

VM-585 User Guide V1.4

1. Introduction

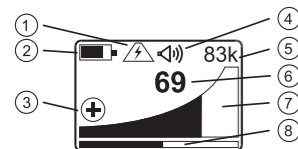
This guide describes the operation of the VM-585 combination pipe and cable locator and ferrous metal detector.



1	VM-585 Receiver	5	User guide
2	VM-585 Transmitter	6	Transmitter strap
3	Ground stake	7	Soft carry bag
4	Direct connect leads		

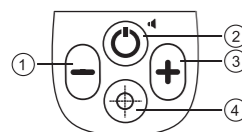
2. Display and Controls

2.1 Receiver Display



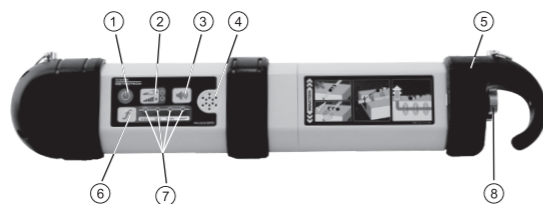
1	Power signal warning. Could be a live cable.
2	Battery level indicator (flashes when replacement is required)
3	Indicates polarity of field (+ or -)
4	Speaker level Indicator
5	Selected locate frequency
6	Percentage signal levels
7	Signal level indicator
8	Sensitivity setting indicator

2.2 Receiver 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 Controls



1	ON/OFF
2	Output power select and indicator
3	Speaker volume select
4	Speaker
5	Battery housing cover
6	Frequency selected
7	Frequency selected indicators
8	Battery cover retaining screws

3. Using the VM-585

3.1 Power Mode Operation

Switch on the unit by pressing the on/off pushbutton. Allow a few seconds to power up.

The frequency selected as shown on display. If this is not the desired locate frequency (i.e., 50 or 60Hz) change as indicated below.



NOTE

The first power up tone indicates the battery life. Replace batteries if necessary. See "Transmitter Batteries" Section.

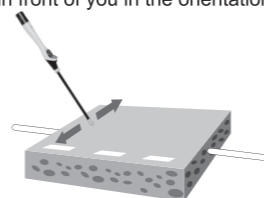
Changing the Receiver Locate Frequency

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 numbers 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.

Frequency range: Passive 50Hz or 60Hz depending on the region.
Active 512/Hz/640Hz (depending on region), 8.192kHz and 83.1kHz, and 8kHz Fault-find mode.

3.2 Locating a Cable in the Power (50/60Hz) 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 50 or 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-550/VM-560 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.

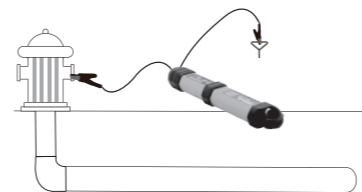


WARNING

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. A good connection will be indicated by a change in speaker tone. The larger the tone change, the better the connection. If there is no tone change, re-check the connections and if necessary clean the connection point with a wire brush and try again.



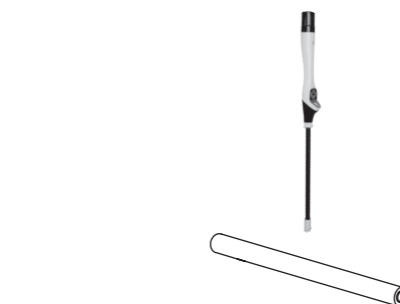
Select the desired frequency by pressing the "f" pushbutton. As a general rule the higher frequency will have a cleaner more stable reading and will jump insulation joints on pipes but has the disadvantage that it is more likely to jump to other utility nearby. The lower frequency is better for tracing a particular utility as it is more likely to keep to the utility line the transmitter is attached to. In if 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.

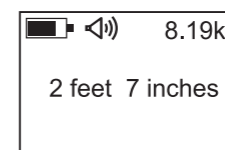
To trace the cable use the same method as described in the Locating a Cable in the Power (60Hz) Mode Section.

3.5 Depth Measurements (Available in 512 or 640Hz and 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.



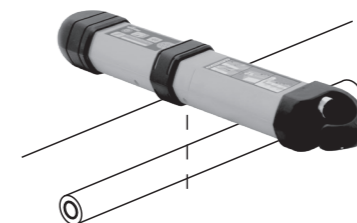
NOTE

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.

