# MIDLAND METROLOGY LTD

# iFlaw-1500
## Ultrasonic Flaw Detector

# Product Features and Application

## Product Features

Provides semi-automatic two-point calibration and automatic calibration functions for sensor zero offset, angle, front-end, and material velocity;

●Equipped with defect location capabilities, which can display information such as sound path, projection (surface distance), depth, and amplitude in real-time;

●Capable of automatic defect sizing using AVG/AVG or DAC and generating reports;

●Can connect to mobile devices via Bluetooth to generate and print inspection reports on site;

●Features curved surface correction functionality;

●Equipped with video recording and playback capabilities, as well as automatic gain control;

●A-scan freeze function: allows freezing the displayed waveform and sound path data, B-scan display function, capture markers, and echo color display within the gating range;

●Includes a peak hold function that compares frozen peak waveforms with real-time A-scans for easy interpretation of test results;

●Features crack height measurement capability;

●Offers multiple storage functions, including storage for 500 sets of calibration settings and 1000 sets of test report files, with unlimited storage available via USB drive connection;

●The pulser has multiple adjustable parameters, including pulse energy, width, and repetition frequency, as well as various testing modes and probe types;

●Equipped with two independent gates for signal height or distance measurement, providing multiple measurement options;

## Product Application

●In welding-related fields: It is used to detect hidden defects such as cracks, pores, and debonding in welds;

●In the forging industry: It inspects forged components to locate potential internal defects;

●In the metallurgical industry: It detects defects in steel billets to ensure their quality;

●In the machinery manufacturing industry: It is used for inspecting shafts and shaft components, such as motor shafts and automotive drive shafts;

●In pressure vessel and tank manufacturing industries: It inspects tank bodies and pressure vessels, such as oil storage tanks, gas tanks in the petrochemical industry, and various pressure vessels in industrial production, to ensure their structural integrity
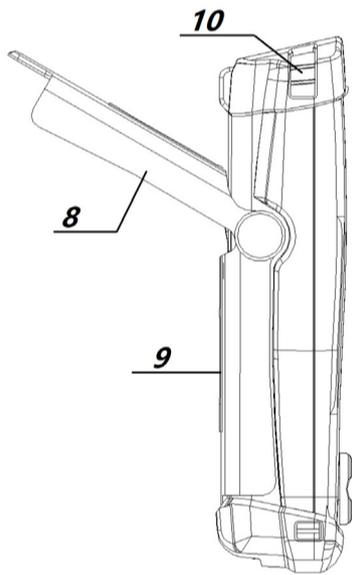
# Instrument Structure
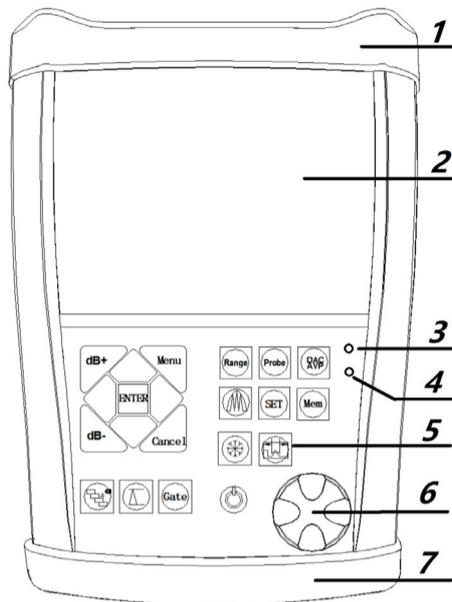


