elcometer NDT

en

# User Guide

## Elcometer NDT

## Model MTG6 & MTG8

### Ultrasonic Material Thickness Gauges

elcometer NDT

# CONTENTS

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Pb Hg CE

Android™

FC

Made for iPod iPhone iPad

For the avoidance of doubt, please refer to the original English language version.

Gauge Dimensions: 145 x 73 x 37mm (5.7 x 2.87 x 1.46") - without transducer

Gauge Weight: 210g (7.4oz) - including batteries, without transducer

Material Safety Data Sheets for the ultrasonic couplant supplied with the Elcometer MTG6 & MTG8 and available as an accessory, are available to download via our website:

Elcometer Ultrasonic Couplant Material Safety Data Sheet:

www.elcometer.com/images/stories/MSDS/Elcometer_Ultrasonic_Couplant_Blue.pdf

Elcometer Ultrasonic Couplant (High Temperature) Material Safety Data Sheet:

www.elcometer.com/images/stories/MSDS/elcometer_ultrasonic_couplant_hi_temp.pdf

## 1 GAUGE OVERVIEW

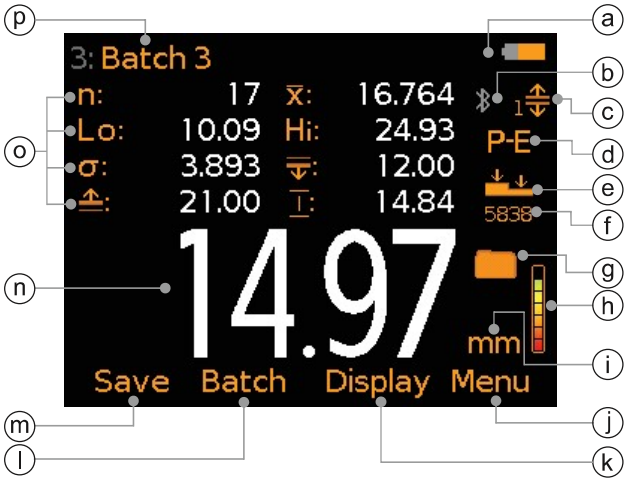

1 LED Indicators - Red (left), Green (right)
2 LCD Display
3 Softkeys
4 On/Off Key
5 Zero Disk
6 Transducer Connection Point
7 USB Data Output Socket (below cover)
8 Battery Compartment (¼ turn open/close)
9 Wrist Strap Connection

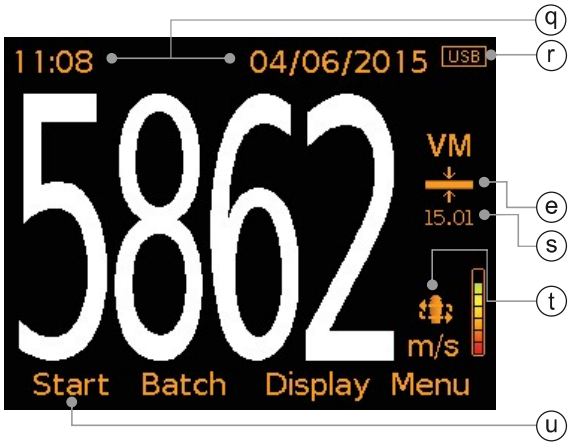
## 2 BOX CONTENTS

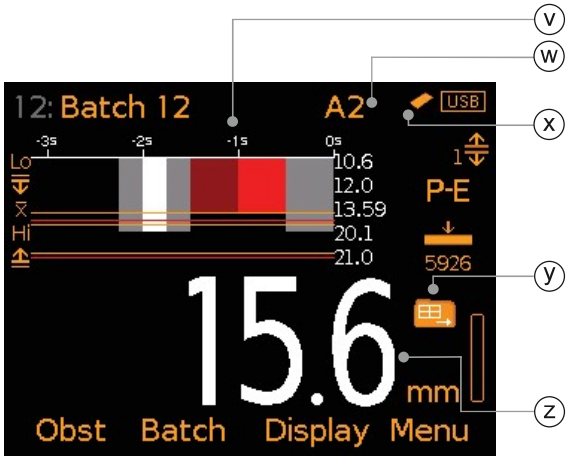
- Elcometer NDT Ultrasonic Material Thickness Gauge
- 5MHz 1/4" Potted Right Angle Dual Element Transducer (if ordered)
- Ultrasonic Couplant; 120ml (4fl oz Bottle)
- 2 x AA Batteries
- Protective Case
- Transit Case
- Wrist Harness
- 3 x Screen Protector
- ElcoMaster® Software & USB Cable
- Calibration Certificate
- User Guide

# 3 USING THE GAUGE






a Power: Batteries - including battery life indicator

b Bluetooth On - Grey: not paired; Orange: paired

c Limits On (with Limit Index Number) - Red: limit exceeded (MTG8)

d Measurement Mode - P-E: Pulsed Echo; E-E: Echo/Echo ThruPaint™; VM: Velocity Mode

e Calibration Method

f Calibration: Sound-Velocity

g Batch Type - Sequential

h Reading Stability Indicator

i Measurement Units - mm, Inch, m/s, in/µs

j Menu Softkey

k Display Softkey

l Batch Softkey

m Save Current Reading Value

n Reading Value - High resolution; 0.01mm (0.001")

o User Selectable Statistics - Maximum of 8

p Batch Name - when in batching

q Date & Time - when enabled and not in batching

r Power: USB

s Calibration: Material Thickness - Velocity Mode

t Scan Mode On - icon flashes during a scan

u Start / Stop Scan - when in Scan Mode

v B-Scan

w Cell Reference - when in grid batching (MTG8)

x Reading Outside Calibration Warning On

y Batch Type - Grid; increment direction: across (MTG8)

z Reading Value - Low resolution; 0.1mm (0.01")

# 4 GETTING STARTED



## 4.1 FITTING THE BATTERIES

Each gauge is supplied with 2 x AA alkaline batteries.

To insert or replace the batteries:

1 Lift the latch on the battery compartment cover and rotate anti-clockwise to remove the cover.
2 Insert 2 batteries taking care to ensure correct polarity.
3 Refit the cover and rotate the latch clockwise to close.

The battery condition is indicated by a symbol in the top right of the display ( ):

- Full symbol (orange) = batteries at full capacity
- Empty symbol (red, flashing) = batteries at lowest sustainable level

## 4.2 CONNECTING A TRANSDUCER

1 Align the red dot on the transducer plug with the red dot on the base of the gauge.
2 Push the transducer into the gauge, ensuring that the connector is fully engaged.

All dual element transducers which can be connected directly to the base of an MTG gauge - see Section 17.1 ‘Transducers’ on page 31 - are ‘intelligent’ transducers. The transducer frequency and diameter will be identified automatically by the gauge.

Details of the transducer connected can be viewed at any time via Menu/About/Transducer Information.

A transducer adaptor is available which enables other Elcometer ‘non-intelligent’, dual element transducers and other manufacturers’ transducers, to be used with the Elcometer MTG product range - see Section 17.4 ‘Transducer Adaptor’ on page 35.

## 4.3 SELECTING YOUR LANGUAGE

1 Press and hold the ON/OFF button until the Elcometer logo is displayed.
2 Press Menu/Setup/Language and select your language using the ↑↓ softkeys.
3 Follow the on screen menus.

To access the language menu when in a foreign language:
1 Switch the gauge OFF.
2 Press and hold the left softkey and switch the gauge ON.
3 Select your language using the ↑↓ softkeys.

## 4.4 SCREEN SETTINGS

A number of screen settings can be defined by the user via Menu/Setup/Screen Settings including:

- **Screen Brightness;** This can be set to 'Manual' or 'Auto' - the brightness is adjusted automatically using the gauge's ambient light sensor.
- **Screen Timeout;** The display will dim if inactive for more than 15 seconds and will go 'black' if inactive for the period defined. Press any key or tap the gauge to awaken it. The gauge can also be set to switch off automatically after a user defined period of inactivity via Menu/Setup/Gauge Auto Off. The default setting is 5 minutes.

## 4.5 SETTING UP THE READING DISPLAY

The colour LCD display is split into two halves; Top Display and Bottom Display. The user can define what information is displayed in each half including: Readings, Selected Statistics, Run Chart, Bar Graph, Readings & Differential[a] (MTG8 only) and B-Scan (MTG8 only).

**To setup the display:**
1 Press Display/Setup Display/Top Display (or Bottom Display as required).
2 Use the ↑↓ softkeys to highlight the required option and press 'Select'.

[a] Not available in 'Scan Mode' - see Section 10.3 'Taking a Reading in Scan Mode' on page 22.

## 4 GETTING STARTED (continued)

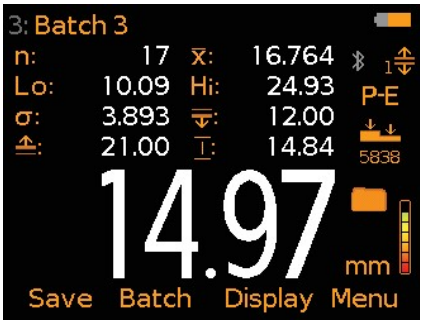


If 'None' is selected for one half and 'Readings', 'Run Chart' or 'B-Scan' (MTG8 only) for the other half, the readings, run chart or B-Scan will fill the whole screen. If any other combination of options is selected; the data will be shown in the top or bottom display as specified.

