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ISO-1500F
COATING THICKNESS GAGE
OPERATION MANUAL

V0

INSIZE

General Information

1.1 Applications

This compact, handy pocket gauge is designed for non-destructive, fast and precise coating thickness measurement.

ISO-1500F measures with the high precision, is user-friendly and sturdy. The instrument is ideal for uncomplicated reliable on-site applications. With its integrated measurement probe, measures the thicknesses of coatings quickly and non-destructively utilizing the magnetic induction.

ISO-1500F is suitable for non-destructive, quick and precise coating thickness measurement. Easy to handle they are the ideal instrument for the finishing industry, electroplating, ship and bridge building, aircraft construction and the engineering and chemical industry.

1.2 Principle

Work on the magnetic induction principle and should be used for nonmagnetic coatings such as aluminum, chrome, copper, zinc, paint and varnish, enamel, rubber etc., on an iron or steel substrate; they are also suitable for alloyed and hardened magnetic steel.

1.3 Standards & Regulation

GB/T 4956, JB/T 8393, DIN EN ISO 2178, ASTM B499.

1.4 Operating Environment

Tempature:0℃-40℃;
Humidity:20%RH-90%RH;
The environment must be free from strong magnetic field, strong vibration, and no corrosive medium and severe dust.

1.5 Description

Measured values and user information are shown on a large, easy-to-read LCD display. A display back light ensures easy reading of screen data in poorly-lit conditions. The gauges' user-friendly measuring system permits automatic storage of up to 1000 readings.

Appendix

Specifications

Test Method: Magnetic induction
Measuring Range: 0~1500μm (0 ~60mil)
Resolution: 0 ~ 999μm: 0.1μm, ⩾1000μm: 1μm
Accuracy: up to 100μm: ± 1.5 μm;
100 ~ 1500 μm: ⩽ 1.5 %
Data Memory: up to 1500 readings.
Display: Graphic LCD with backlight
Power Supply: 1.5V*3 (AAA-type batteries).
Operating Temperature: 0 ~ 50°C
Dimension: 88 X 67 X 30 mm
Weight: 120 g

4.3.1 Protect the gauge from dirt, dust, humidity, chemicals and corrosive vapors. And do not let the gauge drop.

4.3.2 After use, please store the gauge in the protective case.

4.3.3 Avoid direct, strong sunlight and temperature-shocks as these can have a negative influence on the measurement result.

4.3.4 The instrument housing is resistant to most chemical cleaners; use a soft, moist cloth for cleaning.

4.3.5 Exact measurements can only be taken with a clean probe. Therefore the probe has to be checked and cleaned regularly so that any paint residue and iron fragments can be removed.

4.3.6 When the batteries are low, "▭" will be displayed and flicker.

The batteries should be changed immediately (Note: 1.5V alkaline battery 3 pcs).
The calibrations and all kinds of settings are stored in a nonvolatile memory, they will not be lost even if batteries go

dead completely or during the process of changing the batteries.

If the gauge is not to be used for an extended period of time, remove batteries to avoid battery acid spoilage and the resultant destruction of the electronics.

4.3.7 The standard thickness foils are important in the calibration procedure. If the foils are worn, broken, bent or damaged, replacements are available from your dealer.

4.3.8 If the gauge has a fault condition, please return it to the agent who will assist you. If possible or return it to the factory for repair.

A portable wireless printer (optional) allows immediate printing of measured values and subsequent printing of the statistical values by means of RF.

Structure

2.1 Gauge

The structure and appearance of ISO-1500F are shown as Fig.2-1 and Fig.2-2.