**1.Upper rubber cover  2.LCD Display**   **3.Power LED          4.Alarm LED**
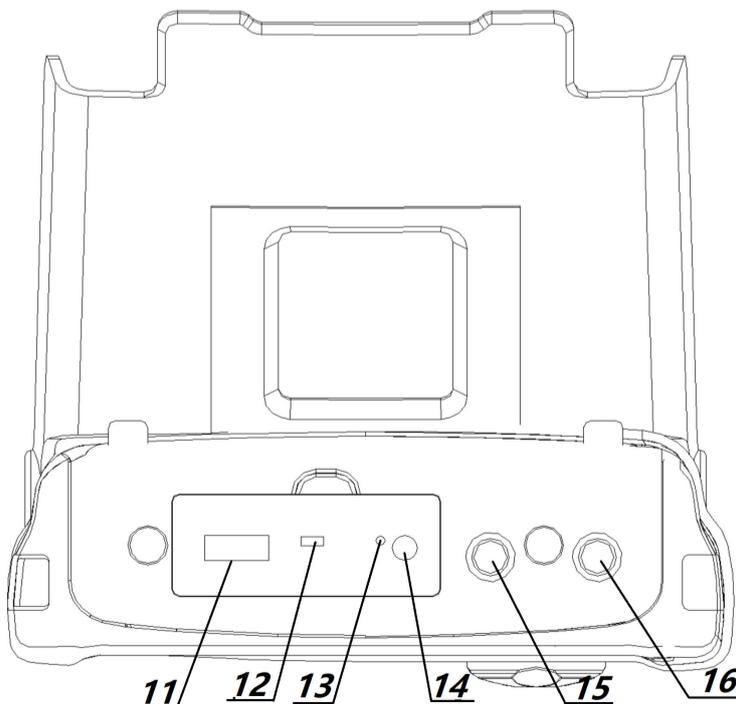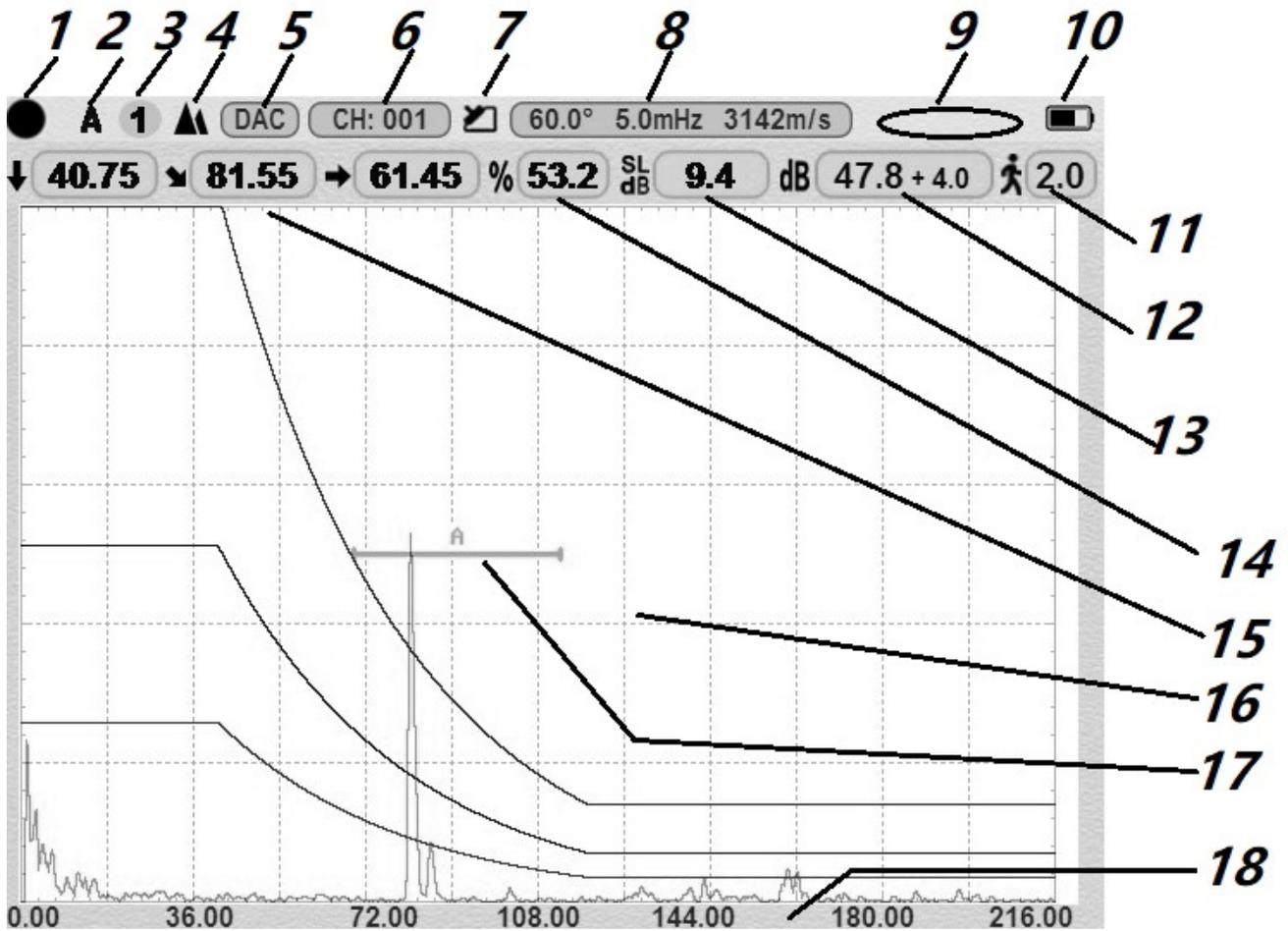**5.Keypad   6.Rotary Knob**   **7.Rubber cover**



