

AD-3252B

ULTRASONIC THICKNESS GAGE

INSTRUCTION MANUAL

Instruction-AD-3252B-v.1.a 93.08.30

ULTRASONIC THICKNESS GAGE



A&D Company, Limited

Table of Contents

Chapter 1-Introduction	page 1-1
Features	page 1-2
Measurement Principle	page 1-3
Front Panel Description	page 1-4
Front Panel Key Description	page 1-6
Back Panel Description	page 1-8
Unpacking and Setting up	page 1-10
Best Conditions for Use	page 1-12
Examples of Simple Measurement Procedures	page 1-13
Measuring Thickness of Steel	page 1-14
Measuring Thickness after Changing the Velocity to 6020 m/s	page 1-15
Printing the Steel Thickness Measurement Data	page 1-17
Storing Steel Thickness Measurement Data Using the Data Logger	page 1-20
Chapter 2-Specifications	page 2-1
Specifications	page 2-2
General Specifications	page 2-2
Setup Mode Measuring Ranges	page 2-2
Thickness Measurement Specifications (Longitudinal Wave in Steel)	page 2-3
Standard Accessories	page 2-3
Options	page 2-4
Chapter 3-About Initialization	page 3-1
About Initialization	page 3-2
Procedure in Initialization Mode	page 3-2
Keys Used in the Initialization Mode	page 3-2

Chapter 4•Setup Mode	page 4•1
Setup Mode	page 4•2
Procedure in Setup Mode	page 4•2
Keys Used in Setup Mode	page 4•2
Measurement Specifications	page 4•3
Data Logger	page 4•4
Data Output Conditions	page 4•7
To Reset Settings in Setup Mode to	
Factory Settings	page 4•9
Chapter 5•Measurement Mode	page 5•1
About Measurement Mode.....	page 5•2
Measurement Display	page 5•2
Measurement Mode Procedure	page 5•5
Velocity Calibration Procedure	page 5•6
Storing Data	page 5•7
Sending/Printing Data	page 5•7
Waveform Display	page 5•8
Chapter 6•RS-232C	page 6•1
Connecting the Printer	page 6•2
Connecting a Printer	page 6•2
Connecting the Computer	page 6•3
Connecting a personal computer	page 6•3
Print Examples and Output Data Formats	page 6•4
1. Output data = CURRENT	page 6•4
2. Output data = SCREEN	page 6•4
3. Output data = MEMORY	page 6•5

AD-3252B • Chapter 1

Introduction



Features

☐ A scope display

The A scope displays the waveforms of flows and corrosion. This feature ensures more accurate diagnosis and greatly reduces the measurement errors.

☐ B scope display

The simple time-sweep-type B scope displays a sectional view.

☐ High-speed measurement

The high speed mode (15 readings per second) permits rapid location of the minimum thickness of the object being measured.

☐ Data logger

A built-in data logger stores 8,000 measured values and 15 waveforms.

☐ RS-232C

A built-in RS-232C interface allows data (measured values) to be sent to the printer or computer.



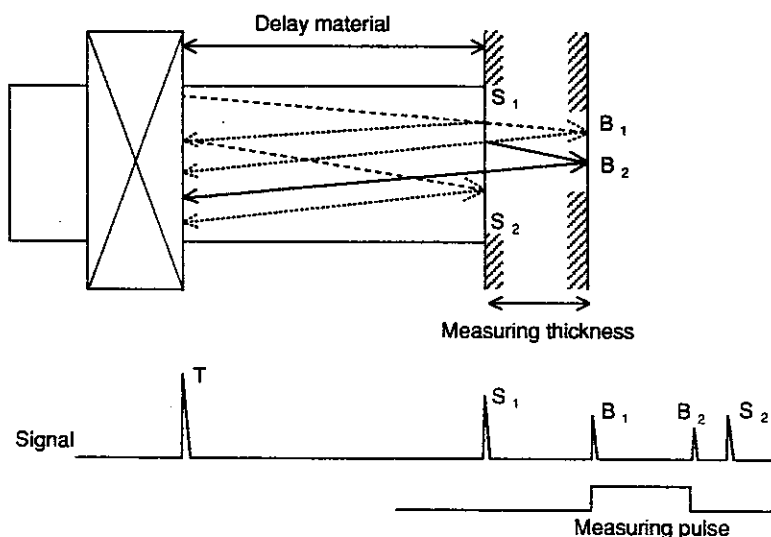
Measurement Principle

Ultrasonic pulses generated by an oscillator are emitted to the measuring object through a delay material. The ultrasonic pulses reflected from the surface of the measuring object are echoed back to the oscillator as surface echoes (S-echoes). On the other hand, the ultrasonic pulses that entered the measuring object are reflected from the surface and bottom of that object several times, then returns to the oscillator as B1, B2, B3, and so forth through the delay material.

In this mode, the time interval between the echoes B1 and B2 is displayed after being converted to a measured value.

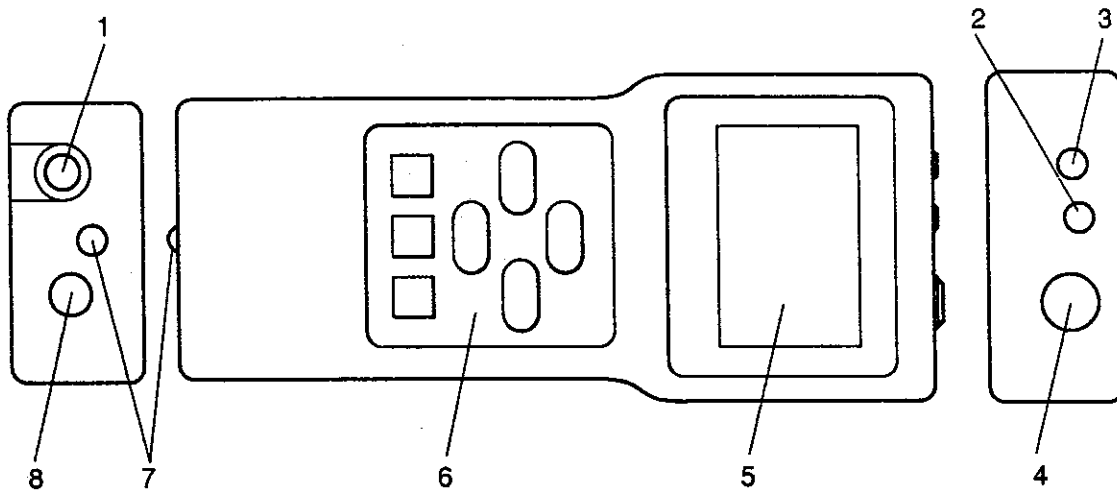
Principally, echoes B1 and B2 must be between the echoes S1 and S2, so thick objects cannot be measured; however, thin objects can be measured to a high accuracy.

Vertical probe with Delay Material





Front Panel Description



1 *External Connector*

The external connector is an RS-232C interface for connection of the AD-3252B to a printer or host computer. See "Connecting a Printer" (page 6•2) and "Connecting a Computer" (page 6•3)

2 *Probe Connector (green)*

This connector is not used.

3 *Probe Connector (red)*

The red probe connector is for the connecting to the red jack of the probe. See step 3 in "Unpacking and Setting up" (page 1•9).

4 *Adjusting Surface*

A test piece equivalent to an approx. 5-mm steel plate.

5 *LCD Display*

The LCD display graphically shows all menus for the initialization mode, setup mode, measurement mode, and waveform display function.

6 *Front Panel Keys*

See “Front Panel Key Description” beginning on page 1•6.

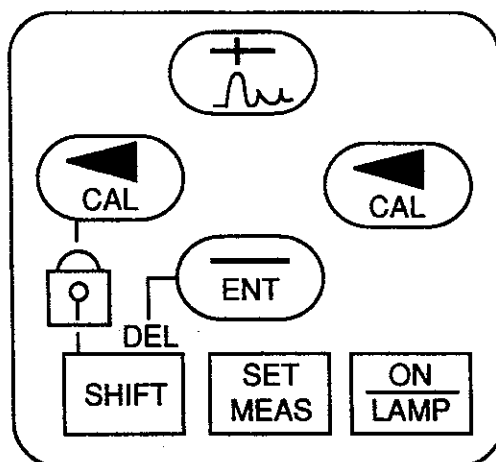
7 *Strap Terminal*

The strap terminal fastens a wrist strap to the AD-3252B. When using the AD-3252B, put on the wrist strap to protect against dropping and damaging the instrument.

