be connected with DIRUI FUS-100 Urine Sediment Analyzer forming work station.

3.3.3.2.3 Plus system

Touch the  in front of “Plus system” (figure 3-27), it will switches between “ON” and “OFF”.

- When “Plus system” is “ON” and “Result Unit” is “Conventional”, the result is as figure 3-28. When “Result Unit” is “SI”, the result is as figure 3-29.
  When “Result Unit” is “Plus”, result is as figure 3-30.

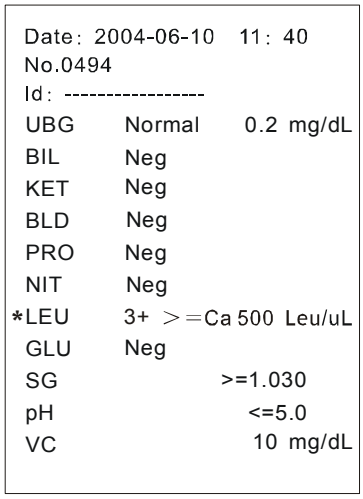


Figure 3-28

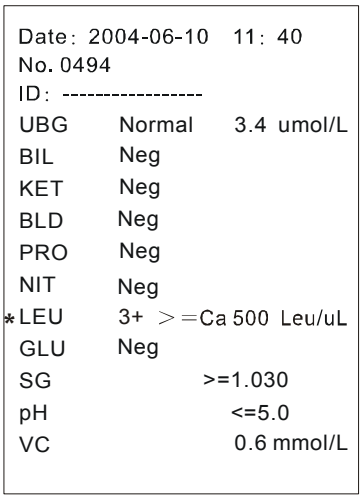


Figure 3-29

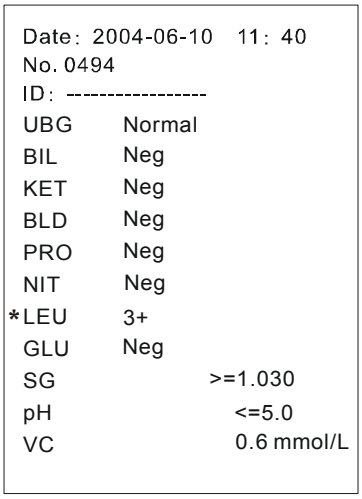


Figure 3-30

- When “Plus system” is “OFF” and “Result Unit” is “Conventional”, the result is as figure 3-31.
  When “Result Unit” is “SI”, result is as figure 3-32.
  When “Result Unit” is “plus”, result is as figure 3-33.

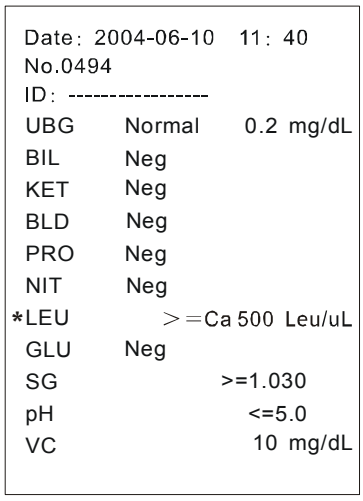


Figure 3-31

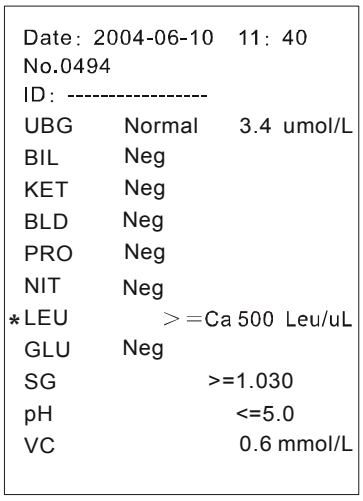


Figure 3-32

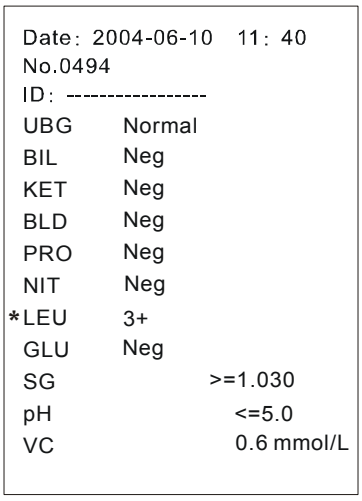


Figure 3-33

3.3.3.2.4 Strip selection

Touch  in front of “Strip select”, the contents will be switched among the following table:

1	8 PARAMETERS
2	10 PARAMETERS
3	11 PARAMETERS
4	11-MA(N)
5	4-B

Table 3-9

The corresponding content behind “Strip select” indicates the current used strip types.

Note:

The suitable reagent strips for H-500 Urine Analyzer are DIRUI H8, H10, H11, H-11MA(N),4-B manufactured by DIRUI. For getting correct test result, please do not use other type of reagent strips.

Note:

Touch  in set sub-menu 1 in figure 3-21, if the screen shows the following content in figure 3-34 instead of figure 3-27.

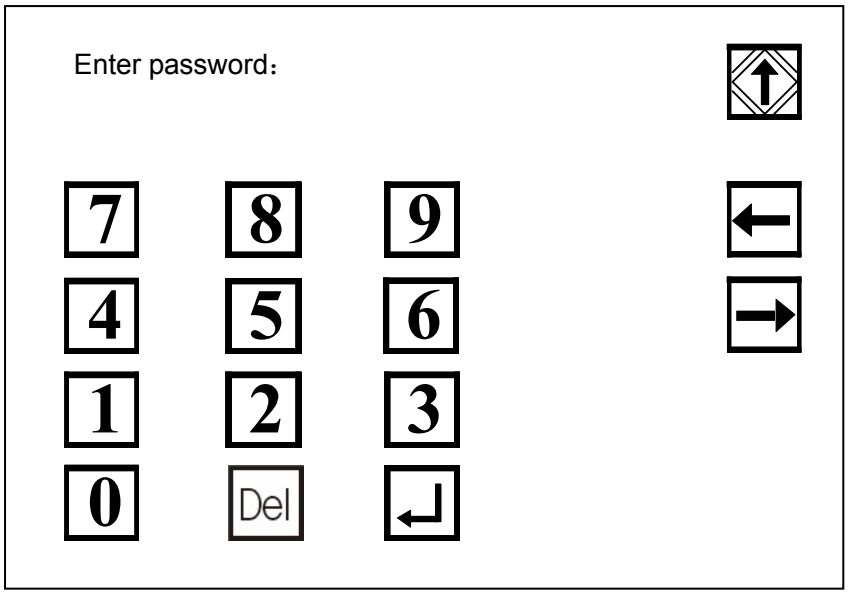


Figure 3-34

Figure 3-34 is password entering page, indicating that later pages has been protected by a password.

Use the number keys to enter the password and touch  to confirm. If entering correct password, figure 3-27 will show. However, if entering incorrect password or touching  after entering the password, figure 3-21 will show.

Note:

The original password of the analyzer is “1234”.

