BOWERS METROLOGY GROUP

Testing Instruments

Ultrasonic Thickness Gauge IPX-251H

Partners in Precision

INSTRUCTION MANUAL

Contents

1. TECHNICAL SPECIFICATIONS

Measurement range	0.65mm 400.0mm
Resolution	0.01mm(0.001), 0.1mm (0.01)
Velocity range	1000m/s 9999m/s
Measurement rate	4 /s and 10/s in fast mode
Average mode	2 to 9 times average measurement
Limited setting	With Low-high indication and alarm
Measuring Units	Mm / inch
Memory	Memory of 5000 readings with location number
Data output	USB to PC
Display	128×64 LCD with back light
Battery	2 x AAA Batteries
Operating temperature	-20°C +50°C
Measuring temperature	-20°C +350°C (according to the probes)
Dimensions	116mm L ×64mm W ×27mm H
Weight	0.22kg (including batteries)

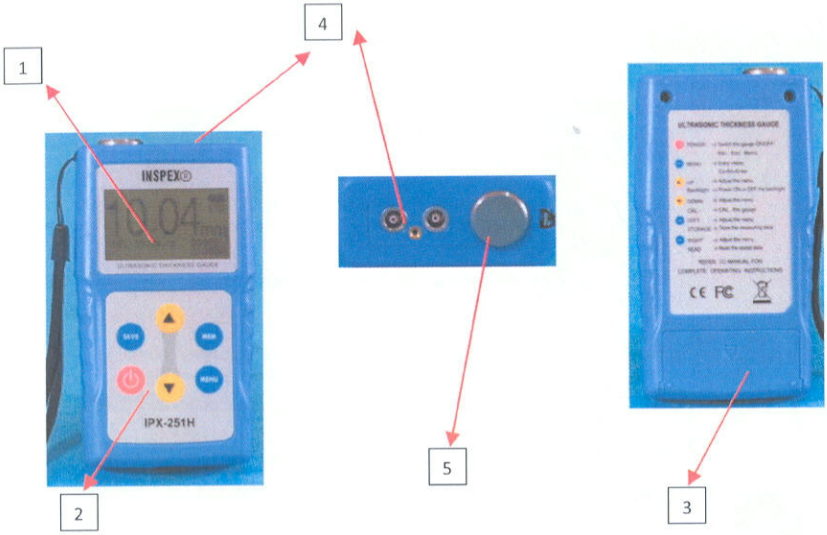
2. STANDARD DELIVERY

- Main Unit
- Standard 5MHZ transducer
- 75ml Couplant
- Build-in calibration block
- Software and USB cable
- Carrying case
- Operating manual
- Certificate

3. OPTIONAL TRANSDUCERS

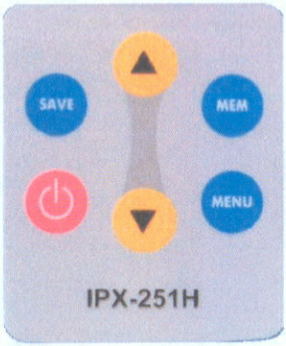
Model	Frequency	Range	Temperature
D5008	5.0MHz	0.8mm ~ 300mm	<60°C
D5113	5.0MHz	2.0mm ~ 200mm	<350°C
D7006	7.5MHz	0.65mm ~ 50mm	<60°C
D7004	10.0MHz	0.65mm ~ 20mm	<60°C
D2012	2.0MHz	3.0mm ~ 400mm	<60°C

4. OVERVIEW OF THE DISPLAY UNIT



1. LCD Screen
2. Key Pad
3. Battery Pack
4. Transducer Port
5. Test Block with 4mm

5. KEYPAD FUNCTIONS



	Function
	- On/ Off Key - Esc. Menu
MENU	- Menu Key - Confirm Key
▲	- Up Arrow Key - Backlight Key (Under the measurement)
▼	- Down Arrow Key - Calibration Key (Under the measurement)
SAVE	- Left Arrow key - Storage Key (Under the measurement)
MEM	- Right Arrow Key - Read data (Under the measurement)

6. DISPLAY SCREEN

1. Measuring Symbol
2. Battery Life
3. Current Velocity
4. Current Transducer model
5. Measurement Value and Measurement Mode
6. Current memory location

7. BASIC GAUGE OPERATIONS

7.1 Switch on

Press  to turn on the gauge. The gauge will flash the series and version number.

7.2 Probe Zero

The gauge automatically zero's the transducer thus eliminating the need to zero. The gauge will switch into the measurement mode directly.
Make sure the transducer is not coupled to the test piece when the gauge is first turned on and that there is no coolant on the end of the transducer. The transducer should also be at room temperature, clean without any noticeable wear.

7.3 Backlight

Press  to turn on / off the backlight.

7.4 Parameters setting

7.4.1 Measurement Mode

Press  to select measurement mode settings

Press  or  to select the type of measurement mode.

IPX-251H Ultrasonic Thickness Gauge offers two measurement modes; they are T-E Mode and Scan:

T-E Mode

1. STANDARD - For normal measurement.
2. MINIMUM - The gauge will measure and display the minimum measured thickness during one measurement process. Useful for measuring the thickness of curve surfaces or pipe.
3. DIFFERENCE - The gauge will display a thickness value as an absolute number of what has been inputted. For example, input value = 5.00mm and the real thickness is 5.03mm, the display will show diff 0.03mm. If the real value is 4.97 mm, the gauge will display, -0.03mm.
4. AVERAGE - The gauge will display the average thickness of 2-9 measurements
5. LIMITS – The gauge will alarm to alert low or high limits via an audible sound.