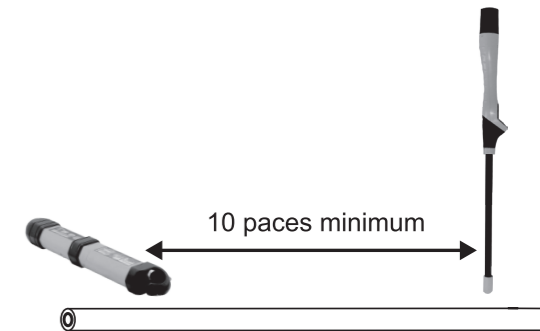
3.6 Induction Mode

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.



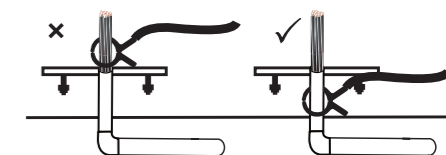
Switch on the transmitter and set to low output. Only switch to high if the signal received is too low. Only the high frequency is available in induction mode.

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.



3.7 Signal Clamp Mode

1. Connect the signal clamp to the transmitter.
2. Place the clamp around the cable to be located. 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 set to 8.192kHz for optimum clamp performance. Follow the locating instructions as in "the Direct Connection Mode" section.



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.

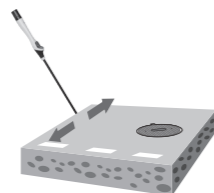
3.8 Ferrous Metal Detect Mode

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.

3.8.1 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)

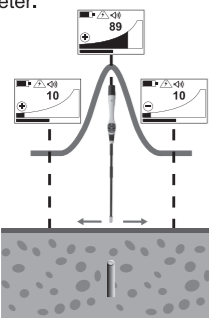
- Now momentarily press the auto sensitivity pushbutton. The sensitivity setting indicator should show maximum. (if not, find another test site) The display should read less than one half and the numeric value should be less than 50.
- Now lower the VM-585 receiver down towards the PK nail. Stop when 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.
- If the unit fails this test, it should be returned to the factory or approved service center as there are no field serviceable parts.



3.8.2 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 VM-585 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.



3.8.3 To Operate the VM-585 Metal Detection mode:

- 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).
- The sensitivity of the instrument will automatically set itself to mid gain.
- There will also be a "+" or "-" icon on the screen. This indicates the polarity of the magnetic field which will be explained later.

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- 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.
- 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).
- 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.
- If the signal over ranges, use the "+" and "-" keys to bring the signal back into the range of the bar graph.
- Alternatively pressing the auto sensitivity pushbutton will alter the gain automatically so that the bar graph is set to approximately 50%.



3.8.4 "Signatures" of Different Targets

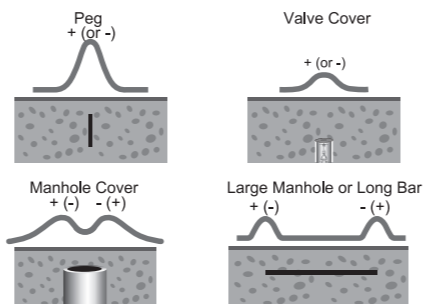
The following figures illustrate typical VM-585 responses to common targets. With a little experimentation you will become familiar with the "profile" or "signature" of each object you are trying to locate.

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.

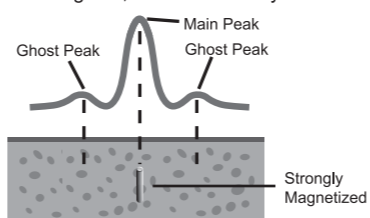
The polarity is indicated by the "+" or "-" icon. The polarity of the field depends on a number of factors. Magnets are polarized North and South. The polarization of the VM-585 detects depends on the way the magnet was inserted in the ground. Others are polarized by the earth's magnetic field.

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.

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



3.8.5 8kHz Fault Find Mode

The transmitter is also capable of energising a line with a fault find signal. The standalone A-frame (VM-510FFL) can then be used to identify the position of a ground fault. These faults tend to be cable sheath to ground faults or coating defects on pipelines. More information can be found in the user information for the particular accessory used, this manual instructs the user in how to apply the fault find signal from the VM-585FF transmitter and gives an overview of the standalone A-frame VM-510FFL.

To detect a damaged section, the line should be isolated and have all ground bonding removed. This will ensure that the ground fault is not masked by deliberate bonding to ground. The A-frame cannot distinguish between these two situations.

