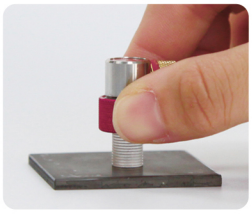
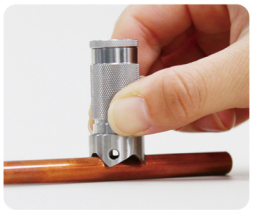
YUSHI

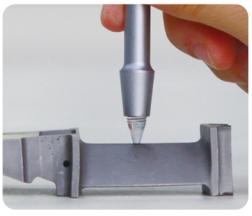
PM5 Gen3 Precision Ultrasonic Thickness Gauge

* Design Patent: Instrument Protective Case (ZL 2020 3 0600327.9)
* Utility Model Patent: Instrument Protective Case (ZL 2020 2 1834019.3)
* Invention Patent: Multi-Measurement Method (ZL 2024 1 0073980.1)









Solving a Variety of Thickness Measurement Challenges

PM5 Gen3 Precision Thickness Gauge
Helping You Overcome Challenges and Stay Ahead

After 3 years of dedicated upgrades, the new-generation PM5 Gen3 Precision Ultrasonic Thickness Gauge delivers outstanding performance, high measurement accuracy, and a compact yet rugged design. Its readings feature excellent stability and repeatability,capable of accurately distinguishing test blocks with a difference of 0.001 mm. With enhanced thin-material measurement capabilities,it achieves a lower limit of 0.05 mm in steel (high-frequency option). The device is compatible with a wide range of probes, supported by over 20 types of single element probes covering frequencies from 1 to 75 MHz. Equipped with multiple powerful software options, flexible options for users. The PM5 Gen3 thickness gauge housing is IP67-rated and comes with a rubber protective case and reinforced design,offering reliable protection against drops and impacts. It ensures reliable performance in harsh industrial environments, meeting the toughest demands of on-site inspections.

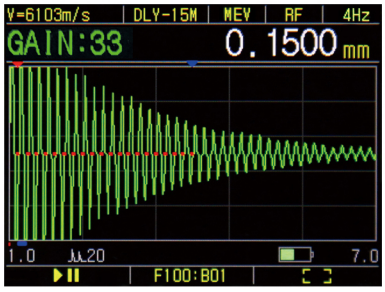


PM5 Gen3 Standard Model: Main Features

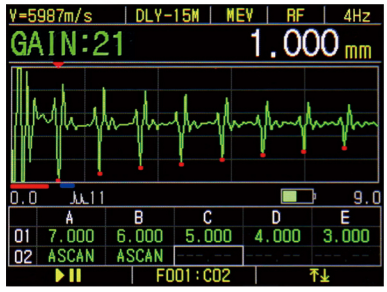
- Real-time A-scan with complete waveform adjustment functions, capable of locking onto any echo
- 0.001mm resolution (can truly distinguish test blocks with a difference of 0.001mm), and the displayed value has high stability and repeatability
- Measuring Range in Steel: 0.1mm ~ 480mm
- Probe Types: single element probes, including delay line probes, contact probes, protective membrane probes, pen type probes, water immersion probes
- Automatically matches the excitation pulse, damping, and sampling frequency according to the selected probe
- The factory pre-sets the default configuration of various probes, and can also store 400 sets of user-defined configurations, one-click loading to simplify operation
- 200MHz digital frequency ensures accurate measurement with distortion-free waveforms
- Extremely low power consumption of less than 0.3w, two AA alkaline batteries can work continuously for 22 hours
- The sensitivity is 12dB higher than the previous generation PM5Gen2
- Measurement Mode: P-E (Pulse-Echo),E-E (Echo-Echo), I-E (Interface Echo-Echo),MEV (Multiple Echo Verification)
- Measuring Point : wave flank, wave peak, pre-zero crossing post-zero crossing
- 60dB analog gain + 6.5x digital gain.Digital gain amplifies the signal and allows for a maximum amplitude range of 650% to prevent signal saturation
- Linear Time-dependent Gain (TDG),the slope starting point can be adjusted automatically or manually. TDG can reduce the blind area of the excitation pulse or interface echo , and optimize the near-surface resolution and minimum thickness measurement.
- Automatic Gain Control (AGC), include TDG and normal automatic gain modes
- Guided Calibration,waveform display during the process, with adjustable waveform
- Material Velocity Table, including 52 common material sound velocities
- Pause Function , calibration can be performed on frozen waveforms, changing measurement modes , and adjusting various parameters such as gain, range, delay, gate, blank
- One-click Range Zoom, quickly find/enlarge waveforms
- Units: mm,in,um,mil
- Rectification Wave:RF, RF-, HALF+, HALF-, FULL
- Upper/Lower Limit Alarm Mode, supports thickness, sound velocity and time of flight
- With minimum/maximum value mode, difference/reduction rate mode
- Echo Strength Indicator, the echo height of the measurement point can also be displayed on the large digital view
- Time-base B-scan, converting thickness values into cross-sectional images in real time to observe the internal corrosion profile of the workpiece
- Full Screen Display Function, one-click switching, increasing waveform display area by 20%
- "A-scan + storage grid" view, developed specifically for easy data recording
- It can store 100,000 measurement values and 400 sets of parameter configurations
- Standard with Windows-based DataView interface software
- Designed to meet IP67 dust and water resistance (1m underwater for 30minutes)
- Rubber sheath with holder

