Clima

EQUIPMENT FOR IN VITRO DIAGNOSTICS

USER'S MANUAL

VERSION 3

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1. SHORT DESCRIPTION

CLIMA is an interferential filter photometric analyser for clinical chemistry. Microprocessor controlled, it performs photometric measurements and calculates the results according to programmes whose parameters have been selected by the user.

Measuring modes

ABSORBANCE (ABS)
CONCENTRATION (CONC)
KINETIC (KIN)
FIXED TIME (FxT)
DIFFERENTIAL (DIF)
RATIO (RAT)
MULTISTANDARDS(MSTD)

The CLIMA allows the user to perform Multiple-Standard calibrated tests by storing their relative calibration curves.

The operator can introduce programmes in 100 different memory locations, which can be stored in memory until cleared.

The analyser also includes a 10 place square cell temperature regulated thermostat. The temperature in the thermostat and in the cell compartment can be adjusted at 37°C or room temperature.

The user can programme the analyser by introducing the necessary parameters using the keyboard. The instrument has an 80 character LCD display for displaying results, error messages, etc.

Analytical results of the tests are directly displayed in the measuring units selected by the current programme and the printout is made on thermo-sensitive paper.

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2. TECHNICAL CHARACTERISTICS

2.1- Optical system:

Mono and Bichromatic for high resolution readings.
Spectral ranges 320 - 650 nm.

- Standard interference filters : 340 - 405 - 500 -546 - 578 - 630 nm.

- Bandpass < 8 nm.

- Light source : Halogen 20 W. lamp.

- Detector : Solid State.

- Maximum photometric noise: ±0,001 OD to 1,5 OD at 340 nm.

Drift: < 0,005 OD/h.Photometric linearity: better than 1 %.

- Photometric accuracy: ± 2 % from 0 to 2500 O.D.

- Repeatability : ± 1 digit.

2.2- Digital operating system:

- "Measurements": Absorbences

Concentrations

FxT Rate Differential Multi-Standard

- "Alphanumeric Display" : LCD of 4 x 20 characters.

- "Measurement range": 0 - 2500 OD.
- Reproducibility: ± 1 digit.
- "Zero set": Full automatic.

- "Completely programmable" : Directly from the numeric keyboard.- "Storage capacity" : 100 tests, with all parameters.

- "External interface" : RS 232

- "Reading volume": 1 ml. (minimum 500 microliters)

- Minimum reading volume: 1 ml. macro cuvette

0,5 ml. semi-micro cuvette

2.3- Incubator system:

- 10 cuvettes reading cell compartment thermostated at room temperature or 37°C.

2.4- Reading and Control system:

- Direct reading display of 80 characters, and 7 \times 5 dots printer, 46 cps/sec. with thermostatic 58 mm. wide paper and bi-directional reading.

- Power requirements :

- 220 V A.C. 50 Hz 200 VAmp.

- 110 V A.C. 60 Hz 200 VAmp. (optional)

- **Dimensions**: 41 x 34 x 18 cm.

-Weight: 8,5 Kg.

3. GENERAL DESCRIPTION

3.1. PRINTER

Analytic results are printed out with some useful warnings for the user.

3.2. TEMPERATURE REGULATED BLOCK

It holds up to 10 square or cylindrical cells for pre-incubation of samples/solutions before readings.

3.3. CELL HOLDER COMPARTMENT

Holds the cell under test. This may be a semi-micro or macro disposable cell.

3.4. DISPLAY

80 CHARACTER ALPHANUMERIC DISPLAY

On the display we can see the following messages:

- Requests for specific test parameters.
- Answers to previous requests entered with the numeric keyboard.
- Operational messages (see below):

(CHECK) Appears on the screen when the analyser is switched ON. The

analyser checks:

- Electronic components and memory.
- Optical filters.
- Electronic zeroing.

(CODE) (Memory location) At this point we can introduce the code

number of the test we want to do. If we enter PRINT, the analyser will print out 100 UTILITIES and all the stored tests.

Code number appears on the display:

- when we switch on the analyser.
- every time the operator presses the STOP key.

(37° C or R.T.) The temperature is displayed on the top right corner, when we

are doing test. A blinking number means that the instrument is heating the cell compartment and the thermoblock, and when it is fixed the instrument reaches the selected temperature.

is fixed, the instrument reaches the selected temperature.

3.5 KEYBOARD

Apart from the numeric values, some keys have special functions:

(CL) Used to clear the last keys pressed before pressing ENTER.

(1/Y) This key has two functions: number 1 and YES.

(0/N) This key has two functions: number 0 and NO.

(ENTER) Stores the displayed value.

(PRINT)	When pressed after normal test printout, executes a duplicate printout. If pressed after one of the following prompts:
	- IDENTIFICATION: Displays a list containing all the possible identification names for the tests.
	- UNITS: Displays all the possible units for the tests.
(FEED)	Paper advance control.
(STOP)	Aborts current operation and returns to CODE
(READ)	To perform a measurement when we are analysing a sample.

4. INSTALLATION

(W/*)

4.1 INSTALLING THE ANALYSER

The instrument is supplied for 220 V AC 50 Hz. (110 V AC 60 Hz under request).

A point is considered.

Be sure that the available main socket supplies the correct voltage and has a good ground connection.

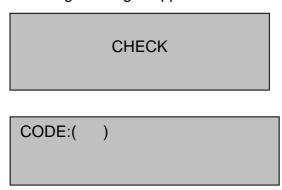
4.2 PRELIMINARY OPERATIONS

The analyser should be turned on 15 minutes before starting any measurement in order to let the instrument reach the necessary stability.

After switching ON the analyser, the following CHECKS are executed:

- Cell holder compartment is switched to 37°C.
- Filter positioning at 500 nm.
- Electronic zeroing.