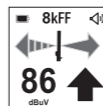
Connect the transmitter to the target line using the red connection lead. A ground stake needs to be pushed into the ground and the black connection lead clipped to it. Try to place the ground stake as far as possible from the line to be evaluated. This ensures return currents do not distort the results. Switch on the transmitter and make sure the A-frame and transmitter are both set to 8kHzFF. Note the 8kHzFF defaults to the high setting on the transmitter. It is not possible to select low output when in the 8kHz FF mode.



Remove the rubber spike covers from the A-frame.

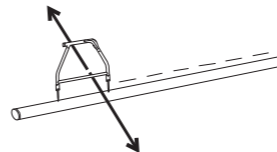
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Make a momentary push on the on/off button of the A-frame. It will automatically default to the A-frame screen.



Note that if the spikes are not in the ground or there is only a very small signal, the db reading and arrow may not be visible. These are only shown when there is a valid fault find signal.

Use the left/right indicator to position yourself over the cable. The correct position is indicated by the bar being centralised on the display. Note that if using the default FF screen as indicated above, there is no need to adjust the gain using the "+" and "-" buttons as the unit does this automatically for you.

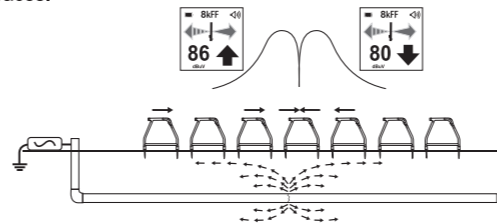


Also, the speaker will emit a pulsed tone one side of the cable and a solid tone the other, so it is possible to locate without looking at the screen. If necessary, adjust the volume by using short presses on the on/off button.

Hold the A-frame in line with the suspected route of the cable.

Walk along the route of the line placing the spikes of the A-frame in the ground (with the green leg pointing away from the transmitter connection point) every two or three paces. Allow a couple of seconds for the electronics to settle before moving off to the next position.

If starting near the transmitter, the arrow on the display will point away from the ground point. As the distance from the transmitter increases, the dBuV reading will reduce and eventually the arrow will fluctuate or disappear altogether. This is because the fault location is further along the line. Use the left/right indicator to ensure the A-frame is positioned over the line and continue placing the A-frame in the ground every two or three paces.



Eventually the A-frame will detect the fault signal and the "fault direction indicator" arrow will point forward. Continue moving forward, it may be worth reducing the distance between measurements points as the fault is neared. The dBuV reading will increase as the fault is neared. Maximum reading will be just before and just after the fault.

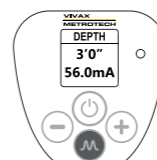
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When over the fault, the dBuV reading will drop and the arrow will flip backward indicating that the position of the fault has been passed. Carefully place the A-frame before and after the fault to pinpoint the position. Repeating this across the line direction will pinpoint the fault laterally. The fault will be at the point where the lateral fault is identified.

3.8.6 Determining the Depth and Signal Current applied to a Conductor (VM-510FF+ only)

To determine the depth/current of a conductor accurately, the VM-510FFL+ field strength must be strong enough to provide a stable meter reading. Keep in mind that depth and current measurements are affected by, overhead lines, adjacent conductors and abrupt changes in direction or depth.

- First determine the location of the conductor using any of the methods described above.
- Slowly rotate the A-frame to achieve the largest numeric value on the display. The A-frame is now on top of and in line with the conductor. Touch the spike tips to the ground keeping the A-frame vertical.
- Single press and release the Mode Button on the handle of the A-frame. Within seconds, the digital display will show the signal current and depth of the conductor.



The display will show "N/A" when a depth reading is not possible.

4. Changing Batteries

4.1 Transmitter Batteries

The VM-585FF transmitter is supplied with alkaline batteries. An optional rechargeable battery pack is available. A low battery is indicated by a flashing on/off LED. The transmitter requires four D type alkaline batteries. To replace the batteries, unscrew the two retaining fasteners of the battery compartment. Remove the old batteries and replace all of them. Mixing good and discharged batteries may result in excessive heat or even fire.

Note the retaining screws should only be hand tight. Only use a screw driver to undo the screws. It is not necessary to use a screw driver to tighten them.

4.2 Receiver Batteries

The VM-585 receiver is supplied with alkaline batteries.

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



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Service Center Information

If the equipment does not function properly, replace the batteries as described above. If the equipment still malfunctions, contact one of the Vivax-Metrotech Customer Service departments, or call the factory for the nearest authorized Vivax-Metrotech repair station.

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

EMC Compliance (VM-585FF Transmitter)

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.

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Visit us at www.vivax-metrotech.com to view our full product line and worldwide locations.

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