



# COATING THICKNESS METER

## User Manual



DFT-821

# USER INSTRUCTIONS

Please read this manual carefully before your first utilization

- 1>By any means, do not disassemble or repair the meter; reforming illegally is not allowed. Keep it properly away from children and irrelevant people.
- 2>Do not use it nearby planes or medical instruments which could be interfered by electromagnetic radiation of this meter. Do not use it in combustible, explosive places.
- 3>Do not throw away the meter at the end of its working life with the normal household waste, please dispose it by nation or local related laws and regulations.
- 4>The broken-down meter which is beyond the warranty time could be handed over to the company for repairing according to its charging standards.
- 5>The warranty service is not available for any of the below situations: disassembling the product by yourself; transportation damage; improper safekeeping; all kinds of wrong operations without looking over the manual and altering warranty card.
- 6>If there are any troubles on quality, or any doubts about utilization, please contact the local agent or us, we will solve it as soon as possible.

## Introduction

- Based on the magnetism and the eddy current feature of metal substrate, the meter can distinguish the property of metal substrate precisely. With high-precise probe, the meter can accurately measure the non-magnetic coating thickness on magnetic substrate surface (like, the coating of painting, rubber and enamel, etc.), and the non-conducting coating thickness on non-magnetic metal substrate surface (like, the coating of painting, rubber, etc.).
- Researched with constant testing and improvement, the basic standard of complex environments of all kinds of major industries, the end comes to the final meter, it can measure the coating thickness accurately, rapidly and un-harmfully, suitable for all kinds of major industrial workshops, labs and outside environment.

