Instruction & Operation Manual

Tap Density Test Apparatus
Model: µTDCal$_{50}$

Version Number : _____

INDEX

SR. NO	TOPICS	PAGE
01	Introduction	02
02	Environmental Conditions	02
03	Installation Prerequisites	02
04	Packing List	03
05	Technical Specifications	04
06	Description of Keypad	05
07	Description of Rear Panel	05
08	Installation	06
09	Sample Analysis	07
10	Operation Procedure	11
	Mode 1 Method	11
	1.1 Create Method	11
	1.2 View Method	15
	1.3 Delete Method	16
	1.4 Print Method	17
	Mode 2 Utilities	18
	Utility 1 Date / Time	18
	Utility 2 Name Set	19
	Utility 3 Instrument ID	20
	Utility 4 Department	20
	Utility 5 Printer Configuration	21
	Utility 6 Change Password	22
	Utility 7 Measure Tap Height	23
	Mode 3 Analysis Data	24
11	Standard Operating Procedure	37
12	Guarantee	38
13	Service after Sales	38

1. Introduction

The μTDCal50 is an advance Tap Density apparatus, offers standardize, reproducible and accurate method for measurements of tapped & bulk density of powder, granules, pellets, flakes and other bulk substances. μTDCal50 is two station tap density tester supporting USP method I,USP method II and USP method III Both the stations are separately driven by independent motors to ensure trouble free drive.

The tapping action is generated by a rotating eccentric cam shaft which lift the platform and allow it to drop back to its original position. The spring in the cam allow platform to rotate approx. 5 to 15 times per minute which will ensuring an evenly pack surface of powder.

Large LCD display Bulk Density shows tapped density, Compressibility index and Hauser ratio. **Instrument is having in built memory which saves more than 1000 analysis data.**

2. Environment Condition

The Instrument can operate within temperature and relative humidity conditions of 0°C to 55°C and 5 to 95 % respectively. However, an environment comfortable for human habitation (reasonable constant temperature and humidity conditions) is recommended for optimum performance and instrument lifetime.

Exposure to corrosive substances (weather gas, liquid or solid) may affect materials and components used in instrument and should avoid.

3. Installation Prerequisites

Power Supply Requirements:

1) Stabilized Power supply 230 VAC ± 10 %, 50Hz.
   (Earth voltage should be **Less than 3V AC** – between Earth & Neutral)
2) Three 5 Amp. Points require for Main unit, PC and Printer

Accessories Required:

1) Tissue Paper Roll
2) Dot Matrix Printer 40 column (if report printing requires)

Location

The μTDCal50 requires a conventional laboratory bench 60 cm. Long, 60 cm. Deep.

4. Packing List

Sr. No.	Description	Qty	Packed √ | X
01	Tap Density Test Apparatus- Basic Unit μTDCal50	01	
02	Cylinder Holders for 250- and 100-mL cylinders	01 each	
03	Cylinders: 250 mL Sr. No. _____ & 100 mL Sr. No. _____	02	
04	Power Supply Cable	01	
05	Instructional & Operational Manual	01	
06	Manufacturer test certificate	01	
07	Warranty Card	01	
Optional Items (If ordered)			
08	Keypad Screen Guard	01	
09	IQ/OQ/PQ/DQ Documents	01 Set	
10	10 ml Cylinder	01	
11	10 ml Cylinder Rubber Adaptor	01	
12	25 ml Cylinder	01	
13	25 ml Cylinder Rubber Adaptor	01	
14	50 ml Cylinder	01	
15	50 ml Cylinder Rubber Adaptor	01	

Serial No.: _____ Packed By: _____

UNPACKING PROCEDURE

a. Open the box to indicate arrow.

b. Take out the bonded Accessories carefully.

c. Install the unit according to procedure of installation.

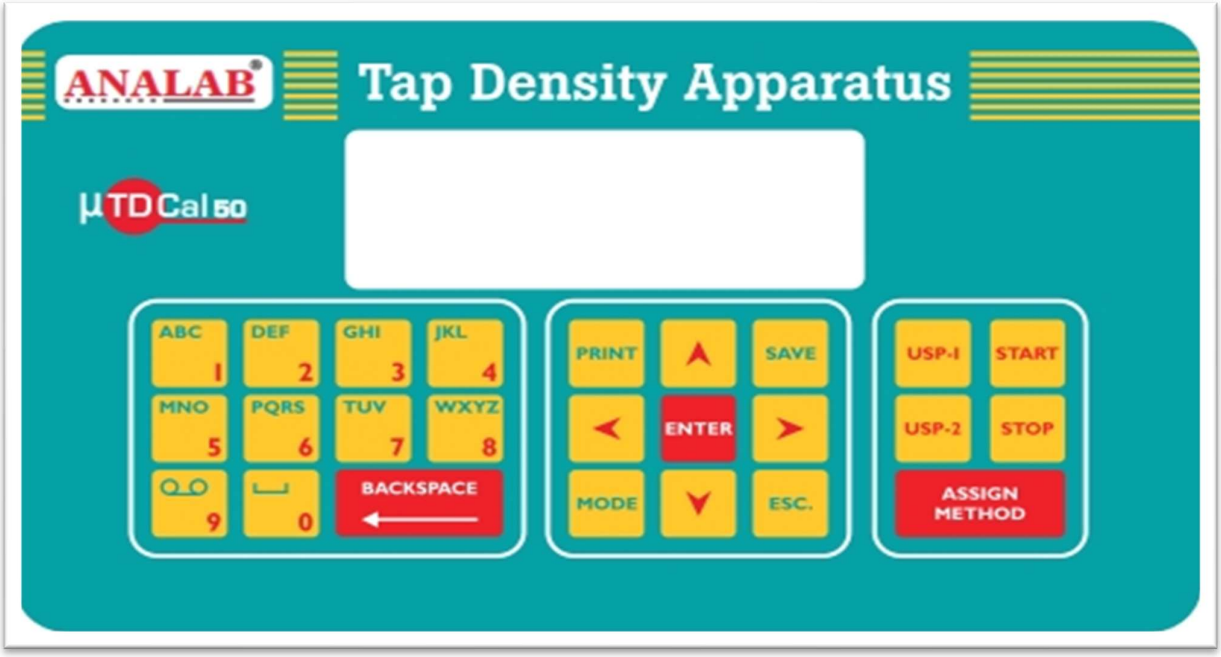
5. Technical Specifications

Technical Specifications:

No. of Station	: 1) USP1 (300 taps per min.) 2) USP2 (250 taps per min.) 3) USP3 (50 - 60 taps per min.).
Stroke Height	: 14 mm ± 2mm / 3mm ± 0.2 mm
Stroke / Minute	: 300 ± 15, 250 ± 15
No. of taps	: 1-9999
Rotation and tapping	: Simultaneously
Display of Strokes/min	: Set & Actual
Cylinder Supports	: 100ml and 250 ml – Supplied without Cylinder
Display	: 20 x 4 Line Alphanumeric Backlit LCD
Keypad	: Membrane waterproof polycarbonate soft touch keypad compliance to UL/ROHS
Pharmacopeia Complies	: As per USP, IP, Ph. Eur.
Method	: 40 analysis method with View, Print & Delete facility
Password Protection	**: Delete Stored Protocol, Delete Stored Analysis Data, Date & Time**
Date	: 12/24 Hours Format
Time	: Real time clock
Calculation of result	: Bulk Density, Tapped density, Compressibility index and Hauser ratio
Report Formation	: As per GLP Compliance
Calibration Data Storage	: Non-Volatile Memory which can store, print & view company name, standard name, standard MP, observed MP, Calibration date and time, last calibration date & time, calibration done by, calibration status, instrument ID, serial number, model number etc.
Searching of data	: with record number, batch number, Date and by scrolling
Analysis Data Storage	**: More than 1000** data can be store in non-Volatile Memory which can print & view test data with Batch No., username, sample name, instrument serial no., Instrument ID, model no., test date & time and test print date & time. **Secondly**, data can directly without saving test data in the instrument.
Printer Interface	: Centronics Parallel Port / Serial (RS-232 C) Port
Printer	: 40 / 80 Column Dot Matrix Printer
Power Supply	**:** 230 VAC ± 10%, 50 Hz

6. Description of Keypad

µTDCal50 has TWENTY-THREE keys with 20 x 4 LCD displays.



Part 1 consisting of TEN keys for alphanumeric characters, to enter values & characters, ONE keys is used to **Assign Method** for analysis.
Part 2 consist of command keys: **PRINT** to Print command, **SAVE** to save result, **ESC** to come out from mode or sub modes, **MODE** to select modes, **ENTER** to confirm or select command or Value, and ▲▼►◄ keys to take character or lines to UP / DOWN or LEFT / RIGHT.
Part 3 consists of keys to apply direct methods for **USP1,USP2 & USP3** with **START** /**STOP** keys and back space key.

7. Description of Rear Panel

- Serial Port - to connect serial printer or balance
- Parallel Port – to connect Parallel Printer
- Power Supply - to connect 230 Volts supply.
- Programming Connector – To Upgrade the software programming

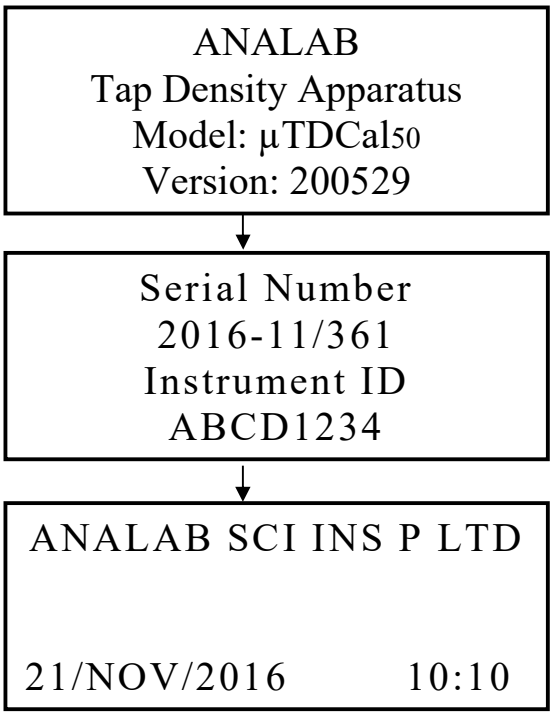
8. Installation

Install the unit in dust and water vapors free area.
Insert platform shafts on the cylinder platforms from the top of the unit. It should be free to move up and down smoothly.

Insert the base of the cylinder into platforms and lock the platform with spring clips.

Connect Printer to the parallel port at rear side of instruments or PC with USB connector

Connect power cable and check mains supply 230 VAC±10%, 50Hz supply. Check proper earth voltage between Neutral and Earth pin should be less than 3 VAC. Switch ON the mains switch.



