Dakota NDT
an Elcometer company

Dakota CMX Corrosion Thickness Gauges

Can be used in accordance with: NIST & MIL-STD-45662



The Dakota CMX ultrasonic corrosion thickness gauge is available in four models - from an entry level Dakota CMX1 Ultrasonic Thickness Gauge to the top of the range Dakota CMX3-DL Ultrasonic Thickness Gauge.

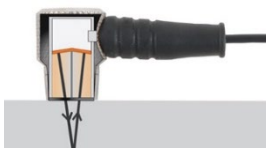
Features

- Range of display & measurement options: Pulse-Echo, Echo-Echo, Pulse-Echo Temp, Comp Mode (PETP), Coating Only Mode (CT), Pulse-Echo Coating Mode (PECT)
- Manual or automatic gain control (AGC) with adjustable 110dB range
- Gate control
- Threshold adjustment
- 64 User defined setups
- Multiple language display
- Multiple calibration and material selection options
- High speed scan mode: 250 readings per second (Dakota CMX1 Ultrasonic Thickness Gauge and Dakota CMX1-DL Ultrasonic Thickness Gauge), 50 readings per second (Dakota CMX2-DL Ultrasonic Thickness Gauge and Dakota CMX3-DL Ultrasonic Thickness Gauge)
- A-Scan portrait & landscape views (Dakota CMX3-DL Ultrasonic Thickness Gauge only)
- Differential and minimal thickness alarm modes
- Data output and storage: 4GB internal memory
- Download to DakMaster data management software

Features Explained

Repeatability / Stability Indicator
Consisting of 6 vertical bars, when all the bars are fully illuminated and the last digit on the digital thickness value is stable, the gauge is reliably measuring the material thickness.

Differential Mode
Once a user defined nominal thickness value has been set, the gauge will display the +/- thickness difference from the nominal value entered.



V-Path Correction
Dual element transducers consist of a probe with two crystals (one to transmit and one to receive the sound pulse). The crystals are separated by an acoustic barrier - generating a 'V-shaped' sound path as the sound travels from one element to the other. This path is slightly longer than the direct path therefore V-path correction is used to calculate the correct thickness.

High Speed Scan with Minimum Thickness Display
By significantly increasing the measurement refresh rate this mode allows the user to make scanned passes over the test material. The smallest thickness value is held in memory and displayed when scanning is complete. This feature can also be used in conjunction with the minimum & maximum limit alarm feature (model dependant).

Limit Alarm Mode
The user can define minimum and maximum thickness limits. If the measurement falls outside the upper or lower limit a red LED will light and the beeper sounds. A green LED will light to indicate an acceptable thickness.

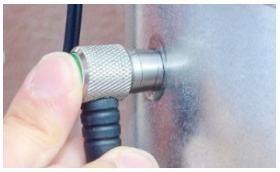
Introducing the Dakota CMX Corrosion Thickness Gauges

Top of the range and easy to use, the Dakota CMX Corrosion Thickness Gauges provide inspectors with all the features necessary to measure the material and coating thickness at the same time.



Versatile

The Dakota CMX Ultrasonic Thickness Gauges have the ability to measure coatings and material thickness simultaneously while maintaining the ability to locate pits, flaws and defects in the material.



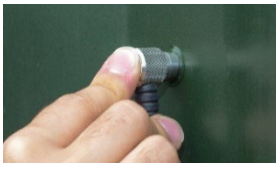
Powerful

Up to 4GB of readings can be saved into the gauge memory as each measurement is taken, which can be downloaded later into an inspection application or into DakMaster Software for further analysis and reporting.



Customizable

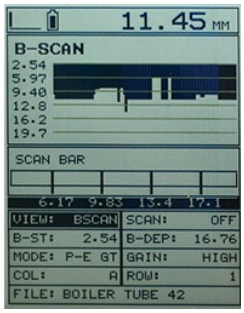
The Dakota CMX Thickness Gauge range has a choice of display modes allowing the user to select the most appropriate for their needs; Readings, B-Scan, B-Scan combined with readings, Scan bar & the A-Scan on the Dakota CMX2-DL Corrosion Thickness Gauge and Dakota CMX3-DL Corrosion Thickness Gauge.



