High Technology, Inc.

HTI CL-500

Operator's Manual

Document Number	:	OM-E-CL500
Revision Level	:	Rev. 4
Effective Date	:	1Jan18

HIGH TECHNOLOGY, INC. PROPRIETARY AND CONFIDENTIAL

Content

1 OPERATION 1

1.1 INTRODUCTION 1
1.2 SPECIFICATIONS 1
1.3 UNPACKING 1
1.4 STRUCTURE AND PRINCIPLE 2
1.4.1 Structure (Picture 1) 2
1.4.2 Principle 3
1.4.3 Human Eye vs. Instrumental Optics 3
1.4.4 The semi-quantitative denotation and concentration of the reagent strip 3
1.5 OUTER APPEARANCE AND COMPONENTS 4
1.5.1 Outer Appearance 4
1.5.2 Components 5
1.6 FUNCTION 5
1.6.1 Self Test 5
1.6.2 Printing and display 5
1.6.3 Data Storage and review 6
1.6.4 External printer (optional) 6
1.6.5 Communication to computer 7
1.7 INSTALLATION 7
1.7.1 Installation requirements 7
1.7.2 Installation of printer paper 7
1.7.3 Power supply cable installation 8
1.7.4 External printer connection 8
1.7.5 Computer connection 8
1.7.6 Push bar installation and removal 8
1.7.7 Fixed platform installation and removal 8
1.7.8 Floating panel installation and removal 9
1.8 OPERATIONS 9
1.8.1 General information 9
1.8.2 Meaning and functions of the keys 10
1.8.3 Operation 10
1.8.4 Check the reagent strip before operation 13
1.8.5 Calibration 14
1.8.6 Routine test 14
1.8.7 Waste disposal 15
1.9 MAINTENANCE 15
1.9.1 General Instructions 15
1.9.2 General cleaning 15
1.9.3 Daily cleaning 15
1.10 SIGNS AND THEIR MEANINGS 16

2 TROUBLESHOOTING 16

2.1 PREFACE 16
2.2 SERVICE 16

3 TROUBLE & CORRECTIONS 16

4 APPENDIX 19

4.1 EXPORTING FORMAT OF NORMAL TESTING RESULT (H10) 19
4.2 EXPORTING FORMAT OF NORMAL TESTING RESULT (H11) 20
4.3 EXPORTING FORMAT OF NORMAL TESTING RESULT (H13) 21
4.4 EXPORTING FORMAT WHEN MALFUNCTION OCCURS 21

1 Operation

1.1 Introduction

The HTI CL-500 urine analyzer (abbreviated as "the analyzer" or "the instrument") is a semi-automated urinalysis instrument based on the principle of dual-wavelength reflectance, integrated with electronics, optics and mechanics. The instrument can simultaneously perform 14 tests: pH, Nitrite, Glucose, Protein, Blood, Ketone, Bilirubin, Urobilinogen, Specific Gravity, Leukocyte, Ascorbic Acid, Creatinine, Calcium and Microalbumin with the reagent strips.

NOTE: Only H10, H11 and H13 urine strip could guarantee the precision.

1.2 Specifications

(1) Parameter choices: 10, 11, or 13 parameters;
(2) Measuring principle: Dual-wavelength reflectance method;
(3) Throughput: Maximum 500 samples/ hour, 65 sec / test;
(4) Analysis mode: Automatic continuous testing;
(5) Test parameters: pH, Nitrite, Glucose, Protein, Blood, Ketone, Bilirubin, Urobilinogen, Specific Gravity, Leukocyte, Ascorbic Acid, Creatinine, Calcium and Microalbumin;
(6) Reagent strip: H10, H11 and H13 urine strip;
(7) Display: LCD screen displaying operational information and test results (in Semi-Quantitative symbol and SI units);
(8) Printing: Thermal printer (life span: 500 thousand line) or external printer (serial interface or parallel interface) optional;
(9) Ambient conditions: (15~30) °C RH≤80% (Optimum);
Extreme conditions: (5~40) °C RH≤80%;
Storage conditions: (-20~55) °C RH≤95% ;
(10) Control function: Self-checking, testing and malfunction-verification by inbuilt microcomputer;
(11) Output signal: Serial ASCII code (RS 232 standard interface) and parallel interface, communicable to computer;
(12) Memory: Up to 5000 samples;
(13) Weight: 6.5Kg;
(14) Outer dimension: 390×340×290(mm);
(15) Power: AC 220V (1±10%), 50Hz;
(16) Power dissipation: 61VA.

1.3 Unpacking

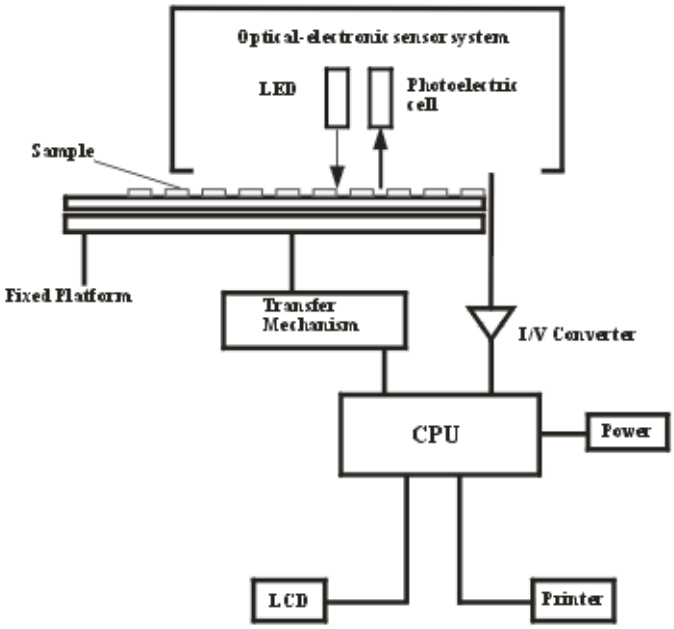
Inspect the shipping box for any damage.
Unpack and check the carton as follows:
(1) Carefully unpack the shipping carton and remove the instrument and accessories.
(2) Check the contents according to the following packing list for the correct quantity.
(3) Please notify the authorized distributor immediately in case of any damage.

