RA-25 Chemistry Analyzer

User Manual

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Bayer Diagnostics India Ltd.,
589, Sayajipura, Ajwa Road,
Baroda - 390 019, Gujarat,
India.

Document Number: TA0-0405-00

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1 Introduction

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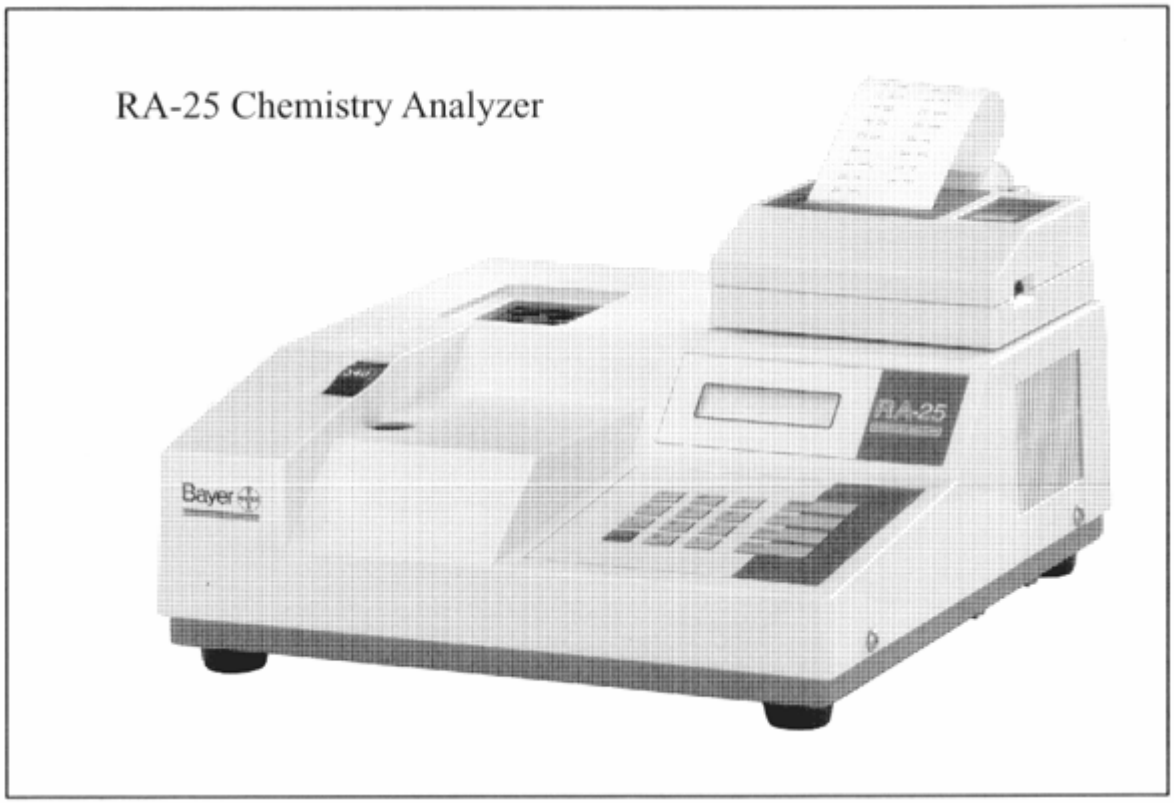
General Description

This manual contains complete operating instructions for the RA-25 Chemistry Analyzer.



The RA-25 Chemistry Analyzer is a compact, programmable, user-friendly, benchtop instrument. It is designed to measure conveniently, accurately and quickly different types of tests based on the following methods:

- Absorbance
- Endpoint
- Fixed Time
- Kinetic
- Enzyme Immunoassay
- Immunoturbidimetric Assay
- Drug Assay

The RA-25 Chemistry Analyzer performs photometric measurements and calculates results according to preprogrammed parameters, which are operator selectable through the keypad. The RA-25 has five interference filters covering the range of 340-630 nm (340-405-505-546-630 nm).

The RA-25 has a test directory of 50 tests, out of which, any 25 test programs can be stored in memory.

The RA-25 is designed for round cuvettes of 12 mm O.D. (outside diameter) with 10 mm cuvette pathlength. It has a built-in incubator block to incubate 12 cuvettes at a time. The incubator block can maintain a constant temperature of 37° C for chemistries that require preincubation. The test reading is taken directly by placing the cuvette into the cuvette well, which is also thermally regulated at 37°C.

The test results are displayed and printed.

2 Unpacking and Installation

Unpacking ***2-2***

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Unpacking

The RA-25 Chemistry Analyzer and accessories are shipped in two separate cartons. As each carton is opened and unpacked, check the contents against the packing list. The packing list is kept in the instrument carton. The items of each carton are given below:

Instrument Carton
(Code No. 9091)

- RA-25
- User Manual
- Autopak / RA-25 Working Instructions and Program Parameters (File)
- Dust Cover
- Power Cord
- Printer

Accessory Carton
(Code No. 9081)

- Micropipettes
- Micropipette Workstation
- RA-25 Cuvettes (2x50 Cuvettes)
- Test Tube Workstations (2 Nos.)
- Printer Paper Roll (Pack of 4)
- Spare Lamp
- Spare Fuse

Installation

The RA-25 Chemistry Analyzer is a microprocessor controlled electronic instrument and be careful not to damage any component while unpacking and setting up the analyzer. The RA-25 should be set up and operated by connecting it to a source of stable mains power supply (110 / 220 V ac) through a proper socket. It is recommended that the RA-25 be used in a closed, dust-free and air conditioned environment.

Battery Charging

At the time of shipment, the rechargeable battery pack in the RA-25 Chemistry Analyzer is in a fully discharged condition. Therefore, it will need a start-up procedure for charging, which is as follows:

Switch on the mains supply and CVT (Constant Voltage Transformer) but do not switch on the RA-25 Chemistry Analyzer. This keeps the supply 惹n?to the battery charging circuit.

Approximately 90 hours will be required to fully charge the battery. This can be achieved by keeping the mains and CVT on (as mentioned above) continuously for 6 days.

Please note that the battery gets recharged automatically as and when the RA-25 Chemistry Analyzer is in use.

Instrument Setup and Operation

1. Place the RA-25 on a firm surface in the designated work area.

    CAUTION

   The correct voltage must be set to avoid damage to the instrument.

2. Ensure appropriate voltage selection 110 V / 220 V by setting the switch on the back panel to the desired voltage.

3. Plug the power cord to the mains.

4. Ensure paper roll is loaded in the printer. Attach the printer cable to RS-232C port on the back panel of the instrument.

5. Switch on the RA-25. CHECK prompt is displayed momentarily on the LCD and then Insert PGM. CODE < > message is displayed on the LCD.

6. Allow the analyzer to warm-up for at least 20 minutes (ambient temperature : 25癈) to attain 37癈.

7. When the **List** key is pressed repeatedly, all the tests, which are already programmed and stored in the memory along with their respective code numbers, will be displayed by the analyzer. The list of chemistry tests can be printed through PGM. CODE < 98 >.

Display	**Keypad**
Insert PGM. CODE < >	Press List

Display of Stored Programs (Example)

01 GLUC	10 URIC	19 Cl
02 UREA	11 ALKP	20 TBIL-Sample Blank
03 CRTN	12 ALT	21 DBIL-Sample Blank
04 BUN	13 AST	22 T3
05 CHOL	14 GGTP	23 T4
06 HDL	15 CPK	24 TSH
07 TRIG	16 CKMB	25 TBIL (Bichromatic)
08 ALB	17 LDH	
09 TPR	18 CAL	

For Printing

Display	**What You Do**
Insert PGM. CODE < >	Press 9 8 ENTER
1) Print Program 2) Printer ON/off	Press 1 Yes .The printer starts printing stored programs.

3 Analyzer Description

Component Identification ***3-2***

Component Description and Functions ***3-3***

On/Off Switch *3-3*

Fuse Holder *3-3*

Liquid Crystal Display Panel *3-3*

Wavelength Selector *3-3*

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Keypad Description and Key Functions *3-4*

Component Identification

Component Description and Functions

On/Off Switch

The On/Off switch is located at the rear of the analyzer. In the 揚own?position, the switch turns the electrical power on, and in the 搖p?position, the switch turns the electrical power off.

Fuse Holder

The fuse holder is located at the rear of the analyzer. It holds a 1A fuse.

Liquid Crystal Display Panel

The RA-25 has a 16 × 2 character alphanumeric display. It displays test name, test result, test absorbance, delay and reading times (kinetic mode) and operational messages.

Wavelength Selector

The wavelength selector allows the operator to select wavelength from 340-630 nm through 5 interference filters (340-405-505-546-630 nm). The desired wavelength can be selected by rotating the wavelength selector.

Incubator Block

The incubator block is preset to maintain 37癈 when the analyzer is connected to the mains and can hold 12 round cuvettes. The basic function of this incubator block is to provide the necessary incubation temperature to reagents or reacted solutions, where required. The heater circuit in the incubator block is automatically shut off when operation switches over to battery mode.

Cuvette Well

The cuvette well is controlled at 37癈 temperature when the analyzer is connected to the mains. It holds a round cuvette for taking readings. At the bottom of the cuvette well, a sensing switch is provided. This gets activated when a cuvette is fully inserted in the cuvette well. A reading is taken and the result is displayed. The heater circuit in the cuvette well is automatically shut off when operation switches over to battery mode.

Rechargeable Battery Backup

This battery pack has a 9.6 V Ni-Cd battery. When the mains supply fails, the RA-25 automatically switches over to battery mode and this is indicated on the upper right corner of the LCD by a flashing **B**. The battery is continuously charging when the RA-25 is operating on the ac mains supply.

Only endpoint chemistries can be performed on the battery mode. The following kinetic and fixed time chemistries, which are temperature dependent, cannot be performed when the RA-25 is operating in the battery mode:

ACPH, ALKP, ALT, AMYL, AST, BUN, CHE, CKMB, CPK, CRTN, GGTP, HBDH, LDH

Socket

A socket is provided on the back panel for connecting the RA-25 to the mains with the power cord.

RS-232C Interface Connector

RS-232C interface is provided on the back panel for connecting the RA-25 printer.

Printer

This is a 24-column, thermal printer which uses a thermal paper of 56 mm width. The On/Off switch is located on the right side panel of the printer. The printer prints test code, test name, type of reaction, parameters, sample ID and test results. The 揚aper Feed?key is provided on top of the printer.

Keypad Description and Key Functions

There are 16 keys on the keypad. The following are their functions:

: Press

- to enter digit ?□
  or
- to answer 掣es?to a prompt displayed on the LCD
  or
- to display 4 deltas after the result of a kinetic chemistry is displayed.

: Press to enter digit ??or to answer 揑o?to a prompt displayed on the LCD.

: Press to enter the respective digits.

: Press to enter the decimal point.

: Press to clear the last entry. This key is effective only if pressed before the 揺nter?key is pressed.

: Press to register the selected command in the computer.