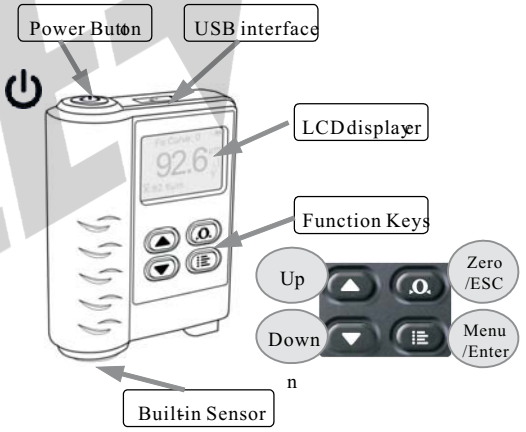


Fig. 2-1

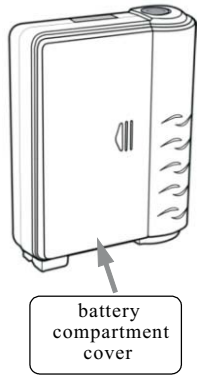
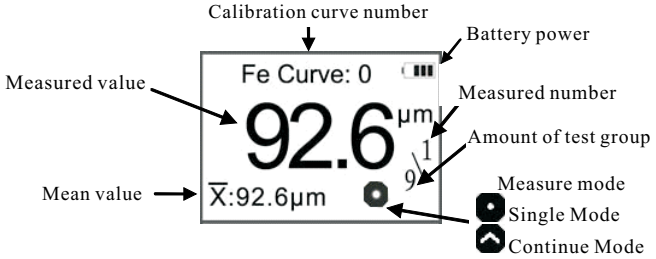


Fig. 2-2

2.2 LCD Display



Operation

3.1 First Steps

3.1.1 Insert batteries

a) Slide and open the battery compartment cover, as shown in Fig.3-1.

b) Insert the batteries into the battery compartment. Respect polarities as shown in Fig.3-2.

Fig.3-1

Fig.3-2

c) Close and fix the battery compartment cover.

3.1.2 Switch on

a) Press Power Button ⏻ to turn the gauge on.

b) Check the gauge no any abnormal.

Note: If there are magnetic metals near the probe at the moment of swatch on, the gauge will display a alarm "Detect Error: Surround Error!". Should take gauge far from magnetic metals and wait few seconds it can go normal.

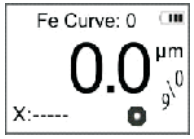
3.1.3 Switch off

When the gauge is switched on, press ⏻ to turn the power off.

3.2 Measuring Procedure

a) Ready the test piece;

b) Switch on the gauge, it should display logo and then "0.0μm" or "0 mil".



c) Calibrate the gauge if necessary. (see 4.1 Calibration)

4.2.2 Basis-metal thickness

The gauge has a critical thickness of the basis-metal, greater than it the measurement will independent of the thickness. It is about 0.5mm for ISO-1500F.

4.2.3 Roughness

Measurements are influenced by the surface topography of the basis metal and coating. Surface roughness becomes significant when the degree of roughness is greater than 10 % of the coating thickness, causing increased scatter in measurements. Therefore, on a rough or scratched surface, to make a greater number of measurements at different positions to obtain an average value that is representative of the mean coating thickness. If the basis metal is rough, it may also be necessary to check, and adjust. If necessary, the zero of the instrument at several positions on a portion of the uncoated, rough basis metal.

4.2.4 Residual magnetism

Residual magnetism in the basis metal affects the measurements made by gauge that employ a stationary magnetic field. Its influence on measurements made by gauge employing an alternating magnetic field is much smaller.

4.2.5 Stray Magnetic Fields

Strong stray magnetic fields produced by various types of electrical equipment, can seriously interfere with the operation of the gauge.

4.2.6 Coating deform

For very soft coating, measuring probe will make deformation, so the measurements of these specimens can't be reliable, or may be impossible.

4.3 Maintenance

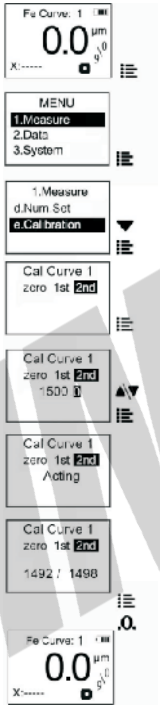
ISO-1500F is a precision instrument with a wide scope of applications. It is therefore of great importance that the unit is handled with care to ensure an extended life and accurate measurement results. So the following guidelines are important.

g) Measuring the standard thickness foil on substrate 4 or 5 times.

h) Press ☰ to confirm calibration, or press .0. to discard calibration. Press .0. to exit.

4.1.3 Two-points calibration

Before performing the two-points calibration, zero-calibration and one-point calibration must be performed in accordance with 4.1.1 Zero-calibration and 4.1.2 One-point calibration.



a) In the measurement state, press the key ☰ to enter the menu.

b) Press ▲ or ▼ to select "1.Mesure"; press ☰ enter;

c) Press ▲ or ▼ to select "e. Calibration", press ☰ to enter;

d) Press ▲, select "2nd"; press ☰ to display "0000.0";

e) Press ▼ to enter values adjustment.

f) Adjust to mean value of standard thickness foil, press ▲ or ▼ to adjust the digital and press ☰ for move to next bit, press ☰ to display "Acting";

g) Measuring the standard thickness foil on substrate 4 or 5 times.

h) Press ☰ to confirm and save this calibration, or press .0. to discard calibration. Press .0. to exit.