3.3.3.3 Set sub-menu 3

Touch  in set sub-menu 2 In figure 3-27，the screen shows as follows:

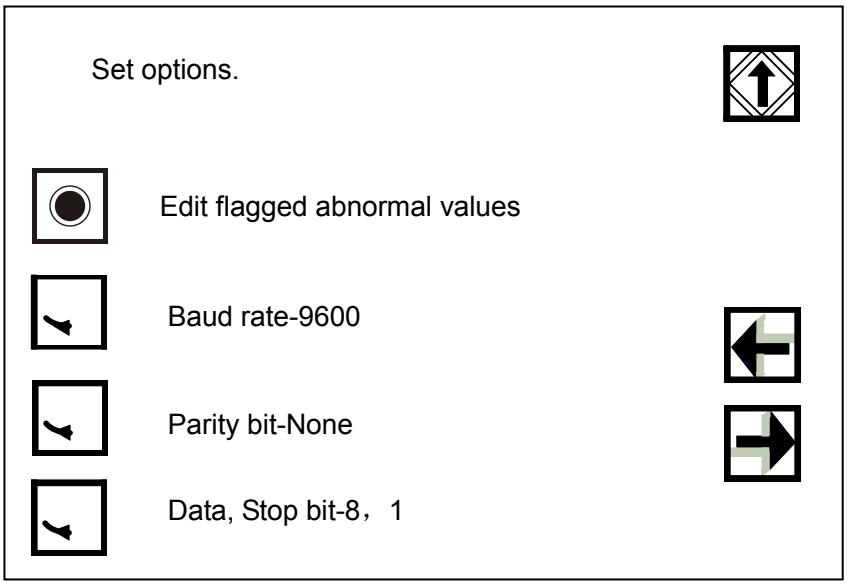


Figure 3-35

3.3.3.3.1 Set positive levels for tests

Touch  in front of “Edit flagged abnormal values” (Figure 3-35), the screen shows as follows:

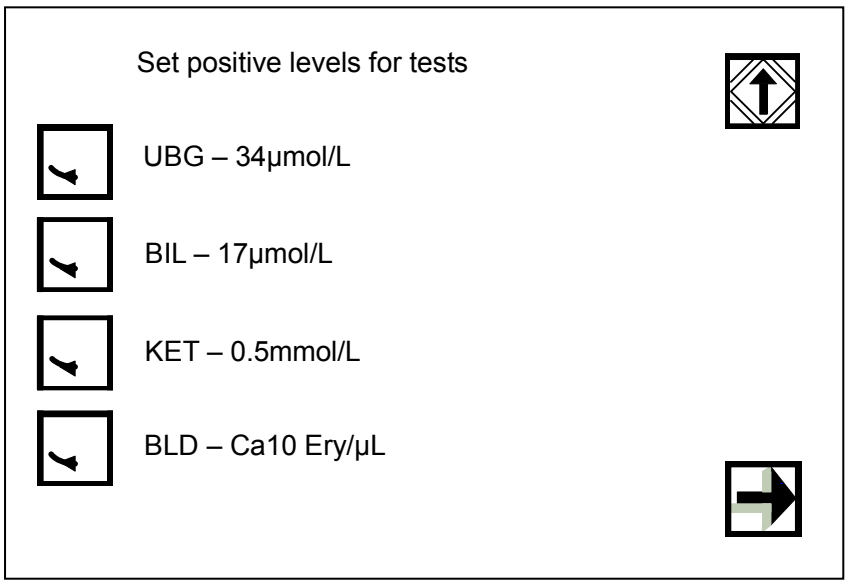


Figure 3-36

In figure 3-36,touch ， operator could set the protein, nitrite, leucocytes, glucose.

Touch  in front of each item，content of each item will be switched orderly among the following table:

Item / No.	UBG	BIL	KET	BLD	PRO	NIT	LEU	GLU
1	3.4μmol/l	Neg	Neg	Neg	Neg	Neg	Neg	Neg
2	17μmol/l	17μmol/l	0.5mmol/l	Ca10Ery/μL	shadiness	Pos	Ca15Leu/μL	2.8 mmol/l
3	34μmol/l	51μmol/l	1.5mmol/l	Ca25Ery/μL	0.3g/L		Ca70Leu/μL	14 mmol/l
4	68μmol/l	>=103μmol/l	3.9mmol/l	Ca80Ery/μL	1.0g/L		Ca125Leu/μL	28 mmol/l
5	>=135μmol/l		>=7.8mmol/l	>=Ca200Ery/μL	>=3.0g/L		>=Ca500Leu/μL	>=56 mmol/l

Table 3-10

When one of the test item in the test result is higher than the setted abnormal value in figure 3-36, "*"will appear in the output result.

For example, the test results of BLD、NIT、LEU、GLU are higher than the setted abnormal values, there are "*" as in the printed result as follows:

```
Date: 2004-06-10  11: 40
No.0494
ID: ----------------
 UBG      Normal    3.4 umol/L
 BIL      Neg
 KET      Neg
*BLD      2+      Ca80 Ery/uL
 PRO      Neg
*NIT      Pos
*LEU      3+  >=Ca 500 Leu/uL
*GLU      1+        5.6mmol/L
 SG              >=1.030
 pH                <=5.0
 VC                0.6 mmol/L
```

Figure 3-37

3.3.3.3.2 Set Baud rate, Parity bit, Data and Stop bit

Baud rate, Parity bit, Data, Stop bit are used to connect with computer. Touch each corresponding , contents behind each item will be switched among the following table:

Name / No.	Baud rate	Parity bit	Data, Stop bit
1	9600	None	8，1
2	1200	Odd	8，2
3		Even	7，1
4			7，2

Table 3-11

3.3.3.4 Set sub-menu 4

Touch  in set seb-menu 3 in figure 3-35，the screen shows as follows：

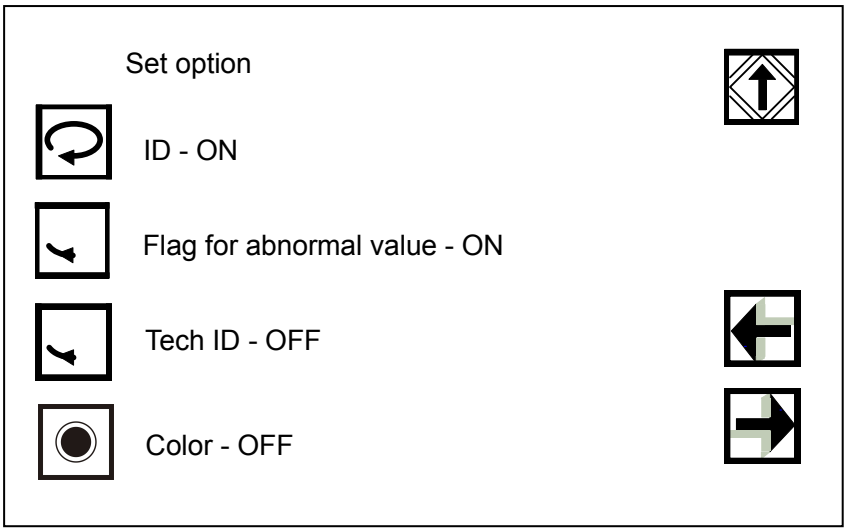


Figure 3-38

There are ID, Flag for abnormal value, Tech ID, color and clarity on this page. Touch  in front of each item, the contents will be switched between “On” and “Off”.

- **ID**

When “ID” is “ON”, output result includes ID number. When “ID” is “OFF”, no ID number in the result.

- **Flag for abnormal value**

When “Abnormal Value” is “Off”, there is no “∗” in the output test result. When “Abnormal Value” is “On” and one of the test item in the test result is higher than the setted abnormal value, “∗” will be shown in the output result.

- **Tech ID**

When “Tech ID” is “Off”, there is no tech ID on the main screen. When “Tech ID” is “On”, there is tech ID on the main screen.