Powerful Application Functions

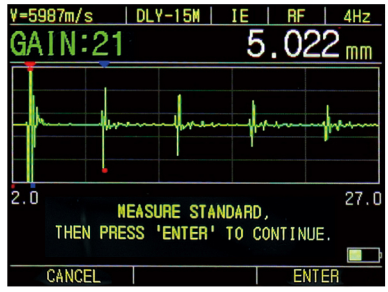
All PM5 Gen3 thickness gauge models are equipped with the following measurement interface, combining professional and detailed design with intuitive and easy operation.Even non-professionals can quickly master it to obtain stable, reliable, and high precision measurement data—perfectly meeting the challenges of various industrial inspection scenarios.



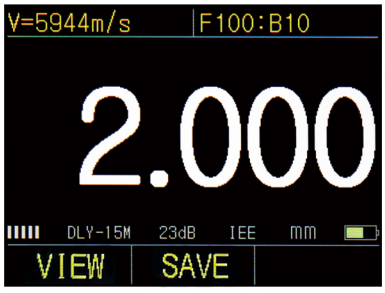
Full-Screen A-Scan Interface



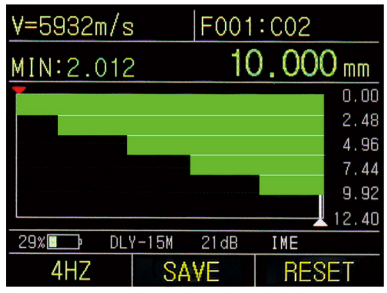
Grid A-Scan Interface



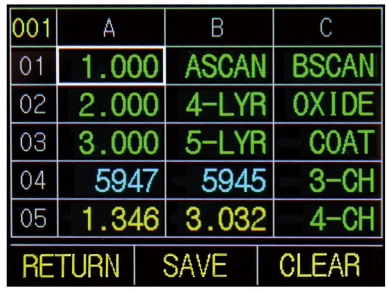
Guided Calibration Interface



Large Digit Interface



Time-Base B-Scan Interface

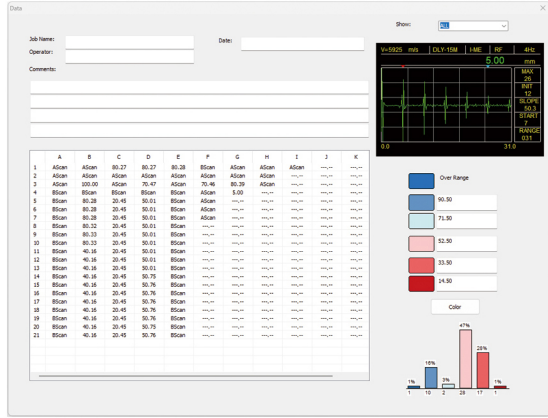


Data Storage Interface

Data Logger and PC Interface Software

The PM5 Gen3 ultrasonic thickness gauge is equipped with a built-in data logger, providing users with an efficient and convenient solution for data storage and transfer.