NOTE: Remove the Push bar, fixed platform and floating board and put them into accessory bag before transporting the instrument. Pack the fixed platform with the original packing material to avoid damage.

1.4 Structure and Principle

1.4.1 Structure (Picture 1)

The analyzer is composed of an optical-electronic System, Transfer-Mechanism and I/V converter, CPU, printer, LCD display, keys and power supply.



1.4.2 Principle

The optical-electronic sensor system is composed of a light source and a light receptor. The light from the light source falls onto the reagent pad on the test strip. The absorbance and reflectance vary according to the color of the reagent pad. For example, if the reagent pad is darker more light is absorbed, and less light is reflected and vice-versa. The degree of color development is proportional to the concentration of the analyte in the urine.
The reflectance ratio is obtained by the following formula:

$$R\ (\%) = \frac{(Tm \times Cs)}{(Ts \times Cm)} \times 100\%$$

R = Reflectance ratio
Tm: Reflectance intensity of measurement wavelength for test area
Ts: Reflectance intensity of reference wavelength for test area
Cm: Reflectance intensity of measurement wavelength for calibration pad
Cs: Reflectance intensity of reference wavelength for calibration pad

The reflected light is transmitted into the optical-electronic detector system, which transforms the optical signal into electrical signal. The strength of the electrical signal correlates with reflectance. Then the electric signals are processed by the CPU after being transformed by I/V converter and the test results are printed.

1.4.3 Human Eye vs. Instrumental Optics

The human eye is inherently different in the colors that it perceives compared to those detected by an optical system. The human eye is capable of determine differences in shade and color by the minute, whereas the optical system cannot. However, optical systems can detect specific colors that are hidden or masked by other colors apparent to the human eye.
Since there are slight difference between the human eye vs an optical system, an exact agreement between the two options may be hard to find. Yet, agreement between the two can be found visually, if the user reports a value within one visual color block compared to the optical system reading.

Each color block or instrumental result represents a range of values. Because of specimen and reading variability, specimens with analyte concentrations that fall between nominal levels may give results at either level. Results will usually be within one level of the true concentration. Exact agreement between visual results and instrumental results might not be found because of the inherent differences between the perception of the human eye and the optical systems of the instruments

1.4.4 The semi-quantitative denotation and concentration of the reagent strip

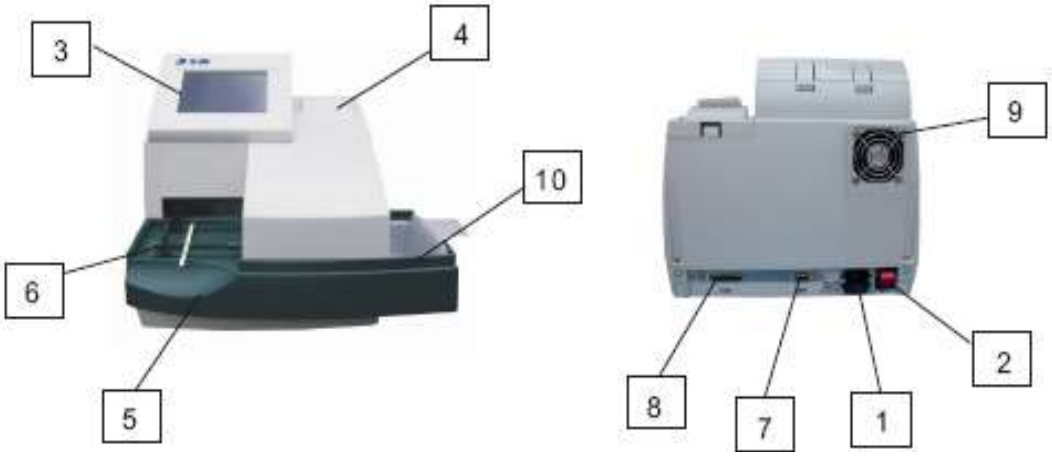
There are many factors that may affect the test results, such as the freshness of the urine sample, drinking & eating habits of the patient, as well as pre-sports & post-sports activities. Therefore, the semi-quantitative value is good enough for clinical diagnosis. The testing results are rounded off to a whole number. It is permitted that two relevant values may vary in repeated tests. See Table-1 for details.