- **Color**

Touch  in front of “Color” in figure 3-38， the screen shows as follows：

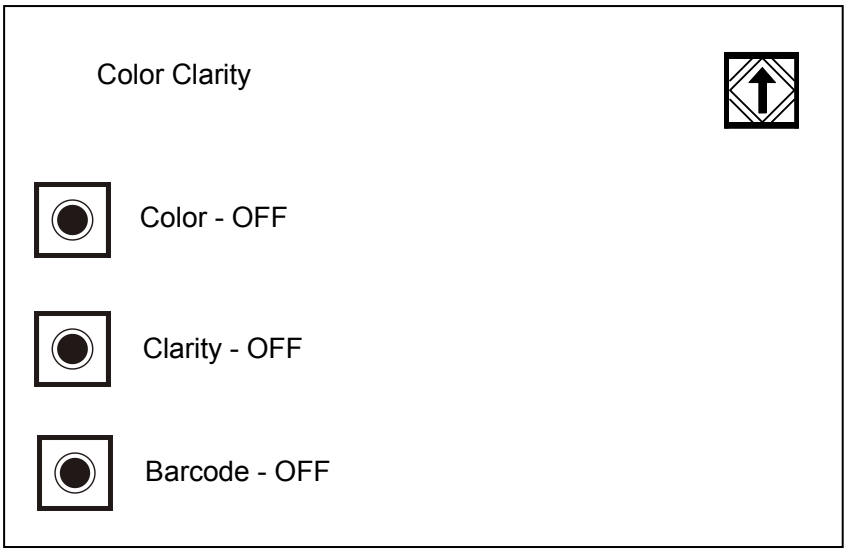


Figure 3-39

● When “color”、“turbidity”、“barcode” are all ON, press “ID” of main menu，use external barcode reader to scan “color” 、“Clarity” barcode，color and turbidity will be printed.

● When “color”、“turbidity”、“barcode” are all OFF, press “ID” of main menu，use external barcode reader to scan “color” 、“Clarity” barcode，color and turbidity will not be printed.

● When “color”、“turbidity” are ON, and “barcode” is OFF, “color” 、“Clarity” barcode can not be scanned，color and turbidity can be filled by hands.

3.3.3.5 Set sub-menu 5

Touch  in set sub-menu 4 in figure 3-38, screen shows as follows:

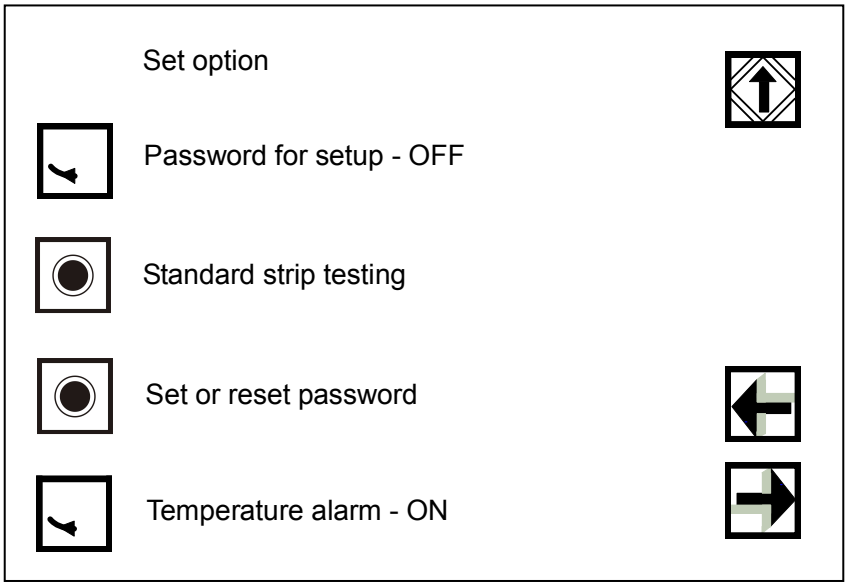


Figure 3-40

3.3.3.5.1 Set password

Touch  in front of "Password for setup", it switches between "ON" and "OFF".

a) When it shows "Password for setup -OFF", touch  in set sub-menu 1 in figure 3-21, the screen displays set sub-menu 2 as in figure 3-27.

b) When it shows "Password for setup -ON", touch  in set sub-menu 1 in figure 3-21, the screen displays set sub-menu 2 as figure 3-34. Only with the right password can the screen enter into setup menu 2 as in figure 3-27.

3.3.3.5.2 Calibration strip test

This function will be introduced in "Chapter 4 Quality Control Monitoring".

3.3.3.5.3 Set / reset password

Touch  in front of "Set or reset password" the screen shows as follows:

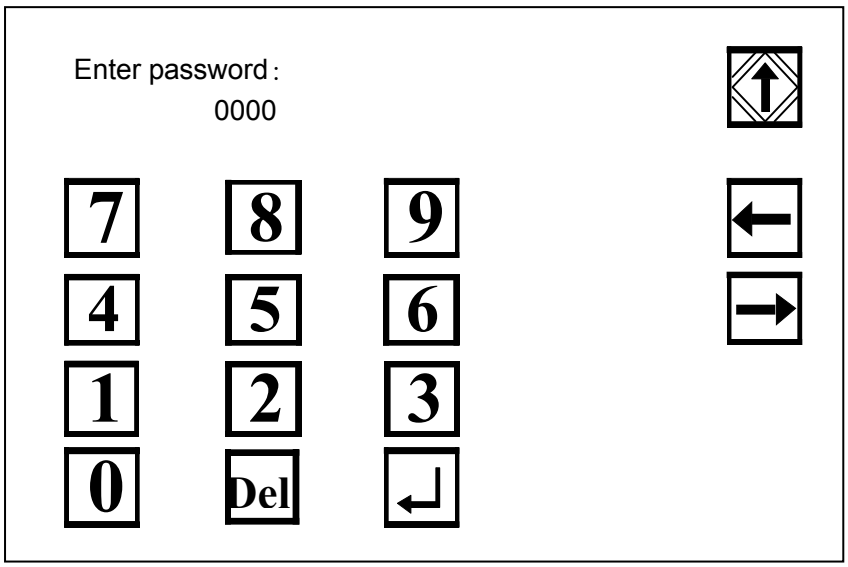


Figure 3-41

Figure 3-41 is screen for password modification. The password here is used to protect further setup under the setup menu 2 and below. Operator can use the number keys on the screen to set a new password. Touch  to confirm and exit. Touch  to exit and make the original one effective.

3.3.3.5.4 Temperature alarm

Press “Temperature Alarm”  to switch between ON and OFF. When the temperature is >37℃ or <15℃，the instrument will prompt alarm.

3.3.3.6 Set sub-menu 6

Touch  in set sub-menu 5 in figure 3-40, the screen displays as follows:

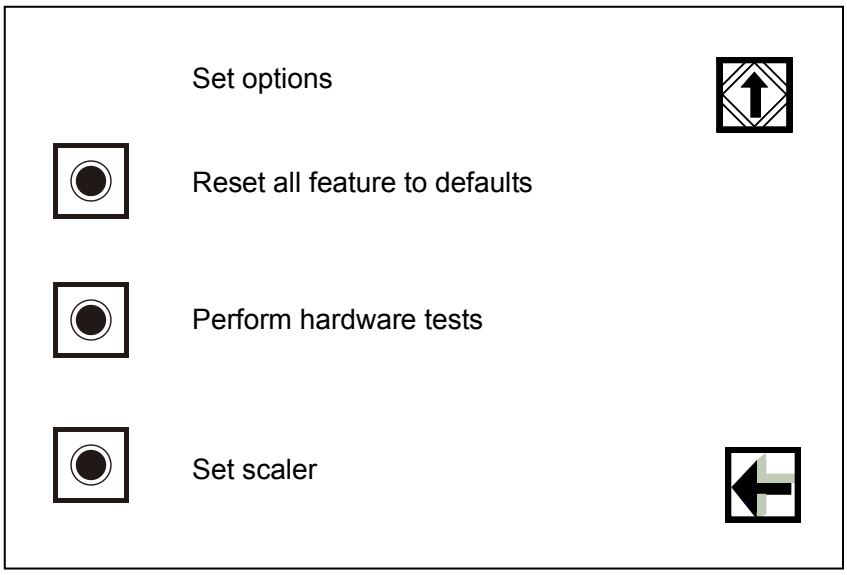


Figure 3-42

3.3.3.6.1 Reset all feature to defaults

Touch  in front of “Reset all feature to defaults”, the screen shows as follows:

