

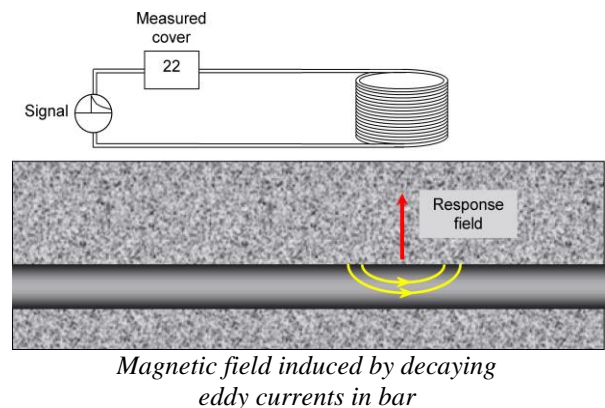
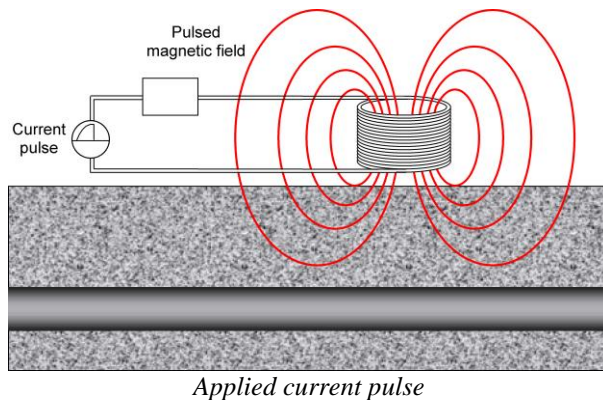
## Purpose

**CoverMaster (Elcometer 331)** is a portable, convenient, accurate rebar locator and concrete covermeter that can be used in reinforced concrete structures for the following applications:

- Locate position and orientation of reinforcing bars and metal cable ducts in concrete structures
- Measure the cover depth of reinforcement
- Estimate the diameter of reinforcing bars
- Locate other metal objects embedded in concrete

## Principle

The instrument is based on the pulse-induction technique. A repetitive current pulse is applied to the coils in the search head (below left). During each pulse, current increases gradually in the coils but is turned off rapidly. The sudden end of the pulse causes a sudden collapse in the magnetic field produced by the coils, which induces eddy currents in a bar located within the coils' influence zone. As the eddy currents decay, a decaying magnetic field induces a secondary current in the coils (below right). The instrument measures the amplitude of the induced current, which depends on the orientation, depth, and size of the bar. The search head is directional, so the maximum signal is obtained when the bar is aligned with the long axis of the search head. The pulse-induction technique is uniquely stable, is not affected by moisture in concrete or magnetic aggregates and is immune to temperature variations and electrical interference.



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. When the search head approaches a reinforcement bar, the covermeter will start to emit a sound which increases in pitch and the signal strength indicator bar on the display increases in length. When the bar is positioned below the center of the search head, the pitch of the sound will be at its highest and the signal strength indicator bar will be at its maximum. At this moment, the depth of cover will be shown on the display.



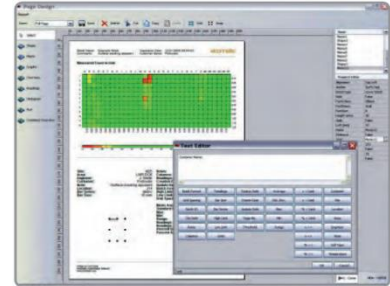
The case is designed to meet IP65 protection so the instrument can be used in harsh environments.

A range of fully interchangeable search heads are available to suit different requirements. Changing

from one search head to another is quick and simple. All functions can be accessed through 4 buttons on the search head.

The **Elcometer 331** can also be used with half-cell electrode probes to measure half-cell potentials in accordance with ASTM C876, in a similar manner to the **Mini Grate Dane** (see its technical data sheet).

The Covermaster™ software, available for some models, is a data management tool to store cover and half-cell readings and produce professional reports.