Note: The standard foil used in two-points calibration should be thicker than the one used in one-point calibration.

4.2 Factors that affect the measurement

4.2.1 Magnetic properties of the substrate

ISO-1500F used magnetic induction method is affected by variations in the magnetic properties of the basis metal. In order to higher measuring accuracy, the substrate used in calibration adjustment should be the same with the specimen as far as possible.

d) Measurement:
Press gauge on the measured surface of specimen lightly and vertically. Or place the gauge on measured surface of specimen directly. After the buzzer, can lift the gauge and readout the measured value, or measure the next point.

e) Turn off: Press ⏻ to turn off the power.
It will be turn off automatically about 3 minutes later if no any operation.

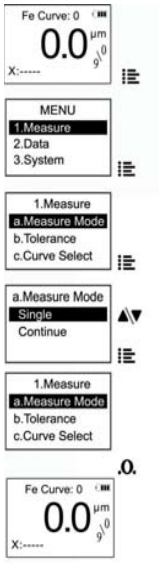
3.3 First Steps

3.3.1 Measuring mode

1) Single mode ●
The sensor of gauge touches the surface of specimen, measure one thickness value. For measuring the another point , must lift up the gauge from surface of specimen no less than 10cm and the interval should be greater than 1 second.

2) Continue mode ◉
Measurement and display continuously no need to lift the gauge from the surface of specimen.

3) Change measuring mode:



a) In the measurement state, Press the key ☰ enter the menu.

b) Press ▲ or ▼ to select "1.Mesure";

c) Press ☰ enter, then Press ▲ or ▼ to select "a. Measure Mode";

d) Press ☰ enter, then Press ▲ or ▼ to select "Single" (single mode) or "Continue" (continue mode);

e) Press .0. back to measurement state.

3.3.2 Limits of tolerance

As the limits of tolerance are set, once the measured value exceeds these limits the gauge will sound alarm.

a) In the measurement state, Press the key to enter the menu.

b) Press ▲ or ▼ to select "1.Mesure";

c) Press enter, then Press ▲ or ▼ to select "b. Tolerance";

d) Press enter, the focus is in ON/OFF, Press to set "On" (turn limit alarm on) or "Off" (turn off limit alarm);

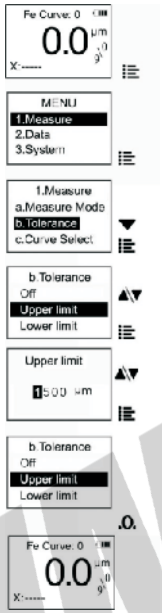
e) Press ▼ can select "Upper Limit" or "Lower Limit", Press to enter limit value input.

f) Press ▲ or ▼ can increase or decrease the digit, Press to move to next bit.

g) Press can save the setting value and exit.

h) Press .0. back to measurement state.

Note：The upper limit should be greater than the lower limit, otherwise this alarm function is invalid.



3.3.3 Select calibration curve

ISO-1500F can memory 6 calibration curves for difference kinds of substrate. Choice a appropriate calibration curve can ensure precision of measurements.

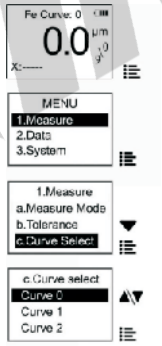
To select the curve:

a) In the measurement state, Press the key to enter the menu.

b) Press ▲ or ▼ to select "1.Mesure";

c) Press enter, then Press ▲ or ▼ to select "c. Curve select";

d) Press enter, ▲ or ▼ select curve number;



2) Menu zero calibration

a) In the measurement state, press the key to enter the menu.

b) Press ▲ or ▼ to select "1.Mesure"; press to enter;

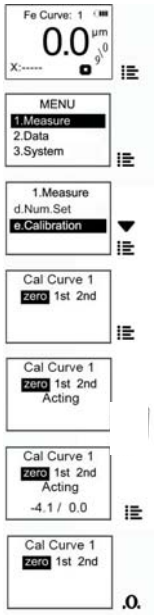
c) Press ▲ or ▼ to select "e. Calibration", press to enter;

d) Press ▲ or ▼ select "Zero"; press to display "Acting";

e) Then measuring on substrate directly. 4 or 5 times measurements should be done for more accuracy.

f) Press for save zero calibration, or press .0. to discard calibration.

g) Press .0. to exit.



