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PEN TYPE ELECTROMAGNETIC ULTRASONIC THICKNESS GAGE

OPERATION MANUAL

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VIDEO

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1. General Description

Pen-type electromagnetic ultrasonic thickness gauge, the world's only one with automatic measurement of A and B scanning thickness gauge, microprocessor technology, the use of electromagnetic principle, the roughness of the metal material, corrosion serious surface without grinding treatment, non-contact measurement can be realized; can also be realized containing coating workpiece measurement, significantly improve work efficiency.

The instrument has automatic zero calibration, automatic recognition of the probe and other highly intelligent functions, which can maximize the elimination of measurement deviation caused by human error.

Before using the instrument, please read this manual thoroughly in order to understand the functions of the instrument and master the use of the instrument.

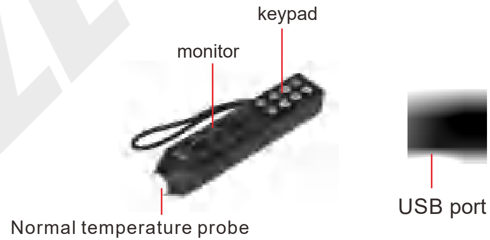
2. Specification

Code	EMU-A100	EMU-B100
Data output	USB	USB, Bluetooth
Measuring range	refer to the specifications of transducers	
Resolution	0.01mm	
Accuracy	±0.04mm (H≤10mm) ±(0.04+H/1000)mm (10≤H≤100mm) [illegible] H is measuring thickness [illegible]	
Working gap (the distance between the probe and the measured object)	1mm	
Gain	automatic and manual gain	
Material velocity	1000~9999 m/s	
Measurement frequency	2 times/second, 10 times/second fast measurement mode	
Measuring mode	auto mode, manual mode	
Display	LED, 600x288	
Storage	10000 data stored in 100 files	
Power supply	5V rechargeable lithium battery, 8 hours working time	
Operation temperature	[illegible]	
Dimension	180×35×34mm	
Weight	300g	

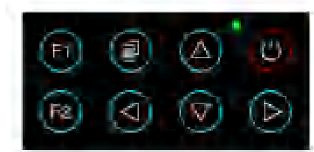
3.Measuring principle

Pen type electromagnetic ultrasonic thickness gauge is a commonly used instrument to measure the thickness of metal materials, its working principle is based on electromagnetic ultrasound, by transmitting and receiving ultrasonic waves to measure the thickness of the material, accurately measuring the time of ultrasonic wave propagation in the object, and calculate the thickness, and then digitally display it.

4. Overview



5.Keyboard Functions



On & Off Key

Function 1 It is used to power the unit either **ON** or **OFF**.
Function 2 Pressing this key to escape the menu setting and returnback to the main measurement screen.

Menu Key

Function 1 It is used to enter the menu and confirm the selection.
Function 2 It is as a shortcut key in A-scan mode. After finish one A-scan measurement (keeping the Parameters field in highlight), press this key to store the current set-up parameters into the CUSTOM SETTING.

F1 Key

Function 1 In A-scan manual mode, it is a toggle button mainly used to set up the parameters **RANGE, GAIN, DELAY,GATE, BLANK** by adjusting the key

Function 2 In B-scan mode, press this key to clear current gragh And ready for next measurement.

F2 Key

Function 1 Press this key to toggle between display view options-A-Scan, B-SCAN and DIGITS.
Function 2 In A-scan mode, press this key to save current custom setup that has been modified or created by the user.

UP key

Function 1 It is used to navigate the menus and increase values while setting the parameters.
Function 2 In measurement mode, press this key to store the current measurement reading.

DOWN key

Function 1 It is used to navigate the menus and decrease values while setting the parameters.
Function 2 In the measurement mode, it is used as the calibration Key.

LEFT Key

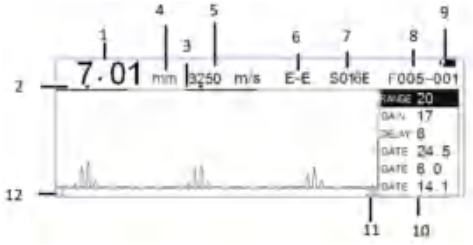
Function 1 It is used to navigate the menus and decrease values while setting the parameters.
Function 2 In A-SCAN mode, press this key to enter CUSTOM SETTING screen to open a setup that has been saved before.
Function 3 In B-Scan mode, press this key to control the thickness reading indicator (the small yellow triangle).

RIGHT Key

Function 1 It is used to navigate the menus and increase values while setting the parameters.
Function 2 In B-Scan mode, press this key to control the thickness reading indicator (the small yellow triangle).