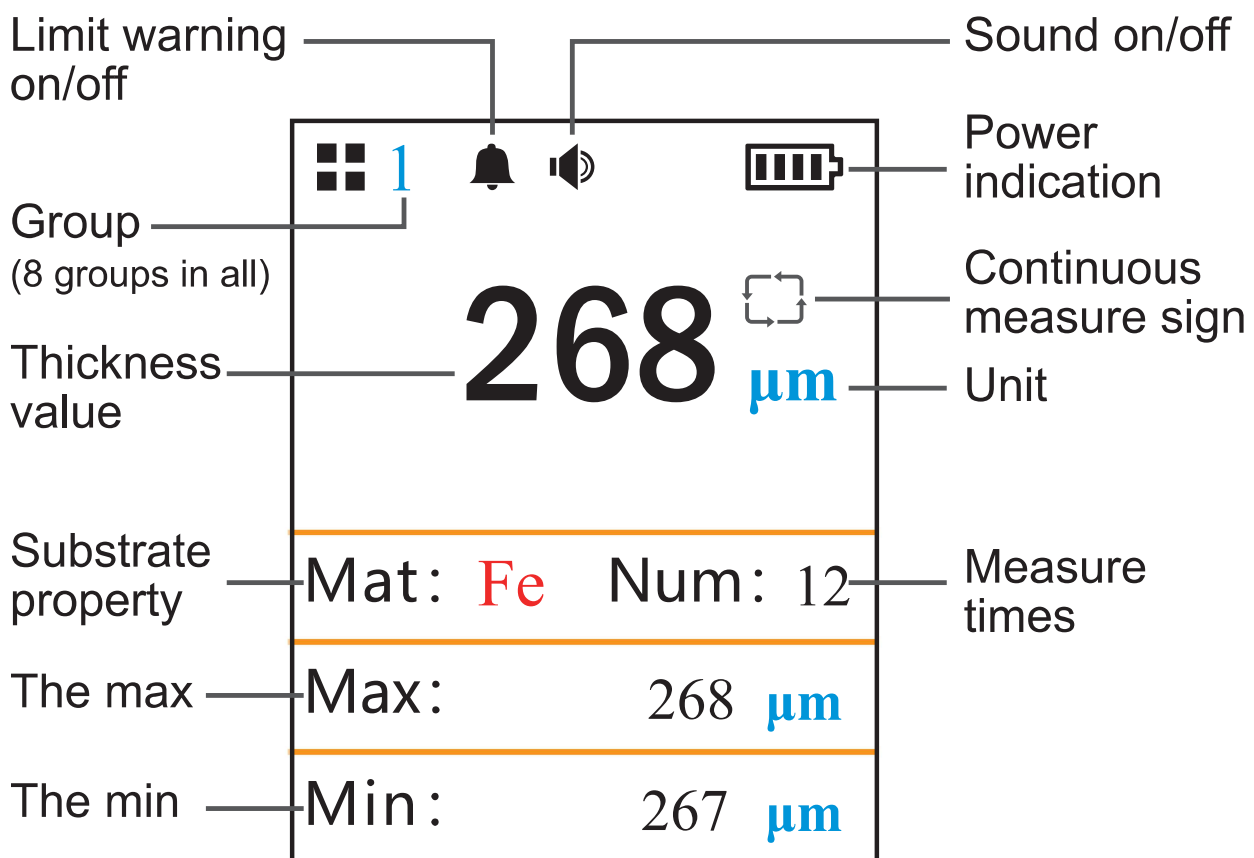
## Features

- **The main functions and features**
  1. 2 inches color screen
  2. Rotatable screen with four directions
  3. Built-in 850mAh lithium battery
  4. USB port connecting PC to export data
  5. Voice broadcast
  6. Data grouping, 8 groups and each 32 sets of data
  7. Calibrated data grouping, corresponding to calibrating 8 groups of base-metal
  8. On screen shows directly the thickness of the cover and the material of the base-metal

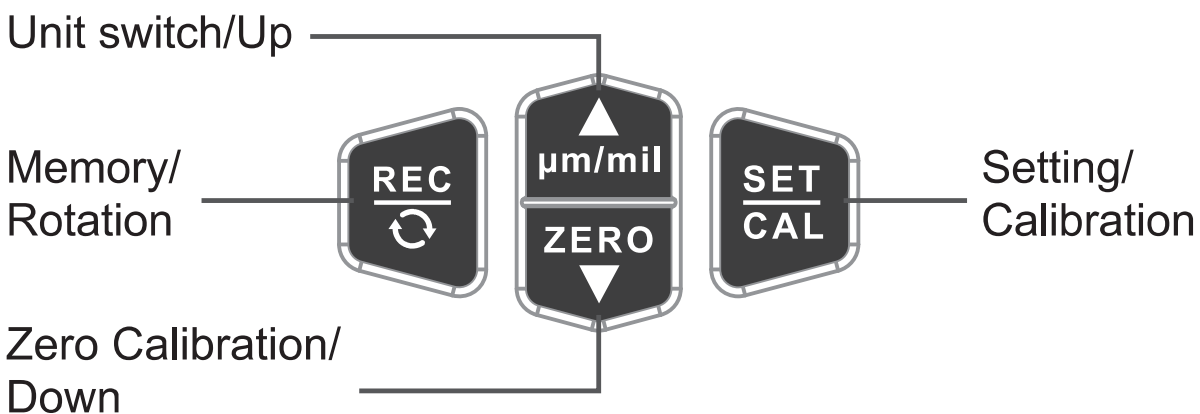
## ● Other functions and features

9. Histogram display
10. Upper/Lower limit warning function
11. Pressing for power-on, the time of auto-OFF is settable
12. Restoring factory settings and calibration values
13. Statistics: the average(Avg), the max(Max), the min(Min), and the standard deviation(SDev)






### Functions introduction and keys



And Fe is for magnetic material, NFe is for non-magnetic material.








## The Home page






On the Home screen, the upper left corner shows the group number “  * ”	
	Short press for the Menu; Long press for the calibration mode of current group.
	Short press to switch groups; Long press to switch units between µm and mil.
	Short press to display datum in histogram; Long press to calibrate the zero-spot, save the current measured value as the zero-spot's value.
	Short press to save the current measured values; Long press to rotate the screen.

**Attention:** After switching groups, the error of measured value could be caused by the difference of calibrated data.

## The Menu


On the Home page, short press the  key to enter the menu page	
	Short press to choose the options in the menu page
	Short press to move forward or increase the value by 1
	Short press to move backward or decrease the value by 1
	Short press to return to the previous

## Calibration mode

On the Home page, long press the  key to enter the calibration mode, and calibrate the datum in the current group	
	Short press to switch the calibrating spots: 1(0 $\mu$ m), 2(50 $\mu$ m), 3(100 $\mu$ m), 4(250 $\mu$ m), 5(500 $\mu$ m), 6(1000 $\mu$ m), six spots in all
	Short press to increase the thickness by 1
	Short press to decrease the thickness by 1
	Short press to exit the calibration mode

\* Long press the  key beyond 15 seconds to shut it down or restart compulsively.

