



VIVAX
METROTECH



**VM-510FFL+ Locator &
Fault Locator**



vLoc3 Accessory A-frame

A-Frame Fault Locators

User Manual

Vivax-Metrotech Corporation

4.04.000234 12/08/2023 V1.1

General Safety & Care Information

◆ Who Can Use This Equipment

- This equipment must only be used by people suitably trained in the use of pipe and cable locators.

◆ Work-site Safety

- Use your company's or other applicable safety codes and rules when using this equipment.
- Without the required authorization, license, and appropriate training, do not connect to any pipe, cable, or conductor.
- The equipment should not come in contact with corrosive or hazardous chemicals, gases, or dust.
- **Do not** directly connect this equipment to cables or pipes with a potential difference to ground greater than 25V AC.

◆ Equipment Safety

- **Do not** open the enclosures (housings) of the transmitter or receiver.
- Place the ground stake firmly before connecting the cable from the transmitter.
- **Do not** hold any uninsulated portion of the connection leads clips when the transmitter is switched on.

◆ Batteries and Environmental Safety

Vivax-Metrotech products use four types of batteries:

- Alkaline batteries
- Ni-MH (Nickel-Metal Hydride) batteries – rechargeable
- Lithium-ion batteries – rechargeable
- Lithium-metal batteries – (small non-rechargeable button cells for "clock" applications)

1. Alkaline Batteries (Non-Rechargeable)

- When replacing the alkaline batteries – use only the size and type specified – **do not** mix battery types (rechargeable and alkaline).
- **Do not** mix partially discharged and fully charged cells in the same battery pack – **do not** mix old with new.
- **Never** attempt to charge alkaline batteries.

2. Nickel-Metal Hydride Batteries (Rechargeable)

- When using rechargeable batteries, use only the correct charging device supplied or specified by the manufacturer. The battery pack or the battery charger will contain circuitry to manage the charging process – other chargers (even if they have the same connector, polarity, voltage, current rating will not have the same control circuitry and can cause damage to the product, overheating, and in extreme cases fire or harm to the individual.
- **Do not** assume that if the plug fits, it is the correct charger – a charger with the correct part number **must** be used – just because it is a Vivax-Metrotech charger and the plug fits **does not** mean it is the correct charger.
- Before using for the first time, charge rechargeable batteries for six hours. If the rechargeable batteries do not last as long as anticipated, discharge them fully and then charge them for six hours.
- Care should be taken when charging batteries – **Never** repeatedly recharge batteries (or turn the power off) without using the instrument. If used with an inverter in a vehicle – charge the product,

unplug the charger, and **not** charge again until the rechargeable batteries have been used for at least ten minutes. Failure to do this could result in the overcharging of the battery, which will shorten the battery's life and could, in some circumstances, cause overheating or fire.

- If the product becomes hot during the charging process, **immediately** unplug the charger and use the rechargeable batteries for at least ten minutes before recharging. If this reoccurs the next time the unit is charged – return immediately to Vivax-Metrotech for repair.
- **Do not** charge batteries for prolonged periods without using the locator for at least ten minutes. Charging for a prolonged period could overcharge the battery, reduce battery life, and in extreme circumstances, cause damage to the locator and fire.

3. Lithium-ion Batteries (Rechargeable)

• Lithium-Ion Batteries – some products use Lithium-Ion batteries – and the requirements for marking and transportation are still developing. Please contact Vivax-Metrotech before shipping products containing Lithium-Ion batteries or battery packs for any "special instructions."

4. Lithium-metal batteries (Non-Rechargeable)

- Commonly known as "button cells," these are small – non-rechargeable batteries used to power internal "clocks" within some units (similar to computers). Generally, they have a life of three to five years.
- Under no circumstances should any attempt be made to charge these batteries.
- Dispose of following your company's work practice/environmental standards, the prevailing laws, or recognized best practices. Always dispose of batteries responsibly.

5. General Rules regarding Disposal of Batteries

- **Never** disassemble a battery or battery pack.
- **Never** dispose of in a fire or water.
- Dispose of batteries following your company's work practice/environmental standards, prevailing laws, or recognized best practices. Always dispose of batteries responsibly.