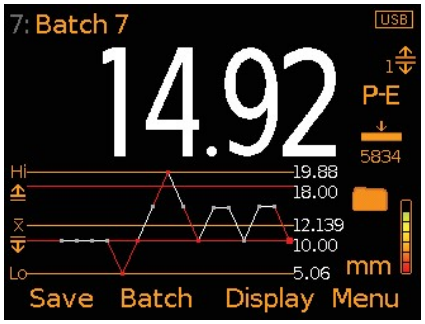
- **None;** No information is displayed.
- **Readings;** The reading value is displayed.
- **Selected Statistics;** Up to 8 statistical values can be displayed as defined by the user via Display/Statistics/Select Statistics. Select from:
  MTG6: Number of Readings, Mean, Lowest Reading, Highest Reading, Standard Deviation.
  MTG8: MTG6 list plus Low Limit Value, Number Below Low Limit, High Limit Value, Number Above High Limit, Range, Nominal Value.
- **Run Chart;** A line trend graph of the last 20 measurements which is updated automatically after each reading.
- **Bar Graph;** An analogue representation of the current measurement value together with the highest (Hi), lowest (Lo) and average ($\overline{X}$) reading. The graph is updated automatically when each reading is taken.
- **Readings & Differential[a] (MTG8 only);** The last reading is displayed together with the variation from the nominal value set via Menu/Limit Memories/Create Limit Memory/Set Nominal.

Readings

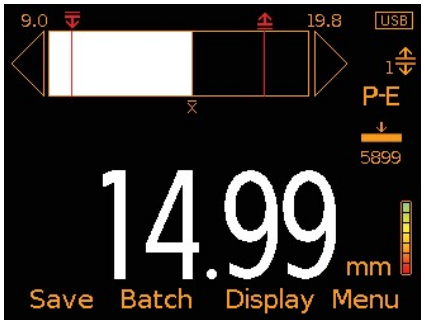

Selected Statistics




Run Chart




Bar Graph



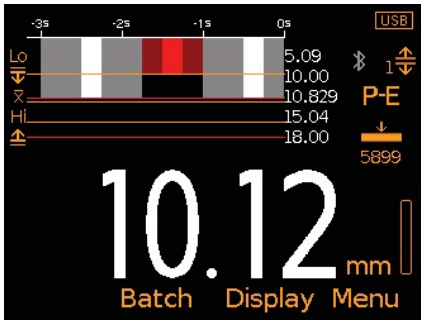

Readings & Differential


[a] Not available in 'Scan Mode' - see Section 10.3 'Taking a Reading in Scan Mode' on page 22.

- **B-Scan (MTG8 only);** Available when in ‘Pulsed Echo’ or ‘Echo-Echo ThruPaint™’ mode, see Section 4.6 ‘Selecting the Measurement Mode’ on page 8, B-Scan provides a time-based, cross-sectional view of the material being tested. Readings taken, saved readings, the highest (Hi), lowest (Lo) and average ($\overline{X}$) reading together with upper and / or lower limit values (if set and enabled) are displayed.

The material thickness is illustrated by grey and red shaded areas; red if readings are outside limits (if set and enabled). Readings which are saved into the gauge or batch memory are displayed as white or red vertical bars; red if readings are outside limits (if set and enabled).

B-Scan




The B-Scan vertical scale can either be set to 'Auto' or the user can set the scale most appropriate for the thickness of the material under test.

When the ‘Start Depth’ and ‘Max Depth’ are both set to 'Auto', the scaling is determined by the minimum and maximum readings taken.

**To set the B-Scan resolution:**

1 Press Display/Setup Display/B-Scan Scaling/B-Scan Start (or ‘B-Scan Depth’ as required).
2 Use the ↑↓ softkeys to select ‘Auto’ and press ‘Ok’ or alternatively, use the ↑↓ softkeys to set the required value, pressing the → softkey to move to the next digit, and press ‘Set’.
3 Repeat Step 2 for ‘B-Scan Depth’ (or ‘B-Scan Start’ as required).
   - The default setting is ‘B-Scan Start’ = 0; ‘B-Scan Depth’ = ‘Auto’.

## 4 GETTING STARTED (continued)

### 4.6 SELECTING THE MEASUREMENT MODE

Three measurement modes are available for selection; 'Pulsed Echo', 'Echo-Echo ThruPaint™' and 'Velocity Mode'. For an explanation of the different modes, see Table 1: Measurement Modes.

To select the measurement mode, press Menu/Setup/Reading/Measurement Mode.

**TABLE 1: MEASUREMENT MODES**

| Measurement Mode | Icon | Description |
|---|---|---|
| Pulsed Echo (PE) | **P-E** | The total thickness from the base of the transducer to the material density boundary (typically the back-wall) is measured. Suitable for measurement of materials between 0.63mm and 500mm (0.025" to 20")[b] thick. |
| Echo-Echo ThruPaint™ (EE) | **E-E** | A coating of up to 2.0mm (0.08") thick is ignored and the material thickness from the top surface of the material to the material density boundary (typically the back-wall) is measured. Suitable for measurement of materials between 5.00mm and 25.4mm (0.200" to 1")[b] thick. |
| Velocity Mode (VM) | **VM** | Measures the speed of sound of the material. Ideal for measuring the homogeneity of a material/alloy. |

*Note: The gauge should be re-calibrated when the measurement mode is changed - see Section 8 'Calibrating your Gauge' on page 14. The calibration icon will flash intermittently to indicate that re-calibration is required.*

### 4.7 SELECTING THE MEASUREMENT UNITS

A choice of measurement units is available, depending on the measurement mode selected, see Table 2: Measurement Units.

To select the measurement units, press Menu/Setup/Units.

[b] Thickness range is dependent on the material being measured and the transducer used.

## 4 GETTING STARTED (continued)



| TABLE 2: MEASUREMENT UNITS | | | | | |
|---|---|---|---|---|---|
| **Measurement Mode** | **Icon** | **mm** | **Inch** | **m/s** | **in/µs** |
| Pulsed Echo (PE) | **P-E** | ✓ | ✓ | | |
| Echo-Echo ThruPaint™ (EE) | **E-E** | ✓ | ✓ | | |
| Velocity Mode (VM) | **VW** | | | ✓ | ✓ |

### 4.8 SELECTING THE MEASUREMENT RATE & RESOLUTION

Three user selectable measurement repetition rates are available; 4, 8 and 16 Hz - the gauge will take 4, 8 or 16 readings per second depending on the rate selected.

To select the reading rate, press Menu/Setup/Reading/Reading Rate. When in 'Scan Mode' - see Section 10.3 'Taking a Reading in Scan Mode' on page 22 - the reading rate is set at 16 Hz (16 readings per second).

The gauges have a user selectable reading resolution of 0.1mm (0.01") - 'Low', or 0.01mm (0.001") - 'High', which gives more precise readings when measuring on thinner materials.

To select the resolution, press Menu/Setup/Reading/Resolution and select 'Low' or 'High' as required.

## 5 SETTING LIMITS - MTG8

Limits are acceptable tolerance levels as defined by the user allowing the user to compare readings to pre-defined values. The MTG8 can store up to 40 pre-programmed limits.

Limits can be created on the gauge or via PC using ElcoMaster®, and saved into the gauge memory for future selection. Using ElcoMaster®, saved limits can be transferred to other MTG8 gauges.

Each Limit can consist of a nominal or target value (x:) - required for 'Readings & Differential' - a low (▼:) and / or high (▲:) limit value.

Limits can either be created for individual readings or when a new batch is opened, see Sections 5.1 and 5.2. Different batches can have different limit values.

## 5 SETTING LIMITS - MTG8 (continued)



When created, limits are stored in the gauge limit memory and are available for future selection, see Section 5.3.

Saved limits can be renamed and the values can be amended at any time, see Sections 5.4 and 5.5.

### 5.1 CREATING LIMITS FOR INDIVIDUAL READINGS

1 Press Menu/Limit Memories/Create Limit Memory/Set Upper Limit (or 'Set Lower Limit').
2 Use the ↑↓ softkeys to set the required value and press 'Set'.
3 If required, repeat Step 2 for 'Set Lower Limit' (or 'Set Upper Limit') and 'Set Nominal'.
4 When all values have been set, use the ↑↓ softkeys to highlight 'Save Limit Memory n' and press 'Select' to save.
   - Limits are specific to the measurement mode in use when created.

### 5.2 CREATING LIMITS FOR A NEW BATCH

1 Press Batch/New Batch/Batch Limits/Create Limit Memory/ Set Upper Limit (or 'Set Lower Limit').
2 Use the ↑↓ softkeys to set the required value and press 'Set'.
3 If required, repeat Step 2 for 'Set Lower Limit' (or 'Set Upper Limit') and 'Set Nominal'.
4 When all values have been set, use the ↑↓ softkeys to highlight 'Save Limit Memory n' and press 'Select' to save.
   - Limits are specific to the measurement mode in use when created.
   - Batch limits can be viewed at any time via Batch/Review Batch/Batch Information.

