Integrated Rebar Detector

User Manual

Thank you for choosing our products!

In order to make you have a better understanding and correct use of this product, please read this manual carefully before using it.

Introduction

Dear Users,

Thank you for using Our company non-destructive testing products. It is our great honor that you chose our products.

In order that you can quickly master the usage of the product, understand the detector performance of the system, know the test method, application and technical indicators, master test environment and field test technique, data processing and other related information knowledge. Read carefully the manual and other relevant information of distribution so that you can better use the product.

The products adopt international advanced integrated circuit technology and new type LCD screen, and each performance index has reached or exceeded the international advanced level. This product is advanced in design, manufacturing sophisticated high-tech products, in the R & D and manufacturing process through rigorous technical assessment, with high reliability. You may encounter some technical problems in the process of using, so we have a detailed explanation in this manual, in order to facilitate your use. If you encounter problems in the use of the product, please refer to the relevant parts of the manual, or directly contact the company.

On the basis of summarizing the relevant technical data, our company strives to use the manual in a comprehensive and simple way. With the continuous accumulation of field testing technology experience, and to meet the needs of users, the product is also constantly upgrading and improving, so as to serve the vast number of users.

Please check carefully whether the document is complete, the detectors and accessories and packing list are consistent, if there is something wrong, please contact the company. After purchasing the detector, please carefully read the relevant information of the detector, in order that you get the right and service.

If you do not understand the manual, welcome to call us, so that we can better serve you.

Thank you !

Contents

Instructions

1、【XX】indicates a key button.For example【⏻/Fn】。

2、XX indicates an Option or Menu in the screen. For example Start Measuring。

3、OK Indicates a Menu of the analyzing software, For example 如 Reading records or OK。

4、  indicates attention。

5、In addition to the contents of this manual, the user will automatically display some hint information in the process of using the product, please operate according to the prompt information.

6、The software interface and photos used in this manual are only used as schematic diagrams, and may change as the software upgrades and the continuous improvement of the product without notice.

7、This manual is a general operation manual for Rebar detector series. There are differences in the interface between high and low versions. Please understand.

1 General Information

1.1 Introduction

Integrated Rebar detector are mainly used for detecting the internal reinforcement position, the protective layer thickness, reinforcement spacing and diameter of rebar. It can accurately draw the distribution map of the whole rebar, to provide test data with high precision and high speed; the integrated structure of the host and the sensor coil, making it is convenient and quick when carrying and field operation ; It is characterized in coil structure design, faster speed, higher accuracy, stronger resolution.

1.2 Functions

1.2.1 Main Functions

1. Accurately measure the thickness of protective layer of rebar;
2. Locate the position, trend and distribution of steel bars;
3. Measure the protective layer of steel bar and estimate the diameter of steel bar;
4. Storage, view and transmission of detection data.

1.2.2 Special Functions

1. The detection mode is intuitive, accurate, accurate display of steel bar position, spacing, protective layer thickness in the same screen;

2. Four kinds of single point measurement, grid detecting, waveform detecting and profile detecting are all implemented the deletion operation of the wrong test data and graphics, which is easy to use in field test;

3. Complete at any time interleaved switching of X axis and Y axis grid scan testing process (i.e. direction coordinate axis) test, random switching data and steel distribution will automatically continue the information before test, so as to improve the flexibility of the field test;

4. Single handing machine, operation design and four wheel positioning method, equipped with high strength wear-resistant tires, easy to protect the wear and tear of the detector;

5. The automatic storage calibration value is used to realize rapid measurement and reduce the troublesome procedures before each check.

1.2.3 Main Features

1. 2.8 inch high resolution color LCD screen (320 x 240 pixels), whether in indoor or outdoor, any situation can be clearly visible detection data;
2. Multi-coil structure design, faster, higher precision, stronger resolution;
3. Using USB mode data transmission and charging, you can quickly upload the stored data to the computer through the USB.
4. With built-in high-capacity lithium battery, the power consumption is low, in the case of battery is full the

standby time is about 16 hours;

5. Data management mode in the data storage, view, delete and other functions, can store about two hundred thousand rebar measuring point data;
6. The problem of reinforcing steel bar leakage is solved by using super dense tendon resolving power;
7. Standard test block which can be configured with special and unique design;
8. Using the host and sensor coil integrated design, compact size, light weight, easy to carry;
9. Adjacent steel bar intermediate position real-time judgment, indicating light prompt, can avoid around the steel bar, easy drilling coring;
10. The detector box protection lining adopts the domestic ladder and cylindrical diversion trough, easy to put in the detector;
11. Equipped with medium and large steel bar detection software, it is convenient for professional data analysis, data processing and generating complete report in PC.

1.3 Technical sheet

Table 1.1Technical sheet

Items	Values
Applicable range of Rebar（mm）	φ6～φ50
Protective layer	Small range：1～80 Large range：

thickness range（mm）	5～185
Screen	320×240
Power supply	Built in high capacity lithium battery
Working hours	≥16h
Communication	USB interface
Storage	200K Measuring point of steel bar
Operation	Silicone keypad
Size（mm）	219×92×106
Weight（Kg）	0.60(Battery included)

Table 1.2 Measuring range of different steel bar diameters

Range / BarDiameter	Small（mm）	Large（mm）
φ6～Φ8	1～60	5～100
Φ10～Φ18	1～80	5～120
Φ20～Φ28	1～80	5～140
Φ32～Φ50	1～80	5～185

Table 1.3 Error range of different thickness

Range / Error range	Small（mm）	Large（mm）
±1	1～59	5～59
±2	60～80	60～79

±3	……	80～99
±4		100～185

1.4 Attention

For your better use of this product, please read the use manual carefully before use, fully understand the use of detectors and software and precautions.

1.Working environment requirements

- he environment temperature: -10 to +42 ℃
- The relative humidity: <90%RH
- The electromagnetic interference: no strong alternating electromagnetic field
- Do not exposure to or use at direct sunlight for long time, otherwise may cause the detector can not work properly.
- Anti - Corrosion: in damp, dust, corrosive gas environment, should take the necessary protective measures.

2. Storage environment requirements

- The environment temperature: -20 to +50 ℃
- The relative humidity: <90%RH
- Products shall be placed in the detector box, placed at room temperature for ventilation, cool and dry; if not used for a long time, should regularly check and power it on.

3. Avoid entering water.

4. Antimagnetic: avoid the use of strong magnetic environment, such as large electromagnet, transformers and other nearby.

5. Shockproof: in use and transportation process, should prevent violent vibration and impact.

1.5 Service and maintenance

1.Operation

When press the buttons, should not be forced too much, should not be stained with too much oily or muddy hand operating detector keyboard, so as not to affect the keyboard service life.

2. Power supply

The detector uses built-in rechargeable lithium battery power supply. It can standby for not less than 16 hours. Please note that when the power indicator shows insufficient, you should shut down the detector as soon as possible and charge the detector timely, otherwise may cause a sudden power failure and lost test data or damaged equipment.

The use of other batteries or power supplies is not allowed to power the detector, otherwise it may cause damage to the detector, battery leakage or fire . Please contact our company or dealer for more details.

 **Shows the power status；**  **Indicates need recharging；**  **Indicate power is completely discharged.**

3. Charging

This detector is equipped with lithium battery, it is

recommended to charge in the shutdown state. Support Micro USB standard charging port, please use the charger, power supply socket socket terminal to AC220 + 10% V and the other end of the Micro USB is plugged in USB interface equipment or directly use of USD cable can be plugged into the computer. When charging, the charging indicator light is red, indicates charging the detector built-in lithium battery; when the lights changed to green, indicates the battery is full, you should promptly unplug the charger or USB line, so as to avoid excessive battery charging of battery life. During the charging process, the detector battery and charger will produce a certain amount of heat, which is a normal phenomenon, so it is recommended to put the detector in good ventilation, easy to dissipate heat.

☞Attention：

In order to ensure adequate power completely charging, please keep the charging for about 4 hours, Do not charge at the environment exceeding 50 ℃. The charging current is large, suggest you use the original charger USD cable, otherwise may cause damage to the detector.

4. Lithium battery

The general life of rechargeable battery is charge and discharge for about 500 times.If it is found that the battery can not work normally, charging failure or insufficient,it may be damaged or reached the battery life, please contact our Service Department to replace a new battery timely. Battery short circuit or near high temperature heat source is prohibited.

5. Storage and Clean

When the detector is not in use, please put it in the detector box

and keep it in a ventilated, cool and dry (relative humidity less than 90%) room temperature environment. If not used for a long time, the rechargeable battery will naturally discharge, resulting in reduced electricity. Therefore, please charge before use, and regularly power on to check the detector and generally charge every one month.

Every time after using this detector, the detector should be properly cleaned, to prevent water, oil, mud, dust into the connector, thereby affecting the test performance or poor measurement and other phenomena.