On the display the following messages appear:



While waiting for the analyser to stabilise, check that there is enough thermal paper on printer holder.

5. OPERATING PROCEDURES

5.1 GENERAL PRINCIPLES

Two procedures are required for operating the analyser:

- A. PROGRAMMING THE TEST METHODS.
- B. OPERATING WITH PROGRAMMED METHODS (ROUTINE).

A) PROGRAMMING THE TEST METHODS

The analyser has 100 memory locations for storing operator's programmed tests, which are programmed following the instrument questions and indications. For every answer a compatibility control is done and the instrument only accepts answers which are on the accepting range or with the peculiar characteristics of the test to be done. Once programming is finished the instrument prints out the program.

B) OPERATING WITH PROGRAMMED METHODS (ROUTINE)

When you enter the test code number the test is recalled from memory and the main parameters are printed out. The analyser can take readings and compute immediate the results for the following analytic procedures:

- ABSORBANCE
- CONCENTRATION
- KINETIC
- FIXED TIME
- DIFFERENTIAL
- RATIO
- MULTISTANDARDS ANALISIS

5.2 OPERATING SYSTEM

After executing the automatic CHECK routine at power ON, the analyser displays CODE (). The user can select any one of the following procedures:

- a) (0 to 99) PROGRAMMED TEST METHODS
- b) 100 EDIT MODE

6. TEST PROGRAMMING (EDIT METHOD)

Programming sequence: Requests made by the analyser:

On the display it appears:

CODE ()	

Enter 100 and press ENTER. The display changes into:



By pressing PRINT we can see on the printer the available options.

UTILITIES 1

- 1. EDIT METHODS
- 2. IDENT. METHODS
- 3. PRINT METHODS
- 4. ABS. READ
- 5. FACTOR EXCHANGE
- 6. STD EXCHANGE
- 7. EDIT Q.C.
- 8. SEE Q.C.
- 9. PRINTER ACT/INACT
- 110. UTILITIES 2

From the following display:

UTILITY 1 ()		

Select EDIT METHODS by pressing 1 and ENTER.

```
CODE: ( )
```

CODE

The operator has to enter the desired memory location for the test. Enter a position from 0 to 99 and press ENTER. On the display it can appears:

```
LOACTION OCCUPIED
EDIT ( Y/N)
```

When this location is occupied with a programmed method, then the user decides to delete the old program and reprogram a new one by pressing Y or to keep the old program by pressing N. The instrument goes to the main menu.

If the position is free or after answering Y on the last situation, on the display it appears:



IDENTIFICATION

Enter a number that corresponds to a test on the list of possible method codes. Pressing PRINT key, a list of all possible method codes is displayed. Press again, all displayed methods are showed. Remember the number, press STOP, introduce the number and press ENTER.

For example: For Calcium press 11 and ENTER.

MODE ()	
0. ABS 3. FxT 6. MTSD	1. CONC 4. DIF	2. KIN 5. RAT

MODE

The kind of reaction must be entered here. The possible methods are simultaneously displayed:

0 - ABS : ABSORBANCE measurements.

1 - CON : END POINT Concentration measurements.

2 - KIN : KINETIC measurements.

3 - FxT : FIXED TIME (two points kinetic) measurements.

4 - DIF: DIFFERENTIAL measurements.

5-RAT : RATIO - Used in END POINT methods when, to

calculate the final result, the analyser itself computes a ratio (p.e.

Glycohemoglobine tests).

6 - MSTD : MULTISTANDARDS - Used in END POINT methods

with calibration curve made by several points, using several standards (up to

10).

For example, select 1 ENTER for END POINT determination.

WL1 ()		
1. 340 4. 546 7		2. 405 5. 578 8	3. 500 6. 630

WL1

Enter a number corresponding to one of the possible **principal** wavelengths.

Press 5 ENTER, for example.

WL2 ()		
1. 340 4. 546 7		2. 405 5. 579 8	3. 500 6. 630

WL2

Enter a number corresponding to one of the possible **complementary** wavelengths, in case of Bichromatic readings. Press zero if it is not needed.

Note: Be aware that bichromatic measurements reduce reading speed, Approximately 50%.

```
UNITS: ( )
```

UNITS

Enter a number that corresponds to one of the possible units. Press PRINT key, a list of possible units is displayed.

0. MG/DL	1. U/L
2. G/DL	3. MU/ML
4. G/L	5. MCG/ML
6. %	7. NG/ML
4. G/L	5. MCG/ML

If we press PRINT, a new display is shown:

8. MCG%	9. MEQ/L
10. MCG/DL	11. MMO/L
12. MCMO/L	13. NMO/L
14. KAT/L	15. MCKAT/L

Press STOP and introduce the corresponding number and press ENTER.

```
TEMPERATURE ( )
1.37 2.RT
```

TEMPERATURE

Enter one of the following temperatures: 37°C or room temperature. And press ENTER. It is important to select the same temperature for all the tests that must be performed to avoid stability delays by changes.

STANDARD (Y/N)

STANDARD

This is not activated in kinetic mode. If you press YES the test will have to be calibrated by a STANDARD. If you press NO, you will have to calibrate it by a FACTOR.

Note: In MTSD method the No. OF STANDARDS is required.

STD ()	

STD

Appears when you press YES in STANDARD (Y/N). Here the standard concentration must be entered.

```
FACTOR ( )
```

FACTOR

Appears when you press NO in STANDARD (Y/N), or in kinetic mode. Here a factor should be entered.

```
N. OF READ. ( )
```

N.OF READINGS

In Kinetic mode, the number of readings to do. In MSTD: to do one, two or three readings in standards, during calibration procedure.

```
INTERVAL ( )
```

INTERVAL

In kinetic or FxT. Interval between readings, in seconds.

```
DELAY()
```

DELAY

In kinetic or FxT; the time the analyser has to wait before the first reading.

```
ABS. LIM. MAX ( Y/N )
```

ABS.LIM.MAX

Enter YES for MAXIMUM limit when the kinetic increases or NO for MINIMUM limit when it decreases.

