VIVAX METROTECH

VM-585 User Guide V1.2

1.0 Introduction

This guide describes the operation of the VM-585 pipe and cable locator (with ferrous metal detect mode), used to detect buried pipe and cable services in a variety of situations.

The operational frequencies of the VM-585 are M mode (ferrous metal detect mode), 60Hz, 512Hz, 8 kHz, 83 kHz.

The VM-585 is supplied with 1 watt transmitter with both direct connection and induction capabilities. An inductive clamp and LPC live separation filter are also available as optional accessories.

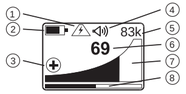
The VM-585 is rugged, lightweight, water resistant and compact.

Standard equipment is listed below and pictured as above.

- VM-585 pipe and cable locator
- 1 watt transmitter
- Carrying bag
- User guide

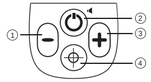
2.0 Displays and Controls

2.1 Receiver Display



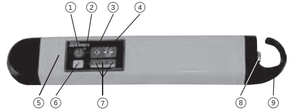
1	Power signal warning. Could be a live cable.
2	Battery level indicator (flashes when replacement is required)
3	Indicates polarity of field (+ or -)
4	Speaker level Indicator
5	Selected locate frequency
6	Percentage signal levels
7	Signal level indicator
8	Sensitivity setting indicator

2.2 Receiver Operational Controls



1	Sensitivity Control (reduce sensitivity)	Increment sensitivity down, or auto scale down to 50% if off scale. When in frequency select menu use this button to scroll backwards through available frequencies.
2	On/Off Control	Long press to switch on/off. Short press to change speaker volume.
3	Sensitivity Control (increase sensitivity)	Increment sensitivity up, or auto scale to 50% if off scale. When in frequency select menu use this button to scroll forwards through available frequencies.
4	Depth Measurement/ Ferrous Metal / Frequency Selection / Sensitivity Set	In line/locate mode, short press to initiate depth measurement. Long press to enter frequency select menu then short press to exit menu. In ferrous metal detect mode, short press auto sensitivity set. Sets sensitivity to 50% meter deflection.

2.3 Transmitter Operational Controls



1	ON/OFF (Long press until Power ON indicator is on, long press again to turn off)
2	Power ON Indicator
3	Low Output Power Selected
4	High Output Power Selected
5	Speaker
6	Frequency Select
7	Frequency Selected Indicators
8	Battery Cover Retaining Screws
9	Battery Housing Cover

3.0 Using the VM-585

3.1 Power Mode Operation

Switch on the unit by pressing the ON/OFF pushbutton. Allow a few seconds to switch on.

The frequency selected as shown on the display. If this is not the desired locate frequency (ie 60Hz) change as indicated below.

NOTE

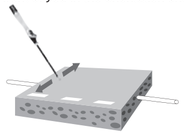
The battery condition as indicated on battery icon. Replace batteries if necessary. See Changing Batteries Section.

Changing the Locate Frequency

Press and hold the depth measurement/frequency selection pushbutton until the frequency menu is entered. The display will show the present frequency selected in large numeric's in the centre of the screen. Use the "+" or "–" pushbuttons to select the desired frequency. Press the depth measurement/frequency selection pushbutton to re-enter the locate screen.

3.2 Locating a Cable in the Power (60Hz) Mode

1. Hold the locator vertically in the area that is required to be searched. Press the "+" or "-" pushbuttons to set the gain so that the bar graph reads approximately 50%.
2. Hold the locator in front of you in the orientation shown below.



3. Sweep the locator left to right along the suspected route of the cable. As the locator approaches the cable the meter reading will increase. Pinpoint the position by detecting the largest signal. Adjust the sensitivity of the locator by pressing the "+" or "-" pushbuttons to keep the signal on scale.
4. To confirm the direction of the cable, rotate the locator until the largest signal is detected. The direction of the cable is then directly ahead.
5. Continue to locate the cable along the route.
6. Depth measurements are not possible in the power (60Hz) mode, if pressed by accident it will show N/A.