◎Large-capacity storage,supporting up to 400 files and 100,000 measurement values.
◎It can store up to 400 user-defined profiles with all parameters and waveforms. Adjusted measurement parameters can be saved along with the results, allowing subsequent tests to recall these settings directly ,without the need to reset them, significantly improving test efficiency.
◎Easy Grid File Management System. Parameters, waveforms,and measurement data are stored together for more convenient review.
◎Standard Windows-based DataView interface software is included, allowing users to export stored data from the thickness gauge for data management and analysis, alarms, printing, or saving in Excel format.



DataView interface software

PM5 Gen3 Function Options

The PM5 Gen3 series ultrasonic thickness gauges are designed with the core mission of solving customers' thickness measurement challenges. A wide range of functional options have been developed to meet the diverse needs of different industries, allowing users to flexibly configure the instrument according to their specific application scenarios.

- High Frequency and High Resolution
- Digital Noise Reduction and Damping
- Double Layer Software
- Large Measurement Range
- Temperature Compensation
- System Integration and Remote Control
- High Speed Measurement and Simultaneous Directional Display
- Sound Velocity Meter and Time of Flight
- Window Mode and Adjustable Sampling Frequency
- Internal Oxide Scale Measurement Software
- Directional Capture
- Auto Freeze
- Dual Element Probe
- Bluetooth
- Multilayer Software
- Four Channel Option

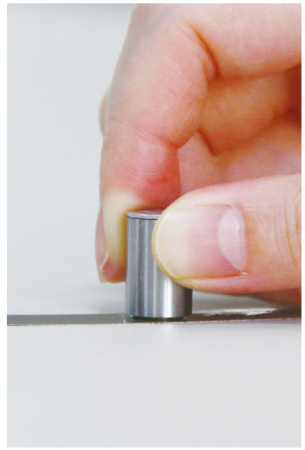
High-Frequency Option

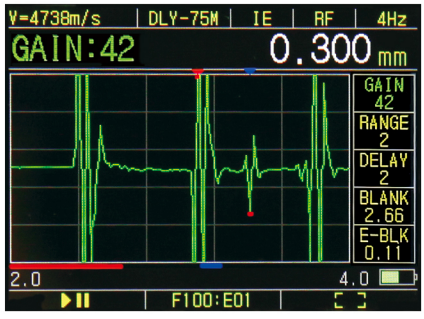
Supporting ultrasonic frequencies up to 75 MHz, compatible with 30 MHz, 50 MHz, and 75 MHz high-frequency probes. Suitable for measuring ultra-thin materials, coatings, and multi-layer structures. With a 50 MHz probe, the minimum measurable thickness in steel is 0.05 mm.



0.0001 mm Resolution

In MEV mode, the maximum display resolution reaches 0.0001 mm, 0.1 µm, 0.00001 in, or 0.01 mils, which is suitable for high-precision measurement of thin materials.