6. Transportation of Lithium-Ion and Lithium-Metal Batteries

- The Lithium-Ion and Lithium-Metal batteries used in Vivax-Metrotech products meet the required safety standards and include the designated protection circuitry.
- Recent regulation changes require that when batteries with Lithium-Ion and Lithium-Metal batteries are transported, the packaging **must** include specified warning labels.
- please contact Vivax-Metrotech Customer Service (USA 1-800-446-3392, International +1-408-734-1400 (USA Pacific Time Zone)) for more details.
- Regulations have also changed regarding the shipping of spare battery packs (battery packs that are not inside a product). There are limitations on the package's weight, and the packaging must be marked with the appropriate warning labels.
- please contact Vivax-Metrotech Customer Service (USA 1-800-446-3392, International +1-408-734-1400 (USA Pacific Time Zone)) for more details.

- Vivax-Metrotech vLoc Series 3 products using Lithium-Ion batteries are classified as "not restricted" and can be shipped normally by road/rail/sea & passenger & freight aircraft without restrictions.



IMPORTANT

Batteries contain dangerous chemicals. They can be affected by many things, such as water ingress or heat. In some circumstances, they can explode. They also can cause electric shocks!

◆ **Care of Equipment**

- Use equipment only as directed in this User Handbook.
- **Do not** immerse any part of this equipment in water.
- Store in a dry place.
- Keep equipment in the case provided when not in use.
- If left for a prolonged period – remove alkaline batteries.
- Keep the unit clean and free of dust and dirt.
- Protect against excessive heat.

◆ **Care when Interpreting the Information provided by the Locator**

- This instrument locates and provides depth and current readings based on electromagnetic signals from the buried cable or pipe. In most cases, these signals will enable the locator to correctly pinpoint both position depth and current.
- **Beware** – in some cases, other factors will distort electromagnetic fields radiating from the cable or pipe, resulting in incorrect information.
- Always locate responsibly and use information learned during your training to interpret the information provided by the locator.
- **Do not** provide information regarding cable or pipe depth to anyone unless authorized by your company.
- **Remember** that depth measurements are to the center of the electromagnetic field or pipe – In the case of pipes, this may be significantly deeper than the top of the pipe.

◆ **American & Canadian Safety Notices**

USA

- This transmitter and receiver comply with the general operation conditions according to part 15 of the FCC Rules.
 - CFR 47 Part 2
 - CFR 47 Part 15
- Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the products.

CANADA

- Equipment is for use by trained operators only and not for general household or consumer use.
- Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference that may cause undesired operation.

EUROPE

- Vivax-Metrotech confirms that the location system complies with the relevant provision of European directive 1999/5/EC.
 - EN 55011
 - EN 61000-4-2: A1 & A2
 - EN 61000-4-3
 - EN 61000-4-8: A1
 - ETSI EN 300 330-2
 - ETSI EN 301 489-1
 - ETSI EN 301 489-3

Table of Content

1.	Service & Support.....	1
1.1	Serial Number and Software Revision Number	1
1.2	Distributors and Service Centers Closest to You:	2
2.	VM-510FFL+ Introduction	3
2.1	VM-510FFL+ What's in the Box	3
2.2	Fault Finding Frequencies VM-510FFL+	3
2.3	Changing the VM-510FFL+ Batteries	3
2.4	VM-510FFL+ Locate Screen	4
2.5	VM-510FFL+ Menu Settings	4
2.5.1	MODE Setting.....	5
2.5.2	FREQ Setting	6
2.5.3	BATT Setting.....	6
2.5.4	INFO	6
3.	vLoc3 Accessory A-Frame Introduction	7
3.1	Accessory A-Frame: What's in the Box	7
3.2	Fault-Finding Frequencies	7
3.3	Connect the vLoc3 Accessory A-Frame to a vLoc3 Series Receiver	7
3.4	vLoc3 Accessory A-Frame Locate Screen	8
4.	Transmitters	9
4.1	VM Series Transmitters Overview and Controls	9
4.1.1	VM Series Transmitter What's in the Box	9
4.1.2	VM Series Transmitters Overview	9
4.1.3	VM Series Transmitters Controls	9
4.2	Loc3 Series Transmitter Overview and Controls.....	9
4.2.1	Loc3 Series Transmitters - What's in the Box.....	10
4.2.2	Loc3 Transmitter Screen Descriptions.....	10
4.2.3	The Loc3 Transmitter Controls	10
4.2.4	Using the Transmitter	11
4.2.5	Connect the Transmitter	11
5.	Locating the Utility with an A-Frame	13
5.1	Locating the utility with the VM-510FFL+	13
5.2	Depth and Current readings from the VM-510FFL+	13
5.3	Locating with the vLoc3 Accessory A-Frame	14
6.	Fault Locating with the VM-510FFL+	15
6.1	Fault Locating with the VM-510FFL+ Receiver	15
7.	Fault Locating with the vLoc3-Accessory A-Frame	17
7.1	Using the Accessory A-Frame to Fault Find	17
8.	Glossary.....	20