WARNING

The power mode is used to detect signals radiating from cables or services that are carrying a 60Hz load. It is possible for a cable to be live but not carry a load. In this case there may not be a signal to be detected.
Similarly, if a cable is exactly balanced the resulting signal radiating from the cable may be zero and therefore not detectable.
Do NOT use the VM-585 to identify if cables are live. Always dig with caution.

3.3 Active Cable and Pipe Locating

Detecting a cable or pipe can be achieved by applying a locate tone to a cable or pipe from a transmitter. This is called active locating.

The locate tone can be applied by either.

- Direct Connection
- Induction Mode
- Signal Clamp Mode

3.4 Direct Connection Mode

This method involves making a direct connection to the Cable or Pipe.

WARNING

DO NOT attempt to make a connection to a live conductor. Only make a connection to de-energized or dead cables. It is possible to connect to the sheath of active cables but this should only be attempted by qualified and authorized personnel.

Method:

Plug the direct connection leads to the transmitter. Connect the red lead to the cable or pipe and the black one to a suitable ground. Ideally this should be a ground stake placed at right angles to the probable route of the target line. If it is not possible to use a ground stake, connect the black lead to a grounded structure such as the rim of a manhole cover or other buried metallic structure. Try to avoid fencing as this will create interference from the return signal travelling along the fence.
If necessary clean the connection point with a wire brush to ensure a good electrical connection.

Select the desired frequency by pressing the "f" pushbutton. As a general rule the higher frequency will have a cleaner more stable reading and will jump insulation joints on pipes but has the disadvantage that it is more likely to jump to other utility nearby. The lower frequency is better for tracing a particular utility as it is more likely to keep to the utility line the transmitter is attached to. If in doubt, start with the lower frequency and switch to the higher one if it is not possible to detect a stable reading.

The same applies to setting the signal level. A short press on the ON/OFF pushbutton will alter the output from low to high. Always start with the low setting and switch to high if it is not possible to detect a stable reading on the receiver. Using the low setting will also prolong the battery life.

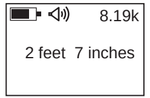
If unsure of the quality of connection to the service, set the frequency of the receiver to match the transmitter, hold the receiver over the direct connection lead and remove and connect the red lead from the utility. There should be a great change in signal received. If not improve the grounding or improve the connection to the pipe or cable. A fast beeping sound indicate a good connection.

To trace the cable use the same method as described in the Locating a Cable in the Power (60Hz) Mode Section.

3.5 Depth Measurements (Available in 8.19 kHz mode only)

To take a depth measurement pinpoint the position and direction as previously described. Now hold the locator vertically and in line with the cable or pipe.

Now press the depth measurement/frequency selection button. There will be a short delay before a depth estimate will be displayed.



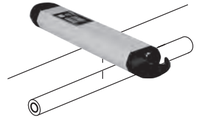
NOTE

The depth measurement is an approximation. Depth indications can be effected by field distortion caused by adjacent utility lines or changes in direction and depth. Always use depth measurements as an aid to line verification but NEVER use them to decide if mechanical digging is safe. Always dig with care.

An aid to determining if the depth is correct is to repeat a depth measurement with the locator a known distance (for example 1ft) above the ground and to note if the depth has increased by this amount. If it is different from what is expected treat the data as suspect.

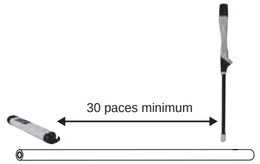
3.6 Induction Mode

The induction mode is useful in situations where access to a cable or pipe is not possible. Remove the direct connection leads so that the transmitter automatically sets itself into the induction mode. Place the transmitter over the suspected position of the target utility line as below.



Switch on the transmitter and set the output to low output. Only switch to high if the signal received is too low. Only the high frequency is available in induction mode.