**8.Swiveling support**       **9.Battery Case**       **10.Hanger column for belt**



**11.USB Socket  12.reserve**   **13.Reset hole  14.Power adapter port**
**15.Probe Cable Port (Transmit)**   **16.Probe Cable Port(Receive)**

# Interface Display

# Button Function



| 1.MENU | Access the instrument's menu system |
|---|---|
| 2.dB+ | Gain Increase Key |
| 3.dB- | Gain Decrease Key |
| 4.CENCEL | Cancel the current operation or setting |
| 5.ENTER | Confirm selections or inputs |
| 6.Up Arrow Key | |
| 7.Down Arrow Key | |
| 8.Left Arrow Key | |
| 9.Right Arrow Key | |
| 10.Power On/Off Key | |
| 11.Shuttle Key | Move the gate in full-screen mode;<br>Adjust selected parameters in the dialog box;<br>Change selections in both submenu mode and main menu mode; |
| 12.DB | The gain level can be set using the shuttle key. |
| 13.AUTO-GAIN | Enable or disable automatic gain. |
| 14.GATE WIDTH | Set the gate width |
| 15.CHAN | Set channel switching and channel parameters |
| 16.PRO | Select the probe type |
| 17.CAL | Initiate the probe calibration procedure |
| 18.DAC/AVG | Create DAC/AVG curves |
| 19.RECORD | Assist in data, video recording, and report generation |
| 20.RANGE | Range adjustment: Includes fine and coarse adjustments. Switch between them using the left/right arrow keys, and rotate the knob to change the value. |
| 21.TRANSMIT | Transmission Mode Setting Key |
| 22.OTHER | Additional Settings Menu Key |
| 23.GATE | Sets the gate mode |
| 24.PEAK MEM | Peak Memory Key |
| 25.FREEZE | Freeze Key |