### 5.3 SELECTING SAVED LIMITS

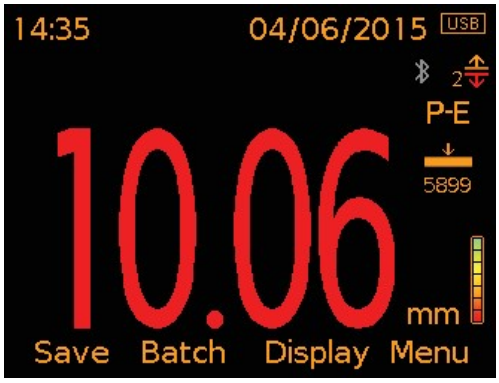
1 Press Menu/Limit Memories/Select Limit Memory or when in Batching, press Batch/New Batch/Batch Limits/Select Limit Memory.
2 Use the ↑↓ softkeys to highlight the limit memory required and press 'Select'.
   - Only the limits specific to the measurement mode in use are available for selection.
   - Batch limits can be viewed at any time via Batch/Review Batch/Batch Information.

When a limit memory is in use, n⇕ is displayed to the right of the measurement screen, where n = the limit index number.

## 5 SETTING LIMITS - MTG8 (continued)



If a measurement is taken which falls outside set limits, the appropriate limit icon, the reading value and the reading differential (if enabled) turn red, the red LED flashes and the alarm beeps.




### 5.4 RENAMING LIMITS

1 Press Menu/Limit Memories/Edit Limit Memory/Rename Limit Memory.
2 Use the ↑↓ softkeys to highlight the limit memory to be renamed and press ‘Select’.
3 Use the ←→ softkeys to rename the limit memory.
4 Select ‘Ok’ to save the changes or ‘Escape’ to exit and disregard any amendments made.

### 5.5 AMENDING LIMITS

1 Press Menu/Limit Memories/Edit Limit Memory/Amend Limit Memory.
2 Use the ↑↓ softkeys to highlight the limit memory to be amended and press ‘Select’.
3 Use the ↑↓ softkeys to highlight ‘Set Upper Limit’ (or ‘Set Lower Limit’) and press ‘Select’.
4 Use the ↑↓ softkeys to set the required value and press ‘Set’.
5 If required, repeat Steps 3-4 for ‘Set Lower Limit’ (or ‘Set Upper Limit’) and ‘Set Nominal’.
6 When all values have been amended as required, use the ↑↓ softkeys to highlight ‘Save Limit Memory n’ and press ‘Select’ to save the changes.

## 6 SETTING THE ZERO POINT



Setting the zero point for the transducer is important. If the zero point is not set correctly, all measurements will be inaccurate.

The gauge will remember the last zero point. It is generally a good idea however, to set the zero point whenever the gauge is switched on, and when a different transducer is used. This will ensure that the zero point is correct.

**To set the zero point:**

1 Plug the transducer into the gauge ensuring that the connector is fully engaged.
   - The wearface of the transducer should be clean and free of any debris.

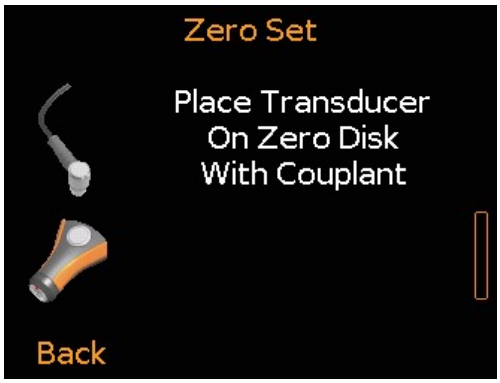
2 Press the On/Off button to switch the gauge on.

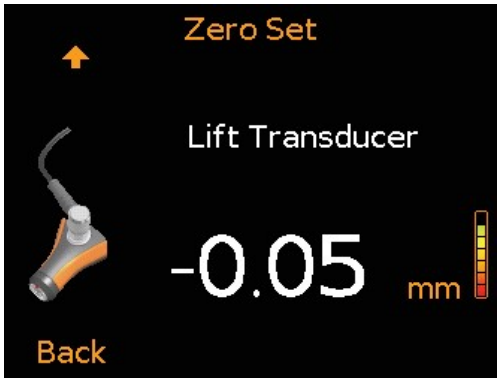
3 Press Menu/Calibration/Zero Set and apply couplant to the zero disk.

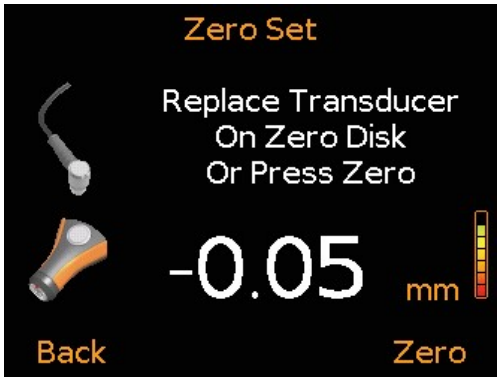
4 When prompted, press the transducer on to the zero disk, making sure it is flat against the surface.
   - The display will show a thickness value which is constantly updating. The stability of the reading is indicated on the stability bar to the right of the display. A valid reading has a stability of 5 or more.

5 Remove the transducer from the zero disk. The last reading is held on screen. If not representative, repeat Step 4.
   - Excessive use of couplant can result in a distorted reading when the transducer is removed from the surface.

6 Press ‘Zero’ to set the zero point.



# 7 CALIBRATION METHODS



In order for the gauge to make accurate measurements, it must be set to the correct sound-velocity for the material being measured.

Different types of material have different sound-velocities. For example, the velocity of sound through steel is 5920m/s (approximately 0.233in/µs) and the velocity of sound through aluminium is 6350m/s (approximately 0.248in/µs).

Setting the calibration is crucial for the gauge to function correctly. The calibration procedure should be performed when the measurement mode, transducer and / or material type is changed.

A choice of calibration methods is available, depending on the measurement mode selected, see Table 3: Calibration Methods.

To select the calibration method, press Menu/Calibration/Cal Method.

**TABLE 3: CALIBRATION METHODS**

| Calibration Method | Icon | Description |
|---|---|---|
| 1 Point |  | This is the simplest and most commonly used calibration procedure. After setting the zero point - see Section 6 ‘Setting the Zero Point’ on page 12 - a reading is taken and adjusted on an uncoated sample piece of test material of a known thickness. Once the thickness has been entered and confirmed, the derived sound-velocity is displayed. |
| 2 Point |  | This method allows for greater accuracy over small ranges. Readings are taken and adjusted on two uncoated sample pieces of test material, of two different and known thicknesses. Once the second thickness has been entered and confirmed, the derived sound-velocity is displayed. |

## 7 CALIBRATION METHODS (continued)

| TABLE 3: CALIBRATION METHODS | | |
|---|---|---|
| **Calibration Method** | **Icon** | **Description** |
| Material[c] |  | Calibration using the sound-velocity of a material, selected from a pre-defined list of materials stored in the gauge. |
| Velocity[c] |  | Calibration using the known sound-velocity of the material under test. |
| Thickness Set |  | For use in 'Velocity Mode' - see Section 4.6 'Selecting the Measurement Mode' on page 8 - calibration is performed using the known thickness of the material under test. |
| Factory Calibration |  | Calibration using the default factory calibration of the standard sound-velocity for steel, 5920m/s (approximately 0.233in/µs). |

## 8 CALIBRATING YOUR GAUGE

### 8.1 USING 1 POINT CALIBRATION

This procedure requires an uncoated sample piece of the material being measured, the exact thickness of which is known (from having been measured by some other means) or a calibration standard - see Section 17.2 'Calibration Standards' on page 33.

1 Plug the transducer into the gauge ensuring that the connector is fully engaged.
   - The wearface of the transducer should be clean and free of any debris.
2 Press the On/Off button to switch the gauge on.
3 Press Menu/Calibration/Cal Method and select '1 Point'.
   - If '1 Point' is already selected - the calibration method currently selected is indicated by the icon to the right of the display - simply press Menu/Calibration/Calibrate.
4 The user will be prompted to perform a 'Zero Set' to set the zero point of the transducer, which is recommended before calibrating the gauge - see Section 6 'Setting the Zero Point' on page 12.
5 When prompted, apply couplant to the uncoated sample or calibration standard.

[c] 'Material' and 'Velocity' calibration methods are useful when uncoated sample test pieces are not available.

## 8 CALIBRATING YOUR GAUGE (continued)



6 Press the transducer on to the uncoated sample or calibration standard, making sure it is flat against the surface.
- The display will show a thickness value which is constantly updating. The stability of the reading is indicated on the stability bar to the right of the display. A valid reading has a stability of 5 or more.

7 Remove the transducer from the uncoated sample or calibration standard. The last reading is held on screen. If not representative, repeat Steps 5-6.
- Excessive use of couplant can result in a distorted reading when the transducer is removed from the surface.