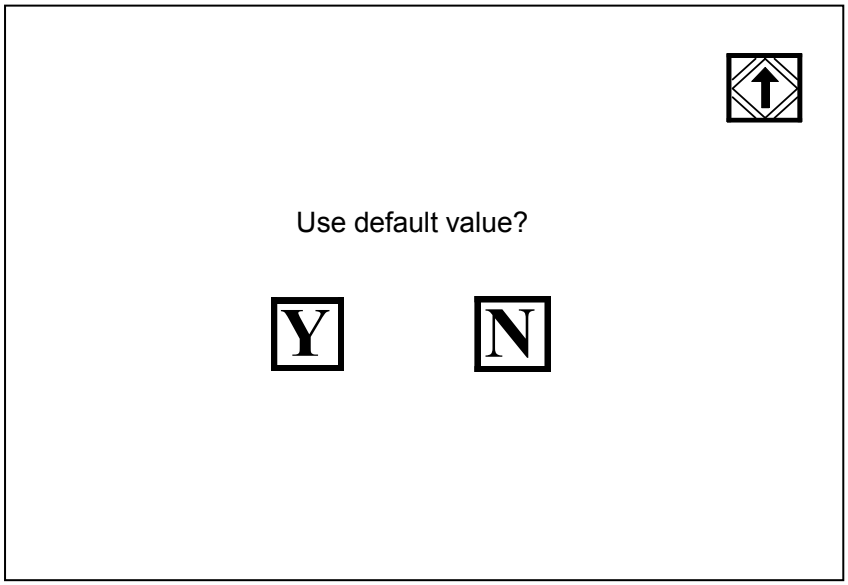


Figure 3-43

Touch Y to confirm, the scaler of the analyzer will recover to original setup. The screen will return to setup menu 6 (figure 3-42). Touch N to cancel the setup and return to figure 3-42.

3.3.3.6.2 Hardware test

Touch ◉ in front of “Perform hardware tests” (figure 3-41), screen shows as below:

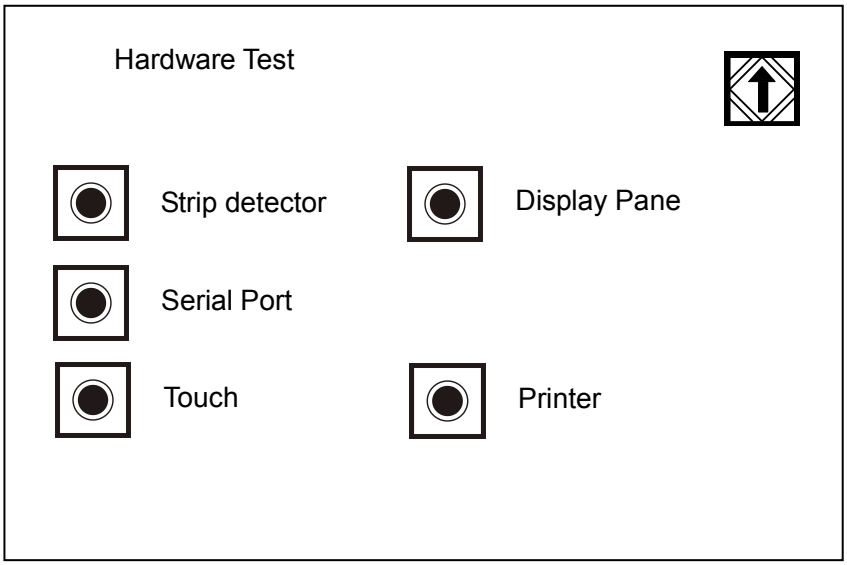


Figure 3-44

- Touch ◉ in front of “Strip detector” to test whether the detector works well. When there is strip in the detecting area, the screen will show “Have Strip”, otherwise it shows “No Strip”.

- Touch ◉ in front of “Serial port” to test whether the port works well.

- Touch ◉ in front of “Touch” to test the touching screen. Tick sign will appear in the square area when touching the square area shown on the screen, touch again, the tick sign will disappear. Press ← to return to figure 3-44.

- Touch ◉ to examine the display screen. Press this key, there will be all the points that can be lightened, press any point on the screen, there will be strips bright and dull. press any point on the screen again to return to Figure 3-44.

- Touch ◉ in front of the item “Printer” to test status of the printer. Touch its corresponding sub-page key to make the normal printer run and print out a piece of record as “PRINT TEST”.

The screen returns to the main screen after setup or returns to the main screen from the main setup menu, the screen shows as follows:

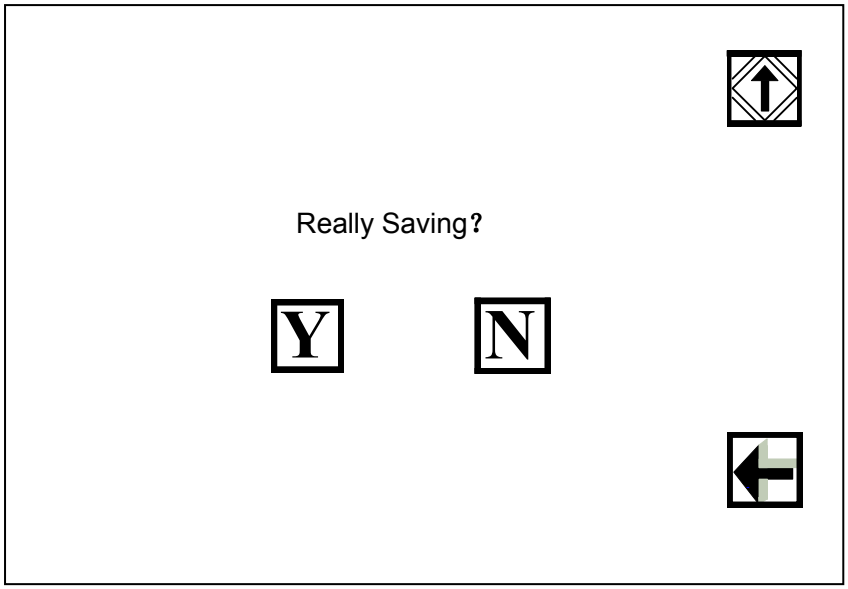


Figure 3-45

Touch Y to confirm, the analyzer will memorize the modification to each setup. Press other keys to cancel the change. The instrument will keep original setup.

3.3.3.6.3 Calibration Setting

Display calibration of each test value, the user can not change it.

Chapter 4 Quality Control Monitoring

4.1 The Test On Quality Control Liquor

In order to make sure the correctness of the test result, please use the positive and negative quality control liquor manufactured by Dirui Industrial Co., Ltd. should be used to test the Urine Analyzer and the reagent strip.

The quality control monitoring might be conducted under the following conditions:

- When before daily test
- When replace another tube of strips
- When operator changes
- When there is query to the test result

Testing method:

Touch  in front of “Control” in figure 4-1 to enter into the figure 4-2.