10	11	13	Test	SemiQuantitative Symbol and Concentration						
●	●	●	LEU	SemiQuantitative	−	±	+1	+2	+3	
				Cell/μL	0	15	70	125	500	
●	●	●	Ketone	SemiQuantitative	−	±	+1	+2	+3	
				mmol/L	0	0.5	1.5	4.0	≥8.0	
●	●	●	Nitrite	SemiQuantitative	−	+				
●	●	●	Urobilinogen	SemiQuantitative	Normal		+1	+2	+3	
				μmol/L			33	66	≥131	
●	●	●	Bilrubin	SemiQuantitative	−		+1	+2	+3	
				μmol/L	0		8.6	33	100	
●	●	●	Protein	SemiQuantitative	−	±	+1	+2	+3	
				g/L	0	0.15	0.3	1.0	3.0	
●	●	●	Glucose	SemiQuantitative	−	±	+1	+2	+3	+4
				mmol/L	0	2.8	5.5	14	28	≥55
●	●	●	Specific Gravity		1.005	1.010	1.015	1.020	1.025	1.030
●	●	●	Occult Blood	SemiQuantitative	−	±	+1	+2	+3	
				Cell/μL	0	10	25	80	200	
●	●	●	pH	4.5	5.0 5.5	6.0 6.5	7.0	7.5 8.0	8.5	9.0
	●		Ascorbic Acid	SemiQuantitative	−	±	+1	+2	+3	
				mmol/L	0	0.6	1.4	2.8	5.6	
		●	Creatinine	SemiQuantitative	*				*	
				mmol/L	≤0.9	4.4	8.8	17.6	≥26.4	
		●	Urine calcium	SemiQuantitative	*				*	
				mmol/L	≤1.0	2.5	5.0	7.5	≥10	
		●	Micro albumin	SemiQuantitative		*				
				mg/L	0	≥100				

Table-1 Method and Data

1.5 Outer Appearance and Components

1.5.1 Outer Appearance



Picture 2

1.5.2 Components

(1) Power plug: Standard IEC 3-cord plug with fuse (T800mA time lag).
(2) Power switch: Turns on or off the power supply.
(3) LCD & keys: LCD shows the function of keys, icons and the result of measurement. The operation can be performed by pressing the corresponding keys.
(4) Printer and printer cabin: Thermal printer for printing out the results.
(5) Fixed platform: Holds the urine strip.
(6) Push bar: Transfers the strip.
(7) Serial interface: Standard 9 pin receptacle for exporting data, RS232.
(8) Parallel interface: Standard 25 pin receptacle for external printer.
(9) Fan: Ventilates the heat.
(10) Waste container: For removing the used test strip.

1.6 Function

1.6.1 Self Test

Turn ON the power, the screen will display the self-test information. If the self-test is successful, OK is displayed for initialization. If not, a buzzer will ring for 2 seconds and a malfunction code (refer to Table-5 in the Troubleshooting section) will be displayed.

1.6.2 Printing and display

The results will be displayed and automatically printed after the measurement. Below in picture 3 is an example of an (H10) printout.

```
N0.000001 2005-01-10
          10:15:56
LEU  -    0 Cell/ μL
KET  -    0 mmol/L
NIT  -
URO       Normal
BIL       0 μmol/L
PRO  -    0 g/L
GLU  -    0 mmol/L
SG        1.030
BLD  -    0Cell/ μL
pH        4.5
```

Picture 3

Line 1: No.000001 is the sequence number. 2005-01-10 is the date: year-month- day.
Line 2: 10:15:56 is the time shown in hour: minute: second.
Line 3 to Line 12: displays the results.

- The first column is the abbreviation of the test parameters.

- The second column is a symbol, "-" is negative and "+" is positive. There are some differences from the routine expression i.e. "+2" is used to replace the routine expression "++" and "+3" is used to replace "+++".
- The third column is an objective value of the test parameter, which is displayed by the semi-quantitative method. The values of this column correspond to the symbol in the second column. When the symbol is shown to be"+3", it means a very high concentration of this parameter and the value will be displayed by the maximum value. For example: KET+3≥ 8.0 mmol/L.
- The fourth column is the SI international unit. (Refer to Table-2 for the full names of the abbreviated items.)

NOTE: When the test result is positive in a semi-quantitative method, there will be a "*" before the test parameter as a prompt. Refer the operating manual of reagent strips for detail.

Table- 2 Abbreviation of Test Items

No.	Abbreviation	Full name
1	pH	pH VALUE
2	NIT	NITRITE
3	GLU	GLUCOSE
4	PRO	PROTEIN
5	BLD	BLOOD
6	KET	KETONE BODY
7	BIL	BILIRUBIN
8	URO	UROBILINOGEN
9	SG	SPECIFIC GRAVITY
10	LEU	LEUKOCYTES (White blood cells)
11	Vc	ASORBIC ACID (VITAMIN C)
12	CR	CREATININE
13	Ca	CALCIUM
14	Ma	MICROALBUMIN

1.6.3 Data Storage and review

The instrument can automatically store the data of up to 5000 samples for reference or printing. If the data is more than 5000, the oldest will be removed from the memory.

1.6.4 External printer (optional)

The instrument can be connected to an external printer (optional accessory) via the printer port.

1.6.5 Communication to computer

The instrument can be interfaced to the COM1 or COM 2 of a computer via the RS232 port. The specifications for communication are:

Baud rate 9600
Data bits 8
Stop bits 1
Parity N/A

Following the above can achieve normal communication, while network communication can be achieved by a hyper terminal in the communication option of the Windows Accessory software or the communication software provided by High Technology, Inc. (optional).

1.7 Installation

After unpacking, install the floating board followed by the installation of the fixed platform, then the push bar, and the printer paper. Refer to sections 7.8, 7.7, 7.6 and 7.2 respectively for instructions.

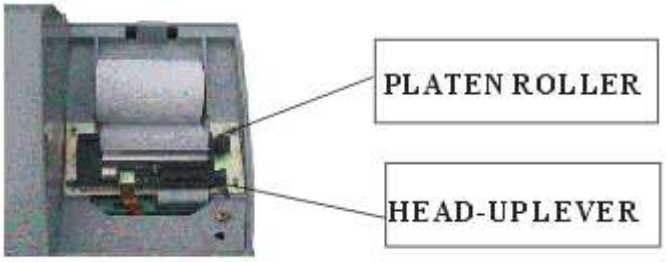
1.7.1 Installation requirements

(1) Install the instrument on a clean, level and firm surface, which is free from vibration, direct sunlight, and intensive magnetic field and in a moisture free environment.
(2) Install the instrument in the room in accordance with the environmental requirements (air-conditioner is recommended to comply with the requirements on temperature and humidity).
(3) Keep the exterior of the instrument free of dust.
(4) Avoid installing the instrument where an electrical noise source or excessive humidity is present.

