English

Elcometer Protovale 100

‘Imp’ Rebar Locator

Operating Instructions

CE This product meets the emc directive 89/336/EEC, amended 92/31/EEC and 93/38/EEC. The Elcometer Protovale 100 'Imp' Rebar Locator has been tested in accordance with EU regulations governing Electromagnetic Compliance and it meets the required directives.

Note: *Performance may be affected if the unit is operated within a radio frequency electromagnetic field strength greater than 3V/m.*

A copy of this Instruction Manual is available for download on our Website via www.elcometer.com/downloads

Doc. No:TMA-0267 Issue 03
Part No: 18729

CONTENTS

Thank you for your purchase of this Elcometer Protovale 100 'Imp' Rebar Locator. Welcome to Elcometer.

Elcometer are world leaders in the design, manufacture and supply of inspection equipment for concrete and coatings.

Our concrete inspection products include a comprehensive range of concrete, and civil engineering inspection equipment. Our coatings products cover all aspects of coating inspection, from development through application to post application inspection.

The Elcometer Protovale 100 'Imp' Rebar Locator is a world beating product. With the purchase of this instrument you now have access to the worldwide service and support network of Elcometer. For more information visit our website at www.elcometer.com

1 ABOUT YOUR REBAR LOCATOR

The Elcometer Protovale 100 'Imp' Rebar Locator is a handheld instrument for fast and accurate location and orientation of concrete reinforcement bars.

1.1 WHAT THE BOX CONTAINS

- Elcometer Protovale 100 'Imp' Rebar Locator
- Search head
- 4 x LR6 (AA) alkaline batteries
- Leather carry case
- Operating instructions

The instrument is packed in a cardboard and foam package. Please ensure that this packaging is disposed of in an environmentally sensitive manner. Consult your local Environmental Authority for further guidance.

To maximise the benefits of your new instrument, please take some time to read these Operating Instructions. Do not hesitate to contact Elcometer or your Elcometer supplier if you have any questions.

2 GETTING STARTED

2.1 FITTING BATTERIES

The Elcometer Protovale 100 'Imp' Rebar Locator uses dry cell batteries only. Sealed alkaline batteries are recommended however rechargeable equivalents may also be used.

4 x LR6 (AA) alkaline batteries are supplied in the kit.

To fit or replace the batteries:

1. Remove the instrument from the carrying case.
2. Remove the battery compartment cover.
3. Fit the batteries taking care to ensure correct polarity.
4. Replace the battery compartment cover.
5. Replace the instrument in the carrying case ensuring that the speaker output grille lines up with the hole in the case.

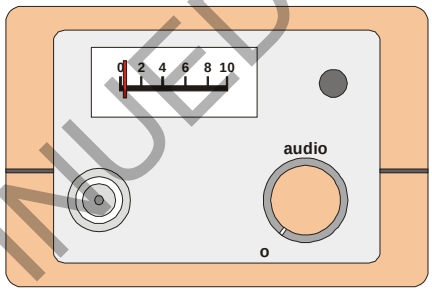
Note: *Remove the batteries from the instrument if it is to remain unused for a long period of time. This will prevent damage to the instrument in the event of malfunction of the batteries.*

Note: *Alkaline batteries must be disposed of carefully to avoid environmental contamination. Please consult your local Environmental Authority for information on disposal in your region.*

Do not dispose of any batteries in fire.

2.2 CONNECTING THE SEARCH HEAD

Screw the plug of the search head into the socket on the front panel of the control unit, taking care not to cross the threads.



2.3 SWITCHING ON

Switch the machine on by turning the control marked ‘audio’ clockwise from the OFF position until it just clicks on.

The machine is now working, and set to minimum sensitivity.

2.4 BATTERY TEST

Press the battery test button; a meter reading of 7 or over indicates that the batteries contain sufficient charge. If the meter reading is less than 7, the batteries should be replaced - see “Fitting batteries” on page 3.

2.5 SENSITIVITY ADJUSTMENT

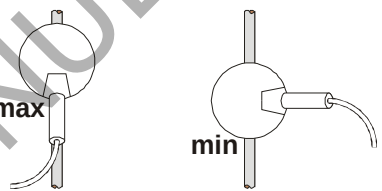
If the control marked ‘audio’ is rotated slowly clockwise (with the search head well clear of any metal), a point is reached when the sound produced is a steady ticking, and the meter is displaying zero (0). Further clockwise rotation will cause the meter to deflect to the right, and the sound to increase in frequency through a buzz to a whine. Maximum sensitivity is achieved when the sound is set to a low tick-over, and is

appropriate when searching for deeply-embedded bars. More often however, this setting gives more sensitivity than Is necessary or desirable, and the control can and should then be turned back as required.

