

Explain

1. Character surrounded by box is behalf of press key .For example ,OK key is behalf of confirmation key .
- 2.Menu selected in interface should be show negative display(this is black background and white word), for instance, serial number show relevant “Rebar scan ”on the interface.
- 3.Gray background ,Characters without box show pop ups control name (such as choice box, input box)on the data processing software. 4. Gray character surrounded by box is behalf of key on data processing software. For example , confirmation is behalf of confirmation key .

**Instruction**

Rebar detector technology with NDT method accurately test rebar location and protective layer on the reinforced concrete structure or constructional element. On the reinforced concrete structure, rebar location and protective layer thickness is an important indicator for guaranteeing the quality .It can not only directly affect physical performance about resisting tension、shearing、bend、shaking、impacting ,but it also directly affect safety of construction. The protective layer is thinner, rebar is easy to rust and affect the working life. The protective layer is so thick that reducing the carrying capacity and then affect the safety. In recent years, rebar location and protective layer thickness are put more and more high value through the evaluating for examining、diagnosis、safety. 2002-4-1 come into effect 《standards of acceptance for concrete quality on the project》 that specific stipulate protective layer thickness: “Sample 2% in total and no less than 5 constructional element each for bridge、plate to test.”

1.1 Theory basis

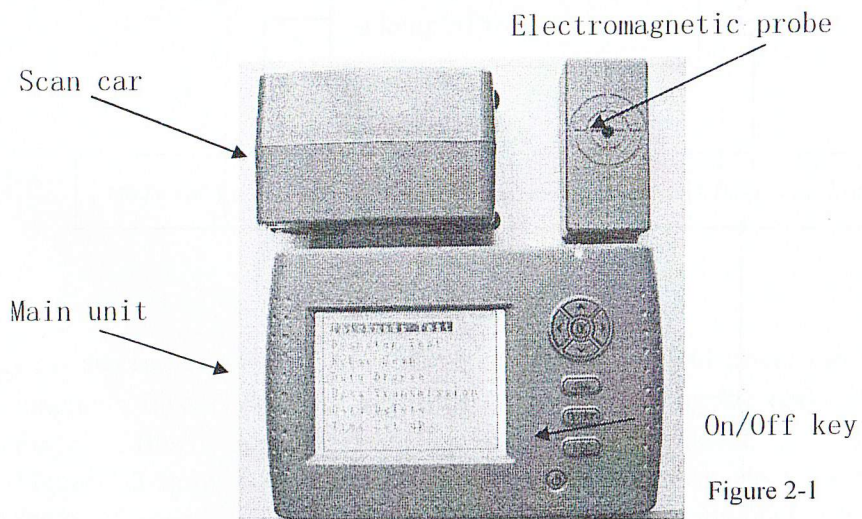
According to electromagnetic field theory ,coil is strict magnetic dipole .When signal source supply alternating current ,it radio electromagnetic field outside, rebar is electric dipole that can receive electric field outside and generate induction current along with rebar distribution, induction current of rebar radio electromagnetic field outside again.(namely, secondary field),original excitation coil generate induced electromotive force to make the output voltage of coil change .According to this theory ,rebar detector confirm location of rebar and protective layer thickness .

Use the instrument for a long time, take out the battery.

Don't open the instrument shell, otherwise should bear the consequence.

Components of instrument and performance index

2.1 Components of instrument



On/Off key

Figure 2-1

Chart 2-1 The instrument is composed with host、signal line、scan car.

2.2 Performance parameter of instrument

Main performance parameter

1 Rebar diameter range: $\Phi 6\text{mm} \sim \Phi 50\text{mm}$

Levels $\Phi 6, \Phi 8, \Phi 10, \Phi 12, \Phi 14, \Phi 16, \Phi 18, \Phi 20, \Phi 22, \Phi 25, \Phi 28, \Phi 32, \Phi 36, \Phi 40, \Phi 50$.

Figure 2.1 The range of concrete cover

Unit: mm

| Rebar Diam. | Range I | | Range II | |
|-------------|---------|-------|----------|-------|
| | Lower | Upper | Lower | Upper |
| 6 | 6 | 70 | 7 | 90 |
| 8 | 7 | 70 | 10 | 100 |
| 10 | 7 | 80 | 11 | 126 |
| 12 | 7 | 80 | 14 | 126 |
| 14 | 8 | 80 | 15 | 126 |
| 16 | 8 | 80 | 16 | 126 |
| 18 | 8 | 80 | 16 | 126 |
| 20 | 8 | 86 | 18 | 160 |
| 22 | 9 | 86 | 18 | 160 |
| 25 | 9 | 86 | 19 | 160 |
| 28 | 9 | 86 | 21 | 160 |
| 32 | 9 | 90 | 21 | 170 |

2. Maximum permissible errors (Concrete cover):

Chart 2.2. Maximum permissible errors (Concrete cover)

Unit: mm

| Max. errors | Concrete cover range | |
|-------------|----------------------|----------|
| | I range | II range |
| ± 1 | 6~59 | 7~79 |
| ± 2 | 60~69 | 80~119 |
| ± 4 | 70~90 | 120~170 |

Diameter

$\Phi 6\text{mm} \sim \Phi 32\text{mm}$

Maximum permissible errors for rebar diameter: ± 1

chart 2.3 Error of indication for diameter

Unit: mm

5.

| | | | | | | |
|-------|---------|---------|---------|---------|---------|---------|
| Diam. | 6 | 8 | 10 | 12 | 14 | 16 |
| Err. | 0~2 | ± 2 | ± 2 | ± 2 | ± 2 | ± 2 |
| Diam. | 18 | 20 | 22 | 25 | 28 | 32 |
| Err. | ± 2 | ± 2 | +3-2 | ± 3 | +4-3 | 0-4 |

Working environment

Environmental temperature: $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$

Relative humidity: $<90\%RH$

Electromagnetic interference: Non-strong alternating electromagnetic filed

Do not directly illuminate by sunlight for a long time

6. Battery

AA Alkaline batteries 6 X 1.5V

Power supply provide more than 30 hours.

steps of on-site test

On the reinforced concrete structure, generally adopt much abreast rebar(main rebar) add to hook rebar (such as :bridge、 pillar) or reticular rebar , and the rebar location cannot be predefined .We need to follow definite principle for improving detection efficiency and precision .We sum up a set of inspection method for through a lot of actual experience .