## The lithium battery charging

- The product is equipped with 3.7V/850mAh lithium battery which is built-in and non-removable
- Please charge it if it can not be turned on or there is no power indication after starting up
- Please use charging adapter with DC5V and over 1A to charge it, the charging port is the microUSB port. (We recommend to use phone charger)
- The battery icon will be displayed in scrollable way during charging process. The battery icon  will show green color and be full when the charging process is completed.

## The battery maintenance

Keep it with full power if no operations for a long time; and charge it once every half year to avoid the battery damage.

## The meter's ON



PIC 1 Turning it on nearby the metal substrate is not the right way.



PIC 2 Turning it on away from the metal substrate is the right way.

The least 5cm is necessary distance between the meter and the metal substrate for turning the meter on, or the other way is to lift the meter away from the metal substrate quickly after turning the meter on. The meter will sound the warning in succession "beep...beep...beep" if turning it on nearby the metal substrate. The operation of turn-on nearby the metal substrate could affect the meter's regular measuring, because the meter will go through the calibration balance the moment its turn-on.

## The calibration


The meter is released with calibrated benchmark datum which is based on standard substrate (random iron and aluminum block). To the measuring of individual materials, please go through the Zero-spot calibration and calibration-film calibration over the to-be-tested substrate for accurate datum.

### ● Zero-spot calibration

This operation is to go through the zero calibration over the substrate's zero-spot and aimed to get the more accurate zero-spot.

**Attention: The zero-spot calibration is only applicative in the current boot status, and can not be saved after power-off.**

Basic operations:

- A. Process single measuring over the substrate, a set of datum is showed on screen, the meter sound "beep".
- B. Long press the  key, the main data returns to zero on screen, and the meter sound "beep" twice, and the calibration is completed.
- C. Repeat the process A and B for more accurate calibrated datum.

### ● Calibration-film calibration

With different specification calibration-films, process multi-spots calibrations over the substrate to guarantee the validity of measured datum on different property substrates.

Basic operations:

- A. On the Home page, switch to the group that need calibration, long press the  key to enter the calibration mode, the screen shows the following figure:



① the calibration mode

② the current group number

(8 groups in all, and each group of calibrated datum is mutual independence )

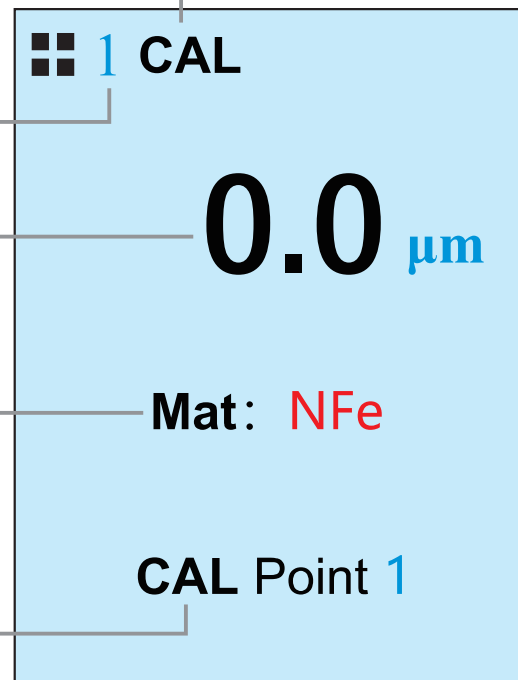
③ the thickness value corresponding to the calibrating spot

④ Substrate material



Attention: Except for the zero spot, in other spots, the thickness can be adjusted based on the calibration sample of thickness



⑤ the calibrating spots (six spots in all)

1 (0 $\mu$ m)	2 (50 $\mu$ m)	3 (100 $\mu$ m)
4 (250 $\mu$ m)	5 (500 $\mu$ m)	6 (1000 $\mu$ m)




B. At this moment, the bottom of the screen shows "CAL Point 1", the main display area shows the standard thickness value which is "0.0 $\mu$ m", and it means the zero-spot is already calibrated. Measuring once over magnetic metal substrate or non magnetic, the meter sounds "beep" twice, then the zero-spot calibration is completed, and the meter goes to next calibration spot automatically.