(5) The instrument should be well grounded by a power socket with the ground, ⏚, symbol.

1.7.2 Installation of printer paper

1) Lift the printer cover by pressing the locking tab on the back side of the printer cover



Picture 4

(2) Lift the printer head-up lever upward and remove the remaining paper if any. Loosen 5-10 cm of printer paper on the new roll and trim the front to be a "V" shape. Insert the paper through the form feed entrance until 1 cm is out. Move the platen roller to form feed the paper, then push the head-up lever down to lock the head in place. (Refer to picture 4).
(3) Slide the paper through the slot in the cover and replace the cover.

1.7.3 Power supply cable installation

Connect one end of the power supply cable with the instrument and the other end to a well grounded AC 220V power outlet

1.7.4 External printer connection

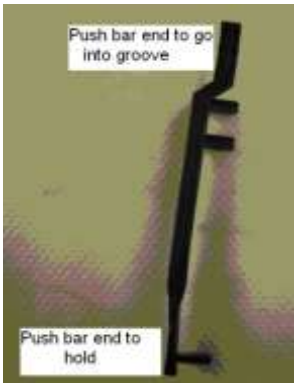
The instrument can be connected with external printer by a 25-pin parallel port and a 9-pin serial port while the instrument is switched OFF .

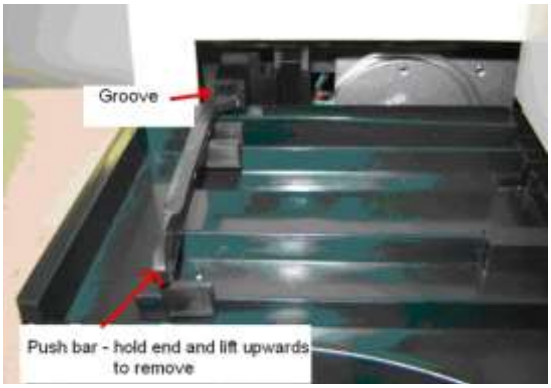
1.7.5 Computer connection

If the communication function is needed, turn off the instrument, and connect the RS232 port to COM1 or COM2 on the computer with a 9 pin COM cable. The instrument uses a bidirectional RS-232 cable.

NOTE: Equipment connected with the instrument should comply with safety criteria.

1.7.6 Push bar installation and removal



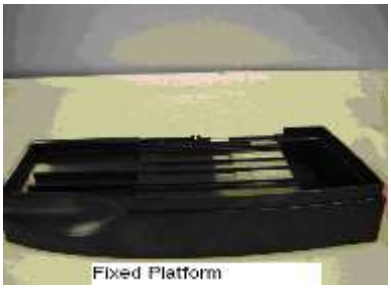


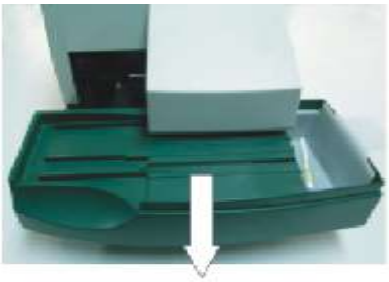
Picture 5 Picture 6

(1) Removal: Hold the end of the push bar and lift it upwards, then remove it.
(2) Installation: Hold the end of the push bar and insert the other end into the groove. (Refer to Figure 6) Lower the Push bar.

1.7.7 Fixed platform installation and removal

(1) Removal: Hold the two sides of the platform and pull the platform (Picture 8) towards the operator.
(2) Installation: Insert the groove of the fixed platform into the arm of the instrument; slowly push the fixed platform until it's fixed.



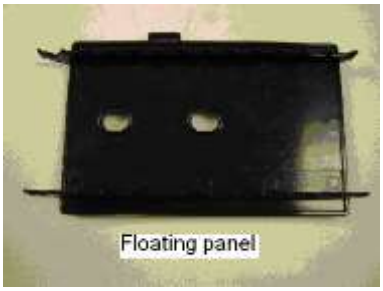


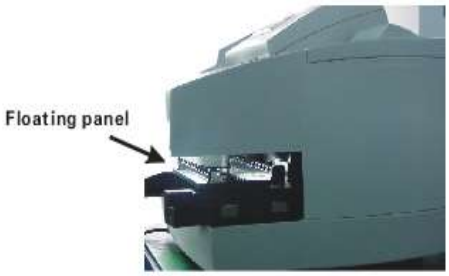
Picture 7 Picture 8

NOTE: DO NOT pull or push the platform if it is hard to move. Check the floating panel to make sure that it is at its lowest position; if not, turn on the instrument and turn it off after the self-test. At this time try to remove and install the fixed platform again. Perform the installation and removal under the direction of an authorized Engineer.

1.7.8 Floating panel installation and removal

(1) Removal: pull the floating panel towards the operator (Picture 10).
(2) Installation: Move the quadrate hole on the underside of the floating panel aiming it towards the platform on the right side of the instrument under the cover. Move the protruding edge of floating panel towards the groove on the fixed platform. Slowly push the floating panel onto the platform until it's attached.





Picture 9 Picture 10

1.8 Operations

1.8.1 General information

Operator can operate and communicate with the instrument through the displayed hints and the keys on the side of the screen. The display screen will display the relative information, options and requirements; Operator can press the corresponding keys to achieve the desired function.

