GE
Inspection Technologies

CL5

Ultrasonic Precision Thickness Gauge

Micrometer Precision in a Rugged Package

The CL5 is an easy-to-use precision thickness measuring solution for components used in the automotive and aerospace industries, such as:

- Cast and stamped metal components made of aluminum, steel, copper, bronze
- Machined workpieces
- Chemically milled components
- Metal strips, metal plates
- Plastics and composites
- Glass

The instrument can be held in one hand or placed on flat workpieces, making the CL5 a compact way to test your material for the required thickness or checking for sheet corrosion.

Compact Solution With a Full Range of Functionality

The CL5 precision thickness gauge offers a full range of functionality in an easy to use, compact and rugged package. Three soft keys directly under the display activate the functions shown on the display menus. Four directional keys help make menu changes and navigation of the text entry screen simple and efficient.

The graphical display presents the user with seven different operation modes. The user can select Normal, Minimum Scan, Maximum Scan, Differential/Rate of Reduction, Thk+A-Scan (option), Velocity (option) or Quality View. The CL5 uses a programmable data recorder for easy set up of data files from the PC. The SD Card memory system places all the data recording and set-up information on a removable SD memory card. The files are formatted allowing drag and drop files when plugged directly into the PC. Other data such as digital photographs can also be stored on the same SD card. The CL5 allows direct connection to the PC, using a serial or USB port (with optional cable).

Simple Operation

The CL5 is a very straightforward instrument to operate. The MODE key progresses the user through a series of selection and set-up menus and back to the measurement mode. One press of the MODE key displays a table of standard probes and up to five special set-ups. Another press of the MODE key displays a set-up menu where the user can easily scroll through the menu, see the current settings and make fast changes to any of the displayed settings.

A supervisor lock-out function enables a knowledgeable user to set up all the specific measuring functions and settings of the CL5 and lock the settings so critical settings cannot be changed by a subordinate user.

Additional advantages offered by this compact, multifunctional instrument include:

- Enhanced measurement performance produces stable and repeatable thickness values
- Seven measurement and display modes: Normal, Minimum Capture, Maximum Capture, Differential and Rate of Reduction, Velocity (with CL5 VL option), Thickness+A-Scan (with Live A-Scan Option) and Quality View Mode (with Data Recorder option).
- Snapshot A-Scan on all models
- Hollow/Fill thickness digits showing coupling or non-coupling status
- Visual LED alarm to alert user when measurements are exceeding the user selectable limit values
- Customer parameter set-ups for special configurations and quick instrument set-up
- Flexible power system via standard AA batteries or rechargeable battery pack system (standard)
- Multi-language user interface
- Automatic ultrasonic performance (gain and gate controls)
- Wide variety of standard probes (sold separately)

CL5—Simply reliable, reliably simple

The Velocity Option: Performance and Flexibility

The CL5 Velocity option gives the user an added measurement mode used for determining the velocity of a known thickness of material. Material thickness can be entered manually via the CL5 keyboard or a digital caliper can be connected, allowing the thickness value to be sent electronically from the caliper to the CL5. The user simply places the probe on the part, and the CL5 displays the material velocity of the test object. Both the thickness and the velocity value can be stored in the Data Recorder and downloaded to the PC.

The Live A-Scan Option

The optional Live A-Scan feature gives the user a real time view of the echoes being digitally measured by the CL5.

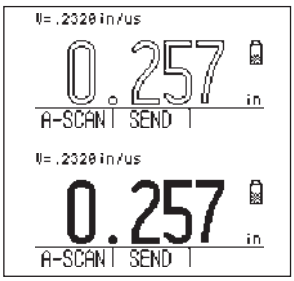
Viewing the Live A-Scan can aid users when attempting to properly align the probe and the test object to achieve the best measurement values. Viewing the Live A-Scan enables the user to ensure the proper echoes are being measured and the digital value is correct.