C. At this moment, the bottom of the screen shows "CAL Point 2", the main display area shows "50.0 $\mu$ m"(Attention: this value could be some one data from 45 to 55), and it means the second spot with 50 $\mu$ m is already calibrated. Put the calibration-film with 50 $\mu$ m thickness(the thickness could be around 50 $\mu$ m)on the substrate which is used to calibrate the zero-spot previously, first compare the meter's reading with the calibration-film thickness, if it's inconsistent, then press the  key or  key to adjust the reading till it is same with the calibration-film thickness, then measure again to complete the 50 $\mu$ m calibration, and the meter goes to next calibration spot automatically.

- D. Refer to the previous step C, continue to calibrate the 3(100 $\mu$ m), 4(250 $\mu$ m), 5(500 $\mu$ m), 6(1000 $\mu$ m). After the sixth spot is calibrated, the meter exits the calibration mode automatically.
- E. If just want to calibrate one of the six spots, then press the  key to switch the calibration spots in calibration mode. Press  key to exit the calibration mode.

### Attention:

1. Only use same one substrate for calibrating the six spots which forms a period one by one, changing the substrate during this process could cause the wrong datum.
2. Calibrating the non magnetic materials(such as aluminium), keeping the magnetic materials away is necessary for right datum.
3. Each group of calibrated datum is mutual independence, such as, calibrate the first group, the other seven groups will not be affected.








\* \* During the calibrating process, if the meter shows "Err", then measure the current thickness once again. If this message does not disappear after measurement a few times, then please press the  key to return to the Home page and calibrate again with eligible calibration sample and substrate.

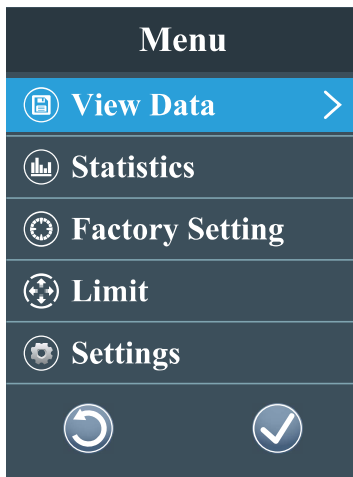
## Basic measurement

- A. Prepare the sample to be tested.
- B. Place the meter in vacant space away from metal material for turn-on.
- C. Start to measure: Press slightly the meter vertically on the sample, the meter sounds "beep" once, the measurement is completed, on the main display area shows the result data, move the meter away from the sample over 5cm quickly, and process next measurement after 1 second.
- D. At this moment, if the phonetic function is on, the meter will broadcast the result automatically.

# View and delete data

## ● View data

- A. On the Home page, press the  key for the menu page, choose the option of "View Data", and press the  key for the list of saved datum.
- B. Press the  or  key to view the last/next page of record.
- C. Short press the  key to return to the previous, or measure directly to return to the Home page.
- D. Shorting press the  or  key will not enter the viewing-data mode if there is no stored record.



PIC 3





PIC 4

— represents the current page




— represents the total pages

## ● Delete data

### ① Delete all datum:

- A. On the Viewing-data page, long press the  key to clear all lists of datum, and the meter sounds "beep beep" to indicate the completion.
- B. Short press the  key to return to the previous, or measure directly to return to the Home page.

### ② Delete individual data:





- A. On the Viewing-data page, press the  key to choose the first set of datum in the current page, then choose the wanted set by the  or  key, and short press

the  key to delete it, and the meter sounds "beep" to indicate the completion.

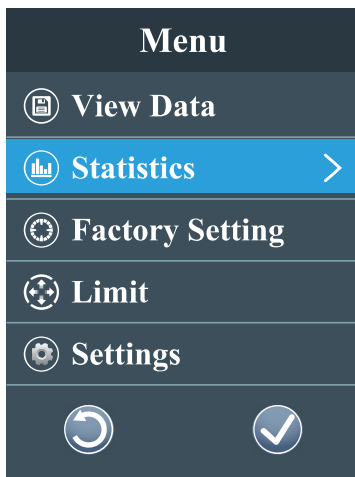
B. Short press the  key to return to the previous, or measure directly to return to the Home page.

