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Concrete Inspection & Metal Detection

Concrete Inspection & Metal Detection



A covermeter, or rebar locator, is a gauge that measures the thickness of concrete cover over steel reinforcement bars and metal pipes. The covermeter can tell you the depth of the rebar, the location and orientation of reinforcement bar (rebar) and determine the diameter of the rebar.

A rebar locator is used to determine the presence and orientation of steel reinforcement rebars under the surface of the concrete.

A contractor engaged in maintenance work will be familiar with the problem of accurately locating the exact position of rebar, wall ties, studs and other metal fasteners. These low cost, simple to use gauges can meet their everyday requirements.

Test hammers are used to determine the surface hardness of concrete and are one of the most widely used instruments to assess concrete compressive strength. It is the quickest, simplest and least expensive method to obtain an estimate of the quality and strength of the concrete.

Test Hammers with both analogue and digital displays are available.

Many concrete structures have a protective or cosmetic coating. Premature failure of this coating can, at the very least, result in additional costs of rework.

Adhesion tests verify that both surface preparation and coating application are within specification.

Concrete structures are porous and will absorb moisture, our range of moisture meters and climate monitoring gauges allows moisture content to be measured.

The range also includes gauges used for the measurement of crack width in concrete and other structures.

The Elcometer Metal Detection range includes Valve Box Locators that are rugged and simple to use making them the ideal choice for all location work in all types of terrain.

Analogue Concrete Test Hammer

The concrete test hammer provides a quick, simple and inexpensive method for non-destructive evaluation of concrete compression strength and other masonry materials. Concrete test hammers are one of the most widely used instruments in the field of non-destructive testing.

This gauge consists of a spring loaded plunger which, when released, strikes the surface with fixed and constant impact energy. During the rebound stroke, the mass moves a pointer that indicates the maximum point of return and at the same time indicates a reference value called Rebound Number.

This number, converted by the correlations available on the hammer, gives the compression resistance value in respect of the impact angle.

Key Features:

- Impact Energy 2.207Nm
- Supplied with grinding stone to prepare test surface
- Aluminium body
- · Rebound value indicated on test hammer
- · Rebound value chart on body, for quick calculation of compressive strength
- · Curve selection on chart dependant on testing angle

Elcometer 181



STANDARDS: ASTM C805, BS 1881:202, DIN 1048, EN 12504-2, ISO 8045, NFP18-417, UNI 9189

Technical Specifi	cation	
Part Number	Description	Certificate
W1811	Elcometer 181 Analogue Concrete Test Hammer - MPa / psi scale	0
Accuracy	Better than ±2 Rebound Number (When tested on Calibration Anvil at 80)	
Resolution	2 Rebound Number(s)	
Range	10 to 100 Rebound Number(s)	
Dimensions	Hammer: 280mm (11.02") length x 55mm (2.17") diameter	
	In Case: 350mm (13.78") length x 80mm (3.15") diameter	
Weight	1.5kg (3.3lb) with case	
Packing List	Elcometer 181 analogue concrete test hammer, plastic storage case, abrasive stone instructions	& operating
Accessories		
TW99919563	Calibration Anvil (supplied complete with Test Certificate)	

Elcometer 331HM

Half-Cell Meter

The rugged **Elcometer 331HM** half-cell meters measure the condition and potential corrosion of rebars and steel structures within concrete.

STANDARDS: Single handed operation: all functions Interchangeable Half-Cell ASTM C876-91, DGZfP:B3, can be accessed & controlled through probes are available Concrete Society Technical Report 60, 4 simple keys/buttons (see page 22-14) UNI 10174 Measures the condition and Memory and data logging with data output to PC or potential corrosion of rebars and steel structures within direct to printer concrete quickly Links to Up to 240,000 readings can be CoverMaster[™] software stored on the gauge for detailed reporting Dete How does a Half-Cell Meter work?

When corrosion occurs the ferric oxide protective layer surrounding the concrete breaks down allowing an electrochemical reaction between the steel and the concrete.

In the half-cell test, a reference electrode is passed over the surface of the concrete and the potential voltage difference is recorded. These potential voltage readings show where corrosion is likely to be, or is currently present.