## Elcometer 331 Specifications and Features

- Power supply: 7.4V battery pack
- Battery life: 32 hours of continuous use (20 hours with backlight)
- Recharging time: 4 hours
- Dimensions: 230 x 130 x 125 mm
- Weight: 1.6 kg (without accessories)
- Half-Cell measurements: -999 mV to +999 mV, ±5 mV
- Operation temperature: 0 to 50°C
- Rugged case IP65

Description of feature	Model				
	B	BH	SH	TH	THD
Rebar location, orientation and depth of cover	•	•	•	•	•
Cover thickness reading in mm and inches	•	•	•	•	•
Graphics display with backlight	•	•	•	•	•
Multiple language menu	•	•	•	•	•
Signal strength bar displayed	•	•	•	•	•
Interchangeable heads with LED and keypad	•	•	•	•	•
Adjustable beep volume and earphone socket	•	•	•	•	•
Measurement sound modes:	•	•	•	•	•
Locate ( <i>tone increases as head approaches rebar</i> )	•	•	•	•	•
Under Cover ( <i>tone only sounds for low cover</i> )			•	•	•
Maxpip™ ( <i>tone only as head passes rebar center</i> )			•	•	•
Half-cell potential measurements capability		•	•	•	•
Auto size mode for bar diameter estimation			•	•	•
Orthogonal mode for bar diameter estimation			•	•	•
RS232 output to printer or PC			•	•	•
CoverMaster™ Software			•	•	•
Statistics			•	•	•
Minimum and maximum cover limits			•	•	•
Date and time			•	•	•
Memory			•	•	•
Linear batch memory (No. batches / Readings per batch)			10 / 1000	200 / 1000	200 / 1000
Grid batch memory (No. batches / Readings per batch)				1000 / 240000	1000 / 240000
User customized batch size				•	•
Graphics plot				•	•
Threshold plot				•	•
Stainless steel probe					•

## Search Heads

<p><b>Standard</b></p>  <p>General purpose</p> <p>Cover layer range: 15 to 95 mm for 40 mm bar 8 to 70 mm for 8 mm bar</p> <p>Sensing area: 120 x 60 mm</p>	<p><b>Narrow Pitch</b></p>  <p>For resolving closely-spaced bars</p> <p>Cover layer range: 8 to 80 mm for 40 mm bar 5 to 60 mm for 8 mm bar</p> <p>Sensing area: 120 x 60 mm</p>
<p><b>Deep Cover</b></p>  <p>For deep-located bars</p> <p>Cover layer range: 35 to 180 mm for 40 mm bar 25 to 160 mm for 8 mm bar</p> <p>Sensing area: 160 x 80 mm</p>	<p><b>Dual Search</b></p>  <p>For high strength and stainless steel (only for model THD)</p> <p>Cover layer range: 35 to 180 mm for 40 mm bar 25 to 160 mm for 8 mm bar</p> <p>Sensing area: 160 x 80 mm</p>

### Bar Diameter Ranges

Metric	5 to 50 mm in 21 values
U.S. Bar Numbers	#2 to #18 in 16 values
ASTM/Canadian	10 to 55M in 8 values
Japanese	6 to 57 mm in 17 values

## Half-Cells Kit



Suitable for models BH, SH, TH and THD. Consists of either a copper / copper sulphate electrode or a silver / silver chloride electrode. Each half cell is a sealed unit, no need to mix chemicals.

It is supplied with a 25 m cable.

## Borehole probe

Borehole probes are also available for locating a second layer of reinforcement or deeply embedded tendon ducts. The borehole probe can be switched from the “forward looking” to the “side looking” mode.

Measurement depth:

Short probe = up to 400 mm / Long probe = up to 1000 mm



## Elcometer 331 Ordering Numbers

Elcometer 331 Covermeters are delivered with your selected search head and/or half-cell electrode, including connecting cables, rechargeable battery pack and charger, earphone, shoulder strap, plastic carry case, operating instructions, CoverMaster™ software (for SH, TH & THD models) & PC cable (for SH, TH & THD models).