## The statistics

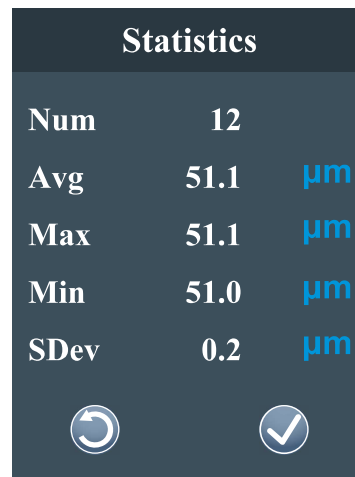
The statistics includes the measuring times, the average, the max, the min, and the standard deviation.

A. On the Home page, press the  key for the menu page, choose the option of "Statistics" by the  or  key, and press the  key for the list of the statistics.

B. Short press the  key to return to the previous, or measure directly to return to the Home page.








PIC 5



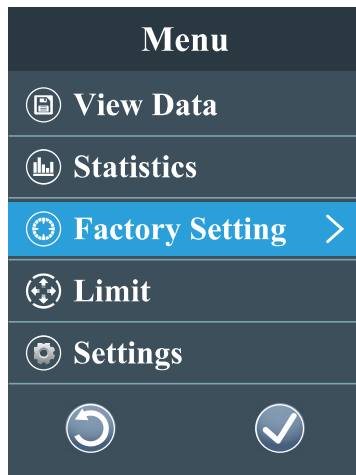
PIC 6

## Restore factory settings

A. On the Home page, press the  key for the menu page, choose the option of "Factory Setting" by the  or  key, and press the  key for the setting page. Press the  key to choose "Yes", the meter will be restored to factory state with all parameters and calibrated default value.

B. Short press the  key to return to the previous, or measure directly to return to the Home page.

Attention: All calibrated datum in 8 groups will be cleared and restored to factory default values after this operation.




PIC 7




PIC 8










## The warning limit value





User can set the warning upper or lower limit value which can be turned off during measuring process.

When the measured value is greater than the upper limit value, on the screen flashes the icon , and the meter sounds "beep...beep..." to warn the user.

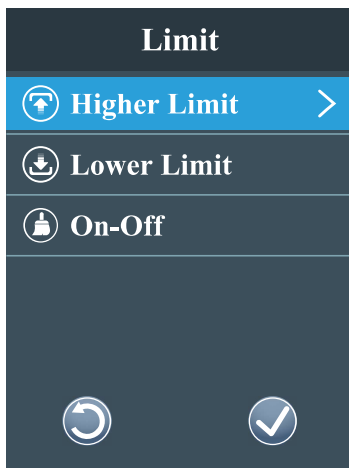
When the measured value is less than the lower limit value, on the screen flashes the icon , and the meter sounds "beep...beep..." to warn the user.

Press any one of keys to stop the warning when the meter gives upper or lower limit value warning.

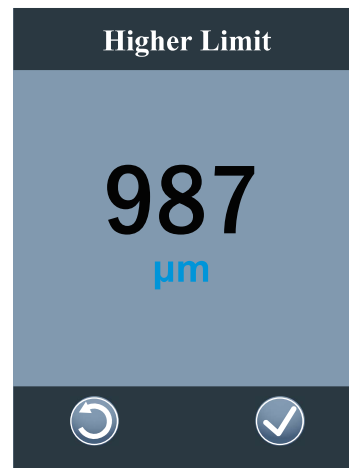
- A. On the Home page, press the  key for the menu page, choose the option of "Limit" by the  or  key, and press the  key for the setting page.
- B. By the  or  key, choose the option of "Higher Limit", or "Lower Limit", or "On-Off", and press the  key for the corresponding setting page.
- C. On the higher or lower limit value's setting page, short press the  or  key to increase or decrease the value, long press the same keys to adjust the value in succession.

- D. On the On-Off's setting page, short press the  or  key to choose "On" or "Off" upwards or downwards, and press the  key to enter.
- E. Short press the  key to return to the previous, or measure directly to return to the Home page.

- \* \* The setting range of the limit value is 0~1999µm;  
 The upper limit warning is Off when the higher limit value is set as 1999µm;  
 The lower limit warning is Off when the lower limit value is set as 0µm.