The Data Recorder Option

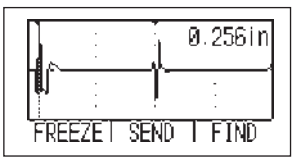
The Data Recorder option permits the quick and easy storage of thickness values in file form. Fully user-programmable, it stores up to 10,000 measured values or as many as 500 values with attached A-Scan.

The programmable data recorder allows creation of data recorder files directly from the CL5 keypad, or from the PC using the flexible UltraMATE® or UltraMATE® Lite software program. The Data Recorder supports the use of alphanumeric file names, standard linear and grid files and custom linear files.

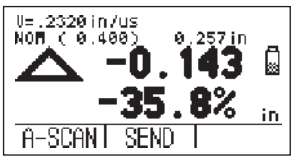
Extended file types store the thickness values, velocity settings and other critical data for each measurement point, making the CL5 and UltraMATE® ideal for test data management.



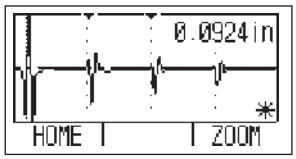
Filled digits indicate successful coupling



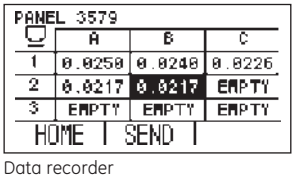
Live A-Scan for more precise evaluations



Rate of reduction



Snapshot A-Scan



Data recorder

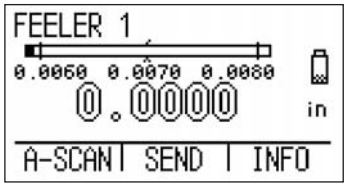
Achieve More Precision With Quality View

Quality View Mode permits Data Recorder-driven control and capture of thickness measurements. It is ideal for singular parts or structures with numerous measurement points that have different target thicknesses and/or varying upper and lower limits or tolerances.

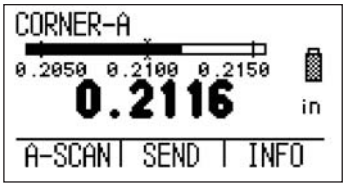
Uses of Quality View Mode include:

1. Fast collection of thickness measurement data for statistical analysis during variation control and quality assurance.
2. Digitally capturing thickness measurement data for quality records and traceability.
3. Variation control of work in progress on the manufacturing or workshop floor.

Quality View Mode displays the current measurement location name, a bar graphic of the thickness measurement that shows the lower specified limit value, the nominal/target value, the upper specified limit and a numerical readout of the measurement.

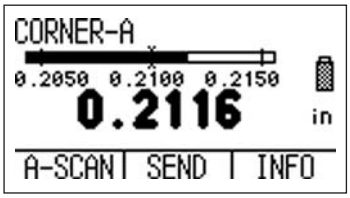


Selection of Quality View Mode displays

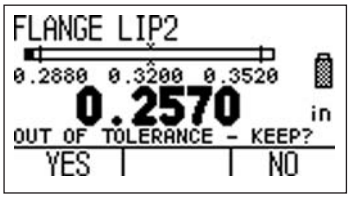


Numerical value of thickness is filled when probe is coupled to the location of measurement

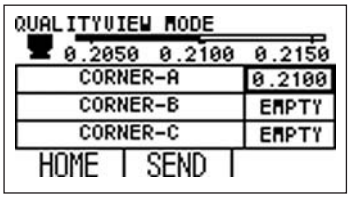
To work in Quality View Mode, custom four-point linear files are created in either Microsoft® Excel or UltraMate® software applications on a PC and downloaded to the CL5 using the optional serial or USB cable. Measurements can also be uploaded into a PC for processing and analysis using Microsoft® Excel, UltraMate® or a third party statistics and/or quality software application.