8 *AC Adaptor Connector*

Connect the AC adaptor to the AC adaptor connector when batteries are not being used. See step 4 in “Unpacking and Setting up” (page 1•11).

Front Panel Key Description

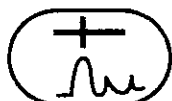


Move to the Left

The ◀/CAL key moves the blinking cursor one space to the left while in the setup mode.

Press the ◀/CAL key while pressing the SHIFT key to lock the front panel keys. See "Front Panel Key Lock" (page 5-3).

In the waveform display mode, the ◀/CAL key expands the display range. For details, see step 11 in "Waveform Display" (page 5-9).



Add One/Waveform Key

Press the \square /WAVE key to increase the value in the right-hand column of the display by one While in the initialization or setup mode.

Press the \square /WAVE key to select the waveform display function While in the measurement mode. See "Waveform Display" (page 5-8).

Press the \square /WAVE key while pressing the SHIFT key to calibrate velocity. See "Velocity Calibration" (page 5-6).



Move Down/Send Key

Press the ▼/SEND key to move the cursor bar down one line while in the initialization or setup mode.

Press the ▼/SEND key while pressing the SHIFT key to clear all logged data while in the setup mode. See step 10 in "Data Logger" (page 4-4).

Press the ON/LAMP key while pressing the ▼/SEND key to reset the current settings to the factory settings. See page 4•9.

Press the ▼/SEND key to send stored data to the printer or computer connected to the external connector while in the measurement mode. See "Sending/Printing Data" (page 5•7).

ENT

Subtract One/Enter Key

Press the -/ENT key to decrease the value in the right-hand column of the display by one while in the initialization or setup mode.

Press the -/ENT key to store data in the data logger while in the measurement mode. See "Storing Data" (page 5•7).

ON
LAMP

Power ON/Lamp Key

Press the ON/LAMP key to turn on the thickness gage. If the power is already on, press the ON/LAMP key to light up the display. Press the ON/LAMP key while pressing the ▼/SEND key to reset the current mode to the factory-set mode. See page 4•9. With the power off press the ON/LAMP key while pressing the SHIFT key to enter the initialization mode. The AD-3252B has no power-off key. The automatic power-off function, if selected, will turn off the AD-3252B after five minutes of non-use. See step 3 in "Procedure in Initialization Mode" (page 3•3).

SET
MEAS

Set/Measure Key

Press the SET/MEAS key to change from Setup Mode to measurement mode, or measurement mode to setup mode. While in the setup mode, the functions indicated in the upper half of front panel key tops will be accessed. While in the measurement mode, the functions indicated in the lower half of front panel key tops will be accessed. The ON/LAMP key functions are not affected by the SET/MEAS key setting.

SHIFT

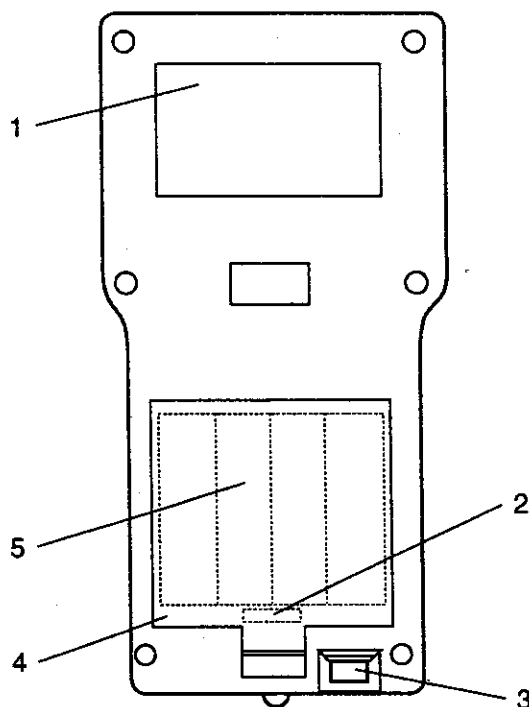
Shift Key

With the power off, press the ON/LAMP key while pressing the SHIFT key to enter the initialization mode. Press the ▼/SEND key while pressing the SHIFT key to clear all data in the specified file while in the setup mode. See step 10 in "Data Logger" (page 4•4). Press the ◀/CAL key while pressing the SHIFT key to lock the front panel keys while in the measurement mode. See page 5•3.

Press the +/∞ key while pressing the SHIFT key to calibrate velocity while in the measurement mode. See page 5•6.



Back Panel Description

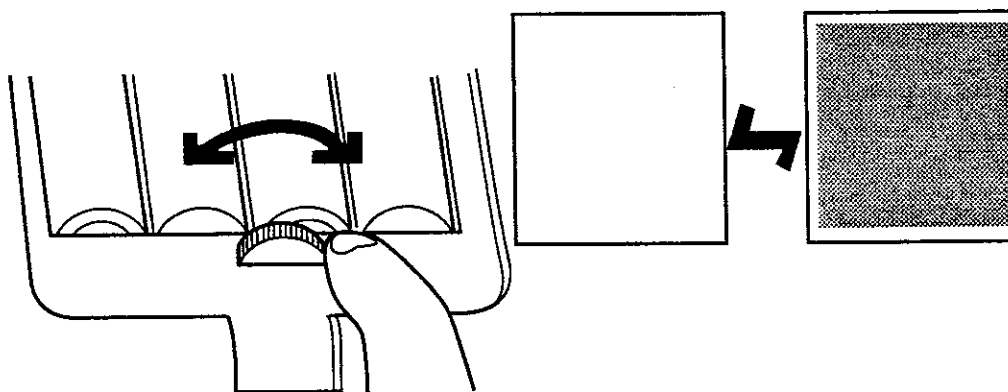


1 *Label*

The serial number of the AD-3252B is printed on the label.

2 *LCD Contrast Adjusting Dial*

The dial inside the battery case adjusts the contrast of the LCD.



The contrast of the LCD is affected by the ambient temperature. To make the display darker, turn the dial counterclockwise. To make it lighter, turn the dial clockwise.

3 *External Connector*

See "Control Panel Description" (page 1•4).

4 *Battery Cover*

Keep the battery cover on except when changing batteries or adjusting the contrast of the LCD. To open the battery cover, lift the latch marked OPEN while pushing it toward the "Δ" mark.

5 *Battery Case*

Four R6P (AA) alkaline batteries are required.



Unpacking and Setting up


1

The following should be included in the carton of the AD-3252B:

- | | |
|--|---|
| <input type="checkbox"/> Thickness gage | <input type="checkbox"/> Oiler |
| <input type="checkbox"/> Carrying case | <input type="checkbox"/> AC adaptor |
| <input type="checkbox"/> Probe with delay material | <input type="checkbox"/> Instruction Manual |
| <input type="checkbox"/> Probe connecting cable | <input type="checkbox"/> Batteries (four) |

2

Open the battery cover and insert four R6P (AA) alkaline batteries as indicated inside the battery compartment.

A [] (check batteries) mark will appear on the LCD display when the batteries begin weakening. Replace all four batteries within two hours of use to ensure that all stored data will not be lost.

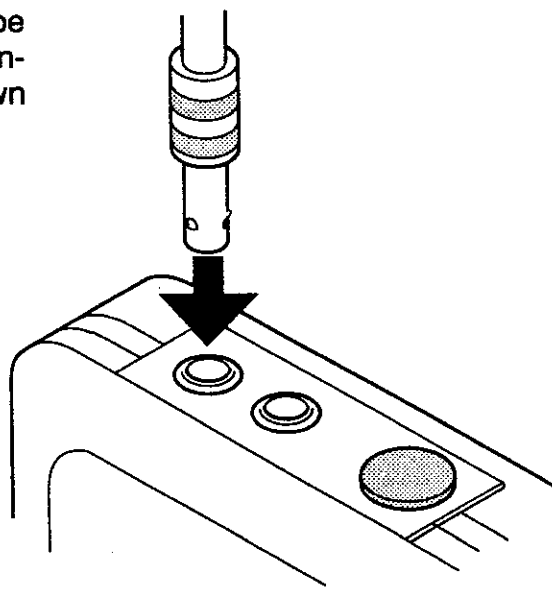
After two hours of use, the AD-3252B will turn off automatically to protect the stored data.