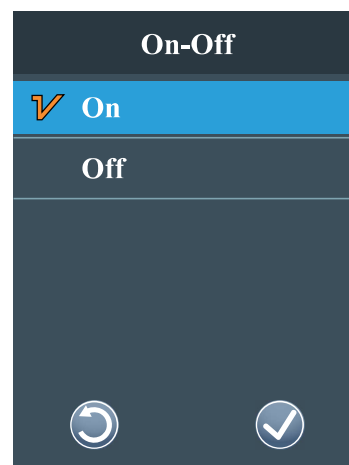
PIC 9



PIC 10










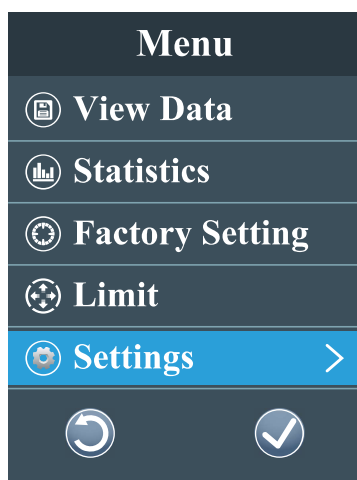
PIC 11



PIC 12

## The parameter settings

- A. On the Home page, press the  key for the menu page, choose the option of "Settings" by the  or  key, and press the  key for the setting page.
- B. By the  or  key, choose one of the following options: Measure Mode, Sound Prompt, Power Off, Group Mode; and press the  key for the corresponding setting page.



PIC 13







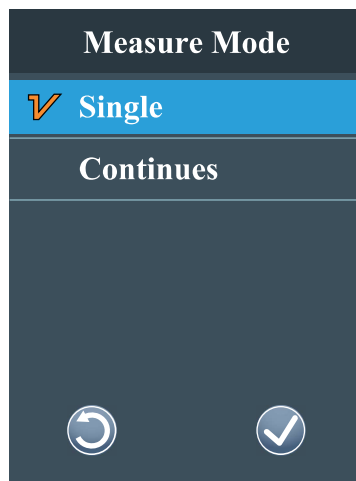
PIC 14

### ● Measure Mode

Single: Each measurement updates only one data, please softly press the meter on the measured part swiftly and perpendicularly.

Continues: Just softly press the meter on the measured part and do not remove it, the data will update automatically in succession. Each updating accompanied by sound "beep" once.

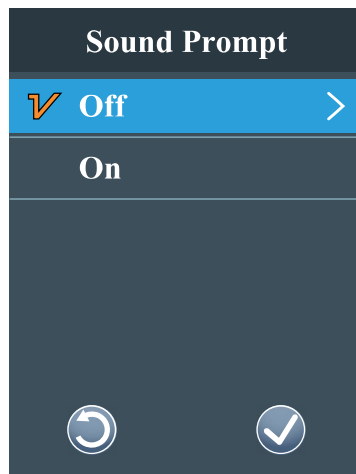
- A. On the Measure-Mode's setting page, choose the option of "Single" or "Continues" by the  or  key, and press the  key to enter.
- B. Short press the  key to return to the previous, or measure directly to return to the Home page.



PIC 15

## ● Sound Prompt

- A. On the Sound-Prompt's setting page, choose the option of "On" or "Off" by the  $\mu\text{m}/\text{mil}$  or ZERO key, and press the SET CAL key to enter.
- B. Short press the REC key to return to the previous, or measure directly to return to the Home page.



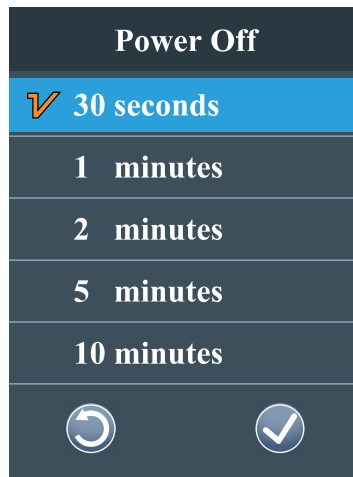
PIC 16

## ● Power Off

The meter provides five choices of auto-OFF time for user to save power. The meter will automatically shut down without any operations in the specified auto-OFF time.

- A. On the Power-Off's setting page, choose the time of auto-OFF by the  $\mu\text{m}/\text{mil}$  or ZERO key, as follows: "30 seconds", "1 minute", "2 minutes", "5 minutes", "10 minutes", and press the SET CAL key to enter.
- B. Short press the REC key to return to the previous, or measure directly to return to the Home page.



