

3 Operating Method

The numbers that are shown with a square outline in this chapter correspond to the numbers in Tables 2-1 and 2-2 on pages 8-11. Furthermore, keys are displayed on this product using **bold Gothic** characters.



WARNING



Do not use any battery pack other than the recommended battery packs. Doing so could cause fire, electric shock, or breakdown.



Do not short-circuit the terminals of the battery charger or battery pack. Doing so could cause fire, explosion, or breakdown.



Do not insert anything metallic or flammable into the CF memory slot. Doing so could cause a personal injury, fire, electric shock, or breakdown.



Do not use any charger other than the dedicated battery charger to charge the battery pack. Doing so could cause fire, electric shock, or breakdown.



Handy Search has a waterproof construction but must not be placed in water. Do not expose this product to water or moisture, and do not use it in rainy weather. Doing so could cause an electric shock or breakdown.



CAUTION



Making a judgment on the scan results considering the depth scan capability of this product. Since the depth scan capability of this product is subject to the conditions of the object of investigation, judging the scan results with no consideration of the depth scan capability may cause the cutting of rebar.



Put your hand through the hand strap and hold this product. Dropping of this product may cause an accident such as a device breakdown or personal injury.



Point the antenna surface in the direction of the probed object (concrete) while you are performing a probe. If it is pointed into the air or otherwise unsuitable direction, it can cause malfunction of other equipment or other such accidents.



CAUTION



Do not use this product in the vicinity of a radio or TV set. Doing so may cause noise or poor reception such as disturbance of television pictures. Doing so also adversely affects the depth sensing capability of this product, and may cause the cutting of reinforcing steel bars.



Do not use this product near a cell phone or transceiver that transmits electromagnetic waves. Electromagnetic waves from the cell phone or transceiver adversely affect the depth sensing capability of this product, and may cause the cutting of reinforcing steel bars.



When this product is used for scanning on the road, take safety precautions such as providing guard fences to prevent traffic accidents.

3.1 Scan preparation

(1) Mounting the hand strap

A hand strap for drop prevention is provided as standard with this product. Mount the hand strap on the handle of this product as shown in Figure 3-1, put your hand through the hand strap to grip the handle, and start to scan.

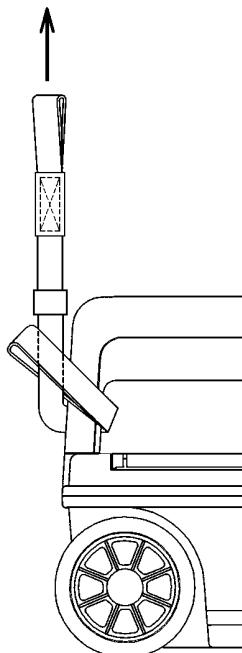


Figure 3-1 Hand Strap

(2) Connecting the power source (battery pack)

The power source applicable to this product is the battery pack or the AC adapter (option).

Notes

- Use this product in the ambient temperature of 0 to 50 °C and the humidity of 45 to 80%.
- Do not move this product in cold condition to a place where it is subject to sharp temperature rise. Doing so generates condensation inside this product that could cause a breakdown.
- Confirm that the power switch **[16]** is set to **OFF** before mounting and dismounting the battery pack or the AC adapter.

a) Mounting the battery pack (See Figure 3-2.)

1. Confirm that the **16** power switch is set to **OFF**.
2. Open the battery cover **2** at the top of this product, confirm the direction of the battery pack and put it into the battery holder.
3. Push the battery pack forward to connect with the terminals, and close the battery cover **2**.

b) Dismounting the battery pack (See Figure 3-3.)

1. Confirm that the **16** power switch is set to **OFF**.
2. Open the battery cover **2** at the top of this product, and slide the battery pack backward.
3. Push down the rear of the battery pack to raise its front, so it can be easily dismounted.

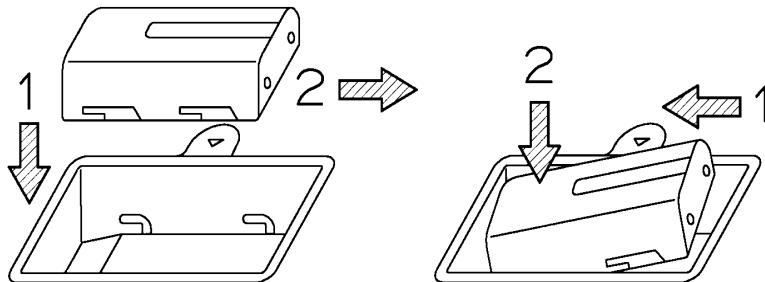


Figure 3-2 Mounting the battery pack

Figure 3-3 Removing the battery pack

Remarks

- When opening the battery cover, hold onto the handle with your left hand, push up on battery cover lock with your middle finger, open the battery cover slightly and lift the battery cover with your right hand to easily remove the battery cover.

c) Mounting the AC adapter

1. Confirm that the **16** power switch is set to **OFF**.
2. Connect the AC cable to the AC power connector on the AC adapter.
3. Open the AC adapter input connector cover **18** at the rear, and connect the DC jack of the AC adapter.
4. Connect the AC adapter cable to the socket outlet.

d) Dismounting the AC adapter

1. Confirm that the power switch **16** is set to **OFF**, and disconnect the AC adapter cable from the socket outlet.
2. Pull out the AC adapter DC jack from this product and close the connector cover for the **18** AC adapter input.

(3) Inserting and removing a CF memory

This product can save scan data into a CF memory. To save scan data into the CF memory, insert the CF memory according to the procedure in Figure 3-4 **always while this product's power switch is off**. To remove the CF memory, perform the procedure in Figure 3-5 **always while this product's power switch is off**.