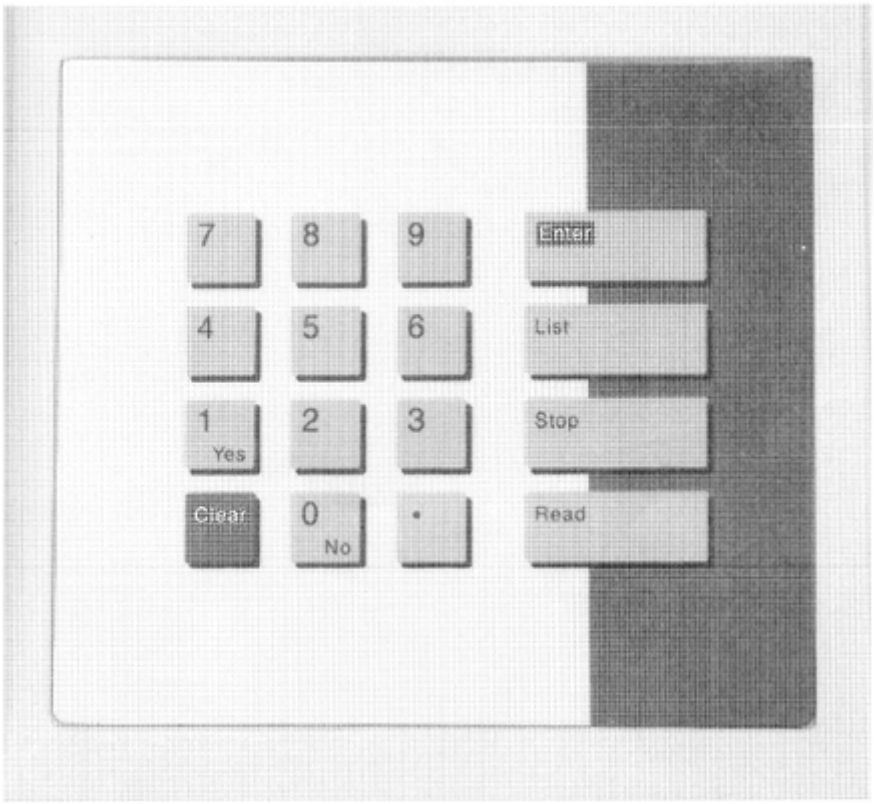
Read : Press to take the reading of a sample again, with the cuvette already in the cuvette well.

Stop : Press to abort the current operation.

List : Press to see list of tests on the LCD.

- If the 揑ist?key is pressed when **Insert PGM. CODE < >** prompt is on the display, the names and code numbers of all preprogrammed tests are displayed.
- If the 揑ist?key is pressed while programming a test when **NAME test < >** prompt is on the display, the test directory of all the 50 tests is displayed.
- If the 揑ist?key is pressed while programming a test when **Insert WL< >** or **UNITS < >** prompt is on the display, the lists of available wavelengths and units for the appropriate selection are displayed.
- Repeated pressing of the 揑ist?key results in the scrolling of information on the display.

Keypad



4 Operating Principles, Test Directory and General Instructions for Use

Operating Principles ***4-2***

Calculation of Results ***4-3***

Endpoint Chemistry *4-3*

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General Instructions for Use ***4-6***

Operating Principles

The light beam from the tungsten-filament lamp with lens passes through a slit. The beam then passes through the reacted solution in the cuvette and goes through the selected interference filter. The beam of selected wavelength falls on the solid-state photodetector, which generates an electrical signal, which is proportional to the intensity of the incident light.

Calculation of Results

Endpoint Chemistry

The reacted solution in the cuvette absorbs light depending upon the concentration of the constituent being determined. Therefore, the signal generated by the photodetector is in inverse logarithmic proportion to the concentration of the constituent in the solution. The final result is calculated using the factor derived from a known standard. The RA-25 calculates the factor using the following formula :

$$\text{Factor} = \frac{\text{Concentration of Standard}}{\text{Absorbance of Standard}}$$

The RA-25 multiplies the sample absorbance with the factor to provide the final result. If the factor is known, it may also be entered directly.

Fixed Time Chemistry

In this type of chemistry, the RA-25 takes two absorbance readings of the sample at a fixed time interval:

1. “T1? which is taken immediately at the end of the 揹elay?time
2. 揟2?which is taken immediately at the end of the 揑nterval?time

The RA-25 calculates the Δ abs (T1-T2 absorbance difference) for the sample and multiplies it by the factor to get the result. The factor is computed by running a standard prior to running the sample, or may be entered directly by the operator.

$$\text{Factor} = \frac{\text{Concentration of Standared}}{(\text{T1} - \text{T2})\ \Delta\ \text{Absorbance of Std.}}$$

The sample result is obtained from the following equation :

$$\text{Test result} = (\Delta\ \text{Abs of Test}) \times \text{Factor}$$

Kinetic Chemistry

When a kinetic chemistry is being run, the RA-25 measures the change in absorbance of the test solution in the cuvette at a fixed interval of time according to programmed parameters. The result is calculated by multiplying the rate of change of absorbance per minute by the preprogrammed factor. The enzyme activity is reported in U/L.

$$\text{Enzyme activity (U/L)} = \text{Average } \Delta \text{ Absorbance/minute} \times \text{Factor}$$

The factor is provided in the reagent kit insert and is derived as follows :

$$\text{Factor} = \frac{\text{TV} \times 10^6}{\text{SV} \times \text{EC} \times \text{LP}}$$

Where :

TV is the total volume, in mL of reagent and sample in the reaction.

SV is the sample volume in mL.

EC is the molar extinction coefficient for the reaction compound at the wavelength being measured.

LP is the light path in centimeters.

10^6 is the conversion factor incorporating conversion of millimoles of substrate to micromoles, and millilitres of serum to litres.

Test Directory

Names of the Chemistry Tests Available for Programming

Program Code	Chemistry	Program Code	Chemistry
01	ACPH	02	ALB
03	ALKP	04	ALT
05	AMYL	06	AST
07	BUN	08	CAL
09	CHE	10	CHOL
11	CKMB	12	Cl
13	CPK	14	CRTN
15	DBIL	16	DGOX
17	FSH	18	GGTP
19	GLUC	20	HBDH
21	HDL	22	HGB
23	IgA	24	IgG
25	IgM	26	K
27	LDH	28	LH
29	MAG	30	Na
31	PHOS	32	PRL
33	T3	34	T4
35	TBIL	36	THEO
37	TPR	38	TRIG
39	TSH	40	UREA
41	URIC	42	OP1
43	OP2	44	OP3
45	OP4	46	OP5
47	OP6	48	OP7
49	OP8	50	OP9

General Instructions for Use

1. See the appropriate reagent kit insert for reconstitution of reagents/preparation of daily working solutions and other details.

2. Use clean, dry, and seamless cuvettes for carrying out test procedure.

3. Use reliable quality micropipettes to dispense samples and reagents when performing the tests. Follow test procedures for reading on the RA-25.

4. Wipe the outer surface of the cuvette with tissue paper to remove finger marks, before inserting into cuvette well for taking a reading.

5. Gently push the cuvette into the well by holding it from the top. Insert until resistance is felt and a beep is sounded. This beep signals the activation of reading.

6. If repeat reading is required, press the 掮ead?key. Do not lift cuvette from the cuvette well and insert again.

7. In case of power failure, the RA-25 automatically switches over to battery mode. The display will show a blinking B in the right corner. In case of power failure during a fixed time or kinetic chemistry, the analyzer will complete the test in process and report the result.

   In battery mode, only endpoint chemistries can be performed.

8. At the end of the day, switch off the RA-25, clean the outer surface of the instrument and cover with dust cover.

9. It is recommended to calibrate the instrument with a standard in each batch of endpoint and fixed time tests.

5 Analyzing Samples

Endpoint Chemistry Using Standard (Example: Glucose) 5-2

Precalibrated Endpoint Chemistry Using Old Factor (Example: Glucose) 5-3

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Endpoint Chemistry Using Factor and Sample Blank (Example: D. Bilirubin) 5-8

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Endpoint Chemistry Using Standard (Example: Glucose)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 1 Yes ENTER
01 : GLUC EP WL 505 STD 100	Select 505 filter and press ENTER
01 : GLUC EP Insert BLANK	Insert cuvette containing reagent into the cuvette well.
01 : GLUC EP Blanking	RA-25 sets to zero.
01 : GLUC EP Insert STD	Insert cuvette containing reacted solution of standard into the cuvette well.
01 : GLUC EP Calibration	RA-25 performs calibration.
01 : GLUC EP FT 0.280	Press ENTER. The printer prints test parameters with factor.
01 : GLUC EP Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
01 : GLUC EP Sampling	RA-25 takes reading.
01 : GLUC EP mg/dL 87	The result is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Precalibrated Endpoint Chemistry Using Old Factor (Example: Glucose)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 1 Yes ENTER
01 : GLUC EP WL 505 STD 100	Select 505 filter and press ENTER
01 : GLUC EP Calib (Y/N)	Press 0 No. The printer prints the test parameters.
01 : GLUC EP Insert BLANK	Insert cuvette containing reagent into the cuvette well.
01 : GLUC EP Blanking	RA-25 sets to zero.
01 : GLUC EP Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
01 : GLUC EP Sampling	RA-25 takes reading.
01 : GLUC EP mg/dL 95	The result is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Fixed Time Chemistry Using Standard (Example: BUN)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 4 ENTER
04 : BUN FXT WL 340 TEMP OK	Select 340 filter and press ENTER
04 : BUN FXT Insert BLANK	Insert cuvette containing distilled water into the cuvette well
04 : BUN FXT Blanking	RA-25 sets to zero.
04 : BUN FXT Insert STD	Insert cuvette containing solution of standard into the cuvette well.
04 : BUN FXT DLY 30 DT 60	The countdown of the delay time is displayed and started and then the first absorbance reading is taken. The second absorbance reading is taken at the end of the Delta Time (DT). The factor is then calculated and stored in the memory.
04 : BUN FXT FT 3.000	Press ENTER. The printer prints the test parameters along with factor.
04 : BUN FXT Insert SAMPLE	Insert cuvette containing solution of sample into the cuvette well.
04 : BUN FXT DLY 30 DT60	The countdown for the delay and Delta Times is displayed.
04 : BUN 1.410 mg/dL 15	The result is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Precalibrated Fixed Time Chemistry Using Old Factor (Example: BUN)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 4 ENTER
04 : BUN FXT WL 340 TEMP OK	Select 340 filter and press ENTER
04 : BUN FXT Calib (Y/N)	Press 0 No. The printer prints the test parameter.
04 : BUN FXT Insert BLANK	Insert cuvette containing distilled water into the cuvette well
04 : BUN FXT Blanking	RA-25 sets to zero.
04 : BUN FXT Insert SAMPLE	Insert cuvette containing solution of sample into the cuvette well.
04 : BUN FXT DLY 30 DT 60	The countdowns for the delay and Delta Times are displayed.
04 : BUN 1.410 mg/dL 15	The result is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Kinetic Chemistry (Example: ALT)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 1 Yes 2 ENTER
12 : ALT KIN WL 340 TEMP OK	Select 340 filter and press ENTER. The printer prints the test parameters.
12 : ALT KIN Insert BLANK	Insert cuvette containing distilled water into the cuvette well.
12 : ALT KIN Blanking	RA-25 sets to zero.
12 : ALT KIN Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
12 : ALT KIN DLY 60 DT 45	The countdown of the delay time is displayed and started and the initial absorbance is recorded. Then the countdown of the Delta Times (interval) is started for all 4 readings.
U/L100 1.100	At the end, the final result is displayed along with the initial absorbance (IA). The printer prints the final result, initial absorbance and 4 deltas.
	Note : Press 1 Yes to display all the 4 delta readings on LCD.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Bichromatic Endpoint Chemistry Using Factor (Example: T. Bilirubin)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 2 5 ENTER
25: TBIL EP WL 546 WL2 630	Press ENTER. The printer prints the test parameters.
SETWL= 546 Insert BLANK	Select 546 filter and insert cuvette containing distilled water into the cuvette well.
SETWL= 546 Blanking	RA-25 sets to zero at 546 nm wavelength.
SET WL2 = 630 Insert BLANK	Select 630 filter and press Read
SET WL2 = 630 Blanking	RA-25 sets to zero at 630 nm wavelength.
SET WL2 = 630 Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
SET WL2 = 630 Sampling	RA-25 takes reading.
SET WL= 546 Insert SAMPLE	Select 546 filter and press Read
SET WL= 546 Sampling	RA-25 takes reading.
SET WL= 546 mg/dL1.2	The result is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Endpoint Chemistry Using Factor and Sample Blank (Example: D. Bilirubin)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 2, 1 Yes, ENTER
21 : DBIL EPSB WL 546 FT 0.263	Press ENTER. The printer prints the test parameters.
21 : DBIL EPSB Insert BLANK	Insert cuvette containing distilled water into the cuvette well.
21 : DBIL EPSB Blanking	RA-25 sets to zero.
21 : DBIL EPSB Insert SMPL BLK	Insert cuvette containing sample blank into the cuvette well.
Blanking	RA-25 takes reading.
Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
Sampling	RA-25 takes reading.
Mg/dL 0.2 Insert SMPL BLK	The result is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Multipoint Chemistry with Calibrators (Example: T3)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 2 2 ENTER
22 : T3 EP WL 405 MLT PT	Select 405 filter and press ENTER
22 : T3 EP Insert BLANK	Insert cuvette containing reagent into the cuvette well.
22 : T3 EP Blanking	RA-25 sets to zero.
22 : T3 EP Insert STD1	Insert cuvette containing reacted solution of STD 1 into the cuvette well.
22 : T3 EP Calibration	RA-25 performs calibration.
22 : T3 EP ABS1 = 1.084	Press ENTER