Elcometer 331HM Half-Cell Meter is supplied with memory and allows users to store up to 240,000 readings in either linear or grid batches.

Half-Cell Meter

Elcometer 331HM

Description	Elcometer 331HM
Model	HM
Part Number	W331HM4
Half-Cell measurement	W00 H IM+
Large graphics display with backlight	
Multiple language menu structure	
Rugged waterproof case (IP65)	
Adjustable beep volume & earphone socket	
CoverMaster [™] software	
Statistics	-
Number of readings (η), Mean (average) (\bar{x})	
Standard deviation (σ), Coefficient of variation (CV%)	
Lowest reading (\downarrow_{iii}) , Highest Reading (\downarrow_{iii})	
Under range (<<)	
Low Limit ($\overline{\nabla}$ or <), Within Limit (1 - 1), High Limit (Δ or >)	
Over range (∞)	
Blank readings([[]])	
Date & Time	
Memory	
Linear batch memory	Up to 200 batches of 1,000 reading
Grid batch memory	Up to 240,000 readings ¹
Graphics plot	
Threshold plot	

Technical Specification

Range	-999mV to +999mV	Accuracy	±5mV
Operating temperature	0 to 50°C (32 to 120°F)		
Power supply	7.4V battery pack provides up to 32 hours of cont Rechargeable in 4 hours, using an external charg		
Dimensions	230 x 130 x 125mm (9 x 5.1 x 4.9") Weight 1	l.6kg (3.5lb)	
Packing List ²	Elcometer 331HM Half Cell Meter, 25m extens cable with connecting clip, 1.7m black half-cell charger (UK, US & EU), earphone, shoulder s CoverMaster [™] software & PC cable	connecting cable, recharge	geable battery pack &



¹ Linear Batch Mode: up to 200 batches of 1,000 readings each. Grid Batch Mode: up to 1,000 batches, maximum number of readings: 240,000 ² Search Heads and Half-Cell Probes are not included as standard and must be ordered separately, see page 22-14

Elcometer 331B

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Covermeter

The easy to use **Elcometer 331B** covermeter quickly and accurately locates/orientates reinforcement bars in concrete and measures the depth of cover over the rebar.

Locate and determine orientation of rebar quickly, easily & accurately

Single handed operation: All functions can be accessed & controlled through 4 simple keys/buttons

International bar sizes: User selectable bar sizes: Metric, Imperial, ASTM/Canadian and Japanese

Range of fully interchangeable search heads (see page 22-14)

STANDARDS:

ACI 318, ASTM C876-91, BS1881:201, BS1881:204, BS8110, CP 110, DGZfP:B2, DGZfP:B3, DIN 1045, EC2, SIA 262, SS-EN 206, UNI 10174, Concrete Society Technical Report 60,

How does a Covermeter work?

To identify the location and orientation of the rebar under the surface of the concrete, a search head is connected to the Covermeter and is used to scan across the designated search area of the concrete.

When the search head approaches a reinforcement bar, the LED on the search head will start to glow. The Covermeter will start to emit a sound which will increase in pitch and the signal strength indicator bar on the display will increase in length.

When the bar is positioned below the centre of the search head then the pitch of the sound will be at its highest and the depth of cover will be shown on the Covermeter display. The signal strength indicator bar is at its maximum.

If the reinforcement bar is too deep to measure, the depth of cover will be displayed as infinite.

The Elcometer 331B Covermeter is an entry level gauge without memory that is only used to quickly locate and measure the depth of cover over the rebar.

Covermeter

Elcometer 331B

Interchangeable Search Heads & Borehole Probes

A range of fully interchangeable search heads and borehole probes are available to suit the requirements without the need to return your gauge to Elcometer.

There are four types of search heads available for use with the Elcometer 331B; Standard, Narrow Pitch, Deep Cover and Borehole.

The Standard Search Head is designed to meet most of the measurement requirements whereas the Narrow Pitch Search Head accurately measures the cover thickness when the gaps (pitch) between each of the rebars are close together.