6. Display Screen

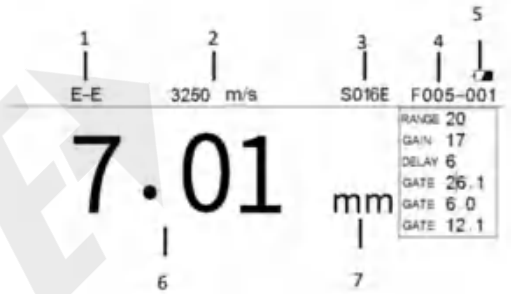
A-SCAN MODE



Full wave

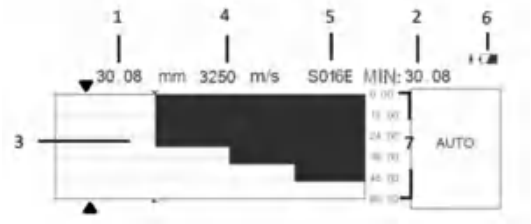
1. **Thickness reading -** Digital readout of thickness. Display with white color means in testing, with blue color means frozen.
2. **The 1st back wall indicator -** The Red▼ indicates the first back wall
3. **The 2nd back wall indicator -**The Purple▼indicates the second back wall
4. **Measuring unit-** millimeters or inches
5. **Velocity**
6. **Measuring mode**
7. **Transducer model -** The transducer automatically recognizes and display
8. **Memory location -** Files 100 X 100 data can be stored
9. **Power life**
10. **Parameters field -** Gain, Delay, Range adjustable and so on
11. **End of Range indicator**
12. **Delay value indicator**

BIG DIGITS MODE



1. **Measuring mode**
2. **Velocity**
3. **Transducer model -** The transducer automatically recognizes and display
4. **Memory location -** Files 100 X 100 data can be stored
5. **Power life**
6. **Thickness Reading -** Digital readout of thickness. Display with white color means in testing, with blue color means frozen.
7. **Measuring unit -** millimeters or inches

B-SCAN MODE



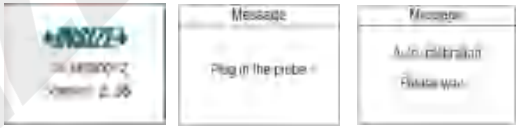
1. **Thickness reading -** Digital readout of thickness. Display with white color means in testing, with blue color means frozen.
2. **Min. value indicator -** Indicates where the minimum is located.
3. **B scan graphic**
4. **Velocity**
5. **Transducer model -** The transducer automatically recognizes and display.
6. **Power life**
7. **B scan display range -** Displays the range set in the menu and auto divides into 5 equal parts.
8. **Thickness reading indicator -** Indicates where the current thickness reading is Located.
9. **Min. value reading -** Displays the minimum value of workpiece.

7. Quick startup guide

Step one: Selecting the Transducer and Probe zero & calibration
The first step in using EMU-A/B100 is to select the transducer type according to frequency and diameter. The optional transducers and its specification are listed below:

Turn the EMU-A/B100 on using the Key. The gauge does an auto calibration of the transducer, thus eliminating the need for an on-block zero. After turning on the gauge, the screen flashes the Series No. and software version, and then, it comes into the measurement mode directly.

If user turning on the unit without the transducer, screen will remind to "Plug in the probe". At this moment, please insert a transducer into the socket, the gauge directly comes into the measurement mode after Auto calibration.



Notice: *Please use the standard transducer offered. Otherwise, the unit does not work normally and displaying "Error".*

Step Two: Setting velocity
Sound velocity plays an important role in measurement. Different material is of different sound velocity. When the sound velocity is incorrect, it will cause wrong measured results. There are 3 ways to set the material's sound velocity, which are:

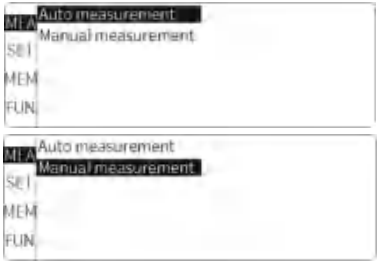
1. Directly select preset material velocity. Please refer to 8.2.1.2.
2. Input the new velocity which is not preset into the menu. Please refer to 8.2.1.3.
3. Get the accurate sound velocity of the workpiece which the thickness is known. Please refer to 8.2.1.4.

Step Three: Measurement
EMU-A/B100 is now ready to measure. There are four different measurement view options, A-Scan RF+, A-Scan HALF+, B-Scan and DIGITS, each with a specific purpose.
A-Scan RF+: It shows both the positive and the negative peaks.
A-Scan HALF +: It shows the positive.
B-Scan: It displays a time based cross section view of test material.
DIGITS: It is a basic digital thickness gauge look and feel.
The color and larger digits make it much easier for the operator to monitor the thickness readings.
User can toggle between the different view mode options by pressing F2.