Likewise the RA-25 will provide instructions to read standards (as per programmed parameters) and to store the absorbances in the memory. On completion of calibration, the printer prints the test parameter along with absorbances of all standards.

22 : T3 EP Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
Sampling	RA-25 takes reading.
ABS = 0.200 7.3 ng/mL	The test result along with the absorbance is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Multipoint Chemistry Using Standard Curve from Memory (Example: T3)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 2 2 ENTER
22 : T3 EP WL 405 MLT PT	Select 405 filter and press ENTER
22 : T3 EP Calib (Y/N) ?	Press 0 No. The printer prints the test parameters.
22 : T3 EP Insert BLANK	Insert cuvette containing reagent into the cuvette well.
22 : T3 EP Blanking	RA-25 sets to zero.
22 : T3 EP Insert SAMPLE	Insert cuvette containing reacted solution of sample into the cuvette well.
Sampling	RA-25 takes reading.
ABS = 0.200 7.3 ng/mL	The test result along with the absorbance is displayed and printed.

Subsequent samples can be read as mentioned above. At the end of the test run, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

6 Programming the Tests

Programming the Test Parameters 6-2

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Programming the Test Parameters

The open programs can be programmed for any chemistry tests which are not available in the test directory. All the test parameters of the existing programs can be accessed through **PGM. CODE <99>** to suit the requirement.

The following are the options available for each parameter:

Parameters	Available Options
Mode	1 = EP 2 = KIN 3 = FXT
Units	1. U/L
	2. U/mL
	3. 礦/mL
	4. mEq/L
	5. M/L
	6. mmo/L
	7. 衯o/L
	8. ng/mL
	9. %
	10. g/L
	11. mg/dL
	12. 礸/dL
	13. g/dL
	14. 礸/mL
	15. mg/L
Factor EP & FXT	0.001-9.999
Factor Kinetic	0001-9999
Standard Concentration	1-999
	0-999 (for Multipoint)
Interval Time (DT)	25-900 sec
Delay Time (DLY)	2-120 sec
Wavelength	340, 405, 505, 546, 630 nm

Programming Endpoint Chemistry (Example: Glucose)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 1 Yes 9 ENTER To see test menu on display, press List and then press Stop
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 1 Yes ENTER
Insert WL < > 340 405 505 546	Press 5 0 5 ENTER To see the next available wavelength on display, press List
UNITS < > 1 = U/L 2 = U/mL 3 = µU/mL	Press 1 Yes 1 Yes ENTER To see the next available units on display, press List
MLT PT (Y/N) ?	Press 0 No
Standard (Y/N) ?	Press 1 Yes
STD value < >	Press 1 Yes 0 No 0 No ENTER
Linearity Limit < >	Press 5 0 No 0 No ENTER
Store (Y/N) ?	Press 1 Yes

Programming Endpoint Chemistry (Example: Glucose)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 1 Yes 9 ENTER To see test menu on display, press List and then press Stop
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 1 Yes ENTER
Insert WL < > 340 405 505 546	Press 5 0 5 ENTER To see the next available wavelength on display, List 1 Yes 1 Yes ENTER List 0 No 1 Yes 1 Yes 0 No 0 No ENTER 5 0 No 0 No ENTER 1 Yes

press List

UNITS < > 1 = U/L **2 = U/mL 3 = μU/mL**

Press 1 Yes, 1 Yes, ENTER

To see the next available units on display, press List

MLT PT (Y/N) ?

Press 0 No

1 Yes

1 Yes, 0 No, 0 No, ENTER

5, 0 No, 0 No, ENTER

1 Yes

press List

UNITS < > 1 = U/L **2 = U/mL 3 = μU/mL**

Press 1 Yes, 1 Yes, ENTER

To see the next available units on display, press List

MLT PT (Y/N) ?

Press 0 No

1 Yes

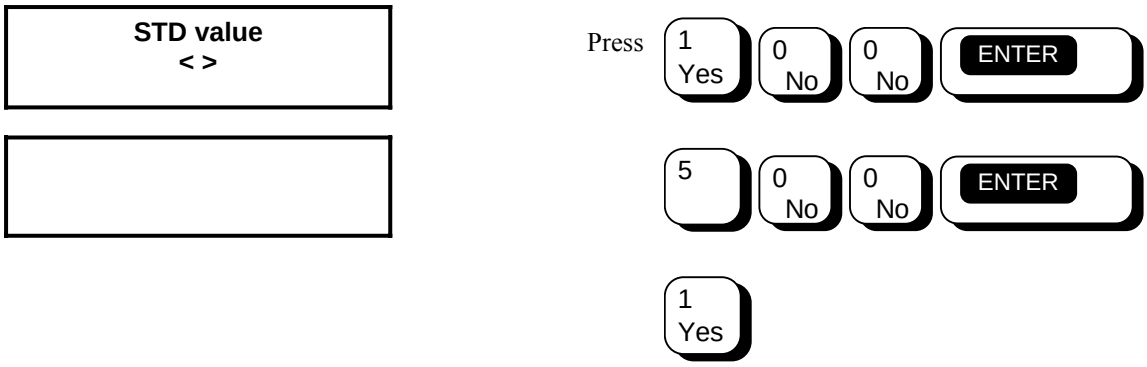
1 Yes, 0 No, 0 No, ENTER

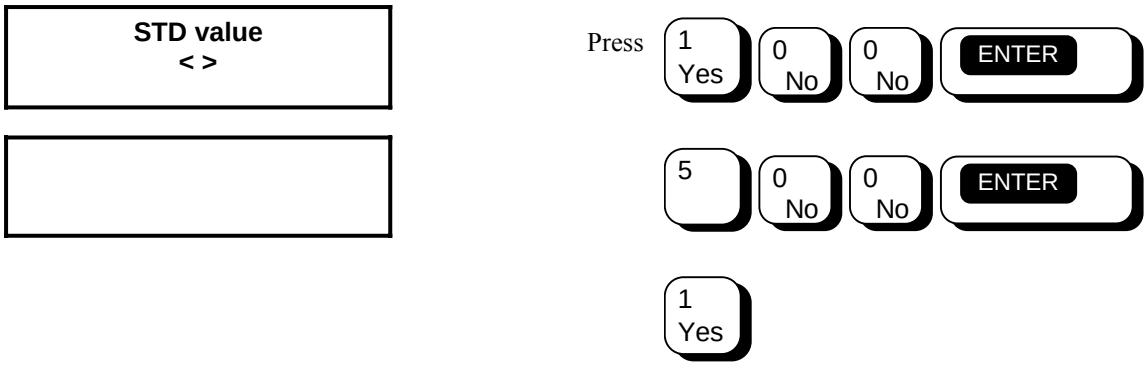
5, 0 No, 0 No, ENTER

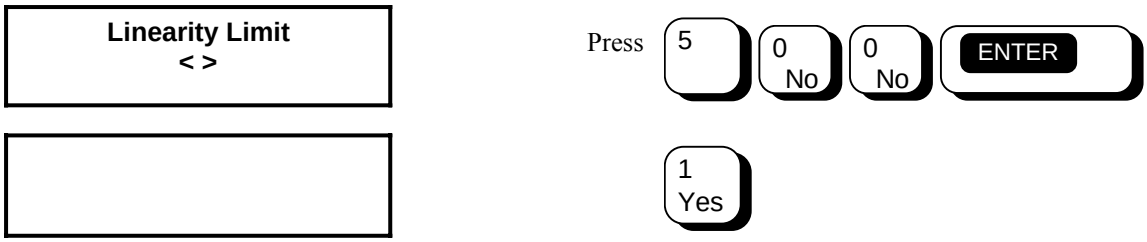
1 Yes

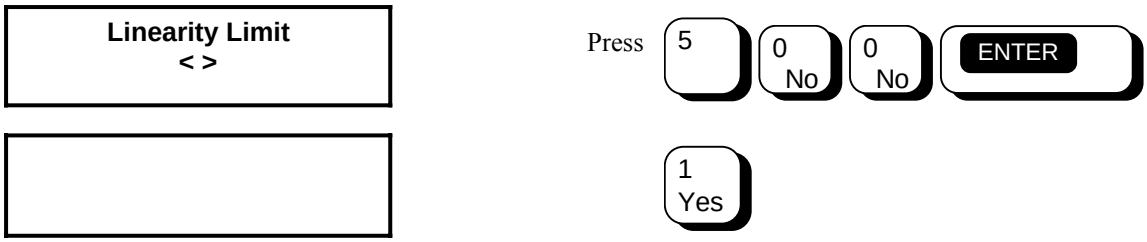
Standard (Y/N) ?	Press 1 Yes
	1 Yes 0 No 0 No ENTER
	5 0 No 0 No ENTER
	1 Yes

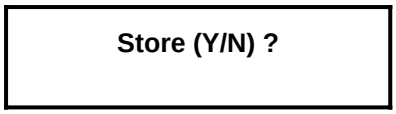
Standard (Y/N) ?	Press 1 Yes
	1 Yes 0 No 0 No ENTER
	5 0 No 0 No ENTER
	1 Yes


STD value
< >
Press
1
Yes
0
No
0
No
ENTER
5
0
No
0
No
ENTER
1
Yes


STD value
< >
Press
1
Yes
0
No
0
No
ENTER
5
0
No
0
No
ENTER
1
Yes


Linearity Limit
< >
Press
5
0
No
0
No
ENTER
1
Yes


Linearity Limit
< >
Press
5
0
No
0
No
ENTER
1
Yes



Press 1 Yes

Press 1 Yes ENTER

The program is stored in memory.