1. Service & Support

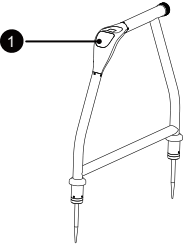
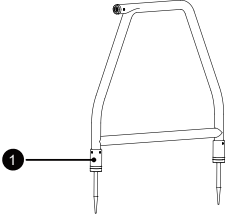
1.1 Serial Number and Software Revision Number

When requesting product support, always quote your A-frame model, serial number, and software revision number.

VM-510FFL+ - When the unit is powered on, the firmware version is momentarily displayed on the bottom of the screen.

Another option is when the unit is turned on, press and hold the Mode button to enter the Menu, use the +/- buttons to move the cursor to the INFO option and use the On/Off button to enter the INFO screen.

vLoc3 Accessory A-Frame - This unit does not have firmware to display. To view the firmware version for the vLoc3 series receiver, enter the user menu by pressing and holding the I button. Now, use the +/- buttons to navigate to and select the ABOUT screen.

Model & Serial Number	
	
VM-510FFL+	vLoc3 Accessory A-frame

1.2 Distributors and Service Centers Closest to You:

Worldwide Sales Offices and Service Centers

World Headquarters,

United States of America

Vivax-Metrotech Corporation

3251 Olcott Street, Santa Clara,
CA 95054, USA

T/Free: 1-800-446-3392

Tel: +1-408-734-1400

Fax: +1-408-734-1415

Website: www.vivax-metrotech.com

Email: SalesUSA@vxmt.com

Central/South America and the Caribbean

Ventas para América Latina

3251 Olcott Street,
Santa Clara, CA 95054, USA

T/Free: 1-800-446-3392

Tel: +1-408-734-1400

Fax: +1-408-743-5597

Website: www.vivax-metrotech.com

Email: LatinSales@vxmt.com

Canada

Vivax Canada Inc.

41 Courtland Ave Unit 8,
Vaughan, ON L4K 3T3, Canada

Tel: +1-289-846-3010

Fax: +1-905-752-0214

Website: www.vivax-metrotech.ca

Email: SalesCA@vxmt.com

France

Vivax-Metrotech SAS

Technoparc - 1 allée du Moulin Berger,
69130 Ecully, France

Tel: +33(0)4 72 53 03 03

Fax: +33(0)4 72 53 03 13

Website: www.vivax-metrotech.fr

Email: SalesFR@vxmt.com

Germany

Metrotech Vertriebs GmbH

Am steinernen Kreuz 10a,
96110 Schesslitz, Germany

Tel: +49 9542 77227-43

Website: www.vivax-metrotech.de

Email: SalesEU@vxmt.com

United Kingdom

Vivax-Metrotech Ltd.

Unit 1, B/C Polden Business Centre,
Bristol Road, Bridgwater, Somerset,
TA6 4WA, UK

Tel: +44(0)1793 822679

Website: www.vivax-metrotech.co.uk

Email: SalesUK@vxmt.com

China

Vivax-Metrotech (Shanghai) Ltd.

3/F No.90, Lane 1122 Qinzhou Rd.(N),
Shanghai, China 200233

Tel: +86-21-5109-9980

Fax: +86-21-2281-9562

Website: www.vivax-metrotech.com

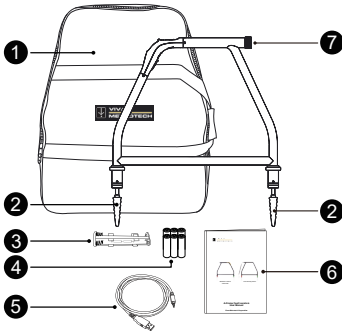
Email: SalesCN@vxmt.com.cn

2. VM-510FFL+ Introduction

The VM-510FFL+ is used to detect ground faults on pipes and cables. In the case of pipes, the faults consist of coating defects, known as holidays. In cables, faults are usually caused by insulation damage, allowing the metallic sheath (or internal conductor) to contact the ground.

In addition to fault locating, the VM-510FFL+ can locate and trace the path of buried cables.