8. MENU

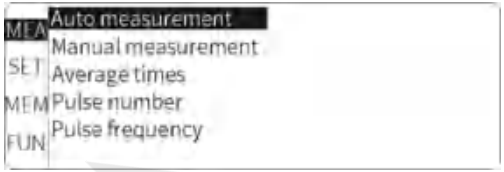
8.1 MEA. (Measurement)

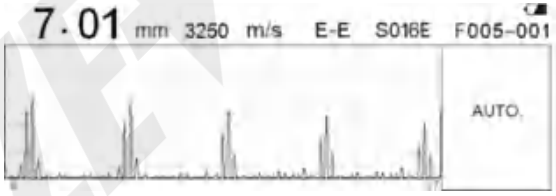
EMU-A/B100 provides two measurement modes: Auto and Manual measurement.



8.1.1

This feature is recommended to measure some basic materials. All parameters are preset according to the different transducers. For A-scan mode, it is a convenient way to let EMU-A/B-100 find the detection point and bring the waveform signal into view automatically.





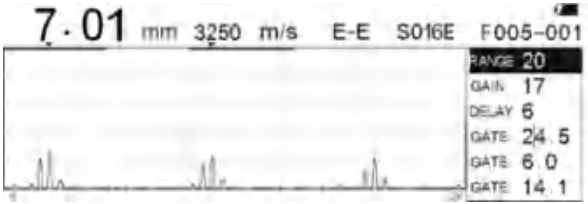
The following steps outline how to enable and set up this feature:
1) Press key to set "**MEA-Auto measurement**"
2) Press key to confirm.
3) Press key to return to the measurement screen and begin to test. There is **Auto** displayed on the right of screen.

8.1.2 Manual measurement

This feature allows user to make fine adjustment of RANGE, GAIN, DELAY, GATE and so on manually in A-SCAN mode. They can be set through toggle the HOT MENUS what is displayed at the lower left side of the screen.
And once the above-mentioned parameters are set, it will remain the same for B-SCAN and DIGITS display.

Range

The range refers to the overall viewable range being displayed on the screen. Make change the range of display, shorten or enlarge it, finally serve User conveniently.



The following steps outline how to enable and adjust the RANGE.

1) Press F1 once to set **"RANGE"**

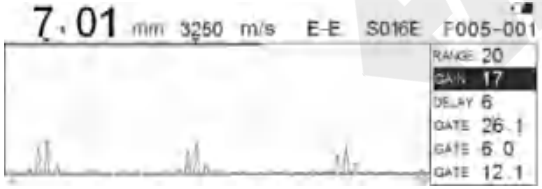
2) Use keys (+1), (-1), (-coarse adjustment), (+ coarse adjustment)to adjust value.

Gain

The gain can be adjusted over a wide range. The setting of the gain is crucial in order to obtain valid reading during the measurement process. Too much gain may result in erroneous measurements, by detecting on noise rather than the actual material back wall itself. Too little gain may result in detection on an undesirable section of the waveform.

The gain will also be represented in both the B-SCAN and DIGITS views.

The following steps outline how to enable and adjust the GAIN.



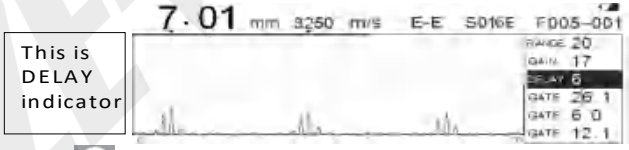
1) Press F1 once to set "GAIN"

2) Use keys (+1), (-1), (-coarse adjustment), (+ coarse adjustment)to adjust value.

Delay

The starting DELAY is the value displayed on the bottom lower left side of the display in both RF+ and HALF+ views. It is the minimum thickness value that can be viewed on the display.

The following steps outline how to enable and adjust the DELAY.



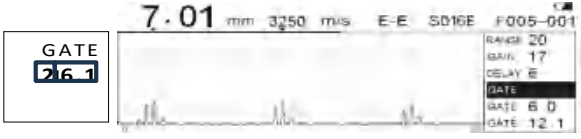
1) Press F1 once to set **"DELAY"**

2) Use keys (+1), (-1), (-coarse adjustment), (+ coarse adjustment) to adjust value.

Gate

GATE is used in both Standard (STD) and E-E modes. The purpose of GATE is to force DE-3000 to measure the useful echo wave.

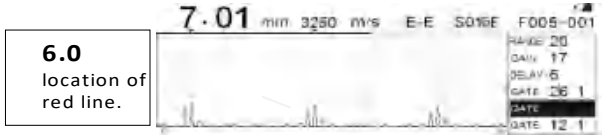
The following steps outline how to enable and adjust the GATE.