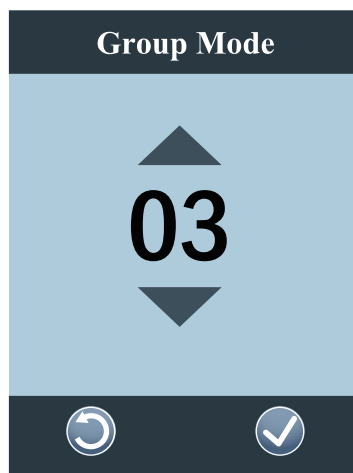


PIC 17

## ● Group Mode

The meter provides eight data-groups for convenience, on the Home page shows the corresponding group number “ 1”, each group storing 32 sets of datum which is mutual independence. The calibrated parameters in each group is mutual independence, user can operate calibration and storage according to different measuring circumstance.


- A. On the Group-Mode's setting page, switch data-groups by the  $\mu\text{m}/\text{mil}$  or key, and press the key to set the chosen data-group.
- B. Short press the key to return to the previous, or measure directly to return to the Home page.
- C. On the Home page, short press the  $\mu\text{m}/\text{mil}$  key to switch data-groups quickly.



PIC 18

## Unit setting

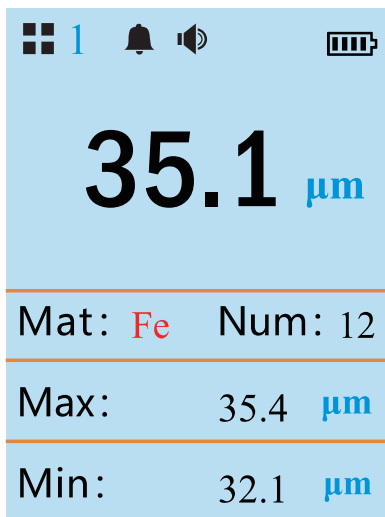
There are two alternative units, user can choose appropriate unit according to the demands.

On the home screen, long press the  key to switch the unit quickly.

The conversion relationship:

1mil=25.4 $\mu$ m;

1 $\mu$ m=0.03937mil;





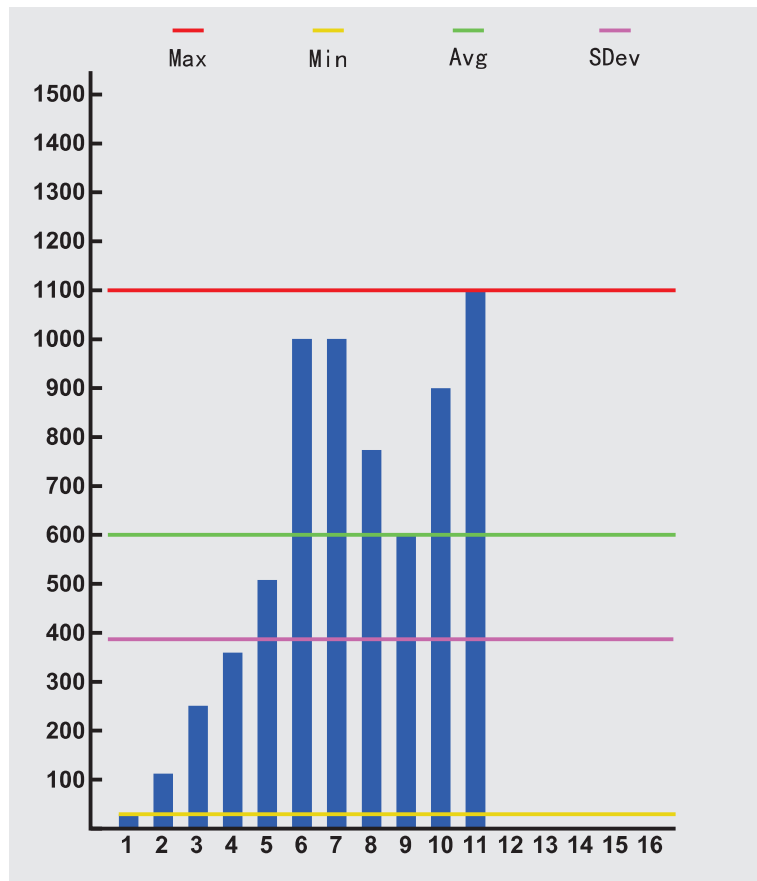
PIC 20



PIC 21

## Histogram mode

On the Home page, short press the  key to turn the datum display into histogram display, short press the  key or measure directly to exit the mode.