In the normal speed mode, the minimum operating life of the batteries is about 100 hours. See step 7 in "Procedure in Setup Mode" (page 4•4).

The batteries may be changed without losing the current data or the data stored in the logger. The data in the memory is saved for up to one hour after the batteries have been removed. However, if the batteries have been dead for an extended period of time, the stored data will be lost and "MEMORY DATA INVALID" will be displayed when the power is turned on. In this case, all the settings except the initial settings will be reset to the factory settings and the data logger will be cleared. If the AD-3252B is not going to be used for a long period of time, remove the batteries.

3

Connect the dedicated cable to the probe and connect the cable to the red connector on the top of the gage as shown at the right.



4

The AD-3252B may be operated by plugging the AC adaptor into the AC adaptor connector on the bottom of the main unit. Remove the AC adaptor connector cap and plug in the AC adaptor into the connector.

The AD-3252B has a high speed mode. In this mode, batteries are consumed quickly. It is recommended that the AC adaptor be used when the high speed mode is selected. See step 7 in "Procedure in Setup Mode" (page 4•4). The internal data remains stored for about one hour after the AC adaptor has been unplugged from the AD-3252B.


5

An optional printer or computer may be connected to the external connector. See "Connecting the Printer" (page 6•2) and "Connecting the computer" (page 6•3).



Best Conditions for Use

To get the most from the AD-3252B, the following conditions must be met:

- ☐ Avoid subjecting the main unit and probe to sudden temperature changes, strong shocks, and excessive water or oil. The AD-3252B is not resistant to a large amount of water or oil. If water or oil is spilled on the main unit, wipe it off immediately. Keep water and oil away from the probe connectors.
- ☐ The operating temperature range is 0-50°C.
- ☐ Avoid pulling or applying excessive force to the probe cable.
- ☐ Clean the main unit occasionally with a weak detergent and soft cloth.
- ☐ Measurement results depend on how the placement of the probe on the object. For the best results, place the probe lightly on the object and press it against the object firmly until the “” (coupling OK) mark appears on the LCD display. See page 5•6.



Examples of Simple Measurement Procedures

This section gives four type of measurement procedures, from power-on to measurement, which are executed frequently. For other procedures, see Chapters 5 and later.

Measuring Thickness of Steel

1

Preparation

Insert the batteries in the main unit.

Connect the attached probe to the probe connectors on the top of the main unit.

2A



(Press the ON/LAMP key.)

This message is displayed when the internal data has been lost. If this message is displayed:

MEMORY DATA
INVALID !



(Press the SET/MEAS key.)



(Press the ON/LAMP key.)

Then, go to step 3.

2B



(Press the ON/LAMP key.)

This screen is displayed when the internal data remains stored.

VEL = 5920m/s
MIN = - - - - mm

— — — — mm

3

Start measurement.

AD-3252B • Chapter 2


Specifications



Specifications



General Specifications

Measurement method	Ultrasonic pulse reflection method
Measurement unit	mm or inch
Display	Graphic LCD
Back light of display	EL back light
Frequency range	1-15 MHz
Measurement frequency	Normal-speed mode: Approx. 2 times/sec. High-speed mode: Approx. 15 times/sec.
Data logger	About 8000 measured values, 15 waveforms
Interface	RS-232C interface
Power supply	Four R6P (AA) alkaline batteries or AC adaptor
Battery life	Min. 100 hours (continuous) in normal speed mode (20°C)
Automatic power off	Power is automatically turned off after 5 minutes of non-use.
Battery check	Replace all four batteries when the [] (check batteries) mark appears on the display.
Operating temperature range	0 to 50°C
Dimensions	102(mm) × 225(mm) × 34(mm) (W×H×D)
Weight	About 520 g (1.1 lbs) including batteries



Setup Mode Measuring Ranges

Velocity setting range	300 to 20000 m/s, 0.01 to 0.8000 inch/μs
Standard thickness for velocity measurement	0.02 to 500.00 mm, 0.001 to 20.000 inches



Thickness Measurement Specifications (Longitudinal Wave in Steel)

Measurement method	Measurement accuracy	Display resolution
0.40 to 10.00 mm	± 0.02 mm	0.01 mm
0.015 to 0.400 inches	± 0.001 inch	0.001 inch

- The above values may vary depending on the velocity and surface condition of the object being measured.



Standard Accessories

Probe with delay material	1
Probe connecting cable	1
Main unit case	1
Batteries	4
Oiler	1
AC adaptor	1
Instruction Manual	1



Options

Probes

Merchandise code	Description
AD-1263	Probe with delay material (standard accessory)
AS-LEMO00-MICRO	Probe connecting cable (standard accessory)

RS-232C Cables

Merchandise code	Description
AX-KO886-150	For connecting a PC9801
AX-KO887-150	For connecting an AD-8120
AX-KO913-150	For connecting an IBM-PC

Printer

Merchandise code	Description
AD-8120 (00007)	Printer (with connection cable), 100 VAC

AD-3252B • Chapter 3

About Initialization



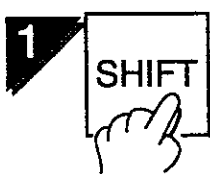
About Initialization

This section is intended for the users who wish to initialize or change the system configuration of the AD-3252B. If the AD-3252B is already initialized and there is no need to change the unit of measure, auto power-off function, and RS-232C configuration, go to "Procedure in Setup Mode" (page 4•2).

(Initial settings remain stored after batteries have been removed. The initialization mode can only be entered while the power is off.)



Procedure in Initialization Mode



With the power off, press the ON/LAMP key while pressing the SHIFT key to initialize the thickness gage. The screen at the right will be displayed.

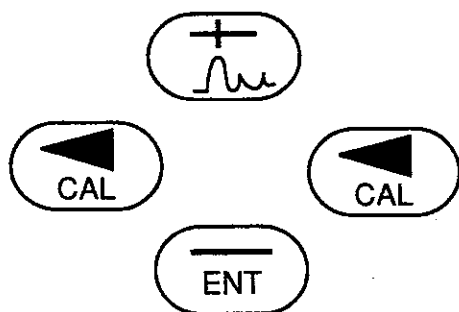
The software version of the AD-3252B is displayed on the bottom line.

ITEM CONFIG

UNIT	METRIC
POWER	AUTO OFF
CLEAR	NO FILE



Keys Used in the Initialization Mode



- ☐ Use the +/∞ and -/ENT keys to change the value in the right-hand column of the display.
- ☐ Press the ▼/SEND key to move the cursor bar down one line. When the cursor bar reaches the bottom line, press the ▼/SEND key again to return the cursor bar to the top line.
- ☐ When the cursor reaches the top line, press the +/∞ or -/ENT key to change menus.

2

Press the ▼/SEND key to move the cursor bar down one line. To change the unit of measure, press the +/∞ or -/ENT key. To use millimeters (mm) and millimeters per second (mm/s), select METRIC. To use inches (in.) and inches per micro-second (in./ls), select INCH.

UNIT METRIC

or

UNIT INCH

- 3** Press the ▼/SEND key to move the cursor bar down one line.

Select the auto power-off function. The auto power-off function automatically turns off the power after 5 minutes of non-use. Before selecting the auto power-off function, press the +/↵ or -/ENT key. Press AUTO OFF to use the auto power-off function. Press CONTINUE to not use the auto power-off function. If the auto power off function is not used, be sure to turn off the AD-3252B after use by removing the batteries or the AC adapter if used. If the batteries or AC adapter are reinserted within a few minutes, the memory will not be lost.

POWER AUTO OFF

or

POWER CONTINUE

- 4** Press the ▼/SEND key to move the cursor bar down one line.

Select ALL to clear the data in all files in the logger. The data in all files will be cleared when the initialization mode is exited in step 11. Enter the setup mode to delete the data in the selected file. See step 10 in "Data Logger" (page 4•4).