Instrument will Display:

Manufacturer Name with Model No and

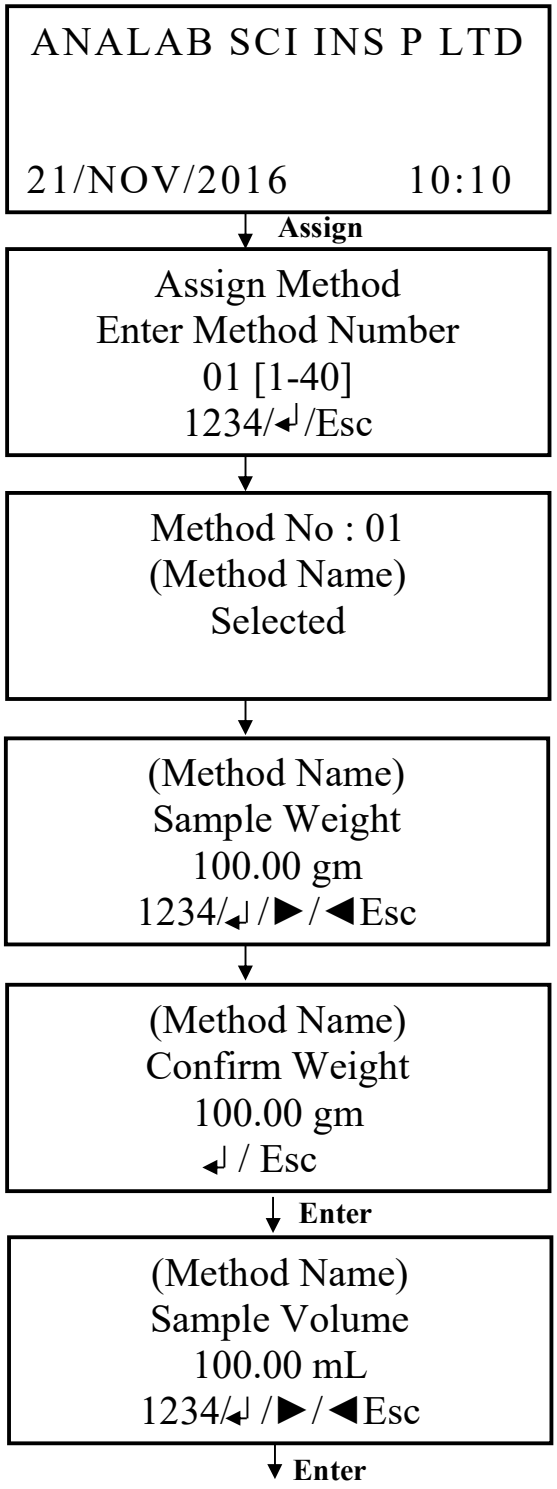
version no. of instrument.

Serial Number of instrument with Instrument ID (to set by customer)

Company Name with current date time (Standby Screen)

9. Sample Analysis

After creating a method for sample, user can ANALYSIS by assigning method. Press **ASSIGN METHOD** key on keypad to select method. Place Cylinders with sample on cylinder Holder and Insert it in the platforms as per sample demand i.e. in USP1 OR USPII Platform.



Standby display

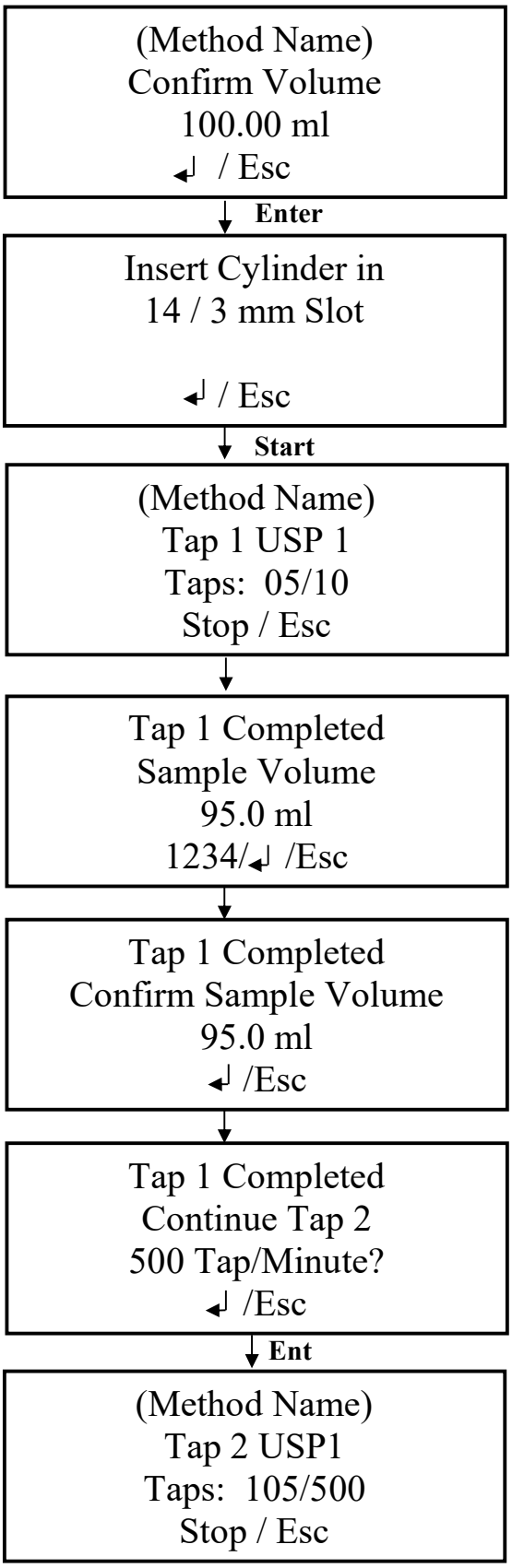
Enter Method no. with numeric keys.

Method number and name will display

Enter initial weight of sample in gram with numeric keys.

Confirm weight, If wrong weight feeds, press ESC and enter correct value

Enter Initial Sample Volume



Confirm initial Sample volume.

Insert Cylinder with sample in cylinder platform/slot and press **START** to start tapping.

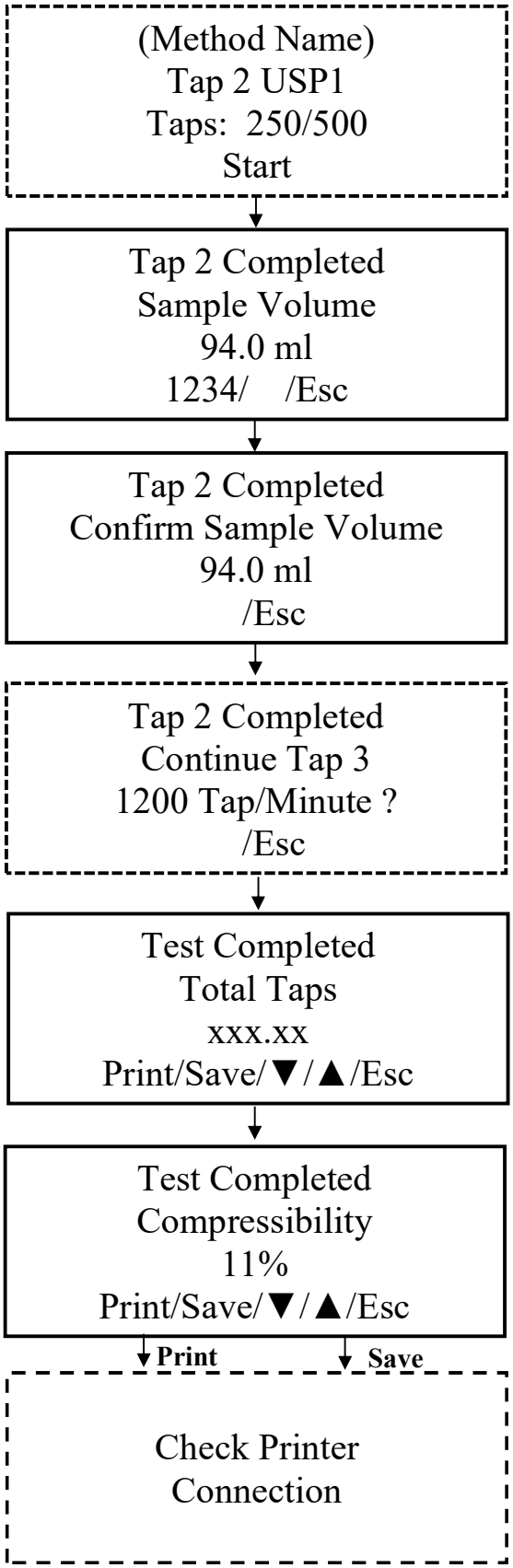
Tapping Starts and will tap as per TAP 1 setting.

After Completion of first set Taps, enter changed Sample volume of sample.

Confirm Sample Volume.

If difference between Initial sample volume and after first tap volume is **more than 2 ml** then instrument will continue for next tap i.e. TAP 2

User can stop tapping in between with STOP key



Press “Start” restart tapping.

Enter new sample volume after 2nd tapping.

Confirm sample volume.

If difference between sample volume after 2nd tapping is more that 2 ml then 1 tapping sample volume, instrument will ready for 3rd tappings

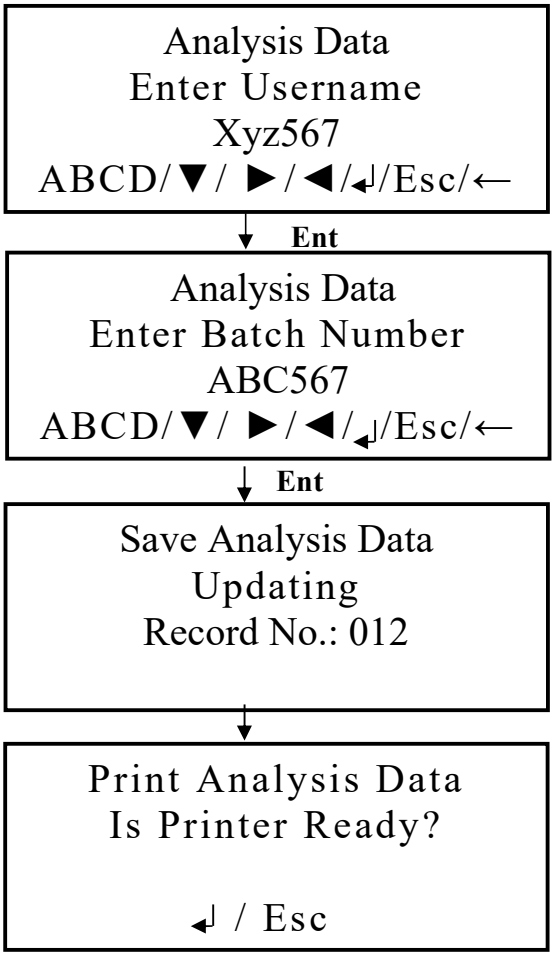
And if difference is less then 2 ml then, test will completed and will show total taps.
User can Print or Save the result.

Press ▲/▼ keys to view
% COMPRESSIBILITY,HAUSNER RATION, TAPPED DENSITY and INITIAL DENSITY

Press **Save** to save analysis data in internal memory.

Press **Print** to print analysis data with username and batch no.

If Printer is not connected, instrument gives this message.



Press **Enter**

Enter Username in alpha-numeric character (Max. 20 character) with alphanumeric keypad. (▼ key to select between alphabetic and numeric characters)
Press **Enter**

Enter Batch Number in alpha-numeric character (Max. 20 character) with alphanumeric keypad. (▼ key to select between alphabetic and numeric characters)

Data will update and will show record number where current data saved.

(Saved data can view in MODE: 2 i.e. Analysis Data)

If **PRINT** key pressed, then instrument will print Analysis data.

Keep Printer ON and press **Enter**

NOTE:

µTDCal50 has also facility to analyze sample without assigning methods. User can place cylinders in USP1 or USP2 slots and start tapping with pressing USP1 or USP2 keys directly given on keypad. Instrument will allow to set all parameters like Tap/Minute, Tap1 to Tap 6 counts, Initial Sample weight & Initial Sample Volume.

Users also can perform sample analysis as per USP3 method.

