

Elcometer Protovale 520

Deep Cover Metal Detector

Operating Instructions



This product meets the emc directive 89/336/EEC, amended 92/31/EEC and 93/38/EEC. The Elcometer Protovale 520 Deep Cover Metal Detector 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.

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

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Thank you for your purchase of this Elcometer Protovale 520 Deep Cover Metal Detector. 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 520 Deep Cover Metal Detector 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 METAL DETECTOR

The Elcometer Protovale 520 is a high powered detector for detection of metal at greater depths than other instruments. Originally designed to locate water mains, pipes and cables, the Elcometer P520 is also the perfect choice for location work in cluttered areas and at depths where other metal detectors simply do not work.

1.1 FEATURES

- Deep seeking and accurate - can locate a 100 mm (4") metal water main at 1.2 m (46") and will locate valves even when the frame and cover are missing.
- Analogue meter shows the signal strength - allowing you to identify the orientation of the metal object.
- Stable and reliable results - the instrument does not need constant zeroing or recalibration.
- Loudspeaker volume control and socket for headphones (for noisy environments).

1.2 WHAT THE BOX CONTAINS

- Elcometer Protovale 520 Deep Cover Metal Detector
- Search head
- Leather carry case
- Charger
- 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 CHARGING BATTERIES

The Elcometer Protovale 520 Deep Cover Metal Detector is powered by internal rechargeable batteries. A fully charged unit will give 9 or 10 hours of operation.

1. Make sure the instrument is switched to the OFF/CHG position.
2. Insert the coaxial plug of the charger into the CHARGE socket on the bottom panel of instrument, and plug charger into mains outlet.

After about half an hour the charger will normally become slightly warm to the touch. The unit will be fully charged in 10 to 12 hours, or over night.

A partially discharged battery can be 'topped up' by charging for as long as the period of discharge. Due to the design of the charger supplied, no harm can come from overcharging, so if in doubt, leave on charge over night.

It is recommended that the batteries are not left for long periods without charging as this can damage the batteries:

- if the instrument is used on a daily basis, charge the batteries at the end of each day,
- if the instrument is used infrequently, charge once a month.

Note: *Nickel Cadmium 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 TNC plug of the search head into the socket marked 'coil' 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 'GAIN' clockwise from the OFF position until it just clicks on.

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

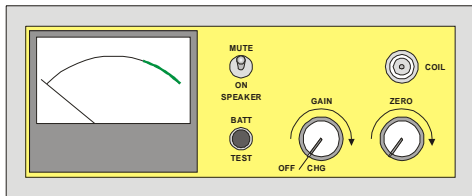
2.4 BATTERY TEST

Press the button marked BATT/ZERO; a meter reading of 7 or over (within the green arc) indicates that the batteries contain sufficient charge. If the meter reading is less than 7, the batteries should be charged - see "Charging batteries" on page 4.

2.5 USING HEADPHONES

In noisy environments it may be easier to hear the signal if headphones are used.

Connect your headphones (not supplied) to the 3.5 mm jack socket fitted on the left-hand side of the case. To switch off the sound to the speaker, use the switch marked SPEAKER MUTE/ON; this will mute the sound from the speaker, but has no effect on the output from the headphone socket.



3 USING THE INSTRUMENT

1. Holding the search head well away from any metal, rotate the GAIN control fully clockwise and then rotate the zero control until the meter is set to zero. The instrument is now set to maximum sensitivity.

The unit will produce a faint tick-over sound.

2. Hold the search head above the ground and sweep the instrument back and forth.

When metal is detected, the meter deflects progressively to the right and the audible tone simultaneously increases its ticking note past a low frequency buzz and progresses through a tone of increasing pitch up to a high whistle.

If the search coil is scanned rapidly over an object, there is a slight time-lag in the onset of indication and also in its dying away, so that the maximum signal appears just past the true position. If the coil is moved more slowly, the lag is not noticeable and precise location is then possible.

The most efficient way to establish quickly the presence of metal is to operate the Elcometer P520 at maximum sensitivity (GAIN control rotated fully clockwise); however having established the presence of metal, the sensitivity can be progressively reduced by turning the GAIN control anticlockwise to enable accurate pin-pointing of the metal object to within 5 cm to 8 cm.

If a steady background signal from distant metal is present, rotate the zero control anticlockwise to reset the instrument to zero.

The most sensitive point of the search head is its centre.

3. When you have finished detecting, remember to switch the unit off and, if necessary, recharge the batteries.

4 STRONG SIGNALS AND TARGET PINPOINTING

Whereas the signal from an object at its maximum detection distance is weak, the signal from the same object very close to the coil is between one hundred and one thousand times stronger and will cause the circuits to overload. Whilst no damage is caused, this produces two effects: the unit will tend to give a saturation signal over a wide area surrounding the object, and even when the coil is moved well away, the indication will persist for a finite time until the circuits recover from the overload. To minimise this, progressively turn the GAIN control anticlockwise.

Accurate pin-pointing may also be helped by moving the search coil into the region of strong signal, and adjusting the zero control anticlockwise to subtract the 'edges' of the response. If this is done, remember to re-zero the instrument away from metal to restore full sensitivity before resuming searching. If the signal is still too strong, try raising the search coil away from the object.