Notes

- Insert/remove the CF memory always while the power switch of this product is off.
- Make sure of the insertion direction before inserting the CF memory.
- Operation of this product has been confirmed with CF TS1GCF80 manufactured by Transcend. This product may not operate with other CF memories.
- Make sure to initialize the CF memory by using this product. If this is performed by using other equipment (NJJ-95 series, PC etc.), the CF may not be recognized.
- Do not use a CF memory that was used with a NJJ-95 series. As the data format used by NJJ-95 series and NJJ-105 are different, this may cause an error.
- JRC assumes no liability for any damage arising from the disappearance of scan results stored in CF memory.

1) Open the lid over the **8**.
Compact Flash insert opening

2) If the eject switch is extended, push in the switch.

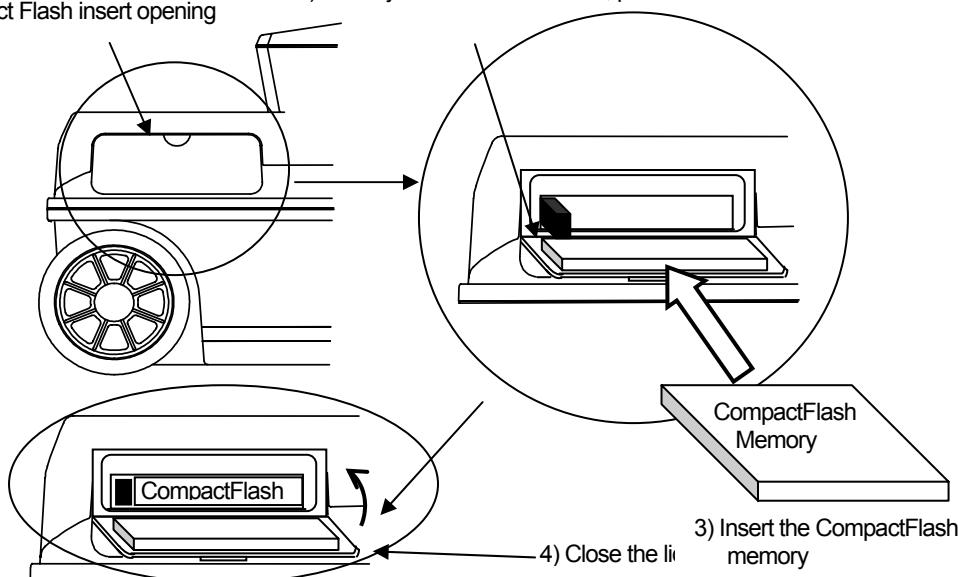


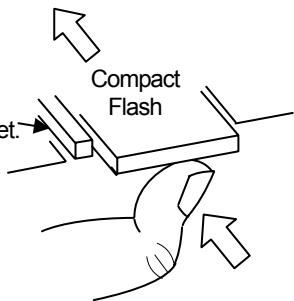
Figure 3-4 Inserting the CF memory

Caution

When inserting the CF memory into the product, make sure to keep the eject switch being pushed down into the memory socket before inserting the CF memory.

OK

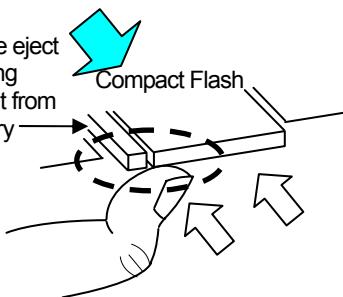
State of the
eject switch
being pushed
down into the
memory socket.



After pushing the eject switch
down into the memory socket,
insert the Compact Flash
memory.

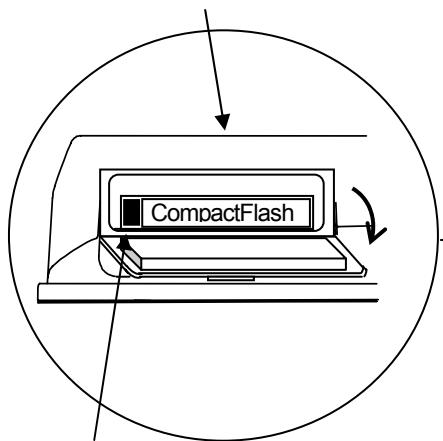
No

State of the eject
switch being
pushed out from
the memory
socket.



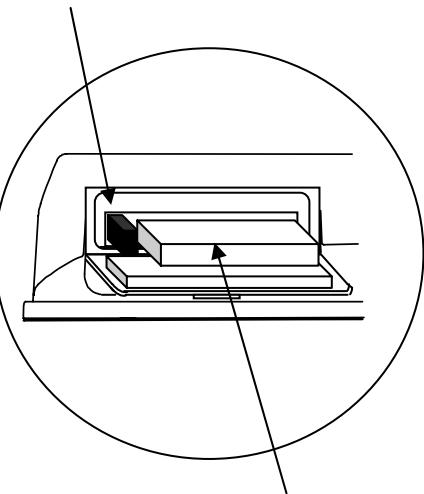
If you insert the Flash Memory at the state of the eject switch being pushed out from the memory socket, the inside of the eject switch is damaged when the finger power to push the memory is also applied to the eject switch. In this case, the power works reversely to the inside of the eject switch.

