Crack Depth Gauge TC200
Instruction Manual

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CONTENTS

Conventions used in this manual:

1.Words in box represent the key, e.g. ENTER indicates the ENTER key.

2.The words with gray shading indicate the item on the interface, e.g. Serial number indicates the "No." item on corresponding interface.

3. Words with gray shading without box in data processing software indicate control name (check box and input box etc.) in the pop-up window on the screen, e.g. file name input box in the window of opening file.

4. Words with gray shading in box represent the button in data processing software, e.g. ENTER indicates the ENTER button in dialog box.

1. Overview

1.1 Brief introduction

TC200 is a kind of intelligent instrument that is used to measure concrete crack depth by applying principle of acoustic diffraction. At the same time, it is also used to measure propagation velocity of ultrasonic wave in concrete. This instrument is a kind of intelligent nondestructive test equipment possessing the functions of automatic detection, data storage and output.

1.2 Main functions

1. Crack depth test；
2. Sound velocity test；
3. Storage function of test data；
4. View data；
5. Transfer data

1.3 Main features

1. High intelligence

2. High efficiency of testing crack depth
3. High measuring accuracy and good repeatability
4. Entire English display , easy to operate
5. Transfer data by using RS232 serial port and USB port
6. Convenient data management
7. Small volume and light weight

2. Instrument composition and maintenance requirements

2.1 Instrument composition

Instrument is composed of main unit, bracket (contains two plane transducers) and data wire etc.

2.2 Preparation before operation

Firstly, take the instrument out of the casing and connect transducer with main unit. Then press the ⏻ key on the keyboard. Start-up screen occurs.

2.3 Replace battery

When insufficient electric quantity or voltage<7.0V are showed on start-up screen, please replace the battery. Pay attention not to reverse the battery polarity.

2.4 Precautions

1. Avoid water in
2. Avoid high temperature（>50℃）
3. Avoid being near very strong magnetic field, e.g. large electromagnet and transformer etc.
4. When the instrument is not used for a long time, please take out of the battery to avoid damaging the circuit due to battery leakage.
5. Without permission, please not open the instrument casing. Otherwise, user will responsible for the consequence!

3. Instruction of operation interface

3.1 Keyboard introduction

There are 9 keys on the keyboard. ⏻ key is used as power switch of instrument; ENTER key is used to ENTER operation in parameter setting; SAVE key is used to store measured values; ESC key is used to return last menu in operation; VEL key is used to test the sound velocity value; ←, ↑, → and ↓ keys are used respectively in auxiliary functions like menu selection, digit add & subtract and cursor movement etc.

3.2 Brief introduction of operation

3.2.1 Start-up

Press the ⏻ key on instrument panel so that the instrument is power on. Then begin operation. Start-up interface is shown as figure 3.1.

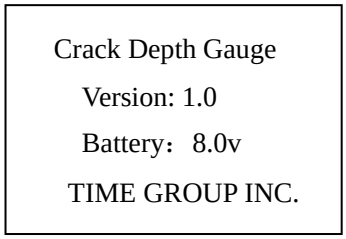

Figure 3-1 Start-up interfaces

3.2.2 Interface of function selection

Press any key on start-up interface to enter into the interface of function selection, as figure 3.2 shows. For functions of Depth Test, View Data, Transfer Data and Delete Data，through ↑ and ↓keys，select corresponding functions and press ENTER key to enter into corresponding functional interfaces.

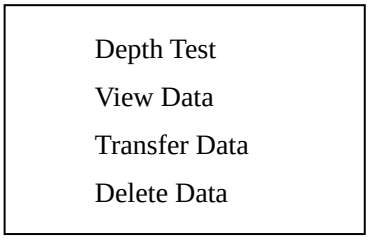

Figure 3-2 Interface of function selection

3.2.3 Interface of Depth Test

Interface of Crack Depth Test is shown as figure 3-3. Press ← and →keys to move the cursor and press ↑ and ↓keys to adjust the value of cursor position. Then press the VEL key to test the sound velocity. Current sound velocity value is default or sound velocity value is entered by manual. Finally, press ENTER key to enter into the status of measuring crack depth.

After finishing sound velocity test, press the ENTER key to enter into flow of measuring crack depth.