1) Press F1 once to set **"GATE"**

2) Use keys  or  to set quantities of Gate (location of Number 2 on above picture),  or  to set width of each Gate(location of Number 6.1 on above picture).

Notice: *Under E-E mode, users should set quantities of Gates as 2; Under Standard (STD) mode, users should set quantities of Gate as 1.*



1) Press  once to set **"GATE"**
2) Use keys  (+1),  (-1),  (-coarse adjustment), 

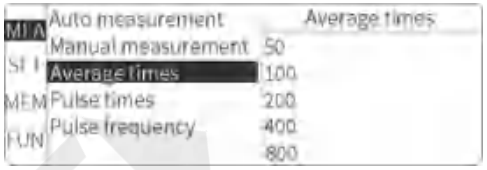
(+ coarse adjustment)to adjust value.

1) Press  once to set **"GATE"**
2) Use keys  (+1),  (-1),  (-coarse adjustment), 

(+ coarse adjustment)to adjust value.

Saving the setting
Once all the parameters are set, there is two ways to save the setting.
1) The user can Press  to store this setting into the current location.
When turn on the gauge next time, this setting will be displayed.
2) Or the user can Press  to store this setting into the **A-SCAN CUSTOM SETTING** for further use while measuring the same workpiece.

8.1.3 Average times

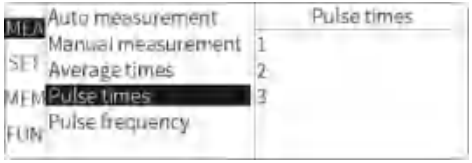


The following steps outline how to enable and set up this feature:
1) Press  key to set **"MEA-Average times",**

2) Press  key to choose the target Average times, Press to confim.

3) Press  to exit and DE-3000 is now ready to perform measurements.
Notice: *Take 50 as an example, there is an average test result shown on the LCD after main unit process these 50 test results.*

8.1.4 Pulse number

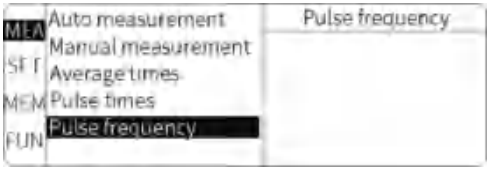


The following steps outline how to enable and set up this feature:
1) Press  key to set **"MEA-Pulse times",**

2) Press  key to choose the target Pulse times, Press  to confim.

3) Press  to exit and DE-3000 is now ready to perform measurements.

8.1.5 Pulse frequency



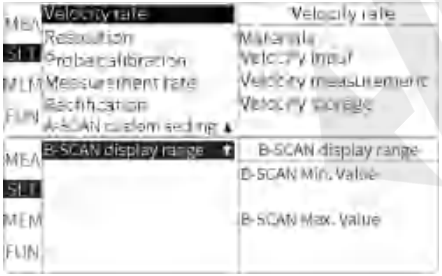
The following steps outline how to enable and set up this feature:
1) Press key to set **"MEA-Pulse frequency",**

2) Press key to choose the target Average times, Press to confim.

3) Press to exit and DE-3000 is now ready to perform measurements.

8.2 SET.

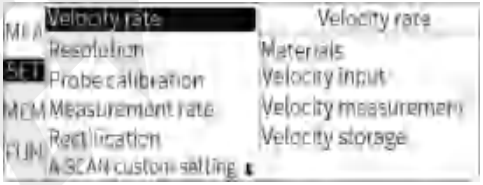
This function allows user to set following parameters of measurement.



The following pages outline how to enable and set up these parameters.

8.2.1 Velocity rate

Sound velocity plays an important role in measurement. Different types of material have different inherent sound velocities. If the gauge is not set to the correct sound velocity, all of the measurements the gauge makes will be erroneous by some fixed percentage.



If the name or sound-velocity of the material to be measured is known, the user could select material name directly in the menu **Materials.** Or input the known velocity in the menu **Velocity Input.**

And the user could measure the sound velocity by using the function **Velocity measurement** If the sound-velocity of the material to be measured is unknown, but the exact thickness of which is known.

1. Materials
The EMU-A100/B100 presets 9 common materials' sound velocity. They are: steel, Cast iron, Aluminum, Copper and Brass.

The user may opt to choose such basic material type from the menu. It's important to Notice that these velocities will not always be an exact representation of the material being tested. Use these values only if a close approximation is acceptable.