LIM. ABS.: ()	

LIM. ABS.

Only for kinetics. Accepted initial absorption value. It indicates the maximum or minimum initial Abs. permitted for the test to be valid. A higher or lower value than the introduced one, will appear when the reaction is in bad conditions or very high values, in which we find a high consumption during the delay time.

```
LIN LIMIT. ( )
```

LIN. LIMIT

Maximum linear results in a test method.

```
NORM. HIGH ( )
```

NORM. HIGH

High value of normal range.

```
NORM. LOW ( )
```

NORM. LOW

Low value of normal range.

```
DECIMALS ( )
```

DECIMALS

Maximum number of decimals in results.

```
SAMPLE V.: ( )
```

SAMPLE V.

Sample volume used in the reaction, in microliters.

```
REAG. V.: ( )
```

REAGENT V. Reagent volume used in the reaction, in microliters.

```
READING. DLY.: ( )
```

READING DLY

Only for concentration mode. The time needed to do the reading from the moment you press READ. In seconds.

REAC. TIME: ()

REAC. TIMENot in kinetic or FxT modes. The time needed to incubate the reaction. In seconds.

Once you entered all the parameters required, the new stored test is printed, and UTILITY 1 appears again on the display.



By pressing STOP we go to the main menu.

```
CODE ( )
```

The programme is now permanently stored and may be recalled simply by entering its code number when CODE () is on the display.

7. OPERATING THE PROGRAMMED METHODS

Enter the code number of the required test and press ENTER. For example no. 1, is a Calcium determination.

CODE 1 CALC 37 CONC STANDARD (10)

A list of the most important parameters of the measurement is printed.

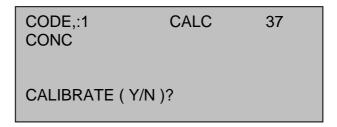
04/10/1999 CALC 1 CONC FACTOR: 37 STD:10 WL1:630 SAMPLE VOL:20 REAGENT VOL:1000 REAC. TIME:60

7.1 <u>Methods with standard.</u> If the method has not been calibrated before, the standard value appears on the display. The operator can modify it introducing the new value, or accepting it by pressing ENTER.

The flushing temperature display indicates that the analyser has not reached the desired temperature.

In multistandard methods, the operator can enter the calibrator values and their absorption, doing readings or using the keyboard to introduce manufacturer values when the absorption is already known.

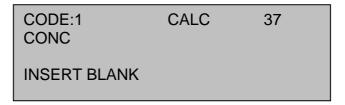
If the method has already been calibrated, then the following question will appear,



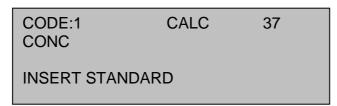
Press YES for a new calibration.

Press NO to use the calibration FACTOR already made. In this case the standard value is not requested.

Then the following message will appear on the display.



Press READ when inserting the cuvette with blank on the measuring holder, to do the optical zero depending on the specifications of the reagent makers. Wait till the following message appears on the display.



Press READ when inserting the cuvette and wait.

Then the calibration is being done and new factor is computed and printed.

CODE:1 CALC 37
CONC
INSERT SAMPLE

FACTOR: 1528

STD: 50

Press READ when inserting the cuvette with blank on the measurement holder using disposable cuvettes and wait

CODE:1 CONC	CALC WAIT: 3	37

The results will appear on the display.

CODE:1 CONC	CALC	37
INSERT SAMPLE	12.6 MG/DL	

The results will be printed with an identification number, and the eventual alarms. From the printer we obtain:

I.D.:89 MG/DL 12.6 AL: H

7.2 <u>Methods with factor</u>, or methods that do not need to be calibrated. Once you have selected the test, the following messages will appear:

CODE:2 KIN	GOT	37
INSERT BLANK		

Insert the blank.

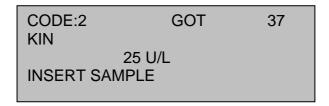
CODE:2 KIN	GOT	37
INSERT SAMPLE		

Insert the sample just diluted with the reagent and well mixed.

While the instrument is reading the following message appears:

CODE:2 KIN	GOT WAIT:48	37

Once the measurement is done, the following message appears on the display:



From the printer we get:

ID:1

ABSO: 1.490
-0.152
-0.154
-0.153

S.D.: 0.002
U/L 25
AL:

7.3 Ratio and differential methods. In these cases standards and samples must be read twice for a correct calculation. In differential methods, the sample blank will be subtracted from the test. In ratio methods the result of Reaction 1 is divided by the result of Reaction 2.

8. PRINTED RESULTS

If thermal printer is not activated, the results will only appear on the display.

If thermal printer is activated:

8.1 In END-POINT, RATIO and MSTD methods: the following parameters are printed.

ID Sample identification.
MG/dl. XXX Result and units.
AL Alarm. If there is any.

8.2 KINETIC methods:

ID: X

ABS 0: XXX

XXX

XXX

XXX

Abs increments (negative or positive)

XXX

S.D. XXX

Standard deviation.

U/L XXX

AL

Alarm, if there is any.

8.3 FxT and DIFFERENTIAL mode:

ID.: Identity number.

ABS 0 : XXX Absorption of first reading.

XXX Abs increment.

MG/dl. XXX Result.

AL Alarm. If there is any.