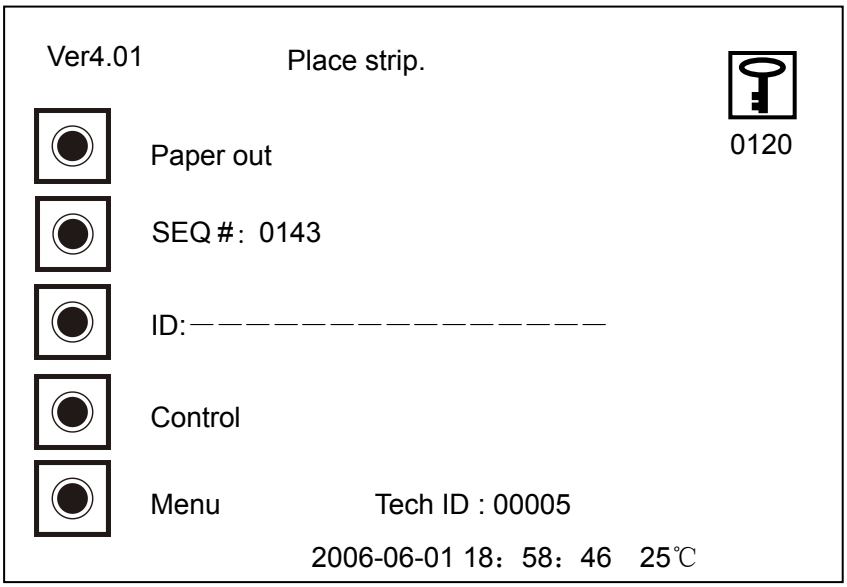


Figure 4-1

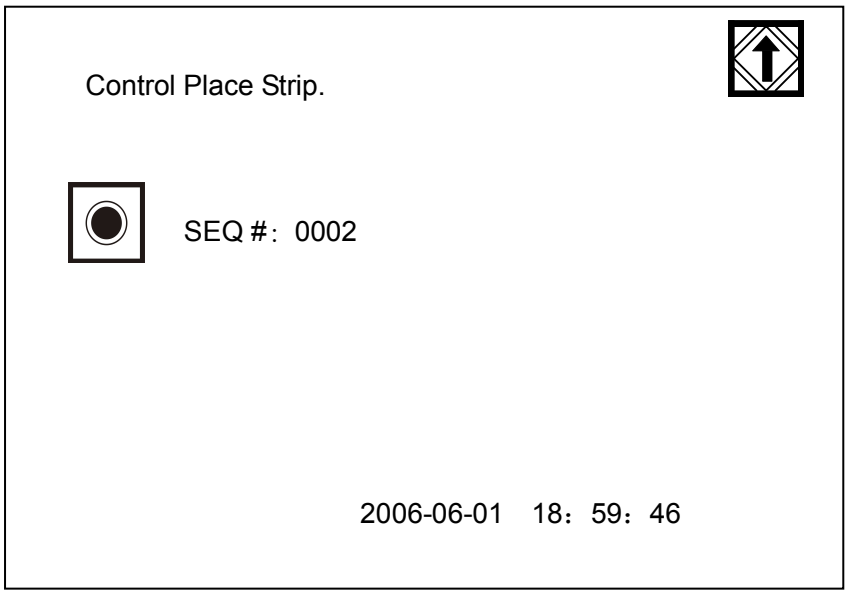


Figure 4-2

Put the reagent strips with urinalysis control liquor onto the strip-examining section (Figure 4-3), when the analyzer detects the existence of the strip, the pusher will push the reagent strip to the test section (Figure 4-4), and the test result will be output after the test. Press to return to main screen (figure 4-1). Check the result with the reference value in the instruction.

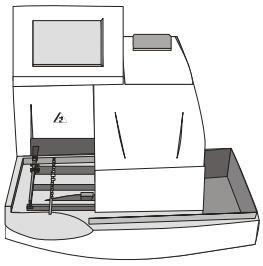


Figure 4-3

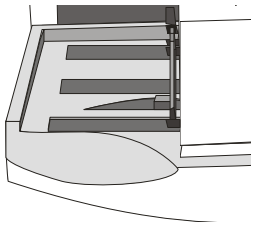


Figure 4-4

4.2 Test the Calibration strip

Note:

- Do not dip the calibration strip into water or any other liquid.
- There are two calibration strips accompanying the analyzer.
- If the calibration strip has been besmirched or damaged, please contact the supplier. Do not continue to use this calibration strip.
- In order to getting correct test result, it is recommended to test the Urine Analyzer by the standard strip every one or two weeks.

Test method

Select “Standard strip testing” in set sub-menu 5 in figure 3-39, Screen displays as follows：

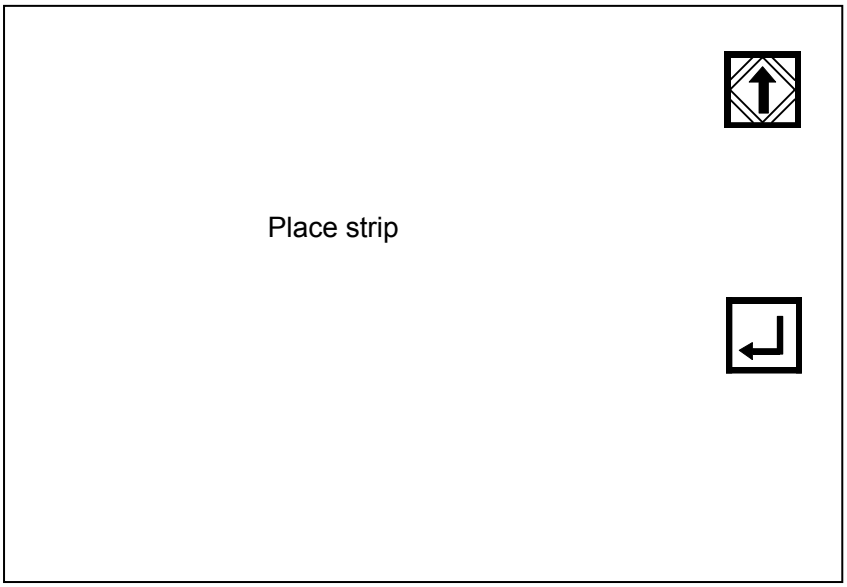


Figure 4-5

Put the calibration strip on the work table（figure 4-6）:

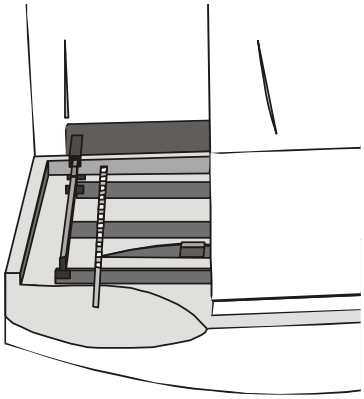


Figure 4-6

Touch  in figure 4-5, the analyzer begins test, the printer print test result after testing,
If it passed the calibration, test result is “Calibration OK”. If it did not pass the calibration, test result is “Calibration Not OK”.

Chapter 5 Conventional Urine Test

⚠ Warning

- The urine sample may have potential infectivity; protective measures should be taken when testing, cleaning, or doing maintenances to the instrument.
- Please dispose the urine sample and the waste strips according to the local laboratory regulation.

This chapter tells the methods of conducting conventional urine test on H-500 Urine Analyzer. Before the test, please read “Chapter 3 Functions and Setup of H-500 Urine Analyzer”.