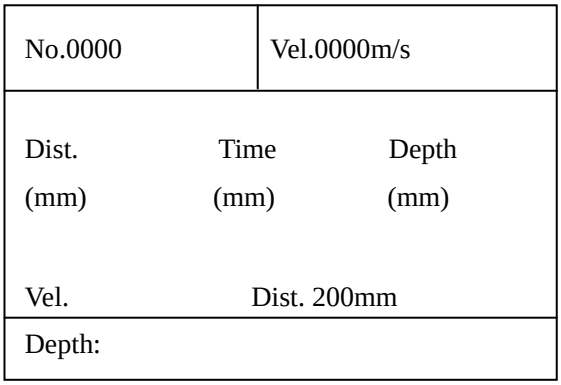

Figure 3-3 Interface of Crack Depth Test

Notice: Before test, it is necessary to move the transducer to corresponding position of bracket according to screen prompt. And transducer is coupled with tested component fully. During Sound Velocity test, the traducer is sure to be moved to 200mm and coupled with seamless zone of tested component fully. During measuring crack depth, the center of bracket (enter of transparent organic glass plate at the bottom of support) is aligned with accurate position of crack measuring point to reduce measurement error.

3.2.4 Transfer data

Interface of transfer data is shown as figure 3-4. Through ↑ and ↓ keys，select corresponding transfer modes. Then press the ENTER key to enter into corresponding function interface.

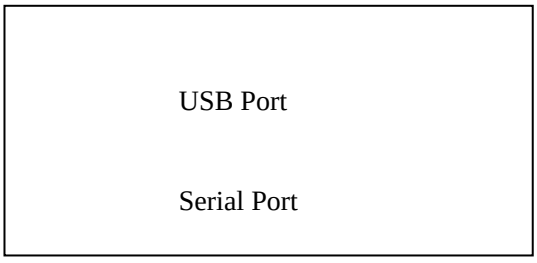

Figure 3-4 Interface of transfer data

3.2.4.1 USB transfer

USB transfer interface is shown as figure 3-5. Press the ENTER key to carry out transfer and press the ESC key to return function selection interface without transferring data. During transfer, prompt Transferring…，as figure 3-6 shows. After transfer is finished, prompt Transfer end，as figure 3-8 shows. Then press any key to ESC function selection interface.

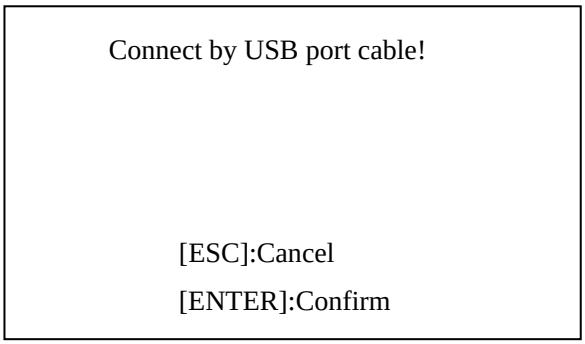

Figure 3-5 Interface of USB transfers

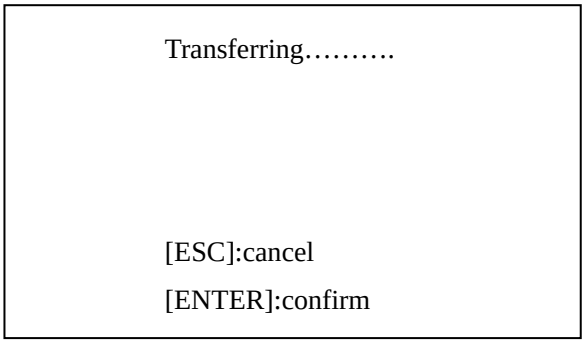

Figure 3-6 Interface of USB transferring

3.2.4.2 Serial port transfer

Serial port transfer interface is shown as figure 3-7. Press the ENTER key to carry out transfer and press the ESC key to return function selection interface without transferring data. After transfer is end, prompt Transfer end, as figure 3-8 shows. Then press any key to return function selection interface.

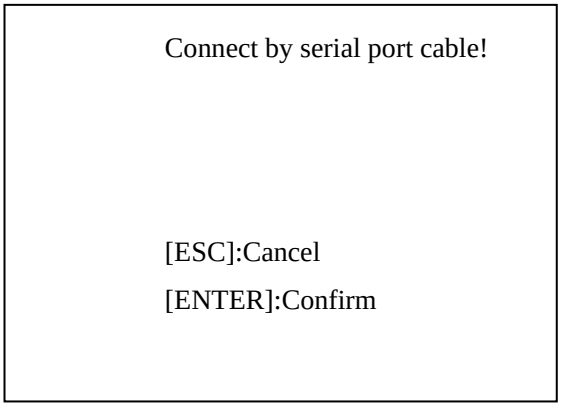

Figure 3-7 Interface of serial port transfers

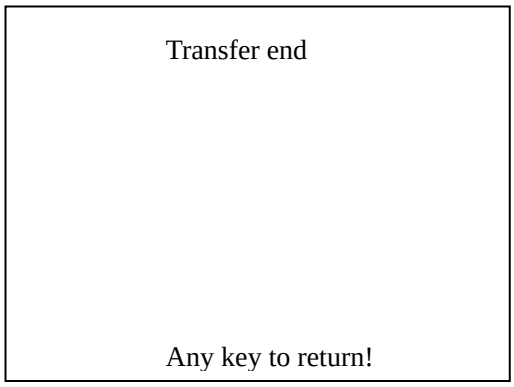

Figure 3-8 Interface of Transfer end

3.2.5 View data

View data interface is shown as figure 3-9. Five projects are showed on each page. Turn the page through ↑ and ↓ keys. After entering to this interface, projects that are tested recently are showed on this interface. If previous tested projects are viewed, turn the page through ↑ key to retrieve forwards.