2.1 VM-510FFL+ What's in the Box



- ❶ A-frame soft carry bag
- ❷ Rubber spike covers
- ❸ Battery holder
- ❹ AA Alkaline battery (only in North America)
- ❺ Mini-USB lead
- ❻ User Manual
- ❼ VM-510FFL+ A-frame locator and fault finder

2.2 Fault Finding Frequencies VM-510FFL+

Fault finding requires a non-standard frequency.

- 3/6Hz Fault find (Used to detect faults on pipelines)
- 8kFF (General purpose fault find with good results on short and long runs and has good sensitivity)

The VM-510FFL+ requires a fault-find signal to be applied to the faulty conductor via a connected transmitter.

This manual assumes that the 8kHz FF signal is used. The operation of the two frequencies is very similar.

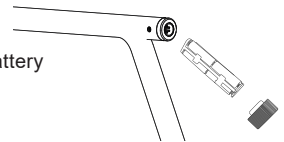
Compatible Transmitters for the VM-510FFL+: All Vivax-Metrotech transmitters with 8kFF or "FF" (3/6Hz fault find) frequencies. This manual assumes that one of the VM series transmitters is used.

This manual assumes that one of the VM series transmitters is used.

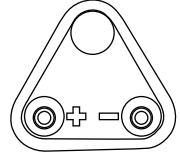
2.3 Changing the VM-510FFL+ Batteries

Six AA-size alkaline batteries power the VM-510FFL+ Receiver. NiMH batteries can also be used.

Unscrew the battery cap on the unit's handle and remove the AA battery holder.



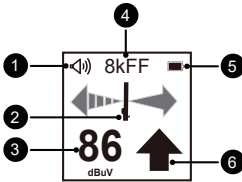
The battery holder contacts should be at the bottom when inserting the battery pack, as shown in the picture on the left.



Replace all of the batteries. Do not mix new and old batteries.

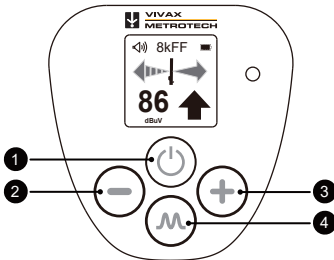
2.4 VM-510FFL+ Locate Screen

A short press on the On/Off button will switch on the unit, and the default Fault Locate screen will appear. The screen elements are listed below.



- 1 Speaker Volume (short press the On/Off button to change the volume levels from low, medium, to high, then off)
- 2 Left/Right of cable indicator
- 3 Fault signal level (dBuV)
- 4 Mode (defaults to 8kFF)
- 5 Battery level indicator
- 6 Fault direction indicator

The unit is operated by four buttons as listed below:



- 1 **On/Off** button. A short press on, long press off. Short press to change the volume.
- 2 **"-"** button. Decrease sensitivity or, when in Menu, will scroll up.
- 3 **"+"** button. Increase sensitivity or when the menu will scroll down.
- 4 **Mode** button. Single press for depth, double press to change mode, long press for Menu.

2.5 VM-510FFL+ Menu Settings

The VM-510FFL+ A-frame has several configurable features. The setup for these features can be accessed from the system menu.

To enter the Menu, press and hold the Mode button until the Menu appears.

MENU	
▶MODE	FF
FREQ	8kFF
BATT	Alka
INFO	

When on the Menu screen, the buttons have the following functions:

- **"+"** and **"-"** buttons navigate up and down to select an item in the Menu.
- The **On/Off** button is used to change a selection.
- The **Mode** button is used to enter or exit the menu screen.

2.5.1 MODE Setting

The VM-510FFL+ receiver has four line locate options to select from.

Press and hold the Mode button to enter the Menu, then use the +/- buttons to navigate the MODE option. Press the on/off button to make the Mode selections of FF, P/N, Peak or Null.

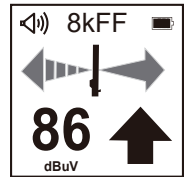


Use the shortcut to change Modes by double-clicking the Mode button while you're on the main screen.

FF (Fault Find)

This is the default VM-510FFL+ screen.

The left/right locate arrows and the Forward/Backward direction to the fault are shown.



P/N (Peak and Null)

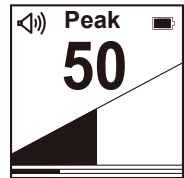
This mode uses the peak and null antenna to indicate the cable's position on the Left/Right indicator. The numeric value indicates the peak value. In a non-distorted signal field, the maximum peak indicator will coincide with the left/right indicator's null position, i.e., the bar will be centralized. If they do not coincide, the signal is distorted, and the information should be treated cautiously.