CLEAR NO FILE

or

CLEAR ALL FILE

- 5** Use the ▼/SEND key to move the cursor bar up to the top line. To use the RS-232C interface, use the +/↵ or -/ENT key. The screen at the right will be displayed.

If no device is to be connected to the RS-232C interface connector, go to step 11.

ITEM RS232

BAUD	9600 bps
STOP B	1
PARITY	NONE
LENGTH	8bits
TERM	CR+LF

- 6** Press the ▼/SEND key to move the cursor bar down one line. Use the +/↵ or -/ENT key to select one of the following baud rates: 300 bps, 600 bps, 1200 bps, 2400 bps, 4800 bps, and 9600 bps.

- 7** Press the ▼/SEND key to move the cursor bar down one line. Use the +/↵ or -/ENT key to set the stop bit.

STOP B 1

or

STOP B 2

8

Press the ▼/SEND key to move the cursor bar down one line.

Use the +/⌂ or -/ENT key to select even, odd or no parity, in accordance with the computer or printer connected to the RS-232C interface.

PARITY EVEN

or

PARITY ODD

or

PARITY NONE

9

Press the ▼/SEND key to move the cursor bar down one line.

Use the +/⌂ or -/ENT key to select the data length of 8 bits or 7 bits.

LENGTH 8bits

or

LENGTH 7bits

10

Use the ▼/SEND key to move the cursor bar down one more line.

Select a symbol (terminator) that marks the end of data. Use the +/⌂ or -/ENT key to select either CR+LF or CR.

TERM CR+LF

or

TERM CR

11



To exit the initialization mode, simply press the SET/MEAS key. The system will enter the measurement mode. The screen at the right will be displayed.

VEL = 5920m/s
MIN = - - - - mm
± - - - - mm

AD-3252B • Chapter 4

Setup Mode



Setup Mode

This section explains the measurement specifications, data logger, and printing conditions. If all settings are correct, go to "Measurement Mode Procedure" (page 5•5).



Procedure in Setup Mode

1



Press the ON/CLAMP key to turn on the AD-3252B. The screen at the right will be displayed.

```
VEL = 5920m/s
MIN = - - - - mm

+ - - - - mm
=
```

2

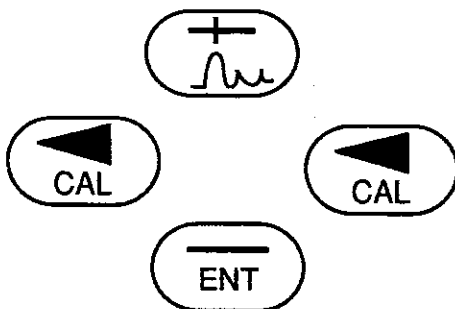


Press the SET/MEAS key to enter the setup mode. The screen at the right (or the menu last used) will be displayed.

```
ITEM MODE
VEL 5920m/s
THICK 20.00mm
HOLD ON
SCAN SLOW
```



Keys Used in Setup Mode



- Press the ▼/SEND key to move the cursor bar down one line. When the cursor bar reaches the bottom line, press the ▼/SEND key again to return the cursor bar to the top line.
- Use the +/∞ and -/ENT keys to change the value in the right-hand column of the display. When the cursor bar reaches the top line, press the +/∞ or -/ENT key to change menus.
- Use the ◀/CAL key to move the blinking cursor one space to the left. Use the +/∞ and -/ENT keys to increase or decrease the numerical value.

SHIFT

- Use the SHIFT key along with the ◀/CAL or ▼/SEND key. Press the ◀/CAL or ▼/SEND key while pressing the SHIFT key. (For more details, see steps 10 and 11.)

- 3** To change only the data logger settings, go to step 9.

To change the data output conditions, go to step 18. To change the measurement specifications or some of the other settings, go to step 4.

Measurement Specifications

- 4** Press the ▼/SEND key to move the cursor bar down one line. To change the velocity, move the blinking cursor with the ◀/CAL key. Use the +/∞ or -/ENT key to change the value. The velocity of the object to be measured must be known for a proper thickness measurement. The acceptable velocity setting range is from 300 to 20000 m/s (0.01 to 0.8000 in./μs).

ITEM MODE	
VEL	5920m/s
THICK	20.00mm
HOLD	ON
SCAN	SLOW

- 5** Press the ▼/SEND key to move the cursor bar down one line in order to change the thickness. Use the ◀/CAL key to move the blinking cursor and use the +/∞ and -/ENT keys to change the value.

This thickness is for velocity calibration. Enter the thickness of the test piece subject to velocity calibration. This thickness does not need to be entered if the velocity is not going to be calibrated.

The acceptable thickness setting range is from 0.02 to 500.00 mm (0.01 to 20.00 inches).

ITEM MODE	
VEL	5920m/s
THICK	20.00mm
HOLD	ON
SCAN	SLOW

- 6** Press the ▼/SEND key to move the cursor bar down one line. Determine whether display of the measurement data is to be held on or off. When ON is selected, the last measured value will be displayed for about 5 seconds after the measurement. When OFF is selected, "----" will be displayed immediately after the measurement.

HOLD ON

or

HOLD OFF

7

Press the ▼/SEND key to move the cursor bar down one line. Use the +/WAVE or -/ENT key to select a fast or slow measurement speed. SLOW will measure the object thickness approximately two times per second; FAST will measure the thickness approximately 15 times per second.

SCAN SLOW

or

SCAN FAST**8**

Use the ▼/SEND key to move the cursor bar to the top line. To change the data logger settings, go to step 9. If the data logger settings are to remain unchanged, but the data output conditions (by selecting SEND) are to be change, go to step 18. Press the SET/MEAS key to exit the setup mode and enter the measurement mode.



Data Logger

9

Use the +/WAVE or -/ENT key to change the menu bar to "LOGGER." The screen at the right will be displayed.

Use the data logger to save thickness measurement data. The data logger can save only measured values, but cannot store measurement conditions.

ITEM LOGGER**MODE OFF****10**

Press the ▼/SEND key to move the cursor bar down one line. Use the +/WAVE or -/ENT key, to select whether logger data is to be saved or cleared. If the data logger will not be used, select OFF and go to step 17.

MODE OFF

or

MODE CLEAR

or

MODE ON

To clear the logger data, select CLEAR. The screen at the right will be displayed.



To clear all data in a selected file, press the ▼/SEND key while pressing the SHIFT key. Go to step 17.

Select ON to use the data logger.

ITEM LOGGER
MODE CLEAR
PUSH SFT + ▼ for file clear

ITEM LOGGER
MODE ON
FILE 1
START 1
TYPE 0.00mm LINEAR

11

Press the ▼/SEND key to move the cursor bar down one line. Specify the file to be used. The file specified here is used for saving data in the logger (step 6 on page 5-7) and for outputting memory data (step 9 on page 5-8). To store the current screen data in the logger, press the ◀/CAL key while pressing the SHIFT key and go to step 13. To store the measured value in the logger, use the ◀/CAL key to move the blinking cursor. Use +/∞ and -/ENT keys to change the value. The acceptable value setting range is 1-128. Steps 12-16 can be executed for each file.

ITEM LOGGER
MODE ON
FILE 1
START 1
TYPE 0.00mm LINEAR

12

Press the ▼/SEND key to move the cursor bar down one line.

Specify the data input address.

Use the ◀/CAL key to move the blinking cursor and use the +/∞ and -/ENT keys to change the values. When MATRIX (matrix incrementation system) is selected, the screen at the right is displayed. The first value is the number of rows and the second number is the number of columns.

The maximum numbers of rows and columns depend on the size specified in step 16.

ITEM LOGGER
MODE ON
FILE 1
START 1 - 1
0.00mm
TYPE MATRIX
SIZE 128

The value displayed under the data input address is the measured value stored at this address. When no measured value is stored, 0.00 mm or 0.000 inch is displayed. Changing the address here allows to confirm the logger contents. However, the logger contents cannot be changed. Go to step 14.

- 13** Press the ▼/SEND key to move the cursor bar down one line.
Set the data input address. Use the ◀/CAL key to move the blinking cursor and use the +/∞ and -/ENT keys to change the value. The maximum value that can be set is 15. Go to step 17.