Store (Y/N) ?	Press 1 Yes
	1 Yes ENTER

CODE program **< >**	Press 1 Yes ENTER
Program 1 **STORING**	The program is stored in memory.

Prompts on Display	What You Do / Response of RA-25
01 : GLUC EP **WL 505 STD 100**	

At the end of the test programming, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Programming Fixed Time Chemistry (Example: BUN)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 7 ENTER To see test menu on display, press List and then press Stop
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 3 ENTER
Insert WL < > 340 405 505 546	Press 3 4 0 No ENTER To see the next available wavelength on display, press List
UNITS < > 1 = U/L 2 = U/mL 3 = µU/mL	Press 1 Yes 1 Yes ENTER To see the next available units on display, press List
Insert DLY < > Range 2-120 sec	Press 3 0 No ENTER
Insert DT < > Range 25-900 sec	Press 6 0 No ENTER
Standard (Y/N) ?	Press 1 Yes ENTER
STD value < >	Press 2 0 No ENTER
Linearity Limit < >	Press 1 Yes 4 0 No ENTER

Programming Fixed Time Chemistry (Example: BUN)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 7 ENTER To see test menu on display, press List and then press Stop
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 3 ENTER
Insert WL < > 340 405 505 546	Press 3 4 0 No ENTER To see the next available wavelength on display, press List 1 Yes 1 Yes ENTER List 3 0 No ENTER 6 0 No ENTER 1 Yes ENTER 2 0 No ENTER 1 Yes 4 0 No ENTER

List

UNITS < > 1 = U/L
2 = U/mL 3 = μU/mL

Press 1 Yes 1 Yes ENTER

To see the next available units on display, press

List

Insert DLY < >
Range 2-120 sec

Press 3 0 No ENTER

6 0 No ENTER

1 Yes ENTER

2 0 No ENTER

1 Yes 4 0 No ENTER

List

UNITS < > 1 = U/L
2 = U/mL 3 = μU/mL

Press 1 Yes 1 Yes ENTER

To see the next available units on display, press

List

Insert DLY < >
Range 2-120 sec

Press 3 0 No ENTER

6 0 No ENTER

1 Yes ENTER

2 0 No ENTER

1 Yes 4 0 No ENTER

Insert DT < > **Range 25-900 sec**	Press 6 → 0 No → ENTER
	1 Yes → ENTER
	2 → 0 No → ENTER
	1 Yes → 4 → 0 No → ENTER

Insert DT < > **Range 25-900 sec**

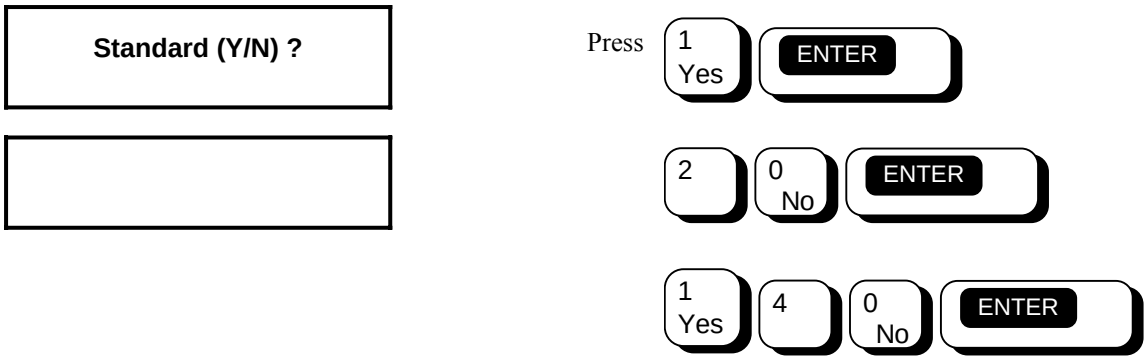
Press 6 0 No ENTER

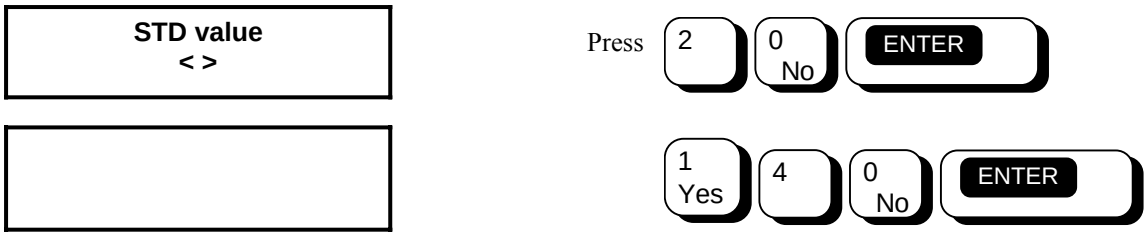
1 Yes ENTER

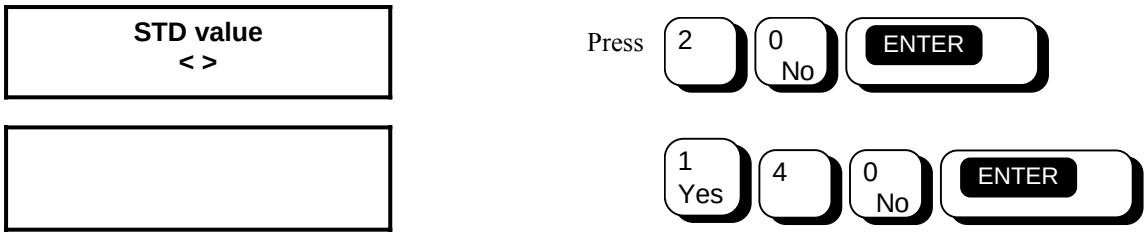
2 0 No ENTER

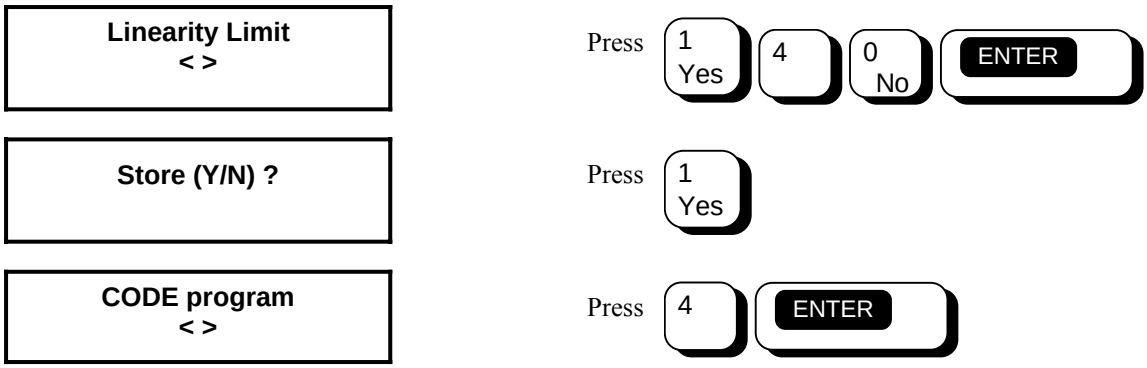
1 Yes 4 0 No ENTER

Standard (Y/N) ?	Press 1 Yes ENTER
	2 0 No ENTER
	1 Yes 4 0 No ENTER


Standard (Y/N) ?
Press
1
Yes
ENTER
2
0
No
ENTER
1
Yes
4
0
No
ENTER


STD value
< >
Press
2
0
No
ENTER
1
Yes
4
0
No
ENTER


STD value
< >
Press
2
0
No
ENTER
1
Yes
4
0
No
ENTER


Linearity Limit
< >
Press
1
Yes
4
0
No
ENTER
Store (Y/N) ?
Press
1
Yes
CODE program
< >
Press
4
ENTER

Linearity Limit **< >**	Press 1 Yes, 4, 0 No, ENTER
	1 Yes
	4, ENTER

Store (Y/N) ?	Press 1 Yes
	4 ENTER

Store (Y/N) ?	Press 1 Yes
	4 ENTER

CODE program < >

Press 

Prompts on Display	What You Do / Response of RA-25
Program 4 **STORING**	The program is stored in memory.
04 : BUN FXT **WL 340 TEMP OK**	

At the end of the test programming, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Programming Kinetic Chemistry (Example: AST)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 6 ENTER To see test menu on display, press List and then press Stop
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 2 ENTER
Insert WL < > 340 405 505 546	Press 3 4 0 No ENTER To see the next available wavelength on display, press ENTER
UNITS < > 1 = U/L 2 = U/mL 3 = μU/mL	Press 1 Yes ENTER To see the next available units on display, press List
Insert DLY < > Range 2-120 sec	Press 6 0 No ENTER
Insert DT < > Range 25-900 sec	Press 4 5 ENTER
FACTOR value < >	Press 1 Yes 7 4 6 ENTER
Linearity Limit < >	Press 2 6 0 No ENTER
Store (Y/N) ?	Press 1 Yes

CODE program **< >**

Press 

Program 13 **STORING**

The program is stored in memory.

Prompts on Display	What You Do / Response of RA-25
13 : AST KIN **WL 340 TEMP OK**	

At the end of the test programming, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

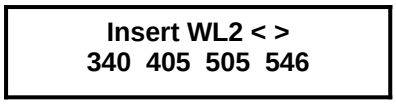
Bichromatic Mode (Explanation)

There is a provision in RA-25 to program, store and run tests in bichromatic mode.

- Test location number 25 is reserved for the programming and permanent storage of a bichromatic test.
- Bilirubin, which is run in bichromatic mode, has been used to illustrate a detailed programming procedure.