No.0000	Vel. Depth
Dist. (mm) Vel.	Time Depth (mm) (mm) Dist. 200mm
Page	Total

Figure 3-9 Interface of view data

3.2.6 Delete data

Interface of delete data is shown as figure 3-10. Press the ENTER key to delete all data. After deleting all data, then ESC return to function selection interface automatically. Press the ESC key to return the function selection interface without deleting data.

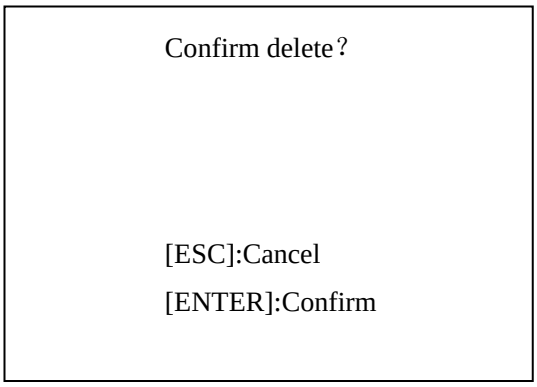

Figure 3-10 Interface of Delete data

Notice：After all data are deleted, they cannot be restored. Please be cautious to use this function.

3.2.7 Shut down

Press the ⏻ key to achieve the shut down.

Notice: To reduce the impact on the screen, after shut down, about 30s later, the instrument can be started again.

4. Detection methods and steps

4.1 Steps of Sound Velocity test

1.Take the instrument out of the casing and connect the transducer with main unit;

2.Press the ⏻ key on the instrument panel so that the instrument is power on to begin operation；

3.Press any key on the start-up interface to enter into function selection interface；

4.Arrowhead is moved to the Crack Depth Test. Press the ENTER key to enter into the interface of Crack Depth Test；

5.Set project NO (This step can be skipped and current project NO of system default is that last project No is added one.)；

6.The transducer is moved to 200mm on the support. Then the transducer is coupled with seamless zone of tested component fully；

7.Press the VEL key to obtain the Sound Velocity value of tested component；

8.After obtaining the Sound Velocity, if necessary, repeat to press the VEL key to repeat Sound Velocity test. Also press the SAVE key to save the Sound Velocity file. Or press the ESC key to return the

function selection interface.

4.2 Steps of crack depth test

Before crack depth test, propagation velocity that sound wave is in concrete need be known. Therefore, crack depth test includes two parts: Part I: sound velocity test; Part II: crack depth test.

1.Take the instrument out of the casing and connect the transducer and main unit;

2.Press the ⏻ key on the instrument panel so that the instrument is power on to begin operation;

3.Press any key on the start-up interface to enter into function selection interface;

4.Arrowhead is moved to the Depth Test. Press the ENTER key to enter into the interface of crack depth test;

5.Obtain the sound velocity: Test the sound velocity or enter sound velocity by manual by introduction of section 4.1;

6.Press the ENTER key to enter into the flow of crack depth test;

7.The traducer is moved to the corresponding position on the bracket according to screen prompt. Support center (center of transparent organic glass plate in the middle of support bottom) is aligned with accurate position of crack measuring point. And the traducer is coupled with the component fully. Press the ENTER key to finish test of this point;

8.Test next point according to prompt or press the ESC key to repeat test of this point;

9.Repeat above steps（require twice or three times single point tests） till final crack depth value is obtained.

10.After obtaining crack depth, press the SAVE key to save the crack depth file or press the ESC key to return crack depth test interface and begin test again.

5. Prompting message and processing method

During measuring crack depth and sound velocity, prompting message occurs possibly. At this time, necessary adjustment is needed to obtain accurate measurement. Special content and solution are showed as following table:

Table 5-1 Prompting message and solution

Prompting message	Reason	Solution
Error！Please test the Sound Velocity again.	Sound Velocity test is unsuccessful.	1.Couple the traducer again 2.Change test position
Error！Please test this point.	Cannot determine the first wave.	1.Couple the traducer again 2.Change test position
Error ！Cannot calculate crack depth.	Calculation of crack depth is unsuccessful.	1.Sound Velocity is error. Test the Sound Velocity again. 2.Measure the crack depth again
Deviation is too much!	Result deviation is too much.	According to actual condition, if necessary, select to test again.