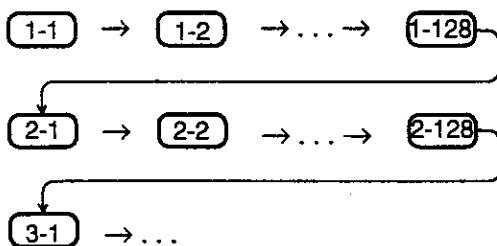
ITEM LOGGER	
MODE ON	
FILE SCREEN	
START	1

- 14** Press the ▼/SEND key to move the cursor bar down one line.
Use the +/∞ or -/ENT key to select whether data is to be stored by the linear incrementation system or matrix incrementation system.
If LINEAR (linear incrementation system) is selected, go to step 17.

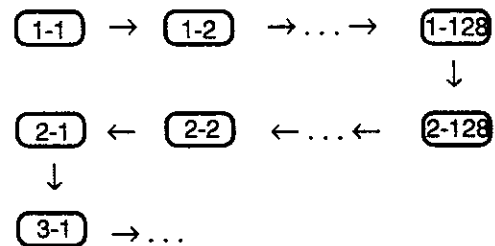
TYPE LINEAR
or
TYPE MATRIX
or
TYPE MATRIX ◀

There are two types of linear incrementation systems with the addresses incrementing as follows:

When **MATRIX** is selected (SIZE = 128)



When **MATRIX ◀** is selected (SIZE = 128)



- 15** When MATRIX (matrix incrementation system) is selected, the screen at the right is displayed.

ITEM LOGGER	
MODE ON	
FILE	1
START	1 - 1
	0.00mm
TYPE MATRIX	
SIZE	128

- 16** Press the ▼/SEND key to move the cursor bar down one line. Specify the matrix size. A maximum matrix size of up to 999 can be specified. Use the ◀/CAL key to move the blinking cursor. Use the +/√ or -/ENT keys to change the value.

ITEM LOGGER			
MODE	ON		
FILE		1	
START	1	-	1
	0.00mm		
TYPE	MATRIX		
SIZE	128		

17

- Using the ▼/SEND key, move the cursor bar to the top line. Press the SET/MEAS key to exit the setup mode and enter the measurement mode.

Data Output Conditions

18

- Using the +/√ or -/ENT key, change the menu bar to SEND. The screen at the right will be displayed.

ITEM SEND	
MODE OFF	

19

- Press the ▼/SEND key to move the cursor bar down one line.

To change the data output conditions, use the +/√ or -/ENT key to change OFF to PRINT. The screen at the right will be displayed.

If the output conditions will not be changed, go to step 25.

ITEM SEND	
MODE	PRINT
DATA	CURRENT
TRIG	KEY

- 20** Press the ▼/SEND key to move the cursor bar down one line. Use the +/∞ or -/ENT key to select whether the data or the data stored in the memory is to be output.

To output the current data, select CURRENT and go to step 21.

To output the data stored in the memory, select MEMORY and go to step 22.

To output the data currently being displayed on the screen, select SCREEN and go to step 25.

- 21** If CURRENT is selected use the ▼/SEND key, to move the cursor bar down one line. If the data is to be output when the -/ENT key is pressed, select KEY. If the data is to be output after each measurement, select STREAM. Use the +/∞ or -/ENT key to choose. Go to step 25.

- 22** If MEMORY is selected, the screen at the right will be displayed.

DATA CURRENT

or

DATA MEMORY

or

DATA SCREEN

TRIG KEY

or

TRIG STREAM

ITEM	SEND
MODE	PRINT
DATA	MEMORY
FROM	TOP
TO	LAST

- 23** Press the ▼/SEND key to move the cursor bar down one line. Specify the data output start address.

Use the ◀/CAL key to move the blinking cursor and use the +/∞ and -/ENT keys to change the value.

ITEM	SEND
MODE	PRINT
DATA	MEMORY
FROM	1
TO	LAST

- 24** Press the ▼/SEND key to move the cursor bar down one line. Specify the data output end address.

Use the ◀/CAL key to move the blinking cursor and use the +/√ and -/ENT keys to change the value.

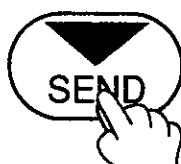
ITEM SEND	
MODE	PRINT
DATA	MEMORY
FROM	1
TO	100

25



The setup mode is now finished. Press the SET/MEAS key to exit the setup mode and enter the measurement mode.

To Reset Settings in Setup Mode to Factory Settings



To reset the settings made in the setup mode to the factory settings, press the ON/LAMP key while pressing the ▼/SEND key.

The factory settings are shown at the right. The data logger and output settings will be cleared. The settings made in the initialization mode will be lost.

ITEM MODE	
VEL	5920m/s
THICK	20.00mm
HOLD	ON
SCAN	SLOW

AD-3252B • Chapter 5

Measurement Mode



About Measurement Mode

This section explains the screen displayed and the functions of the front panel keys used in the measurement mode. The procedure in the measurement mode will begin on page 5•5.

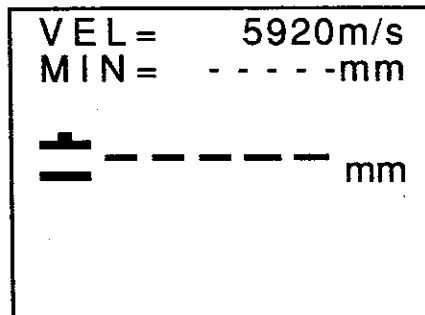


Measurement Display

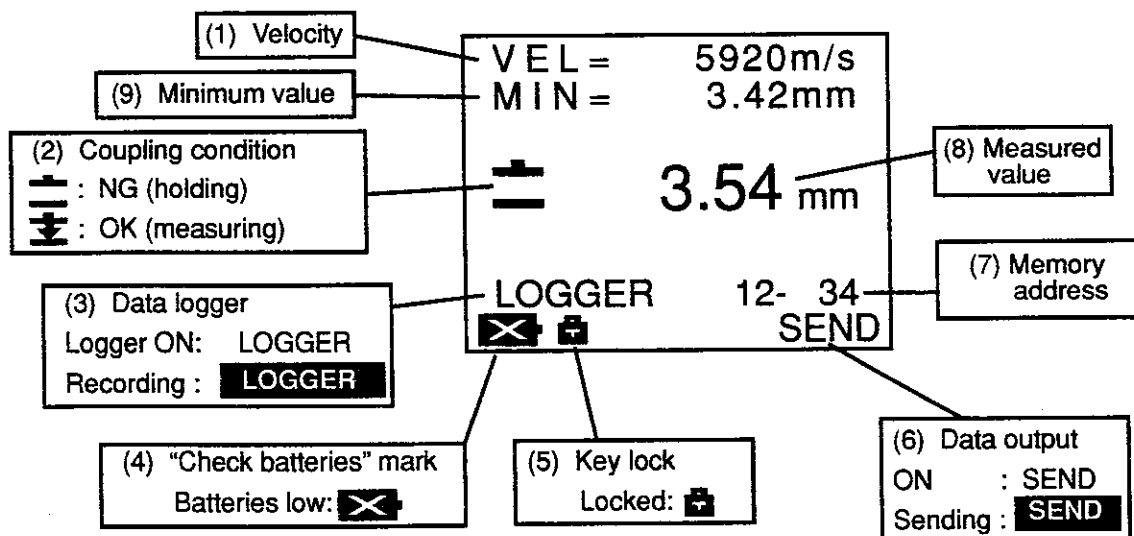


Turn on the AD-3252B by pressing the ON/LAMP key.

The measurement mode will be selected automatically. The screen at the right will be displayed (factory settings).



This section explains the screen displayed in the measurement mode. The display screen with all its possible items, is shown below.



1 *Velocity*

The velocity value specified in step 4 in "Measurement Specifications" (page 4•3) is displayed.

2 *Coupling Condition*

If not measuring any object or coupling with the object is improper, the following mark will be displayed:

:  NG

If measuring an object properly, the following mark will be displayed:

:  (OK)

3 *Data Logger*

When ON is selected in step 10 in "Data Logger" (page 4•4), "LOGGER" is displayed. When the data logger is not selected, nothing will be displayed. "LOGGER" will be displayed in reverse video when data is recorded. See step 6 in "Storing Data" (page 5•7).