1) Open the lid of the **8** CompactFlash insert opening



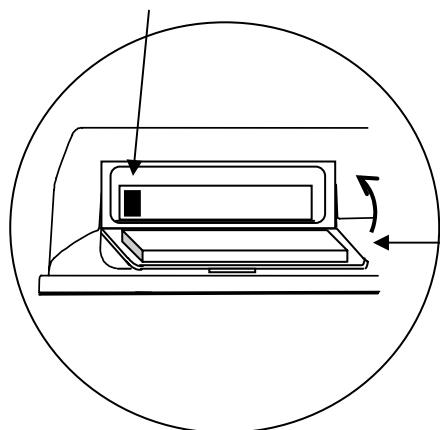
2) Push the eject so that the eject button is pushed in

3) Press the eject again to enable pulling the CompactFlash out



4) Pull out the CompactFlash

5) Push the eject button so that the eject button is pushed in



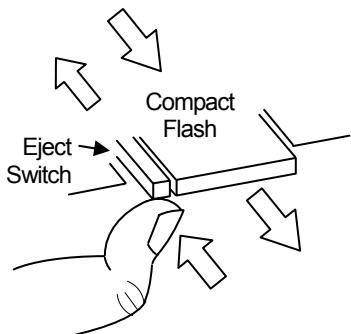
6) Close the lid as was to start with

Figure 3-5 Removing the CF memory

Caution

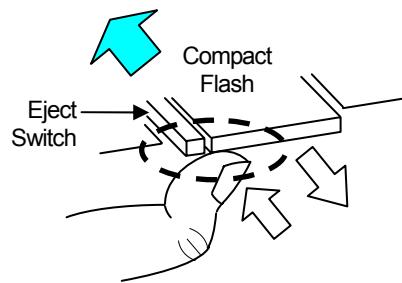
When removing the CF memory from the product, make sure to push only the eject switch and don't push the CF memory at the same.

OK



Push down only the eject switch, then remove the Compact Flash memory.

No



Pushing both the eject switch and the Compact Flash at the same time causes the damage inside the eject switch, since the finger power works reversely to the inside of the eject switch.

(4) Target Preparation for Scanning

Mark the start line and scanning line by using a chalk (or similar) on the concrete surface to indicate where to start scanning (starting line) and where to scan (scanning line). Make sure the start line and the scanning line are orthogonal. As necessary, in order to perform a retest, use the endpoint of the wall as the reference point for the start line and scanning line. An applicable set up example for scanning is shown in Figure 3-6.

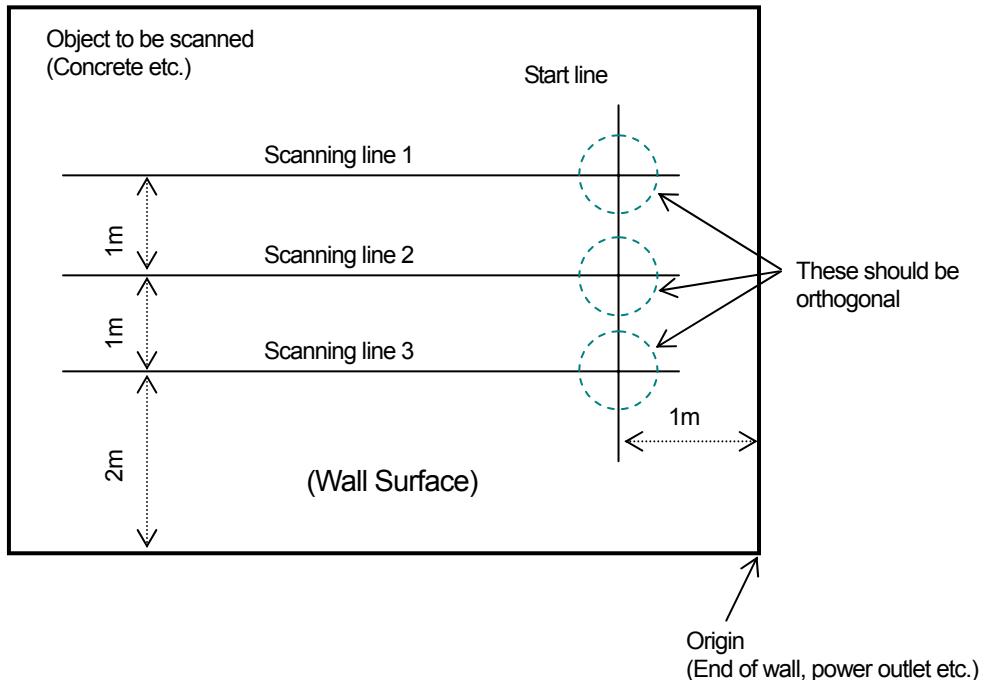


Figure 3-6 Applicable setup example for scanning

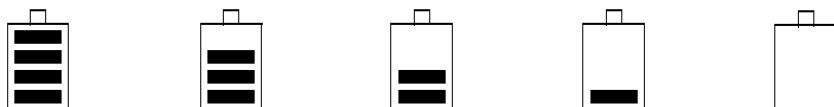
3.2 Scanning

3.2.1 Power-on procedure

The [1] LCD screen lights up roughly 5 seconds after the power is turned on by turning on the [16] power switch, then an initialization screen is displayed. After the initialization screen completes, the scan screen is displayed. After the scan screen is displayed on the LCD screen, start the scan.

The battery meter showing an approximate value of the remained battery power is displayed at the upper right of the LCD screen

[1]. (See Figure 3-7.)



About 75~100%, About 50~75%, About 25~50%, About 0~25%, About 0%

Figure 3-7 Battery Meter

Notes

- This product gives priority to the AC adapter for power input. Therefore it operates with the AC adapter when both the battery pack and AC adapter are connected. If the AC adapter is connected while operating using the battery, this product performs the re-boot by switching the power source from the battery pack to the AC adapter.