Attention:

Don't put detectors and accessories in water or scrub with wet cloth!

Do not use organic solvents or acid-base liquids to scrub detectors and accessories!

Clean the detector with a clean, soft dry cloth and clean the socket with a soft brush!

6. Failures and solutions

The detector can not boot: check whether the battery is sufficient or direct access to the power adapter after the start; connect the power adapter, open the detector power soft switch. If the above methods are invalid, connect the power adapter and recharge the battery half an hour later.

Detector automatic shutdown: detector has the ability to detect the battery, when the battery is too low, the detector will automatically shut down; Start charging for a period of time of the battery, or direct access to the power adapter, and then reboot.

Attention:

Our company provides one year warranty and lifelong

maintenance service for this detector; please contact our company or dealers for detector maintenance. self repair is not recommended.

1.6 Liability

The detector is a precision testing detector, if the user has the following behavior or man-made damage, the company does not bear the responsibility:

1. The condition of abnormal operating detectors.
2. Open the machine and disassemble any parts without permission.
3. Violation of the above working environment requirements or storage environment requirements.
4. Serious damage caused by human or accidental collision.

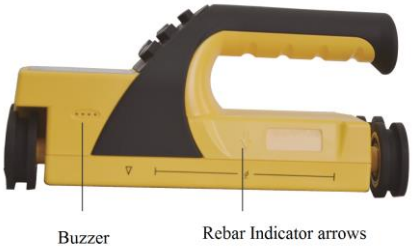
2 Device Introduction

integrated Rebar detector mainly includes main device, charger, USB cable and other accessories

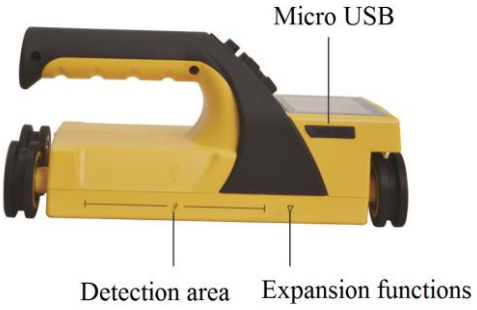
2.1 Main Device

The appearance of integrated Rebar detector is shown in figure 2.1.

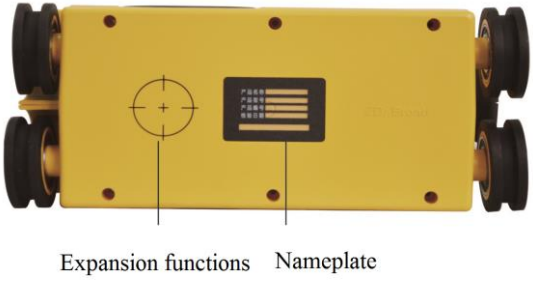
a)Top view



b)Left view



c)Right view



d)Bottom view

Figure 2.1 Schematic diagram of host appearance

☞ **Attention**

The actual detector may be different from the schematic diagram.

2.1.1 Keyboard

The buttons are located on the upper panel of the main

machine, and the functions of each key are illustrated in table 2.2

Table 2.2 List of function keys

Keys	Functions
【⏻/Fn】	Press and hold to turn on or off the detector power supply. Short press for grid / profile / waveform measurement to clear the display content, re test; function selection or parameter settings interface, and the same function as the OK key.
【▲】	Move up options; increase setting numbers.
【▼】	Move down options; reduce setting numbers.
【▶】	Right move options.
【◀】	Left move options.
【OK】	Confirm the menu item or parameter that is currently selected; Test interface saves test data.
【⮌】	Return to the previous level menu.

Attention：Individual buttons have different functions on different interfaces.

2.1.2 Screen

It is installed on the detector panel to display information such as operation interface and detection data.

2.1.3 Indicator

Under the condition of shutdown, the charging state is indicated: the indicator light is red, indicating the charging state, the indicator light is green, indicating the charging is completed.

The position of steel bar is indicated in the process of starting measurement: the indicator light is red, indicating that the sensor is located above the steel bar, the indicator light is green or shining, indicating that the sensor is above the middle of the two steel bars.

2.1.4 Micro USB

The USB interface is located on the right panel of the detector, and data transmission and charging share this interface.

2.1.5 Detection area

This area is a sensor coil that is used to detect reinforcement.

2.1.6 Triangle, cross circle

The small triangle and the bottom cross circle of the two sides of the main panel of the host are marked by other expansion functions.

2.1.7 Cover

The protective cover on the USB interface is mainly for the protection of the interface.

2.1.8 Nameplate

Located at the bottom of the detector, indicating the company name, product model, product number, inspection date and so on.

2.2 Micro USB cable

The Micro USB cable is used to connect the detector and the computer, to upload data, and also to connect the detector and charger to charge the detector, as shown in figure 2.3.

Figure 2.3 USB cable

2.3 Charger

Use USB cable and charger to charge the detector.

Figure2.4 Charger

2.4 Accessories

See product packing list for details

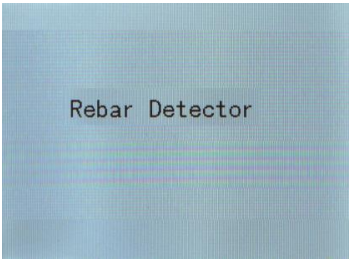
3 Operation

3.1 Introduction

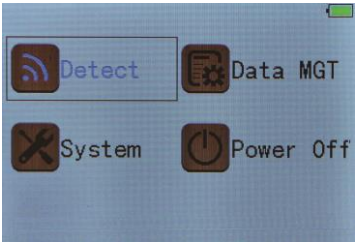
program software mainly realizes functions of each function menu, detector test state, measurement data and result display.

3.1.1 Power on and main menu interface

Power interface and the main menu interface, as shown in Figure 3.1 (a, b).



(a) Power on

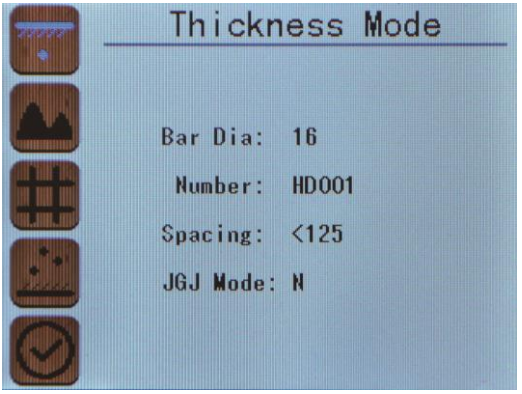


(b)Main Menu

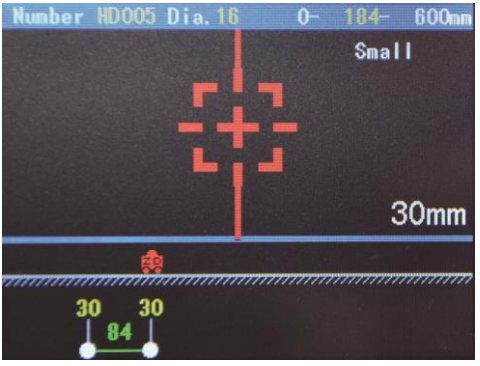
Figure3.1 Power on and main menu interface

3.1.2 Operation interface

The operation program interface is divided into two categories: menu options and test data display, as shown in Figure 3.2 (a, b).



(a)Interface



(b)Testing

Figure 3.2 Operation interface

3.1.3 Power on and Modes

3.1.3.1 Power on

Press【⏻/Fn】, The detector can be Powered on and the detector will enter the main menu after 3 seconds, as shown in figure 3.1.

3.1.3.2 Modes

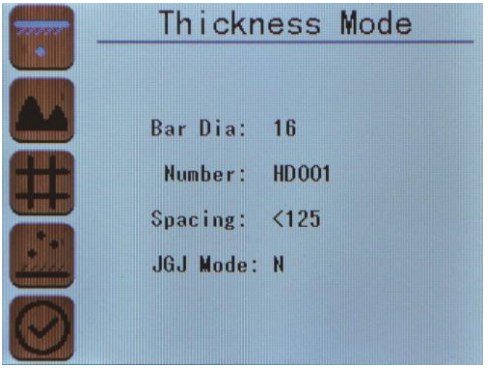
Press【▲】、【▼】、【▶】、【◀】to Select，Press【OK】or【⏻/Fn】to enter the selected interface，Press【⮌】to go back.

3.2 Functional operation instructions

The detector program mainly realizes the start detection, data management, system setting, and power off..