Programming Bichromatic (Endpoint) Chemistry with Factor (Example: T. Bilirubin)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 3 5 ENTER
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 1 Yes ENTER
Insert WL < > 340 405 505 546	Press 5 4 6 ENTER To see the next available wavelength on display, press List
UNITS < > 1 = U/L 2 = U/mL 3 = µU/mL	Press 1 Yes 1 Yes ENTER To see the next available units on display, press List
MLT PT (Y/N) ?	Press 0 No
Standard (Y/N) ?	Press 0 No
FACTOR value < >	Press 0 No • 2 6 3 ENTER
Linearity Limit < >	Press 2 0 No ENTER
Store (Y/N) ?	Press 1 Yes
CODE program < >	Press 2 5 ENTER



Press 6 3 0 No ENTER

To see the next available wavelength on display, press List

Prompts on Display	What You Do / Response of RA-25
Program 25 **STORING**	The program is stored in memory.
25 : TBIL EP **WL 546 WL2 630**	

At the end of the test programming, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Endpoint with Sample Blank Mode (Explanation)

There is a provision in RA-25 to run a test in endpoint with sample blank mode.

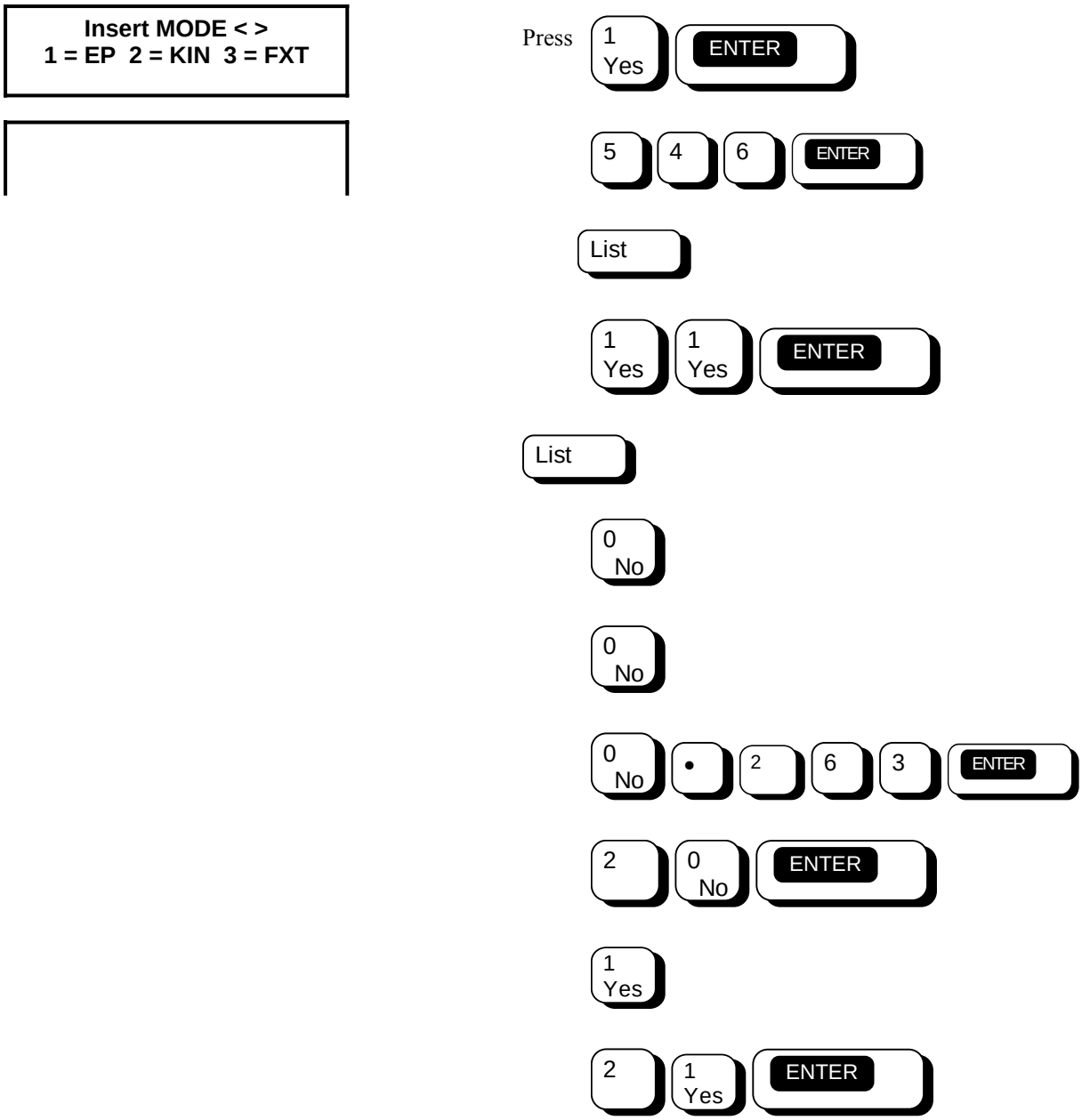
- Test location numbers 20 and 21 can be used for this purpose.
- If desired, these locations can also be used to store programs for fixed time and kinetic chemistries.
- The bilirubin test has been used to illustrate a detailed programming procedure.

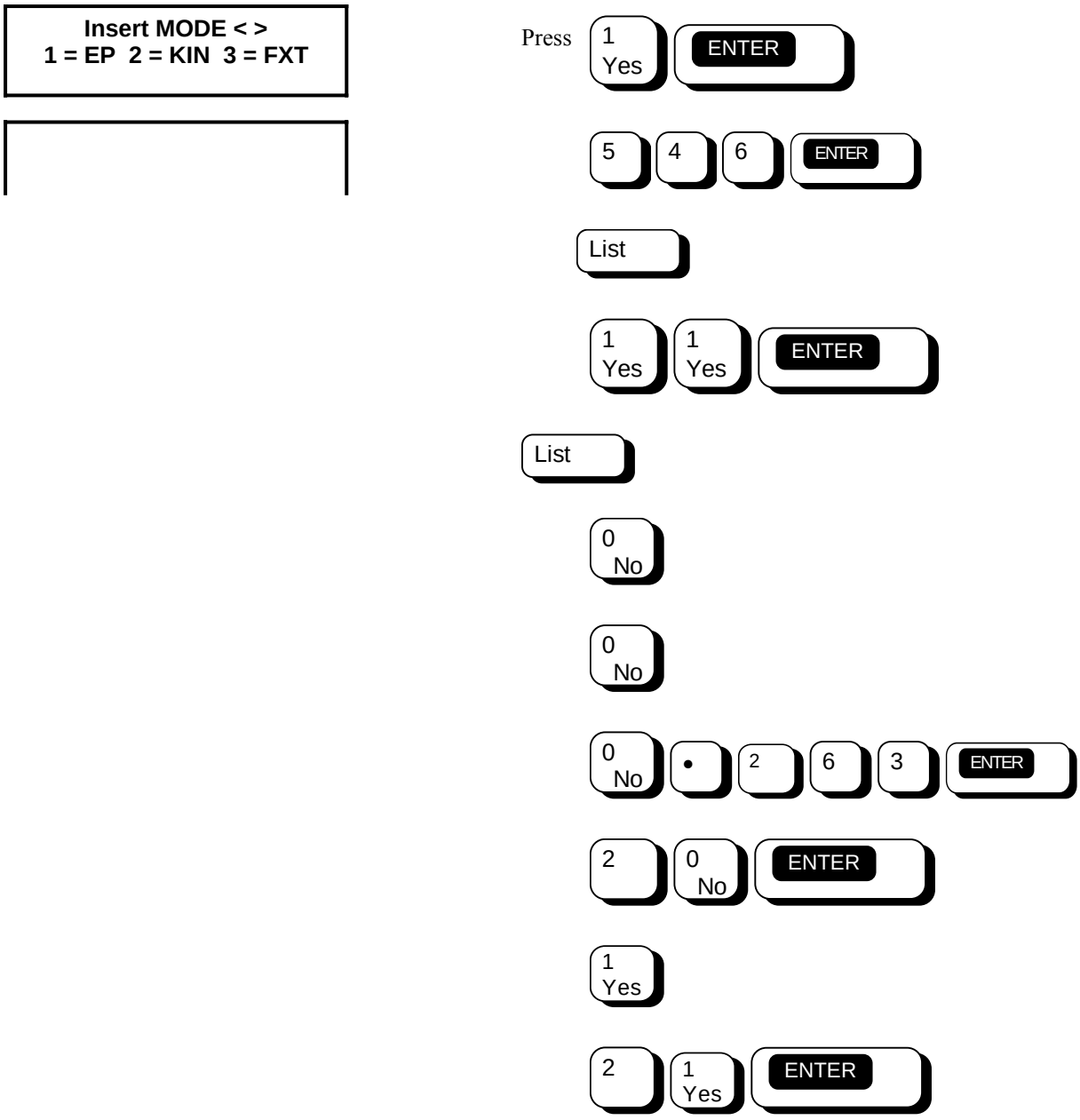
Programming Endpoint Chemistry with Factor and Sample Blank (Example: D. Bilirubin)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 1 Yes 5 ENTER
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 1 Yes ENTER
Insert WL < > 340 405 505 546	Press 5 4 6 ENTER To see the next available wavelength on display, press List
UNITS < > 1 = U/L 2 = U/mL 3 = μU/mL	Press 1 Yes 1 Yes ENTER To see the next available units on display, press List
MLT PT (Y/N) ?	Press 0 No
Standard (Y/N) ?	Press 0 No
FACTOR value < >	Press 0 No • 2 6 3 ENTER
Linearity Limit < >	Press 2 0 No ENTER
Store (Y/N) ?	Press 1 Yes
CODE program < >	Press 2 1 Yes ENTER
PGM. FOR SAMPLE	

Programming Endpoint Chemistry with Factor and Sample Blank (Example: D. Bilirubin)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 1 Yes 5 ENTER
	1 Yes ENTER
	5 4 6 ENTER
	List
	1 Yes 1 Yes ENTER
	List
	0 No
	0 No
	0 No • 2 6 3 ENTER
	2 0 No ENTER
	1 Yes
	2 1 Yes ENTER


Insert MODE < >
1 = EP 2 = KIN 3 = FXT
Press
1 Yes
ENTER
5
4
6
ENTER
List
1 Yes
1 Yes
ENTER
List
0 No
0 No
0 No
•
2
6
3
ENTER
2
0 No
ENTER
1 Yes
2
1 Yes
ENTER


Insert MODE < >
1 = EP 2 = KIN 3 = FXT
Press
1 Yes
ENTER
5
4
6
ENTER
List
1 Yes
1 Yes
ENTER
List
0 No
0 No
0 No
•
2
6
3
ENTER
2
0 No
ENTER
1 Yes
2
1 Yes
ENTER