8 Press 'Adjust' and using the ↑↓ softkeys, adjust the reading to the known thickness value, followed by 'Set' to set the value.
- Pressing 'Escape' at any time will exit the calibration procedure without calibrating the gauge.
- The derived sound-velocity will be displayed to the right of the display, below the calibration method icon.

*Note: One point calibration must be performed on material with the paint or coating removed. Failure to remove the paint or coating prior to calibration will result in inaccurate readings.*

### 8.2 USING 2 POINT CALIBRATION

This procedure requires two uncoated sample pieces of different known thicknesses (from having been measured by some other means) of the material under test, which are representative of the range being measured, or two calibration standards - see Section 17.2 'Calibration Standards' on page 33.

1 Plug the transducer into the gauge ensuring that the connector is fully engaged.
- The wearface of the transducer should be clean and free of any debris.

2 Press the On/Off button to switch the gauge on.

3 Press Menu/Calibration/Cal Method and select '2 Point'.
- If '2 Point' is already selected - the calibration method currently selected is indicated by the icon to the right of the display - simply press Menu/Calibration/Calibrate.

4 When prompted, apply couplant to the first uncoated sample or calibration standard.

5 Press the transducer on to the uncoated sample or calibration standard, making sure it is flat against the surface.
- The display will show a thickness value which is constantly updating. The stability of the reading is indicated on the stability bar to the right of the display. A valid reading has a stability of 5 or more.

## 8 CALIBRATING YOUR GAUGE (continued)

6 Remove the transducer from the uncoated sample or calibration standard. The last reading is held on screen. If not representative, repeat Steps 4-5.
- Excessive use of couplant can result in a distorted reading when the transducer is removed from the surface.

7 Press ‘Adjust’ and using the ↑↓ softkeys, adjust the reading to the known thickness value, followed by ‘Set’ to set the value.

8 Repeat Steps 4-7 using the second uncoated sample or calibration standard.
- Pressing ‘Escape’ at any time will exit the calibration procedure without calibrating the gauge.
- The derived sound-velocity will be displayed to the right of the display, below the calibration method icon.

*Note: Two point calibration must be performed on material with the paint or coating removed. Failure to remove the paint or coating prior to calibration will result in inaccurate readings.*

### 8.3 USING MATERIAL CALIBRATION

The gauge is calibrated using the known sound-velocity of a material as selected by the user from a pre-defined list stored in the gauge. This calibration method is useful if uncoated sample test pieces of known thicknesses are not available.

1 Press the On/Off button to switch the gauge on.

2 Press Menu/Calibration/Cal Method and select ‘Material’.
- If ‘Material’ is already selected - the calibration method currently selected is indicated by the icon to the right of the display - simply press Menu/Calibration/Calibrate.

3 Use the ↑↓ softkeys to highlight the required material followed by ‘Select’.
- Pressing ‘Escape’ at any time will exit the calibration procedure without calibrating the gauge.
- The sound-velocity of the material selected will be displayed to the right of the display, below the calibration method icon.

## 8.4 USING VELOCITY CALIBRATION

To calibrate the gauge using this method, the user must know the sound-velocity of the test material. This calibration method is useful if uncoated sample test pieces of known thicknesses are not available.

1 Press the On/Off button to switch the gauge on.
2 Press Menu/Calibration/Cal Method and select 'Velocity'.
- If 'Velocity' is already selected - the calibration method currently selected is indicated by the icon to the right of the display - simply press Menu/Calibration/Calibrate.

3 Enter the known sound-velocity using the ↑↓ softkeys to select 0 to 9 and the ➔ softkey to move to the next digit, followed by 'Set' to use the value entered.
- Pressing 'Escape' at any time will exit the calibration procedure without calibrating the gauge.
- The sound-velocity entered will be displayed to the right of the display, below the calibration method icon.

## 8.5 USING THICKNESS SET CALIBRATION

Only available when in 'Velocity Mode' - see Section 4.6 'Selecting the Measurement Mode' on page 8 - to calibrate the gauge using this method, the thickness of the test material must be known.

1 Press the On/Off button to switch the gauge on.
2 Press Menu/Calibration/Cal Method and select 'Thickness Set'.
- If 'Thickness Set' is already selected - the calibration method currently selected is indicated by the icon to the right of the display - simply press Menu/Calibration/Calibrate.

3 The user will be prompted to perform a 'Zero Set' to set the zero point of the transducer, which is recommended before calibrating the gauge - see Section 6 'Setting the Zero Point' on page 12.
4 Enter the known material thickness using the ↑↓ softkeys to select 0 to 9 and the ➔ softkey to move to the next digit, followed by 'Set' to use the value entered.
- Pressing 'Escape' at any time will exit the calibration procedure without calibrating the gauge.
- The material thickness entered will be displayed to the right of the display, below the calibration method icon.

# 8 CALIBRATING YOUR GAUGE (continued)

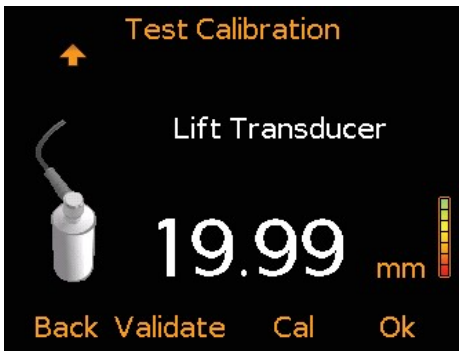
## 8.6 USING FACTORY CALIBRATION

Press Menu/Calibration/Factory Calibration to restore the default factory calibration setting of the standard sound-velocity for steel, 5920m/s (approximately 0.233in/µs).

## 8.7 TEST CALIBRATION

This feature allows the user to test the calibration by taking a reading on an uncoated sample of material of known thickness, without the reading being saved.

**To test the calibration:**




1 Press Menu/Calibration/Test Calibration.

2 When prompted, apply couplant to the uncoated sample.

3 Press the transducer on to the uncoated sample, making sure it is flat against the surface.

- The display will show a thickness value which is constantly updating. The stability of the reading is indicated on the stability bar to the right of the display. A valid reading has a stability of 5 or more.

4 Remove the transducer from the uncoated sample. The last reading is held on screen. If not representative, repeat Steps 2-3.

- Excessive use of couplant can result in a distorted reading when the transducer is removed from the surface.

5 Press ‘Validate’ to retain the existing calibration but refresh the associated time and date of calibration to the current time and date, ‘Cal’ to re-calibrate the gauge or ‘Ok’ to exit the test calibration procedure.

## 8.8 CALIBRATION CHECK

When enabled, this feature warns the user as readings are taken, of any which are outside the values at which the gauge was initially calibrated.


When a reading is 10% or more below the lower calibration value or exceeds 10% above the higher calibration value, the alarm sounds, the red LED flashes and the calibration icon turns red.

## 8 CALIBRATING YOUR GAUGE (continued)



**To enable and disable calibration check:**

1 Press Menu/Calibration.
2 Use the ↑↓ softkeys to highlight ‘Calibration Check’ and press ‘Select’.
3 To disable, press ‘Select’ again to un-check the ‘Calibration Check’ radio button.

### 8.9 LOCKING THE CALIBRATION

Using the ‘PIN Lock’ feature, the calibration settings can be ‘locked’, preventing the user from making any changes to the calibration without first disabling PIN lock.

Users can still test the calibration via Menu/Calibration/Test Calibration when ‘PIN Lock’ is enabled, but are unable to validate or re-calibrate the gauge.

For more information on ‘PIN Lock’, see Section 9 ‘PIN Lock’ on page 20.

### 8.10 CALIBRATION MEMORIES - MTG8

Up to three calibrations can be saved in the gauge memory. Once saved, the user can select the calibration memory - without the need to re-calibrate the gauge.

**To save a calibration into memory:**

1 Press Menu/Calibration/Cal Memory n, where n = 1, 2 or 3.
2 Use the ↑↓ softkeys to highlight ‘Cal Method’ then press ‘Select’.
3 Use the ↑↓ softkeys to highlight the required calibration method and follow the on-screen instructions to calibrate the gauge.
4 The calibration will be stored in the gauge memory as Cal Memory n, where n = 1, 2 or 3.

To rename a calibration memory, press Menu/Calibration/ Cal Memory n/Rename Cal Memory n.

To view the calibration memory data, press Menu/Calibration/ Cal Memory n/View Calibration Data.

## 9 PIN LOCK

The ‘PIN Lock’ feature prevents the user from accidentally adjusting the gauge settings.

**To set a PIN code:**

1 Press Menu/Setup/PIN Lock.
2 Set the four digit PIN code using the ↑↓ softkeys to select 0 to 9 and the ➔ softkey to move to the next digit[d].
3 Press ‘Ok’ to set, ‘Escape’ to cancel or ‘Adjust’ to amend the PIN code.