9. SPECIAL FUNCTIONS

<u>9.1 UTILITIES 1</u>

Pressing 100 from main menu you reach UTILITIES 1.

CODE: ()

Press 100 and ENTER.

UTILITY 1 ()

To print the utilities, press PRINT. And from the printer we obtain the following list:

- 1. EDIT METHODS
- 2. IDENT. METHODS
- 3. PRINT METHODS
- 4. ABS. READ
- 5. FACTOR EXCHANGE
- 6. STD EXCHANGE
- 7. EDIT Q.C.
- 8. SEE Q.C.
- 9. PRINTER ACT/INACT
- 10. UTILITIES 2

To go back to CODE, press STOP.

1.1.- Edit methods.

It refers to the methods programming.

<u>1.2.- Method identification.</u> (Just to have the list of identification numbers)

Press 2 and ENTER.

This option prints the abbreviations of the method names. Normally, it covers all the range of methods required, but in the case that the method to be edited is not on the list it will have the identification no X: No identified. (Ex: no. 59 ID NO)

1.3.- Printing methods. (to know the list of memorised tests)

Press 3 and ENTER.

This option is useful to make a list of the stored test. You can enter the range of the tests, which you wish to print out.

```
UTILITY 1 (3)
FROM ( )
```

Introduce the method number to be the first.

```
FROM (1)
TO ( )
```

All parameters memorised for the tests are printed out. If only one method is going to be printed out, the same number must be chosen for both entries.

1.4.- Absorbaces measurements.

Press 4 and ENTER.

It is used just to read absorbances.

```
UTILITY 1 ( 4 )
```

Select the filter required for the method.

INSERT BLANK PRESS READ

Insert the cuvette with the blank and press READ, to do the optical zero. Then the following message appears:

ABSORBANCE 0.000

Then introduce the cuvette with the sample:

ABSONRBANCE: 0.321

If during measurement we would like to read the zero again, insert the blank and press 0, and wait a little bit.

1.5.- Factor exchange.

Press 5 and ENTER.

UTILITY1 (5)

This option allows the exchange of the method factor without reprogramming.

CODE: ()

Introduce the method number to change the factor.

FACTOR: (2145)

Now, the programmed factor is shown out. Just introduce the new one and press ENTER.

UTILITY 1 ()

1.6.-STD exchange.

Press 6 and ENTER.

This option allows the exchange of the standard without reprogramming.

```
CODE: ( )
```

Introduce the method number to change the standard.

```
STD: (10)
```

Now, the programmed standard is shown out. Just introduce the new one and press ENTER.

```
UTILITY 1 ( )
```

1.7.- Edit Q.C.

This program allows the control evaluation up to 10 methods with a maximum of 20 essays per control.

Press 7 and ENTER.

```
Q.C. CODE: ( )
```

The method to be controlled must be introduced. For example, no 1 is a Glucose determination.

```
GLU
REF. VALUE: ( )
```

or

ERASE CONTROL (Y/N) REF.VALUE: 69

If it was programmed before.

The mean value of the used control must be introduced.

GLUC DEVIATION: ()

Here, the admitted deviation for the control or the reference value is indicated.

Example: Reference value: 100 and deviation: 15.

The Q.C. will admit the values between 85 and 115.

Once the control is programmed, the data are printed, with the name of the method.

Q.C.
CALC 1
N.:1 REF. VALUE: 80
DEVIATION: 20

If there are 10 methods with assigned Q.C., when 7 and ENTER are pressed, on the display it appears:

SPACE FULL

If another Q.C. is wanted, one of the programmed can be erased. After introducing the method code the display will show:

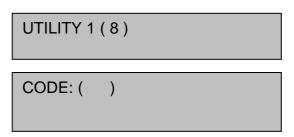
ERASE CONTROL (Y/N)? REF. VALUE: 10

After pressing YES the value is erased and the instrument asks for a new code.

Q.C. CODE: ()

1.8.- See Q.C.

Press 8 and ENTER.



Press the number of the Q.C. method you want to see on the display. Example: Glucose.

GLUC N: M: SD: VC:

M: the middle value obtained

V.C.: variation coefficient shows the precision of the method. More precision

means a small C.V.

N: no. of essays S.D.: standard deviation

R: ratio, coefficient between the obtained value and the reference one.

The ratio indicates the exactitude of the method. The closer to 1, the more exact the method is.

Pressing PRINT:

Q.C.
CALC
N.: REF VALUE:
DEVIATION:

M:
S.D.:
V.C.:
R.:

To perform a control, use the control as a normal sample and before pressing READ, press ENTER. On the right corner it will appear two brackets indicating that the identification number of the sample can be introduced. Then press 0 ENTER and proceed as for a normal sample. The obtained value will be stored as a control.

1.9.- Printer activated/deactivated.

With this function the actual situation changes. Press 9 and Enter. If the printer is activated:

UTILITY 1 (9)

A "biip" indicates the change.

INACT. PRINTER

If it is not activated, after pressing 9 and ENTER:

ACT. PRINTER

And a "biip" indicates the change too.

9.2 UTILITIES 2.

By pressing 110 and ENTER we lead to another level of Utilities.

UTILITY 2 ()

Pressing PRINT we get:

UTILITIES 2

- **11. DATE**
- 12. LANGUAGE
- 13. APPLICATIONS
- 14. ABS. PRINT
- 15. LOAD METHODS
- 16. FILTERS 7,8
- 17. ERASE METHODS
- 18. VERSION
- 19. TEMPERATURE

To go back to the UTILITIES 1 menu, just press STOP:

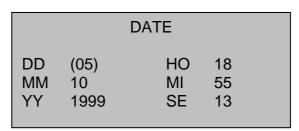
RA136000/V3/R0/0505EA

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2.11.- Date.