Remarks

- When tuning on this product, Window's initial screen (blue display) may appear for a few seconds. This does not indicate that there are any problems in the functions of this product. You can use this product as usual.

3.2.2 Scanning

The scan procedure is shown below. Figure 3-8 shows an example of the scanning in the B-mode.

- (1) Place this product on the concrete so as the [14] ▽ marks on the both side panels of this product come on the start line and the [14] ▽ marks on the front and rear panels of the product come on the scan line.
- (2) Press the [9] **START** key for more than one second. After about one second, a short single beep sound is generated, the fixed cursor is displayed at a position of about 10 cm of the movement distance scale on the B-mode screen.
- (3) Press the [9] **START** key and hold it pressed down, then move this product along with the scan line at a speed less than 40 cm/s by rotating the wheels. If the speed exceeded beyond 40 cm/s, a beep sounds and the scan result become invalid. In this case, perform the steps a) to c) to scan again.

- (4) Press the **11** ▼ key to finish the scan test. A double beeping sound is generated and the scan is stopped. In addition, after 8 seconds from releasing the **9** **START** key, a double beeping sound is also generated and the scan test is stopped. If the scan distance reaches to 15 m, a double beeping sound is generated and the scan automatically finishes.

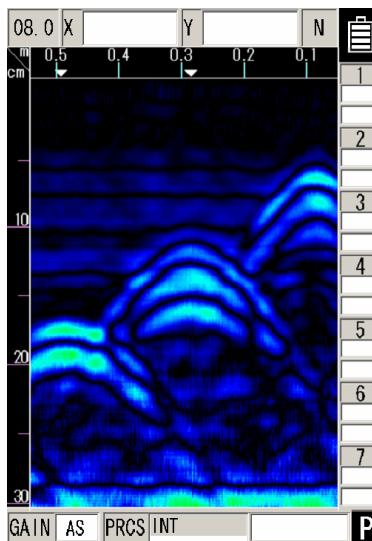


Figure 3-8 Example of the scanning in the B-mode

Remarks

- For the settings of B/BA-mode, Distance feed/Time feed, Absolute value gradation/Offset gradation, Depth calibration value, and Sensitivity, see Section 2.3 Parameter setting screen.
- Automatic real-time surface wave processing may not eliminate all waves reflected by the concrete surface depending on the conditions. By performing the image processing (peak processing) in this state, the waves reflected by reinforcing steel bars may become invisible. The waves reflected by reinforcing steel bars can be displayed by the method explained in section 3.2.5 Manual real-time deduction processing or section 3.4 Image processing.
- If this product is moved too fast, a beep will sound. In this case the scan result is not displayed.
- If this product moves backward toward the direction opposite to the traveling direction, the scan result will be displayed on the assumption that the product moves forward always.
- The latest scan data in the B-mode indicates the scan result at the position of the antenna center mark ▼ of the lower part of this product.
- During scanning, holding **9** **START** key pressed down is recommended. The scan finishes after 8 seconds from releasing **9** **START** key. If **9** **START** key is pressed again within less than 8 seconds after releasing, the scan can be continued.

3.2.3 Sensitivity

The initial sensitivity setting (default) at the factory shipment is **AS** (A shallow). The **A** setting is used to detect rebar at a depth of less than 10 cm in the general concrete. The **A** of the setting name **AS** indicates the overall sensitivity; and the **S** (Shallow) indicates the depth sensitivity. There are five levels for the overall sensitivity: **-2**, **-1**, **A**, **+1**, **+2**. In general, use this product in the **A** setting. Use the +side (**+1** and **+2**) to increase the overall sensitivity and use the -side (**-2** and **-1**) to reduce the sensitivity. There are two levels for the depth sensitivity: **S** (shallow) and **D** (deep). Select the shallow when the object to be scanned is located at a depth less than 10 cm. Select the deep when the object to be scanned is at a depth of 10 cm or more. To change the sensitivity, press the **[3] GAIN** key. The sensitivity is changed as follows:

AS (A, shallow) → **+1S** (+1, shallow) → **+2S** (+2, shallow) → **-2D** (-2, deep) → **-1D** (-1, deep) → **AD** (A, deep) → **+1D** (+1, deep) → **+2D** (+2, deep) → **-2S** (-2, shallow) → **-1S** (-1, shallow) → **AS** (A, shallow) → **+1S** (+1, shallow) →

Remarks

- You can change the sensitivity setting for scan results after scanning by pressing the **[3] GAIN** key. When the sensitivity is changed after scanning, the new sensitivity setting is used in the next scan. For the sensitivity change after scanning, see Section 3.3.2 Sensitivity switching.
- When the product is turned on, the initial sensitivity is set to the value specified in **gain.setting** parameter. See section 3.2.26 **gain.setting** for this parameter setting.

3.2.4 Antenna Mark

If core-boring or reinforced rebar locations are known beforehand (shown on a construction diagram) this product can mark the locations by placing an Antenna Mark at the applicable places during scanning. The method of use for this antenna mark is shown below.

- (1) Place the **[14] ▽** on the side of this product over the start line and the forward/backward **[14] ▽** over the scan line.
- (2) Press the **[9] START** key for more than one second. After about one second, a short single beep sound is generated, the fixed cursor is displayed at a position of about 10cm of the movement distance scale on the B-mode screen, and then scan preparation completes.
- (3) Press the **[9] START** key and hold it pressed down, then move this product along with the scan line at a speed of less than 40 cm/s by rotating the wheels. If the speed exceeds 40 cm/s, a beep sounds and the data for that timeframe is invalid. Perform the scanning again.
- (4) Push the **[10] MARK** when the **[14] ▽** on the side of this product overlaps the rebar position or core-boring as based on design blueprints. (A **▼** is shown on the movement distance gauge)
- (5) Press the **[11] ▼** key to finish the scan test. A double beeping sound is generated and the scanning is stopped. In addition, after 8 seconds from releasing the **[9] START** key, a double beeping sound is also generated and the scanning is stopped. If the scan distance reaches to 15 m, a double beeping sounds is generated and the scanning automatically finishes.