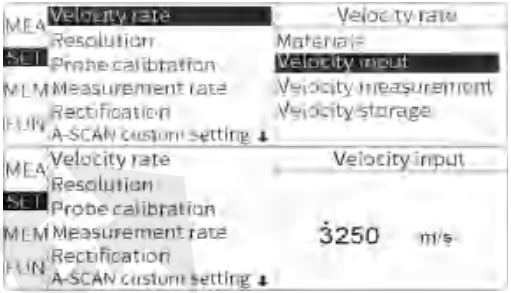
The following pages outline how to enable and set up this feature:
1) Press key to set **"SET-Velocity rate-Materials",**

2) Use keys to scroll through the sub menu items until
The target material is highlighted. Press key to confirm.

3) Press key to exit setting and DE-3000 is now ready to perform measurements.

2. Velocity input

If the material velocity is known, the user may wish to simply enter the velocity number into the EMU-A100/B100, rather than have the EMU-A100/B100 calculate the velocity value on using a known thickness. And EMU-A100/B100 also can store 4 new velocities as custom.

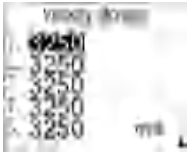


The following pages outline how to enter the velocity:
1) Press key to set **"SET-Velocity rate",**

2) Use keys to scroll through the sub menu items until **VELOCITY INPUT** is highlighted. Press key to confirm.

3) Press or key to move the cursor, Press or

Key to change the numbers,
4) Press key to confirm and store it into **"Velocity Storage",**



5) Press or key to choose the place where want to store,

Press key to confirm.

6) Press key to exit setting and DE-3000 is now ready to perform measurements.

3. Velocity measurement

Sometimes the sound velocity of a material is not known. In this case a sample with a known thickness can be used to determine the sound velocity. It would be very handy to carry a set of mechanical calipers to use in conjunction with the EMU-A100 /B100 in the field.

The following steps outline how to enable and set up this feature:

1) Physically measure an exact sample of the material or a location directly On the material to be measured using a set of calipers or a digital micrometer.

2) Place the transducer in steady contact with the sample or actual test material.

3) The display should show a thickness reading (probably incorrect).

4) Having achieved a stable reading, remove the transducer. (If the Displayed thickness changes from the value shown while the transducer Was coupled, repeat step 3.)

5) Press key to set "**SET- Velocity Measurement",**

6) Use keys to scroll through the sub menu items until **Velocity Measurement** is highlighted. Press key to confirm.

7) Press or key to move the cursor, press or key to adjust the displayed velocity up or down, until the thickness value displayed matches the thickness of the sample piece. And now the displaying sound velocity value is accurate.

8) Press key to confirm and store it into **"Velocity Storage",**

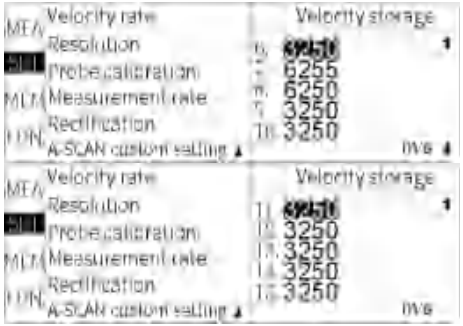
9) Press or key to set the target place, Press key to confirm.

10) Press key to exit setting and DE-3000 is now ready to perform measurements.

Notice: Please do not remove the instrument from the test block when make velocity measurement.

4. Velocity storage

It allows user to store 15 new Velocities as custom and use it in future measurement. User can get the custom velocities by the features of **Velocity input** or **Velocity measurement**.



The following steps outline how to enable and set up this feature:
1) Press key to set **"SET-VELOCITY RATE",**

2) Use keys to scroll through the sub menu items until **Velocity storage** is highlighted. Press key to confirm.

3) Press key to choose the target velocity, Press to confim.

4) Press to exit and DE-3000 is now ready to perform measurements.

8.2.2 Resolution

User can select the displayed resolution. When 0.01mm or 0.001 inch be
selected, the workpiece surface to be measured should be smooth for the purpose of getting an accurate value.

The following pages outline how to enable and set up this feature:

1) Press key to set "**SET-Resolution",**

2) Use keys to scroll through the sub menu items until **Resolution** is highlighted. Press key to confirm.

3) Press key to select resolution and unit. Press to confirm.

4) Press key to exit setting and DE-3000 is now ready to perform measurements.

8.2.3 Probe Calibration

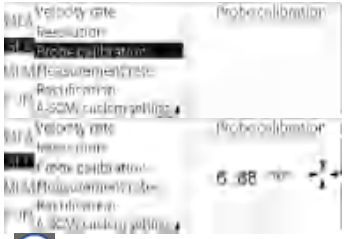
It causes error during the primary stage of usage or operate for long time. User should make probe calibration during following three aspects are happened.
1. The probe itself or the temperature variation,
2. System error caused by the match between the unit and the transducer,
3. Calculation error caused by the sound velocity set in the unit is different from that of the actual material.