This option allows the exchange of date and time (the instrument has an internal clock and it is not necessary to change them once they are introduced at the beginning)

Press 11 and ENTER.

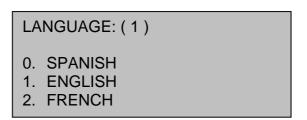


DD	day	НО	hour
MM	month	MI	minute
ΥY	year	SE	second

We can go through them by pressing ENTER. Once we accept all them the instrument goes to UTILITY 2.

2.12.- Language.

It allows to chose the instrument language. Press 12 and ENTER.



Select the one you want and press ENTER. Switch off the instrument and switch it on again to eliminate any memorised data in other language.

2.13.- Applications.

Once 13 and ENTER are pressed the instrument shows:

0. CLIN. & VET.
1. CLIN & VET ES.
2. WATERS
3. FOOD

Press the number required and the instrument will change automatically. This exchange has only relation with the assigned names of the methods. When the number is pressed the display goes to the UTILITY 2 menu

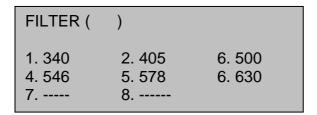
UTILITY 2 ()

NOTE: The selection number 1 includes the following haematological parameters: hematocrite, hemoglobine and red blood cells.

2.14.- Absorbance printing.

This program allows the numeric evaluation of the kinetic reaction, in technical or application fields, for example, to know the time required for an end point reaction to stabilise, or to control the linear zone for a kinetic.

Press 14 and ENTER. The instrument asks for the wavelength to be used.



Select the filter required and press ENTER.

INSERT BLANK PRESS READ

Then, the cuvette with the blank or the reaction to be studied must be inserted. Wait a little bit.

ABSORBANCE: 0.000

The instrument does the zero automatically and it reads and prints every 10 seconds till STOP is pressed. After pressing STOP wait for a while.

If the blank and the reaction cuvette are different, once ABSORBANCE 0:000 appears on the display, the blank cuvette must be removed and the reaction one inserted.

2.15.- Load methods.

This program permits to send and receive files from or to a PC. The PC must have a communication program. Press 15 and ENTER.

1. REC FILE 2. SEND FILE Pressing 1:

RECEIVING FILE 2400 8 NO P1ST

Pressing 2:

SENDING FILE 2400 8 NO P1ST

NOTE: By pressing STOP you go again to

```
UTILITY 2 (
```

But it needs some time, depending on the transmission time.

2.16.- Filters 7, 8.

The instrument has 6 filters but it is possible to add 2 filters more (optional), which are identified from this menu. Press 16 and ENTER.

```
FILTER 7: (
```

Introduce the wavelength of the filter, e.g. 620, and ENTER.

```
FILTER 7: (620)
FILTER 8: (
```

If it is necessary, introduce the wavelength for the 8th filter.

Press STOP.

UTILITY 2:(

2.17.- Erase methods.

It allows to erase any method. Press 17 and ENTER.

```
FROM: (
TO: ( )
```

and press ENTER. Press STOP to go to UTILITY 2. ()

2.18.- Version.

Pressing 18 and ENTER the instrument shows the version.

VERSION 3.04 01/04/2004 136000

Press STOP to go to UTILITY 2 ()

2.19.- Temperature.

To well know if the instrument reaches the desired temperature, put a thermometer on a cuvette with 2 ml. of distilled water on the reading cell. Wait the required time for the temperature to stabilise. Select from the keyboard.

UTILITY 2 () 19 ENTER

On the display it will appear:

37: (74) 30 : 40 25 : 12

Just take for example that we want to control if the 37 °C are reached. We introduced the thermometer and after waiting for a while it shows 36,8 °C. Moving up this value with the keyboard, e.g. 75, we increase the temperature and moving it down, we reduce it. Every unit up and down means 0,2 °C of variation. It must be done patiently and it takes a lot of time due to the fact that the temperature needs time to stabilise.

10. HOW TO PROGRAMM A TEST

10.1 END POINT MODE

Be sure that the PRINTER is activated.

CODE () 100 ENTER

UTILITY 1 1 ENTER

CODE () XX ENTER (from 0 to 99)

LOCATION OCUPIED

EDIT (Y/N) Means that there is a test programmed in this position. Answer Y to reprogram a new test or N

to leave the previous one, going to UTILITY 1 ()

IDENTIFICATION () Appears when code position is free. By pressing PRINT all

possibilities are displayed. Press STOP and introduce the right

value. Press ENTER.

MODE () 1 ENTER

WL1() X ENTER

WL 2 () X ENTER If it is needed.

UNITS() X ENTER

TEMPERATURE XX ENTER

STANDARD (Y/N) YES - To calibrate (first time)

STD () Standard value

LIN. LIMIT. () Limit of method linearity XXX ENTER

NORM. HIGH () XXX ENTER

NORM. LOW (): XXX ENTER

DECIMALS () X ENTER

SAMPLE V () XX ENTER (Microliters)

REAG. V () XXXX ENTER (Microliters)

READING DLY () XX ENTER (Seconds) To avoid air bubbles on the reading

cuvette (e.g.: 3 seconds)

REAC TIME () XXX ENTER (Seconds) Only to remember it.

Now all parameters are printed and programmed.

NOTE If the user wants to store in memory measurements in ABS

mode, this is possible by using FACTOR 1 and programming

as CONC.

10.2 KINETIC MODE

CODE () 100 ENTER

UTILITY 1 () 1 ENTER

CODE () XX ENTER

IDENTIFICATION () XX ENTER

MODE () 2 ENTER

WL 1 () X ENTER

UNITS () X ENTER

TEMPERATURE () XX ENTER

FACTOR () XXXX ENTER

N. OF READ () X ENTER (e.g.: 4)

INTERVAL () XX ENTER (e.g.: 30 seconds)

DELAY () XX ENTER (e.g.: 60 seconds)

ABS.LIM.MAX (Y/N) Y When it is an increasing reaction.