4 *"Check Batteries" Mark*

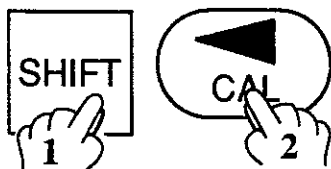
The "check batteries" mark will be displayed when the batteries are running low. See step 2 in "Unpacking and Setting up" (page 1•10).

 : "Check Batteries" mark

5 *Front Panel Key Lock*

The "front panel key lock" mark will be displayed when front panel keys are locked.

 : (Front panel key locked)



To lock the front panel keys, press the ◀/CAL key while pressing the SHIFT key in the measurement mode. Lock the front panel keys to prevent the changing of settings or to avoid accidental use of the ▼/SEND key. When the front panel keys are locked, only the +/√, -/ENT, and ON/LAMP keys are effective.

Once the front panel keys are locked, they remain locked even if the AD-3252B is turned off by the auto power-off function. To unlock front panel keys, press the ◀/CAL key while pressing the SHIFT key.

6***Data Output***

SEND will be displayed when PRINT is selected in step 19 (measurement mode) in "Data Output Conditions" (page 4•7). If PRINT is not selected, nothing will be displayed. When the current measured value is output, "SEND" is displayed in reverse video. See step 7 in "Sending/Printing Data" (page 5•7).

7***Memory Address***

The data input start address specified in step 12 or 13 will be displayed when ON is selected in step 10 (setup mode) in "Data Logger" (page 4•4). (See page 4•5, 4•6.) The start address will automatically be incremented after each data is stored. When ON is not selected, nothing will be displayed.

8***Measured Value***

The value actually measured with the probe will be displayed in the center of the display. When ON is selected in step 6 in "Measurement Specifications" (page 4•3), the measured value will be displayed for five seconds after the measurement is taken. When OFF is selected, "----" will be displayed immediately after the measurement is taken.

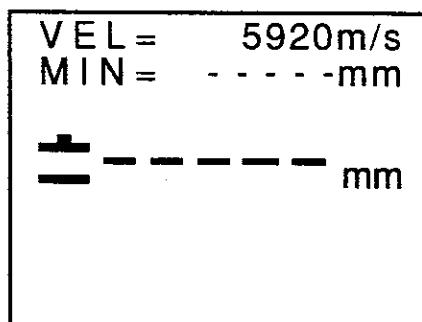
9***Minimum Value***

The minimum value of the values measured will be displayed. It is reset if measurement is interrupted for five seconds.



Measurement Mode Procedure

- 1 Turn on the AD-3252B by pressing the ON/LAMP key; the measurement mode will be selected automatically and the screen (factory settings) at the right will be displayed.



- 2 Confirm that all the settings made in the initialization and setup modes are correct. The procedure in the initialization mode begins on page 3•2 and the procedure in the setup mode begins on page 4•2.

- 3 Using the attached oiler, Put a drop of oil or water on the object to be measured.

The AD-3252B is not resistant to a large amount of oil or water. If water or oil is spilled on the main unit, wipe it off immediately. Keep water and oil away from the probe connectors.

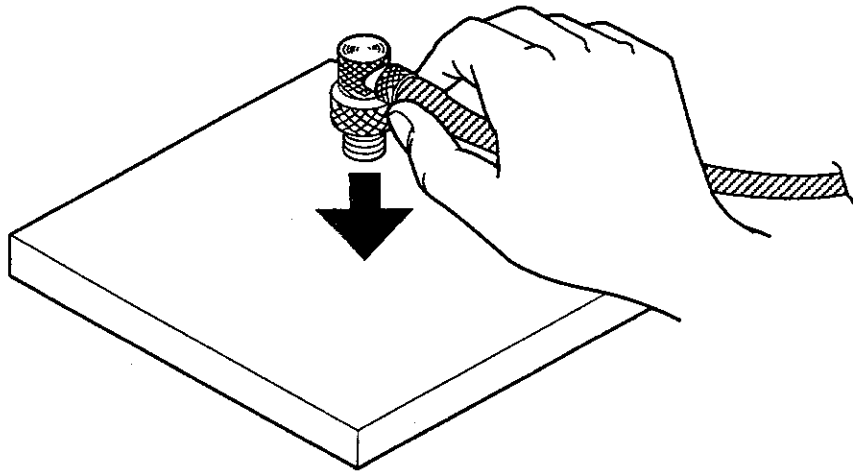
Velocity Calibration Procedure

If the velocity of the object to be measured is not known, the velocity must be calibrated.

- ① Prepare the test piece for velocity calibration. This test piece must be made from the same materials as those of the object to be measured and its surface condition must be good. The recommended thickness of the test piece is 5-10 mm.
- ② Measure the thickness of the test piece with vernier calipers. See step 5 in "Measurement Specifications" (page 4•3).
- ③ Put a drop of oil or water on the test piece and press the +/- key while pressing the SHIFT key.

- 4** Place the probe directly on the object to be measured as shown below. Apply light, but firm pressure until the "coupling OK" mark appears on the display.

 Coupling OK



- 5** After measuring the object, the data may be used in several ways. To save data, go to step 6. To send data to the printer or computer, go to step 7. To use the waveform display function, go to step 10.

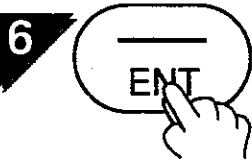


To change the measurement specifications, press the SET/MEAS key to enter the setup mode. If finished using the thickness gage, allow the auto power-off function to turn off the AD-3252B automatically. This will occur approximately five minutes later.

If the auto power-off function is not to be used, select CONTINUE in step 3 in "Procedure in Initialization Mode" (page 3•3).



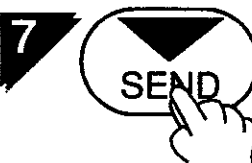
Storing Data



- 6** To store the measurement result, press the -/ENT key. "LOGGER" is displayed in reverse video, incrementing the address by one. If OFF is selected, nothing will happen if the -/ENT key is pressed. For details on the data logger, see "Data Logger" (page 4•4). Go back to step 5.



Sending/Printing Data



- 7** To send data to the printer or computer, press the ▼/SEND key. If CURRENT is selected in step 20 in "Data Output Conditions" (page 4•8), "SEND" will be displayed in reverse video and the measured value will be output. When SCREEN is selected, "SEND" is displayed in reverse video and the current screen data will be output. When MEMORY is selected, see step 8.

When OFF is selected, nothing will happen if the ▼/SEND key is pressed.

For details on data output, see "Data Output Conditions" (page 4•7).

Go back to step 5.

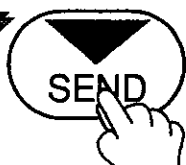
8

If MEMORY is selected in step 20 in "Data Output Conditions" (page 4•8), the screen at the right is displayed.

The data output ranges specified in steps 23 (page 4•8) and 24 (page 4•9) in "Data Output Conditions" will be displayed.

To change the data output ranges, press any key other than the ▼/SEND key and go back to step 23 in "Data Output Conditions" (page 4•8).

MEMORY DATA OUT		
SEND FOR START		
FROM	1 -	1
TO	1 -	7
FILE		1

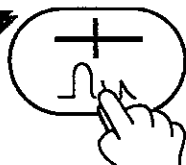
9

Press the ▼/SEND key again to send data. The screen at the right will be displayed. After all data has been sent out, then the regular measurement mode screen will appear. Go back to step 5.

MEMORY DATA OUT		
NOW	HEADER	
FROM	1 -	1
TO	1 -	7
FILE		1

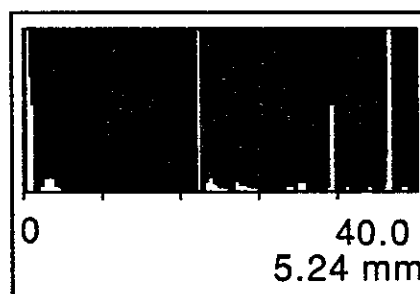


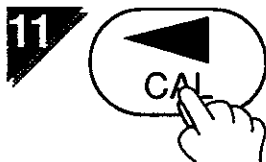
Waveform Display

10

To use the waveform display function, press the +/WAVE key. The screen at the right will be displayed.

To display the B scope, go to step 16.