Insert WL < >
340 405 505 546

Press 5 4 6 ENTER

To see the next available wavelength on display,

List

1 Yes 1 Yes ENTER

List

0 No

0 No

0 No • 2 6 3 ENTER

2 0 No ENTER

1 Yes

2 1 Yes ENTER

Insert WL < >
340 405 505 546

Press 5 4 6 ENTER

To see the next available wavelength on display,

List

1 Yes 1 Yes ENTER

List

0 No

0 No

0 No • 2 6 3 ENTER

2 0 No ENTER

1 Yes

2 1 Yes ENTER

press List

1 Yes 1 Yes ENTER

List

0 No

0 No

0 No • 2 6 3 ENTER

2 0 No ENTER

1 Yes

2 1 Yes ENTER

press List

1 Yes 1 Yes ENTER

List

0 No

0 No

0 No • 2 6 3 ENTER

2 0 No ENTER

1 Yes

2 1 Yes ENTER

UNITS < > 1 = U/L
2 = U/mL 3 = µU/mL

Press 1 Yes, 1 Yes, ENTER

To see the next available units on display, press List

0 No

0 No

0 No, •, 2, 6, 3, ENTER

2, 0 No, ENTER

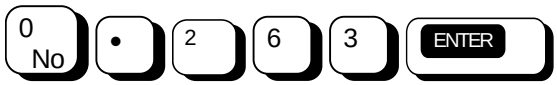
1 Yes

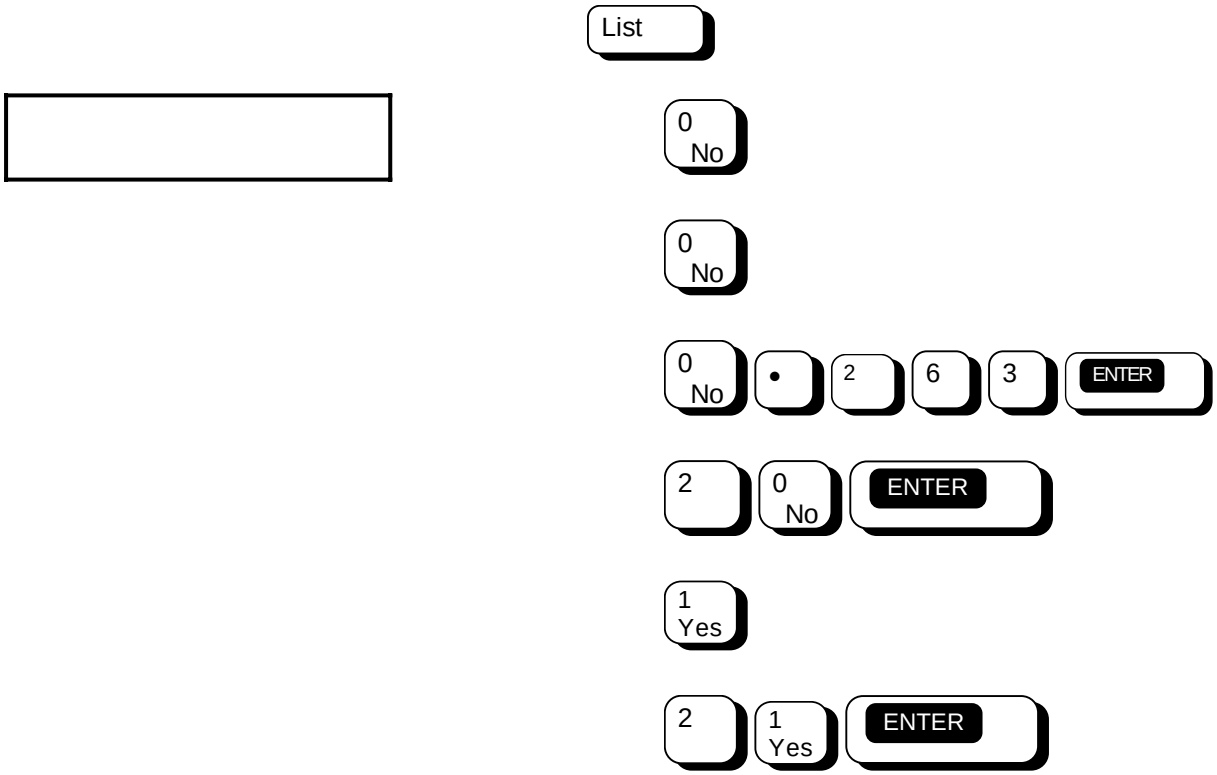
2, 1 Yes, ENTER

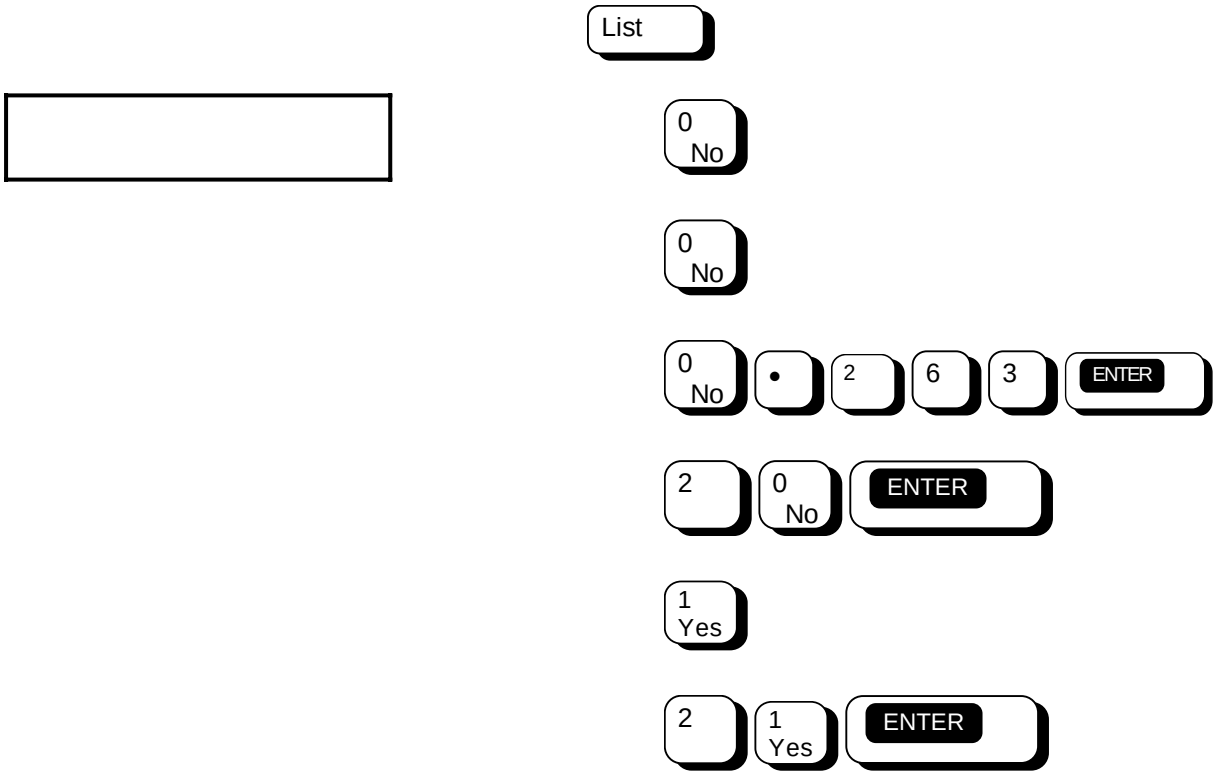
UNITS < > 1 = U/L
2 = U/mL 3 = µU/mL

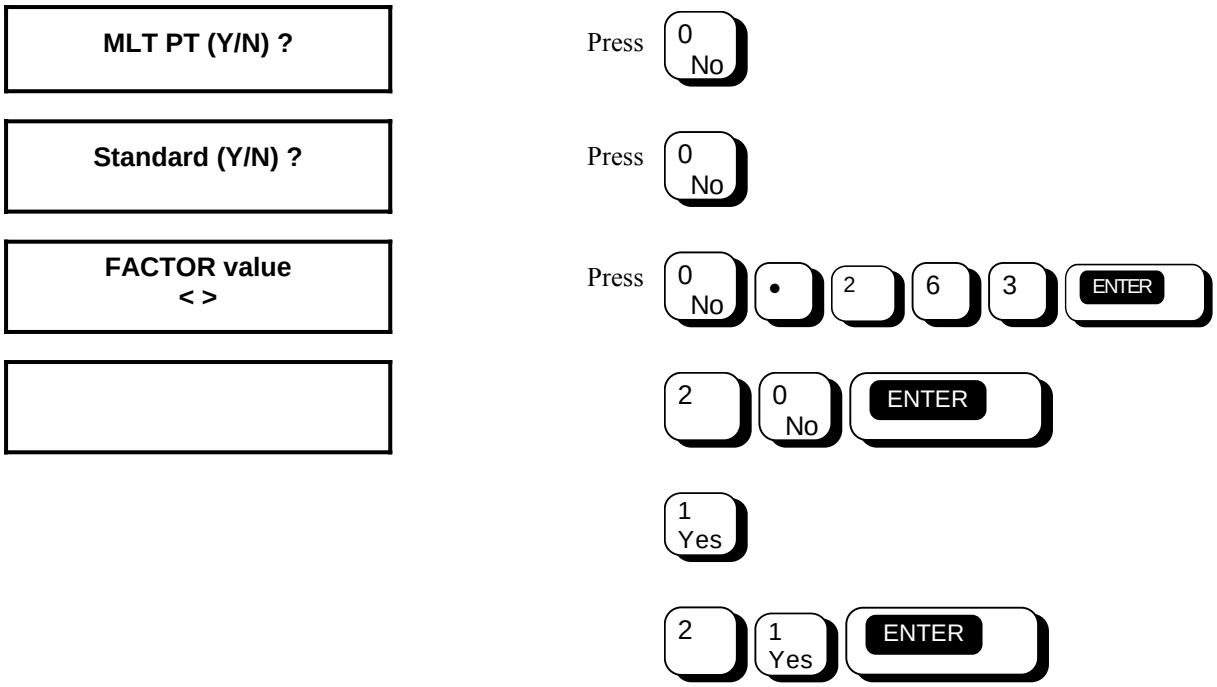
Press 

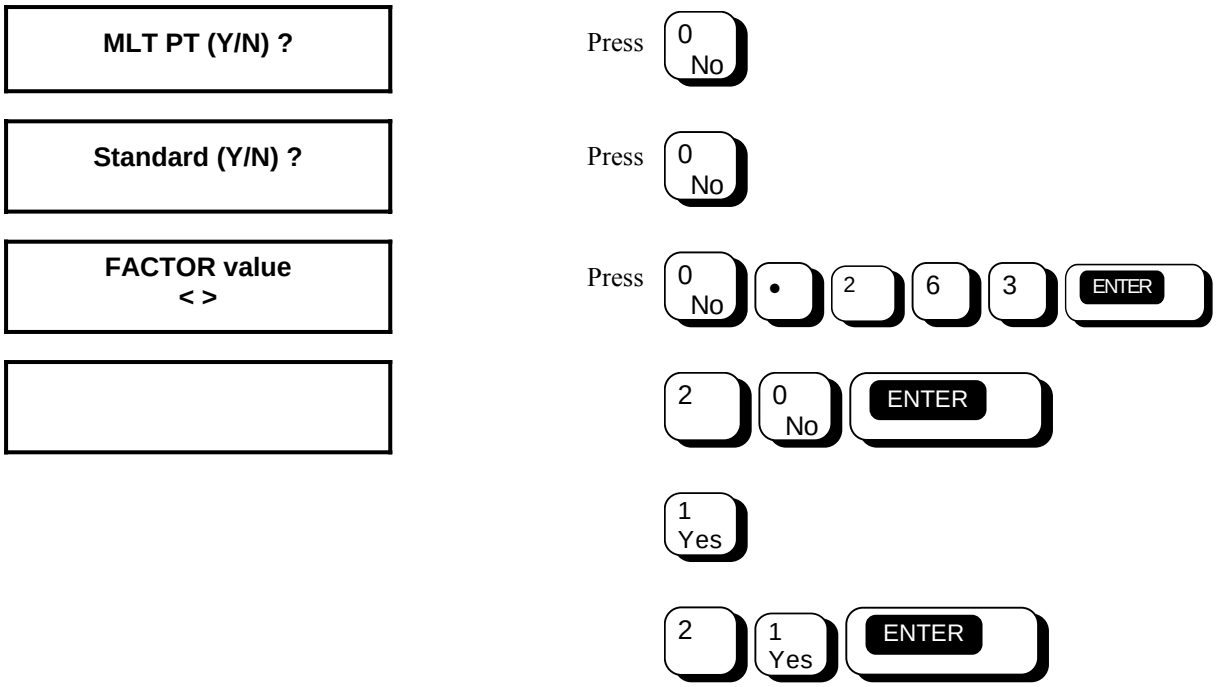
To see the next available units on display, press