1.8.2 Meaning and functions of the keys

The basic keys displays on the screen are as follows:

(1) **Pause**: "", When pressing the Pause key, "", the testing will stop. The Pause key, "", will become the Start key "" after being pressed. Pressing the Start/Pause key again; the instrument will reenter the test mode. If there are any test strips remaining on the instrument, they will be discarded.

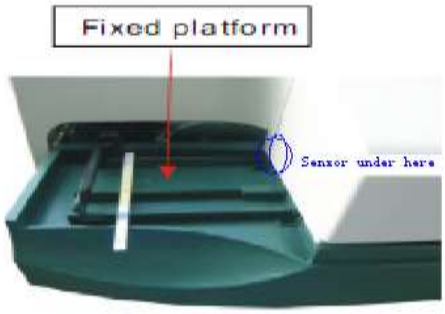
(2) **Start**: Press the Start key "", the instrument will enter the test mode.

(3) Press "" "and "" " key to shift the cursor left or right.

(4) Continuously pressing the Cycling key "" allows the operator to scroll thru the different options available in order to choose from for that function.

1.8.3 Operation

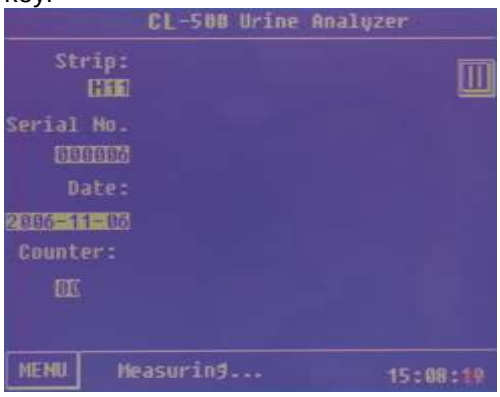
(1) Common use: Turn on the power switch. The instrument automatically goes thru a self-checking and initialization. Then the initial screen will appear (Picture 11). If the system settings have been inputted and are correct then the instrument will be ready to start testing.
As test strips are placed on the fixed platform a sensor is triggered causes the push bar to move to the right pushing the strips as it moves. When the strip stops there is a sensor to count how many strips need to be tested, (refer to the picture below). The number of test strips to be tested is shown on the initial screen as "Counter XX", where the "XX" means the quantity of urine test strips on the floating board ready for testing. This sensor signal also controls when the detector head moves to read the strip.



If there's trouble during the testing, then on the top middle of the initial screen (Picture 12) it will show the "Trouble code" error. By pressing the F7 key the Trouble error suggestion will be displayed.
(2) Instrument setting choices: When on the initial menu screen (Picture 13) press the Menu key on the bottom left corner of the screen in order to set the system preferences. There are 8 option keys on the main menu to choose from such as: "Serial No.", "Review", "Setting", "Menu", "Strip", "Feed", "About" and "Return".

A) Serial No is used to enter the sample number; use the arrow keys," " and " ", to shift the cursor left or right and continuously press the "+1" and "-1" keys to increase or decrease the cursor value by "1" to enter the sample number.
B) Review is to look at already run sample results (Picture 21).

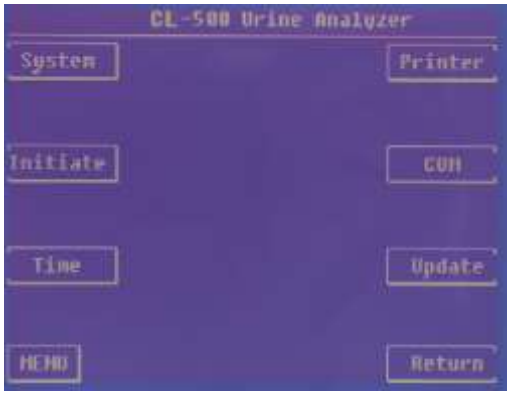
C) Settings is used to do some regular settings, such as "System", "Initiate", "Time", "Printer", "COM" and "Update". To enter the setting menu (Picture 14) press the setting key.



Picture 11 Initial screen

Picture 12 Error screen

Picture 13 Main Menu



Picture 14 Setting Menu

Picture 15 System Setting Menu

- Time: Press the Time key to change the current date and time. Using the arrow keys, " ← " and " → ", to shift the cursor left or right, and continuously press the "+1" and "-1" keys to increase or decrease the cursor value by "1" in order to input the date and time. After inputting the correct date and time press the "OK" button to confirm and return to the previous page.

- Initiate: Press the Initiate key will reset the system information to the manufacturer setting. (The operator does not need to use this function)
- System: Press the "System" key to enter the system setting menu screen. (Picture 15):

"F1": Turns On or Off the systems sound.
"F2": Choice of the Startup Serial number when turning on the instrument:
(Either Continue or Resume)
"F3": Language: English.
"F7": Print and display the Positive Hint switch.
"Exit": The screen goes back a page to the Setting screen

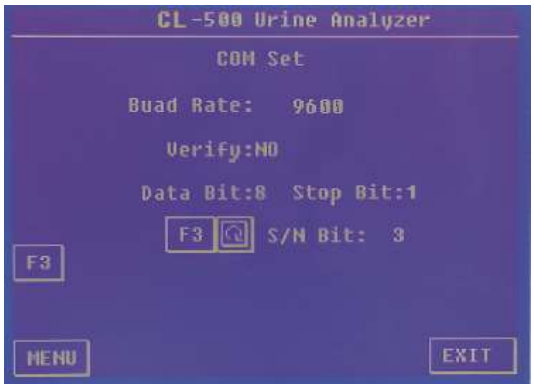
- Printer: Press the Printer key to enter the inbuilt printer screen. (Picture 16)

"F1": Turns the printer On or Off
"F2": Choice of language: English language.
"F3": Choice of result printout: (Either Digital, English, or Conv.)
"F7": Changes the definition of the inbuilt printer. The more black blocks, the darker the print will be.