E-E Mode The Echo to Echo option allows you to make measurements between two consecutive back wall echoes. Therefore, a good usage of the Echo to Echo option is for measuring through coatings to measure only the true metal thickness.

SCAN The gauge will alarm for each measurement and will display all measurements when finished. Also available for measuring the thickness of high temperature surfaces.

Press  to confirm selection

Press  to Esc. Menu and into the measurement.

7.4.2 Other parameters setting

Press MENU and then press MEM to select the setting

7.4.2.1 Velocity Rate

1. Velocity Setting

Press MENU to select " VEL. SETTING"

There are 9 velocities for materials pre-stored in the gauge.
You can select one by pressing SAVE or MEM

Press MENU to confirm.

2. Velocity measurement

Measuring a sample which has a known thickness

Press MENU to select "Velocity measurement"

Press ▲ or ▼ to adjust the value of velocity

Press MENU key to confirm

7.4.2.2 Resolution

Press MENU and select "Resolution"

Press ▲ or ▼ to select resolution and unit.

0.1 mm
0.01 mm
0.01 in
0.001 in

Press MENU key to enter/confirm

7.4.2.3 Calibration

Press MENU and select menu

Press ▲ or ▼ and select "Calibration"

Measure the test piece with known thickness.

If the measured value is different to that of the test piece, adjust the measured value by pressing ▲ or ▼ and then press MENU

The gauge will return to Measurement mode

7.4.3 Memory

Press MENU and select menu

Press ▲ or ▼ and select "Memory", the screen will display

1.Memory Unit
2.Delete ALL Memory

7.4.3.1 Memory Unit

The gauge has a memory capacity of 5000 measurements. The memory location is composed of alphabet A-Z and numbers 0000-4999. You can select an Alphabet + an initial number to store the values. The next number being consecutive.

After taking every measurement, press SAVE key to store the value with a location number.

7.4.3.2 Memory Read

Press MEM Read (Under the measurement)

In "Memory Read", Press SAVE and MEM to select the desired letter.

Press ▲ and ▼ to select the number. The group value will start from this initial number.

7.4.3.3 Delete All Memory

Deletes all memory

7.4.4. Date Transfer

Press  and select menu.

Press  or  and select "Date Transfer".

The data can be transferred to a PC using the data view software and can be stored as DOC,TXT or Excel.

For more information, refer to the "Installation Manual" enclosed in the CD

7.4.5 Function

Press  and select menu, press  or  into "FUNCTION", the screen will display:

1. Power off
2. Gain adjustment
3. Default
4. Information

Press  or  to select the item, press  to confirm.

7.4.5.1 Power Off

The gauge has an Auto shut down mode after 1 Min. 3 Min. 5 Min. or Never.

7.4.5.2 Gain adjustment

Press  and select "Gain adjustment", the screen will display:

1. High
2. Medium
3. Low
4. Automatic

Press  or  to select desired item

Press  confirm.

7.4.5.3 Default

When "Default" is selected, the gauge will recover the default parameter.

7.4.5.4 Information

The screen displays the Supplier info. Version number and Transducer Number.

APPENDIX:

SOUND VELOCITY MEASUREMENT CHART *(All velocities are approximations)*

Material	Sound Velocity	
	Inch/µS	M/s
Air	0.013	330
Aluminum	0.250	6300
Alumina Oxide	0.390	9900
Beryllium	0.510	12900
Boron Carbide	0.430	11000
Brass	0.170	4300
Cadmium	0.110	2800
Copper	0.180	4700
Glass(crown)	0.210	5300
Glycerin	0.075	1900
Gold	0.130	3200
Ice	0.160	4000
Inconel	0.220	5700
Iron	0.230	5900
Iron (cast)	0.180	4600
Lead	0.085	2200
Magnesium	0.230	5800
Mercury	0.057	1400
Molybdenum	0.250	6300
Monel	0.210	5400
Neoprene	0.063	1600
Nickel	0.220	5600
Nylon, 6.6	0.100	2600
Oil (SAE 30)	0.067	1700
Platinum	0.130	3300
Plexiglass	0.110	1700
Polythylene	0.070	1900
Polystyrene	0.0930	2400
Polyurethane	0.0700	1900
Quartz	0.230	5800
Rubber, Butyl	0.070	1800
Silver	0.140	3600
Steel, Mild	0.233	5920
Steel, Stainless	0.228	5800
Teflon	0.060	1400
Tin	0.130	3300
Titanium	0.240	6100
Tungsten	0.200	5200
Uranium	0.130	3400
Water	0.584	1480
Zinc	0.170	4200

BOWERS METROLOGY GROUP

INSPEX®

Bowers Measuring Equipment Shanghai Co., Ltd.

8th Building, No. 168 Chengjian Rd
Minhang District, Shanghai 201108
P.R.China
Telephone: +86 21 6434 8600
Fax: +86 21 6434 6488
Email: sales@bowers-shanghai.com
Website: www.bowers-shanghai.com