# Calibration Interface
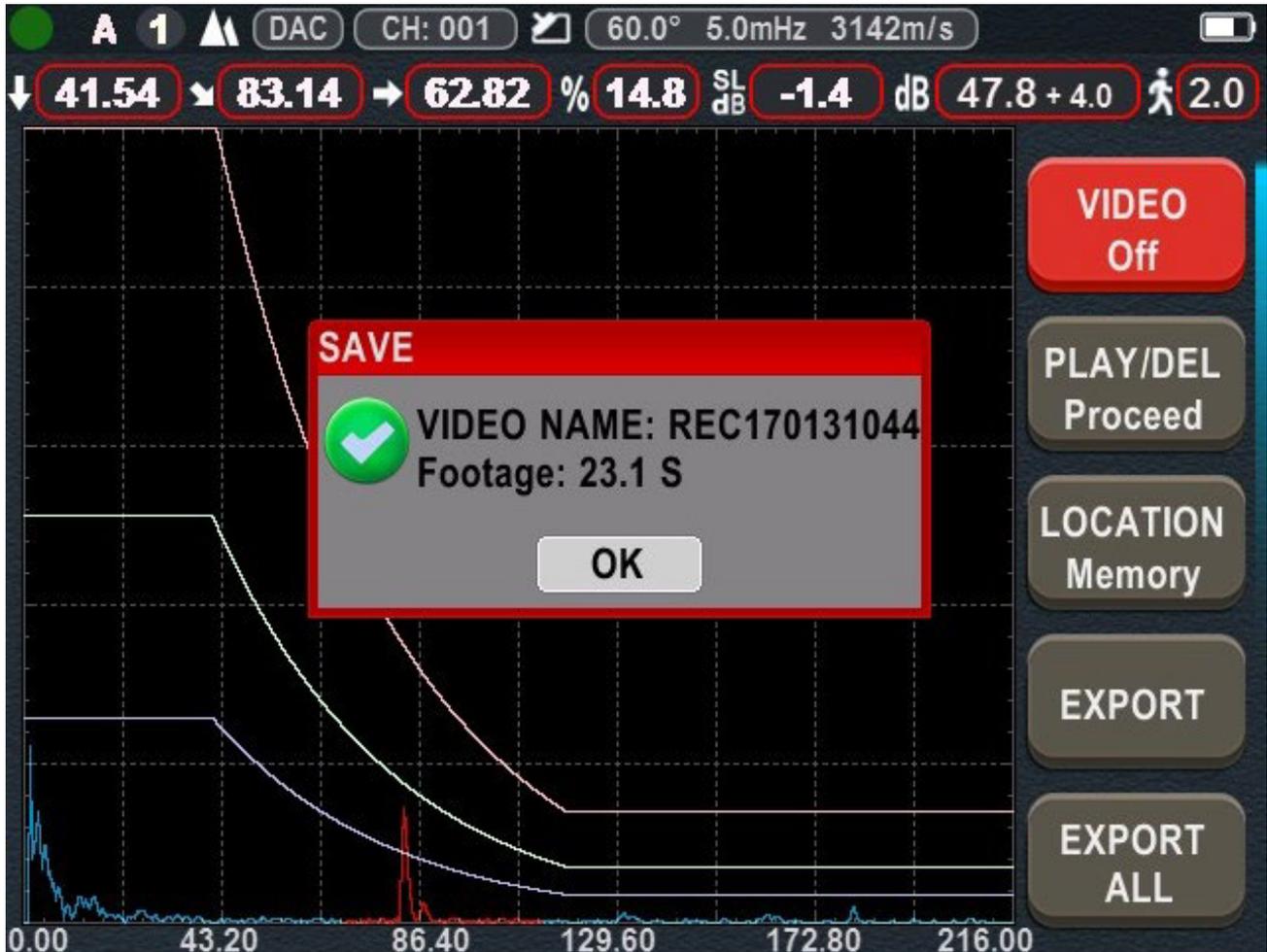


The calibration results include information such as channel number, frequency, and sound velocity; The calibration pass result is confirmed through a message; The instrument automatically determines the sound velocity and probe delay based on the input values and recorded echoes, and sets the corresponding functions accordingly;

# Probe Connection Mode
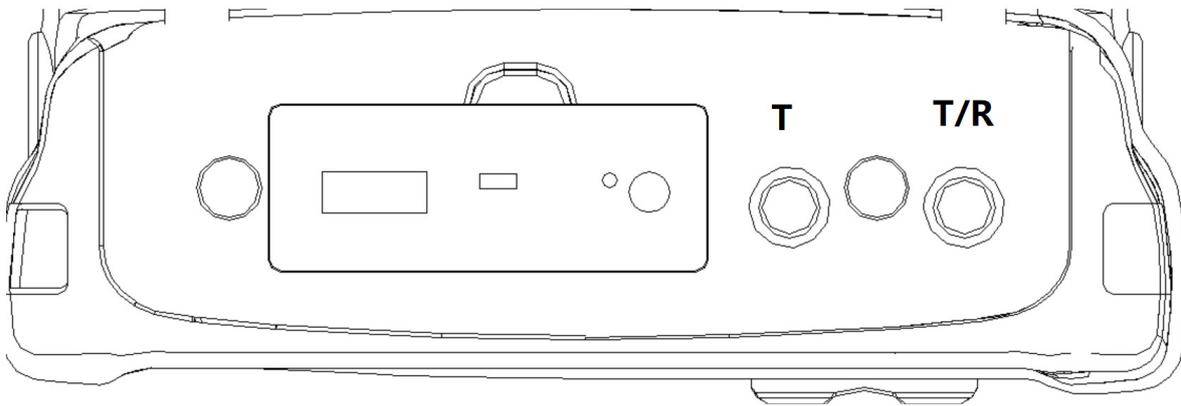


The instrument is equipped with BNC probe connectors (Lemo connectors are optional). The instrument can utilize one or two single-element probes, or one dual-element probe. To install a single-element probe, connect the probe cable to either of the two front ports of the instrument.