NOTE: The darker resolution of printer words, the shorter the printer's life.

- "Exit": When pressed the screen goes back a page to the Setting screen. COM: When the COM key is pressed the Serial interface information is displayed and the choice for the "Bit". Press "F3" to choose the Serial interface output Bit containing 6 digits or the last 3 digits (Picture 17).
- Update: Press the Update key to enter the password screen (Picture 18), Using the arrow keys ," ← " and " → ", to shift the cursor left or right and continuously press the "+1" and "-1" keys to increase or decrease the cursor value by "1", input the password: 12345, and then press the "OK" key to enter the sensitivity screen.
- Press the "F2" key to choose: default setting (Picture 19), high sensitivity, low sensitivity and items adjusted (Picture 20).
- Press the Ok to confirm or the Cancel key to return to the previous page

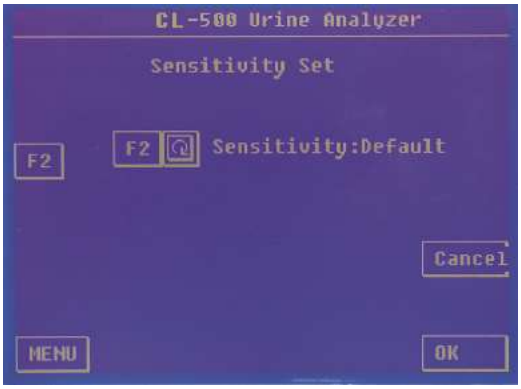
Picture 16 Printer Setting Menu



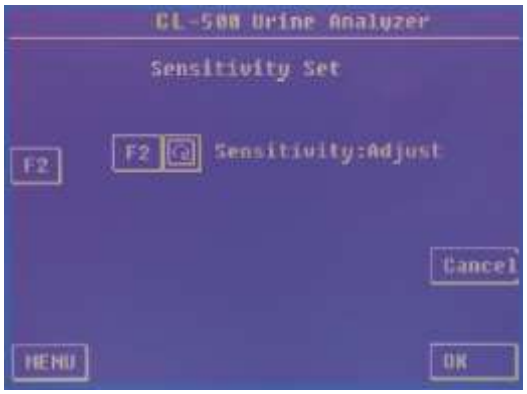
Picture 17 Serial Interface setting

The operator can regulate every single text item. Cutoff value: the "+" means increasing reflectance ratio and decreasing cutoff value, the "-" means decreasing reflectance ratio and increasing cutoff value. Slope: the "+" means increasing the reflectance ratio of high concentration, and the "-" means decreasing.

Picture 18 Input the password



Picture 19 default setting



Picture 20 Items adjusted

Picture 21 Review the Menu

NOTE: It is recommended that the operator collect enough QC test data before using the function of sensitivity adjustment, and check the performance with clinical samples after the adjustment.

- Strip: Used to select the test strip type H10, H11, H13.
- Feed: Used to form feed the printer paper.
- About: Shows the information about our company and software version. **Return**: Used to go back to the previous screen.

1.8.4 Check the reagent strip before operation

(1) The test results will be wrong or the test will fail if an improper reagent strip is used. Select the testing parameters by strip type under the key option Strip.
(2) Check the reagent strip's position is not crooked and that the push bar and fixed platform are correctly installed.
(3) Check that the date, time and setting of the printer satisfy the operator's requirement. Use the Setting and Printer key options to make the selections.

1.8.5 Calibration

The H10 check sample is needed to frequently perform the calibration on the CL-500. There are two check samples for one set. One is for daily use, and the other for standby use. While using the instrument, please make sure that the urine reagent strip you use is H10. After testing with check sample, compare the results with the reference values. If the results are consistent, it means the instrument is normal and can be used for testing. If the results are not consistent, use the other check sample for calibration again. If the results are still not consistent, check if a malfunction occurred and solve it. It is recommended that QC testing be performed (please contact the manufacturer to get the QC solution) under following situations:

- When new reagent strips are used
- When a different operator is running the system
- When there is a Question with results

1.8.6 Routine test

(1) Dip a reagent strip completely into a fresh Urine sample, slowly draw it out along the container wall, use a tissue to wipe off excess urine, but not too dry.

NOTE: A reagent strip which is not fully dried is good for testing; otherwise the result will be different.

(2) Place the reagent strip on the fixed platform with the pad surface facing upward (Picture 22).

Picture 22 Position for the urine reagent strip

NOTE: The reagent strip should be placed in the center of the strip scanner but not below the push bar, and its end should touch the back wall of the fixed platform. Improper position will get the strip blocked or can cause test failure.

(3) The Push bar transfers the strips to the floating platform, which then transfers the strips to scanning area. After being tested, the strips are moved into the waste container.
(4) The results will be indicated on the screen and will also be printed by the built-in printer.

(5) If a problem occurs during the testing, press the Pause key, " ", to stop the test; the Pause key," ", will then become the Start key, " ". After the malfunction has been eliminated, start testing again by pressing the Start key, " ".

NOTE: If there are reagent strips that have not been tested in the instrument after the pause key was pressed then these reagent strips will be discarded.

1.8.7 Waste disposal

The used reagent test strips should be disposed of strictly in accordance with reference to the local Medical sanitary management department's requirements.

1.9 Maintenance

The analyzer is a precise electro-optical instrument that must be handled with care. Rough handling of the instrument may disturb internal calibrations and/or cause malfunctions. If any malfunction occurs, it should be maintained by an engineer authorized by High Technology, Inc. or the instrument should be sent to an appointed department for professional service.