This feature requires a sample piece of the specific material to be measured, the exact thickness of which is known. E.g. from having been measured by some other means. Or to use the build-in standard test block (8mm) comes with EMU-A100/B100.

The following steps outline how to enable and set up this feature:
1) Place the transducer in steady contact with the sample or standard test block.
2) Having achieved a stable reading, remove the transducer.

3) Press key to set **"SET-Probe calibration",**

4) Use keys to Scroll through the sub menu items until **Probe calibration** is highlighted. Press key to confirm.

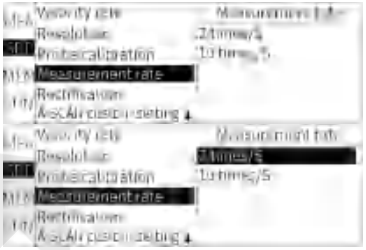


5) Press or key to adjust the displayed reading up or down, until the thickness value displayed matches the thickness of the test block or sample piece. Press key to confirm.

6) Press key to exit setting, Test the block or sample piece again to verify the result.
Please notice that calibration range is within ±5mm. If it is out of range, which means users should replace a new probe.

Notice: Please do not remove the instrument from the test block when make probe calibration.

8.2.4 Measurement rate
The EMU-A100/B100 performs measurement of 2 times/second and 10 times / second. 2 times/second is quite adequate for single measurements. And 10 times/second is recommended to measure the high temperature surfaces.



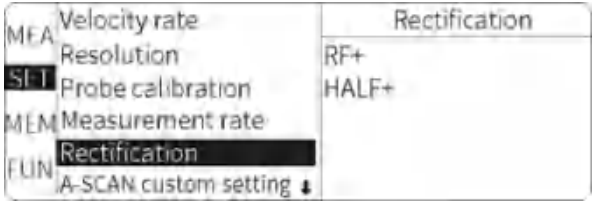
The following steps outline how to enable and set up this feature:
1) Press key to set **"SET-Measurement rate",**
2) Use keys to scroll through the sub menu items until **Measurement rate** is highlighted.

3) Press or key to select **2 times/S** or **10 times/S**. Press key to confirm.

4) Press key to exit setting and EMU-A100/B100 is now ready to perform measurements.

8.2.5 Rectification

EMU-A100/B100 supply two display views of A-Scan. RF+ mode shows both the positive and the negative peaks. HALF+ mode shows the upper of complete waveform only.



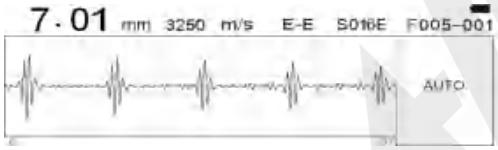
The following steps outline how to select the RECTIFICATION.

1) Press key to set **"SET-Rectification",**

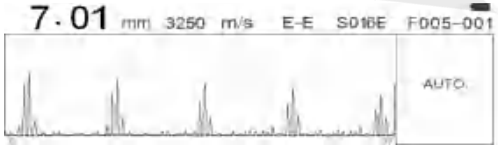
2) Use keys to scroll through the sub menu items until **RECTIFICATION** is highlighted. Press key to confirm.

3) Press key to select RF+ or HALF+,

4) Press to confirm and return to the measurement screen and begin taking readings.



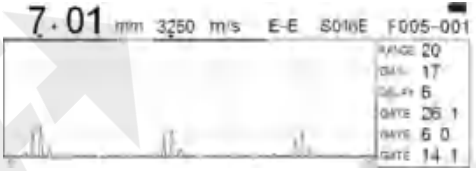
RF+



HALF+

8.2.6 A-SCAN custom setting

EMU-A100/B100 can store 4 A-SCAN custom settings. This feature saves a great deal of time and knowledge for future inspection of the same job or project. Also it eliminates error between two or more users during the setup and calibration process.



The following steps outline how to open/store an A-SCAN CUSTOM SETTING.

1. Opening a custom setting.

1) Press key to set **"SET-A-SCAN Custom setting",**

2) Use keys to scroll through the sub menu items until **A-SCAN CUSTOM SETTING** is highlighted. Press key to confirm.

3) Press key to select target setting.

4) Press to confirm

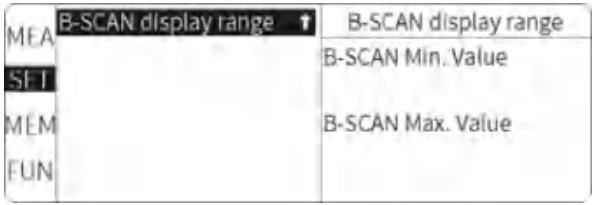
5) Press key to exit setting and EMU-A100/B100 is now ready to perform measurements.