5.1 Form of test operation process

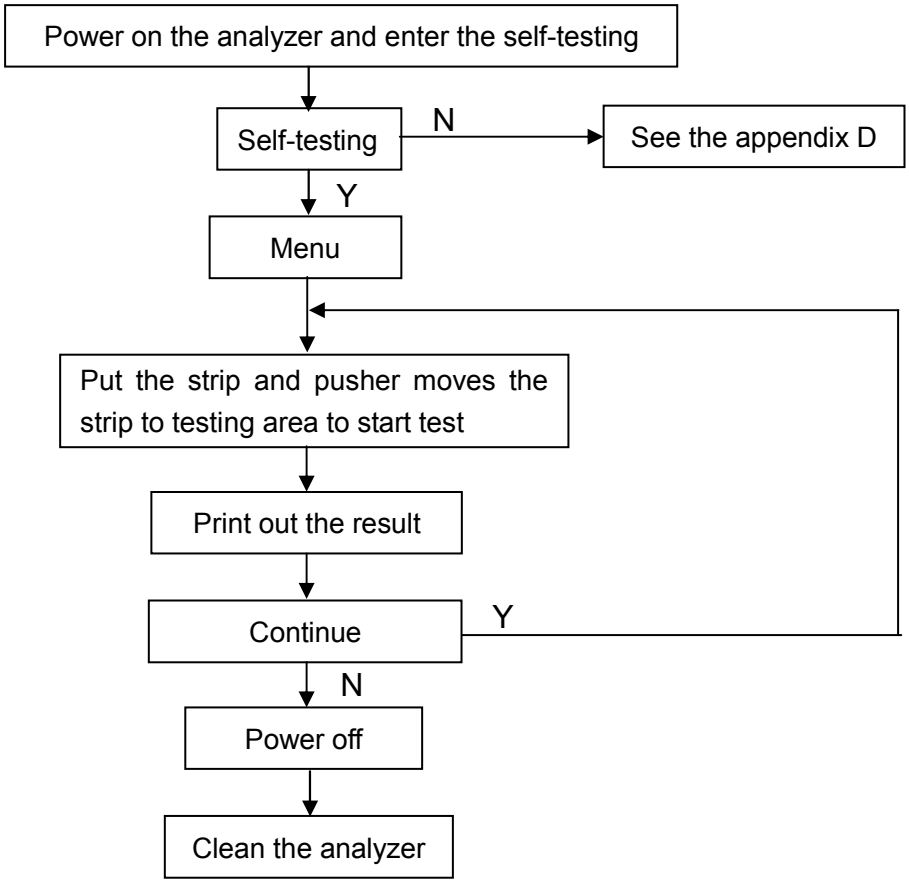


Figure5-1

Note:

- For the specific operation, please read the test operation process
- When the self-testing does not pass, please refer to the malfunction information list for reference as appendix D.

5.2 Test operation process

Note:

- Do not put the analyzer in the place with direct sunlight for fear of affecting the precision of test.
- Check the type of the reagent strips before test, to avoid the wrong test results because of the wrong type of strips used.
- Do not use the reagent strip that has been expired or degenerative.

5.2.1 Check up the worktable

Before the analyzer starts, make sure that the worktable and white bench mark are clean. Clean corresponding parts according to “Chapter 6 cleaning and maintenance”.

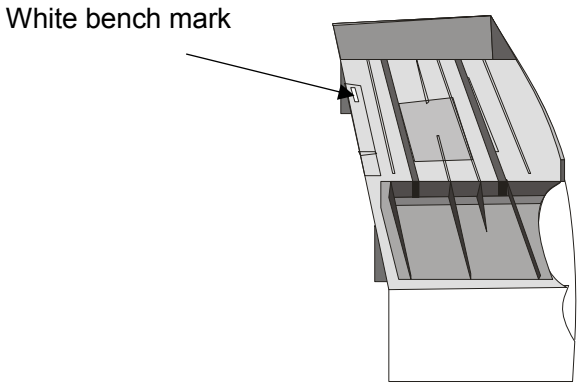


Figure 5-2

5.2.2 Power on the analyzer

After finishing installing the analyzer, power on it, the system will conduct self-testing. The following figure will appear after self-testing:

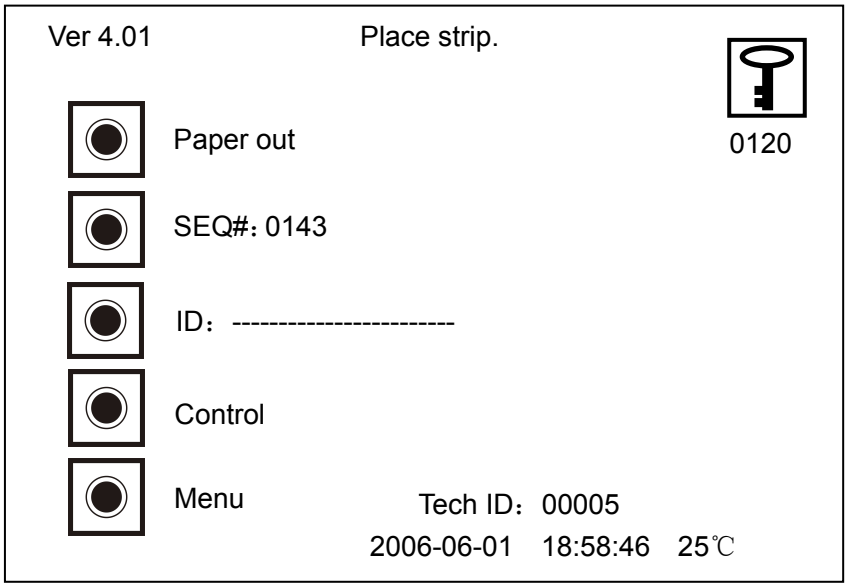


Figure 5-3

5.2.3 Conventional test

Test speed for the analyzer is 514 reagent strips per hour, the test time for each reagent strip is 7 seconds. The operation method is as follows:

Step 1: Pusher is at the start location after self-testing.
Step 2: Put the reagent part of the reagent strips completely into the fresh, completely mixed, uncentrifuged urine sample and take it out immediately by moving the side of the reagent strip along the inside wall of the urine container to get rid of excessive urine.
Step 3: Place the reagent strip on the work place, make sure that the front end of the reagent strip contacts the front wall of the work table (Figure 5-4). When analyzer detects the existence of the reagent strip, it will push the strip to the test section (Figure 5-5).
Step 4: when pusher returns to the start position (Figure5-6), put another reagent strip to keep testing.

Note:
Don't put reagent strip when the pusher is moving.

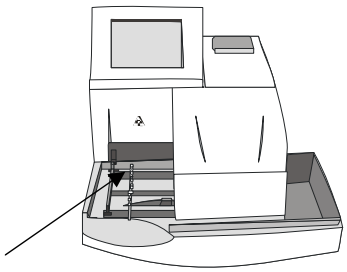


Figure 5-4

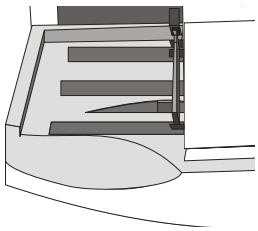


Figure 5-5

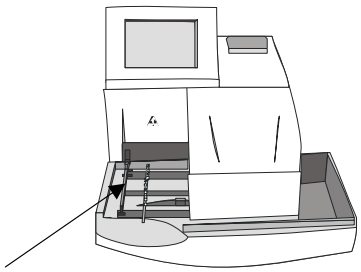


Figure 5-6

Chapter 6 Cleaning and Maintenance

Note:

- Do not clean the analyzer when the power is on.
- Do not use any organic solvent such as petrol, thinner lacquer, benzene compounds and things that may erode the analyzer to wipe it.
- Do not clean the LCD with water.
- Do not use anything that may scrap the strip table and white benchmark to wipe the strip table.
- Do not use any solvent to clean the white benchmark.
- If there is apparent scrape on the white benchmark, contact the supplier.

6.1 Daily Cleaning

(a) The analyzer can be wiped by soft cloth with gentle eradicator to keep it clean.
(b) LCD can be wiped by soft and no abrasion cloth.
(c) In order to make the analyzer work normally and provide correct test result, the worktable must keep clean.
(d) Draw out the pusher, worktable and conveyer board from the analyzer gently. After wash with fresh water, wipe them with soft cloth.
(e) Wipe the benchmark clean with soft cloth.
(f) Install the parts well according to chapter 2.
(g) Restart the analyzer and conduct self-testing.