3.2.5 Real time manual deduction processing

Waves reflected by objects to be probed (e.g., reinforcing steel) at a position near the concrete surface are difficult to identify because they are combined with waves reflected by the concrete surface (called surface waves). This product contains the standard surface wave data (fixed surface wave data) with which it eliminates the influence of the concrete surface waves in real time, thereby making it easy to identify the waves reflected by the objects to be probed.

However, with the condition of the concrete surface and moisture content in the concrete and for special concrete, the effect of the reflected wave from the concrete surface may not be fully removed even if auto surface wave processing for standard surface waves is performed and there may be lateral stripe reflected waves near the surface.

In this type of situation switch to real time surface wave processing based on surface waves in the scan data to remove lateral stripe reflected waves.

Perform manual deduction processing as explained below.

- (1) Place the **[14] ▽** key on the side of this product over the start line and the forward/backward **[14] ▽** key over the scanning line.
- (2) Press the **[9] START** key for more than one second. After about one second, a short single beep sound is generated, the fixed cursor is displayed at a position of about 10cm of the movement distance scale on the B-mode screen, and then scan preparation is complete.
- (3) Press the **[9] START** key and hold it pressed down, then move this product on top of the scanning line at a speed of less than 40 cm/s by rotating the wheels. If speed exceeds 40 cm/s, a beep sounds and the data for that timeframe is invalid. Please perform the scanning again.
- (4) When results for objects that are not being probed overlap with the fixed cursor position, push the **[5] ENTER**. (See Figure 3-9.) The reflected wave that the fixed cursor is pointing to can be processed into a surface wave by real time manual deduction. The resulting data of this processing is indicated in **A** mode or **BA** mode. A **↓** is shown at the position that the real time manual deduction processing was performed on the movement distance guide. In the **PROC** area at the bottom right of the screen, **MAN** is displayed.
- (5) Press the **[11] ▼** key to finish the scan test. A double beeping sound is generated and the scanning is stopped. In addition, after 8 seconds from releasing the **[9] START** key, a double beeping sound is also generated and the scanning is stopped. If the scan distance reaches to 15 m, a double beeping sounds is generated and the scanning automatically finishes.

Remarks

- Real time manual deduction processing performs the image processing same as the deduction processing during scanning. See Section 3.4.3 Deduction Processing regarding the deduction processing.
- When the mage processing is performed for scan data by using real-time manual deduction processing and the surface wave data for manual surface wave processing is rewritten, the scan result during scanning may not be reproduced. See Section 3.4 Image Processing.
- When the scanning is performed again after scanning is complete using real-time manual deduction processing, automatic real-time surface wave processing using the fixed surface wave data is performed.
- The real-time manual deduction processing is invalid when pressing the **5 ENTER** key at the fixed cursor position (at the search distance ≤ 10 cm) where no scan result is available. (In this case, the **PROC** field at the bottom of the scan screen indicates **SUB**, but the image processing is invalid.
- When the real-time manual deduction processing is selected for the cursor line containing the reflection wave from the targeted object (ex:rebar), this image processing has possibility of producing unwanted noise on the display by the influence of this reflection wave signal from the object.

Example of where results for object that is not being probed

overlaps with the fixed cursor position

(Press the **5 ENTER** key)

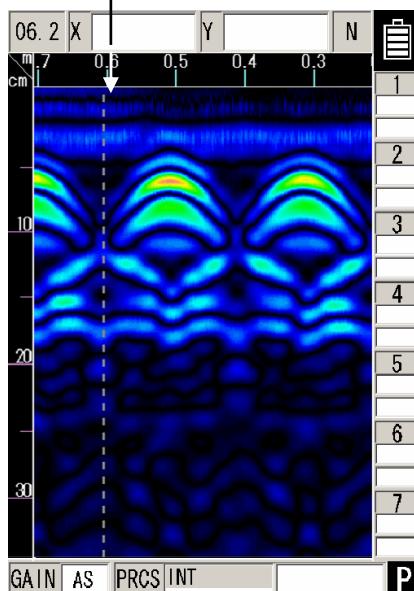


Figure 3-9 Display after real-time manual deduction processing

3.3 Operation while not Scanning

3.3.1 Mode switching

This product can scan/display the scan result in both the B-mode (vertical cross section) and the BA-mode (vertical cross section and reflected waveform display). When the display mode is switched between the B and BA-modes after scanning, the data scanned in the B-mode is displayed in the BA-mode, and the data scanned in the BA-mode is displayed in the B-mode. (See Figure 3-10.)

When the scan mode setting is the distance feed, one screen displays 49 cm distance part of the scan results in the B-mode (maximum recordable distance is 15 m). In the BA-mode one screen displays the 32.5 cm distance part along with the A-mode display (maximum recordable scan distance is 15 m).

The A-mode (waveform display) portion in the BA-mode indicates the waveform at the vertical cursor position in the BA-mode.

Perform the following procedure to switch between the B-mode and the BA-mode.

- (1) Push **4 SET** during not scanning to access to the parameter setting screen.
- (2) Move the cursor (inverse video line) on the **disp. mode** parameter by pressing the **▲▼** cursor keys, press the **◀▶** cursor keys to enter into the setting field of the parameter.
- (3) Select the setting B or BA by using the **▲▼** cursor keys, then press the **◀▶** cursor keys to exit from the setting field.
- (4) Push **4 SET** to switch to the scan screen.