2. Store a custom setting

Once the EMU-A100/B100 parameters and features have be adjusted for an application, the user can Press to save this setting to any one of 4 custom setting locations.

8.2.7 B-SCAN display range

It's important to Notice that the measurement range of B-scan on the display be set wide enough, so that the Maximum thickness of the material can be viewed on the display.



The following steps outline how to set the B-SCAN DISPLAY RANGE.

1) Press key to set **"SET-B-SCAN display range",**

2) Use keys to scroll through the sub menu items until **B-SCAN DISPLAY RANGE** is highlighted. Press key to confirm.

3) Press key to set **B-SCAN MIN.VALUE** and **Max. VALUE**,

4) Press or to move the cursor, press or to change numbers, press to confirm.

5) Press again to return to the measurement screen. Then Press F2 twice go to B-SCAN interface.

Notice: There is a reminder of "Input error" When users set Max. Value is lower than Min. Value and confirm this setting.

8.3 MEM.

The gauge has a memory capacity of 10,000 measurements in 100 files. The current memory location will be displayed on the

screen as F000-000 in both A-scan and DIGIS mode. The files are numbered from 1-100, and measurement number will be followed automatically from 001.

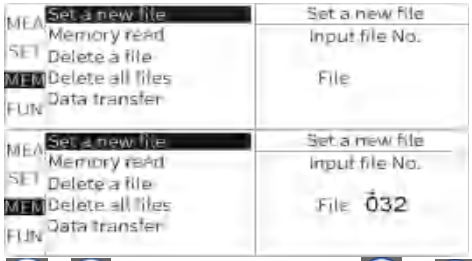
This feature allows user to complete following function:

8.3.1 Set a new file

The following steps outline how to set a **new memory file.**

1) Press key to set **"MEM-Set a new file",**

2) Use keys to scroll through the sub menu items until **set a new file** Is highlighted. Press key to confirm.



3) Press or to move the cursor, press or set the file Number (001-100 can be set), Press to confirm.

4) Press key to exit setting and EMU-A100/B100 is now ready to perform measurements.

Notice: After taking every measurement, press key to store this reading with a location number.

8.3.2 Memory Read

It is sometimes necessary to go back and view the stored readings. The following procedures outline how to read memory.

1) Press key to set **"MEM-Memory read",**

2) Use keys to scroll through the sub menu items until **Memory read** is highlighted. Press key to confirm.

3) Press to move the cursor, press to set the target File Number. Press to confirm. All stored readings in this file will be Displayed. And press or to page forward or backward.

4) Press key to exit setting and EMU-A100/B100 is now ready to perform.measurements.

8.3.3 Delete a file

1) Press key to set **"MEM-Delete a file",**

2) Use keys to scroll through the sub menu items until **Delete a file** is highlighted. Press key to confirm.

3) Press to move the cursor, press to set the target File Number. Press to confirm.

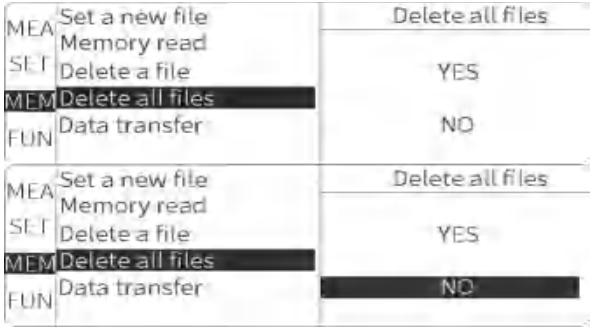
4) Use keys to select YES or NO, press key to confirm.

5) Press key to exit setting and EMU-A100/B100 is now ready to perform.measurements.

8.3.4 Delete all files

1) Press key to set **"MEM-Delete all files",**

2) Use keys to scroll through the sub menu items until **Delete all files** is highlighted. Press key to confirm.



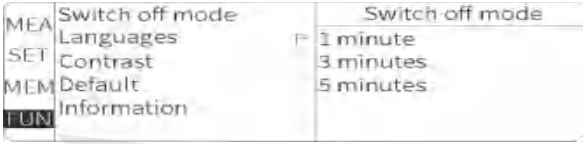
3) Use keys to select YES or NO,press key to confirm.
4) Press key to exit setting and EMU-A100/B100 is now ready to perform. measurements.
Notice: Once data in all files is deleted, it could not be recovered. Please be cautious.