Quality View Mode



Out of tolerance dialogue



Measurement Review Mode

Technical Data

Measuring Range	.005 in to 20.00 in (0.13 mm to 500 mm): depends on material, probe, surface condition and temperature
Units and Measuring Resolution	Inch – 0.0001, 0.001, 0.01 Millimeter – 0.001, 0.01, 0.1
Material Velocity Range	0.03937 to 0.78736 in/µs 1000 to 19999 m/s
Receiver	Bandwidth of 1.0 to 16 MHz at –6 dB
Update Rate	User selectable 4 or 8 Hz, up to 32 Hz in Min Cap or Max Cap mode
Display Type	Graphical LCD 64 × 128 pixels 2.25 in × 2.56 in (40 mm × 57 mm) with backlight and adjustable contrast
Thickness Display	Five-digit display with 0.75 in (19.5 mm) height digits in standard mode and 0.25 in (6.35 mm) height digits in Thickness + A-Scan mode, solid or hollow digits coupling indicator, A-Scan view – R.F. mode only
Display Modes	Thickness (includes Snapshot A-Scan), Thickness + Live A-Scan (optional), Minimum Capture, Maximum Capture, Differential and Rate of Reduction, Velocity Mode (optional), Quality View Mode (optional)
Supervisor Lockout	Alphanumeric password lockout for calibrations, set-up and Data Recorder
I/O Port	Bi-directional serial RS-232: baud rate 1200, 9600, 57600 and 115200
Data Recorder	Programmable Data Recorder, 120 files max. on each 64 MB SD card
File Formats	Grid created from instrument keypad. Grid and Custom Linear files accepted from UltraMATE® software.
Power Supply	Three AA batteries (Alkaline, NiMH or NiCad) or custom rechargeable battery pack

Environmental Sealing	Impact resistant, dust and splash proof, gasket-sealed, case-tested to IP54
Weight	0.92 lb (420 g) with batteries
Size	7.1 in H × 3.7 in W × 1.8 in D (180 mm × 94 mm × 46 mm)
Temperature Range	Operating: –10 °C to +60 °C Storage: –20 °C to +70 °C
Operating Languages	English, German, French, Spanish, Italian, Russian, Japanese, Chinese
Application Software	UltraMATE® Lite and UltraMATE®
Base Instrument Package	CL5 precision thickness gauge Lithium poly battery pack AC power supply Plastic carry case Wire stand XL couplant sample, 4 oz Firmware upgrade CD-ROM Operating manual Operating instruction card Certificate of Conformity
Options	CL5 AS OPT – Live A-Scan option CL5 DR OPT – Data Recorder option CL5 VL – Velocity option
Accessories	PCCBL-690 USB PC cable PCCBL-419 serial PC cable Li-135 lithium poly battery pack AC-296 AC power supply UltraMATE® Lite or UltraMATE® Data Management software

CL5 Compatible Transducer Specifications

Model	Probe Type	Nominal Frequency	Contact Diameter	Measuring Range (in Mild Steel Unless Noted)
Alpha 2 DFR/CLF4	Standard Delay Line	15 MHz	0.30 in (7.6 mm)	0.007 to 1.0 in (0.18 to 25.4 mm)
Alpha 2 F/CLF5	Fingertip Contact	10 MHz	0.38 in (9.5 mm)	0.060 to 10.0 in (1.52 to 254 mm)
Mini DFR	Thin Range Delay Line	20 MHz	0.19 in (4.8 mm)	0.006 to 0.2 in (0.16 to 5.1 mm)
Alpha DFR-P	Delay Line for Plastic Materials	22 MHz	0.30 in (7.6 mm)	0.005 to 0.15 in (0.13 to 3.8 mm) in plastic materials
K-Pen	Delay Line Pencil Probe	20 MHz	0.065 or 0.090 in (1.7 or 2.3 mm)	0.008 to 0.175 in (0.20 to 4.4 mm)
CA211A	Standard Contact	5 MHz	0.75 in (19.1 mm)	0.060 to 20.0 in (1.52 to 508 mm)

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