The first step Obtain the information

Obtain designed information for constructional element, confirm location 、 diameter for rebar , and rebar diameter parameter for instrument set as designed value .If the above information can not be obtained ,rebar diameter was designed as default .Use gridding scan or profile scan and diameter testing to detect rebar diameter and protective layer thickness

The second step Confirm the detection area

A block of smooth area can improves detection precision.

The third step Confirm the location of rebar

According to designed information or experience, make sure the rebar location. If do not be confirmed, scan multipoint on the point of intersection to confirm rebar location. such as figure 3-1

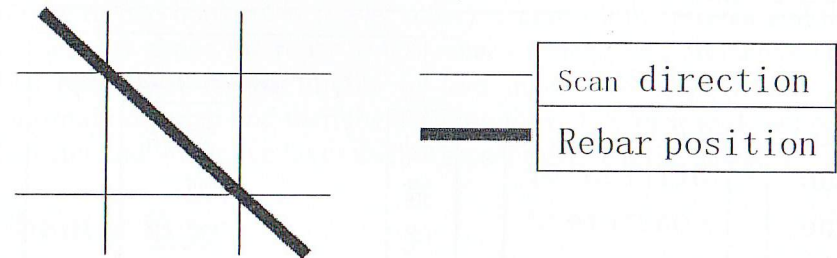


Figure 3-1

The fourth step Confirm main rebar (or upper rebar)

Select an initial point and scan along with main rebar (bridge、 pillar ,etc.) or upper rebar(plate、 wall for reticular structure) to make sure the location for main rebar or upper rebar ,and the move some distance to another scan . Figure 3-2 connects points about two scan with straight line .Notice: If scan just above the hook rebar or lower rebar, figure 3-3, rebar cannot be found or the location of rebar cannot be judged. The location of rebar has big deviation on scan again. Now, this scan line move distance of two rebar diameter and scan again.

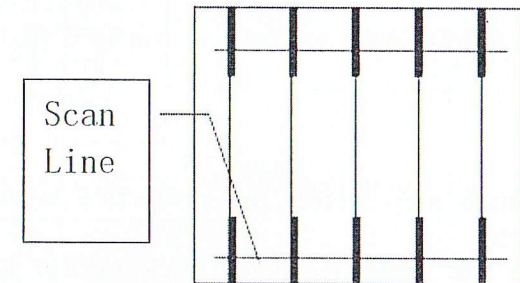


Figure 3-2

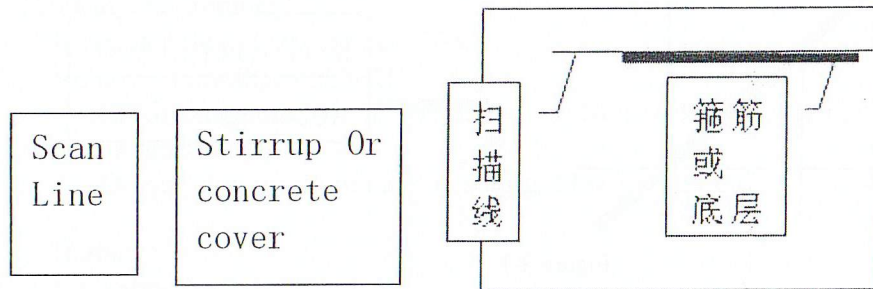


Figure 3-3

The fifth step Confirm the location of hook rebar (or lower rebar)

Scan in the middle of two confirmed rebar to confirm the hook rebar (lower rebar) and then select another two rebar in the middle position to scan. Use the straight line to connect the scanning points.

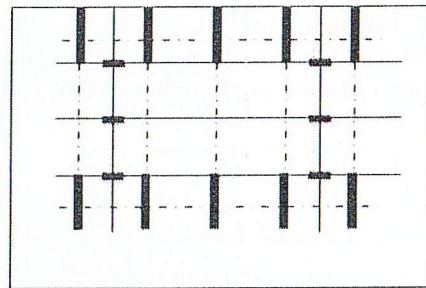


Figure 3-4

The sixth step Detect the protective layer thickness and rebar diameter

Detect the protective layer thickness for known rebar diameter:

Select thickness testing of instrument, set serial number and rebar diameter parameter. Scan in the middle of two hook rebar (lower rebar) to confirm the protective layer of main rebar (upper rebar). Scan in the middle of main rebar to confirm the protective layer thickness of hook rebar (lower rebar). Notice: set relative reticular rebar.

Detect the protective layer thickness and rebar diameter for un-known rebar diameter:

Select diameter testing of instrument and set serial number. Scan in the

middle of two hook rebar (lower rebar) to confirm main rebar and then the detector above the rebar to test rebar diameter and protective layer thickness. Scan in the middle of two main rebar (upper rebar) to confirm hook rebar and then the detector above the rebar to detect rebar diameter and protective layer thickness, set relative reticular rebar.