5 EXTRANEIOUS METAL

Although the user may be searching for just one specific object, the instrument will react to all metal that is within its detection range. This may yield a number of confusing extra responses, and indeed an object which is nearer or larger than the target may well mask its presence. The user should therefore carefully appraise the environment for suitability of application, bearing in mind extraneous metal.

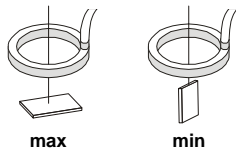
Signals from objects such as structural metal (piles and girders), ferroconcrete, fencing and railings, and pipelines and conduit will be received over long distances. Short-range signals can come from finger rings, watches, metal toe-caps - even wooden benches and trestles containing screws.

Note: Always remember to keep the control unit well away from the search head - otherwise the control unit will be detected also.

6 DETECTOR RESPONSE TO DISCRETE OBJECTS

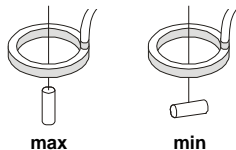
6.1 OBJECT ORIENTATION

Non-magnetic (non-ferrous) objects give the greatest signal when they present the largest area; thus a sheet of metal gives the greatest signal when 'face-on', and the least when 'edge-on'.



For **magnetic** (ferrous) objects (e.g. iron or steel) the signal is 'magnified' by its length-to-diameter ratio; this means that the greatest signal will often be received when the object is being 'looked at' end-on.

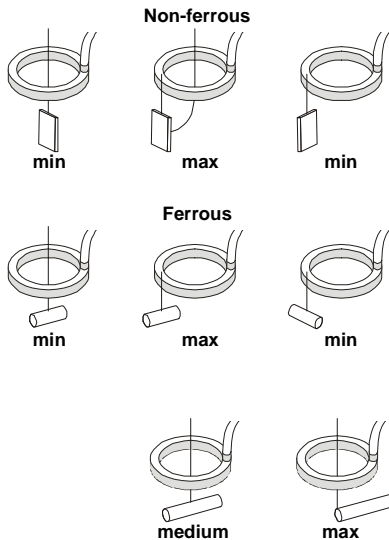
These comments apply when the object lies on the 'axis' of the coil, i.e. on the line through its centre (either above or below), which is where most objects (but not all) give the greatest response.



6.2 EDGE EFFECTS

In some cases, an object with a poor response under the centre of the coil due to its unfavourable orientation will give a stronger signal when under the edge of the coil.

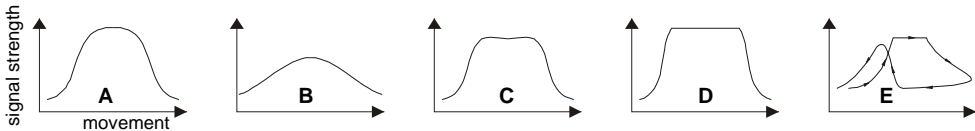
In some cases therefore, a 'difficult' object will appear as two sharp responses exactly one coil diameter apart, with the true position halfway in between; this is particularly true of small iron nails.



A special case is a long iron bar, when the response at the ends is greater than that over the middle:

6.3 WIDTH OF RESPONSE

Mentally plotting the strength of response against position as the object is scanned across can give yet more information about the object:



A: A close object gives sharp responses as it crosses the edges of the coils

B: Distant objects give a more gradual decrease off-centre

C: Extended objects have a sharp response at their edges, and a 'flatter' response across their centre.

And two profiles you should NOT get:

D Signal too strong (object too large or too close) - reduce sensitivity

E Scanning too fast - slow down

The location of a single piece of metal in an environment that is cluttered with extraneous metal will be difficult, if not impossible.

7 TECHNICAL SPECIFICATIONS

Control unit dimensions:	233 mm x 180 mm x 100 mm (9.2" x 7" x 4")
Search Head Diameter:	22 cm (8.7")
Weight:	850 g (1.87 lb)
Power Supply:	Internal rechargeable cells

APPROXIMATE DETECTION RANGE

Gate hook:	61 cm (24")
Barbed wire length 400 mm (15.7"):	36 cm (14")
Staple, length 40 mm (1.6"):	33 cm (13")
Nail, length 75 mm (3"):	33 cm (13")
Nail, length 125 mm (5"):	34 cm (13.4")

8 SPARE PARTS AND ACCESSORIES

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

Description	Sales Part No.
200 mm (8") Search Head	TW520197B
Replacement mains charger, UK (240 V)	TW999060C
Replacement mains charger, EU (220 V)	TW999060F
Replacement mains charger, US (110 V)	TW999060G

9 MAINTENANCE

The Elcometer Protovale 520 Deep Cover Metal Detector 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.

To prevent damage to the search head plug and socket, keep the threads clean and free from mud and grit.

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

10 RELATED EQUIPMENT

Elcometer produces a wide range of metal detectors and concrete and coatings inspection equipment. Users of the Elcometer Protovale 520 Deep Cover Metal Detector may also benefit from the following Elcometer products:

- Elcometer Rebar Locators
- Elcometer Timber Metal Detectors
- Elcometer Concrete Covermeters

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