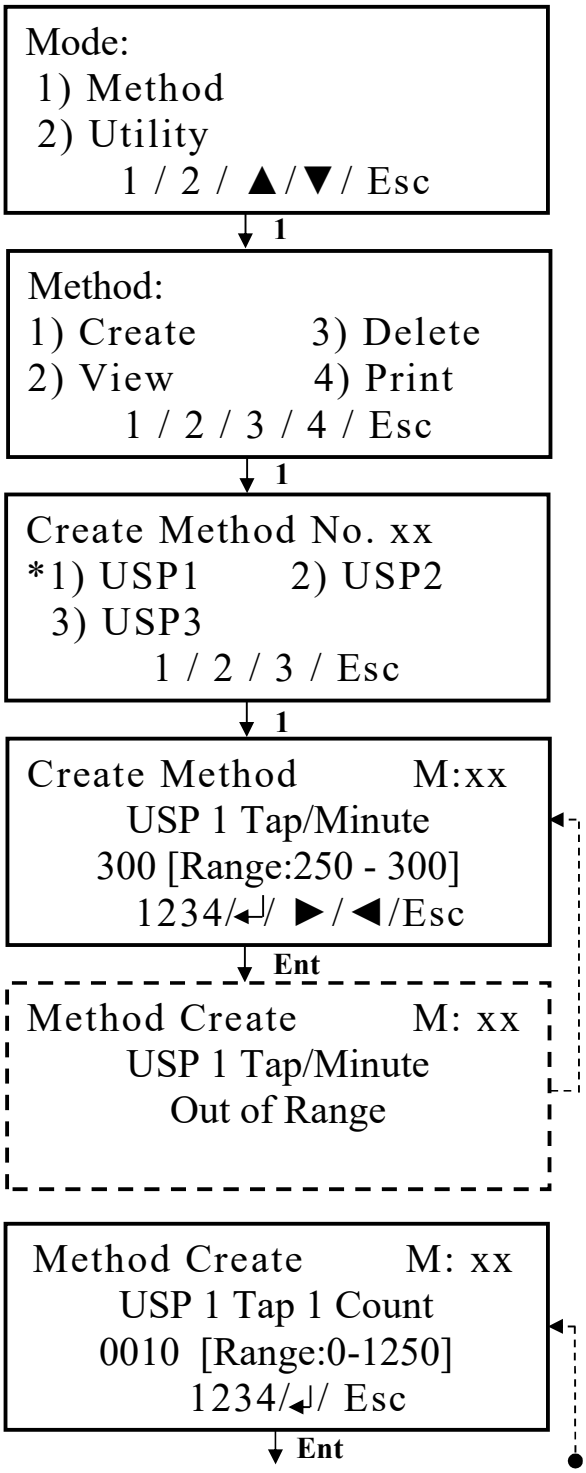
10. OPERATION PROCUDURE

10.1. Mode :1 Method

µTDCal50 has facility to create 40 method for analysis. Instrument will save created method in internal memory.

10.1.1. Create Method

10.1.1.1. Method for USP1



Press **1** to Enter in method

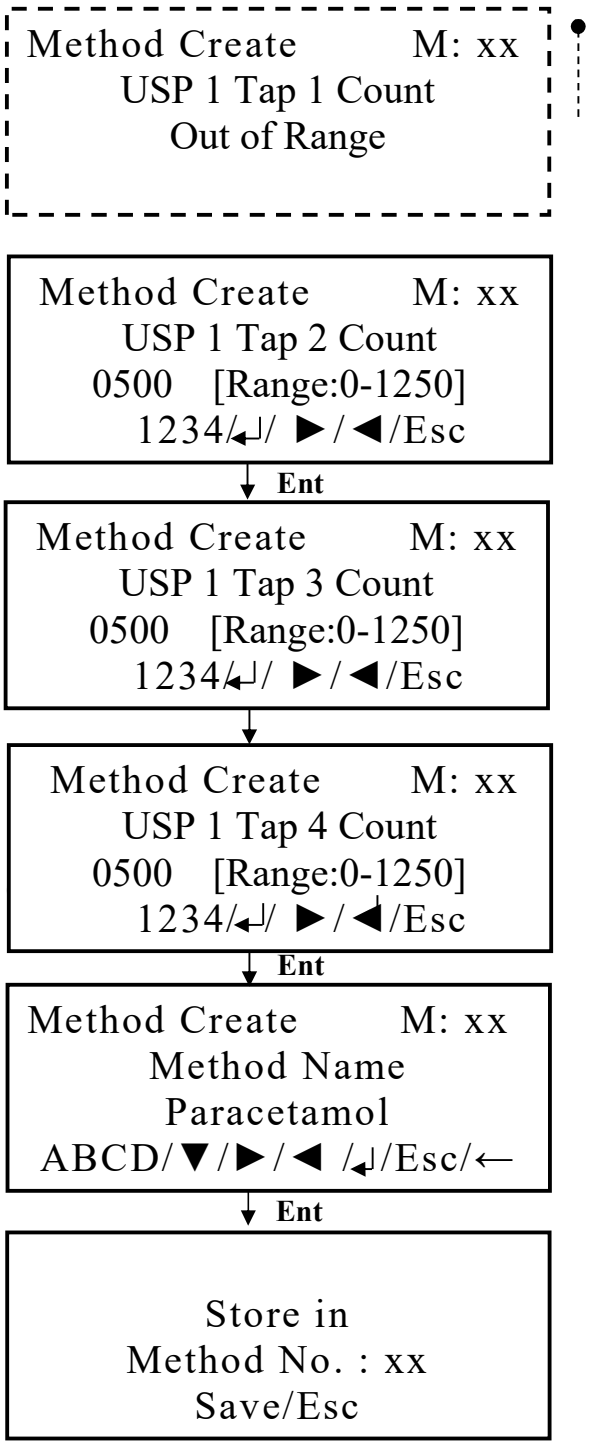
Again press **1** to create new method

To Create method for USP1, press **1**

Set 300 Taps/Minute for USP1 with numeric keys and press **ENTER** , new value will update.

If taps set out of range, ERROR message will display

Set first tap count with numeric keys and press **ENTER**



If the entered count value is more than1250, Error message " Out of Range" will display. Enter correct value and press **ENTER**

Set Second tap count with numeric keys and press **ENTER**

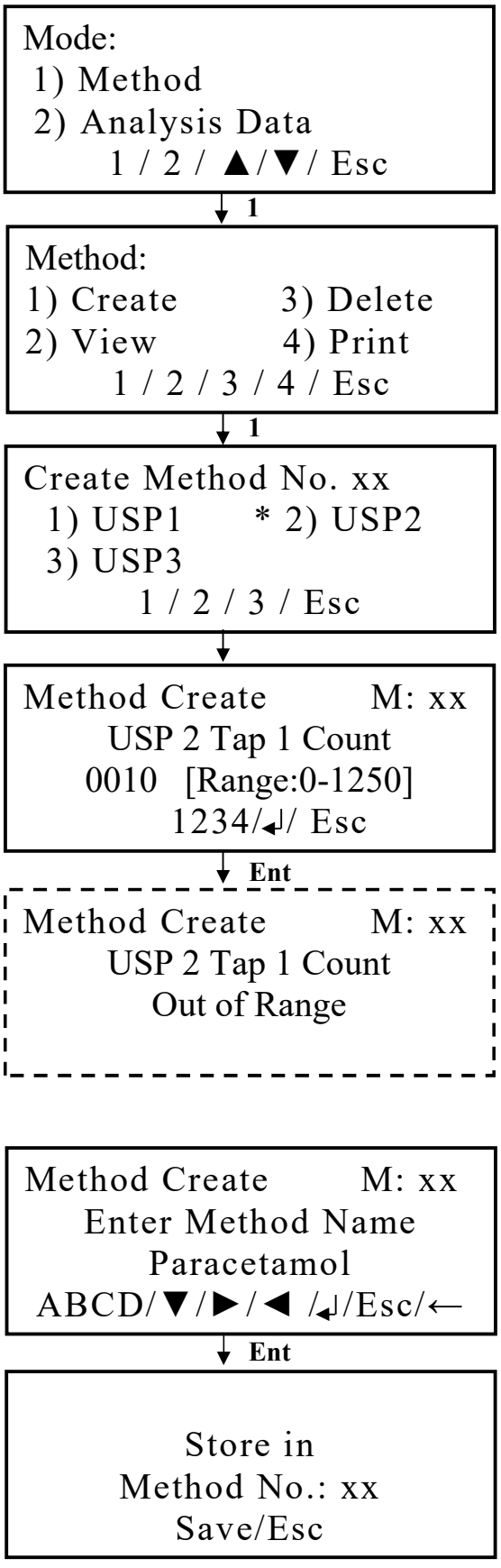
Set Third tap count with numeric keys and press **ENTER**

Set Fourth tap count with numeric keys and press **ENTER**
(Same way set FIFTH and SIXTH Tap counts)

Enter method name (Max. 20 character) with alphanumeric keys and press Enter. ▼ keys to select between alphabetic and numeric characters).

Save Method by pressing **SAVE** key.
(Instrument select next method no.)

10.1.1.2. Method for USP2



Press **1** to Enter in method

Again press **1** to create new method

To Create method for USP 2, press **2**

(Note: In USP2, Tap/Min is set to 250 by default)

Set first tap count with numeric keys and press **ENTER**

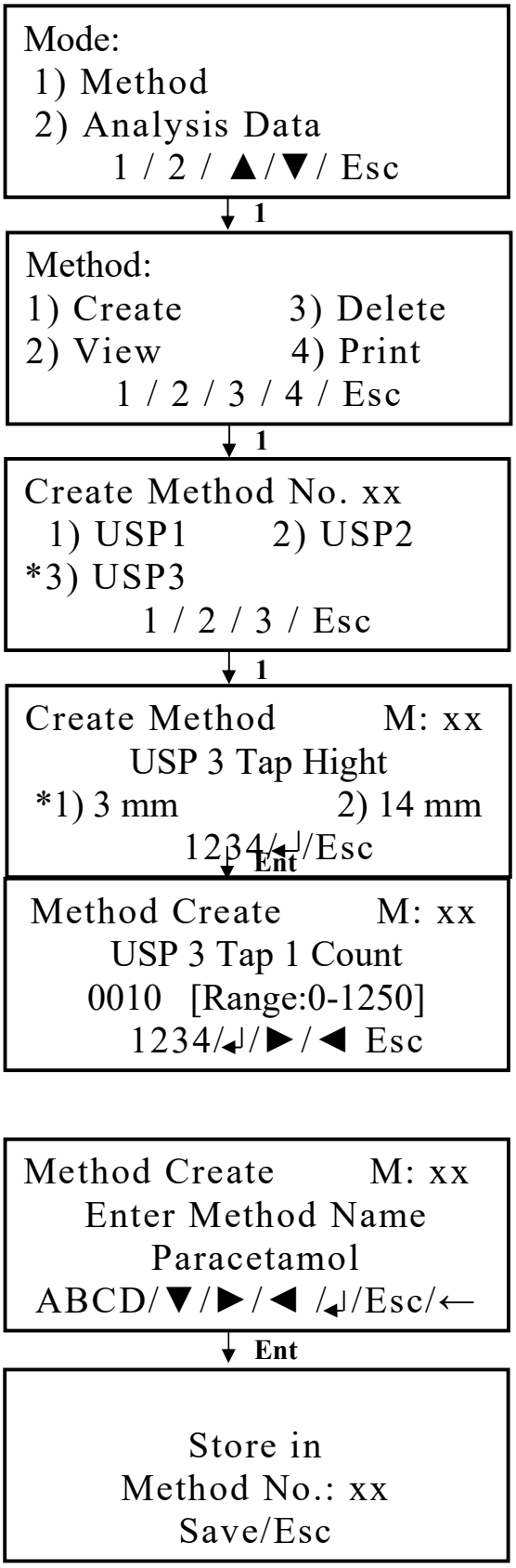
If the entered count value is more than1250, Error massage " Out of Range" will display. Enter correct value and press **ENTER**

Set Tap 2 / 3 / 4 / 5 & 6 count as per USP1 method.

Enter method name (Max. 20 character) with alphanumeric keys and press Enter. (▲/ ▼ keys to select between alphabetic and numeric characters).

Save Method by pressing **SAVE** key. (Instrument select next method no.)

10.1.1.3. Method for USP3



Press **1** to Enter in method

Again press **1** to create new method

To Create method for USP3, press 3

Set 300 Taps/Minute for USP1 with numeric keys and press **ENTER,** new value will update.