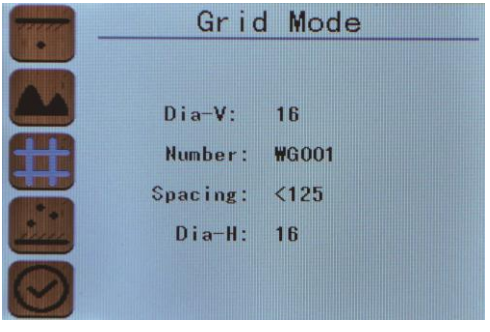
3.2.1 Start testing

Includes thickness starting test detection, waveform detection, grid detecting, profile detection, detector calibration and other functions (limited to different types of products), starting test menu interface as shown in Figure 3.3 (a, b, c, d) are shown.

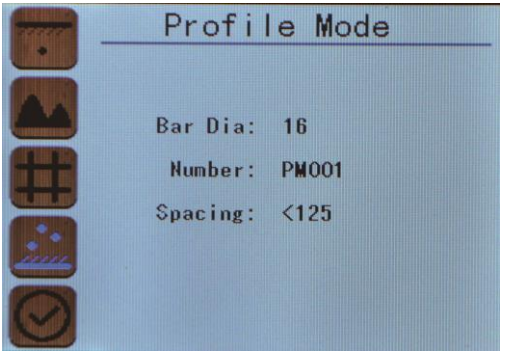


(a) Thickness mode

(b) Waveform mode



(c) Grid Mode



(d) Profile mode

Figure 3.3 Start Testing

On Start testing，Press the following buttons to achieve interface selection：

【▲】: Select menu mode interface up.

【▼】: Select menu mode interface up.

【OK】or【⏻/Fn】Enter the menu.

【BACK】Back to the previous menu.

In the thickness detection settings (thickness detection settings parameters as an example) menu interface, the operation of the following buttons to achieve parameter settings:

Press【▶】to enter The diameter Setting, and the parameter value is shown as yellow background,Press【▼】、【▲】 to select items and press 【▶】, The parameter value is shown as blue background, Press 【▼】、【▲】、【▶】、【◀】 to change, and press; Then, the same

method is used to adjust the name of the component and the spacing of the stirrups, and finally exit the setting state by pressing 【**OK**】 key.

Press【**OK**】or 【⏻/Fn】 to start measuring.In the thickness check settings menu interface, press 【**OK**】 or 【⏻/Fn】 to skip the parameter settings,and directly go to the measurement interface.

Parameters are summarized as follows:

（1）Diameter of Rebar

The direct selection range for the tested steel bars is 6,8,10, 12, 14, 16, 18, 20, 22, 25, 28, 32, 36, 40, 50, totally 15 kinds of rebar specifications.In grid inspection, the diameter of reinforcement is divided into longitudinal diameter and transverse diameter.

（2）Component name

The component name consists of 2 letters and 3 digits, respectively A、B、C、D、E、F、G、H、I、J、K、L、M、N、O、P、Q、R、S、T、U、V、W、X、Y、Z、1、2、3、4、5、6、7、8、9、0.The default is WG001, after the confirmation automatically increase one digit. Also it could be adjusted manually.

（3）Stirrup spacing

Stirrup Spacing parameter setting: the spacing of stirrups should be pre scanned in field test. If the spacing between stirrups is less

than 125mm, the parameter should be set to less than 125, and the corresponding compensation and correction will be made at this time. If the spacing between stirrups is greater than 125mm, the parameter should be set as > 125.

If the spacing between stirrups is less than 125mm, the "down arrow" on both sides of the detector should be placed directly above the stirrups, which means the arrow is directly positioned above the stirrups.

If the spacing between stirrups is greater than 125mm, the "down arrow" placed on both sides of the detector should be placed in the middle position between the two stirrups when the main reinforcement is tested.

3.2.1.1 Thickness detection

After entering the detection mode interface, enter the thickness detection interface, as shown in figure 3.4.

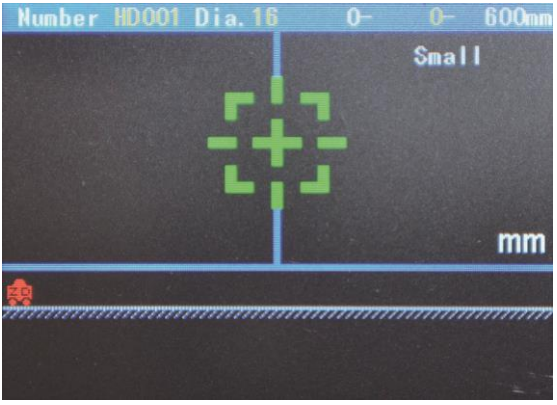


Figure 3.4 thickness detection

In the thickness detection mode, sliding detector to right slowly, when the detector is not detected in reinforced signal, aiming frame and center line coincide and are shown in red; when sliding detector gradually close to the steel, aimed frame move to the center line from the edge of the screen.When the detector position is just above the bar, the green aiming line and blue center line coincide and turn in red, and the indicator in front of the screen turn in red with a beep prompt,a rebar is detected. just below the center of the screen detector line has a reinforced frame, aiming frame shows the value of the thickness of the protective layer, as shown in Figure 3.5. When the detector is moving away from the steel bar, the aiming frame moves away from the center line and moves towards the edge of the screen gradually; when the signal disappears, the aiming frame is

green, and the center line is blue.

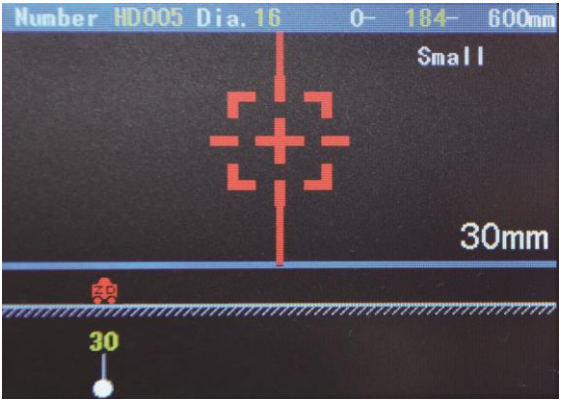


Figure 3.5 Thickness detection interface

If the detector is in the sliding process, the sight frame and the center line coincide, and the indicator light on the detector is a green, which means that the detector is located above the two adjacent reinforcing steel bars and is suitable for drilling and coring in this position.

Continue sliding detector to right slowly, when detecting a reinforced, it will show the spacing of each bar in the lower edge of the screen protection and reinforcement, as shown in Figure 3.6, the reinforced protective layer is 30mm, last protective layer is 30mm , distance of the two bars is 172mm.

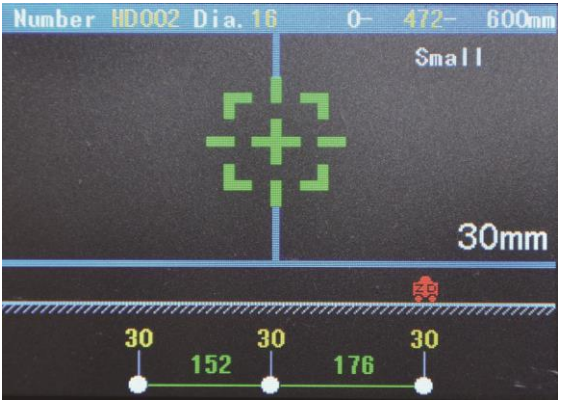
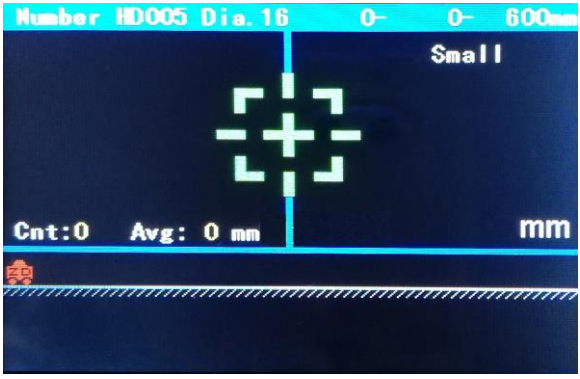


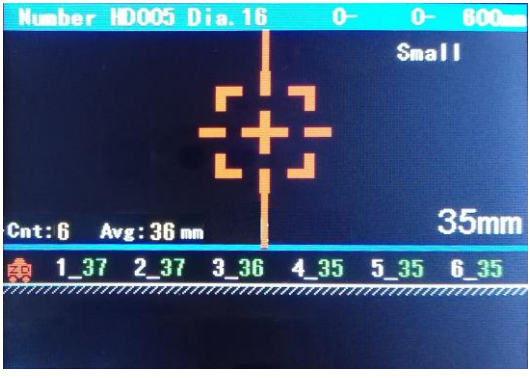
Figure 3.6 Measuring interface

In the thickness detection mode, each page default display is 600mm, when the measurement process exceeds the screen display range, the system will automatically turn over the page. The car marked with "ZD" on the screen stands for the current position. The first value in the upper right corner of the LCD screen is the initial value of the page, the middle is the current displacement value of the car, behind the car is the end of the value.