1.9.1 General Instructions

(1) Carefully read the user manual before operating the instrument.
(2) Always clean the instrument daily to maintain good operating conditions.
(3) If the instrument is not used for a lengthy period of time, cover the instrument with the vinyl dustcoat. On resuming testing conduct a test with the Check Sample before making any determinations.
(4) Do not reconstruct or modify the instrument.

1.9.2 General cleaning

Keep the instrument clean and dust free. If cleaning is needed, use a wet fabric with a mild detergent. Any oil, ester, silica gel and lubricant is forbidden to be used on the instrument. Use only soft fabric dipped with alcohol to clean the screen. Water, ketone and aromatic solvent are forbidden to be used on the screen.

1.9.3 Daily cleaning

Clean the instrument at least once a day; if uncleanness affects the testing results, then clean the instrument at that time.
Remove the push bar, fixed platform and floating platform and clean them using warm water and a mild detergent. Do not wipe the white check block on the fixed platform; use a cotton swab dipped in water to clean it.

NOTE: The use of an organic solvent for cleaning is forbidden because it will cause distortion of the instrument.

Dry the parts with a tissue or soft fabric, except the white check block should air-dry.

NOTE: Check the white check block for damaged. If it cannot be cleaned, replace the fixed platform.

1.10 Signs and their meanings

	Dangerous voltage		**Warning**		**Grounding**
	Power on		**Power off**		

2 Troubleshooting

2.1 Preface

HTI CL-500 urine analyzer is a precise instrument. It is very important to operate the instrument carefully, or malfunctions can emerge. Any damage to accessories or improper operation will affect the instruments function. If a malfunction occurs, the operator should refer to this chapter for solutions. (Read the instructions before maintenance). If the problem is still not resolved, please contact the local distributor. If the problem is caused by the reagent strip, read the instruction on the data, it might help.

2.2 Service

The service engineer should be an electronic engineer trained or authorized by HTI. Please do the troubleshooting and maintenance by following the tips in this maintenance manual.

NOTE: Be careful of the high voltage in the instrument during maintenance.

Please check the position of the fixed platform during maintenance. Because if the instrument is switched off when it's not in the reset or non-running mode, then the floating panel may not be in its lowest position. If you try to remove or install the fixed platform it may be blocked by the floating panel when the floating panel is not in its lowest position. To avoid breaking the floating panel, never forcibly pull out the fixed platform. When in this situation the proper thing to do is to switch the instrument back on and after completion of the self-checking to switch it off, because at this time the floating panel will be at its lowest position, thus allowing the removal or installation of the fixed platform.

3 Trouble & Corrections

The Malfunction Codes and Trouble-shooting cases are shown in Tables-3 and 4

Table-3 Trouble-shooting Table

SN	PHENOMENON	CAUSE	CORRECTION
1	No indication displayed on screen.	1. Power off; 2. Circuit malfunction.	1. Check if the fan functions, or shut off the instrument, check power cable connection and start up again. 2. If 1) is not feasible, please contact local distributor.
2	Push bar fails to move right after strip being placed.	1. Operator may have pressed Pause key; 2. Strips detector is no working.	1. Press Start key at top right of the main screen. 2. Shut off the instrument, start up in 30 seconds, if still not feasible, please contact local distributor.
3	Floating platform moves right (no reagent strips in tray).	1. Strips detector is covered or pressed by some objects; 2. Strips detector error.	1. Do not place your hand or any object on the platform. 2. Shut off the instrument, start up in 30 seconds, if still not feasible, please contact local distributor.
4	Test results can not be printed out by in-built printer.	1. Printer is set to be "OFF". 2. Ran out of Printer paper. 3. Cable connection is twisted. 4. Printer is not working.	1. Set the printer to "ON". 2. Form feed a new roll of printer paper. 3. Check the cable connection. 4. Contact local distributor.
5	Abnormal Key functions	1. Key malfunction. 2. Circuit failure.	1. Shut off the instrument, start-up after 30seconds. 2. If 1) is not feasible, please contact local distributor.

Table-3 Malfunction Code and Trouble-shooting Table

TROUBLE	CODE	CAUSE
TROUBLE-1	Strips detector malfunction occurs.	1. Shut off the instrument, start-up after 30seconds; 2. If 1) is not feasible, please contact local distributor.
TROUBLE-2	Improper position of fixed platform.	1. Check whether fixed platform is installed correctly; 2. If 1) is not feasible, please contact local distributor.
TROUBLE-3	Improper position of reagent strip.	Check if the reagent strip is placed correctly.
TROUBLE-4	No reagent strip or weak brightness.	Check the test results or error report printed when the operation has finished; test the samples which do not have results again.
TROUBLE-5	Interior communication error.	1. Shut off the instrument, start-up after 30seconds; 2. If 1) is not feasible, please contact local distributor.
TROUBLE-6	Memory error.	1. Shut off the instrument, start-up after several seconds. 2. RAM/ROM is damaged, please contact local distributor.

If the follow situations have occurred, please contact the local distributor for solution:
1. The malfunction cannot be solved according to table-3 and table-4.
2. Accessories were damaged in operation.
3. A Malfunction of the instrument, which cannot be solved.
4. Major parts of the instrument are damaged.