N When it is a decreasing reaction.

LIM.ABS. () XXX ENTER

LIN.LIMIT () XXX ENTER

NORM. HIGH () XXX ENTER

NORM. LOW () XXX ENTER

DECIMALS () X ENTER

SAMPLE VOL () XX ENTER (Microliters)

REAG. VOL () XXXX ENTER (Microliters)

All parameters are printed and memorised.

10.3 FIXED TIME (FxT) MODE

CODE () 100 ENTER

UTILITY 1 () 1 ENTER

CODE () XX ENTER

IDENTIFICATION () XX ENTER

MODE () 3 ENTER

WL 1 () X ENTER

UNITS () X ENTER

TEMPERATURE () XX ENTER

STANDARD (Y/N) Y To calibrate (first time)

N (Whether calibration is not needed or to introduce the

FACTOR)

STD () XXXX ENTER

INTERVAL () XX ENTER (in seconds)

DELAY () XX ENTER (in seconds)

LIN.LIMIT () XXX ENTER

NORM. HIGH () XX ENTER

NORM. LOW () XX ENTER

DECIMALS () X ENTER

SAMPLE VOL () XX ENTER (Microliters)

REAG. VOL () XXXX ENTER (Microliters)

All parameters are printed and memorised.

10.4 DIFFERENTIAL MODE

CODE () 100 ENTER

UTILITY 1 () 1 ENTER

CODE () XX ENTER

IDENTIFICATION () XX ENTER

MODE () 4 ENTER

WL 1 () X ENTER

WL 2 () X ENTER

UNITS () X ENTER

TEMPERATURE () XX ENTER

STANDARD (Y/N) Y To calibrate (STD Value)

N To introduce a factor (Factor value)

STD () XXX ENTER (or FACTOR XXX ENTER)

LIN.LIMIT () XXX ENTER

NORM. HIGH () XX ENTER

NORM. LOW () XX ENTER

DECIMALS () X ENTER

SAMPLE VOL () XX ENTER (Microliters)

REAG. VOL () XXXX ENTER (Microliters)

READING DLY () XX ENTER (Seconds)

REAC TIME () XXX ENTER (Seconds)

All parameters are now printed out and memorised.

10.5 RATIO MODE

CODE () 100 ENTER

UTILITY 1 () 1 ENTER

CODE () XX ENTER

IDENTIFICATION () XX ENTER

MODE () 5 ENTER

WL 1 () X ENTER

WL 2 () X ENTER

UNITS () X ENTER

TEMPERATURE () XX ENTER

STANDARD (Y/N) Y To calibrate

N If calibration is not needed

STD () XXX ENTER (or FACTOR XXXX ENTER)

LIN.LIMIT () XX ENTER

NORM. HIGH () XX ENTER

NORM. LOW () XX ENTER

DECIMALS () X ENTER

SAMPLE VOL () XX ENTER (Microliters)

REAG. VOL () XXXX ENTER (Microliters)

READING DLY () XX ENTER (Seconds)

REAC TIME () XXX ENTER (Seconds)

All parameters are now printed out and memorised.

10.6 MULTISTANDARD MODE

CODE () 100 ENTER

UTILITY 1 () 1 ENTER

CODE () XX ENTER

IDENTIFICATION () XX ENTER

MODE () 6 ENTER

WL 1 () X ENTER

WL 2 () X ENTER

UNITS () XX ENTER

N. STANDARDS () XX ENTER (from 0 to 9)

N. OF READ () X ENTER (For standards and curve)

TEMPERATURE () XX ENTER

LIN.LIMIT () XXX ENTER

NORM. HIGH () XXX ENTER

NORM. LOW () XXX ENTER

DECIMALS () X ENTER

SAMPLE VOL () XX ENTER (Microliters)

REAG. VOL () XXXX ENTER (Microliters)

READING DLY () X ENTER (Seconds)

REAC TIME () XXX ENTER (Seconds)

All parameters are now printed out and memorised.

NOTE All Standard values must be entered when the memorised method is recalled

(due to test procedure).

11. HOW TO OPERATE WITH PROGRAMMED TESTS

11.1 END POINT MODE

CODE (): XX ENTER

Introduce code of the memorised test.

On the printing paper the user can see the most interesting parameters of the test.

05/10/1999 CHOLE 2 CONC FACTOR 37 STD:200

WL1 500

SAMPLE VOL: 10 REAGENT VOL: 1000 REAC. TIME: 300

DISPLAY

CODE: XX

COD: XX TEST T°C.

CONC.

CALIBRATE (Y/N)

The user selects whether to calibrate or not.

First time, calibration must be made or the factor introduced.

or

CODE:2 CHOLE:37

STANDARD (200)

Press YES to accept or modify the Standard Value, and press ENTER.

INSERT BLANK Insert a cuvette with blank and press READ.

factor is being calculated.

WAIT ... Means the delay before readings.

From the printer we obtain:

FACTOR: 128.00

STD: 200

INSERT SAMPLE

Proceed the same way for all samples.

ID:1 MG/DL: AL:

After finishing the measurements, press STOP.

11.2 KINETIC MODE

CODE NUMBER (): XX ENTER

The most important parameters are printed out.

5/10/99 GOT 3 KIN FACTOR: 1758

37

WL1: 340

SAMPLE VOL: 100 REAGENT VOL: 1000

COD: XX TEST T°C KIN
INSERT BLANK

Insert the blank cuvette and press READ.

INSERT SAMPLE Do the same with samples.