When connecting two probes or a dual-element probe, the "receive" probe connector should be installed in the right port, and the "transmit" probe connector should be installed in the left port. For through-transmission, connect two single-element probes to the transmit (left side, labeled T) and receive (right side, labeled T/R) ports respectively.

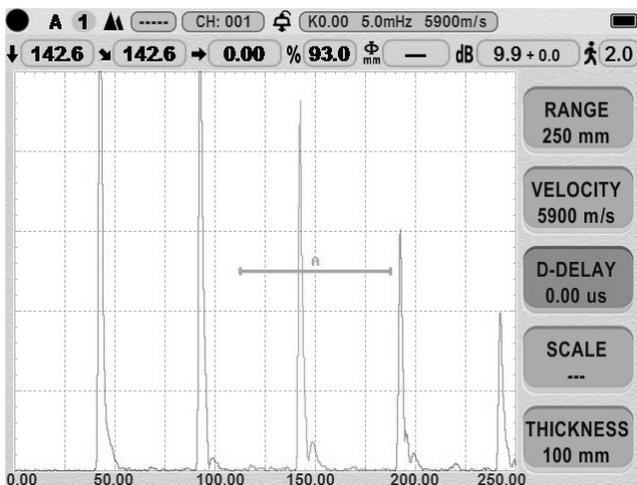# Display Mode

This instrument includes three display modes: Mode A, B, and C



## Mode A (Full-Screen Mode)

Mode A (Full-Screen Mode): The knob is only used to move the gate.



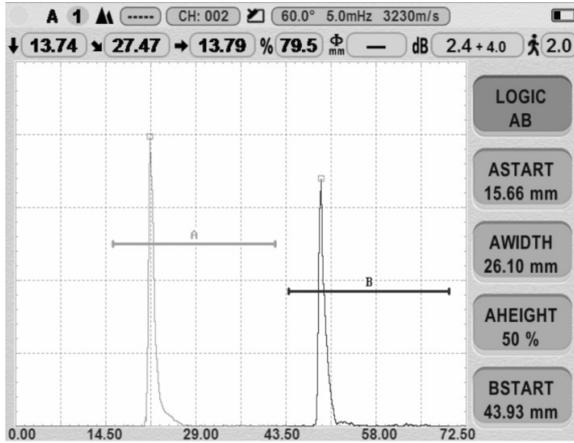## Mode B (Common Display Mode)

Mode B (Common Display Mode): There are functional items on the right side of the display screen.
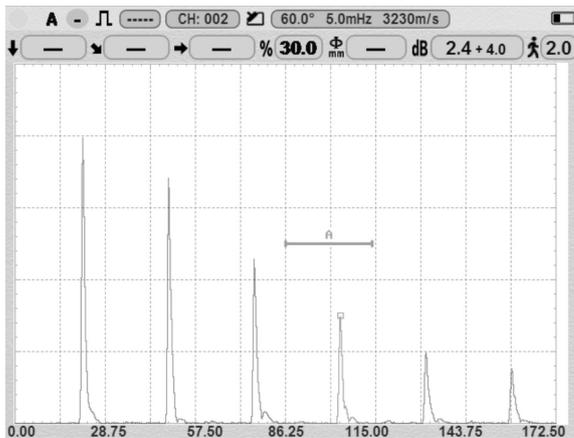


## Mode C (Main Menu Mode)

Mode C (Main Menu Mode): Displays various func-tional menus.

# Gate Setting



## ●Before Magnifying



## ●After Magnifying



The instrument features two independent gates, A and B, which can be configured according to user requirements. Three gate modes, A, B, and AB, can be set in the menu.

Gain includes basic gain, offset gain, and correction gain. The maximum total gain (basic gain + offset gain + correction gain) is 120 dB. Gain is used to adjust the displayed A-Scan height. Basic gain and correction gain are displayed in the top right corner of the screen.