When enabled, the following features are disabled and can not be adjusted:

Menu/Limit Memories/Create Limit Memory
Menu/Limit Memories/Edit Limit Memory
Menu/Calibration/Calibrate
Menu/Calibration/Cal Method
Menu/Calibration/Cal Memory
Menu/Calibration/Factory Calibration
Menu/Calibration/Zero Set
Menu/Reset
Menu/Setup/Reading/Measurement Mode
Batch/New Batch/Batch Measurement Mode
Batch/New Batch/Batch Calibration
Batch/New Batch/Batch Limits/Create Limit Memory
Batch/Edit Batch/Delete Batch
Batch/Deleted Reading

**To unlock the PIN code:**

1 Press Menu/Setup/PIN Lock.
2 Enter the four digit PIN code using the ↑↓ softkeys to select 0 to 9 and the ➔ softkey to move to the next digit[d].
3 Press ‘Ok’ or ‘Escape’ to cancel.

*Note: Should the user forget or lose the PIN code, it can be disabled via ElcoMaster®. Using the USB cable supplied, simply connect the gauge to a PC with ElcoMaster® version 2.0.47 or higher installed and select Edit/Clear PIN.*

[d] The ➔ softkey will appear when the first ‘X’ is changed to a number.

# 10 TAKING A READING



## 10.1 BEFORE YOU START

1 Press the On/Off button to switch the gauge on.

2 Connect a transducer to the gauge.

- All dual element transducers which can be connected directly to the base of an MTG gauge - see Section 17.1 ‘Transducers’ on page 31 - are ‘intelligent’ transducers and will be identified automatically by the gauge. If using other Elcometer ‘non-intelligent’ dual element transducers or other manufacturers’ transducers, a transducer adaptor is required - see Section 17.4 ‘Transducer Adaptor’ on page 35.

3 Select the measurement mode - see Section 4.6 on page 8.

4 Set the zero point of the transducer - see Section 6 on page 12.

5 Calibrate the gauge - see Section 8 on page 14.

6 Prepare the test surface - see Appendix 1 on page 38.

## 10.2 TAKING A READING IN STANDARD MODE

1 Apply a small amount of couplant to the test surface.

2 Press the transducer into the couplant, making sure it is flat against the surface.

- Moderate pressure on the top of the transducer using the thumb or index finger is sufficient; it is only necessary to keep the transducer stationary and seated flat against the surface of the material.

3 The display will show a value which is constantly updating. The gauge will take 4, 8 or 16 readings per second as selected by the user via Menu/Setup/Reading/Reading Rate.

- The stability of the reading is indicated on the stability bar to the right of the display. A valid reading has a stability of 5 or more. If the stability indicator has fewer than 5 bars showing or the numbers on the display seem erratic, make sure there is an adequate film of couplant beneath the transducer, and that the transducer is seated flat against the material. If the condition persists, it may be necessary to select a different transducer (size or frequency) for the material being measured.

4 Press ‘Save’ to store the current reading in the gauge or batch memory.

5 Remove the transducer from the surface.

## 10 TAKING A READING (continued)



### 10.3 TAKING A READING IN SCAN MODE

Scan mode allows measurements to be taken over a large surface by sliding the transducer across the area under test. The gauge takes readings at a rate of 16 Hz (16 readings per second) and at the end of each scan, the average, lowest and highest readings are displayed and can be saved in the gauge or batch memory.

1 Enable ‘Scan Mode’ via Menu/Setup/Reading/Scan Mode.
2 Apply a small amount of couplant to the test surface.
3 Press the transducer into the couplant, making sure it is flat against the surface.
   - Moderate pressure on the top of the transducer using the thumb or index finger is sufficient; it is only necessary to keep the transducer stationary and seated flat against the surface of the material.
4 Press ‘Start’ to begin the scan and slide the transducer over the test surface.
5 The display will show a value which is constantly updating.
   - The stability of the reading is indicated on the stability bar to the right of the display. A valid reading has a stability of 5 or more. If the stability indicator has fewer than 5 bars showing or the numbers on the display seem erratic, make sure there is an adequate film of couplant beneath the transducer, and that the transducer is seated flat against the material. If the condition persists, it may be necessary to select a different transducer (size or frequency) for the material being measured.
6 Press ‘Stop’ to stop taking readings and complete the scan.
   - If the scan is interrupted due to lack of couplant beneath the transducer for example, the scan is paused until a good signal is received or ‘Stop’ is pressed.
7 The scanned lowest, average and highest reading will be displayed on screen. Press ‘Save’ to store the scanned readings into the gauge or batch memory. Press ‘Clear’ to disregard the last scan and start again.
8 Remove the transducer from the surface.

## 11 BATCHING



The MTG6 has a single batch memory which can store up to 1,500 readings whilst the MTG8 can store 100,000 readings in up to 1,000 batches. The following batch functions are available:

- **Batch/New Batch;** Creates a new sequential or grid batch (MTG8 only) - see Section 11.1 ‘Creating a New Batch’ on page 24.
- **Batch/New Batch/Fixed Batch Size (MTG8 only);** Pre-define the number of readings which are stored in a batch. The gauge will notify the user when a batch is complete and ask if another batch is to be opened. These batches are then linked when transferred to ElcoMaster®. This feature is only available in sequential batching - see Section 11.1 ‘Creating a New Batch’ on page 24.
- **Batch/Open Existing Batch;** Open an existing batch.
- **Batch/Review Batch**; Review the readings, statistics, batch information, calibration and limit information and a graph of all readings (MTG8 only) - see Section 12 ‘Reviewing Batch Data’ on page 25.
- **Batch/Copy Batch (MTG8 only)**; Copy a batch including the batch header information, calibration and limit information.
- **Batch/Edit Batch/Rename Batch**; Rename an existing batch.
- **Batch/Edit Batch/Clear Batch**; Clear all readings within a batch - but leaving all batch header information.
- **Batch/Edit Batch/Delete Batch**; Delete a single batch or all batches entirely from the gauge.
- **Batch/Deleted Reading/Delete Without Tag**; Delete the last reading entirely.
- **Batch/Deleted Reading/Delete With Tag**; Delete the last reading but mark it as deleted in the batch memory.

## 11 BATCHING (continued)



### 11.1 CREATING A NEW BATCH

Users can create a sequential batch (MTG6 & MTG8) or a grid batch (MTG8 only):

- **Sequential batching;** list based storage of readings.
- **Grid batching**; readings are taken and stored in a grid / table format. The user defines the number of rows and columns and the direction in which readings are taken and stored.

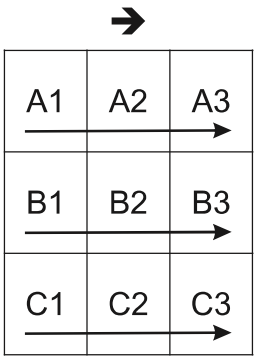
**To create a new sequential batch:**

1 Press Batch/New Batch/Batch Type.
2 Use the ↑↓ sofkeys to highlight 'Sequential' and press 'Select'.

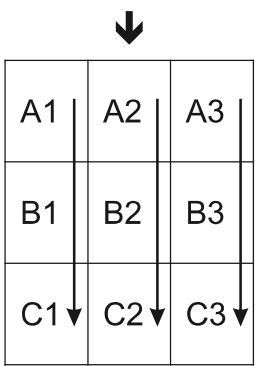
**To create a new grid batch (MTG8 only):**

1 Press Batch/New Batch/Batch Type.
2 Use the ↑↓ sofkeys to highlight 'Grid' and press 'Select'.
3 Use the ↑↓ sofkeys to highlight 'Increment Direction' and press 'Select' to toggle between across columns (➔) or down rows (🡻).
4 Use the ↑↓ softkeys to highlight 'Number Of Rows', press 'Select' then use the ↑↓ softkeys to enter the number of rows required and press 'Ok'.
5 Use the ↑↓ softkeys to highlight 'Number Of Columns', press 'Select' then use the ↑↓ softkeys to enter the number of columns required and press 'Ok'.
   - The maximum number of columns available is dependent on the number of rows selected and vice versa.

For example:




a) Increment Direction = Across,
Number Of Rows = 3,
Number Of Columns = 3.
The first reading will be saved in cell A1, the second A2, the third A3, the fourth B1 and so on.



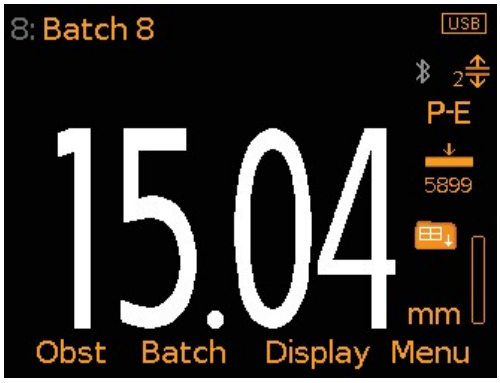

b) Increment Direction = Down,
Number Of Rows = 3,
Number Of Columns = 3.
The first reading will be saved in cell A1, the second B1, the third C1, the fourth A2 and so on.

## 11 BATCHING (continued)



The batch settings are saved in the batch header and can be viewed at any time via Batch/Review Batch/Batch Information.

The grid / table is a template of the measurement area and where each reading is to be taken. If for any reason a reading cannot be taken in a particular location, due to a steel girder for example, the 'Obst' softkey can be used. When the transducer is removed from the surface, the 'Save' softkey changes to 'Obst'. Pressing 'Obst' records that a reading could not be taken.