Set first tap count with numeric keys and press **ENTER**

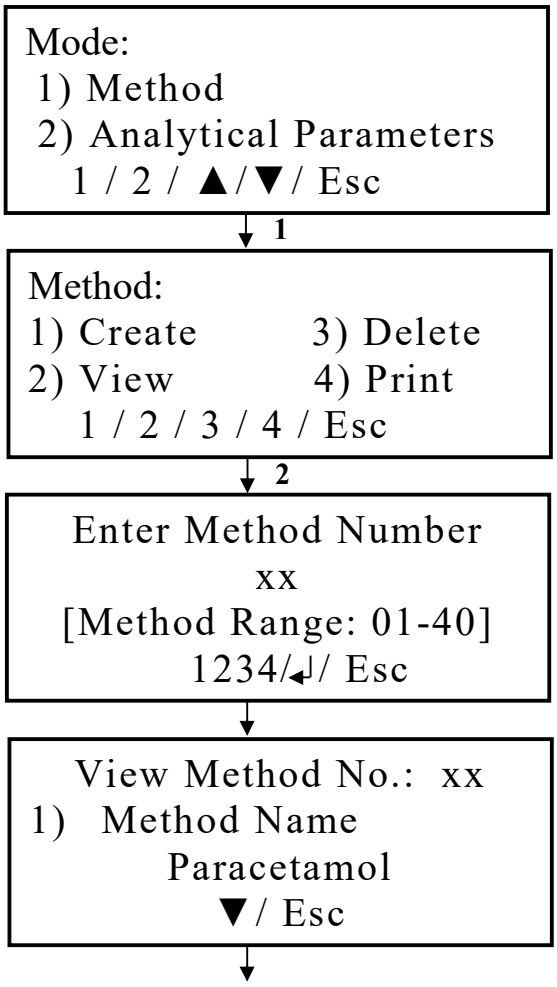
Set Tap 2 / 3 / 4 / 5 & 6 count as per USP1 method.

Enter method name (Max. 20 character) with alphanumeric keys and press Enter. (▲/ ▼ keys to select between alphabetic and numeric characters).

Save Method by pressing **SAVE** key. (Instrument select next method no.)

10.1.2.View Method

After creating new methods, user can view all parameters from this mode to confirm entered parameters in method.



Press **1** to Enter in method

Press 2 to View method

Enter Method Number to view with numeric keys and press **ENTER**

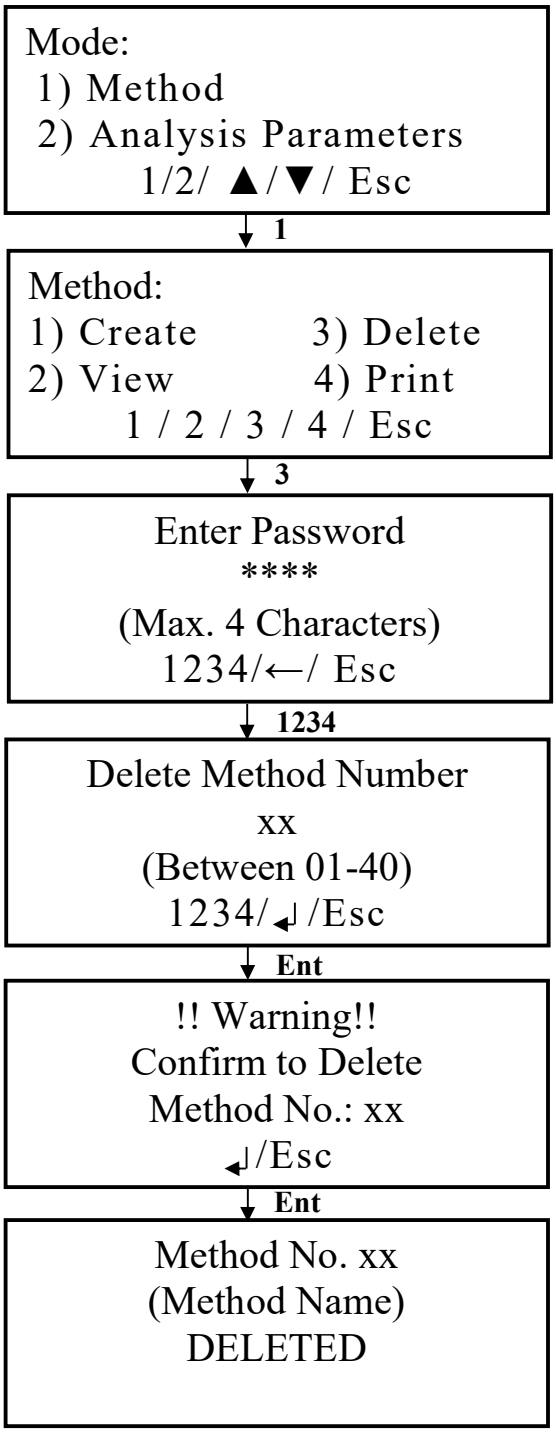
All set values of parameters will display one by one by pressing up & down keys.

Method Name, USP type, Tap/Minute, tap 1,2,3,4,5 & 6 counts and Tap Hight.

Note : Once method created, user cannot edit the method. If any parameter needs to replace during viewing, then complete method must delete and create new method with corrected parameter.

10.1.3.Delete Method

This mode is useful to delete entire method. This mode is password protected and only Admin or authorized user can delete the method/s.



Press **1** to Enter in method

Press **3** to Delete method

Enter Password to delete selected method. (Only authorized person can perform this action)

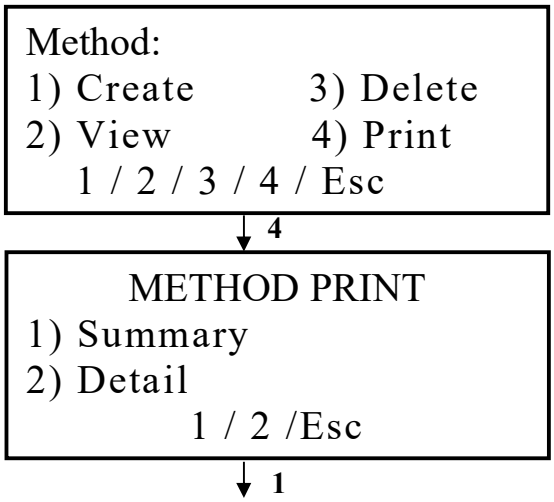
Select method no. with numeric keys to delete.

Instrument will confirm to delete selected method. Press **ENTER** to delete or **ESC** to go to the back screen.

Selected Method deleted.

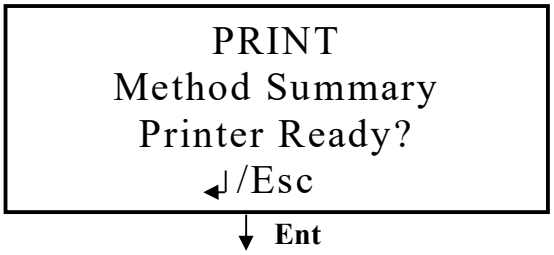
10.1.4.Print Method

This method is useful to print methods parameters. Users can print summary of all methods or individual method parameters. Connect dot Metrix 80 or 40 column (as per selection in utility) printer.



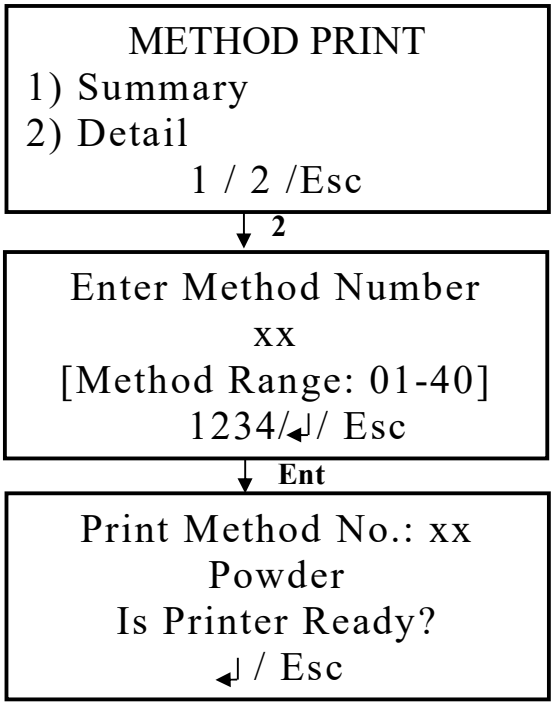
Press **4** to enter **PRINT** mode.

10.1.4.1.Summary



Press **ENTER** to print summary.

10.1.4.2. Detail

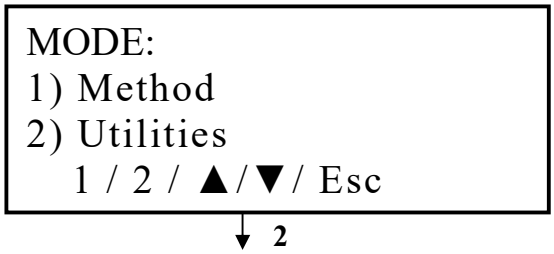


Enter Method Number to Print with numeric keys and press **ENTER**

Confirm printer connection and press **ENTER** to print method details

10.2. Mode 2: Utilities

This mode is useful to set instrument parameters required to perform Analysis of sample. Before starting actual analysis, set proper values in given sub modes.

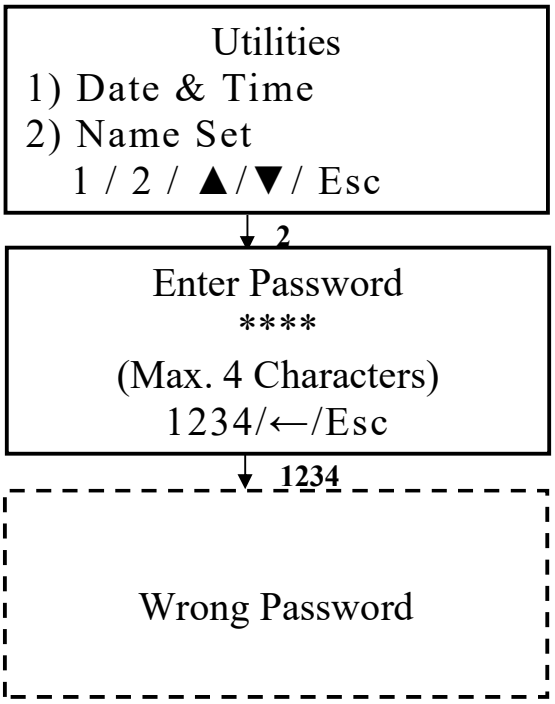


Press **Mode** and 2 keys to select Mode 3 i.e. Utility mode.

10.2.1.Utility: 01 Date / Time

µTDCal50 has in built clock which will updates with inbuilt battery. User can set date and time from this utility.

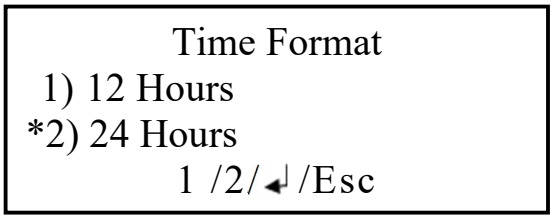
This utility is password protected. Different passwords can set for this utility.



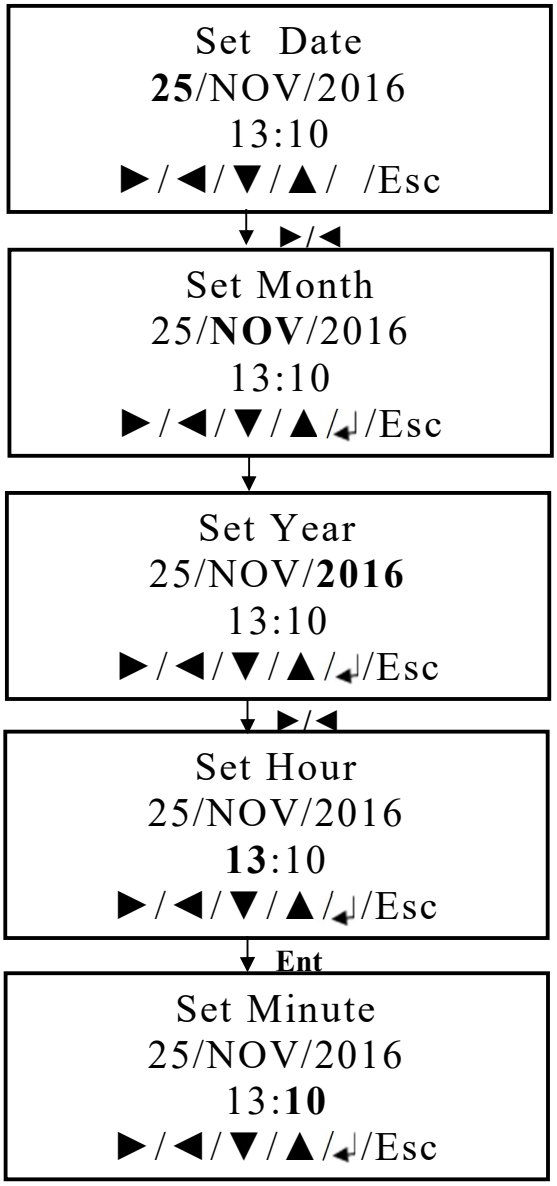
Press 1 to Enter in utility 1 i.e. date / time.