4 Appendix

4.1 Exporting format of normal testing result (H10)

1	2																					
STX	■																					
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
CR	LF	N	O	.	■	■	■	■	■	■			■	■	■	■	—	■	■	—	■	■
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
CR	LF														■	■	:	■	■	:	■	■
49	50																					
CR	LF																					
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CR	LF	■	W	B	C		■	■					■	■	■	C	e	l	l	/	u	L
74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
CR	LF	■	K	E	T		■	■			■	■	■	■	■		m	m	o	l	/	L
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
CR	LF	■	N	I	T		■															
120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142
CR	LF	■	U	R	O		■	■			■	■	■	■	■		m	m	o	l	/	L
143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
CR	LF	■	B	I	L		■	■					■	■	■		u	m	o	l	/	L
166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188
CR	LF	■	P	R	O		■	■				■	■	■	■					g	/	L
189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211
CR	LF	■	G	L	U		■	■				■	■	■	■		m	m	o	l	/	L
212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234
CR	LF		S	G			■	■					■	■	■	■	■					
235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257
CR	LF	■	B	L	D		■	■					■	■	■	C	e	l	l	/	u	L
258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
CR	LF		p	H			■	■					■	■	■							
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303

4.2 Exporting format of normal testing result (H11)

1	2	3																			
STX	■	■																			
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
CR	LF	N	O	.	■	■	■	■	■	■		■	■	■	■	-	■	■	-	■	■
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
CR	LF													■	■	:	■	■	:	■	■
48	49																				
CR	LF																				
50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	
CR	LF	■	L	E	U		■	■			■	■	■	C	e	l	l	/	u	L	
71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	
CR	LF	■	K	E	T		■	■		■	■	■	■	■	m	m	o	l	/	L	
92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	
CR	LF	■	N	I	T		■														
113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	
CR	LF	■	U	R	O		■	■		■	■	■	■	■	u	m	o	l	/	L	
134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	
CR	LF	■	B	I	L		■	■				■	■	■	u	m	o	l	/	L	
155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	
CR	LF	■	P	R	O		■	■					■	■	■	■	■	g	/	L	
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	
CR	LF	■	G	L	U		■	■			■	■	■	■	m	m	o	l	/	L	
197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	
CR	LF	■	S	G			■	■	■	■	■										
218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	
CR	LF	■	B	L	D		■	■			■	■	■	C	e	l	l	/	u	L	
239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	
CR	LF	■	p	H			■	■	■												
260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	
CR	LF	■	V	c			■	■				■	■	■	m	m	o	l	/	L	
281	282	283	284	285	286	287	288	289	290	291											
CR	LF	CR	LF	CR	LF	CR	LF	CR	LF	ETX											

4.3 Exporting format of normal testing result (H13)

1	2																					
STX	■																					
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
CR	**LF**	**N**	**O**	**.**	■	■	■	■	■	■			■	■	■	■	**—**	■	■	**—**	■	■
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
CR	**LF**														■	■	:	■	■	:	■	■
49	50																					
CR	**LF**																					
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CR	**LF**	■	**W**	**B**	**C**		■	■					■	■	■	**C**	**e**	**l**	**l**	**/**	**u**	**L**
74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
CR	**LF**	■	**K**	**E**	**T**		■	■			■	■	■	■	■		**m**	**m**	**o**	**l**	**/**	**L**
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
CR	**LF**	■	**N**	**I**	**T**		■															
120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142
CR	**LF**	■	**U**	**R**	**O**		■	■			■	■	■	■	■		**m**	**m**	**o**	**l**	**/**	**L**
143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165
CR	**LF**	■	**B**	**I**	**L**		■	■					■	■	■		**u**	**m**	**o**	**l**	**/**	**L**
166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188
CR	**LF**	■	**P**	**R**	**O**		■	■				■	■	■	■					**g**	**/**	**L**
189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211
CR	**LF**	■	**G**	**L**	**U**		■	■				■	■	■	■		**m**	**m**	**o**	**l**	**/**	**L**
212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234
CR	**LF**		**S**	**G**			■	■					■	■	■	■	■					
235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257
CR	**LF**	■	**B**	**L**	**D**		■	■					■	■	■	**C**	**e**	**l**	**l**	**/**	**u**	**L**
258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
CR	**LF**		**p**	**H**			■	■					■	■	■							
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303
CR	**LF**	■	**C**	**R**								■	■	■	■	■	**m**	**m**	**o**	**l**	**/**	**L**
304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326
CR	**LF**	■	C	a								■	■	■	■	■	**m**	**m**	**o**	**l**	**/**	**L**
327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349
CR	**LF**	■	M	A								■	■	■	■	■			**m**	**g**	**/**	**L**
350	351	352																				
CR	**LF**	**ETX**																				

4.4 Exporting format when malfunction occurs

1	2																					
STX	■																					
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
CR	LF	N	O	.	■	■	■	■	■	■			■	■	■	■	—	■	■	—	■	■
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
CR	LF														■	■	:	■	■	:	■	■
49	50																					
CR	LF																					
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
CR	LF																					
74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93			
CR	LF							T	R	O	U	B	L	E	—	■	CR	LF	EXT			

Remark:
The decimal number is the serial number of the ASCII code which is exported via the serial port. The second code is communication code inside the instrument. When disposing the data, it can be seen as a vacant code.
■Means testing result.
A blank means a vacant code

CL-500 Urine analyzer
Maintenance Records

_____Year_____Month

	Daily Maintenance	Maintenance Records																													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	Clean cover with a damp cloth and non harsh detergent																															
2	Clean screen with a soft cloth dipped in alcohol																															
3	Remove and clean the push bar, fixed and floating platform with warm water and detergent.																															
4	Clean the white check block with cotton swab dipped with water- air dry																															
5	Verify enough thermal paper and replace if needed																															
6	Run the Check Sample (Calibration) Test Strip																															
7	Run the QC samples																															

Comments: _____

_____

_____

Version: 6/2012