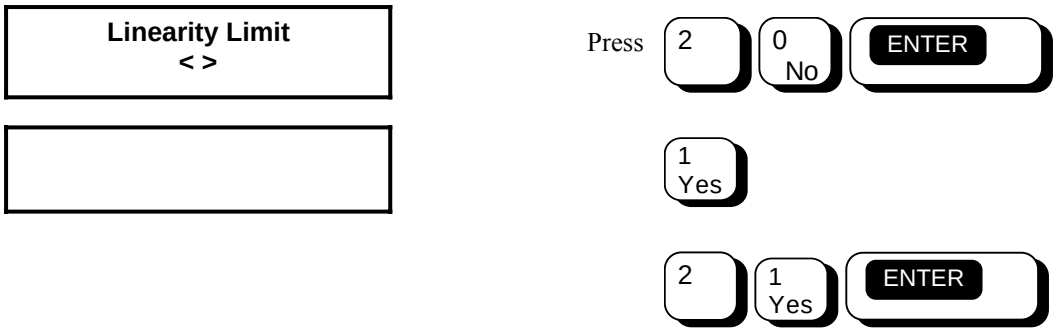

List
0 No
0 No
0 No
•
2
6
3
ENTER
2
0 No
ENTER
1 Yes
2
1 Yes
ENTER


List
0 No
0 No
0 No
•
2
6
3
ENTER
2
0 No
ENTER
1 Yes
2
1 Yes
ENTER

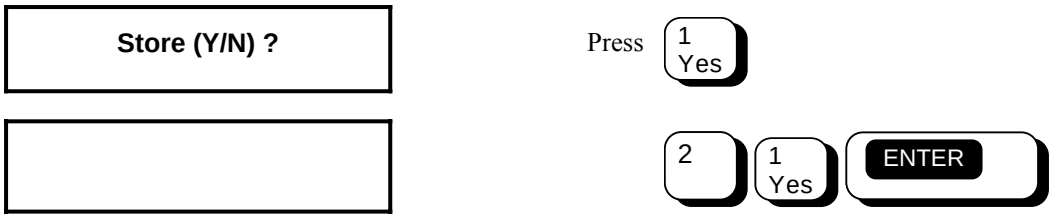

MLT PT (Y/N) ?
Press
0 No
Standard (Y/N) ?
Press
0 No
FACTOR value
< >
Press
0 No
•
2
6
3
ENTER
2
0 No
ENTER
1 Yes
2
1 Yes
ENTER


MLT PT (Y/N) ?
Press
0 No
Standard (Y/N) ?
Press
0 No
FACTOR value
< >
Press
0 No
•
2
6
3
ENTER
2
0 No
ENTER
1 Yes
2
1 Yes
ENTER

Linearity Limit **< >**	Press 2 → 0 No → ENTER
	1 Yes
	2 → 1 Yes → ENTER


Linearity Limit
< >
Press
2
0
No
ENTER
1
Yes
2
1
Yes
ENTER

Store (Y/N) ?	Press 1 Yes
	2 1 Yes ENTER


Store (Y/N) ?
Press
1
Yes
2
1
Yes
ENTER

CODE program **< >**	Press 2 1 Yes ENTER
PGM. FOR SAMPLE **BLANK METHOD**	
Program 21 **STORING**	The program is stored in memory.

Prompts on Display	What You Do / Response of RA-25
21 : DBIL EPSB **WL 546 FT 0. 263**	

At the end of the test programming, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

Multipoint Chemistry Methods

Generally hormone level determinations and drug level determinations are based on ELISA/EIA methods and Immunoturbidimetric methods which involve plotting of multistandard curves since these are non-linear methods. The final result of an unknown sample is calculated from the standard curve. The RA-25 has the following facilities for these specialized chemistries:

- Test location numbers 22 to 24 are reserved for the permanent storage of any multistandard chemistry.
- The readings of up to 6 standards can be stored in the memory.
- The calibration curve is stored in the memory and may be used for the subsequent test runs.

Programming Multipoint (Endpoint) Chemistry (Example: T3)

Prompts on Display	What You Do / Response of RA-25
Insert PGM. CODE < >	Press 9 9 ENTER
NAME test < >	Press 3 3 ENTER
Insert MODE < > 1 = EP 2 = KIN 3 = FXT	Press 1 Yes ENTER
Insert WL < > 340 405 505 546	Press 4 0 No 5 ENTER To see the next available wavelength on display, press List
UNITS < > 1 = U/L 2 = U/mL 3 = 礦/mL	Press 8 ENTER To see the next available units on display, press List
MLT PT (Y/N) ?	Press 1 Yes
CODE program < >	Press 2 2 ENTER
IMP! FOR STD VAL ENTRY SEE MANUAL	Press ENTER to insert (0-3) digits after decimal point uniformly for all standard values.
STD 1 value < >	Press keys representing the value of standard #1 with appropriate decimal position and then press ENTER
STD 2 value < >	Press keys representing the value of standard #2 with the decimal position same as for standard #1 and then press ENTER

Similarly enter the concentrations of all the remaining standards with

same number of decimal positions as in standards 1 and 2 and press

If the test requires less then 6 standards, then at the end of the last standard entry, press 

Prompts on Display	What You Do / Response of RA-25
Program 22 **STORING**	The program is stored in memory.
22 : T3 EP **WL 405 MLT PT**	

At the end of the test programming, press Stop. The prompt **Insert PGM. CODE < >** is displayed.

7 Instrument Care, Maintenance and Minor Repair

Instrument Care ***7-2***

Maintenance ***7-3***

Cleaning the Cuvette Well *7-3*

Minor Repair ***7-4***

Replacing Fuse *7-4*

Replacing Printer Paper *7-4*

Instrument Care

The RA-25 instrument contains sensitive electronics and optics.

- Handle the instrument with extreme care.
- Do not operate the instrument in direct sunlight.
- Do not operate the instrument in extreme high temperatures and high humidity.
- Do not operate instrument where the power supply is unstable.
- Ensure that the operating environment is dust-free, the temperature is between. 18 and 32癈 and the relative humidity at 30癈 is 85 %.

Maintenance

External cleaning of the instrument should be carried out daily at the end of the day or as and when required. The following procedure is to be followed for cleaning the instrument:

1. Switch off the instrument.

2. Clean the exterior of the instrument with a lint-free cloth dampened with water. Be careful so as to prevent water from dripping into the cuvette well/wavelength selector/incubator block area.

3. Dry the instrument with a lint-free cloth.

Cleaning the Cuvette Well

Whenever dust particles are observed inside the cuvette well, carryout the following procedure for cleaning:

1. Switch off the instrument.

2. Blow air or use mild vacuum to clean.

Minor Repair

You can replace the fuse and the printer paper.

Replacing Fuse

1. Switch off the instrument.
2. Remove the fuse holder by rotating it counterclockwise.
3. Remove the old fuse from the fuse holder and insert a new 1 A fuse (Code No. 9084).
4. Replace the fuse holder by rotating it clockwise.
5. Switch on the instrument and confirm that it is working.

Replacing Printer Paper

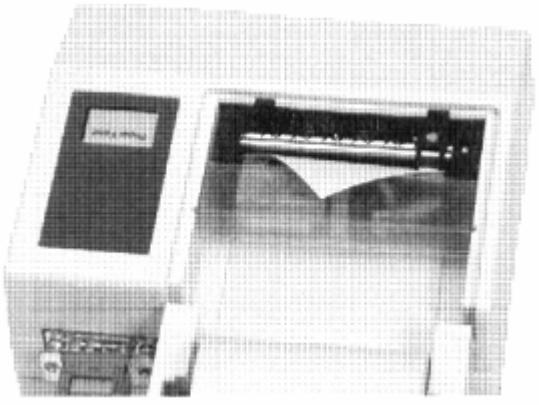
Paper Type: Thermal, 56 mm width

Code No.: 9071

1. Switch off the instrument and the printer.
2. Remove the printer cover by applying light inward pressure to its back panel and then pull it upward to detach and remove.
3. Remove spindle from paper roll holder and discard the empty paper roll core.

   NOTE: If paper remains on roll and in printer; tear the paper at a point before it enters the printer. Then, pull remaining piece of paper **forward** through the printer. Pulling the paper backward may damage the printer.
4. Using scissors, cut the corners off the leading edge of the new roll of paper.
5. Insert the spindle into the roll of paper; then insert spindle and new paper roll into the paper roll holder.

   IMPORTANT: Paper should feed from bottom of roll.
6. Insert the leading edge of the paper into the slot meant for the insertion.



NOTE: To avoid uneven paper-feeding, make sure the paper is tightly wound.