75 MHz probe for measuring copper-aluminum composite materials



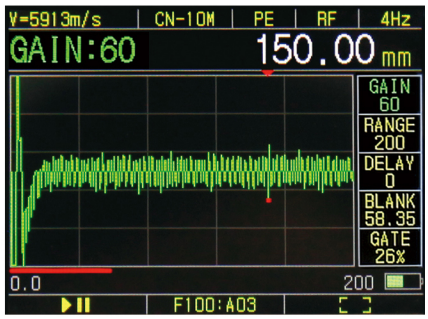
50 MHz probe for measuring thin sheets down to 0.05 mm

High-Speed Measurement & Simultaneous Directional Display

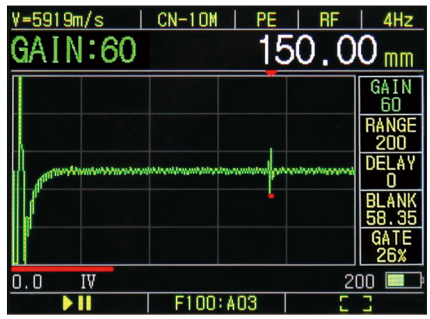
High-speed measurement in the background, with low refresh-rate directional display on the front screen, configurable with 8 directional display schemes. Truly achieves high-speed visibility with no missed detection during scanning. In window mode, the maximum measurement rate reaches 2 kHz, adjustable in 16 Hz increments.

Noise Reduction and Damping

Noise reduction function can significantly increase the signal-to-noise ratio.It is very suitable for application scenarios requiring high sensitivity measurements, such as layered composite steel(steel/stainless steel)thickness measurement and high attenuating material thickness measurement. Damping can be set to High, Low or Default to optimize the sensitivity and resolution of the probes.



Noise Reduction Off



Noise Reduction On

Ultrasonic Velocity Meter and Time of Flight

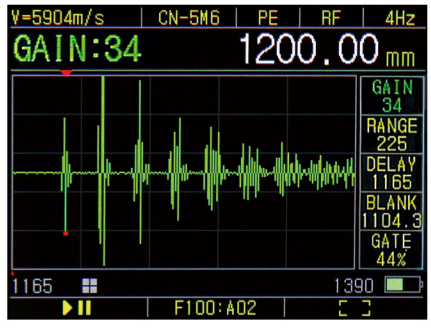
It can measure material sound velocity and time-of-flight. This mode is equipped with Alarm, Maximum/Minimum, Difference/Percentage and Data Storage function. The unit of sound velocity is m/s or in/μs. The unit of time-of-flight is ns or μs. The typical applications include cast iron spheroidization rate test, bolt stress measurement, monitoring material density changes,etc.

Window Mode

The starting point and time of data acquisition are adjustable ,corresponding to display the window delay and range.Themaximum delay distance reaches up to 62 m in steel. This function can either extend the measuring range or increase the measurement speed.

Adjustable Sampling Frequency

Sampling frequency selectable at 200 MHz, 100 MHz, 50 MHz, or default, optimizing both measurement accuracy and measuring range.

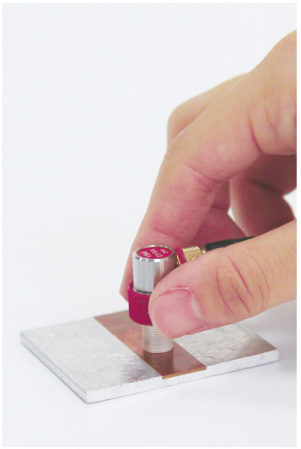


1200mm Long Steel Bar
Thickness Measurement



Double-Layer Measurement Software

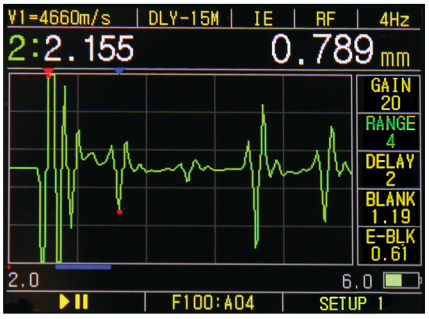
The powerful double-layer measurement software that can simultaneously measure and display the thickness of two layers of materials, and can view and adjust the A-scan waveform of each layer separately,just like two instruments measuring at the same time. This option also includes multiple scan and time-difference function. Typical applications are double-layer composite plate and coated metal materials measurements.