Intelligent

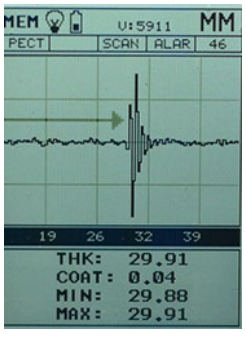
Set limits for pass/fail indication on individual reading or for each batch with audible & visual warnings.

Display Modes Explained



Material Thickness Digits Display:
The standard display on all models, this displays the numerical thickness value in either millimetres (MM) or inches (IN).

Scan Bar Display:
A linear graphic display which allows users to graphically monitor changes in thickness readings. As the scale range can be adjusted by the user, this display is ideal for observing tiny variations in material thicknesses.

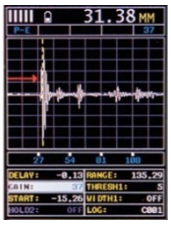


A-Scan Display; Full Wave (RF):*
The A-Scan display shows the sine wave created by the reflected sound, or oscillation, from the material being measured. In RF mode the full wave form is displayed.

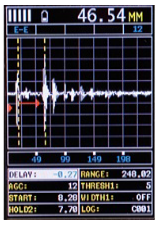
A-Scan Display; Rectified (+ or -):*
Users can select to view either the positive or the negative cycle of the full waveform (RF). This rectified (RECT) display shows the amplitude of the echo versus the transit time.

* Available on CMX2-DL and CMX3-DL thickness gauge Models only

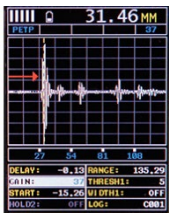
Measurement Modes Explained



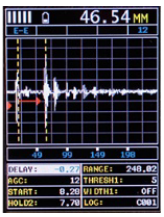
Pulse - Echo Mode (PE): The normal display mode, measures the total thickness from the base of the transducer probe to the material density boundary (typically the back wall). Ideal for pit and flaw detection.



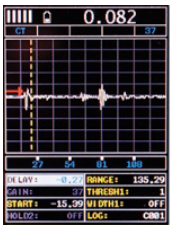
Echo - Echo Mode (EE): Also known as the ThruPaint Mode, EE ignores the coating thickness, displaying the material thickness from the top surface of the material to the material density boundary.



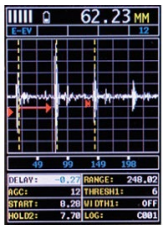
Pulse - Echo Temp Comp Mode (PETP): Similar to the PE mode, PETP takes into account and compensates for the variations in measurement caused by temperature variations.



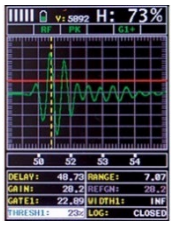
Echo - Echo Verify Mode (EEV): The echo-echo verify mode measures by comparing the values between 3 reflections and is commonly used to eliminate errors from surface coatings and to make measurements in multiple layered materials.



Coating Only Mode (CT): Displays the thickness of the coating applied to the material.



Pulse - Echo Coating Mode (PECT): Displays both the material thickness (PE) and the coating thickness (CT) at the same time



Basic Flaw Mode (FLAW MODE): Basic prove-up flaw detection using single element angle beam transducers is available on the CMX2-DL and CMX3-DL corrosion thickness gauges.