6.2 Periodical Cleaning

If there is accumulated dirt on the pusher, worktable and conveyer board, cleaning can be done according to the following procedures:
(a) Prepare a little 0.1N NaOH solution.
(b) Draw out the pusher, worktable and conveyer board from the instrument gently.
(c) Wipe the strip table thoroughly by the cotton bar dipped with 0.1N NaOH solution. Clean the remains of the NaOH solution on the strip table by fresh water.
(d) Wipe and dry those with soft cloth, install them well according the chapter 2.
(e) Restart the analyzer and conduct self-testing.

Note:
Do not get the white benchmark come into contact with NaOH solution.

6.3 Disinfections

(a) As the pusher, worktable and conveyer board contact the urine sample, they should be disinfected.
(b) Each of the following solutions can be used to conduct disinfections.
    a) 2% glutaric dialdehyde solution
    b) 5% hypo chlorite natrium solution
(c) Pour some disinfect liquid into an appropriate container.
(d) Immerge the pusher, worktable and conveyer board into the disinfect liquid, and make sure the white benchmark does not contact the liquid.
(e) Immerge them for10 minutes.
(f) Clean with water the disinfect liquid that remains on them after removing it from the disinfect liquid.
(g) Wipe and dry the pusher, worktable，conveyer board and the white benchmark with a soft cloth in turn, and then install them according to the procedures in the chapter 2 to install them well.
(h) Restart the analyzer and conduct self-testing.

Note:

- Repeat to use glutaric dialdehyde solution for long may lead to the color change of worktable, but it will not influence the results.
- Do no get the white benchmark contact disinfection liquid.

Chapter 7 Transportation and Storage

7.1 Transportation requirement

In the transportation, the instrument should be damp proofed, water proofed, and avoid being vibrated or extruded strongly .The analyzer should be held and put gently.

7.2 Storage requirement

The instrument should be stored in the room where there is no chemical drugs , corrosive gas, and with a good ventilation, clean sanitation and storage temperature among -40℃～+50℃.

Appendix A

Manufacturer's warranty

Dear consumer:

Thank you for purchasing H-500 urine analyzer. Our company provides the following services for you:

1. Technical consultations are provided at any time.
2. Maintenance free of charge within a year from the day you purchase the instrument.
3. Maintenance will be charged in the following conditions:
   1) Product which has pass the date for free maintenance.
   2) Damage caused by accidental factor or improper use.
   3) Damage caused by the operation that not according to the instruction manual.
   4) Damage caused by your own repair that without our company's permission.
4. With the development of technology, DIRUI will supply the service of update of analyzers.

If you need any technological service, please reach us according to the following address:

DIRUI INDUSTRIAL CO., LTD.

95 Yunhe Street New & High Tech. Development Zone Changchun, Jilin 130012 P.R.China

Tel: +86(431) 85100409

Fax: +86(431) 85172581

E-mail: dirui@dirui.com.cn

http://www.dirui.com.cn

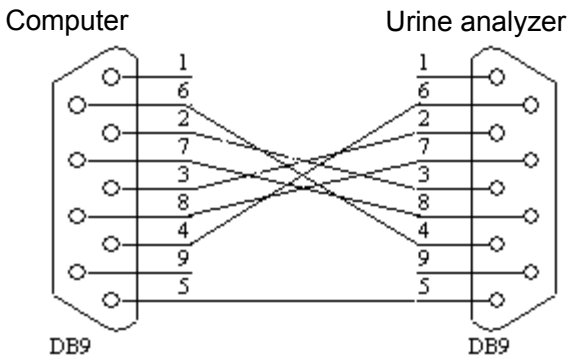
Appendix B

Linking port between H-500 Urine Analyzer and computer

H-500 Urine Analyzer links to computer through RS-232 standard serial port. The communication agreements are as follows:

Baud rate	9600bps, 56000bps, 115200bps , 1200bps optional
Date bit	8 bits, 7bits optional
Stop bit	1 bit, 2bits optional
Parity bit	No
Hardware handshake	No
Start symbol	02H
Single byte blank	20 H
Double byte blank	40H
Line-change symbol	0DH0AH
End symbol	03 H

Linkage between computer and H-500 Urine Analyzer:



International Unit Transmission Format (Bar Code reader is Off)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
STX	CR	LF																					
SP	D	a	t	e	:	×	×	×	×	-	×	×	-	×	×	SP	×	×	:	×	×	CR	LF
SP	N	O	.	SP	×	×	×	×	CR	LF													
SP(*)	U	B	G	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	B	I	L	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	K	E	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	B	L	D	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	P	R	O	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	N	I	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	L	E	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	G	L	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP	S	G	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP	P	H	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP	v	C	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
ETX																							

International Unit Transmission Format (Bar code reader is On)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
STX	CR	LF																					
SP	D	a	t	e	:	×	×	×	×	-	×	×	-	×	×	SP	×	×	:	×	×	CR	LF
SP	N	O	.	SP	×	×	×	×	CR	LF													
SP	I	D	:	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF			
SP(*)	U	B	G	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	B	I	L	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	K	E	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	B	L	D	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	P	R	O	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	N	I	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	L	E	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP(*)	G	L	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP	S	G	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP	P	H	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
SP	v	C	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF	
ETX																							

CT200 Transmission format:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
STX	C R	LF																			
#	×	-	×	×	×	SP	SP	SP	SP	SP	SP	×	×	-	×	×	-	×	×	CR	LF
U	B	G	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
B	I	L	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
K	E	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
B	L	D	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
P	R	O	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
N	I	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
L	E	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
G	L	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
S	G	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
p	H	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
v	C	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
ETX																					

DR200 Transmission format:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
STX	CR	LF																		
S P	N	O	.	×	×	×	SP	SP	×	×	–	×	×	–	×	×	×	×	CR	LF
SP	SP	S P	SP	SP	SP	SP	SP	SP	SP	SP	×	×	:	×	×	:	×	×	CR	LF
CR	L F																			
SP	p	H	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	N	I	T	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	G	L	U	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	v	C	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	S	G	SP	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	B	L	D	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	P	R	O	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	B	I	L	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	U	R	O	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	K	E	T	SP	×	×	S	×	×	×	×	×	×	×	×	×	×	×	CR	LF
SP	W	B	C	SP	×	×	×	×	×	×	×	×	×	×	×	×	×	×	CR	LF
CR	LF																			
ETX																				

Note:

SP (*) ---SP or *

SP-------space character (20h hex) STX-----start character (o2h hex)

CR-------return character (0dh hex) LF--------line feed character (0ah hex)

ETX-----ending character (03h hex)