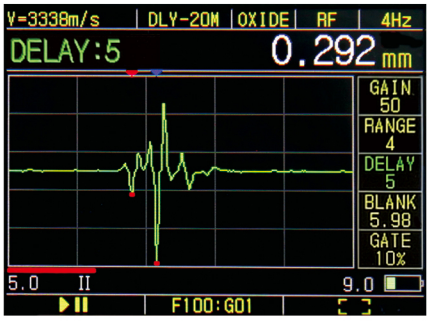
Internal Oxide Scale Measurement Software

Measures the thickness of oxide scales and deposits on boiler tube inner walls, used for evaluating and predicting boiler tube life. We have developed an Oxide Layer Measurement mode that effectively identifies oxide layer echo signals and can simultaneously display the thickness of both the metal substrate and the oxide layer. Standard 15 MHz probe with a minimum measurement limit of 0.25 mm for oxide layers; a 20MHz shear wave probe offers higher resolution, with a minimum measurable oxide layer thickness of 0.15 mm; for thick-walled tubes, a 10 MHz, 6 mm contact probe is recommended.





Double-layer Copper-Aluminum Composite Plate Thickness Measurement



Oxide Layer Wall Thickness Measurement

Large Measurement Range Mode

It is a composited measurement mode based on pulse-echo method. The display range can up to 38 m. The key feature is achieving large range measurement while maintaining high accuracy.

AUTO Freeze Function

Supports four trigger conditions,including highest echo, number of consecutive equal thickness values, number of echoes, and target thickness range. When all trigger conditions are met at the same time, the waveform is automatically frozen.

Bluetooth

Real-time measurement values can be wirelessly transmitted to applications on computers or mobile devices, enabling cross-platform data transfer without additional software installation. Supports Windows, Android, and iOS systems.

Temperature Compensation

The sound velocity of a material changes with temperature, which affects measurement accuracy. The temperature compensation function automatically calculates the compensation based on the input calibration block temperature and the actual workpiece temperature,and display the corrected thickness value.



Multilayer Software

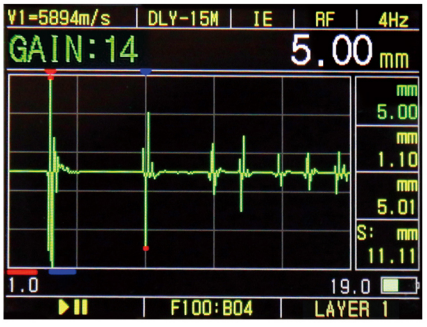
Powerful multilayer software(including all functions of the double-layer measurement software), based on multiple measurement technology protected by a granted national invention patent. It can simultaneously measure and display up to five independent layer thicknesses, supports total thickness calculation and display for any combination of layers, and integrates professional features such as multi-scan and time-difference to achieve precise measurement of complex multilayer structures.



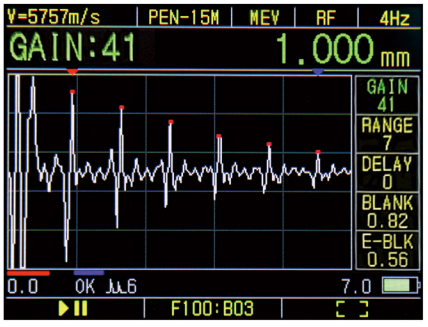
Directional Capture

Provides five capture modes (Minimum, Maximum, Highest echo, Maximum consecutive equal values,Maximum number of echoes),and supports automatic or manual display of captured results. Accurately captures target thickness and waveform during high-speed scanning, high-temperature measurements, and curved surface measurements.





Multilayer Laminated Glass Thickness Measurement



Turbine Blade Thickness Measurement

Dual-element Probe Option

Supports all functions of dual-element probes, including Pulse-Echo and Echo-Echo measurement modes, and automatic V-path error correction.

Dual-element probes are suitable for measuring corroded metal thickness, Pulse-Echo mode is suitable for measuring uncoated materials; Echo-Echo mode can penetrate coatings to measure the thickness of the metal substrate.