JGJ detection mode: single point retest, mostly repeated six measurements, automatic calculation of the average value; set the same as above; No: unused,YES: has been used; as shown in figure 3.7.



（a）JGJ interface



（b）JGJ measuring interface

Figure 3.7　JGJ measuring interface

Following functions in thickness detection process are supported:

【OK】Save the measurement data and restart the next set of measurements.

【⏻/Fn】Clear the measurement data and start the measurement again.

【⮌】Exit measurement mode without saving measurement data.

【▲】Start diameter measurement function.

【▼】Switch size range.

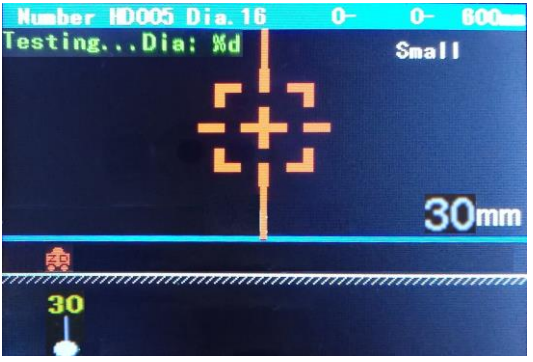
Attention：

In the thickness, waveform, grid, profile modes, when the measurement is inaccurate and the test operation error, you can return to cancel the current error data;When tested in the field, you can press【▶】、【◀】 to select the pages to show data and waveform.But in the grid pattern, only to flip the cursor on the axis, Press 【▼】、【▲】 to adjust the cursor direction (X\Y axis), red and blue axis as the cursor direction, then press【▶】、【◀】to select the pages to view the axis data and waveform of the cursor position.

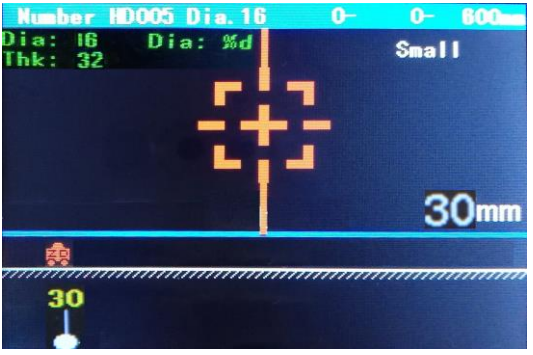
3.2.1.2 Estimating diameter

In the thickness detection mode, slide the detector to right slowly, when the green aiming frame and blue core line combine and show the red color,and the indicator show red with a beep prompt, a

rebar is detected. Press 【▲】 to measure the diameter is shown in Fig. 3.8 (a, b) shows, wait about 3 seconds to complete the test which shows the diameter of steel bar, and the protection thickness,then continue the protective layer thickness measurement.



（a）Measuring



（b）Measure finish

Figure 3.8 Estimating diameter interface

Attention：

Estimating the diameter of the rebar is more accurate when spacing is large, and the magnetic object interference is small. And the measured reinforcement protective layer range is 15mm-50mm.

3.2.1.3 Waveform detecting (limited to different types of products)

Entering the waveform detecting interface at the beginning of the detection mode interface, as shown in figure 3.9.

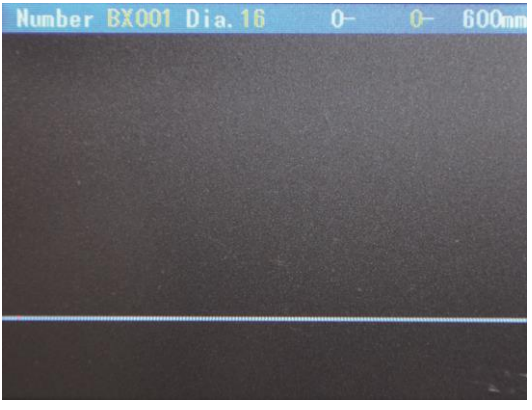


Figure 3.9 Waveform detecting

In the waveform detecting interface, the detector is placed on the concrete surface to be measured, slide the detectors slowly to right to measure, the screen will display the signal waveform, as shown in Figure 3.10; when measuring the next rebar, it will display the distance between the adjacent bars.After detecting, move away the object to be measured, the detector procedures the automatic

calculation of the location of steel, reinforced protective layer, adjacent bar spacing, until the end of the test.

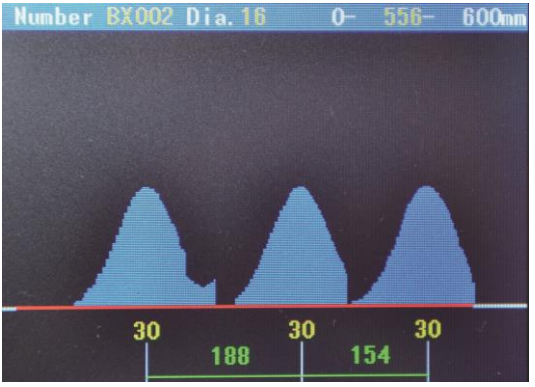


Figure 3.10 Waveform detecting display interface

The thinner the Reinforced protective layer is, the smaller the distance between detector and rebar is; the stronger the signal waveform displays, the curve is high; The thicker the Reinforced protective layer is, the bigger the distance between detector and rebar is;the weaker the signal waveform displays, the curve is lower; each peak represents a bar, at the same time the waveform shown below the protective layer thickness and the adjacent rebar spacing. In the detection process, if the two steel bars are closer, the waveform will show relatively gentle, and the total height of the waveform is higher

than that of the individual.

In the waveform detecting mode, each page defaults to 600mm, when the waveform detecting process exceeds the screen display range, the system will automatically turn over the page. The first value in the upper right corner of the LCD screen is the initial value for this page, the middle is the current displacement value of the detector, and the end of this page is the end of the value. The maximum distance of waveform detecting for each waveform number is 5400mm. If exceeded, the waveform number should be renewed, and a tail value is automatically added according to the default by pressing 【**OK**】.

In the waveform detecting process, the following functions are supported

【**OK**】Save the measurement data and restart the next set of measurements.

【⏻/Fn】Clear the measurement data and start the measurement again.

【⮌】Exit measurement mode without saving measurement waveform and data.

3.2.1.4 Grid detection (limited to different types of products)

Enter the grid detection at the beginning of the detection mode interface, as shown in figure 3.11.

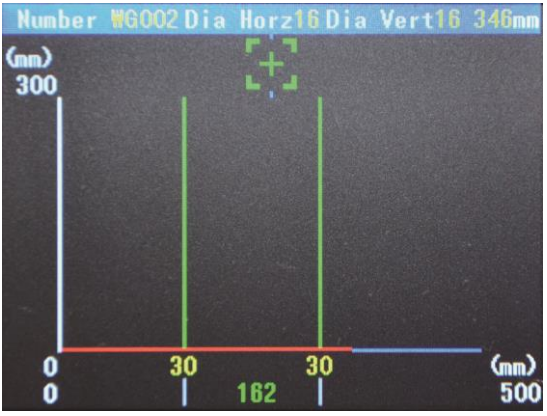
Grid detection is a measurement model of grid measured steel bar position, protective layer thickness and adjacent steel bar spacing in the form of grid diagram.

In grid detection,a scan test is completed by detecting to X and Y respectively. In the grid detection interface, the default is X detecting direction (X axis is blue) when the X direction is completed, press 【▲】or 【▼】 to switch to Y direction.

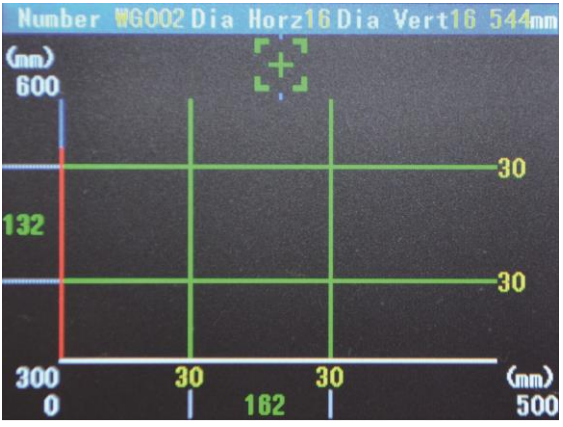
Figure 3.11 Grid detection

The grid detection interface is shown in Figure 3.12 (a, b), the

aiming frame display is the same as thickness detection.Details are shown in chapter 3.2.1.1.



(a) X direction



（b） Y direction

Figure 3.12 Grid detection

In Grid detection, the default is X detecting direction, slide the detector to right slowly, the X axis becomes red lines, when detecting a rebar, the detector will draw grid lines in the corresponding position of measuring points and the thickness of the protective layer of reinforced, when detecting next rebar, the detector will automatically the calculation of adjacent rebar spacing; and then switch to the Y direction to continue the same measurement method, until the end of the test, as shown in figure 3.11.