Enter Password to change Date & Time

If wrong password entered, display shows" wrong password"



Set Time format between 12 and 24 hours



Set **Date** with ▲/▼ keys.

Press ►/◄ keys to set month.

Set **Month** with ▲/▼ keys

Press ►/◄ keys to set Year

Set **Year** with ▲/▼ keys

Press ►/◄ keys to set hour

Set Hour with ▲/▼ keys (24 hrs. format)

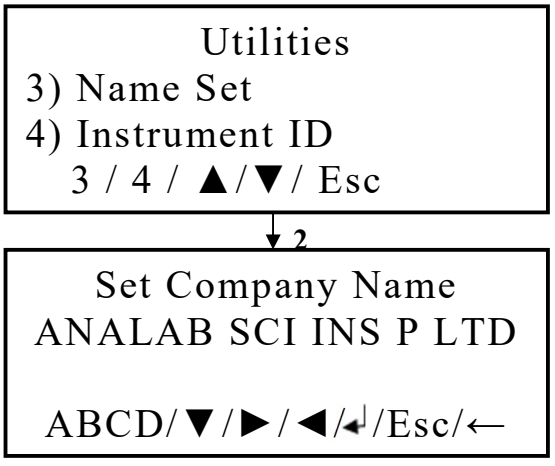
Press ►/◄ keys to set hour

Set Minute with ▲/▼ keys

Press **Enter** to update new date and time

10.2.2.Utility: 02 Name Set

Set the name of company to display on standby screen of the instrument. Same name will be view and print on report.



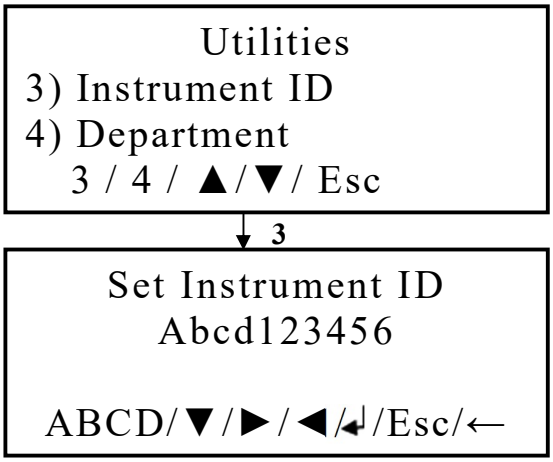
Press 2 to Enter in utility 2 i.e. Name Set

Enter the company name with the help of alphanumeric keys. (press▼ to select numeric value) .Max. 20 character can set

Press **Enter** to update new name.

10.2.3.Utility: 03 Instrument ID

µTDCal50 is having unique facility to enter instrument ID. Instrument ID is different from serial number and user can feed this ID from this mode which will print in analysis report.

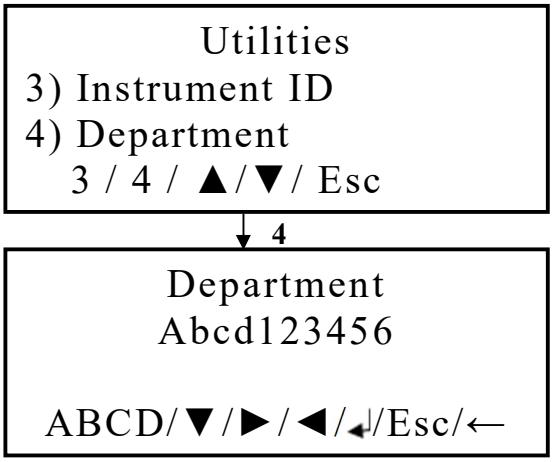


Press 3 to enter Utility 3 i.e. Instrument ID

Enter the Instrument ID with the help of alphanumeric keys. (Press▼ to select numeric value). Max. 20 characters can be set.

10.2.4.Utility: 04 Department

µTDCal50 is having unique facility to enter department where this instrument installed in the company.

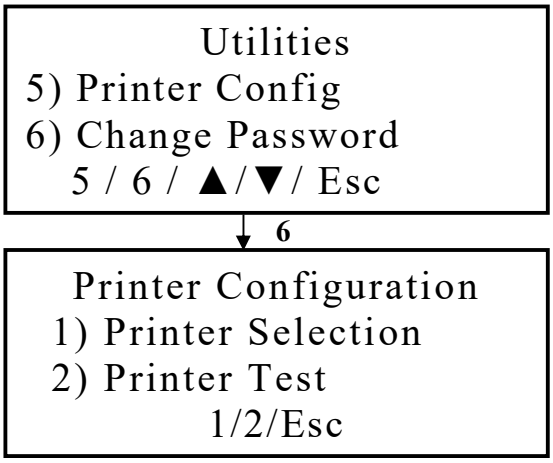


Press 4 to enter in Utility 4 i.e. Instrument ID

Enter the Department with help of alphanumeric keys. (Press▼ to select numeric value). Max. 20 characters can be set.

10.2.5.Utility: 05 Printer Configuration

µTDCal50 is having facility to connect Serial or Parallel dot matrix printer. Printer can be configured from this utility.

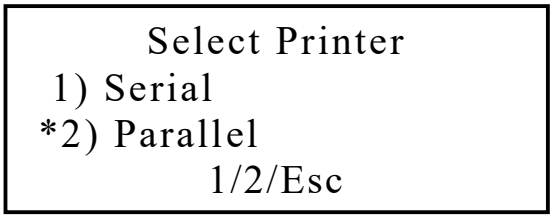


Press 6 to enter in Utility 6 i.e. Printer configuration

Press 1 to test Printer connection.

10.2.5.1. Printer Selection

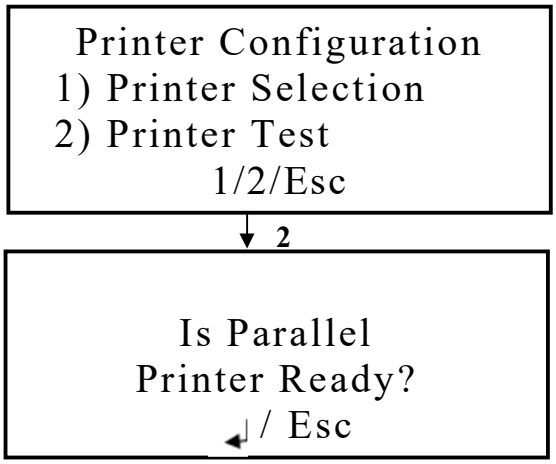
µTDCal50 has facility to connect Serial or Parallel printer with instrument. User can select printer from this utility.



Select printer between Serial and Parallel with numeric key.

10.2.5.2. Printer Test

µTDCal50 has facility to test printer connectivity with instrument from this utility.

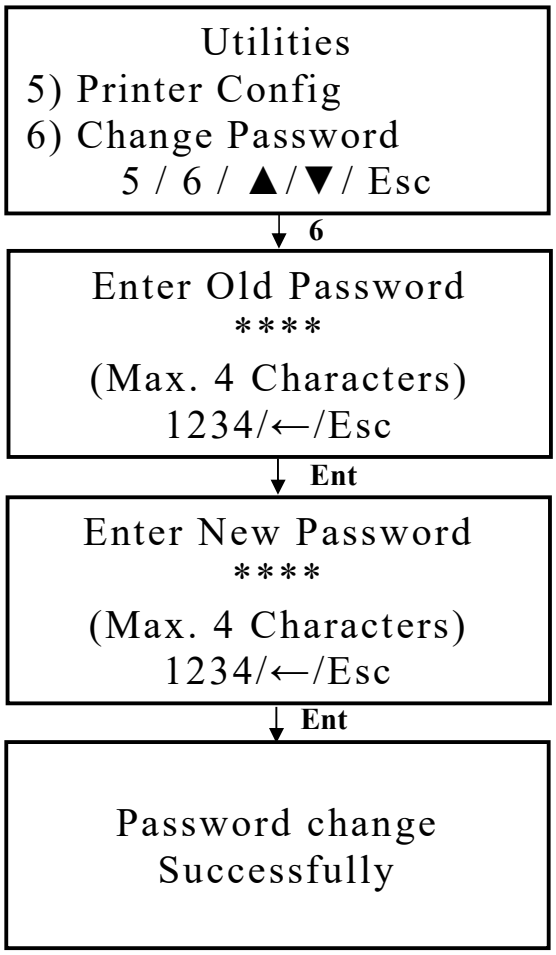


Press 2 to Test connected Printer

Switch ON printer and press Enter to check printer connectivity with instrument.

10.2.6.Utility: 06 Change Password

Users can change password to operate certain password protected menu from this utility.



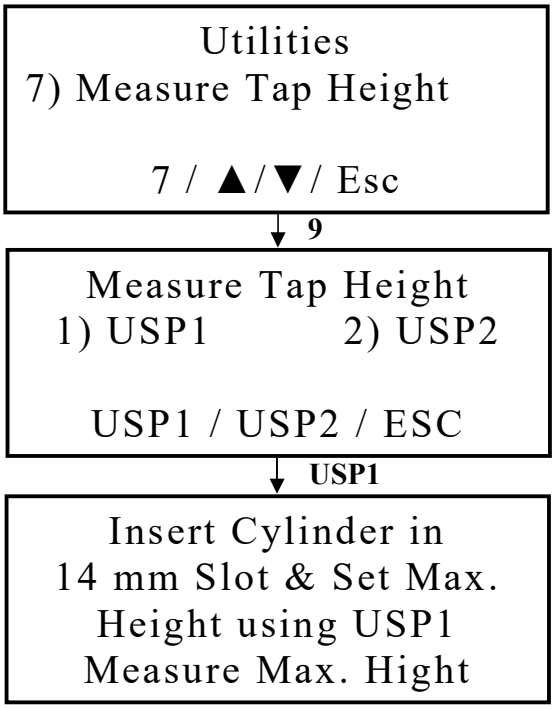
Press 6 to change password.

Enter old password. (if password is forgotten then contact manufacturer to reset the password.)

Enter a new password. It should be of 4 numeric characters.

10.2.7.Utility: 07 Measure Tap Height

Users can measure tap height for verification with this utility.



Press 7 to change password.

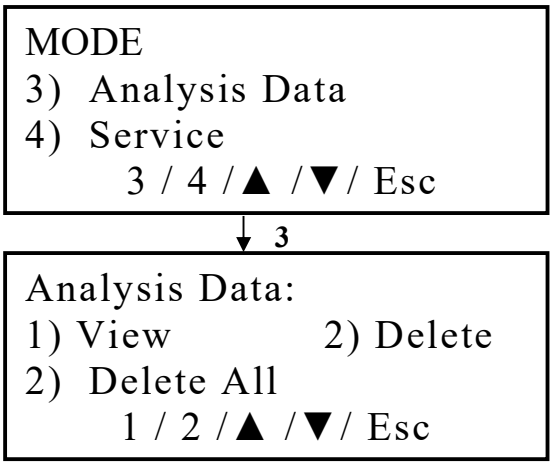
Select platform between USP1 and USP2 to measure Tap Height with USP1 or USP2 key

Insert Empty Cylinder in USP1 slot and set max. height by pressing USP1 key. Once it reaches at Maximum height, measure height between platform to cylinder holder.

Press **ESC** to come out from this utility.

10.3. Mode 3: Analysis Data

µTDCal50 has facility to save 501 analysis data. These saved data can view or print from this mode.