Start locating the line a few paces from the transmitter. Starting too close will be difficult as the signal radiated through the air from the transmitter will be greater than that from the cable. Trace the cable in the normal way.



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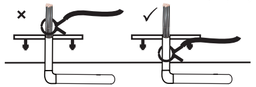
3.7 Signal Clamp Mode

1. Connect the signal clamp to the transmitter.
2. Place the clamp around the cable to be energised. Ensure that clamping is done below the earthing point of the cable otherwise a signal will not be induced efficiently.
3. Make sure the two halves of the clamp close properly.



4. Switch on the transmitter and follow the locating instructions as in Direct Connection Mode.

NOTE
Using the clamp does NOT require a ground connection from the transmitter. However, the signal quality will be better if there is a ground at both ends of the cable.

3.8 LPC Separation Filter

The LPC separation filter is used to safely inject a trace tone to a live cable via a domestic mains socket, so that the cable can be traced from the premises to the connection in the street. It is suitable for connecting to voltages between 100V AC and 250V AC.

Method:

1. Plug the LPC into the output socket of the transmitter.
2. Identify a suitable main socket. If a switch is fitted to the socket, switch off.
3. Plug in the LPC to the mains socket and then switch back on.
4. Set the LPC rotary switch to match the two indicator lights.
5. Set the transmitter to the frequency to be located.
6. Locate the line as described in the section Direct Connection Mode.

NOTE
A transmitter ground connection is not required with this method as the ground is made within the mains socket.

3.9 Ferrous Metal Detect Mode

The VM-585 locator in ferrous metal detect mode is designed to locate only buried magnetic (iron and steel) objects. It rejects those objects that are not magnetic, i.e. aluminum cans, bottle caps, etc. The "finely tuned" sensitivity of the VM-585 makes it possible to locate magnetic objects at greater depths.

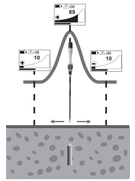
3.9.1 Checkout Procedure

1. Hold the unit in a vertical position well away from any metallic objects. Switch on the unit and ensure the frequency is set to 'M' (see Change the Locate Frequency in section 3.1). Check that the battery is good by looking at the battery icon. Replace the battery if necessary. (See battery replacement section below)
2. Now momentarily press the auto sensitivity pushbutton. The sensitivity setting indicator should show maximum. (if not, find another test site) The display should read less than one half and the numeric value should be less than 50.
3. Now lower the VM-585 down towards the PK nail. Stop when the numeric value increases by approximately 10 and the speaker pitch increases. The distance from the nail should be greater than 2" (*50mm*). This will vary greatly due to site condition and PK nail tolerance.
4. If the unit fails this test, it should be returned to the factory or approved service centre as there are no field serviceable parts.

3.9.2 Operation

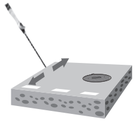
The VM-585 Ferrous Metal Detector locates only those ferrous metals that attract the earth's magnetic fields, such as iron, nickel, cobalt and their alloys, as well as magnets, such as magnetic markers.

Utility objects that contain these metals would include PK nails, marker stakes, valve boxes, cast iron pipe, manhole covers and large iron tanks. It also locates objects that generate their own magnetic field, such as magnets. This discriminating feature of the VIP-MAG simplifies the operator's search for a specific magnetic target. The size, shape, depth and orientation of the target object will define the "profile" or "signature" indicated on the VM-585 meter.



To Operate the VM-585:

1. To turn on the unit, press the ON/OFF /Speaker pushbutton. Then make sure the frequency is set to 'M'. (see Change the Locate Frequency in section 3.1).
2. The sensitivity of the instrument will automatically set itself to the last setting.
3. There will also be a "+" or "-" icon on the screen. This indicates the polarity of the magnetic field which will be explained later.