System Integration & Remote Control

◎Real-Time Communication:Users can integrate the PM5Gen3 thickness gauge into their own products, connecting via wired or wireless methods for real-time transmission of thickness values, waveforms, and parameters. The thickness gauge supports power supply via the USB interface.

◎UStation Thickness Measurement Software: Connect the PM5Gen3 to a PC, laptop, or tablet running UStation software to form a thickness measurement workstation,providing a large touchscreen display and additional processing capabilities for improved convenience and efficiency.

◎WIFI: Master/Slave dual-mode WIFI functionality. Even without an external network, it can connect to a computer or tablet via WIFI Master mode. Enables high-speed wireless transmission when combined with the real-time communication option.

◎Wireless Data Transmission: Maximum communication range of 2500 m in an open environment, with a communication speed of 115200 bps.

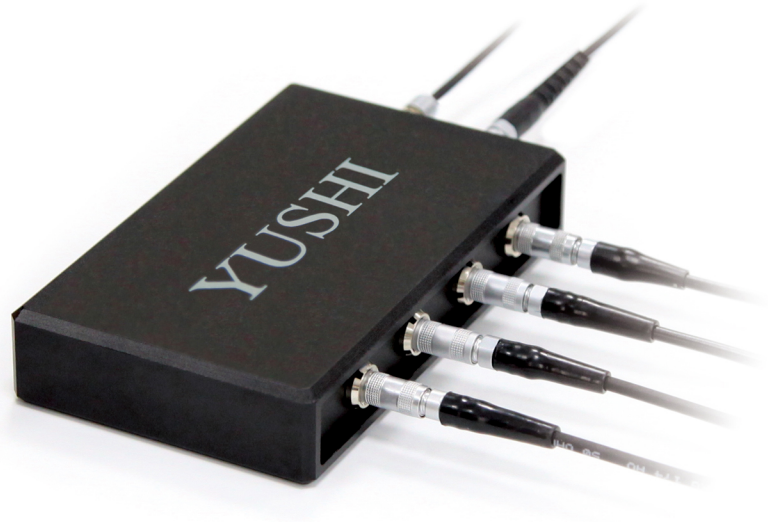


UStation Software Interface

Four-Channel Option

◎Based on multiple-measurement technology, the PM5 Gen3 can be connected to the optional MX-4 multiplexer to simultaneously display thickness values measured by up to four different probes. The A-scan waveform for each channel can be individually viewed and adjusted, with 28 independent parameters per channel. When not connected to the MX-4, the PM5 Gen3 functions identically to the standard thickness gauge.





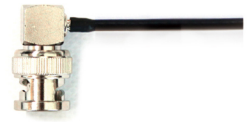
MX-4 Four-channel Multiplexer
Dimensions: 113mm × 67mm × 22mm
Weight: 182g

Accessories

Cables


LEMO 00 Connector


LEMO 00 Armored


BNC Right Angle Connector


Microdot Connector


Microdot Armored


LEMO 00 Right Angle Connector


BNC Connector


LEMO 00 Right Angle Connector


LEMO 1 Connector

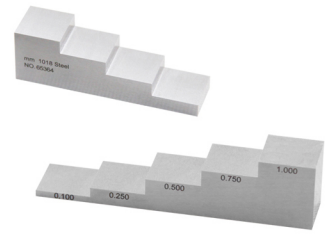

Microdot Right Angle Connector


Waterproof UHF Connector

Test Blocks

Material	Product Code	Step
1018 Steel	B-101-0002	0.250" 0.500" 0.750" 1.000"
304 Stainless Steel	B-101-0033	0.100" 0.200" 0.300" 0.400" 0.500"
6063 Aluminum	B-101-0037	2.50mm / 5.00mm / 7.50mm / 10.00mm / 12.50mm
6AL4V Titanium Alloy	B-101-0057	0.100" 0.200" 0.300" 0.400" 0.500"
7075 Aluminum	B-101-0031	2.50mm / 5.00mm / 7.50mm / 10.00mm / 12.50mm 15.00mm / 17.50mm / 20.00mm / 22.50mm / 25.00mm

Note: We offer over 100 types of test blocks, with only a selection of specifications shown here.