4.1.2 One-point calibration

Before performing the one-point calibration, zero point must be calibrated in accordance with 4.1.1 Zero-calibration.

a) In the measurement state, press the key enter the menu.

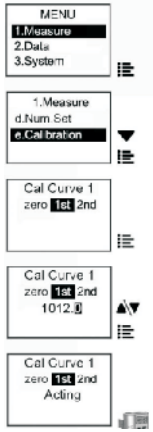
b) Press ▲ or ▼ to select "1.Mesure"; press enter;

c) Press ▲ or ▼ to select "e. Calibration", press to enter;

d) Press ▲, select "1st"; press to display "0000.0";

e) Press ▼ to enter values adjustment.

f) Adjust to mean value of standard thickness foil, press ▲ or ▼ to adjust the digital and press for move to next bit, press to display "Acting";



b) Press ▼, select “3. System” and press ☰ to enter;

c) Press ▼, select “g. Default system”, then press ☰ to enter;

d) A warning information " Are you sure you want to set system to default?" will be displayed. Press ▲ or ▼ to select "Yes" or "No".

e) Press ☰ to confirm and return.

f) Press .0. , return to measurement state.

Calibration and Maintenance

4.1 Calibration

Due to mechanical wear in use, changes in the test environment, with a different calibration of substrate material will be to the gauge to bring a certain error, appropriate calibration can improve its accuracy of measurement.
ISO-1500F is designed with three levels of calibration methods, zero-calibration one-point calibration and two-point calibration.

4.1.1 Zero-calibration

There are two ways for zero-calibration: measuring calibration and menu calibration.

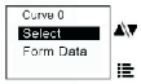
1) Measuring zero calibration

a) In single mode, measuring on substrate directly and measured value is "x.x μm".

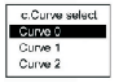
b) Press .0. , zero the display to "0.0μm ".

Note:
i) If "x.x μm" is greater than 80μm, this calibration is invalid, Should use Menu calibration as following.
ii) Repeat the steps a) and b) for more accuracy.

e) Press ☰ enter, Press ▲ or ▼ can select “Select” or “Form Data”, Press ☰ to confirm.



f) Press ▲ or ▼ can increase or decrease the digit, and Press ☰ to move to next bit.



g) Press ☰ can save the setting value and exit.

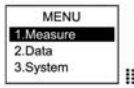
h) Press .0. back to measurement state.

If selected “Form Data” , Press ☰ the certificated time and date will be displayed.

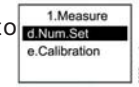
If a curve which not calibrated is selected, " --/--/---- --:-- " will be displayed.

3.3.4 Set amount of the test groups

ISO-1500F saves the measured data in test groups, the statistical evaluation is in one group too.
Every group can be 1 to 9 data.

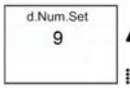


To set the amount of test groups:



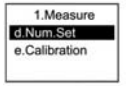
a) In the measurement state, press the key ☰ to enter the menu.

b) Press ▲ or ▼ to select “1.Mesure”; press ☰ enter;



c) Press ▲ or ▼ to select “d. Num. set”, press ☰ to enter;

d) Press ▲ or ▼ set number; press ☰ to confirm and return;

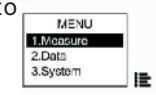


e) Press .0. back to measurement state.

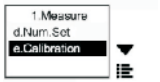
3.3.5 Calibrate current curve

a) In the measurement state, press the key ☰ to enter the menu.

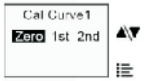
b) Press ▲ or ▼ to select “1.Mesure”; press ☰ to enter;



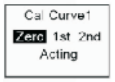
c) Press ▲ or ▼ to select e. Calibration, press ☰ to enter;



d) Press ▲ or ▼ to select “Zero”, “1st”, or “2nd” (zero calibration, one point calibration or two points calibration);



e) Press ▼ to enter adjustment of calibration. Press ▲ or ▼ to adjust the calibrating value and press ☰ to move to next bit and exit;



f) Press .0. to back to measurement state.

Note: Zero calibration must be done at first, then the one point and two points calibration.