7. Switch on the instrument and printer. Press **Paper Feed** key to advance the paper.

8. Insert the paper through the slot in the printer cover.

9. Replace the printer cover.

8 Troubleshooting

Flag Messages and Troubleshooting Guide *8-2*

Flag Messages and Troubleshooting Guide

Flagging/Problem	Possible Cause(s)	Corrective Action
1. An asterisk (*) appears after the test result.	The reported test result exceeds linearity limit.	Dilute the sample and repeat the test.
2. Blinking B appears on upper right corner of the display.	a. There is no ac mains power supply. b. RA-25 on Battery mode.	Check mains power supply.
3. Blinking B appears on upper right corner of display, even when ac mains power is available.	The fuse is blown.	Replace the fuse. If problem persists, **contact the nearest Bayer Service Representative.**
4. Result for endpoint chemistry is 9999. Result for FXT is 9.999.	The lamp is fused.	Press 揾ead?key and observe for lamp illumination in the cuvette well. If no glow is seen, **contact the nearest Bayer Service Representative.**
5. The factor displayed for endpoint or fixed time chemistry is 9.999.	a. The lamp is not illuminating. b. There is no change in the reagent absorbance after reaction with std.	a. **Contact the nearest Bayer Service Representative.** b. Develop a new standard tube and recalibrate.
6. The printer does not print.	a. The printer is not switched on. b. The paper installation is incorrect. c. The printer cable is loose. d. The printer is switched off through **PGM. CODE < 98 >.**	a. Switch on the printer. b. Install the paper correctly and check paperfeed action. c. Check and refit the printer cable connectivity. d. Switch on the printer through **PGM. CODE < 98 >.**
7. **TEMP** remains blinking for a long time, for example, >25 min at 220 V or for >35 min at 110 V.	The temperature circuit is faulty.	**Contact the nearest Bayer Service Representative.**
8. The display is blank when switched on.	a. The voltage is low. b. There is no ac mains supply or battery backup.	Check the ac voltage and keep the instrument on for battery recharging. Replace the fuse. If problem persists, **contact the nearest Bayer Service Representative.**

Flagging/Problem	Possible Cause(s)	Corrective Action
9. Endpoint factors are higher than routine and lower than expected absorbance values.	There is deterioration in lamp energy or filter.	**Contact the nearest Bayer Service Representative.**
10. All kinetic/fixed time results are lower or higher than expected.	The temperature circuit is faulty.	**Contact the nearest Bayer Service Representative.**
11. **HIGH SD** is displayed in kinetic chemistry.	The reaction is nonlinear due to:	
	a. high sample value	a. Dilute the sample appropriately and repeat the test.
	b. deterioration of reagent	b. Replace the reagent.
12. **BELOW RANGE** is displayed in multipoint chemistry.	The test result is below the lowest calibrator concentration.	Report the result as lower than the lowest calibrator value.
13. **OVER RANGE** is displayed in multipoint chemistry.	The test result is above the highest calibrator concentration.	Dilute the sample and repeat the test or report the result greater than the upper limit of the last calibrator.
14. **RANGE ERROR** is displayed.	In multipoint, only one standard value is fed.	Reprogram with appropriate number of standards for multipoint.
15. **ERROR?** is displayed in 掏ndpoint Sample Blank?mode.	Absorbance of sample blank is more than the absorbance of sample.	Repeat the test.
16. **9999** is displayed.	Absorbance of solution is >2.5.	Dilute the sample and repeat the test.

9 Service Information

When You Have a Problem with the System ***9-2***

How to Report the Problem ***9-3***

First *9-3*

Second. *9-3*

Third *9-3*

Replacement Parts and Accessories ***9-4***

Where to Order *9-4*

When You Have a Problem with the System

- See Section 8, *Troubleshooting,* in this manual.

If Section 8 cannot assist you in solving the problem, answer all questions listed on the facing page before contacting us for help. The requested information will help identify the cause of the particular problem.

How to Report the Problem

First

Record the following information:

Instrument Serial Number _____

Installation Date_____

Second

Complete the following 揚reservice Questionnaire?

1. Has Section 7, Instrument Care, Maintenance and Minor Repair, been reviewed? Yes ☐ No ☐

2. Turn the instrument on.
   Is **C H E C K** displayed? Yes ☐ No ☐

3. If Step 2 answer is No, is the instrument plugged into a live, ac electrical outlet or was the battery discharged before? Yes ☐ No ☐

4. Does the instrument warm up? Yes ☐ No ☐

5. Do characters or numbers on display appear partially displayed? Yes ☐ No ☐

6. Does the printer provide a complete printout? Yes ☐ No ☐

7. List error (flag) messages that have occurred.
   _____
   _____
   _____

8. Record the exact sequence of events that took place when the failure occurred and results you have obtained.

Third

Contact Bayer Instrument Service Engineer/Application Specialist as appropriate.

Replacement Parts and Accessories

Product Code No.	Description
9082	Bayer RA-25 Cuvettes (50 cuvettes/box)
9083	RA-25 Dust Cover
9084	RA-25 Fuse (1 A)
9085	RA-25 Lamp Assembly
9071	RA-25 Printer Paper Roll (pack of 4)
-	RA-25 User Manual (Document Number : TAO-0405-00)

Where to Order

For pricing and information on ordering replacement parts and accessories, contact your nearest RA-25 Representative.

10 Technical Specifications, Safety Notes, Warranty

Technical Specifications ***10-2***

Safety Notes ***10-3***

Warranty ***10-4***

Manufacturer's Warranty *10-4*

Disclaimer of Warranties *10-4*

Limitations of Liability *10-4*

Warranty Service 10-4

Technical Specifications

Power Requirement	:	220 V ac, 50 Hz or 110 V ac, 60 Hz
Fuse Requirement	:	1 A
Power Consumption	:	Max. 50 Watts
Operating Modes	:	Absorbance, Endpoint, Fixed Time and Kinetic
Wavelength Range	:	Interference filters mounted in a 5 position filter wheel 340, 405, 505, 546, and 630 nm
Band Pass	:	?10 nm
Light Source	:	Tungsten 3.7 V / 1 W
Photometric Range	:	-2.500 A to +2.500 A
Photometric Accuracy	:	?3%
Drift	:	< 0.005 A per hour
Zero Setting	:	Automatic
Operating Conditions	:	18簇 to 32簇; Max. 85 % R.H. noncondensing at 30癈
Kinetic Program	:	Delay Time = 2 - 120 sec
		Interval Time = 25 - 900 sec
		No. of deltas = 4 (fixed)
Display Type	:	Alphanumeric Liquid Crystal Display ; 2 Lines, 16 characters each
Printer Type	:	External, 24 column Thermal Printer
Microprocessor	:	8 bits
Memory	:	128 Bytes,
		Data Storage: 25 tests with parameters, calibration factor and calibration curve in multistandard assay
Interface	:	RS-232C
Cuvette Well	:	For round 12 mm O.D. (10 mm cuvette pathlength); 37癈 temp. controlled
Incubator Block	:	12 holes for 12 mm O.D. (10 mm cuvette pathlength); 37癈 temp. controlled
Battery Backup	:	Rechargeable built-in Ni-Cd battery pack
Cuvettes	:	Disposable 12 mm O.D. (10 mm pathlength)
	:	Use only Bayer cuvettes (Code No. 9082)

Dimensions	:	**RA-25**	**Printer**
		Height : 115 mm (4.5 inches)	45 mm (1.8 inches)
		Width : 300 mm (11.8 inches)	132 mm (5.2 inches)
		Depth : 321 mm (12.6 inches)	151 mm (5.9 inches)
Weight	:	5.4 kg (11.9 lb)	0.4 kg (0.9 lb)

Safety Notes

- The instrument is designed for indoor use.
- Before switching on the power, make sure the power source operating voltage and line voltage correspond.
- The power plug may only be plugged into a socket with a ground contact. Do not use an extension cord with a nonfused grounded conductor.
- When opening covers or removing parts (Exception: you can do it manually), the voltage carrying parts may lay open when the instrument is in the power-on mode. Connecting parts can also be under voltage.
- Disconnect the instrument from all voltage sources before performing maintenance procedures, changing parts, or making repairs or adjustments.
- Capacitors in the instrument can still be under voltage even if the instrument has been disconnected from all power sources.
- When the instrument is open and in the power-on mode, do not perform maintenance procedures, change parts, or make repairs or adjustments. In a circumstance where this work must be done, it must only be carried out by a trained expert familiar with the dangers.
- Only use fuses of the type specified and with the current rated. Do not use repaired fuses. Do not short-circuit the fuse holder.
- If safe operation of the instrument can no longer be ensured, switch off the power. Make sure the instrument cannot be switched on by mistake.
- Safe operation is no longer guaranteed when the instrument:
    - o is visibly damaged
    - o is not working
    - o has been improperly stored for some time
    - o has been transported under unfavourable conditions
- All products or objects that come into contact with human blood, even after cleaning, should be handled as if capable of transmitting viral diseases. Wear-protective eyeware, gloves, and clothing. The user should follow the guidelines for prevention of blood-borne transmissible disease in health care settings, as recommended in Protection of Laboratory Workers from Infectious Disease Transmitted by Blood, Body Fluids, and Tissues, 2nd edition, Approved Guideline (1977), Document M29A, promulgated by the National Committee for Clinical Laboratory Standards (NCCLS). This document has complete information about user protection against potentially infectious human blood specimens and can be used as background material for instruction.

Warranty

Manufacturer's Warranty

Bayer Diagnostics India Ltd. warrants to the original purchaser that the RA-25 Chemistry Analyzer, for a period of one (1) year will be free from defects in materials and workmanship from the date of original purchase and/or installation (except as noted below). During the stated warranty period (above), we shall replace with a reconditioned unit or, at its option, repair at no charge a unit that is found to be defective.

This warranty is subject to the following exceptions and limitations:

1. A 90 day warranty only will be extended for consumable parts, and/or accessories.

2. This warranty is limited to repair or replacement due to defects in parts or workmanship. Parts required which were not defective shall be replaced at additional cost, and we shall not be required to make any repairs or replace any parts which are necessitated by abuse, accidents, alteration, misuse, neglect, maintenance not performed by us, or failure to operate the instrument in accordance with instructions. Further, we extend no warranty for malfunction or damage to our instruments due to use of reagents other than reagents manufactured or recommended by us.

3. We reserve the right to make changes in design of this instrument without obligation to incorporate such changes into previously manufactured instruments.

Disclaimer of Warranties

This warranty is expressly made in lieu of any and all other warranties express or implied including the warranties of merchantability and fitness for use.

Limitations of Liability

In no event shall we be liable for indirect, special or consequential damages, even if we have been advised of the possibility of such damages.

Warranty Service

For service under this warranty, contact:

The Service Department,
Bayer Diagnostics India Ltd.,
589, Sayajipura, Ajwa Road,
Baroda - 390 019, Gujarat, India.
Phone: 91-265-562720
Fax: 91-265-565103

Serial Number _____ Installation Date _____

RA-25 Chemistry Analyzer

Warranty

Bayer Diagnostics India Ltd. warrants to the original purchaser that the **RA-25 Chemistry Analyzer,** for a period of one (1) year will be free from defects in materials and workmanship from the date of original purchase and/or installation (except as noted below). During the stated warranty period (above), we shall replace with a reconditioned unit or, at its option, repair at no charge a unit that is found to be defective.

This warranty is subject to the following exceptions and limitations:

1. A 90 day warranty only will be extended for consumable parts, and/or accessories.

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For service under this warranty, contact:

The Service Department,
Bayer Diagnostics India Ltd.,
589, Sayajipura, Ajwa Road,
Baroda - 390 019, Gujarat, India.
Phone : 91-265-562720
Fax : 91-265-565103

Return this card to
Bayer Diagnostics India Ltd.
within (10) ten days of
installation of **Bayer**
RA-25 Chemistry Analyzer

Installation
Date : _____

Bayer RA-25 Warranty Registration Card
(Product Code No. 9091)

Date of Installation : _____ Date of Delivery : _____
Serial Number : _____
Purchaser : _____
Address : _____
_____

Serial
No.:_____

_____ PIN _____

Certificate of Installation

I certify that **Bayer RA-25** has been satisfactorily installed.

Signature of Purchaser

or Authorized Representative : _____

Name of Purchaser (IN BLOCK LETTERS) _____

(Return this card to **Bayer Diagnostics India Ltd.** within 10 (ten) days of installation).