Product Features

Model	CMX1	CMX1-DL	CMX2-DL	CMX3-DL
Display Mode				
Material thickness digits display	■	■	■	■
B-Scan cross sectional display	■	■	■	■
Combined B-Scan and digits display	■	■	■	■
Coating Thickness Display	■	■	■	■
Scan Bar Display	■	■	■	■
A-Scan Display			+ Rectified, - Rectified, Full Waveform (RF)	+ Rectified, - Rectified, Full Waveform (RF) Portrait & landscape views
Measurement Range	PE: 0.63 - 1219.2mm	PE: 0.63 - 1219.2mm	PE: 0.63 - 1219.2mm	PE: 0.63 - 1219.2mm
	PETP: 0.63 - 1219.2mm	PETP: 0.63 - 1219.2mm	PETP: 0.63 - 1219.2mm	PETP: 0.63 - 1219.2mm
	EE: 2.54 - 152.4mm	EE: 2.54 - 152.4mm	EE: 2.54 - 152.4mm	EE: 2.54 - 152.4mm
	EEV: 1.27 - 25.4mm	EEV: 1.27 - 25.4mm	EEV: 1.27 - 25.4mm	EEV: 1.27 - 25.4mm
	CT: 0.01 - 2.54mm	CT: 0.01 - 2.54mm	CT: 0.01 - 2.54mm	CT: 0.01 - 2.54mm
	PECT: 0.63 - 1219.2mm	PECT: 0.63 - 1219.2mm	PECT: 0.63 - 1219.2mm	PECT: 0.63 - 1219.2mm
	PECT: 0.01 - 2.54mm	PECT: 0.01 - 2.54mm	PECT: 0.01 - 2.54mm	PECT: 0.01 - 2.54mm

Measurement Rate				
Manual	8 readings per second	8 readings per second	8 readings per second	8 readings per second
Scan Mode	250 readings per second	250 readings per second	50 readings per second	50 readings per second
Scan bar display	10 readings per second	10 readings per second	10 readings per second	10 readings per second
Measurement Resolution	0.01mm	0.01mm	0.01mm, 0.001mm selectable	0.01mm, 0.001mm selectable
Velocity Calibration Range	309.88 - 18,542m/s	309.88 - 18,542m/s	309.88 - 18,542m/s	309.88 - 18,542m/s
Additional Features				
High Speed Scan Mode				■
Differential Mode				■
Limit alarm mode				■
B-Scan Display Speed	15 readings per second	15 readings per second	15 readings per second	10 to 200 readings per second
Flaw Mode			Basic prove-up flaw detection using single element angle beam transducers	Basic prove-up flaw detection using single element angle beam transducers
Calibration Setups				64 user-definable setups transferable to and from a PC archive
Gates			3 fully adjustable gates: start, stop, width & threshold	3 fully adjustable gates: start, stop, width & threshold
Damping			Adjustable damping (50 - 1500ohms)	Adjustable damping (50 - 1500ohms)
Pulser Type	Dual square wave pulsers	Dual square wave pulsers	Dual square wave pulsers	Dual square wave pulsers
	Pulse repetition frequency up to 250Hz	Pulse repetition frequency up to 250Hz	Pulse repetition frequency up to 250Hz	Pulse repetition frequency up to 250Hz
Gain	Manual or automatic gain control (AGC) with 110dB range (limited)	Manual or automatic gain control (AGC) with 110dB range (limited)	Manual, automatic gain control (AGC) with 110dB range (limited), Linear time dependent gain (TDG) with adjustable slope	Manual, automatic gain control (AGC) with 110dB range (limited), Linear time dependent gain (TDG) with adjustable slope
Timing	Precision temperature-controlled crystal oscillator (TCXO) timing with single shot 100MHz 8bit ultra-low power digitizer	Precision temperature-controlled crystal oscillator (TCXO) timing with single shot 100MHz 8bit ultra-low power digitizer	Precision temperature-controlled crystal oscillator (TCXO) timing with single shot 100MHz 8bit ultra-low power digitizer	Precision temperature-controlled crystal oscillator (TCXO) timing with single shot 100MHz 8bit ultra-low power digitizer
Memory and Data Logging	• 4GB internal memory	• 4GB internal memory	• 4GB internal memory	• 4GB internal memory
	• Sequential and grid logging	• Sequential and grid logging	• Sequential and grid logging	• Sequential and grid logging
	• Alpha numeric batch identification	• Alpha numeric batch identification	• Alpha numeric batch identification	• Alpha numeric batch identification
	• OBSTRUCT indicates inaccessible locations	• OBSTRUCT indicates inaccessible locations	• OBSTRUCT indicates inaccessible locations	• OBSTRUCT indicates inaccessible locations
	• Bitmap graphic capture and capture viewer	• Bitmap graphic capture and capture viewer	• Bitmap graphic capture and capture viewer	• Bitmap graphic capture and capture viewer