4. Sweep the area holding the unit such that it is pointing towards the ground at an angle of about 45 degrees. Walk forward slowly sweeping left to right and keeping the tip an even and close distance from the ground.
5. When a ferrous object is approached the bar graph will expand and the pitch from the speaker will increase. (Set the speaker volume with a momentary press of the ON/OFF pushbutton).
6. Hold the unit exactly vertical to pinpoint the highest pitch and largest bar graph deflection. If preferred, invert the screen by a prolonged press of the auto sensitivity pushbutton. The numeric value can be used to aid the pinpointing process. Refer to below picture. Pinpoint in two directions to ensure the exact location is found.
7. If the signal over ranges, use the "+" and "-" keys to bring the signal back into the range of the bar graph.
8. Alternatively pressing the auto sensitivity pushbutton will alter the gain automatically so that the bar graph is set to approximately 50%.

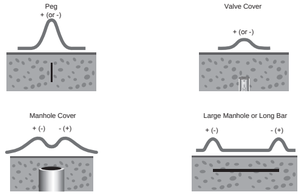
3.9.3 Signatures" of Different Targets

The following figures illustrate typical VM-585 responses to common targets. With a little experimentation you will become familiar with the "profile" or "signature" of each object you are trying to locate.

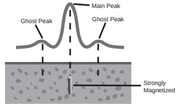
All magnetic fields have a positive or negative polarity. A long bar for instance will be positive one end and negative the other. Knowing the polarity of the magnetic field helps identify the shape and length of the object and helps distinguish it from other objects in the ground.

The polarity is indicated by the "+" or "-" icon. The polarity of the field depends on a number of factors. Magnets are polarized North and South. The polarization of the VM-585 detects depends on the way the magnet was inserted in the ground. Others are polarized by the earth's magnetic field.

The shape of response depends how big and how deep the object, larger objects will display a peak at the extremities of the object. These peaks will be opposite polarity. Smaller or deeper objects will have just one peak and may have a "+" or "-" polarity.

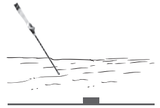


Very strong magnetic fields may have ghost signals either side of the main peak signal. Buried magnets, for instance may exhibit this effect.



3.9.4 Locating in Water

The VM-585 has a fully sealed antenna shaft. Therefore it is suitable for locating in water up to the end of this shaft.



4.0 Accessories

Direct Connection Leads 	To make a direct connection to a pipe or a de-energized cable conductor or cable sheath.
Ground Stake 	To make a ground connection to complete a direct connection circuit.

Signal Clamp 	To make an inductive coupling connection to a live cable or pipe.
LPC Separation Filter 	To safely inject a trace tone to a live cable via a domestic mains socket, so that the cable can be traced from the premises to the connection in the street.

5.0 Changing Batteries

Transmitter

1. A low battery is indicated by a flashing ON/OFF led.
2. To replace the batteries unscrew the two retaining screws on the end of the transmitter. Remove the battery cover and take out the old batteries.
3. Replace with four D type alkaline batteries.
4. Always replace all the batteries. Having batteries with different charges may result in batteries being reverse polarised which may then leak or overheat.
5. Replace the battery and hand tighten the retaining screws.

Receiver

1. A low battery is indicated by the icon of the receiver display.
2. To replace the batteries unscrew the end cap on the handle end of the VM-585.
3. Remove and replace BOTH batteries with fresh 1.5V alkaline AA (LR6)
4. Replace end cap.

6.0 Service Centre Information

If the equipment does not function properly, replace the batteries as described above. If the equipment still malfunctions, contact the Customer Service department at Vivax-Metrotech.

7.0 EMC Compliance

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

8.0 Maintenance

The VM-585 is designed for rugged, outdoor use, but rough handling should be avoided. Keep the equipment dry, clean and free of grit. Store the VM-585 in its carrying case and in a cool, dry place. **DO NOT** expose to excessive temperatures.

Disclaimer: Product and accessory specification and availability information is subject to change without prior notice.

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