WAIT ... During delay and intervals of measurements.

XX U/L Result at the end and printed on the paper, after a "biip" signal.

Initial Absorbance: To control the quality of the reagent.

The other Δ absorbances are done to control the reaction linearity.

ID:

ABSO: XXXX
X.XXX
X.XXX
X.XXX
S.D.: X.XXX
U/L: XXX

Press STOP to change method.

11.3 FIXED TIME MODE

CODE () XX ENTER

CODE: XX TEST T°C.

FxT

STANDARD (XX)

Press ENTER to accept STD value.

From the printer we obtain:

06/10/1999 TEST CODE
FxT FACTOR:
37 STD:
WL1:
SAMPLE VOL:
REAGENT VOL:

COD : XX TEST T°C.

FxT.

INSERT BLANK

Insert a cuvette with blank and press READ.

WAIT ...

Delay for first reading and new delay for second one. After calibration, Factor value and Standard concentration are printed.

INSERT SAMPLE

XX.XX MG/DL

Result at the end, and printed on the paper, after a "biip" signal.

ID:

ABSO: X.XXX Initial Absorbance

X.XXX Δ ABS

MG/DL XX.XX CONCENTRATION

INSERT SAMPLE

On the display we have:

CODE: XX TEST

T°C

FxT

X.XX MG/DL INSERT SAMPLE

Press STOP to change method

11.4 DIFFERENTIAL MODE

CODE ():

XX ENTER

CODE:

TEST T°C

DIF

STANDARD (

From the printer we obtain:

06/10/1999 TEST

DIF FACTOR:

37 STAD

WL1:

SAMPLE VOL:

REAGENT VOL:

REAC. TIME:

CODE: XX TEST T°C.

DIF

INSERT BLANK

Insert the blank and press READ.

T°C

STANDARD BLANK Insert the blank/Standard and press READ.

WAIT ...

INSERT STANDARD Insert the standard and press READ.

WAIT ... At the end the factor value is printed.

SAMPLE BLANK Insert sample blank and press READ

WAIT ...

INSERT SAMPLE (): Insert the sample and press READ

WAIT ...

X.XX MG/DL Result.

On the printer

SAMPLE BLANK

ID: XX

ABS X.XXX Blank ABS

X.XXX Sample ABS

MG/DL X.XX Concentration

AL:

Press STOP to change method.

11.5 RATIO MODE

CODE NUMBER (): XX ENTER

CODE: TEST T°C RAT STANDARD ()

From the printer we obtain:

06/10/1999 TEST T°C

RAT FACTOR:

37 WL1:

SAMPLE VOL:

REAGENT VOL: REACT. TIME:

|

COD: XX T°C. TEST RAT INSERT BLANK

Insert the blank (in this case distilled water).

STANDARD REACTION 1

Insert the solution 1 and press READ

WAIT ...

STANDARD REACTION 2

Insert the solution 2 and press READ

WAIT ...

On the printer:

FACTOR XX.XX STD XXX

SAMPLE REACTION 1

Insert the solution 1 of the sample and press READ.

WAIT ...

SAMPLE REACTION 2

Insert the solution 2 of the sample and press

READ.

WAIT ... Results are printed out

ID: %: AL:

CODE: T°C **TEST** RAT ----% **SAMPLE REACTION 1**

New Sample

Insert sample and press READ.

.... and so on, till the samples are finished.

Press STOP to change method.

11.6 MULTISTANDARD MODE

CODE (): XX ENTER

From the printer we obtain:

06/10/1999 TEST T°C
MSTD
T°C
WL1:
SAMPLE VOL:
REAGENT VOL:
REACT. TIME:
1. ABS:
1. CONC:
2. ABS:
2. CONC:

COD: XX TEST T°C.

MSTD

1. BY KEYBOARD
2. BY READINGS

- 1.- To introduce the theoretical values of the standard curve, given by the manufacturer.
- 2.- To make the curve with calculated values from different standards, by the instrument.

PROCEDURE 1

Press 1 and ENTER.

COD:XX TEST T°C.

MST POINT:1

ABS:()

CONC:

Introduce ABS value and press ENTER.

Then introduce the Concentration value and press ENTER.

MSTD POINT 2

ABS: () Introduce ABS and press ENTER.

CONC : Introduce CONC and press ENTER.

POINT 3 Proceed the same way.

When all the information is introduced.

When all the points are determinated.

INSERT BLANK Insert cuvette with blank and press READ.

WAIT

INSERT SAMPLE

Insert the cuvette and press READ

WAIT ...

Results are printed out

ID: XX

MG/DL XXX

AL:

On the display:

CODE:

TEST

T°C

MSTD

MG/DL

INSERT SAMPLE

Press STOP to change method

PROCEDURE 2

CODE: TEST T°C MSTD

- 1. BY KEYBOARD
- 2. BY MEASURING

Press 2 and ENTER.

COD: XX TEST T°C.

MSTD POINT: 1

CONC:()

Introduce concentration of first standard and press ENTER.

POINT 2

CONC : (): Second standard and press ENTER.

Till all the concentration points are introduced.

INSERT BLANK Aspirate the blank or insert the cuvette and

press READ

STANDARD 1 Insert the cuvette and press READ

READ 1

WAIT ...

STANDARD 1 READ 2

Insert the cuvette and press READ.

WAIT ...

STANDARD 1 READ 3

Insert standard 1 again and press READ.

NOTE: We programmed 3 readings.

WAIT ...

STANDARD 2

Repeat the process again. Until all standards have been read

READ 1

(once, twice, ...) as we have programmed.

At the end, all mean Absorbencies are printed

out on the paper.