Couplant

Type	Product Code	Description
Universal Type	A-101-0006	Temperature Range: -40~99°C, Capacity: 50ml/Bottle
High Temperature	A-101-0003	Temperature Range: -18~371°C, Ferrous metal rust resistance reaches 80
Shear Wave	A-101-0011	Capacity: 80g/Tube, environmentally friendly formula, with very high viscosity



Delay Line

Model	Product Code	Description
Φ13.9*12.5mm	P-112-0018	Suitable for probes with a 13mm element size
Φ4.7*5.6mm	P-112-0019	Suitable for probes with a 3mm element size
PHT-13-1	P-112-0021	Suitable for probes with a 13mm element size, the maximum temperature is 480°C for short-term contact, followed by a one-minute cooling period
PHT-6-0.5	P-112-0013	Suitable for probes with a 6m element size, the maximum temperature is 480°C for short-term contact, followed by a one-minute cooling period



Single Element Probe for Ultrasonic Thickness Measurement

Delay Line Probe

It has the advantages of high accuracy, high resolution, and low measurement limit, making it suitable for measuring the thickness of thin and ultra-thin materials. High-temperature thickness measurement can be performed by changing the delay line.

Model	Element Size		Frequency MHz	Product Code	Lower Limit of Measurement in Steel (MEV)
	in	mm			
D2.25A13	0.5	13	2.25	Q-717-0046	1.00mm
D5A6	0.25	6	5	Q-717-0047	0.40mm
D5A13	0.5	13	5	Q-717-0048	0.38mm
D10A6	0.25	6	10	Q-717-0049	0.23mm
D15A6	0.25	6	15	P-111-0001	0.13mm
D20A3	0.125	3	20	Q-717-0050	0.10mm
30M3	0.125	3	30	J-717-0045	0.08mm
50M3	0.125	3	50	J-717-0043	0.05mm
M2102	0.74	18.8	75	J-717-0044	0.05mm

Contact Probe

It has the advantages of large measuring range and strong penetration, suitable for measuring medium-thick plates or materials with high attenuation.

Model	Element Size		Frequency MHz	Product Code	Lower Limit of Measurement in Steel	
	in	mm			P-E	MEV
C1M13	0.5	13	1	P-702-0010	9.00mm	
C2.25M13	0.5	13	2.25	P-702-0011	3.00mm	1.00mm
C5M6	0.25	6	5	P-701-0010	3.00mm	0.60mm
C5M13	0.5	13	5	P-702-0012	3.00mm	0.60mm
C10M6	0.25	6	10	P-701-0011	1.00mm	0.30mm



Single Element Probe for Ultrasonic Thickness Measurement

Water Immersion Probe

The immersion technique provides a stable coupling method, enabling point or line focusing, and is suitable for automated in-line thickness measurement.

Model	Element Size		Frequency MHz	Product Code	Lower Limit of Measurement in Steel (MEV)
	in	mm			
W2.25M13	0.5	13	2.25	Q-717-0043	1.00mm
W5M6	0.25	6	5	Q-717-0044	0.40mm
W5M13	0.5	13	5	Q-717-0021	0.40mm
W10M6	0.25	6	10	Q-717-0041	0.30mm
W15M6	0.25	6	15	Q-717-0042	0.20mm

Protective Membrane Probe

The protective-membrane probe is impedance-matched with coating materials, making it suitable for thickness measurement through thick coatings. It features a multiple-echo verification mode and can measure the metal substrate thickness through coatings up to 100mm. Smooth surfaces allow dry coupling.