PEAK

The bar graph and numeric value show the maximum signal (peak) over the cable in the Peak mode. The Peak locate mode is the most accurate and will pinpoint the cable's position when high accuracy is required.

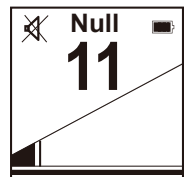
The bar graph at the bottom of the display indicates the gain setting. The gain can be altered when pressing the +/- buttons in Peak or Null modes.



NULL

The bar graph and numeric value show the minimum signal (null) over the cable in the Null mode. This method is useful for tracing the approximate position of the cable while walking the route.

Caution should be taken because the null signal can be displaced to the side by a distorted signal.



2.5.2 **FREQ Setting**

Use the +/- buttons in the user menu to move the cursor to the FREQ option, then use the On/Off button to select either 8kFF or FF. The preferred fault find mode is 8kFF because it performs best in most situations. However, the FF signal is compatible with older-type transmitters. Check which setting is used on the transmitter and select the setting on the A-frame to match.

2.5.3 **BATT Setting**

Use the +/- buttons to move the cursor to the BATT option, then use the On/Off button to select either ALKA for alkaline batteries or NiMH if rechargeable batteries are used.

2.5.4 **INFO**

Press and hold the Mode button to enter the Menu, use the +/- buttons to move the cursor to the INFO option, and use the On/Off button to enter the INFO screen.

3. vLoc3 Accessory A-Frame Introduction

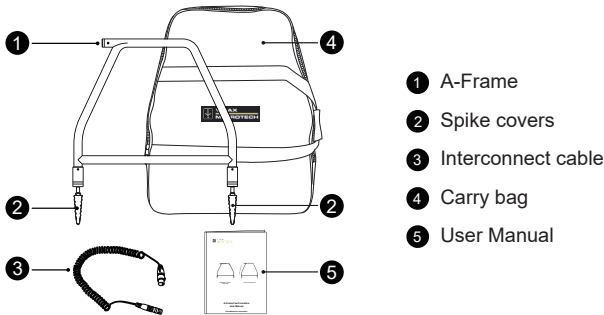
The vLoc3 Accessory A-Frame is used to detect ground faults on pipes and cables. In the case of pipes, the faults consist of coating defects known as Holidays. In cables, faults are usually caused by insulation damage, allowing the metallic sheath (or internal conductor) to contact the ground.

Fault Locate Frequencies: The vLoc3 Accessory A-Frame requires a fault-find signal on the faulty conductor via a connected transmitter. The two available fault find frequencies are FF (3/6Hz) fault find and 8kFF (8Hz fault find).

This manual assumes that the 8kHz FF signal is used. The operation of the two frequencies is very similar.

Compatible Transmitters: All Vivax-Metrotech transmitters with 8kFF (8Hz fault find), "FF" (3/6Hz fault find), SD- or SiS-frequencies.

3.1 Accessory A-Frame: What's in the Box



What's in the box

3.2 Fault-Finding Frequencies

Fault finding requires a non-standard frequency. Historically, there have been many versions of fault-finding frequencies. Some of these are listed below:

- 3/6Hz Fault find (Used to detect faults on pipelines)
- Signal Select Fault find (Good for fault finding on short runs such as power networks)
- SD Fault find (General purpose fault-finding)
- 8kFF (General purpose fault find with good results on short and long runs and has good sensitivity)

For this manual, 8kFF is concentrated on as it gives the best overall performance.

3.3 Connect the vLoc3 Accessory A-Frame to a vLoc3 Series Receiver

The Accessory A-Frame plug and the vLoc3 accessory socket are keyed connectors. Line the red dot on the plug to the red dot on the socket (12 o'clock position) to the red dot on the socket and insert the plug.



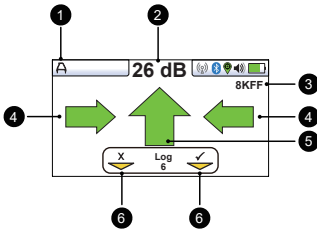
To remove the plug, grab the textured end and pull it back while pulling the plug out of the socket.



The “Auto shutdown” option in the vLoc3 series receiver is automatically set to “Never shut down” when the A-frame is attached.