Date format: dd/mm/yy

Appendix C

Output value of the H-500 Urine Analyzer

Item	Conventional unit			International unit			Plus system unit
	Plus -ON		Plus -OFF	Plus -ON		Plus -OFF	
UBG	Normal	0.2 mg/dL	0.2 mg/dL	Normal	3.4μmol/L	3.4μmol/L	Normal
	Normal	1 mg/dL	1 mg/dL	Normal	17 μmol/L	17 μmol/L	Normal
	1+	2 mg/dL	2 mg/dL	1+	34 μmol/L	34 μmol/L	1+
	2+	4 mg/dL	4 mg/dL	2+	68 μmol/L	68 μmol/L	2+
	3+	>=8 mg/dL	>=8 mg/dL	3+	>=135 μmol/L	>=135 μmol/L	3+
BIL	Neg		Neg	Neg		Neg	Neg
	1+	1 mg/dL	1 mg/dL	1+	17 μmol/L	17 μmol/L	1+
	2+	3 mg/dL	3 mg/dL	2+	51 μmol/L	51 μmol/L	2+
	3+	>=6 mg/dL	>=6 mg/dL	3+	>=103 μmol/L	>=103 μmol/L	3+
KET	Neg		Neg	Neg		Neg	Neg
	+-	5 mg/dL	5 mg/dL	+-	0.5 mmol/L	0.5 mmol/L	+-
	1+	15 mg/dL	15 mg/dL	1+	1.5 mmol/L	1.5 mmol/L	1+
	2+	40 mg/dL	40 mg/dL	2+	3.9 mmol/L	3.9 mmol/L	2+
	3+	>=80 mg/dL	>=80 mg/dL	3+	>=7.8 mmol/L	>=7.8 mmol/L	3+
BLD	Neg		Neg	Neg		Neg	Neg
	+-	Ca10 Ery/μL	Ca10 Ery/μL	+-	Ca10 Ery/μL	Ca10 Ery/μL	+-
	1+	Ca25 Ery/μL	Ca25 Ery/μL	1+	Ca25 Ery/μL	Ca25 Ery/μL	1+
	2+	Ca80 Ery/μL	Ca80 Ery/μL	2+	Ca80 Ery/μL	Ca80 Ery/μL	2+
	3+	>= Ca200 Ery/μL	>= Ca200 Ery/μL	3+	>= Ca200 Ery/μL	>= Ca200 Ery/μL	3+
PRO	Neg		Neg	Neg		Neg	Neg
	Trace		Trace	Trace		Trace	Trace
	1+	30 mg/dL	30 mg/dL	1+	0.3 g/L	0.3 g/L	1+
	2+	100 mg/dL	100 mg/dL	2+	1.0 g/L	1.0 g/L	2+
	3+	>=300 mg/dL	>=300 mg/dL	3+	>=3.0 g/L	>=3.0 g/L	3+
NIT		Neg	Neg		Neg	Neg	Neg
		Pos	Pos		Pos	Pos	Pos
LEU	Neg		Neg	Neg		Neg	Neg
	+-	Ca15 Leu/μL	Ca15 Leu/μL	+-	Ca15 Leu/μL	Ca15 Leu/μL	+-
	1+	Ca70 Leu/μL	Ca70 Leu/μL	1+	Ca70 Leu/μL	Ca70 Leu/μL	1+
	2+	Ca125 Leu/μL	Ca125 Leu/μL	2+	Ca125 Leu/μL	Ca125 Leu/μL	2+
	3+	>=Ca500 Leu/μL	>=Ca500 Leu/μL	3+	>=Ca500 Leu/μL	>=Ca500 Leu/μL	3+

GLU	Neg		Neg	Neg		Neg	Neg
	+-	50 mg/dL	50 mg/dL	+-	2.8 mg/dL	2.8 mg/dL	+-
	1+	100 mg/dL	100 mg/dL	1+	50 mg/dL	5.6 mmol/L	1+
	2+	250 mg/dL	250 mg/dL	2+	14 mmol/L	14 mmol/L	2+
	3+	500 mg/dL	500 mg/dL	3+	28 mmol/L	28 mmol/L	3+
	4+	>=1000 mg/dL	>=1000 mg/dL	4+	>=56 mmol/L	>=56 mmol/L	4+
SG		<=1.005	<=1.005		<=1.005	<=1.005	<=1.005
		1.010	1.010		1.010	1.010	1.010
		1.015	1.015		1.015	1.015	1.015
		1.020	1.020		1.020	1.020	1.020
		1.025	1.025		1.025	1.025	1.025
		>=1.030	>=1.030		>=1.030	>=1.030	>=1.030
pH		<=5.0	<=5.0		<=5.0	<=5.0	<=5.0
		5.5	5.5		5.5	5.5	5.5
		6.0	6.0		6.0	6.0	6.0
		6.5	6.5		6.5	6.5	6.5
		7.0	7.0		7.0	7.0	7.0
		7.5	7.5		7.5	7.5	7.5
		8.0	8.0		8.0	8.0	8.0
		8.5	8.5		8.5	8.5	8.5
		>=9.0	>=9.0		>=9.0	>=9.0	>=9.0
VC		0 mg/dL	0 mg/dL		0 mmol/L	0 mmol/L	0
		10 mg/dL	10 mg/dL		0.6 mmol/L	0.6 mmol/L	0.6
		25 mg/dL	25 mg/dL		1.4 mmol/L	1.4 mmol/L	1.4
		50 mg/dL	50 mg/dL		2.8 mmol/L	2.8 mmol/L	2.8
		>=100 mg/dL	>=100 mg/dL		>=5.7 mmol/L	>=5.7 mmol/L	>=5.7

Appendix D

Malfunction Information List

No.	Trouble State	Cause of the trouble	Solution
1	Nothing was shown on the screen	It doesn't connect the power wire well	1. Check whether the power supply is normally electrified. 2.Check whether the tube fuse is damaged. 3. Contact with the supplier if the trouble cannot be removed.
2	The printer doesn't work	Have not set the printer properly, or the paper cannot move smoothly	1. Check whether set "int. printer" in "on" or not. 2. To see is there any paper in the printer. 3. Check if the paper goes aside to jam the printer, if yes, re-install the printer. 4. If these methods don't work, please contact the supplier.
3	The test result is wrong	The type of the strip is wrong	1. Check whether the type of the strips is accorded with the Setup or not. 2. If this method doesn't work, please contact the supplier.
4	Screen shows"Calibration not found"	The white benchmark damaged, lost or stained. Photocoupler damaged	1.Replace a new white benchmark. 2.Replace a new photocoupler. 3.Wipe white benchmark. 4.Restart analyzer for self-testing. 5.If these no work, please contact with supplier.
5	Screen shows"strip missing"	Strip does not conveyed to test area	1. Restart the analyzer for self-testing. 2.Clean worktable. 3. Check up the strip type. 4. Check if there is object on the worktable or cover. 5. If these do not work, please contact with suppiler.
6	Screen shows "Calibration not OK"	White benchmark dirty Rediation tube aging Calibration strip dirty	1. Power off the analyzer and retest. 2. Clean white benchmark. 3. Replace calibration strip. 4. If these do not work, please contact with supplier.
7	Screen shows "CENTER NOT OK"	Do not find the central value	1. Repower on the analyzer for self-testing. 2. Contact with suppiler.
8	Screen shows "Stray light warning"	Ambient light abnormal Analyzer is under direct sunlight or twinkling light souce	1. Keep the analyzer away from direct sunlight. 2. Power off the twinkling light souce. 3. Restart the analyzer.

9	Screen shows “Strip error”	Strip type is wrong	1. Check if the setted strip type is according with used strip type. 2. Check if the strip immerged urine sample totally. 3. If these do not work, please contact with supplier.
10	Pusher does not work	Optic detector does not work normally	1. Check is there is direct sunlight. Keep the analyzer away from the sunlight. 2. If this does not work, please contact with supplier.
11	Screen shows “Test system error”	Test system trouble	1. Restart analyzer for setl-testing. 2. Please contact with supplier.
12	Screen shows “Strip push system error”	Strip pushing system trouble	1. Restart analyzer for self-testing. 2. Please contact with suppiler.
13	Screen shows “Strip moving error”	Strip conveying system trouble	1. Restart analyzer for self-testing. 2. Please contact with supplier.
14	Screen shows “ Green light error”	Failure of 525nm LED	1. Restart analyzer for self-testing. 2. Please contact with supplier.
15	Screen shows “Kelly light error”	Failure of 572nm LED	1. Restart analyzer for self-testing. 2. Please contact with supplier.
16	Screen shows “Orange light error”	Failure of 610nm LED	1. Restart analyzer for self-testing. 2. Please contact with supplier.
17	Screen shows “Red light error”	Failure of 660nm LED	1. Restart analyzer for self-testing. 2. Please contact with supplier.

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