Remarks

- When you changes the display mode from the B-mode to the BA-mode or vice versa during not scanning and restarts the scan, this product displays the scan results with the new setting of the display mode.

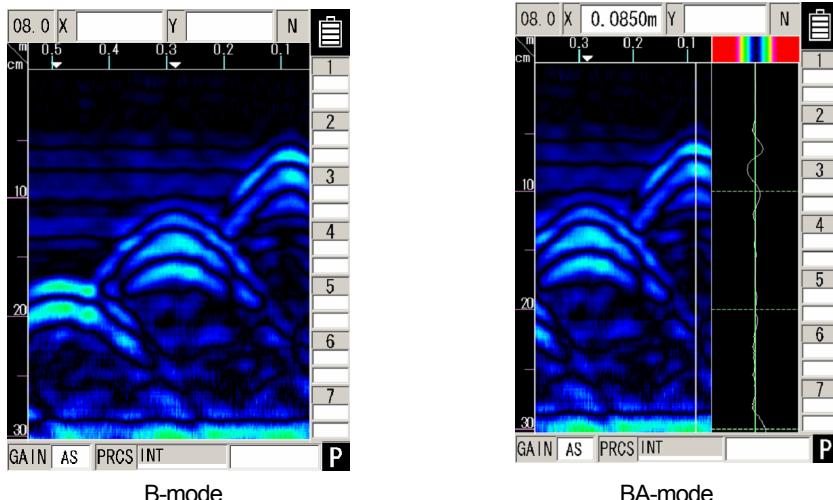


Figure 3-10 B-mode/BA-mode Display

3.3.2 Sensitivity switching

As the sensitivity can be switched for the scan results in the same way as during scanning, re-scanning does not have to be performed again after changing sensitivity.

The sensitivity is displayed, for example, as **AS** (A shallow). The **A** of the setting name **A shallow** indicates the overall sensitivity; and the **S** (Shallow) indicates the depth sensitivity.

There are five levels for the overall sensitivity: **-2**, **-1**, **A**, **+1**, **+2**. In general, use this product in the **A** setting. Use the **+side** (**+1** and **+2**) to increase the overall sensitivity and use the **-side** (**-2** and **-1**) to reduce the sensitivity.

There are two levels for the depth sensitivity: **S** (shallow) and **D** (deep). Select **S** the shallow when the object to be scanned is located at a depth less than 10 cm. Select the **D** deep when the object to be scanned is at a depth of 10 cm or more.

To change the sensitivity, press the **[3] GAIN** key. The sensitivity is changed as follows:

AS (A, shallow) → **+1S** (+1, shallow) → **+2S** (+2, shallow) → **-2D** (-2, deep) → **-1D** (-1, deep) → **AD** (A, deep) → **+1D** (+1, deep) → **+2D** (+2, deep) → **-2S** (-2, shallow) → **-1S** (-1, shallow) → **AS** (A, shallow) → **+1S** (+1, shallow) →

Remarks

- When the sensitivity is changed during stopping the scan and the next scan is performed again, the new sensitivity setting is used for the new scanning.

3.3.3 Cursor operation

Figure 3-11 shows the sample display of the cursor operation.

(1) Cursor display

By pressing the cursor keys **▶**, **▼** after completing a scan, you can show a vertical cursor in the **B** mode display. You can move the cursor on the screen vertically by pressing the **▲** **▼** keys, and horizontally by pressing the **◀** **▶** keys. The distance and depth at the intersection point are displayed in the upper area of the screen.

When the cursor reaches at the right or left end of the screen the vertical cursor disappears, and the scroll mode is enabled to continuously display the scan result stored in the memory.

(2) Cursor marker display

After moving the vertical/horizontal cursor intersection point to the position of the rebar etc., press the **[10] MARK** key. Then you can place a cursor marker (**▼** symbol and number) at the cursor intersection point. The moving distance and depth at the cursor marker are shown at the cursor marker coordinate area.

You can place 7 cursor markers in one page of the cursor marker coordinate and total 6 pages. Therefore you can place maximum 42 cursor markers. To change the displayed cursor marker coordinate page, press the **[5] ENTER** key. The displayed page changes from the 1st page of cursor markers 1 to 7 to the 2nd page 2 of cursor markers 8 to 14, and to the 3rd

page of cursor markers 15 to 21, and to the 4th page of cursor markers 22 to 28, and to the 5th page of cursor markers 29 to 35, and to the 6th page of cursor markers 36 to 42, then returns to the 1st page. (See Figure 3-12 Cursor Coordinate.)

When you place a new cursor marker by pressing the **[10] MARK** key, the coordinate information (moving distance and depth) of the new cursor marker is registered automatically in the first vacant cell at the displayed cursor marker coordinate page. When you attempt to place a new cursor marker on the page having 7 markers already, the next page is automatically displayed if the next page is blank, then the coordinate information of the new cursor marker is entered in the first cell of the next page. If the next page has already one or some coordinate information, the message below appears. Then select one desired page by pressing the **[5] ENTER** key.

There are marker data
on the following page.
Please choose a page
with an ENTER key

To delete a cursor marker, move the vertical/horizontal cursor intersection point onto the cursor marker and press the **[10] MARK** key.

Remarks

- The movement distance value is displayed with truncating 0.5mm order. Therefore when the least significant number is 2 or 7, treat it as 25 or 75, respectively. Example: when the cursor marker coordinate X = 1.002, the actual marker coordinate is 1.0025.
- When switching from a scan stopped state to scanning state, all of the cursor markers are erased.