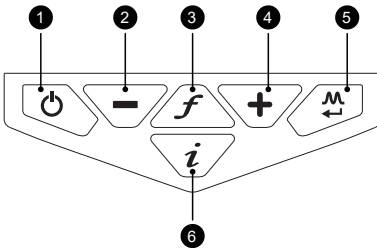
3.4 vLoc3 Accessory A-Frame Locate Screen

When the A-frame is plugged into the vLoc3 series receiver accessory socket, the receiver will automatically default to the A-frame screen when powered on.



- 1 A-Frame icon – shows that the a-frame is detected and the receiver is in the fault find mode.
- 2 Fault Signal Level (dBuV)
- 3 Receiver/A-frame frequency
- 4 Left/Right cable locate arrows.
- 5 Fault direction arrow
- 6 Data logging options

vLoc3 series locate and fault locate screen



- 1 On/Off button
- 2 Reduce sensitivity. (Also, scroll up when in the menu)
- 3 Select frequency
Long press = show the pre-selected frequency table
- 4 Increase sensitivity. (Also, scroll down when in the menu)
- 5 Enter Key
Short press = change antenna response when in classic screen
Long press = change the locate perspective
- 6 Information and Depth key
Short press = enter the information and logging screen
Long press = enter the menu

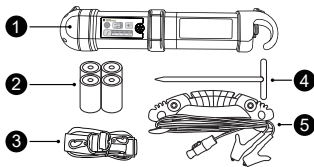
vLoc3 series keypad

4. Transmitters

4.1 VM Series Transmitters Overview and Controls

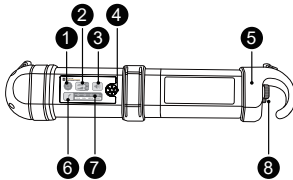
The VM-500 series transmitters are rugged portable transmitters powered by alkaline “D” cells or Li-ion rechargeable batteries. The following describes the features and controls of the transmitter.

4.1.1 VM Series Transmitter What’s in the Box



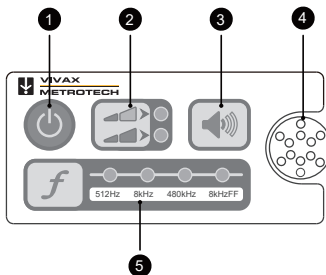
- 1 VM series transmitter
- 2 D-cell Alkaline batteries (not supplied in all regions)
- 3 Carry strap
- 4 Ground stake
- 5 Direct connection lead

4.1.2 VM Series Transmitters Overview



- 1 On/Off button
- 2 Output power select and indicator
- 3 Speaker volume select
- 4 Speaker
- 5 Battery housing cover
- 6 Frequency selector
- 7 Selected frequency indicators
- 8 Battery cover retaining screws

4.1.3 VM Series Transmitters Controls

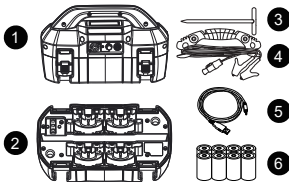


- 1 On/Off button
- 2 Output Low/High
- 3 Volume control
- 4 Speaker
- 5 Frequency indicator

4.2 Loc3 Series Transmitter Overview and Controls

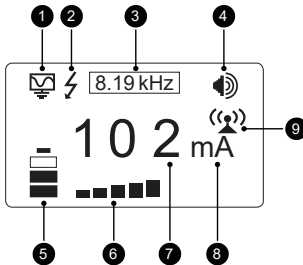
The Loc3 series transmitters are rugged portable transmitters powered by alkaline “D” cells or Li-ion rechargeable batteries. The following describes the features and controls of the transmitter.

4.2.1 Loc3 Series Transmitters - What's in the Box



- 1 Loc3 series transmitter
- 2 Alkaline battery tray
- 3 Ground stake
- 4 Direct connection lead
- 5 Mini-USB lead
- 6 D-cell alkaline batteries (not supplied in all regions)

4.2.2 Loc3 Transmitter Screen Descriptions

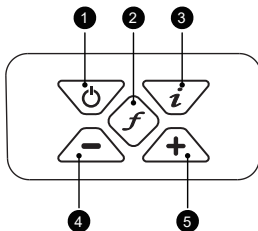


- 1 Mode indication icon
- 2 High Voltage Warning*
- 3 Active frequency
- 4 Speaker level
- 5 Battery status
- 6 Output step bar graph up to 280V Peak to Peak (60V RMS)
- 7 Digital readout (mA, volts, ohms)
- 8 Units (mA, volts, ohms)
- 9 Tx-Link – Remote link to control the transmitter from the receiver.
Blinking icon = Tx-Link is not paired,
Solid icon = Tx-Link is active and linked to the transmitter

*Output Protect Warning

The transmitter checks the line when connected. Output protection against accidental momentary connection to up to 230V AC (RMS) will display the "high voltage" warning icon and not allow the transmitter to operate. A 1.6A/250V fuse protects the 5-watt and 10-watt transmitters. The fuse protects both in case of excessive voltage spikes on the line.