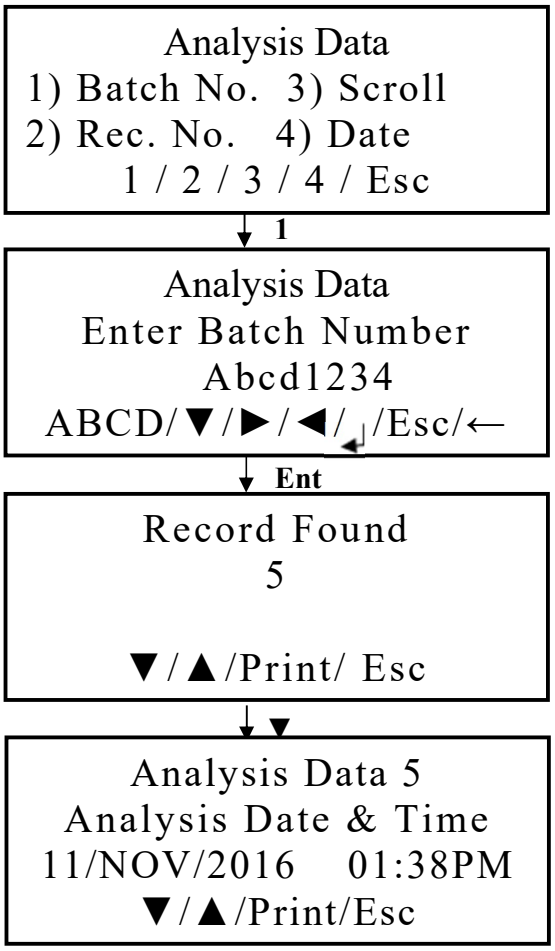
Press **MODE** & **3** keys to enter in analysis data mode.

To View Saved Analysis data press **1**

10.3.1.View Analysis Data:

Analysis data can be viewed by selecting with Batch No. OR with scrolling display OR with saved record no. OR with date of analysis.

10.3.1.1. Data Search with Batch Number:



Press 1 to search data with batch number.

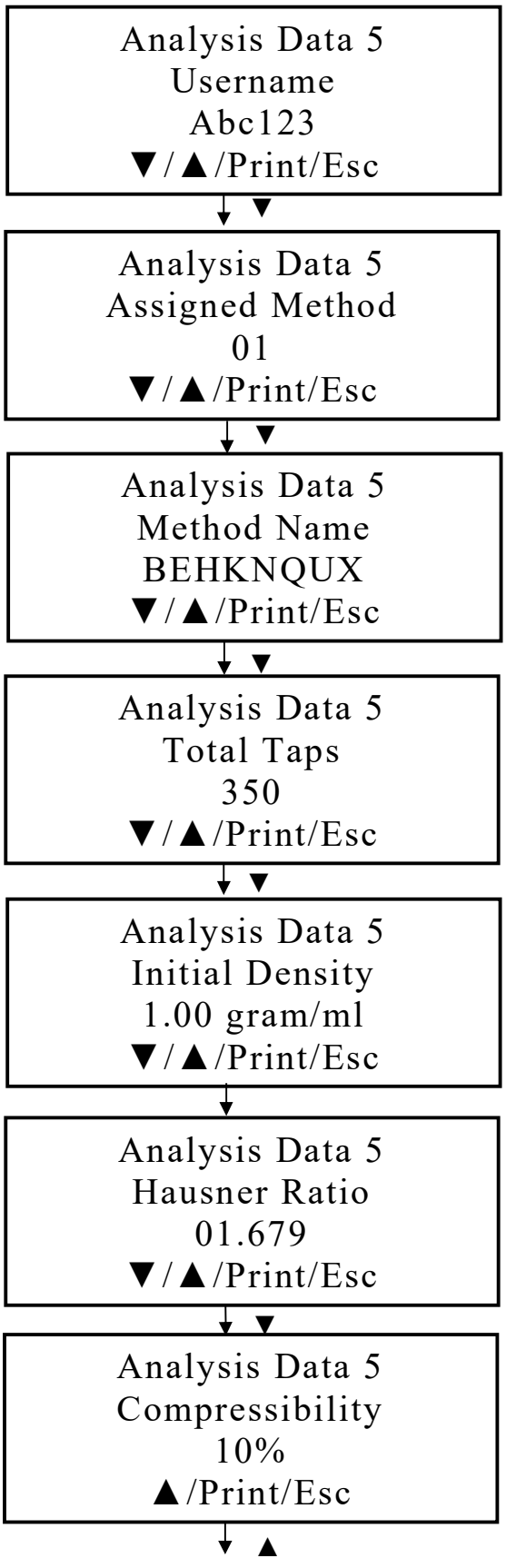
Enter Batch Number with alphanumeric keys (▼ keys to select between alphabetic and numeric characters)

Press **Enter**

It may be possible to have same batch number for one or more record. Select record no. with ▼/▲ key and press **ENTER** to view.

Selected Record can Print with Print key

Analysis date and time display
Press ▼ key to view other parameters



Username

Assign Method Number

Assigned Method Name

Total Taps

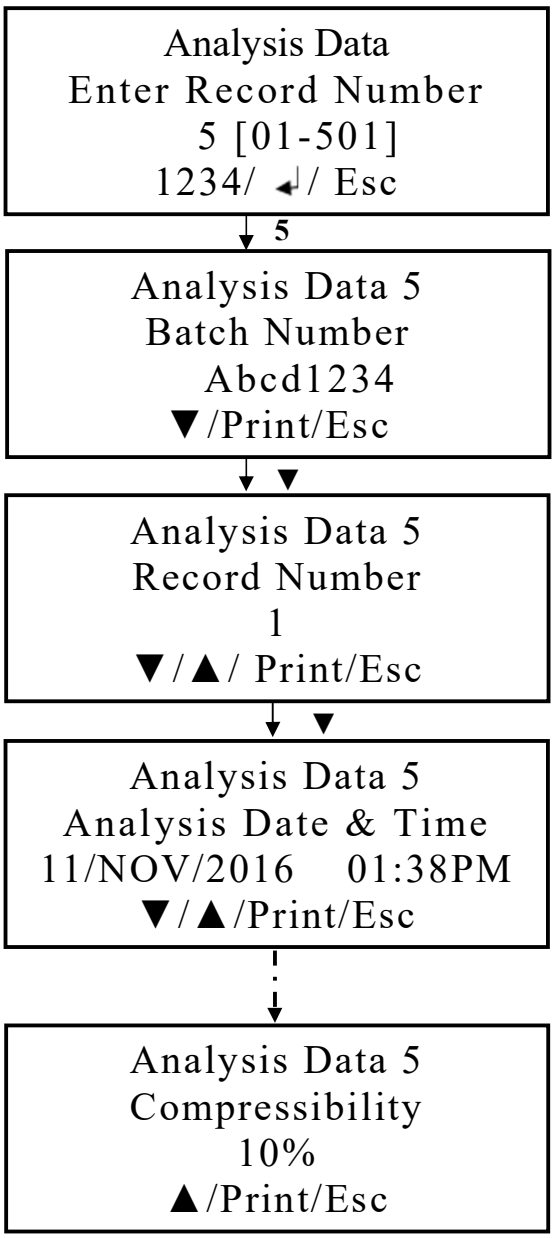
Initial Density

Hausner Ratio

% Compressibility

Press **ESC** comes out from analysis data view.

10.3.1.2. Data Search with Record Number:



Press 2 to search for data with record number.

Display Batch Number

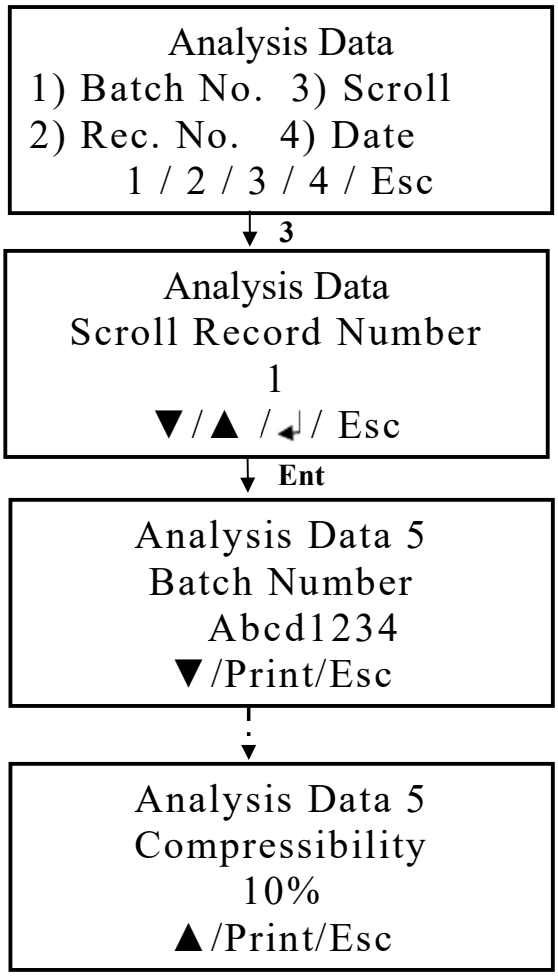
Record Number

Analysis Date & Time

All screens as shown in: **Data search with batch no.** menu.

Press **ESC** come out from analysis data view

10.3.1.3. Data Search with Scroll (Data):



Press 3 to search analysis data with scrolling

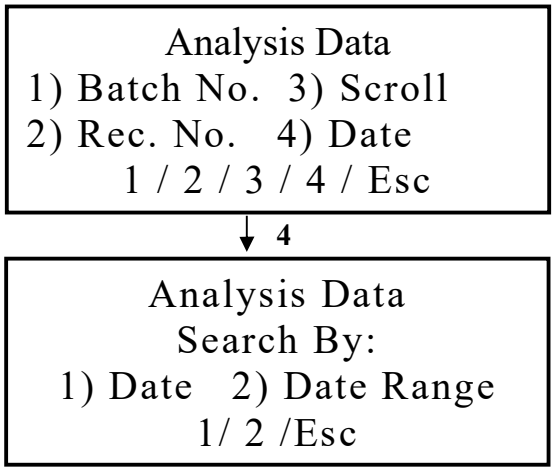
Scroll record number to view with ▲▼Keys.

Batch number of selected record

All screens as shown in: **Data search with batch no.** menu

Press **ESC** come out from analysis data view

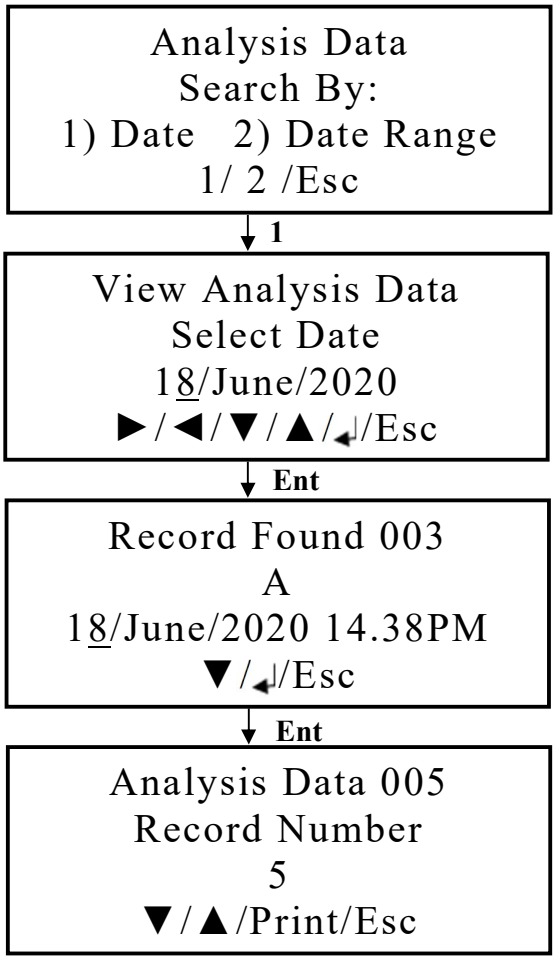
10.3.1.4. Data Search with Date:



Press 4 to search analysis data with date.