2.6 SEARCH HEAD ORIENTATION

Despite having a circular face, the search head is in fact directional and has a sensitive axis running across the face parallel to the line of the handle.

The relative orientation of this axis to the line of the rebar affects the signal strength, and it is by this means that the direction of a rebar can be determined, and complex structures resolved.



3 USING THE INSTRUMENT

The best way to learn how to use your Elcometer Protovale 100 'Imp' Rebar Locator is to practise on situations where the position and direction of the rebar are known (or visible). Start with the simple case of a single rebar, and then move up in stages through parallel bars, crossed bars; and finally the special case of welded fabric (which responds differently). Note that since the machine is not affected in any way by the concrete itself, experience gained on bars measured "in air" will be just as applicable to bars in concrete.

Experiment with 4 rebars of a minimum length of 450mm. For instance 2 x 16 and 2 x 12 rebars. Place on a metal-free surface and practice as below.

3.1 SINGLE BARS

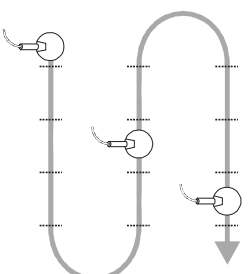
Hold the search head with the line of the handle parallel to the bar, and scan across sideways. If the machine had been set to maximum sensitivity, a very strong signal will be produced at all typical distances. If the sensitivity is progressively reduced, the "width" of the signal will become narrower, and it will become apparent that the maximum signal occurs when the search head is exactly over the bar. The exact position of the bar can also be found by moving the search head in, first from one side and then the other, and noting in each case where the signal starts; the bar then lies exactly midway between these two points.

If the search head is now rotated whilst being held at a constant distance from the bar, the largest signal will be given when the handle is parallel to the bar, but little or no signal when at right angles.

This direction-finding feature will be used in all situations.

3.2 PARALLEL BARS

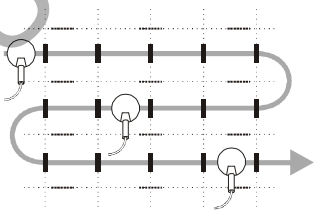
As with a single bar, the handle of the search head should be aligned with the bars, and the search head scanned across the bars. At maximum sensitivity, a strong signal may well be produced everywhere, but as the sensitivity is progressively reduced, the signal will drop to a minimum when the search head is halfway between bars. Unless the search head is very close to the bars, further reduction in sensitivity will produce a "null" of silence between the bars, and a maximum when the search head is exactly over a bar. In this way, the centres of the spaces between the bars can be located just as accurately as the bars themselves.



Note: *If the search head is turned through 90 degrees so that the line of the handle is at right angles to the bars, the signal will be much weaker and the resolution reduced - so do not use this orientation in normal operation.*

3.3 CROSSED BARS

This refers to the common structure of one set of parallel bars running vertically, and a second set running horizontally but not touching the first set.



First map out the horizontal bars by holding the search head with the handle horizontal, and scanning vertically along lines which run between the vertical bars. When the sensitivity is reduced as necessary, the horizontal bars will be resolved exactly as in the previous example of parallel bars. Still keeping the handle horizontal, repeat the vertical traverses, but try moving the search head vertically up and down as well; it will be found the horizontal bars are clearly resolved, regardless of whether the search head is also over a vertical bar or not.

Now turn the search head so the handle is vertical, and scan horizontally. This time the vertical bars (and the spaces between them) are clearly indicated, whilst the horizontal bars are largely ignored. (Note that if the vertical bars are significantly different from the horizontal bars in either size or distance, the optimum setting of the audio control may also be slightly different).

To sum up: the maximum signal occurs when the search head is over a bar and aligned parallel to it; a minimum (or null) signal occurs when the search head is in the centre of the space between bars, whatever the alignment (at the crossing-points, a signal is obtained from each bar).

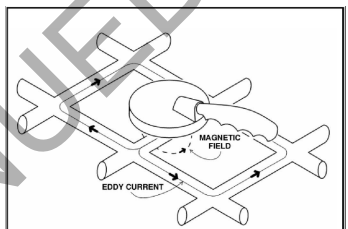
3.4 WELDED MESH FABRIC

This refers to a structure like the previous case of crossed bars, but where the bars are joined at each crossing-point and therefore in electrical contact.

This means that every space is now surrounded by a "picture frame" which represents a continuous electrical path, and this results in an additional response which did not occur in any of the previous examples.

As with the previous examples, it will be necessary to reduce the sensitivity somewhat, otherwise the machine may signal continuously.