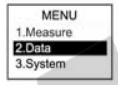
3.4 Data Management

3.4.1 Browse data

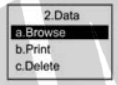
In Single measurement mode, mean value is saved when finished a group. You can browse or print them.

To browse data:

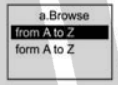
a) In the measurement state, press the key ☰ to enter the menu.



b) Press ▼, select “2 Data” and press ☰ to enter;

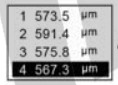


c) Select “a. Browse” and press ☰ to enter;

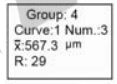


d) Select “From A to Z” or “From Z to A” and press ☰ to enter;

e) Press ▲ or ▼ to select some data or page forward or backward;



f) Press ☰ ,display some information of selected group, as shown Fig3-10.
Press ▼ , the values of this group will be displayed, as shown Fig3-11.



g) Press .0. to return to measurement state.

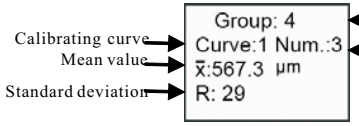
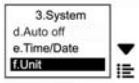


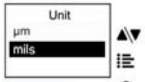
Fig. 3-10

Fig.3-11

c) Press ▼ select “f. Unit” , then press ☰ to enter;



d) Press ▲ or ▼ to select "µm" or "mils".

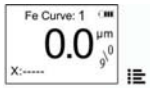


e) Press ☰ to store the Set up and return.

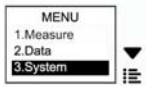
f) Press .0. , return to measurement state.

3.5.7 Set to default curve

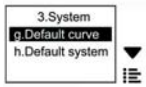
"Set to default curve" function may recall the default calibration curve and delete current custom calibration curves.
On the other hand, the zero calibration and one-point calibration and two-points calibration are all deleted.
So make sure you want to set to the default curve!



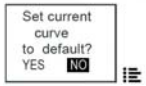
a) In the measurement state, press the key ☰ to enter the menu.



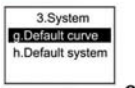
b) Press ▼, select “3. System” and press ☰ to enter;



c) Press ▼ select “g. Default curve”, then press ☰ to enter;



d) A warning information " Set current curve to default?" will be displayed. Press ▲ or ▼ to select "Yes" or "No".



e) Press ☰ to store the Set up and return.

f) Press .0. , return to measurement state.

3.5.8 Restore factory settings

Perform this function all factory settings are restored. Calibration curves, measured value in memory and settings of custom are all deleted.
So be careful to perform this function.

a) In the measurement state, press the key ☰ to enter the menu.

3.5.4 Set auto power off

If the auto power off is set to "On" power will be shut down at 3 minutes after no any operation.
When the gauge is restarted, "Auto off" is defaulted to "On".

a) In the measurement state, press the key to enter the menu.

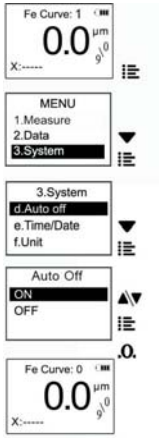
b) Press ▼, select “3.System” and press to enter;

c) Press ▼select “d. Auto off” , then press to enter;

d) Press ▲ or ▼ to select "Off" or "On".

e) Press to store the Set up and return.

f) Press .0. ,return to measurement state.



3.5.5 Set time/date

a) In the measurement state, press the key to enter the menu.

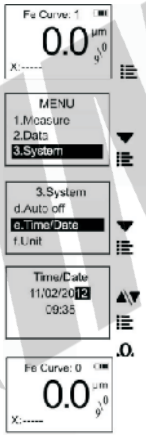
b) Press ▼, select “3. System” and press to enter;

c) Press ▼ , select “e. Time/Date” , then press to enter;

d) Press ▲ or ▼ to adjust the digital and press for move to next bit.

e) Press to store the Set up and return.

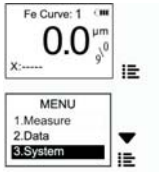
f) Press .0. , return to measurement state.



3.5.6 Set time/date

a) In the measurement state, press the key to enter the menu.

b) Press ▼, select “3. System” and press to enter;



3.4.2 Print data

ISO-1500F can connect to Wireless mini-printer for printing data in memory. First of all, turn on the printer, and make sure shorter than 3m around the gauge.

a) In the measurement state, press the key to enter the menu.

b) Press ▼ , select “2 Data” and press to enter;

c) Select “b. Print” and press to enter;

d) Press ▲ or ▼ to select.