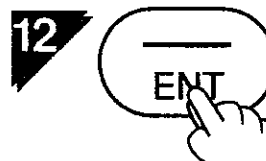
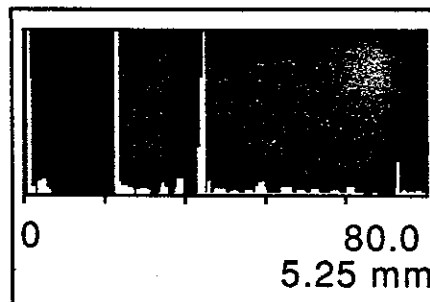




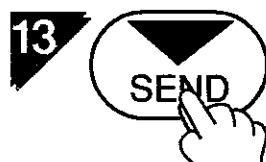
To expand the display range, press the ◀/CAL key. The display range will be expanded as shown at the right. This range depends on the velocity.

The ◀/CAL key allows the display range to be expanded in four steps.

To display the B scope, go to step 16.



To store the measurement result, press the -/ENT key. If OFF is selected for the data logger, nothing will happen if the -/ENT key is pressed. For details on the data logger, see "Data Logger" (page 4•4).



To send data to the printer or computer, press the ▼/SEND key. If CURRENT is selected in step 20 in "Data Output Conditions" (page 4•8), the measured value will be output. When SCREEN is selected, the current screen data will be output. When MEMORY is selected, see step 14.

When OFF is selected, nothing will happen if the ▼/SEND key is pressed. For details on data output, see "Data Output Conditions" (page 4•7). Go back to step 11.

14 If MEMORY is selected in step 20 in "Data Output Conditions" (page 4•8), the screen at the right will be displayed.

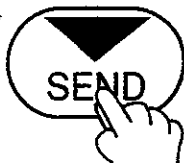
The data output ranges specified in steps 23 (page 4•8) and 24 (page 4•9) in "Data Output Conditions" (page 4•7) will be displayed.

To change the data output ranges, press any key other than the ▼/SEND key and go back to step 23 in "Data Output Conditions" (page 4•8).

MEMORY DATA OUT

SEND FOR START

FROM	1 - 1
TO	1 - 7
FILE	1

15

Press the ▼/SEND key again to send data. The screen at the right will be displayed. After all data has been sent out, the A scope will appear again. Go back to step 11.

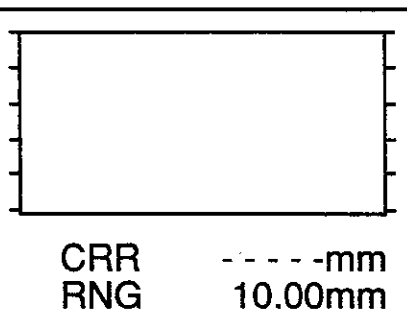
MEMORY DATA OUT

NOW	HEADER
FROM	1 - 1
TO	1 - 7
FILE	1

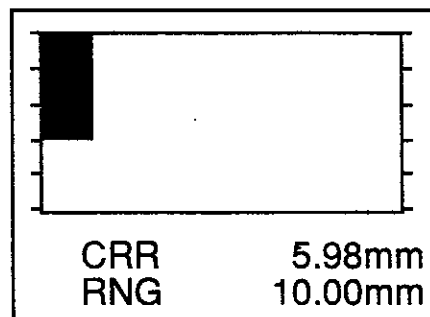
16

To display the B scope, press the +/⌋ key again. The screen at the right will be displayed.

CRR indicates the current measured value. RNG indicates the height of the display range.

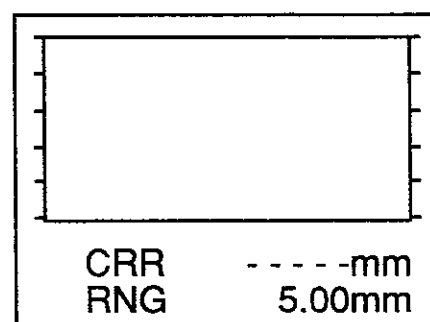
**17**

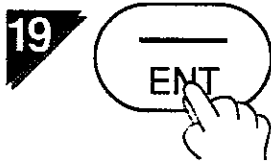
When measurement starts, the graph representing measured values will be displayed, starting at the left end of the display range. When a slow measurement speed (SLOW) is selected, the scan time is about 20 seconds. When a fast measurement speed (FAST) is selected, the scan time is about 5.5 seconds. See step 7 in "Procedure in Setup Mode" (page 4•4).

**18**

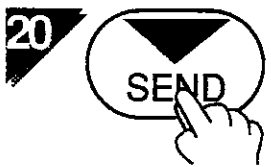
To change the display range, press the ◀/CAL key. The screen at the right will be displayed. The RNG value will change. The ◀/CAL key allows the RNG value to be changed in seven steps.

To stop using the waveform display function, press the +/⌋ key again.





To store the measurement result, press the $\text{---}/\text{ENT}$ key. If OFF is selected for the data logger, nothing will happen if the $\text{---}/\text{ENT}$ key is pressed. For details on the data logger, see "Data Logger" (page 4•4).



To send data to the printer or computer, press the $\blacktriangledown/\text{SEND}$ key. If CURRENT is selected in step 20 in "Data Output Conditions" (page 4•8), the measured value will be output. When SCREEN is selected, "SEND" will be displayed in reverse video and the current screen data will be output. When MEMORY is selected, see step 21.

When OFF is selected, nothing will happen if the $\blacktriangledown/\text{SEND}$ key is pressed. For details on data output, see "Data Output Conditions" (page 4•7). Go back to step 18.

21 If MEMORY is selected in step 20 in "Data Output Conditions" (page 4•8), the screen at the right will be displayed.

The data output ranges specified in steps 23 (page 4•8) and 24 (page 4•9) in "Data Output Conditions" will be displayed.

To change the data output ranges, press any key other than the $\blacktriangledown/\text{SEND}$ key and go back to step 23 in "Data Output Conditions" (page 4•8).

MEMORY DATA OUT

SEND FOR START

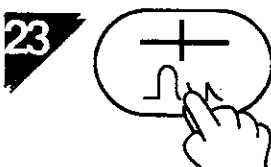
FROM	1 -	1
TO	1 -	7
FILE		1

22 Press the $\blacktriangledown/\text{SEND}$ key again to send data. The screen at the right will be displayed. After all data has been sent out, the B scope will appear again. Go back to step 18.

MEMORY DATA OUT

NOW HEADER

FROM	1 -	1
TO	1 -	7
FILE		1



To stop using the waveform display function, press the $+/\text{w}$ key again. Go back to step 5 (page 5•7).

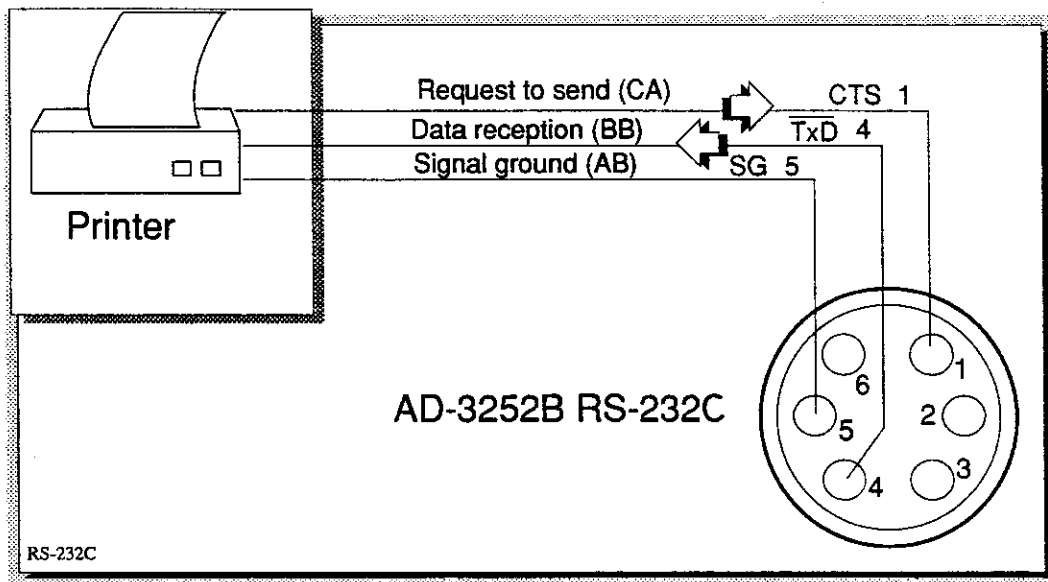
AD-3252B • Chapter 6

RS-232C



Connecting the Printer

Connect the printer to the external connector (RS-232C interface) as shown below.