The Deep Cover Search Head is ideal for accurately measuring rebars that are deep within the structure. The Borehole Probe is ideal for locating tendon ducts and multiple layers of rebar lying deep within the concrete.

Changing from one type of search head to another is quick and easy; simply switch off the Covermeter, swap search heads, switch on again and zero the Covermeter.

For full details on search heads please see page 22-14.



Product Features

Description	Elcometer 331B
Model	В
Part Number	W331B4
Covermeter/rebar location	
Rebar orientation	
Depth of cover	
Large cover (thickness) reading mm or inches	
Large graphics display with backlight	
Multiple language menu structure	
Signal strength bar	
Interchangeable heads with LED & keypad	
User selectable bar range sizes & numbers	
Rugged waterproof case (IP65)	
Adjustable beep volume & earphone socket	
Measurement sound modes	
Locate (tone increases as head approaches rebar)	

Technical Specification

Operating temperature	0 to 50°C (32 to 120°F)
Power supply	7.4V battery pack provides up to 32 hours of continuous use (20 hours if backlight is on). Rechargeable in 4 hours, using an external charger, either inside or outside the gauge.
Dimensions	230 x 130 x 125mm (9 x 5.1 x 4.9") Weight 1.6kg (3.5lb)
Packing List	Elcometer 331B Covermeter, standard search head & search head connecting cable, rechargeable battery pack & charger (UK, US & EU), earphone, shoulder strap, plastic carry case & operating instructions.

Elcometer 331

Covermeters & Half-Cell Meters

The **Elcometer 331** is an all in one gauge that combines the rebar locator, concrete covermeter and half-cell measurement, making site visits quicker and more convenient.

Locate and determine orientation of rebar quickly, easily & accurately in Cover Mode Measures the condition and potential corrosion of rebars and steel structures within concrete quickly in Half-Cell Mode

Up to 240,000 readings can be stored on the gauge for detailed reporting

Single handed operation: all functions can be accessed & controlled easily through 4 keys/buttons

Memory and data logging with data output to PC or direct to printer

Links to CoverMaster[™] software

International bar sizes: user selectable bar sizes: Metric, Imperial, ASTM/Canadian and Japanese Available in Cover Mode

STANDARDS:

ACI 318, ASTM C876-91, BS1881:201, BS1881:204, BS8110, CP 110, DGZfP:B2, DGZfP:B3, DIN 1045, EC2, SIA 262, SS-EN 206, Concrete Society Technical Report 60, UNI 10174 Full range of interchangeable search heads, borehole probe & half-cell probes available to suit the requirements (see page 22-14)

Covermeters & Half-Cell Meters

Interchangeable Search Heads, Borehole Probes & Half-Cell Probes

A range of fully interchangeable search heads, borehole probes and half-cell probes are available to suit the requirements without the need to return your gauge to Elcometer.

Changing from one search head to another is quick and easy; simply switch off the Covermeter, swap search heads, switch on again and zero the Covermeter.



Standard Search Head

Designed to meet most measurement requirements



Narrow Pitch Search Head

 Accurately measures the cover thickness when the gaps (pitch) between each of the rebars are close together



Deep Cover Search Head

 Ideal for accurately measuring rebars that are deep within the structure

Dual Search Head

 Designed to locate high tensile steel & stainless steels

Borehole Probe

 Ideal for accurately measuring rebars that are deep within the structure





Half-Cell Kit

- Consists of either a copper electrode in a copper sulphate solution or a silver electrode in a sodium chloride solution
- Each half cell is a sealed unit no need to mix chemicals
- Supplied with a 25m/80ft cable
- Every half-cell probe is guaranteed for 5 years

Elcometer 331

Cover Mode Displays









Half-Cell Mode Displays









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Elcometer 331
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Covermeters & Half-Cell Meters