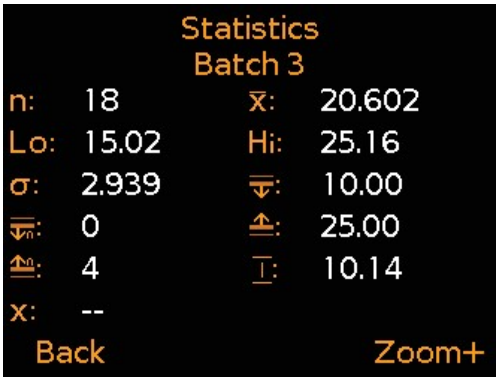



*Note: The number of readings within the batch includes those recorded as 'Obst' however, 'Obst' readings are not included in statistics calculations.*

## 12 REVIEWING BATCH DATA

### 12.1 BATCH STATISTICS (Batch/Review Batch/Statistics)

Displays statistical information for the batch including:




- Number of readings in the batch (n:)
- Average reading for the batch (X̄:)
- Lowest reading in the batch (Lo:)
- Highest reading in the batch (Hi:)
- Nominal value (x:)
- Range ( T̄: ); the difference between the highest and lowest reading in the batch
- Standard Deviation (σ:)
- Low limit value ( T̄: ) - if set - and the number of readings below the low limit ( T̄n: )
- High limit value ( T̄: ) - if set - and the number of readings above the high limit ( T̄n: )

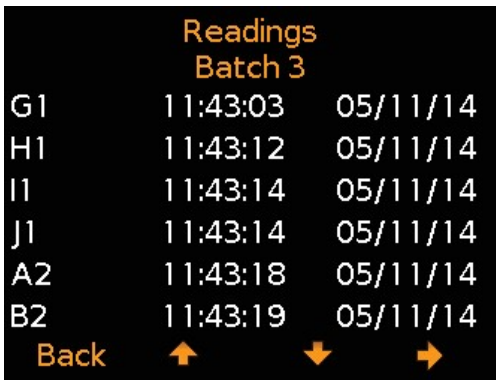
# 12 REVIEWING BATCH DATA (continued)



## 12.2 BATCH READINGS (Batch/Review Batch/Readings)

Displays the reading value together with date and time stamp for each individual reading in the batch and the cell reference (A1, B3, etc) where the measurement was taken (for grid type batches).


Press the ↑↓ softkeys to scroll through the readings and ➔ to move to the next information screen.

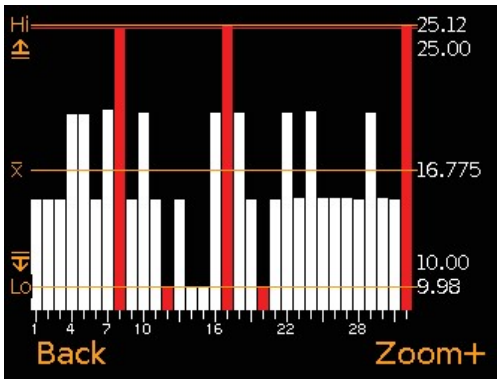



Readings outside any enabled limits for the batch are displayed in red with the appropriate limit icon to the left of the reading, (⊼) if the reading is below the low limit and (⊻) if above the high limit.

## 12.3 BATCH GRAPH (Batch/Review Batch/Batch Graph)

Allows the users to view the readings within the batch as a column bar graph. Up to five horizontal axes as displayed representing different values / statistics as follows:

- Highest reading in the batch[e] (Hi:)
- Lowest reading in the batch[e] (Lo:)
- Average reading for the batch[e] ($\overline{X}$:)
- Low Limit (⊼:); *when set and enabled*
- High Limit (⊻:); *when set and enabled*



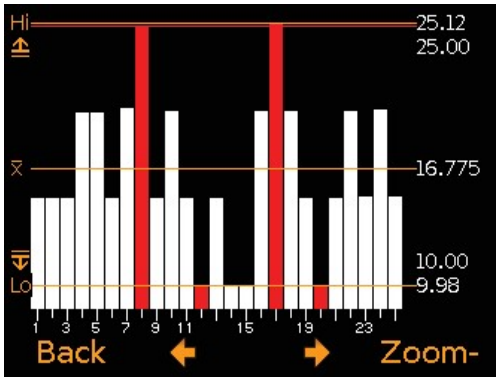

[e] For batches of more than one reading.

## 12 REVIEWING BATCH DATA (continued)

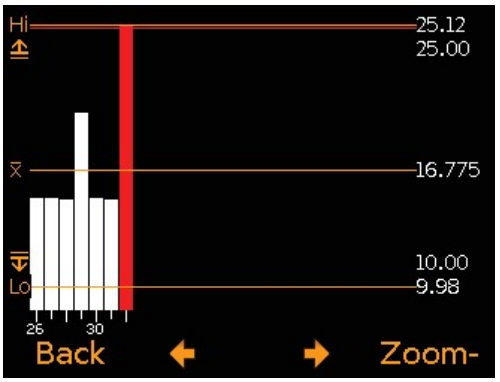


If limits were not set and enabled, the readings are displayed as white vertical bars. If limits were set and enabled, readings are displayed as white bars if within set limits or red; if outside set limits.

If there are more readings in the batch than can be displayed on a single screen, multiple readings will be combined into one bar. Should a single reading within the 'combined bar' be outside set limits, the whole bar will be red.




Pressing the 'Zoom+' softkey, allows each individual reading to be displayed, thereby showing the individual readings outside the set limits.

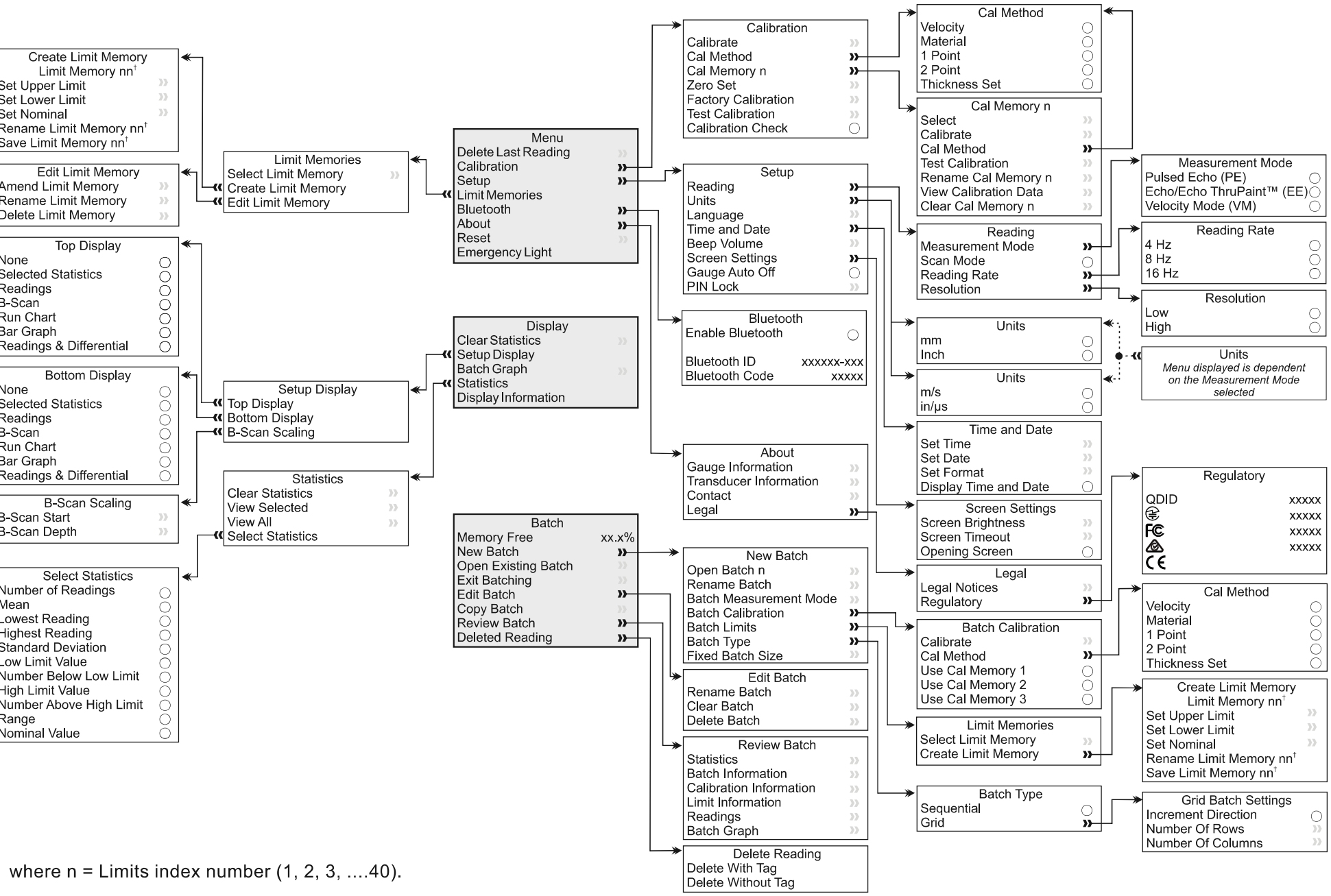



When zoomed in, the graph will always display the first 25 readings. Pressing the ← softkey will display the last 25 readings in the batch.