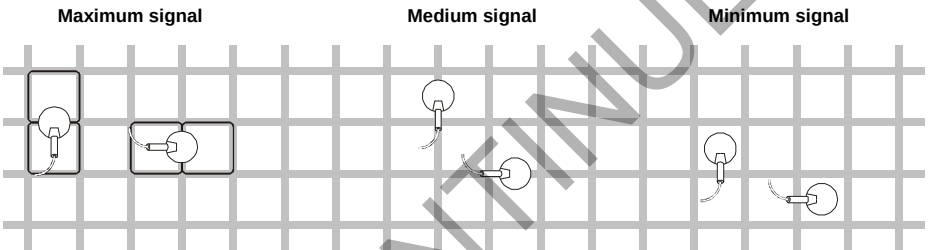
As with the case of crossed bars, little or no signal is given when the search head is in the centre of a space between four bars (assuming that the sensitivity is reduced sufficiently). A signal is certainly given when the search head is over a bar and aligned parallel to it, but this is not the maximum signal.



Signal from welded mesh

If the search head is held with the handle vertical, and scanned vertically between vertical bars, the maximum signal occurs every time the search head is over a horizontal bar. Similarly, with the handle horizontal, scanning sideways between the horizontal bars gives the maximum signal at each vertical bar.

To sum up: the maximum signal occurs when the search head is over a bar and the handle is at right angles to the bar; a minimum or null signal occurs when the search head is in the centre of a space between bars, at any orientation.



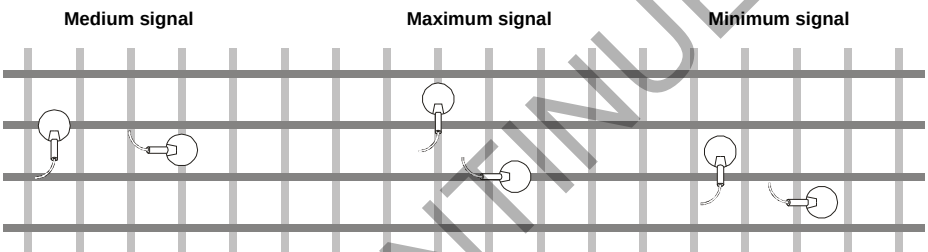
3.5 LOOSELY-JOINED FABRIC

When crossed bars are joined by wires or stirrups, it may not always be obvious whether the bars are in good electrical contact or not, and so may or may not behave as welded mesh (though it usually behaves like separated crossing bars).

Under these circumstances, remember that the minimum signal always occurs in the centre of the space between bars, regardless of the nature of the fabric structure and the orientation of the search head.

The recommended procedure therefore is to first map out these spaces. If the aim was to find "safe spots" for drilling, the object will then have been achieved.

Having found all the spaces, the bars must now be between these spaces, and so the bar locations are now determined. Investigation of the behaviour of the signal (and the effect of search head orientation) over the bar positions will now reveal the nature of the structure itself.



4 TROUBLE SHOOTING

Any fault conditions encountered can usually be cleared by checking:

- the battery voltage and cell polarity
- the battery contacts for spring tension and corrosion
- the search head plug and socket for good electrical and mechanical connection.

5 MAINTENANCE

The Elcometer Protovale 100 'Imp' Rebar Locator is designed to give many years reliable service under normal operating and storage conditions.

No special maintenance is necessary, though the unit should be wiped clean of dirt and moisture after use.

Two points in particular will ensure long-term trouble free operation:

- To prevent damage to the search head plug and socket, keep the threads clean and free from mud and grit.
- To prevent corrosion damage from leaking batteries: make sure the unit is switched OFF after use; and remove the batteries if the unit is to be stored unused for any period of time.

The instrument does not contain any user-serviceable components. In the unlikely event of a fault, the instrument should be returned to your local Elcometer supplier or directly to Elcometer. The warranty will be invalidated if the instrument has been opened. Contact details can be found on the outside cover of these instructions, or on the Elcometer website, www.elcometer.com

6 SPARE PARTS AND ACCESSORIES

The following replacement and optional items are available from Elcometer or your local supplier.

Description	Sales Part No.
100 mm (4") Directional Search Head for Rebar	TW999198F
200 mm (8") Hi-Depth Locator Search Head - Short handled (250 mm / 9.8")	TW999198G
200 mm (8") Hi-Depth Locator Search Head - Long handled (650 mm / 25.5")	TW999198H

7 RELATED EQUIPMENT

Elcometer produces a wide range of concrete and coatings inspection equipment. Users of the Elcometer Protovale 100 ‘Imp’ Rebar Locator may also benefit from the following Elcometer products:

- Elcometer Adhesion and Bond Strength Testers
- Elcometer Concrete Crack Microscopes
- Elcometer Concrete Moisture Meters
- Elcometer Concrete Test Hammers
- Elcometer Concrete Covermeters

For further information contact Elcometer, your Elcometer supplier or visit www.elcometer.com