Press 1 to search analysis data with specific date.

10.3.1.4.1. Data Search with Specific Date:



Press 1 to find analysis data for specific date.

Select Year, Month, and date help of ►/◄/▼/▲ keys and press **ENTER**

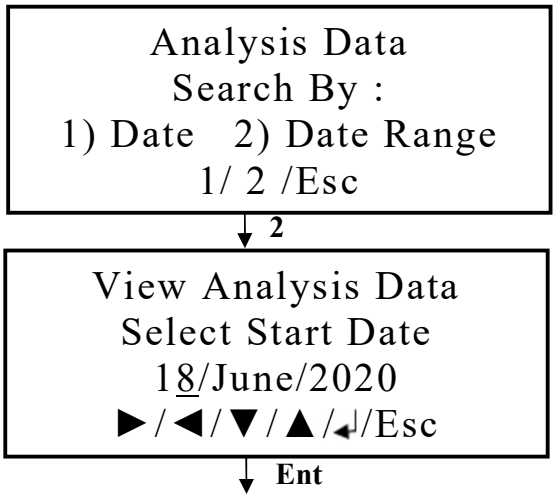
Instrument will search record number saved on selected date. Press ▼ to find other records of same date.

Press ▲▼ key to view analysis data.

All screens as shown in: **Data search with batch no.** menu

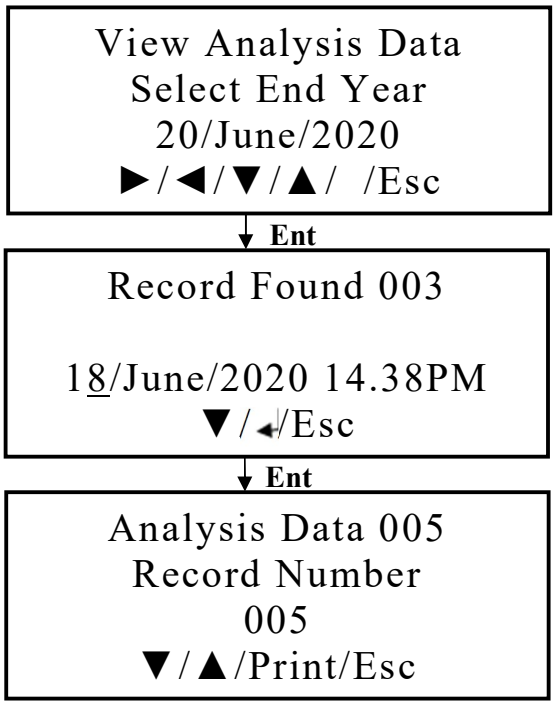
Press **ESC** come out from analysis data view

10.3.1.4.2. Data Search with Date range:



Press 2 to find analysis data for date range

Select Start date - Year, Month and date help of ►/◄/▼/▲ keys and press **ENTER**



Select End date - Year, Month and date help of ►/◄/▼/▲ keys and press **ENTER**

Instrument will search record number saved on between selected date range. Press ▼ to find other records of selected date range.

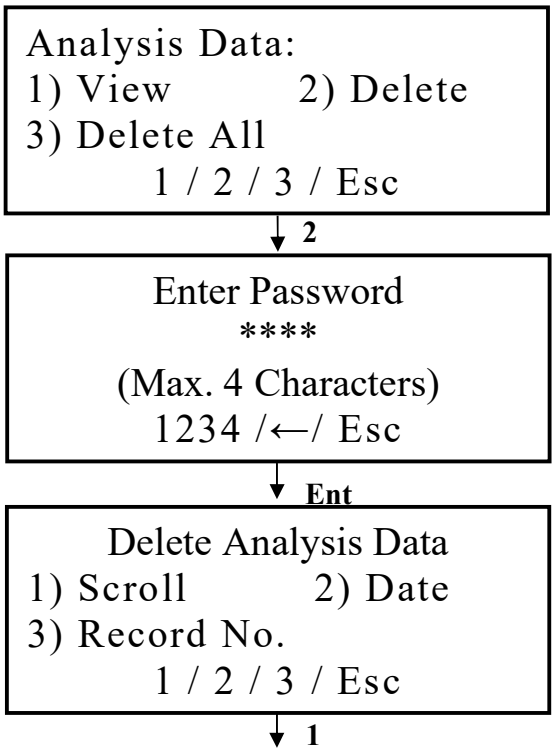
Press ▲▼ key to view analysis data.

All screens as shown in: **Data search with batch no.** menu

Press **ESC** come out from analysis data view

10.3.2.Delete Analysis Data:

Saved analysis data can delete from this sub mode. This mode is password protected.

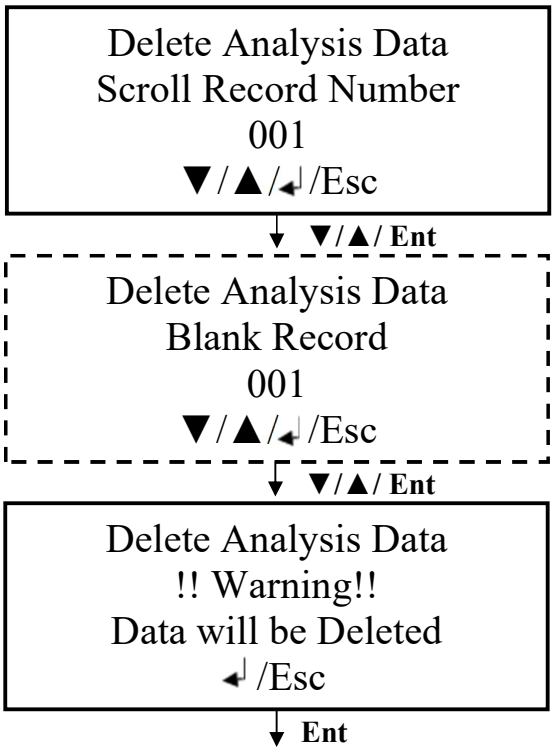


To delete Saved Analysis data press 2

Enter password from alphanumeric keypad. Use ← key if wrong character entered.

Select analysis data by scrolling or by specific date or by record no. to delete.

10.3.2.1. Search Analysis Data with scrolling to delete:

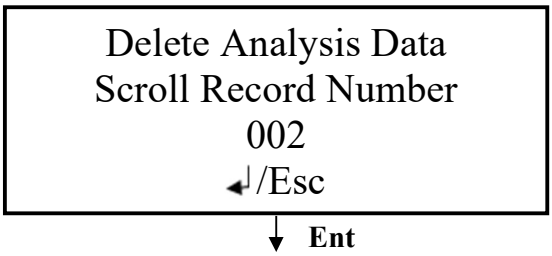


Scroll record number with ▲▼ keys to delete and press **ENTER**

If the selected record is not found or already deleted earlier, system gives Blank Record display.

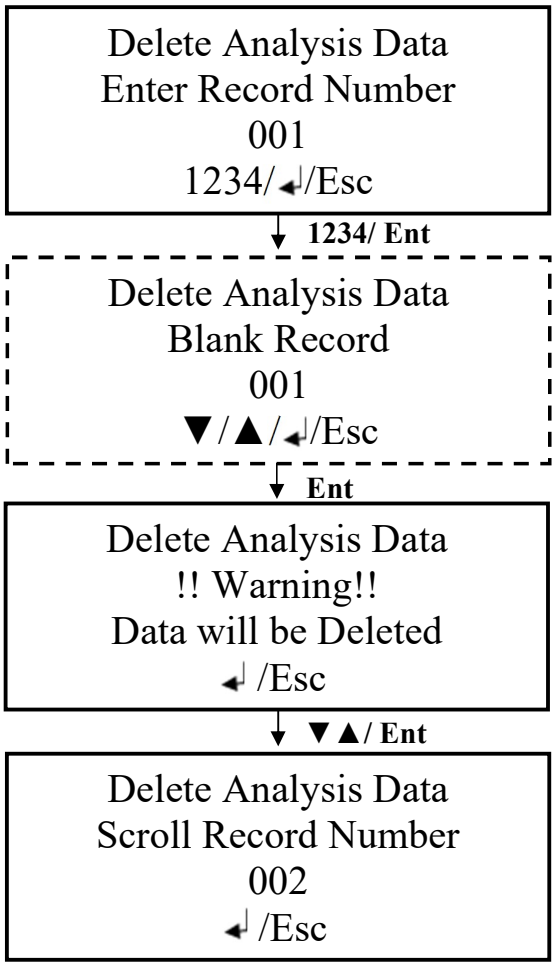
Select other record with ▲▼ or press **ESC**

Instrument will warn user before deleting analysis data. Press **ENTER** to delete or press **ESC** to come out from menu.



Selected Record deleted and ready to select other record if required.

10.3.2.2. Search Analysis Data with Record No. to delete:



Enter record number with numeric keys to delete and press **ENTER**

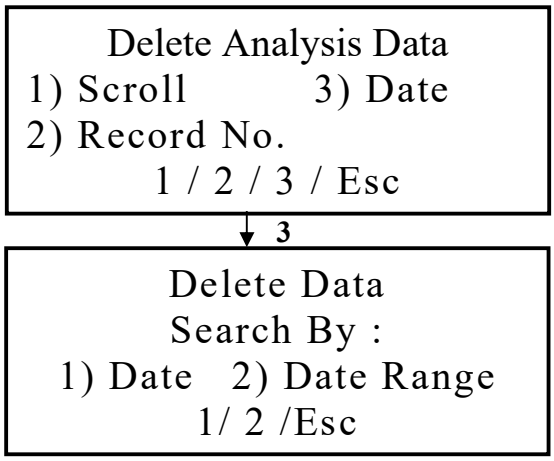
If the selected record is not found or already deleted earlier, system gives Blank Record display.

Select other record with ▲▼ or press **ESC**

Instrument will warn user before deleting analysis data. Press **ENTER** to delete or press **ESC** to come out from menu.

Selected Record deleted and ready to select other record if required.

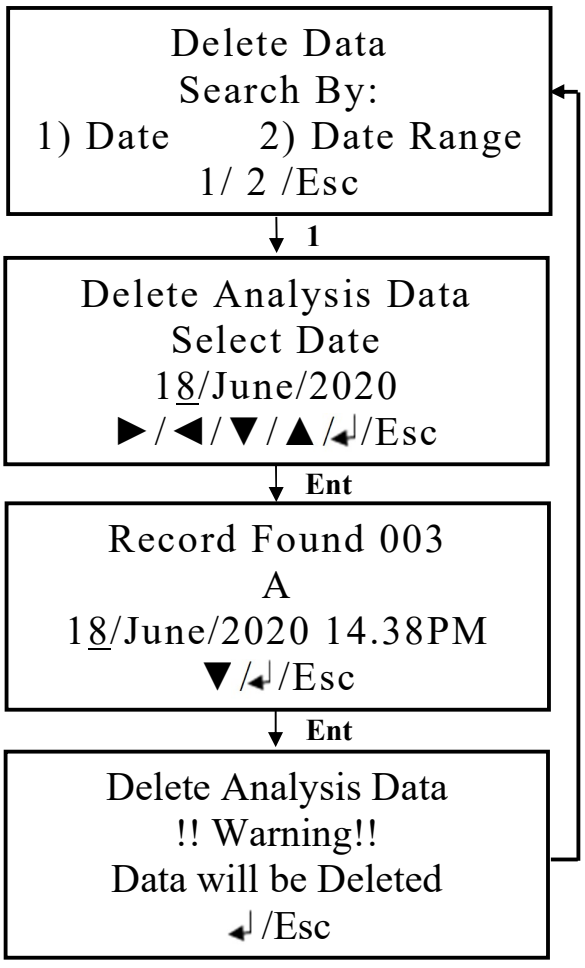
10.3.2.3. Search Analysis Data with Date to delete:



Press 3 to search analysis data with date to delete

Press 1 to search analysis data with specific date.