Connecting a printer

Before connecting the printer, execute steps 6-11 in "Procedure in Initialization Mode" (page 3•3). Next, execute step 19 in "Data Output Conditions" (page 4•7).

Data may now be printed. See "Data Output Conditions" beginning on page 4•7 and "Sending/Printing Data" beginning on page 5•7. To make a hardcopy of the screen data, use the AD-8120.

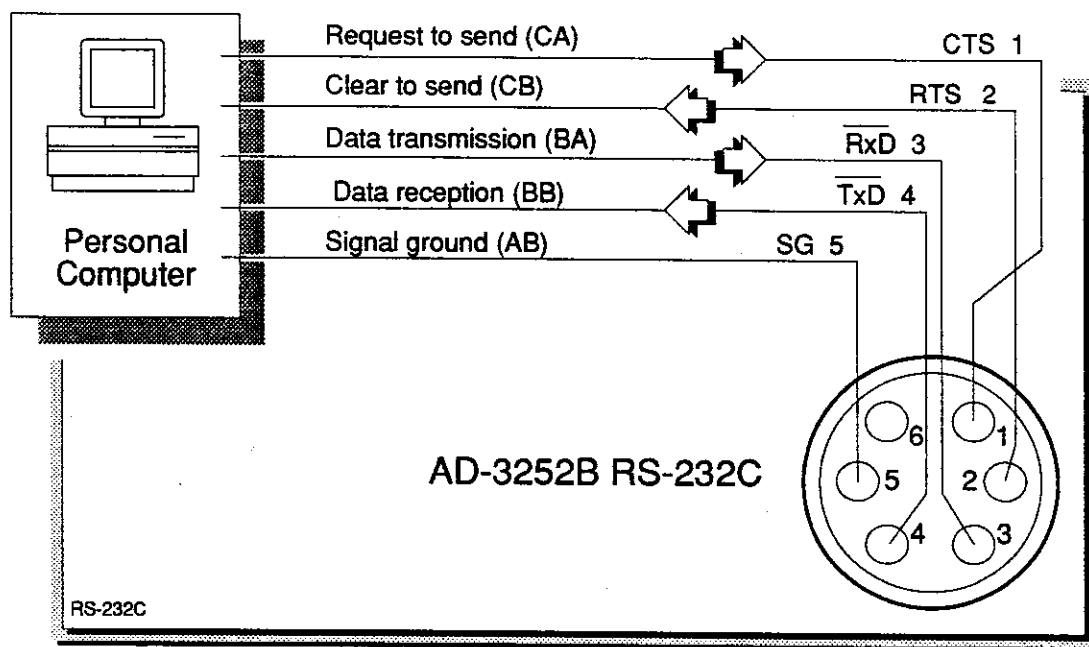
Option

AD-8120 (00007): General-purpose printer (with printer cable), 100 VAC



Connecting the Computer

Connect the computer to the external connector (RS-232C interface). Data can be output only through the RS-232C; pin No.6 is not connected.



Connecting a personal computer

Execute steps 6 to 11 in "Procedure in Initialization Mode" (page 3•3).

Next, execute step 19 in "Data Output Conditions" (page 4•7). (See "Sending/Printing Data" beginning on page 5•7.)

Options

AX-KO886-150: PC9801 connection cable

AX-KO913-150: IBM-PC connection cable



Print Examples and Output Data Formats

The type of the data output when the ∇ /SEND key is pressed in the measurement mode depends on the value set in the mode setting; the following is the relevant setting items.

Measurement unit in step 2 in "Procedure in Initialization Mode" (page 3•2)

Data terminator in step 10 in "Procedure in Initialization Mode" (page 3•4)

File in step 11 in "Data Logger" (page 4•5)

Output data in step 20 in "Data Output Conditions" (page 4•8)

In the following example, the unit is METRIC and the data terminator is CR.



1. Output data = CURRENT

The current measured value is output. When "—" is displayed, 0.0 mm is output.

Print Example

6.78mm

Data Format

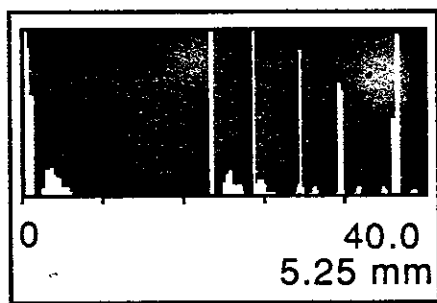
		2	.	3	4	m	m	CR
--	--	---	---	---	---	---	---	----



2. Output data = SCREEN

The display data is printed as it is.

Print Example





3. Output data = MEMORY

The output data depends on the specified file contents.

3.1 File = 1-128

The measured thickness values stored in the selected file are output.

Specify the data output range by executing step 23 (page 4•8) and step 24 (page 4•9) in "Data Output Conditions."

Print Example

V = 5920m/s
FILE = 1

ADDRESS	DATA
1- 1	1.48mm
1- 2	1.88mm
1- 3	1.18mm
1- 4	2.38mm
1- 5	2.98mm

Data Format

```

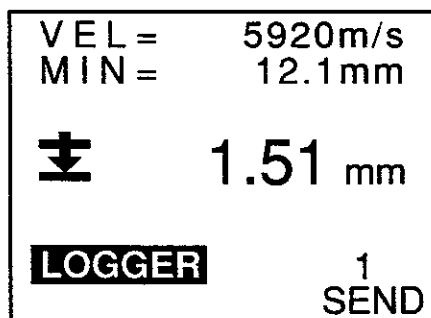
V |   |   |   |   |   | 5 | 9 | 2 | 0 | / | s |   |   |   | CR|
F | I | L | E |   | = |   |   |   |   | 1 | CR|
CR|
A | D | D | R | E | S | S |   |   |   |   | D | A | T | A | CR|
| 1 | 3 | - |   |   | 4 |   |   |   |   | 1 | . | 1 | 0 | m | m | CR|
| 1 | 3 | - |   |   | 5 |   |   |   |   | 1 | . | 0 | 4 | m | m | CR|
| 1 | 3 | - |   |   | 6 |   |   |   |   | 1 | . | 0 | 0 | m | m | CR|
| 1 | 3 | - |   |   | 7 |   |   |   |   | 1 | . | 1 | 9 | m | m | CR|
| 1 | 3 | - |   |   | 8 |   |   |   |   | 1 | . | 1 | 7 | m | m | CR|
CR|
CR|
EOF
  
```

3.2 File = SCREEN

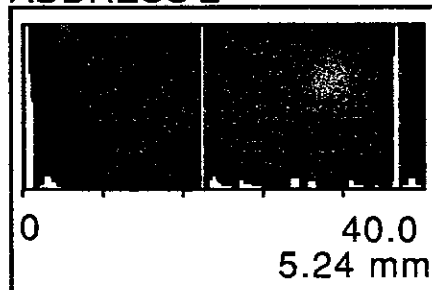
The stored waveform data is output. Specify the output range by executing step 23 (page 4•8) and step 24 (page 4•9) in "Data Output Conditions."

Print Example

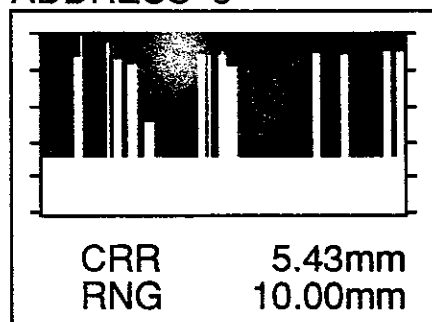
ADDRESS 1



ADDRESS 2



ADDRESS 3



MEMORANDA

[illegible]



A&D Company, Limited

3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170 JAPAN
Telephone: [81] (03) 5391-6132 Fax: [81] (03) 5391-6148