Description	Covermeter & Half Cell			
Model	BH	SH	TH	THD
Part Number	W331BH4	W331SH4	W331TH4	W331THD-
Covermeter				
Half-Cell measurement		-	-	
Rebar orientation				
Depth of cover				
Large cover (thickness) reading mm or inches			-	
Large graphics display with backlight		-	-	
Multiple language menu structure		-	-	
Signal strength bar				
Interchangeable heads with LED & keypad			-	
User selectable bar range sizes & numbers			-	
Rugged waterproof case (IP65)		-	-	
Adjustable beep volume & earphone socket			-	
Measurement Sound Modes				
Locate (tone increases as head approaches rebar)			-	
Under Cover (tone only sound for low cover)		-	-	
Maxpip [™] (tone only as head passes rebar centre)			-	
Large half cell reading mV			-	
Automatic bar size estimate			-	
Orthogonal bar size calculation		-	-	
RS232 Output - direct to printer or PC			-	
CoverMaster [™] software			-	
Statistics			-	
Number of readings (η)			-	
Mean (average) <i>(</i> x̄ <i>)</i>			-	
Standard deviation (σ)			-	
Coefficient of variation (CV%)				
Lowest reading ($\frac{1}{100}$) , Highest Reading ($\frac{1}{100}$)				
Under range (<<)				
Low Limit ($\overline{ abla}$ or <), Within Limit (++), High Limit ($m \Delta$ or >)			-	
Over range ([∞])				
Blank readings()			-	
Minimum & maximum cover limits		-	-	
Date & Time		-	-	
Memory		-		
Linear batch memory		10 linear batches of 1,000 readings each	Up to 200 batches of 1,000 readings*	Up to 200 batche of 1,000 readings
Grid batch memory			Up to 240,000 readings*	Up to 240,000 readings*
User customised batch size				
Graphics plot				
Threshold plot				

* Linear Batch Mode: up to 200 batches of 1,000 readings each Grid Batch Mode: up to 1,000 batches, maximum number of readings: 240,000

Covermeters & Half-Cell Meters

Elcometer 331

Technical Specification			
Range	-999mV to +999mV	Accuracy	±5mV
Operating temperature	0 to 50°C (32 to 120°F)		
Power supply	7.4V battery pack provides up to 32 hours of continu Rechargeable in 4 hours, using an external charger,		
Dimensions	230 x 130 x 125mm (9 x 5.1 x 4.9") Weight 1.6	kg (3.5lb)	
Packing List:	Elcometer 331 Covermeter & Half-Cell Meter, rechargeable battery pack & charger (UK, US & EU operating instructions, CoverMaster™ software (SH,), earphone, shoulder s	trap, plastic carry case

Cover Mode and Half-Cell Mode

This all in one gauge combines the rebar locator, concrete covermeter and half-cell measurement, which allows the user to easily switch from Cover Mode to Half-Cell Mode depending on the type of measurement required on site.

Cover Mode: Measures the depth of cover over the rebar, detecting the location, orientation and depth of the rebar under the surface of the concrete using either a Standard, Narrow Pitch, Deep Cover, Dual Search Head or a Borehole Probe.

Half-Cell Mode: Measures the condition and potential corrosion of rebars and steel structures within concrete using either a copper electrode in a copper sulphate solution or a silver electrode in a silver chloride solution.

The Elcometer 331 Covermeter and Half-Cell meter is available in four models - Model BH, SH, TH and THD.

Elcometer 331 Model BH: entry level gauge without memory.

Elcometer 331 Model SH: intermediate level gauge supplied with memory and allows users to store up to 1,000 readings in linear batches.

Elcometer 331 Model TH: supplied with memory and allows users to store up to 240,000 readings in either linear or grid batches.

Elcometer 331 Model THD: supplied with memory and allows users to store up to 240,000 readings in either linear or grid batches. Also able to detect stainless steel reinforcement bars.

Elcometer 331

Covermeters & Half-Cell

Bar Size Dimensions available on the Elcometer 331 Models B, BH, SH, TH & THD in Cover Mode

The bar size can be selected when using a Covemeter only or the Covermeter & Half-Cell meter in Cover Mode. Dimensions of reinforcement bars are stored in the Elcometer 331 Models B, BH, SH, TH & THD and includes the following four standards bar series: Metric, US Bar, ASTM/Canadian and Japanese. Due to this wide selection of bar sizing, the Elcometer 331 Covermeters can be utilised worldwide with accurate results.