4.2.3 The Loc3 Transmitter Controls

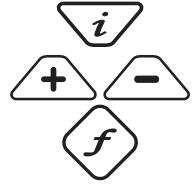


- 1 On/Off button
- 2 Frequency selector
- 3 Information (Volume, Volts, Ohms, Multi-frequencies LCD Contrast, Receiver Link, Frequency Menu and About screen)
- 4 Output decrease/navigate through the Menu
- 5 Output increase/navigate through the Menu

Press the **i** button to access the transmitter settings and Menu.

Use the **+** and **-** buttons to navigate the settings and menus.

Use the **f** button to make selections. An **X** will appear for selected items.



4.2.4 Using the Transmitter

The following method assumes the cable has been de-energized and no dangerous voltages are present. The transmitter can only be applied to live cables if a qualified engineer uses the appropriate voltage isolators.

If in doubt, use the Induction mode. For further details on these techniques, refer to the full user manual supplied with the equipment.

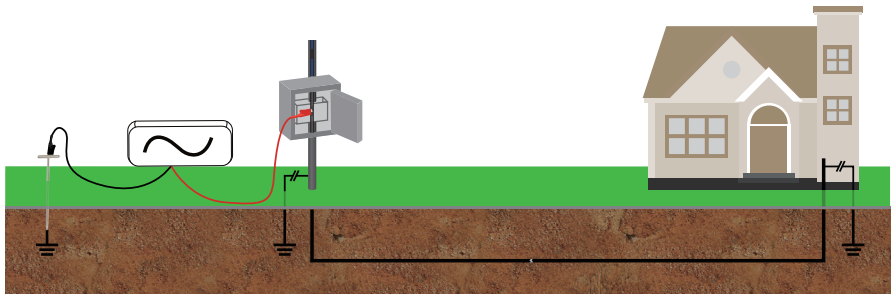
4.2.5 Connect the Transmitter

This section covers the VM series, Loc series and Loc3 series of transmitters. While these transmitters have different features, they all have the 8kFF fault Locate frequency and connect similarly. These different transmitters are represented in the illustrations by this icon.



Transmitter icon

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



The line is isolated by lifting the grounds at both ends

After isolating the line, if available, use the resistance measuring function on the transmitter, or if not, use a dedicated resistance measuring device to confirm that the resistance is not too high. The A-frame will typically detect faults up to 2 megaohms depending on the transmitter's output power, soil conditions, etc.



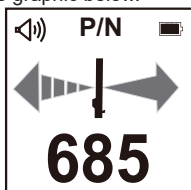
Always connect the ground stake first when connecting up and last when disconnecting. Make the connections before switching on, as hazardous voltages can be on the connection clips.

1. Connect the transmitter to the target line using the red lead. A ground stake must be pushed into the ground and the black cable clipped. Place the ground stake as far as possible from the line to be evaluated. This ensures that return currents do not distort the results.
2. Switch on the transmitter and use the "f"-button to select 8kFF high or low. Use 8kFF high if the line to be surveyed is long, or the fault resistance is high. Set the receiver to the same frequency.

5. Locating the Utility with an A-Frame

5.1 Locating the utility with the VM-510FFL+

Use the Left/Right Guidance, signal strength and audio tone to guide you toward the conductor. The Left/Right Guidance meter needle will move to the right, and the tone will be steady if the conductor is to your right. The needle will move to the left and the tone will pulse if the conductor is to your left. The signal (or field) strength on the digital display (LCD) will rise as you approach the conductor. As you close in on the conductor's location, the meter needle will move toward the center, the signal will peak and the tone will be silent. See the graphic below.



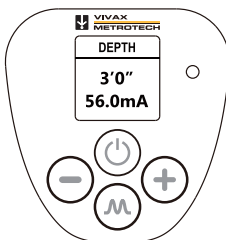
VM-510FFL+ A-Frame

5.2 Depth and Current readings from the VM-510FFL+

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

1. First determine the conductor's location using the methods described above.
2. 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.
3. Single press and release the Mode Button on the A-Frame handle. Within seconds the digital display will display the signal current and depth of the conductor.