8.3.5 Data transfer
The data can be transferred to PC by Bluetooth. Then user could copy them into DOC. or Excel for further analysis. Procedure is as follows:
1) Under measurement interface, press for several seconds to open Bluetooth function.

2) Connect APP, press key once, measurement would be uploaded automatically.

3) Press for several seconds to close Bluetooth function.

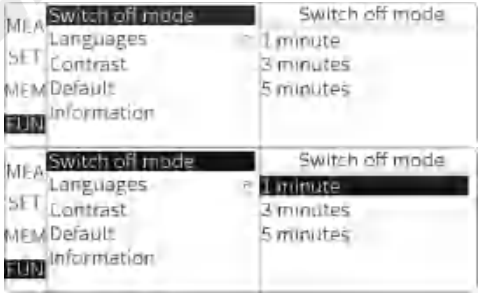
8.4 FUN.
It allows user to adjust following functions:



8.4.1 Switch off mode
Auto shut down after 1 Min. 3 Min. 5 Min. can be selectable.

1) Press key to set **"FUN-Switch off mode",**

2) Use keys to scroll through the sub menu items until **Switch off mode** is highlighted. Press key to confirm.



3) Use keys to select 1, 3, or 5 minutes, press key to confirm.

4) Press key to exit setting and EMU-A100/B100 is now ready to perform. measurements.

8.4.2 Languages

The gauge provides muti-languages for selection.

1) Press key to set **"FUN-Languages",**

2) Use keys to scroll through the sub menu items until **Languages** is highlighted. Press key to confirm.

3) Use keys to select Language, press key to confirm.

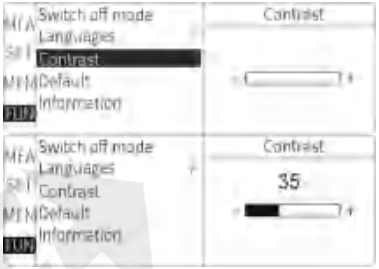
4) Press key to exit setting and EMU-A100/B100 is now ready to perform. measurements.

8.4.3 Contrast

User can adjust contrast of display.

1) Press key to set **"FUN-Contrast",**

2) Use keys to scroll through the sub menu items until **Contrast** is highlighted. Press key to confirm.



3) Use keys to set Contrast, press key to confirm.

4) Press key to exit setting and EMU-A100/B100 is now ready to perform.

8.4.4 Default

During the usage, when User cannot ensure why the problems comes out and with some questions on setting, he can use this function to make the parameters to restore the factory status to eliminate any abnormal because of the parameters setting.

1) Press key to set **"FUN-Default",**

2) Use keys to scroll through the sub menu items until **Default** is highlighted. Press key to confirm.

3) Use keys to set Default, press key to confirm.

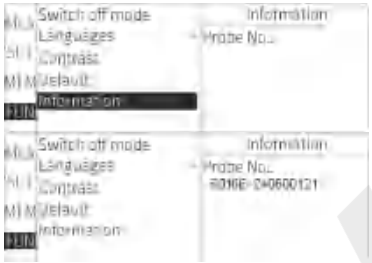
4) Press key to exit setting and EMU-A100/B100 is now ready to perform.

8.4.5 Information

The screen displays the Transducer Number.

1) Press key to set **"FUN-Information",**

2) Use keys to scroll through the sub menu items until **Information** is highlighted. Press key to confirm.



3) Use key to check Information,

4) Press key to exit setting and EMU-A100/B100 is now ready to perform.

9. Maintenance and precautions

9.1 Power check

When the power is low, the low battery indicator will appear, at this moment User should replace the battery in time, or it will affect the measuring accuracy. The backlight cannot be switched on for a long time, because it is a big consumer of electricity.

Notice: If the unit did not used for a long time, please take out of the battery to avoid leakage to damage the unit.

9.2 Precautions

9.2.1 General precautions

The unit should avoid strong vibration, do not let it in an excessively humid environment, plug in or out the probe should hold the jacket to avoid the core wire of the probe damaged.

9.2.2 Precaution during the measuring

1. During the measurement, only the measuring icon appears and displayed stable, it can be regarded as a good measurement.
2. If there are large quantity coupling agents attached on the measured surface, when taking away the probe, it will cause error, so when the measurement is completed, please move the probe away from the measured surface quickly.
3. If the probe wears out, it will cause the displayed value unstable, please replace the probe.

10.Sound Velocity Measurement Chart

Material	Sound Velocity	
	M/s	Inch/μS
Steel 1	3250	0.128
Steel 2	3227	0.127
Steel 3	3190	0.1256
Cast Iron 1	2200	0.0866
Cast Iron 2	2800	0.1102
Aluminum	3130	0.170
Aluminum	3120	0.1232
Bronze	2440	0.0961
Copper	2120	0.0835