INSERT SAMPLE Insert the sample and press READ

> ID: MG/DL: AL:

> > Press STOP to change method

12. ALGORITHMS USED BY CLIMA

12.1 CONCENTRATION OPERATING MODE

The analyser measures the samples absorbance values and multiplies them by a factor before printing out the results directly in the programmed concentration units. The computing Factor may be entered directly or obtained from the instrument by reading the standard absorbance. In this case, the well known equation is used:

STD CONC. STANDARD CONCENTRATION FACTOR = -----= = ------STD ABS. STANDARD ABSORBANCE

This factor is then used to compute the samples concentration in the following equation:

 $S. CONC = FACTOR \times S.ABS$

SAMPLE CONCENTRATION = FACTOR x SAMPLE ABSORBANCE.

12.2 KINETIC OPERATING MODE

Programmed parameters determine the measurements executed on a kinetic test, thus the value programmed for the delay NUMBER OF READINGS and the INTERVAL TIME requested (time interval between subsequent measurements). The analyser reads the programmed number of absorbance values used later to obtain the delta ABS (or differences of Absorbance). After that, the instrument computes the values of the standard deviation on all the measured delta ABS, as well as the delta ABS average over one minute.

The sample enzymatic activity is computed by multiplying the delta ABS average over one minute by the previously programmed factor:

Remember that the factor value is usually stated by the reagent manufacturer but may be calculated using the following equation:

Total vol. Total volume of reaction mixture.

S. vol. t

 Total volume or reaction mix
 Sample volume.
 time (in minutes).
 molar extinction coefficient.
 cell optical pass (in cm). e s

12.3 FIXED-TIME OPERATING MODE

Two Absorption measurements are done on the sample in this Operating Mode:

First reading is done after the programmed delay. The second one after the programmed time interval.

Both absorption measurements are kept in memory and the delta ABS is computed. Substrate Concentration values are computed by multiplying the delta ABS by the appropriate Factor.

This factor may be entered directly by the operator or calculated from a Standard by the instrument.

12.4 DIFFERENTIAL OPERATING MODE

The instrument computes the difference between the sample absorption and the blank absorption. The concentration is computed in the same way as in end-point methods.

12.5 RATIO

This mode is used specially in computing Glycohemoglobine.

The analyser reads two absorptions. Absorption of reaction 1 and absorption of reaction 2.

SAMPLE CONCENTRATION = FACTOR x SAMPLE RATIO

12.6 MULTISTANDARD OPERATING MODE

In this mode, a curve is made with several points and we find the concentration interpolating absorptions with this curve.

13.ADJUSTEMENTS CLIMA

13.1 LAMP ADJUSTEMENT:

IT: In case the lamp has to be changed, take off the upper cover turning out the four screws from the bottom of the base, which settle it. Take it out carefully, being sure not to broken the tubes nor the electrical connections. To rest it over its left side (having the instrument in front). With an allen key, slacken the lamp, take it out and take also out the plate connector.

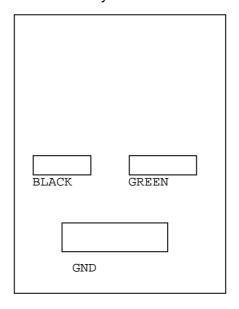
Put in the same way a new lamp and before fixing it with the key, check – looking directly inside the reading cell – that the light intensity is maximum. To do it, put the filament in vertical position and move the socked of the lamp with the hand from right to left and vice versa. Once you have the maximum intensity, press the fixing screw with the allen key.

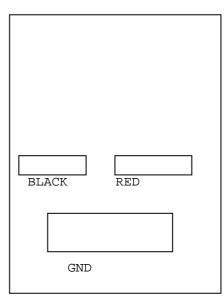
NOTE: If this procedure has any difficulty, can be checked using the display.

Switch the instrument on, select readings in ABS and when it reads, move the lamp till obtain the minimum value, that coincides with the maximum transmission. Fix it in this position.

13.2 MAIN SWITCH (view from inside the instrument)

Check that the connection is the right one before switching on the instrument. It is normally despatched from the factory at 220 V AC.





220 V. 50 Hz

110 V. 60 Hz

APPENDIX

1) Alarms and error messages

With the results, some alarms may appear:

ALARM: H - Value over NORMAL HIGH.

L Value below NORMAL LOW.
LL - Value out LINEARITY LIMIT.

FL - Initial absorption value over or below ABSORBANCE LIMIT.

FR - In MSTD, value over the highest calibrator.
FR - In MSTD, value below the lowest calibrator.
* - For controls. The value is out of the range.

2) Range of different parameters

Values out of range are not accepted:

<u>PARAMETER</u>	RANGE	
FACTOR	0,001 a 99.999	
STANDARD	0,01 a 9.999	
N. OF READINGS	1 a 9.999	
INTERVAL	1 a 9.999	
WAIT	1 a 9.999	
LIN. LIMIT	0,01 a 9.999	
ABS. LIM.	0,01 a 9.999	A limit of 1.200 Abs. will be translated
	into 1.2. Units a	re expressed in absorption units.
NORM. HIGH	0,01 a 9.999	·
NORM. LOW	0,01 a 9.999	
DECIMALS	0 - 3	
SAMPLE V.	0,01 a 9.999	It is just indicative
SAMPLE REAG.	0,01 a 9.999	It is just indicative
DELAY	0 a 999	
REAC. TIME	0 a 999	It is just indicative.

3) Other messages on the display

a) POSITION OCUPPIED ... EDIT Y/N.

This message appears if you try to edit a test in a location that is already occupied.

Enter YES, if you want to clear the programmed test. Enter NO, if you want to keep the programmed test.

b) ERROR 21: Bad filter positioning.

Switch OFF and switch ON the instrument again. If the problem persists contact your nearest Technical Service.