In the grid detection mode, the Non boundary grid detecting is realized. The default X direction of each page is displayed as 500mm, and the Y direction is displayed as 300mm. When the grid detecting process exceeds the display range of the screen, the system will automatically turn over the page. The upper right angle of the LCD screen is the value of the current displacement value of the detector.

In the grid detection process, the following key functions are supported.

【**OK**】Save the measurement data and restart the next set of measurements.

【⏻/Fn】Clear the measurement data and start the measurement again.

【⮌】Exit measurement mode without saving measurement waveform and data.

【▲】、【▼】Shifts between X and Y.

Attention：

Complete at any time interleaved switching of X axis and Y axis grid scan during testing process (i.e. direction coordinate axis) test, switching data and steel distribution will automatically continue the information before test, so as to improve the flexibility of the field test.

3.2.1.5 Profile detection (for different types of products)

Entering the profile detection at the beginning of the detection mode interface. As shown in Figure 3.13

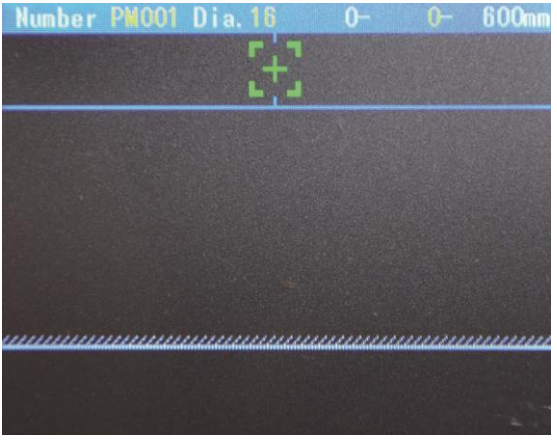


Figure 3.13 Profile detection interface

The interface of the section detection is shown in Figure 3.14, where the display of the sight frame are the same as thickness detection mode, as shown in chapter 3.2.1.1.

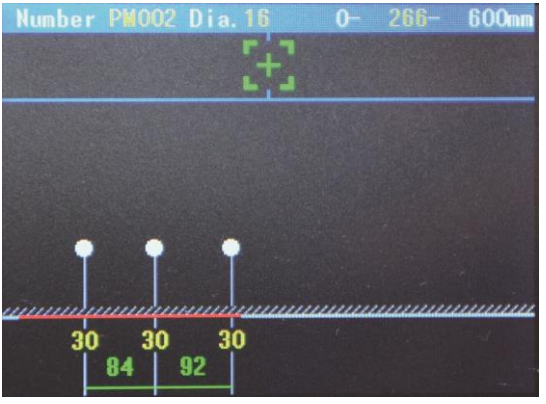


Figure 3.14 Profile detection interface

Profile detection, first default any detecting direction, Slide the detecting detector slowly to right. A red line appears at the same time, it is the detector axis sliding position real-time display; when detecting that a bar, in the position corresponding to the profile measurement points drawing steel measuring points and the thickness of the protective layer, when detecting a steel, the detector will automatically calculate the adjacent bar spacing, until the end of the test.

In the profile detection mode, the grid scan is realized without any boundary. The default display is 600mm for each page. The system will automatically turn over pages when the profile detecting process exceeds the display range of the screen. The first value in the upper right corner of the LCD screen is the initial value for this page, the middle is the current displacement value of the detector, and the end of this page is the end of the value. The maximum distance of waveform detecting for each waveform number is 5400mm, beyond this it will need to re increase the waveform number, press **【OK】**, it will automatically add a bit value.

The following functions are supported:

【OK】Save the measurement data and restart the next set of measurements.

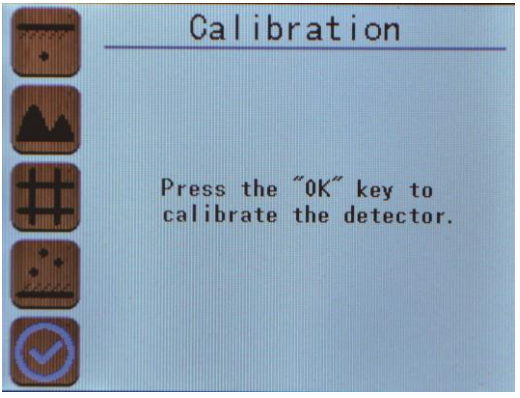
【⏻/Fn】Clear the measurement data and start the measurement again.

【⮌】Exit measurement mode without saving measurement waveform and data.

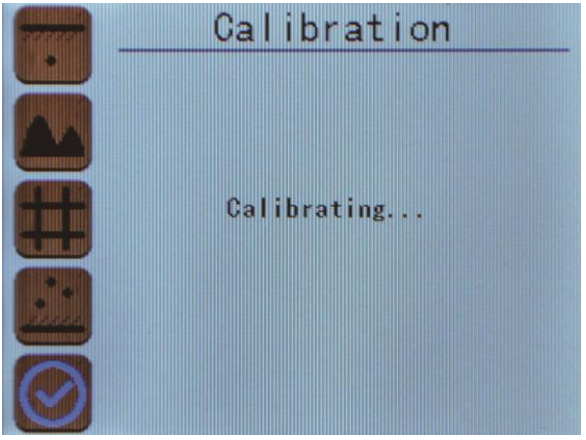
3.2.1.6 Calibration

When the detection environment changes, or the thickness of the measured value and the actual deviation is large, the detector needs to be calibrated. Calibration process as shown in figure 3.15.

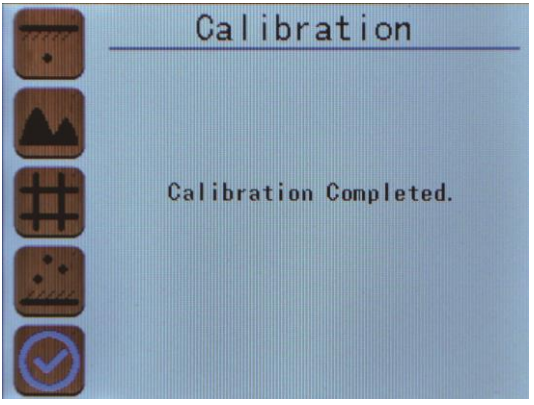
In the calibration of the detector, please take the detector in the air, away from the magnet and other metal objects, and then press the **【OK】** key for calibration, and wait for the detector interface prompt calibration is completed.



(a) Start calibration



(b) Calibrating



(c） Calibration completed

Figure 3.15 Calibration interface

Following function is supported：

【OK】 Confirm the calibration

Attention：

In the process of detector calibration, the detector should be taken in the air, away from the magnet and other metal objects. According to the interface prompt, the calibration process should be started by pressing【**OK**】,and waiting for the detector to complete the calibration.

3.2.2 Data management

The data management mainly realizes the function of measuring data viewing, data uploading and data deleting on the detector, and the data management menu interface is shown in figure 3.16.

In the data management and data viewing menu interface, the following Keys are used to realize the interface selection:

【▲】 Select menu up(recyclable).

【▼】 Select menu down(recyclable).

【◀】 Select menu left(recyclable).

【▶】 Select menu right(recyclable).

【**OK**】 or 【⏻/Fn】: Enter the selected menu.

【⮌】 Go back to previous menu.

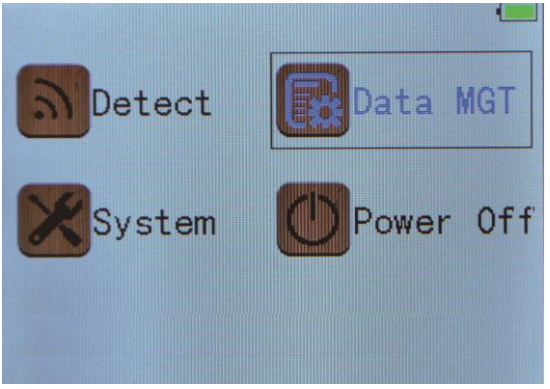


Figure 3.16 Data management

3.2.2.1 Data viewing

Data viewing is mainly used to measure and view the thickness of the detector, view the waveform, view the grid, view the profile . The data viewing menu interface is shown in figure 3.17.

The total number of existing thickness components is displayed under the view thickness surface.

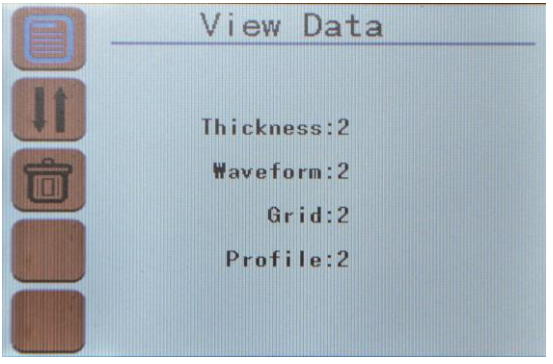


Figure 3.17 Data viewing interface

1、View thickness

In the data viewing mode, select the thickness interface, as shown in figure 3.18.