Model	Element Size		Frequency MHz	Product Code	Lower Limit of Measurement in Steel (MEV)
	in	mm			
2.25M19	0.75	19	2.25	P-101-0023	1.00mm
2.25M13	0.5	13	2.25	P-101-0020	1.00mm
3.5M13	0.5	13	3.5	P-101-0021	0.60mm
5M13	0.5	13	5	P-101-0026	0.50mm
5M10	0.4	10	5	P-101-0025	0.50mm
5M6	0.25	6	5	P-101-0024	0.50mm

Pen Type Probe

The delay line is conical, with a very small contact point at the end, suitable for measuring curved and concave surfaces.

Model	Element Size		Frequency MHz	Product Code	Lower Limit of Measurement in Steel (MEV)
	in	mm			
V260-SM	0.125	3	15	J-717-0011	0.20mm



PM5 Gen3 Main Technical Parameters

Measurement Principle

Measurement Modes	Pulse-Echo, Interface-Echo, Echo-Echo, Multiple Echo Verification, Automatic
Probe Types	Single element probe (Delay line probe, contact probe, protective membrane probe , pen type probe, water immersion probe)
Probe Frequency Range	0.5MHz-20MHz, 1MHz-75MHz (High frequency option)
Measurement Range in Steel:	0.05mm-62m, depending on probe,surface conditions, temperature, and selected configuration. (To measure the thickness within the entire measurement range, the high frequency and window options should be selected.)
Sound Velocity Range	310m/s-18,699m/s,measures sound velocity based on known thickness object
Resolution	0.1mm/0.01in 0.01mm/0.001in 0.001mm/0.0001in/1um/0.1mil 0.0001mm/0.00001in/0.1um/0.01mil (High Resolution Option)
Measurement Units	mm, inch, µm, mil m/s, in/µs, ns, µs （Sound velocity meter and time of flight option)
Display Update Rate	Selectable at 4Hz, 8Hz or 16Hz
Data Logger	Stores 100,000 thickness values and 400 parameter configuration files, comes with PC software and USB drive
Digital Frequency	200MHz

Display

Display Screen	2.4-inch (320x240 dot matrix) IPS wide-angle color display
Rectification Modes	RF, RF-,FULL, HALF+, HALF-
View Modes	A-scan, B-scan, A scan/Grid, Large Digits

Interfaces

Probe Connector	Lemo 00
I/O Connector	Lemo 00 4-pin
Communication Interface	Mini USB (Optional RS232)

General Specifications

Operation Temperature Range	-10°C to 50°C
Housing	Impact-resistant, waterproof, sealing gasket housing designed to meet IP67 standards.
Dimensions	153mm×76mm×37mm（H×W×D)
Weight	280g including batteries
Power	Two AA batteries USB port power supply (real-time communication option)
Battery Operating Time	Two AA alkaline batteries (22 hours) Two AA lithium batteries (22 hours)
Power Off	Automatic shutdown after 5, 10, or 20 minutes of inactivity, or manual shutdown.

Standard Configuration

- PM5 Gen3 Ultrasonic Thickness Gauge Main Unit
- Two AA Alkaline Batteries (Not included in air shipment)
- D15A Single Element Delay Line Probe (Include test report)
- LEMO00-Microdot Probe Cable
- Rubber Protective Sheath with Holder
- Couplant (Not included in air shipment)
- Communication Cable
- Communication USB Flash Drive
- User Manual
- Certificate of Conformity, Warranty Card, Packing List, Factory Calibration Certificate

Function Options

- High Frequency and High Resolution Option
- High Speed Measurement and Simultaneous Directional Display Option
- Digital Noise Reduction Option
- Sound Velocity Meter and Time of Flight Option
- Window Mode Option
- Double Layer Measurement Option
- Internal Oxide Scale Measurement Option
- Temperature Compensation Option
- Auto Freeze Option
- Large Measurement Range Option
- Directional Capture Option
- Multilayer Measurement Option
- Bluetooth Option
- System Integration and Remote Control Option
- Four Channel Option
- Dual Element Probe Option