Subsequent presses of the ← softkey will scroll backwards, pressing the → softkey will scroll forwards through the readings, 25 readings at a time.

Pressing the 'Zoom-' softkey returns to the original overview graph of all readings in the batch.

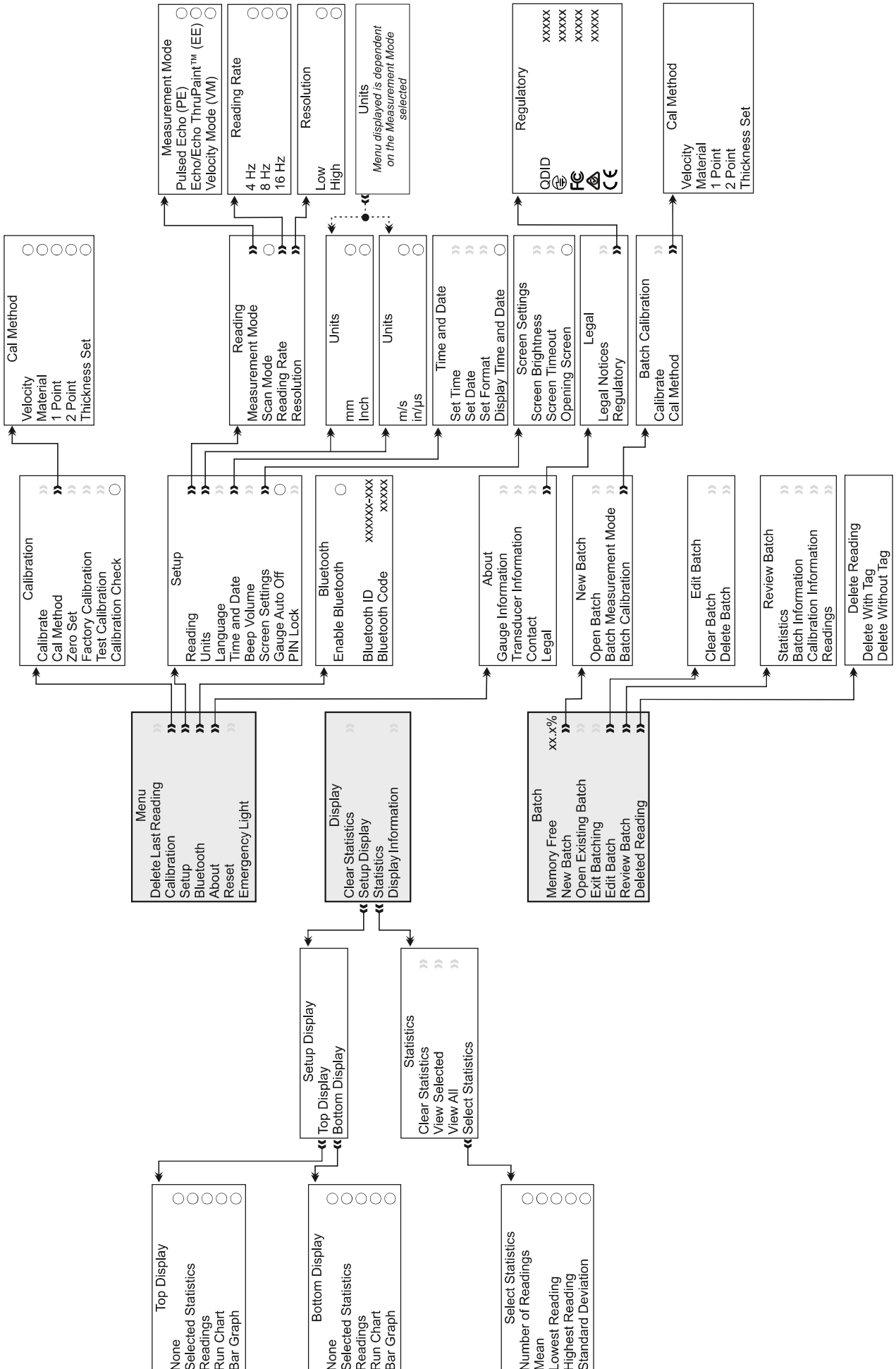
Pressing the 'Back' softkey returns the gauge to the Batch/Review Batch menu.




where n = Limits index number (1, 2, 3, ....40).

# 14 MENU STRUCTURE - MTG6





# 15 DOWNLOADING DATA



## 15.1 USING ELCOMASTER® ON A PC

Using ElcoMaster® - supplied with each gauge and available as a free download at elcometer.com - gauges can transmit readings to a PC for archiving and report generation. Data can be transferred via USB or Bluetooth®. For more information on ElcoMaster® visit www.elcometer.com

## 15.2 USING ELCOMASTER® MOBILE APPS

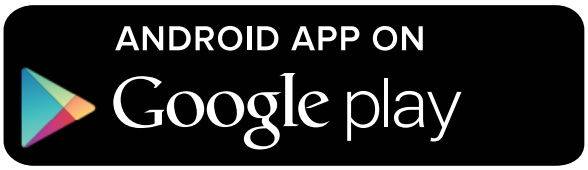
Ideal when out in the field or on-site, using the ElcoMaster® Android™ or iOS Mobile App users can:

- Store live readings directly on to a mobile device and save them into batches together with GPS coordinates.
- Add photographs of the test surface.
- Map readings on to a map, photograph or diagram.
- Inspection data can be transferred from mobile to PC for further analysis and reporting.

For more information on ElcoMaster® Mobile Apps visit www.elcometer.com

## 15 DOWNLOADING DATA (continued)






Compatible with smart phones and tablets running Android 2.1 or above. To install, download via www.elcometer.com or using the Google Play™ Store app, and follow the on screen instructions.


Made for iPhone 6 Plus, iPhone 6, iPhone 5s, iPhone 5c, iPhone 5, iPhone 4s, iPhone 4, iPad Air 2, iPad mini 3, iPad Air, iPad mini 2, iPad (3rd and 4th generation), iPad mini, iPad 2, and iPod touch (4th and 5th generation). To install, download via www.elcometer.com or the App Store, and follow the on screen instructions.

## 16 UPGRADING YOUR GAUGE

Gauge firmware can be upgraded to the latest version by the user via ElcoMaster®, as it becomes available. ElcoMaster® will inform the user of any updates when the gauge is connected to the PC with an internet connection.

## 17 SPARES & ACCESSORIES

### 17.1 TRANSDUCERS

The transducers listed are compatible with the MTG product range.

They are potted - the transducer cable is permanently fixed to the transducer head - right angle, dual element, ‘intelligent’ transducers. When connected, the transducer frequency and diameter will be automatically identified by the gauge.

Details of the transducer connected an be viewed at any time via Menu/About/Transducer Information.

The MTG6 & 8 are supplied as a gauge only or complete with 5MHz 1/4" Potted Right Angle Dual Element Transducer.

## 17 SPARES & ACCESSORIES (continued)



When choosing a transducer, the frequency, diameter and material under test should be considered.

| Part Number | Frequency | Diameter | Suitable for Measuring | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | C/I | P | T/P | G/F | T/G | S | G | A | T |
| TXC1M00EP-2 | 1.0MHz | 1/2" | ✓ | ✓ | | ✓ | | | | | |
| TXC2M25CP-2 | 2.25MHz | 1/4" | ✓ | ✓ | | | ✓ | | | | |
| TXC2M25EP-2 | 2.25MHz | 1/2" | ✓ | ✓ | | | ✓ | | | | |
| TXC3M50EP-1† | 3.5MHz | 1/2" | ✓ | ✓ | | | ✓ | | | | |
| TXC5M00BP-4† | 5.0MHz | 3/16" | | | ✓ | | | ✓ | ✓ | | |
| TXC5M00EP-3 | 5.0MHz | 1/2" | | | ✓ | | | ✓ | ✓ | | |
| TXC5M00EP-4† | 5.0MHz | 1/2" | | | ✓ | | | ✓ | ✓ | | |
| TXC5M00CP-4 | 5.0MHz | 1/4" | | | ✓ | | | ✓ | ✓ | | |
| TXC5M00CP-6† | 5.0MHz | 1/4" | | | ✓ | | | ✓ | ✓ | | |
| TXC5M00CP-8# | 5.0MHz | 1/4" | | | ✓ | | | ✓ | ✓ | | |
| TXC7M50BP-3† | 7.5MHz | 3/16" | | | ✓ | | | ✓ | ✓ | ✓ | |
| TXC7M50CP-4‡ | 7.5MHz | 1/4" | | | ✓ | | | ✓ | ✓ | ✓ | |
| TXC7M50CP-5† | 7.5MHz | 1/4" | | | ✓ | | | ✓ | ✓ | ✓ | |
| TXC10M0BP-1 | 10.0MHz | 3/16" | | | | | | ✓ | | ✓ | ✓ |
| TXC10M0CP-4 | 10.0MHz | 1/4" | | | | | | ✓ | | ✓ | ✓ |

Key

C/I = Cast Iron
P = Plastics
T/P = Thin Plastics
G/F = Glass Fibre
T/G = Thin Glass Fibre
S = Steel
G = Glass
A = Aluminium
T = Titanium

† Coating thickness, high damped transducer utilising ThruPaint™ technology. Suitable for use with 'Echo-Echo ThruPaint™' measurement mode only - see Section 4.6 'Selecting the Measurement Mode' on page 8.