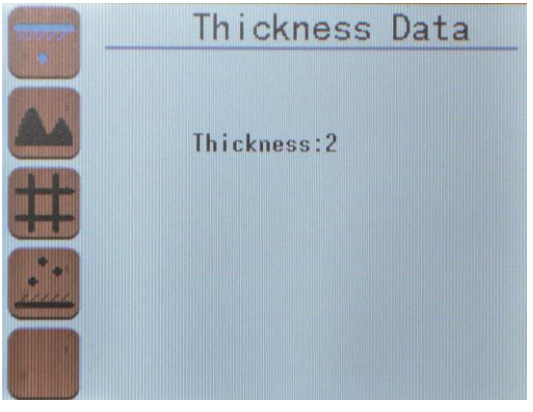


Figure 3.18 Thickness

After entering the view thickness view, it is shown in Figure

3.19, the main information is shown below:

1) component numbering and total number of components;

2) rebar diameter;

3) average protective layer thickness;

4) minimum protective layer thickness;

5) maximum protective layer thickness;

6) number of protective layer of rebar detected;

7) total number of pages of rebar detected;

8) the thickness of each reinforcement layer;

9) the value of adjacent reinforcement spacing.

In the Thickness data review, following functions are supported

【▲】、【▼】Select component numbers (recyclable)；

【◀】、【▶】Switch the current numbering page number；

【⮌】Return to the upper level menu interface

【**OK**】Enter the selection menu interface

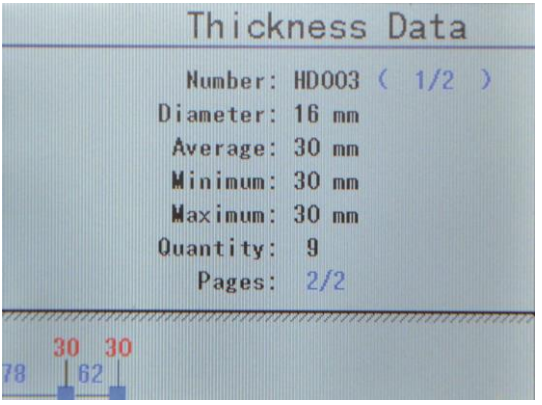


Figure 3.19 Thickness data interface

2、view waveform

In the data viewing mode, select the view waveform interface, as shown in Figure 3.20

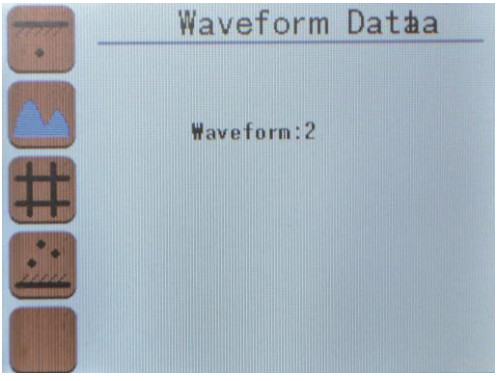


Figure 3.20 View Waveform Interface

After entering the view waveform view function, as shown in Figure 3.21, the following information is shown:

1) waveform number and total waveform number;

2) rebar diameter;

3) measure start and stop distance per page;

4) waveform and data;

5) the number of pages per waveform;

6) the thickness of each reinforcement layer;

7) the value of adjacent reinforcement spacing.

In the waveform data view process, support the following functions:

【▲】、【▼】Switch waveform number view (recyclable)

【◀】、【▶】Switch the current numbering page number;

【⮌】Return to the upper level menu interface;

【**OK**】Enter the selected menu interface.

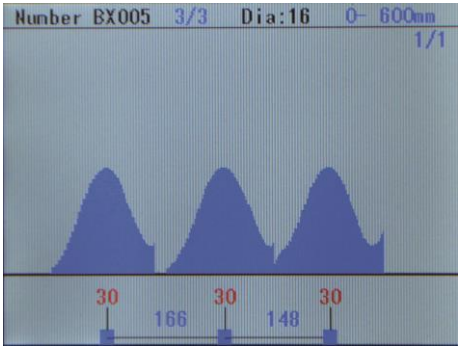


Figure3.21 Waveform data interface

3、View grid

In the data view mode, select the view grid interface, as shown in figure 3.22.

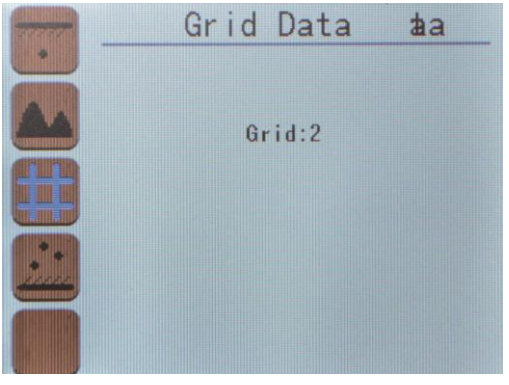


Figure 3.22 view grid interface

Enter the grid view, as shown in Figure 3.23, the following information content is displayed:

1) grid number and total number of grid drawings;

2) longitudinal and horizontal reinforcement diameter;

3) vertical and horizontal page numbers;

4) grid graphics and data;

5) the thickness of each reinforcement layer;

6) the value of adjacent reinforcement spacing.

In the grid data viewing process, support the following function:

【▲】、【▼】Vertical switch current number page view

【◀】、【▶】Horizontal switch current number page view

【OK】、【Fn】Switch grid number view;

【⮌】Return to the upper level menu interface;

【OK】Enter the selected menu interface.

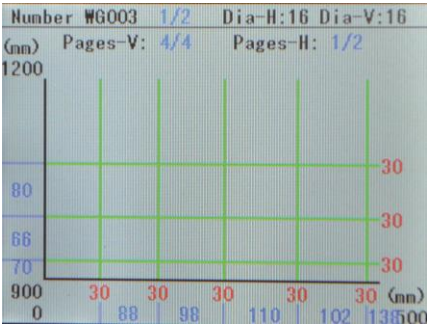


Figure 3.23 Grid data interface

3、Viewing profile

In the data viewing mode, select the view profile interface, as shown in figure 3.24.

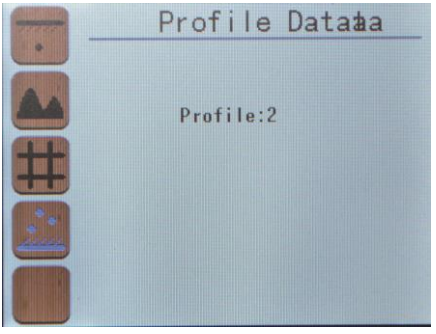


Figure 3.24 viewing profile interface

Enter the view profile function, as shown in Figure 3.25, the following information content is displayed:

1) section number and total number of sections;

2) rebar diameter;

3) measure start and stop distance per page;

4) sectional drawing and data;

5) the number of pages per section;

6) the thickness of each reinforcement layer;

7) the value of adjacent reinforcement spacing.

In the profile data view process, support the following function:

【▲】、【▼】Switch profile number view (recyclable)

【◀】、【▶】Switch the current numbering page number;

【⮌】Return to the upper level menu interface.

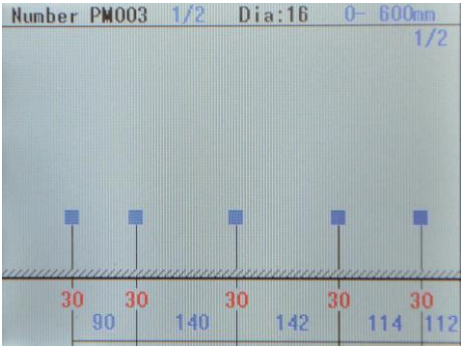


Figure 3.25 Profile data interface

3.2.2.2 Data upload

The detector provides the USB transmission interface, the user can upload the measurement data if needed; User can use the standard Micro USB transmission cable to connect the detector to the PC .

First, run series integrated rebar detector data processing software, and connect the USB cable, and then select the data upload function in the detector interface, as shown in Figure 3.26. Click processing software to read records. If the connection is successful, it began to transmit data, data transmission completed with the corresponding message. Press 【⮌】to return to the menu interface of the previous level.

Attention

The storage capacity is 500 components (ie. reinforced the measuring point is two hundred thousand numerical control), suggest that after testing or when test data reaching to the limit, please upload the data saved to the PC machine, and clear data in detector.