When an A-Scan is activated, pressing the GATE WIDTH key will enlarge the displayed portion of the A-Scan contained within the selected gate. Any available gate can be designated as the selected gate. The width of the zoomed-in gate determines the level of magnification, as the display is enlarged until the gate's width equals the full-screen width. The display will contain the zoomed-in view until pressed again.

# Fill Function

The Fill Function toggles between fill and normal echo display modes; the fill echo display mode enhances echo perception due to its strong contrast, especially when scanning workpieces more rapidly
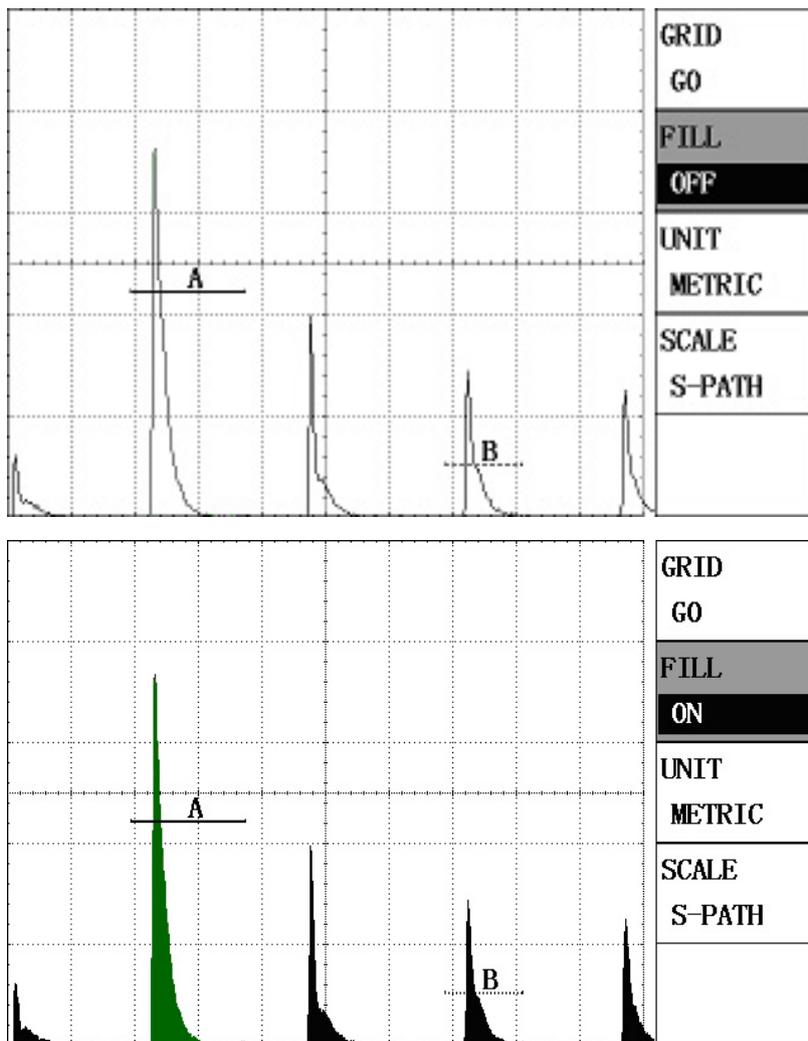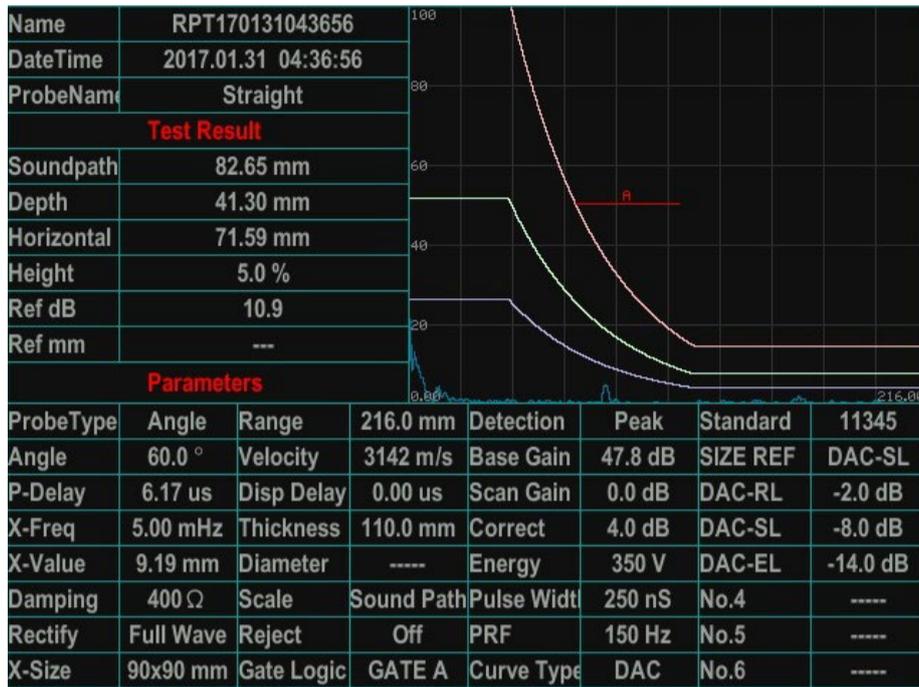
# B-scan Image