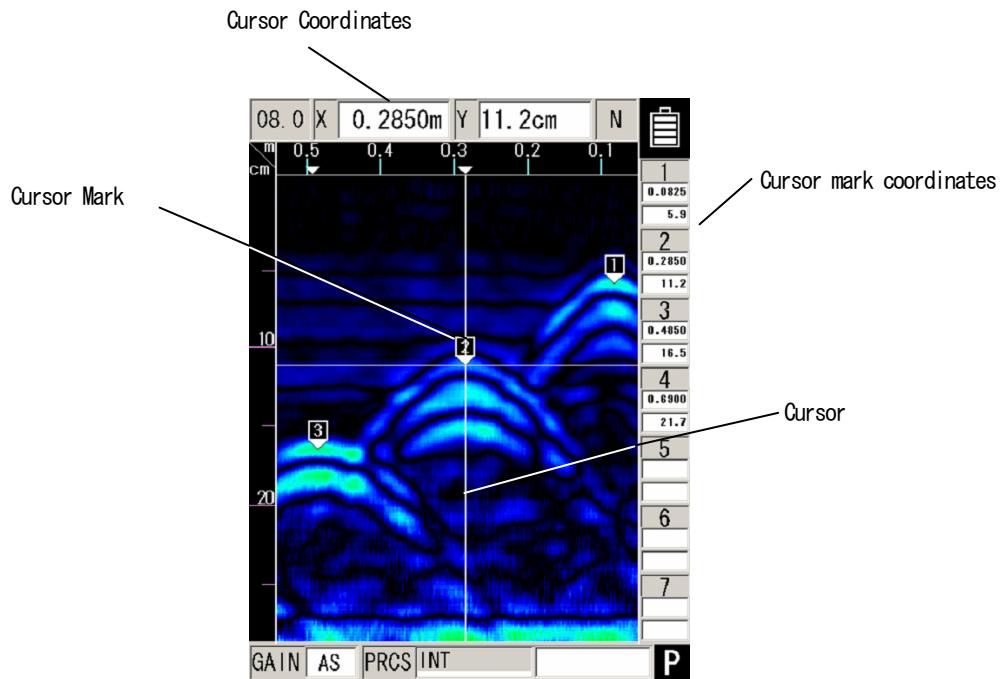


Figure 3-11 Cursors and Cursor Markers

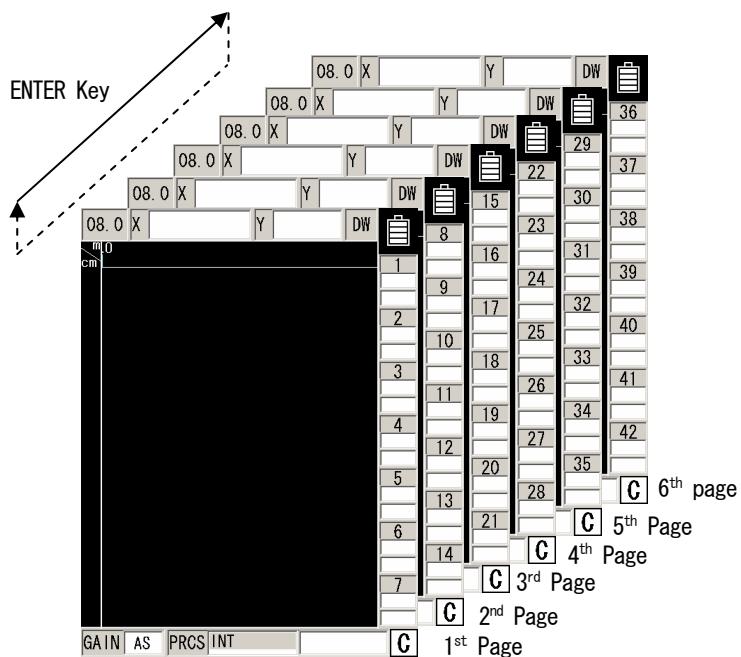


Figure 3-12 Cursors Marker Coordinate

(3) Cursor marker coordinate

Cursor marker coordinate consists of four lists which display the cursor marker coordinate values (X, and Y) with full available digits. And the lists display the pitch between each neighboring cursor markers (horizontal distance between a cell and the above cell), and one list displays the average, minimum, and maximum values of all cursor markers' depth (Y) and pitch.

To access this screen, press the **4 SET** key while the scan is stopped, then the parameter setting screen shown in Figure 2-6 appears. Move the cursor (inverse video line) on **Marker** by pressing the **▲▼** cursor keys, press the **◀▶** cursor keys to enter into the Cursor Marker Coordinate. Select a desired list by pressing the **▲▼** cursor keys. To exit from this mode, press the **◀▶** cursor keys and press the **4 SET** key. (see Figure 3-13 Cursors Marker Coordinate List.)

001/DATA
TB041346.002 depth:08.0

Marker X (cm) Y (mm) Pitch (cm)

29	001/DATA				
30	TB041346.002 depth:08.0				
31					
32	Marker	X (cm)	Y (mm)	Pitch (cm)	
33	1(a)	001/DATA			
34	1(b)	TB041346.002			
35	17				
36	18	Marker	X (cm)	Y (mm)	Pitch (cm)
37	19	1	d) 399.75	e) 112	f) ---
38	20	2	378.75	111	21.00
39	21	3	357.00	109	21.75
40	22	4	338.00	108	19.00
41	23	5	317.75	108	20.25
42	24	6	298.75	108	19.00
	25	7	279.75	108	19.00
	26	8	256.25	109	23.50
	27	9	229.25	108	27.00
	28	10	208.75	108	20.50
		11	196.50	84	12.25
		12	208.25	61	11.75
		13	225.75	61	17.50
		14	244.50	57	18.75

Marker List1 List2 List3 List4

Cursor Marker Coordinate

Marker List1/DELETE MARKER ALL <ENTER>

Marker List4/DELETE MARKER ALL <ENTER>**k**

List1 **List4**

Figure 3-13 Cursors Marker Coordinate List

a) Data No./Folder

The **xxx(Data No.)/xxxx(Folder)** of a) area displays settings at **data No.** and **folder** parameters, respectively.

b) File Name

The **xxxxxxxxxx(File Name)** of b) area displays the data file name in the CF memory when the data is stored into CF memory or the data is recalled from the file stored in CF.