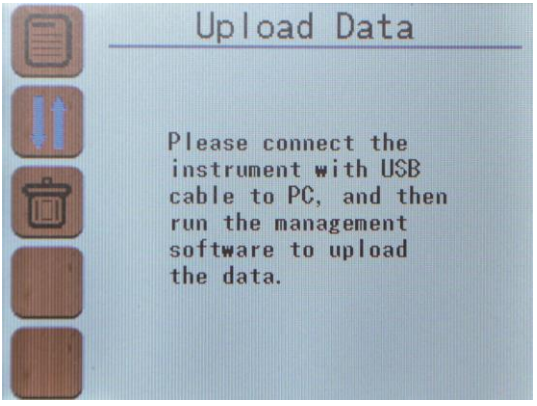


Figure 3.26 Data uploading interface

3.2.2.3 Data clearance

When you need to clear data, select the data management data clear function in the main menu, then entering the data clear interface, as shown in figure 3.27. Press 【**OK**】key to confirm to clear data file, press【⮌】 key to return to the upper level menu interface.

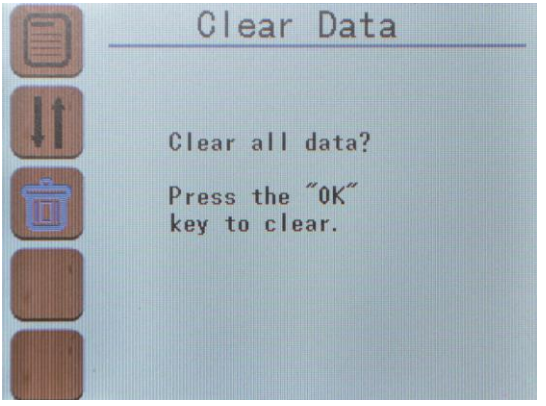


Figure 3.27 Data clear interface

Attention

Please ensure that the data uploaded and then clear the data, and the data can not be repaired after deleting.

In the process of clearing data, the detector does not support the key revocation.

3.2.3 System setting

The system settings menu interface mainly realizes the user to adjust the system configuration parameters information, including automatic shutdown time, error correction, display of the machine information, as shown in figure 3.28.

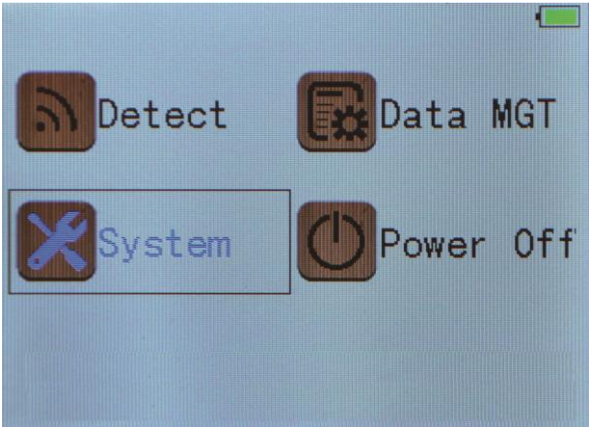


Figure 3.28 System setting

3.2.3.1 System settings

In the system settings menu interface, operate the following buttons to achieve parameter settings:

Press 【▶】 entering automatic shutdown time settings, the parameter value is displayed as a yellow background, Press 【▼】、【▲】 cycle select the parameter name, then press 【▶】 button then the parameter value is displayed as a blue background, press 【▼】、【▲】 to adjustment parameter value, press 【**OK**】 to return to the previous state; with the same method to adjust correction coefficient of the thickness error, and press 【**OK**】 to exit the setting state, as shown in figure 3.29.

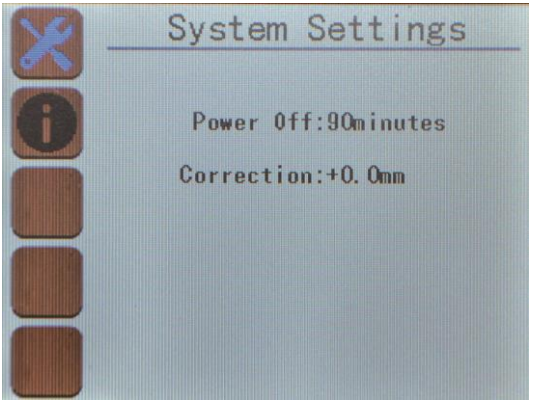


Figure 3.29 System settings

Parameters under System setting interface

（1） Automatic shutdown time

Automatic shutdown time range is 5mins, 10mins, 15mins, 30mins, 60mins, 90mins a total of 6 options of automatic shutdown time.

（2）Thickness error correction

The numerical range of error correction can be adjusted to ±0.5mm, ±1mm, ±1.5mm, ±2mm, ±2.5mm, -±3mm, ±3.5mm, ±4mm, ±4.5mm, ±5mm, ±5.5mm, ±6mm and 12 kinds of correction values.

Attention

Due to long-term outdoor complex environment, as well as by

the impact of external magnetic field, temperature and other interference factors, self-check (or self calibration)is recommended on a regular basis. If error is not in the standard range of detector setting thickness error correction, it can be properly modified, to ensure the normal use of equipment. No need to return to factory for calibration.

3.2.3.2 About Detector

In the About detector interface, the main information about the current detector is shown as Figure 3.30.

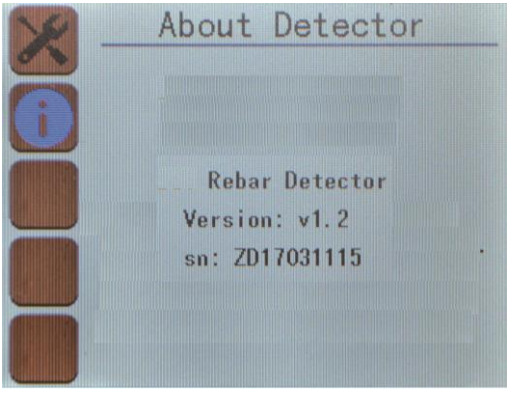


Figure 3.30 About Detector

3.2.4 Power off

The detector could be the powered off,the system could automatically shut down, and under any boot interface, press the 【⏻/Fn】to mandatory shutdown and power shortage shutdown.

3.2.4.1 System program shutdown

In the main menu, press【▼】、【▲】、【◀】、【▶】to select power off and then press 【**OK**】, the system will automatically shut down, as shown in figure 3.31.

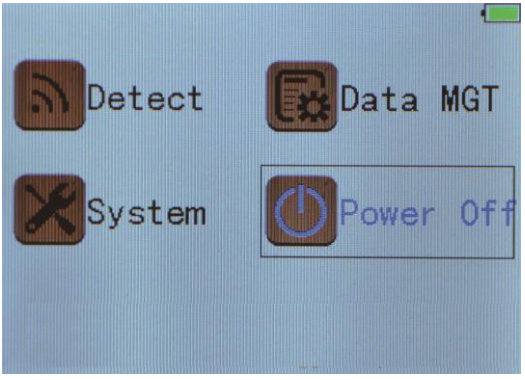


Figure 3.31 Power off interface

3.2.4.2 Automatic power off

The detector program is designed for low power consumption,

with automatic shutdown function in the setting time without operation. The specific automatic shutdown time is adjustable in the system settings interface.

3.2.4.3 Automatic shutdown due to insufficient power

The detector will display real-time detected power consumption, when power is low and the detector interface on the upper right corner of the green battery icon turns into the red,you are advised to stop using the detector and charge the detector timely. If you continue to use the detector to the electricity shortage in the detection, automatic shutdown may happen.

4 Quick reference

4.1 Preparation for detection

4.1.1 On-site preparation

◦ Before the test starts, the tested component (concrete surface) should be cleaned and leveled. When the surface roughness of the concrete affects the measurement accuracy, the surface of the tested component should be smooth. Before testing, it is necessary to combine the design data to understand the layout of reinforcement. The ferromagnetic materials such as steel bar joint, tie wire, pre

embedded iron and metal pipe should be avoided.

4.1.2 Power on

First, press 【⏻/Fn】to start the instrument, it takes3 seconds, as shown in Figure 4.1, and with red light and buzzer prompt.

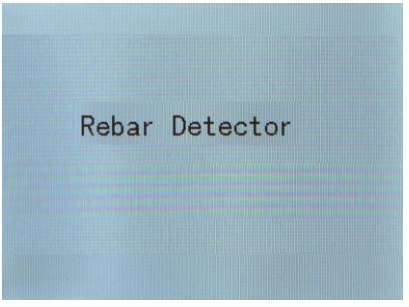


Figure 4.1 Power on

After the display of the boot interface, it automatically enters the main menu, as shown in Figure 4.2.