In B-SCAN mode, the B-scan function allows the instrument to display a graphical cross-section of the workpiece; follow these steps to switch to B-SCAN mode; select the BSCAN function and toggle BSCAN to ON by turning the knob.

# B-scan Image



| Name | RPT170131043656 | | | | | | |
|---|---|---|---|---|---|---|---|
| DateTime | 2017.01.31 04:36:56 | | | | | | |
| ProbeName | Straight | | | | | | |
| **Test Result** | | | | | | | |
| Soundpath | 82.65 mm | | | | | | |
| Depth | 41.30 mm | | | | | | |
| Horizontal | 71.59 mm | | | | | | |
| Height | 5.0 % | | | | | | |
| Ref dB | 10.9 | | | | | | |
| Ref mm | --- | | | | | | |
| **Parameters** | | | | | | | |
| ProbeType | Angle | Range | 216.0 mm | Detection | Peak | Standard | 11345 |
| Angle | 60.0 ° | Velocity | 3142 m/s | Base Gain | 47.8 dB | SIZE REF | DAC-SL |
| P-Delay | 6.17 us | Disp Delay | 0.00 us | Scan Gain | 0.0 dB | DAC-RL | -2.0 dB |
| X-Freq | 5.00 mHz | Thickness | 110.0 mm | Correct | 4.0 dB | DAC-SL | -8.0 dB |
| X-Value | 9.19 mm | Diameter | ------ | Energy | 350 V | DAC-EL | -14.0 dB |
| Damping | 400 Ω | Scale | Sound Path | Pulse Width | 250 nS | No.4 | ------ |
| Rectify | Full Wave | Reject | Off | PRF | 150 Hz | No.5 | ------ |
| X-Size | 90x90 mm | Gate Logic | GATE A | Curve Type | DAC | No.6 | ------ |

The instrument is equipped with a data storage system. In A-scan mode, instrument settings and videos can be stored in data files for later retrieval. File data can be saved, recalled, and deleted using the MEM menu.
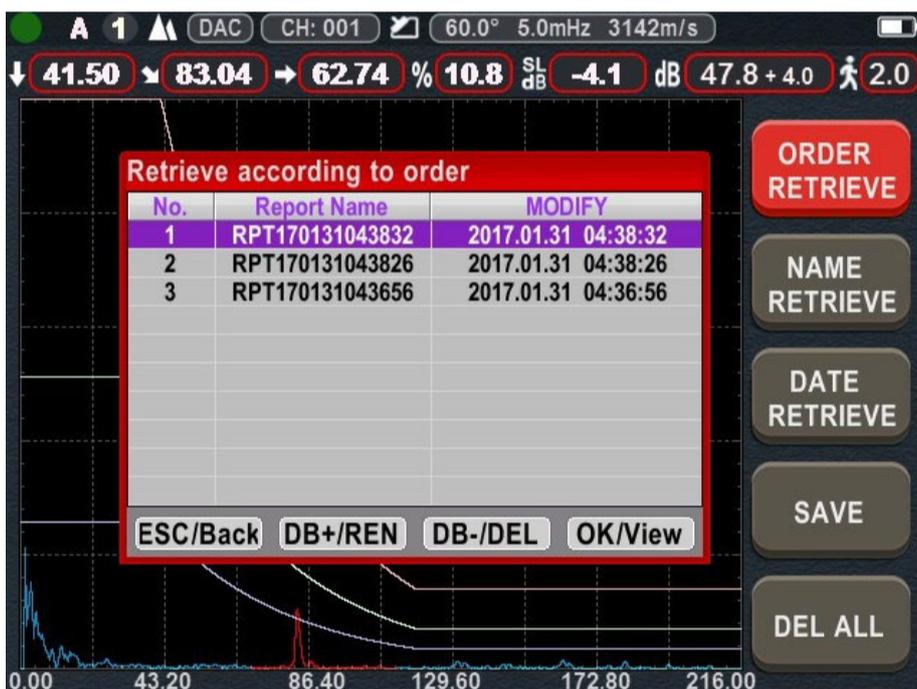