PIC 22

## Screen rotation

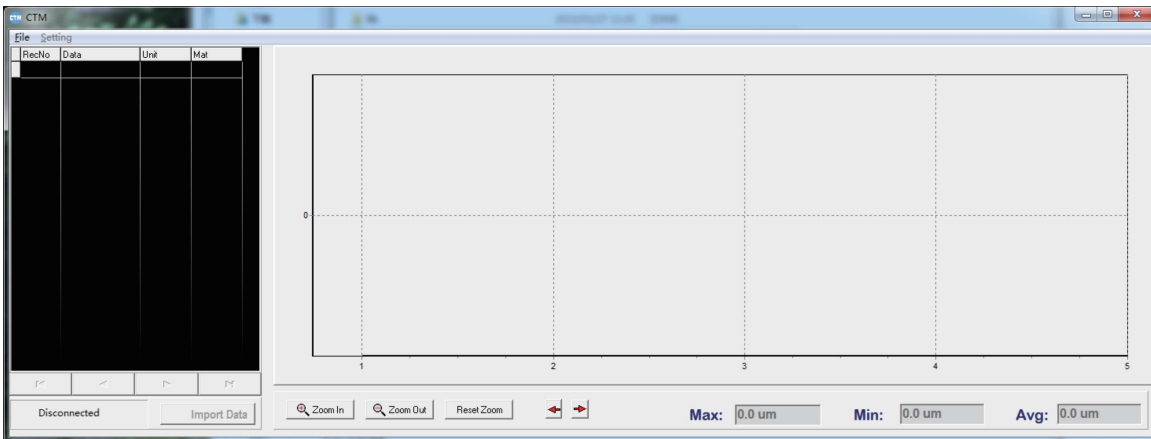
On the Home page, long press the  key to rotate the screen, each time with screen rotating 90 degree.

## The computer software

The meter is equipped with the computer software CTM (Coating Thickness Meter). The CTM software has below functions: export records, produce histogram, calculate the max/the min/the average value, produce printable statement, export information to EXCEL software, and system setting.

For the specific operation introduction, please refer to “readme EN VR”.

The software interface diagram:



PIC 23

## Specifications

Items	DFT-821
Measuring range	magnetic material 0~1700μm; non magnetic material 0~1700μm
Resolution	0.1μm @ (0~99.9μm); 1μm @ (100~1700μm)
Indication error	$\pm(2+2\%*H)\mu\text{m}$ @ (0~500μm) $\pm(2.5\%*H)\mu\text{m}$ @ (500~1700μm)
Min measuring area	magnetic material 25×25mm; non magnetic material 25×25mm
Min curvature	convexity 5mm; concave 30mm
Min substrate thickness	magnetic material 0.2mm; non magnetic material 0.05mm
Screen	2 inches color screen
Memory	8 groups and each 32 sets of data
Data Export	USB port connecting PC to export
Battery specification	3.7V 850mAh lithium battery
Working temp and humidity	0°C~50°C, 10%~80%RH
Storage temp and humidity	-10°C~60°C, 10%~70%RH
Dimension	120x52x26mm

## General maintenance

- Keeping in high temp and humidity environment in the long run is not allowed; please put it inside the box and keep the box in dry and cool place.
- Please keep the surface clean, wipe the dust with wet soft cloth, do not use corrosive cleaning fluid.
- Keep it with full power if no operations for a long time; and charge it once every half year to avoid the battery damage.

## Detail packing list

Please check if there are all appendixes according to the following list when purchase this meter.

Items	Name	Unit	Quantity	Remark
1	The Meter	PC	1	
2	Pouch	PC	1	
3	Sling	PC	1	
4	USB Cable	PC	1	
5	The Manual	PC	1	
6	Color-box Package	PC	1	
7	Iron Substrate	PC	1	
8	Aluminium Substrate	PC	1	
9	Calibration Film	PC	5	
10	Small PP Box	PC	1	for storing the substrates and the calibration films

Web:[www.hazari.com](http://www.hazari.com)