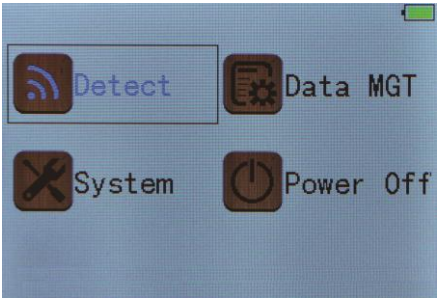


Figure 4.2 Main menu

4.2 Component detecting

In the main menu by pressing 【▼】、【▲】、【◀】、【▶】 to select. The default is to start the detection mode, press【**OK**】 or 【⏻/Fn】 to enter the starting detection interface, as shown in figure 4.3.

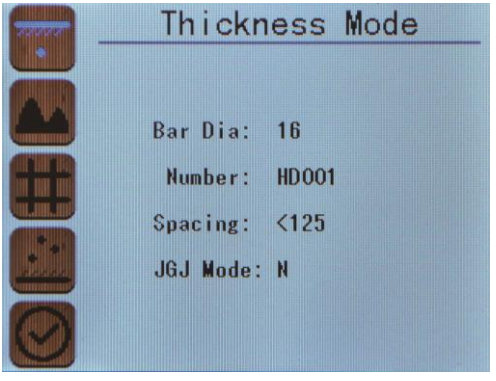


Figure 4.3 Start detection

4.2.1 Parameter setting

At the beginning of detection mode, first by pressing 【▼】、【▲】 to select the detecting mode, and then press 【▶】into the corresponding settings, then press【▶】again, the parameter values at this time is blue background. Press 【▼】、【▲】 to select parameter adjustment, press 【**OK**】to return to the previous state (with thickness detection set for example), as shown in figure 4.4. (limited

to different types of products)

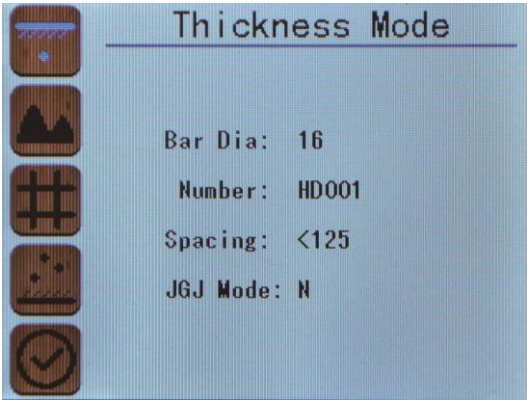


Figure 4.4 Thickness detection setting

4.2.2 Measuring data

In the thickness detection mode, the instrument collects real-time signal and current value of displacement, and through the instrument automatic calculation processing, shows real time protection layer thickness, spacing of rebar, and display the corresponding results at the same time. The indicator light and buzzer indicates in the same time. The user only need to slide instrument slowly to finish detection. When finished, press **【OK】**to save the data. Detailed introduction please refer to chapter 3.2.1.

Following functions in thickness detection process are supported:

【 **OK** 】Save the measurement data and restart the next set of measurements.

【⏻/Fn】Clear the measurement data and start the measurement again.

【⮌】Exit measurement mode without saving measurement data.

【▲】Start diameter measurement function.

4.3 Data management

When on-site detection finished, measurement data is stored on the device, the user can upload the data to the PC. Via Windows platform analysis software to analyze the survey data and generate the detection report.

After analyzing all the measured data correctly, the data stored in the instrument can be deleted in order to save the internal space of the instrument.

4.4 Points for attention in field test

1、If the detection surface is too rough to be cleaned, a non-magnetic sheet (such as a board) can be placed on the scanning surface, and the thickness of the plate can deducted after measuring.

2、The scanning direction of the instrument should be perpendicular to the direction of the rebar (90 degrees angle of the instrument and rebar). Otherwise it may cause misjudgment or deviation of the thickness.

3、During the scanning process, the four wheels of the instrument should moving slowly and uniformly.

4、For the measurement of double-layer steel distribution network, the outer reinforcement is usually detected first, and then the protective layer and position of the inner reinforcement are detected between the two outer steel bars.

5、When the detection environment changed or major measurement error appears, A calibration of instrument operation is need. It is suggested to perform calibration before each detection, to eliminate the factors of external environment impacts on the measurement results.

6、Input the correct value of diameter of the rebar before detecting, in order to reduce the judgment deviation of the corresponding thickness .

Special explanation：

Export data for this product, please read the software help guide

Appendix 1 Quick index of menu

Main menu	Sub menu	Functions
Start Detecting	Thickness	The most commonly used detection mode, measure the rebar thickness value, location and spacing according to the specification requirements; JGJ detection mode.
	Waveform	The rebar detecting is performed in the form of waveform, especially for the distribution of dense steel bars, when it is difficult to distinguish the number of rebars. Rebar number, location and thickness can be accurately judged by the waveform.
	Grid	Detecting can be done in the direction of X and the direction of Y by the way of grid graph.
	Profile	Rebar detecting with engineering drawings and sectional drawings.
	Calibration	Reset the detector
Data Management	View	To view the stored measuring data.
	Upload	Upload the data to PC
	Clear	Clear data in the detector
System Setting	Off time	Set the auto power off time
	Error correction	Setting instrument calibration error

	About Detector	View the name of the instrument, instrument type, version number, instrument number and contact information.
Power Off	Power off	Shutdown the device

Appendix 2 Measurement and verification

integrated rebar detector has been checked according to relevant standards before leaving the factory.

Testing items and steps：

F2.1 Environment

1. Room temperature

2． No strong electromagnetic interference

3. There is no corrosive gas in the air, and the relative humidity is less than 80%.

F2.2 Verification equipment

1. A set of plexiglass plates.

2. Ordinary II grade rebar with length no less than 500mm, diameter 12, 16 and 20, respectively.

3. Bracket set of standard thickness.

F2.3 Verification items and verification methods

1、Appearance

a.Connectors, fasteners without loosening.

b.The surface treatment of plating and oxidation should be smooth, uniform in color and luster, without peeling, corrosion, scratch and other defects;

c.Words, symbols and symbols are clear.

2、Methods

a、A kind of standard rebar is sampled from the ordinary second grade rebar of 12, 16, 20, and three key points are measured by the steel bar scanner. The thickness of the 3~6 protective layer is measured continuously, and the average value or the qualified rate of the coating is calculated.

b、Measuring common protective layer thickness value area: each rebar diameter area is generally three kinds of values 20, 30, 50, with continuous measurement of 3~6 times the diameter of rebar, calculate the average diameter of steel bar.

Appendix 3 Standards

The relevant standards of this instrument are as follows:

1. Code for acceptance of construction quality of concrete structures (GB50204 - 2015)

2. "Technical specification for reinforcing bar detection in concrete" (JGJ/T152 - 2008)

3. Technical standard for building structure inspection (GB/T50344 - 2004)

4. Technical standards for field inspection of concrete structures GBT50784-2013

5. Technical specification for detecting the thickness of protective layer and the diameter of steel bar by electromagnetic induction method (DB11/T365-2006)

6. "Steel protection layer thickness measuring instrument, floor thickness measuring instrument calibration specification" JJF1224-2009

Producer Certificate

Product Name： **Rebar Detector**

Product Model Number： _____

Serials Number: _____

Inspection Date： _____

Stamp:

Inspector_____

Check Member_____

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Packing List of Rebar Detector

No.	Name	Unit	Quantity	Remarks
1	Product Host	piece	1	/
2	Charger	piece	1	/
3	USB Cable	piece	1	/
4	User Manual	piece	1	/
5	Producer Certificate	piece	1	/
6	Warranty Card	piece	1	/
7	Packing List	piece	1	/
8	Software CD	piece	1	Limited to Different Models
9	Product Suites/Box	piece	1	/
10	crayon	piece	1	/
11	Standard Block	piece	1	Optional accessories

Product Warranty Card

Thank you very much for using our products, our company will provide you with the best products and after-sale service. The specific warranty content as follows:

1. Offer a one-year warranty service since the date of purchasing the product, and provide life-long software upgrade, technical services and maintenance services.

2. This warranty card (stamp valid) and the formal purchase vouchers (such as invoice, etc.) will be used together as a basis for warranty.

3. During the warranty period, if the failure occurs under normal circumstances, the maintenance fee is exempted after the technical personnel of our company verify it. In excess of warranty period, the cost and maintenance fee will be charged according to the failure condition of the product.

4. Please check the product carefully after receiving it. If you have any problems, please suggest it within 5 days, otherwise it will be deemed acceptable.

5. In the following cases, the company shall provide paid services:

(1) Abnormal operation, installation and maintenance, not in

accordance with the operating manual, cause failure.

(2) Disassembling, repairing and refitting by the organizations or personnel that are not authorized by our company.

(3) Damage caused by natural disasters such as earthquakes, etc.

(4) Damage caused by an accident (such as shock, overpressure).

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