Report Files: Waveform files are used to store test report files along with instrument settings. Data within the waveform files can be stored, recalled, and deleted. The unit can save up to 1000 reports, which can be exported to a USB flash drive at any time.



Video Files are used to store a video clip. Please note that when the video file is full, the recording process will automatically end. To play a video file, use the PLAY/DEL function, and the system will play the video file.

# Technical Parameters

| | |
|---|---|
| **Filter Band** | 0.2~35 MHz |
| **Total Gain Amount** | 120 dB (with 0.1dB, 1dB, 2dB, 6dB incremental values) |
| **Hardware Real-time Sampling** | High-resolution 10-bit AD converter, sampling rate 320MHz, waveform highly preserved |
| **Detection Range** | 15meters(steel,longitudinal wave),transmission30meters(expandable) |
| **Sound Velocity Range** | (100~20000)m/s |
| **Dynamic Range** | ≥38dB |
| **Pulse Amplitude** | 100V, 200V, 300V, 400V, 500V, selectable in steps, suitable for a wide range of probes |
| **Pulse Width** | Continuously adjustable in the range of (0.03~0.51)μs to match different frequency probes |
| **Probe Impedance** | 50Ω, 100Ω, 150Ω, 400Ω selectable, to meet different sensitivity and resolution requirements |
| **Probe Types** | Straight probe, inclined probe, dual-crystal probe, penetration probe, crawling wave probe, surface wave probe |
| **Repetition Rate** | 10-3000Hz adjustable |
| **Receiving Waveform** | positive half-wave, negative half-wave, full wave, RF waveform |
| **Gate** | Incoming wave gate, lost wave gate; single gate, dual gate |
| **Gate Reading** | Single gate and dual gate reading modes available |
| **Alarm** | buzzer alarm, LED light alarm |
| **Connector** | BNC/LEMO optional |
| **Vertical Linear Error** | ≤1.5% |
| **Horizontal Linear Error** | ≤0.1% |
| **Digital Rejection** | (0~80)%, no effect on linearity and gain |
| **Resolution** | >40dB (5P14) |
| **Sensitivity Margin** | >66dB (deep 200mm Φ2 flat-bottomed hole) |
| **Power Requirements** | AC Mains 100-240 VAC, 50-60 Hz |
| **Temperature** | Operating Temperature -10°C to 50°C<br>Storage Temperature -30°C to 50°C |
| **Size** | 260mm×175mm×60mm |

Note: The above specifications are measured at the probe frequency of 2.5MHz and the detection mode is full wave.

# Standard Delivery

| Items | Qty | |
|---|---|---|
| Host | 1 | |
| High-precision straight probe | 1 |  |
| High-Precision angle probe | 1 |  |
| Probe connection wire | 2 |  |
| 9V power adapter | 1 |  |
| User manual | 1 | |
| Certificate | 1 | |
| Warranty card | 1 | |
| Ultrasonic flaw detector mobile APP | 1 | |
| Instrument strap | 1 | |

# Optional Delivery

| | |
|---|---|
| Standard test blocks | |
| Other types of probes | |
| Other probe cables | |
| Coupling agents | |
| Bluetooth printer | |