When taking measurements for high tensile steel or Grades 304, 316 and Duplex Stainless Steel using the Elcometer 331 Model THD, details for the Bar Grade and Bar Size can be manually input into the covermeter, alternatively the gauge can be used in Autosizing Mode.

Metric		Imp	Imperial		ASTM/Canadian		Japanese	
Bar Size	Diam. (mm)	Bar Size	Diam. (Inch)	Bar Size	Diam. (mm ²)	Bar Size	Diam. (mm)	
5	5	#2	0.250	10M	100	6	6	
5.5	5.5	#3	0.375	15M	200	10	10	
6	6	#4	0.500	20M	300	13	13	
7	7	#5	0.625	25M	500	16	16	
8	8	#6	0.750	30M	700	19	19	
9	9	#7	0.875	35M	1000	22	22	
10	10	#8	1.000	45M	1500	25	25	
11	11	#9	1.125	55M	2500	29	29	
12	12	#10	1.250			32	32	
14	14	#11	1.375			35	35	
16	16	#12	1.500			38	38	
18	18	#13	1.625			41	41	
20	20	#14	1.750			44	44	
22	22	#15	1.875			48	48	
25	25	#16	2.000			51	51	
28	28	#18	2.250			57	57	
32	32							
36	36							
40	40							
44	44							
50	50							

CoverMaster™ Software

Elcometer's CoverMaster[™] software will manage your data efficiently and effectively.

Available with the Elcometer 331 Models HM, SH, TH & THD.

Data is transferred quickly into the CoverMaster[™] software data management system via RS232 connection.

Both Covermeter and Half-Cell readings can be stored together with associated photos, Word documents, Excel spreadsheets and other files.







CoverMaster[™] software is supplied free of charge with all Elcometer 331 models that have batch data storage.

Features:

- Data easily translated into a typographic view giving you all the information you need at a glance
- Data for each reading can be presented in colour or can be shown in greyscale, complete with reading values in each grid
- Site survey data from both cover and half cell measurements can be shown on the same typographic (or gradient) chart
- Reports can be fully customised allowing corporate logos, photos and memos to be added providing a fully comprehensive report for clients
- All survey information in one place, CoverMaster™ links directly with Excel, Word and PowerPoint files, it is simple to analyse and assess your results
- CoverMaster[™] one platform for the storage of data, notes, photos, PDF files for the creation of comprehensive reports

Elcometer 331



Elcometer 331 Accessories

For the Elcometer 331 BH, SH, TH and THD models, all search heads, the borehole probe and half-cell probes are fully interchangeable there is no requirement to return your gauge to Elcometer.

Elcometer 331 SH, TH and THD models are also supplied with CoverMaster[™] & EDTS Excel link transfer software and PC Cable.

The Elcometer 331 Model B does not have half-cell capability and cannot be used with the half-cell probes.









Standard Search Head

Designed to meet most of your measurement requirements.

Part Number	TW33119124-1A
Range	40mm / 1.6" bar 15mm to 95mm / 0.6" to 3.75"
	8mm / 0.3" bar 8mm to 70mm / 0.3" to 2.75"
Dimensions	155 x 88 x 42mm / 6.1 x 3.5 x 1.65"
Sensing area	120 x 60mm / 4.72 x 2.36"

Narrow Pitch Search Head

Accurately measures the cover thickness when the gaps (pitch) between each of the rebars are close together.

Part Number	TW33119124-2A
Range	40mm / 1.6" bar 8mm to 80mm / 0.3" to 3.1"
	8mm / 0.3" bar 5mm to 60mm / 0.2" to 2.4"
Dimensions	155 x 88 x 42mm / 6.1 x 3.5 x 1.65"
Sensing area	120 x 60mm / 4.72 x 2.36"

Deep Cover Search Head

The ideal search head for accurately measuring rebars that are deep within the structure.

Part Number	TW33119171A
Range	40mm /1.6" bar 35mm to 180mm / 1.4" to 7"
	8mm / 0.3" bar 25mm to 160mm / 1" to 6.3"
Dimensions	170 x 94 x 54mm / 6.7 x 3.7 x 2.1"
Sensing area	160 x 80mm / 6.3 x 3.15"

Dual Search Head for high tensile and stainless steels

The search head is designed to locate High Tensile and Stainless Steel.