# High temperature transducer, suitable for measuring hot surfaces up to 343°C (650°F).

‡ Extra resolution transducer with increased near surface resolution, ideal for use on thin substrates.

Other transducers are available which can be connected to MTG gauges using a transducer adaptor - see Section 17.4 'Transducer Adaptor' on page 35. For a complete list of transducers, visit elcometerndt.com

## 17.2 CALIBRATION STANDARDS

Available as a set or individually, allowing users to select the most appropriate thicknesses for their application, Elcometer calibration standards are manufactured from 4340 steel[f] to a tolerance of ±0.1% of the nominal thickness.


Calibration standard sets and individual standards are supplied complete with calibration certificate.

| Description | Sales Part Number |
|---|---|
| Calibration Standard Set;<br>Nominal Thickness: 2 - 30mm (0.08 - 1.18")[g]<br>*Comprising of nominal thicknesses; 2, 5, 10, 15, 20, 25 & 30mm (0.08, 0.20, 0.39, 0.59, 0.79, 0.98 & 1.18")[g], complete with holder and calibration certificate.* | T920CALSTD-SET1 |
| Calibration Standard Set;<br>Nominal Thickness: 40 - 100mm (1.57 - 3.94")[g]<br>*Comprising of nominal thicknesses; 40, 50, 60, 70, 80, 90 & 100mm (1.57, 1.97, 2.36, 2.76, 3.15, 3.54 & 3.94")[g], complete with holder and calibration certificate.* | T920CALSTD-SET2 |
| Calibration Standard Holder<br>*for thicknesses up to 100mm (3.94")[g]* | T920CALSTD-HLD |

*Note: Elcometer recommends that Calibration Standards are wrapped in anti-corrosion film when not in use.*

[f] Calibration standards manufactured in other materials are available on request. Contact Elcometer for further information.
[g] Imperial values for information purposes only. Calibration standards are manufactured and measured in millimetres.

## 17 SPARES & ACCESSORIES (continued)



| INDIVIDUAL CALIBRATION STANDARDS | | | | | |
|---|---|---|---|---|---|
| Part Number | Nominal Thickness | | Part Number | Nominal Thickness | |
| | mm | inch[g] | | mm | inch[g] |
| T920CALSTD-2 | 2 | 0.08 | T920CALSTD-40 | 40 | 1.57 |
| T920CALSTD-5 | 5 | 0.20 | T920CALSTD-50 | 50 | 1.97 |
| T920CALSTD-10 | 10 | 0.39 | T920CALSTD-60 | 60 | 2.36 |
| T920CALSTD-15 | 15 | 0.59 | T920CALSTD-70 | 70 | 2.76 |
| T920CALSTD-20 | 20 | 0.79 | T920CALSTD-80 | 80 | 3.15 |
| T920CALSTD-25 | 25 | 0.98 | T920CALSTD-90 | 90 | 3.54 |
| T920CALSTD-30 | 30 | 1.18 | T920CALSTD-100 | 100 | 3.94 |

*Note: Elcometer recommends that Calibration Standards are wrapped in anti-corrosion film when not in use.*

### 17.3 ULTRASONIC COUPLANT

For the gauge to work correctly, there must be no air gap between the transducer and the surface of the material being measured. This is achieved by using a couplant.

A 120ml (4fl oz) bottle of couplant is supplied as standard with each gauge, other sizes are available to purchase separately.


| Description | Sales Part Number |
|---|---|
| Ultrasonic Couplant; 120ml (4fl oz) | T92015701 |
| Ultrasonic Couplant; 300ml (10fl oz) | T92024034-7 |
| Ultrasonic Couplant; 500ml (17fl oz) | T92024034-8 |
| Ultrasonic Couplant; 3.8l (1 US Gallon) | T92024034-3 |
| Ultrasonic Couplant - High Temperature; 60ml (2fl oz) | T92024034-9 |

*For use with high temperature transducers up to 510°C (950°F) - see Section 17.1 'Transducers' on page 31.*

[g] Imperial values for information purposes only. Calibration standards are manufactured and measured in millimetres.

## 17 SPARES & ACCESSORIES (continued)



### 17.4 TRANSDUCER ADAPTOR

This adaptor allows dual element, ‘non-intelligent’ transducers from Elcometer - see Section 17.1 ‘Transducers’ on page 31 - and other manufacturers’ transducers with Lemo connectors, to be used with the MTG product range.

Simply plug the adaptor into the transducer connection point at the base of the gauge to connect any ‘non-intelligent’, dual element transducer and follow the on-screen instructions.

| Description | Sales Part Number |
|---|---|
| Dual Element Transducer Adaptor | T92024911 |

## 18 WARRANTY STATEMENT

MTG gauges are supplied with a 12 month warranty against manufacturing defects, excluding contamination and wear. The warranty can be extended to two years within 60 days of purchase via www.elcometer.com.

Transducers are supplied with a 90 day warranty.

## 19 TECHNICAL SPECIFICATION

| Model | MTG6 | MTG8 |
|---|---|---|
| **Thickness Range**[b] | Pulsed Echo: 0.63 - 500mm (0.025 - 20")<br>Echo-Echo ThruPaint™: 5.00 - 25.40mm (0.200 - 1") | |
| **Velocity Range** | 1250 - 10,000m/s (0.0492 - 0.3937in/µs) | |
| **Accuracy** | ±1% or 0.05mm, whichever is the greater<br>(±1% or 0.002", whichever is the greater) | |
| **Resolution** | 0.1mm (0.01") or 0.01mm (0.001") switchable | |
| **Measurement Rate** | 4 Hz (4 readings per second)<br>8 Hz (8 readings per second)<br>16 Hz (16 readings per second) | |
| **Gauge Memory** | Single batch of up to 1,500 readings | 100,000 readings in up to 1,000 batches |
| **Operating Temperature** | -10 to 50°C (14 to 122°F) | |
| **Power Supply** | 2 x AA batteries | |
| **Battery Life**[h] | Alkaline: Approximately 15 hours<br>Lithium: Approximately 28 hours | |
| **Gauge Weight** | 210g (7.4oz) - including batteries, without transducer | |
| **Gauge Dimensions** | 145 x 73 x 37mm (5.7 x 2.87 x 1.46") - without transducer | |
| Can be used in accordance with: ASTM E 797, EN 14127, EN 15317 | | |

[b] Thickness range is dependent on the material being measured and the transducer used.
[h] When in continuous reading mode at a reading rate of 4 Hz. Rechargeable batteries may differ.

# 20 LEGAL NOTICES & REGULATORY INFORMATION



The Elcometer MTG6 & MTG8 meet the Radio and Telecommunications Terminal Equipment Directive.

The USB is for data transfer only and is not to be connected to the mains via a USB mains adapter.

The ACMA compliance mark can be accessed via: Menu/About/Legal/Regulatory

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Giteki mark, its ordinance number, the FCC ID and Bluetooth SIG QDID can be accessed via: Menu/About/Legal/Regulatory

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

-- Consult the dealer or an experienced radio/TV technician for help.

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Modifications not expressly approved by Elcometer Limited could void the user's authority to operate the equipment under FCC rules.

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This Class B digital apparatus complies with Canadian ICES-003.



Made for iPhone 6 Plus, iPhone 6, iPhone 5s, iPhone 5c, iPhone 5, iPhone 4s, iPhone 4, iPad Air 2, iPad mini 3, iPad Air, iPad mini 2, iPad (3rd and 4th generation), iPad mini, iPad 2, and iPod touch (4th and 5th generation).

“Made for iPod,” ”Made for iPhone,” and “Made for iPad” mean that an electronic accessory has been designed to connect specifically to iPod, iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPod, iPhone, or iPad may affect wireless performance.

# 21 APPENDIX 1: PREPARING THE TEST SURFACE



The shape and roughness of the test surface are of paramount importance when carrying out ultrasonic thickness testing. Rough, uneven surfaces may limit the penetration of ultrasound through the material and result in unstable, and therefore unreliable measurements.

The surface being measured should be clean, and free of any small particles, rust or scale. The presence of such obstructions will prevent the transducer from seating properly against the surface.

Often, a wire brush or scraper will be helpful in cleaning surfaces. In more extreme cases, a rotary sander or grinding wheels may be used, though care must be taken to prevent surface gouging, which will inhibit proper transducer coupling.

Extremely rough surfaces, such as the pebble-like finish of some cast iron, will prove most difficult to measure. These kinds of surfaces act on the sound beam like frosted glass acts on light, the beam becomes diffused and scattered in all directions.

In addition to posing obstacles to measurement, rough surfaces contribute to excessive wear of the transducer, particularly in situations where the transducer is ‘scrubbed’ along the surface.