10.3.2.3.1. Data Search with Specific Date:



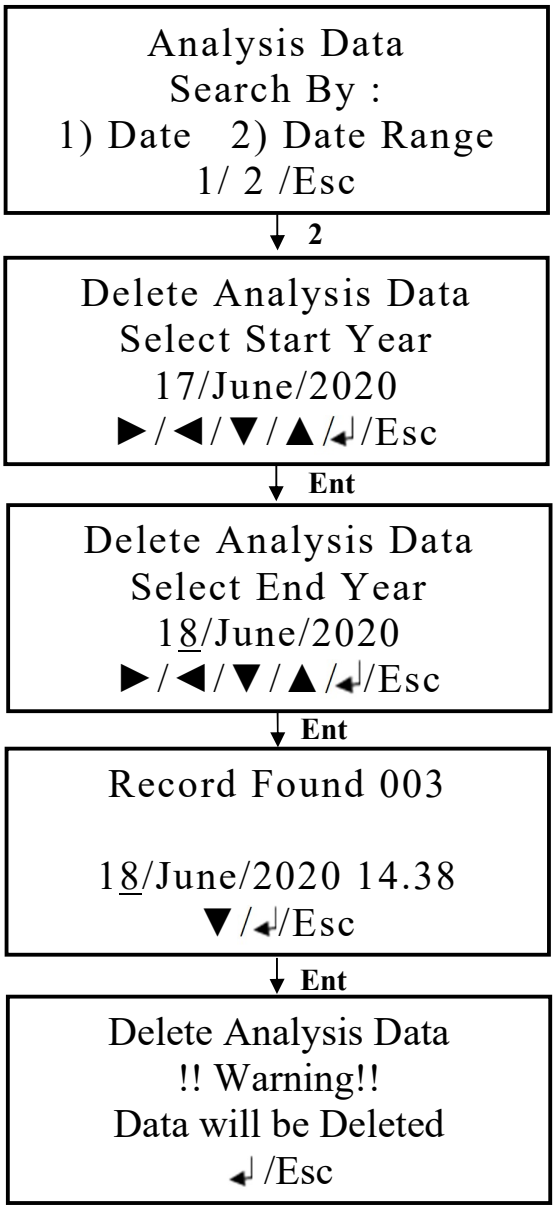
Press 1 to find analysis data for specific date.

Select Year, Month and date help of ►/◄/▼/▲ keys and press **ENTER**

Instrument will search record numbers saved on selected date. Press ▼ to find other records with same date.

Select analysis data and press **ENTER** to delete. Instrument gives warning once. Again, press **ENTER** to delete data.

10.3.2.3.2. Data Search with Date Range:



Press 2 to find analysis data for date range

Select Start date - Year, Month and date help of ►/◄/▼/▲ keys and press **ENTER**

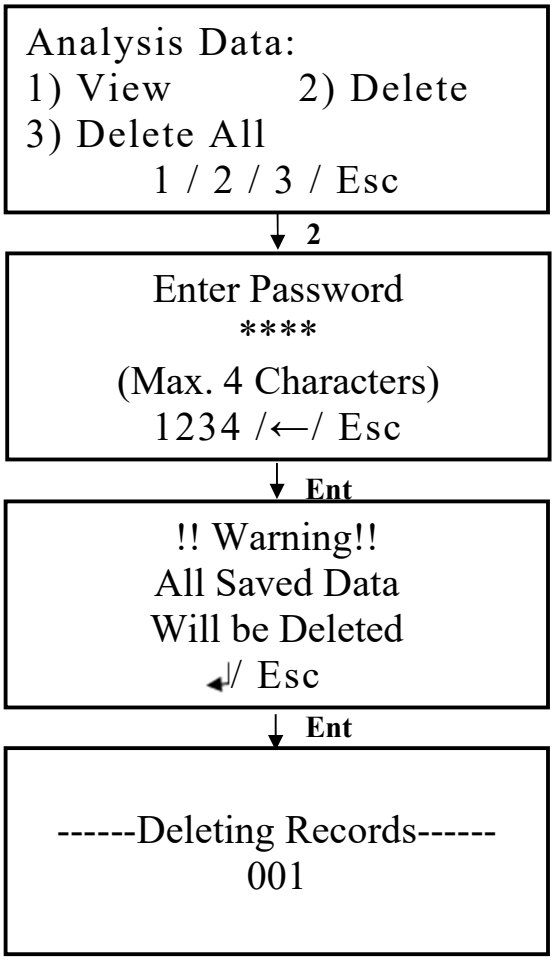
Select End date - Year, Month and date help of ►/◄/▼/▲ keys and press **ENTER**

Instrument will search record number saved in between selected date range. Press ▼ to find other records of selected date range.

Select analysis data and press **ENTER** to delete. Instrument gives warning once. Again, press **ENTER** to delete data.

10.3.3.Delete All Analysis Data:

All saved analysis data can be deleted to gather from this sub mode. This mode is password protected.



To delete Saved Analysis data press 2

Enter password from alphanumeric keypad. Use ← key if wrong character entered.

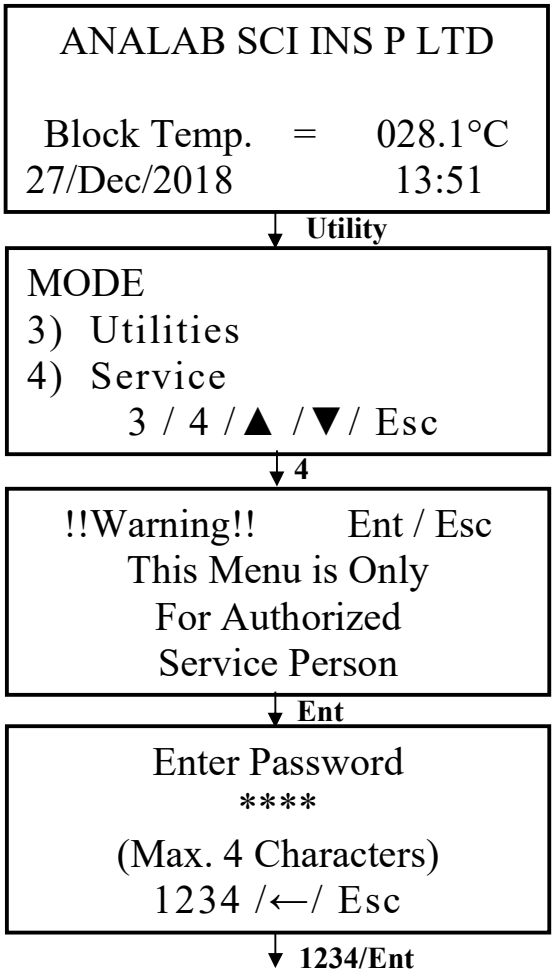
Instrument give warning before deleting all save data. Press **ENTER** to confirm delete.

All analysis saved data will be deleted

10.4. Mode 6: Service

This mode is useful to set Serial Number of instrument, Installation date set and for Version upgradation. This mode is password protected.

This mode can be operated only by authorized person of ANALAB. If other than authorized person operates this mode, ANALAB is not liable for any mal operation of instrument.

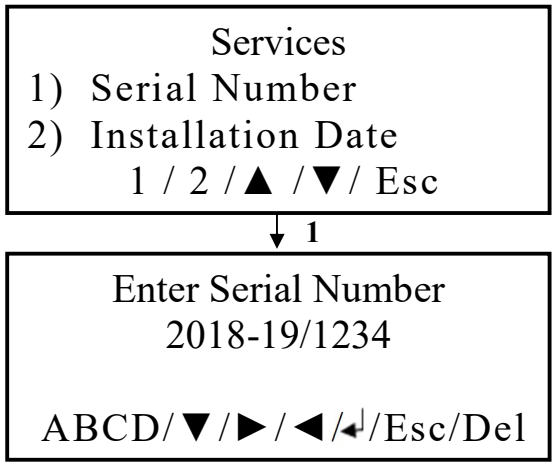


Press **UTILITY** and ▼key to scroll modes.

Press 4 to select Service mode.

Enter password from alphanumeric keypad.
Use ← key if wrong character entered.

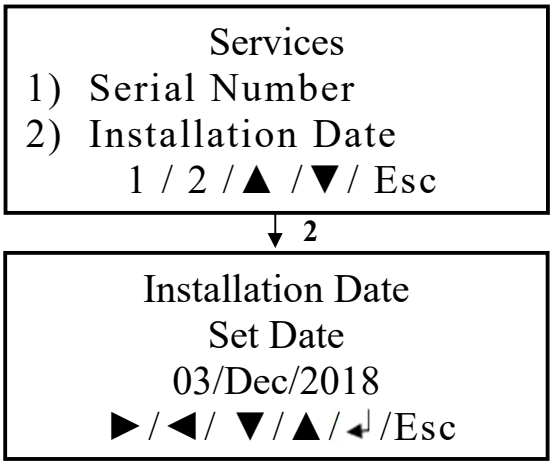
10.4.1.Serial Number



Press **1** to enter serial number of instrument.
(Serial number should not change by user)

Enter Serial Number

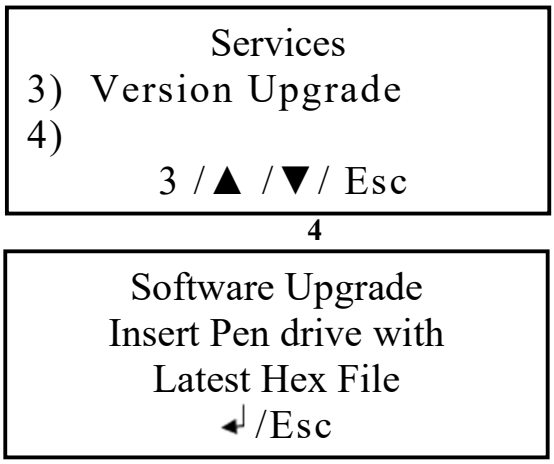
10.4.2.Installation Date:



Press 2 to enter Installation date of instrument. (should fill by authorized person of ANALAB or ANALAB authorized dealer)

Set installation date and press **ENTER** to update.

10.4.3.Version Upgrade:



Due to continuous in-house research in instrument software, new versions must be upgraded. This mode is useful to upgrade to a new version on site.
Press **4** and **ENTER**

Authorized ANALAB person will upgrade the software version whenever it is available.

11. Standard Operating Procedure (SOP)

11.1. General

11.1.1. Create method for sample to be analyze in method mode. (or select analysis method directly from keypad as USP1/USP2/USP3)

11.2. Operation of Tap Density Apparatus

11.2.1. Fill cylinder with sample as per monogram.
11.2.2. Press Assign method key and assign appropriate method or Press USP1/2 or 3 directly from keypad
11.2.3. Enter and confirm Sample weight
11.2.4. Enter Sample Volume. (V0)
11.2.5. Tapping will start as per TAP 1 setting in method.
11.2.6. Enter sample volume after first Tapings. (V1)
11.2.7. If sample volume difference between initial volume (V0) and after 1st taping volume (V1) is more than 2 ml., proceed for 2nd Tapings.
11.2.8. After the 2nd Tapings again enter sample volume (V2).
11.2.9. If sample volume difference between V1 and V2 is less than 2 ml, instrument will show total numbers of taps and Sample result in Tap Density, Hausner Ratio and compressibility of sample.
11.2.10. If sample volume difference between V1 and V2 is more than 2 ml, proceed for 3rd Tapings.
11.2.11. Save this record by pressing the SAVE key, instrument will ask to enter username and batch number. Record will be saved in its internal memory and will update record number. This record can view from Analysis data mode
11.2.12. Press Esc to analyze next sample/s

12.GUARANTEE

All Analab make instruments are guaranteed for a period of 12 calendar months from the date of installation OR 18 calendar months from the date of delivery (whichever is earlier) against defects in material or workmanship other than valves, semiconductor, electrodes, batteries, PVC & Polycarbonate material etc. During the guarantee period, our liability is limited to the repair or replacement at our option of the instrument or parts thereof found to be defective.

13.SERVICE AFTER SALES

The utmost care is taken in the design, manufacture, and inspection of all ANALAB makes instruments to ensure trouble free service for long periods. However, in case of unsatisfactory performance of any our instruments please contact our distributor for your area through whom the instrument was purchased under intimation to us.

Manufactured By:

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