The file name of b) displays blank (space) when the data displayed on the scan screen is not stored into CF before/after the scan.

c) depth

The **depth:xx.xx** of c) area displays the setting at the **depth** parameter.

d) X(unit)

The **X(xx(unit))** column of d) area displays the horizontal direction coordinate of cursor markers with the unit setting of the horizontal direction at the **XY.unit** parameter.

e) Y(unit)

The **Y(xx(unit))** column of e) area displays the vertical direction coordinate of cursor marker with the unit setting of the horizontal direction at the **XY.unit** parameter.

f) Pitch(unit)

The **Pitch(xx(unit))** column of f) area displays the pitch between each neighboring cursor markers (absolute horizontal distance between a cell and the above cell). Whereas the top cell indicates --- due to no above cell.

g) Number of theMarkers

The **NumberoftheMarkers** cell of g) area displays the number of cursor markers placed on the scan screen. When no cursor marker is placed, this cell display blank (space).

h) Ave

The **Ave** raw of h) area displays the averaged values of depths and pitches of all cursor markers placed on the scan screen. When no cursor marker is placed, the pitch cell indicates blank (space). When only one cursor marker is placed, the pitch cell indicate ---.

i) Min

The **Min** raw of i) area displays the minimum values of depths and pitches of all cursor markers placed on the scan screen. When no cursor marker is placed, the pitch cell indicates blank. When only one cursor marker is placed, the pitch cell indicate ---.

j) Max

The **Max** raw of j) area displays the maximum values of depths and pitches of all cursor markers placed on the scan screen. When no cursor marker is placed, the pitch cell indicates blank. When only one cursor marker is placed, the pitch cell

indicate - - -.

k) **DELETE MARKER xxx**

You can delete some cursor markers one time per each cursor marker page or all cursor markers one time by using this field. The available settings for **DELETE MARKER xxx** are **DELETE MARKER ALL**, **DELETE MARKER 1– 7**, **DELETE MARKER 8–14**, **DELETE MARKER 15–21**, **DELETE MARKER 22– 28**, **DELETE MARKER 29–35**, **DELETE MARKER 36–42**. To delete the cursor markers, select one setting by pressing the **▲▼** cursor keys and press the **ENTER** key. Then the message shown in Figure 3-14 appears. Then select **Yes** or **No** by using the **◀▶** cursor keys and press the **5 ENTER** key.

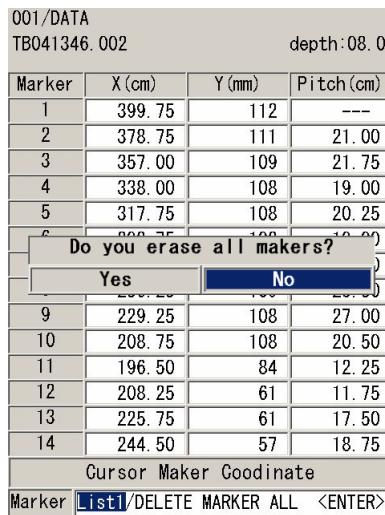


Figure 3-14 Example: Confirmation message for deleting all cursor markers

3.4 Image Processing

Image processing is processing that is performed on data input through scanning and enables easy deciphering of objects that are being probed for from the scan result. This product contains the following seven types of image processing:

- a) Fixed surface wave processing
- b) User processing
- c) Deduction processing
- d) Manual surface wave processing
- e) Average wave processing
- f) Peak processing
- g) Original image

3.4.1 Fixed surface wave processing

This image processing processes the scan result by using the internal surface wave data and displays the image-processed scan result. (The processing is same as the real time auto surface wave processing.) This image processing is available when the **Search PRCS** setting at the parameter setting screen is **Int**. Perform the following steps to use this image processing.

- (a) Confirm the **Search PRCS** setting being **Int**

Press the **4 SET** key to switch to the parameter setting screen, then confirm the **Search PRCS** setting being **Int**. When the **Search PRCS** setting is **User**, change it to **Int**. Then press the **4 SET** key to switch to the scan screen.

- (b) Press the **6 PRCS** key.

The setting field of the **PROC** at the bottom line of the scan screen is video-inverted. Then the image processing mode starts.

- (c) Set **Int** to the **PROC** by pressing the cursor keys **▲▼**.

Then the graphical image obtained by the fixed surface wave processing is displayed,

- (d) To exit from the image processing mode, press the **6 PRCS** key again.

The setting field of the **PROC** changes to normal display. Then the image processing mode finishes.

Remarks

- After setting **Int** to the **Search PRCS**, the image processing performed at the next scan is the real time fixed surface wave processing (at **Int** of the **Search PRCS**).
- The image processing performed to the data recalled from the CF memory follows the setting of the **Search PRCS**. And the image processing processes the recalled data by using the surface wave contained in the recalled data. When scanning at the next, the image processing uses the fixed surface wave in the product.