Calibration Options				
1 - point	■	■	■	■
2 - point	■	■	■	■
Material selection	■	■	■	■
Velocity (speed of sound)	■	■	■	■
Transducer Probe Type	Dual element	Dual element	Dual element	Dual Element, Single Element (1 - 20Mhz), Contact, Matching Layer, Delay Line and Pencil
Transducer Frequency Range	1 - 10MHz	1 - 10MHz	1 - 10MHz	1 - 20MHz
Transducer Recognition	Automatic & manual - selectable from a list	Automatic & manual - selectable from a list	Automatic & manual - selectable from a list	Automatic & manual - selectable from a list
V-path / dual path error correction	Automatic	Automatic	Automatic	Automatic
Probe Zero	Automatic & manual (via integrated probe disk)	Automatic & manual (via integrated probe disk)	Automatic & manual (via integrated probe disk)	Automatic & manual (via integrated probe disk)
Display	1/8 VGA (greyscale)	1/8 VGA (greyscale)	1/8 VGA (greyscale)	1/4 VGA AMOLED colour display
	62 x 45.7mm viewable area	62 x 45.7mm viewable area	62 x 45.7mm viewable area	57.6 x 43.2mm viewable area
				Landscape Mode
Display Refresh Rate	25Hz	25Hz	25Hz	120Hz
Units (selectable)	mm	mm	mm	mm
LED Backlight	on/off/auto	on/off/auto	on/off/auto	Adjustable brightness
Repeatability / Stability Indicator	■	■	■	■
Battery Save Mode	Auto	Auto	Auto	Auto

[1] Measuring range & accuracy depends on material, surface conditions and the transducer selected

Technical Specifications

Part Number	Description	Certificate
Z-170-0005	Dakota CMX1 Thickness Gauge (CMX)	●
Z-171-0005	Dakota CMX1-DL Thickness Gauge (CMX-DL)	●
Z-172-0005	Dakota CMX2-DL Thickness Gauge (CMX-DL+)	●
Z-187-0005	Dakota CMX3-DL Thickness Gauge (CMX-DL+ Colour)	●
Transducer Probe Type	Dual Element	
Measurement Accuracy[1]	0.01mm	
Memory	4GB Internal Memory	
Operating Temperature	-10 to 60ºC	
Data Output	USB	
Power Supply	3 x AA batteries and via USB	
Battery Life	Alkaline: greyscale 35 hrs, colour 12 hrs, Nicad: greyscale 10 hrs, colour 5hrs, NI-MH: greyscale 35 hrs, colour 12 hrs	
Gauge Weight	383g - including batteries	
Gauge Dimensions	63.5 x 165 x 31.5mm	

[1]Measuring range & accuracy depends on material, surface conditions and the transducer selected
[2]Approximate battery life, when in continuous measurement mode.
●Certificate of Calibration supplied as standard.

Packing List

Dakota Thickness Gauge (CMX, CMX-DL, 0CMX-DL+, CMX-DL+ Colour)
Selectable Transducer
Couplant
Manual
Plastic Carrying Case
Certificate of Calibration
AA Batteries
PC Software and Data Transfer Cable



Part Numbers

Dakota CMX1 Corrosion Thickness Gauge



Part Number: Z-170-0005

Dakota CMX1-DL Corrosion Thickness Gauge



Part Number: Z-171-0005

Dakota CMX2-DL Corrosion Thickness Gauge



Part Number: Z-172-0005

Dakota CMX3-DL Corrosion Thickness Gauge



Part Number: Z-187-0005