Part Number	TW33120014D
Range	40mm /1.6" bar 35mm to 180mm / 1.4" to 7"
	8mm / 0.3" bar 25mm to 160mm / 1" to 6.3"
Dimensions	170 x 94 x 54mm / 6.7 x 3.7 x 2.1"
Sensing area	160 x 80mm / 6.3 x 3.15"

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Accessories

Borehole Probe

The solution for locating tendon ducts and multiple layers of rebar lying deep within the concrete.

		Metric	Imperial
Part Number	Short	TW33119223-1A	TW33119223-3A
	Long	TW33119223-2A	TW33119223-4A
Measurement depth	Short Probe: 0 - 400mm / 0 - 16" Long Probe: 0 - 1000mm / 0 - 40"		
Approximate detection ranges	Tendon duct (70mm / 2.75" diameter): up to 90mm / 3.54"		

Half-Cell Kit

Consists of either a copper electrode in a copper sulphate solution or a silver electrode in a sodium chloride solution, each half cell is a sealed unit - no need to mix chemicals. Supplied with a 25m / 80' cable, every half-cell probe is guaranteed for 5 years.

Part Number	TW331CUKIT	Copper/Copper Sulphate	
	TW331AGKIT	Silver/Silver Chloride	

Extension Cable 100m / 325ft

The extension cable for use with the half-cell kits gives the flexibility to take readings in difficult to reach areas.

Part Number

TW33119683

Verification Block

The verification block allows the user to check the calibration of their gauge in order to ensure maximum measurement accuracy.

Part Number

TW33119218

Extension Arm Kit

This kit allows the user to scan bridge decks and floor areas using the hand-held search heads from a standing position as both the standard or narrow pitch search head can be attached to the extension arm.

Part Number

TW33119222



Elcometer 331









Metal Detection

Elcometer P500



Metal Box Locator

Although originally designed to accurately locate valve boxes and manhole covers, the Elcometer P500 can also be used as a general metal detector. It is straight forward to use and very rugged making it a popular choice in the market.

Detects metal objects to a maximum depth of 1m (39.4"), the Elcometer P500 has a number of key unique features:

- Manufactured from a single moulded design, in high impact ABS plastic, the Elcometer P500 stands up to a tough environment
- A balanced, lightweight unit with a single control button for ease of use
- Audio signal with headphone socket and an ultra-bright LED visual indicator identify when metal has been detected

Technical Specification

Part Number	Description
W500157F	Elcometer P500 Metal Box Locator
Overall Length	960mm (38")
Search Head Diameter	210mm (8")
Weight	1.1kg (2.5lb)
Power Supply	4 x 1.5V AA Cells or 4 x 1.5V NiMH Rechargeable Cells
Packing List	Elcometer P500 Metal Box Locator, 4x LR6 (AA) batteries, operating instructions

Approximate Detection Ranges

Typical Object Type	Metric	Imperial
Stop Top Box	500mm	19"
Fire Hydrant Cover	870mm	34"
Inspection Cover	950mm	37"

Metal Box Locator

The Elcometer P500 submits a strong, focused downwards search field ensuring the accurate location of objects, even when close to metal fencing and vehicles.

The metal box locator ignores any ghost signals from cigarette packets, drinks cans and other metallic waste materials, making your search more efficient.



Concrete Inspection

Crack Width Ruler

This simple gauge is designed specifically to provide inspectors with a low cost alternative to a graduated microscope when determining the width of a crack in concrete or other building materials.

Similar in size to a standard credit card, this transparent gauge is marked with a range of graded lines. Each line is a specified width.

To use, position the gauge over the crack and identify which line is a similar width to the crack. Read off the width value.

Elcometer 143





Technical Specification

Part Number	Description
E1431	Elcometer 143 Crack Width Ruler
Range	0.10 - 2.50mm / 0.004 - 0.100 inches

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Due to our policy of continuous improvement, Elcometer Limited reserves the right to change specifications without notice. All gauges are supplied with a 1 year warranty as standard unless stated otherwise.

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