There are 3 options: “Current group”, “Selected group” and “All”.

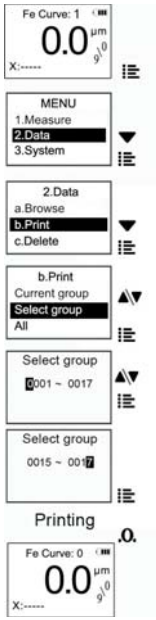
If “Current group” or “All” is selected, press to start to print.

If you choice "Selected group",press , enter the group selection.

e) To select group number, press ▲ or ▼ to adjust the digital and press for move to next bit.

f) Press to start printing.

g) Press .0. , return to measurement state.



3.4.3 Delete data

With this function, you can delete current measured value, current measured group or all data in memory.

a) In the measurement state, press the key to enter the menu.

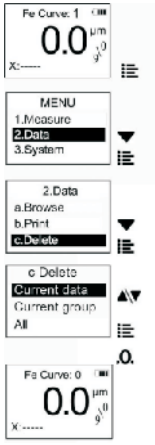
b) Press ▼ , select “2 Data” and press to enter;

c) Select “c. Delete” , then press to enter;

d) Press ▲ or ▼ to select “Current data” , “Current group” or “All” . Press to confirm the deletion.

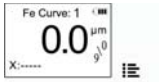
e) Press .0. , return to measurement state.

NOTE: It couldn't restore again once you deleted the data.

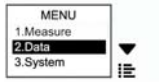


3.4.4 Data upload

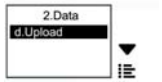
The data in memory of ISO-1500F can upload to computer. You can use the software to receive data, and to manage, transform or analyze these data with computer. You should set up software in your computer (See manual of software for detail). Connect the gauge and computer with the cable then run software in the computer.



a) In the measurement state, press the key to enter the menu.



b) Press ▼, select “2 Data” and press to enter;



c) Select “d. Upload” , then press to enter;

d) Press ▲ or ▼ to select.

There are 3 options: “Current group” , “Selected group” and “All” .

If “Current group” or “All” is selected, press to start to upload.

If you choice “Selected group” ,press ,enter the group selection.

e) To select group number, press ▲ or ▼ to adjust the digital and press for move to next bit.

f) Press to start upload.

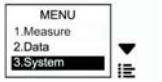
g) Press .0. ,return to measurement state.

3.5 System Set up

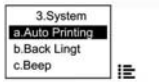
3.5.1 Set up auto printing

If "Auto printing" is turned on, print measured value of a group as the measuring ended automatically. When the gauge is restarted, "Auto Printing" is defaulted to "OFF".

a) In the measurement state, press the key to enter the menu.

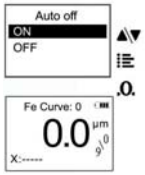


b) Press ▼, select “3. System” and press to enter;



c) Select “a. Auto printing”, then press to enter;

d) Press ▲ or ▼ to select "ON" or "OFF".



e) Press to confirm Set up and return.

f) Press .0. ,return to measurement state.

3.5.2 Set up backlight

You can set Backlight to "Off","15s","30s" and "On". Set to "Off", shut the backlight down. Set to "On", the backlight will be lit always."15s" or "30s" is the duration of backlight, "15s" means the backlight will be shut down at 15 seconds after no any operation.
Note: Set the backlight to "On" isn't recommended for battery power save.

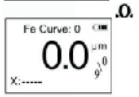
a) In the measurement state, press the key to enter the menu.

b) Press ▼ , select “3. System” and press to enter;

c) Press ▼ select “b. Backlight”, then press to enter;

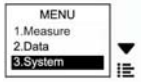
d) Press ▲ or ▼ to select "Off","15s","30s" or "On"..

e) Press to store the Set up and return.



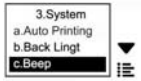
f) Press .0. , return to measurement state.

3.5.3 Set up buzzer

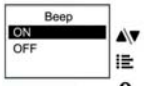


a) In the measurement state, press the key to enter the menu.

b) Press ▼, select “3. System” and press to enter;



c) Press ▼ select “c. Beep”, then press to enter;



d) Press ▲ or ▼ to select "Off" or "On".

e) Press to store the Set up and return.

f) Press .0. , return to measurement state.