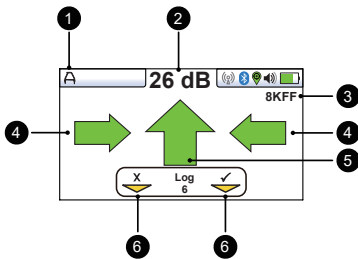
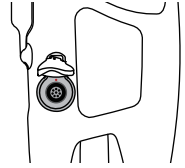
The display will show N/A when a depth reading is not possible.



VM-510FFL+ A-Frame

5.3 Locating with the vLoc3 Accessory A-Frame

1. Press the on/off button to power up the vLoc3 series receiver.
2. Plug the vLoc3 accessory a-frame into the receiver's accessory socket. The receiver will automatically enter the fault find mode and a screen like the one below will be seen on the receiver.



- 1 A-Frame icon – shows that the a-frame is detected, and the receiver is in the fault find mode
- 2 Fault Signal Level (dBuV)
- 3 Receiver/A-frame frequency
- 4 Left/Right cable locate arrows
- 5 Fault direction arrow
- 6 Data logging options

Use the Left/Right Guidance arrows and audio tone to guide you toward the conductor.

6. Fault Locating with the VM-510FFL+



Always be aware of the location of buried utilities, especially buried power lines when pushing the A-frame spikes into the soil.

The A-frame spikes are sharp. Always handle carefully to avoid injury.

Do not stand on the cross brace or put too much force on it as it will damage the A-Frame.

6.1 Fault Locating with the VM-510FFL+ Receiver

Fault finding requires a non-standard signal "8kHz FF". (Or FF fault find signal but ensure the Rx and Tx settings are matched)

Please look at section 4.2.5, "Transmitter connection" to ensure the transmitter's proper connection. Make sure the receiver and transmitter are set for the same fault-finding frequency.

Reference – If just one fault is suspected, it is possible to take a reference number to estimate the magnitude of the fault. To obtain a reference, push the A-Frame spikes in the ground approximately 1 meter from the earth stake and point away from the stake. The dBuV number shown on the display is called the Reference number. When the fault is reached, the dB numbers on the display will fall within the reference numbers range. Make a note of the reference number.

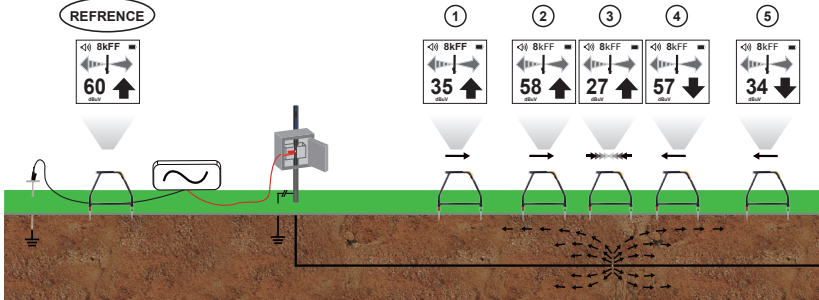
Walk along the line's route, holding the A-frame in line with the cable's suspected route. Place the A-frame's spikes in the ground every two or three paces, pointing the green leg away from the transmitter connection point. Allow a few seconds for the electronics to settle before moving to the next position. (#s 1 and 2 in the below illustration)

If starting near the transmitter the arrow on the display will point away from the ground point. As the transmitter's distance increases, the dBuV reading will reduce, and the arrow will eventually 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 Find" arrow will point forward. Continue moving forward, and it may be worth reducing the distance between measurement points as the fault is neared. The dB reading will increase as the fault is neared. Maximum reading will be just before and just after the fault. If there is just one fault, the maximum dB reading will be close to the reference recorded at the beginning of the survey. When the fault is passed the arrow will point backward indicating the fault has been passed.

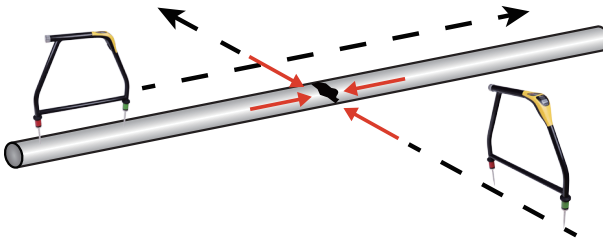
Carefully place the A-frame before and after the fault to pinpoint the position.

When exactly over the fault, the dBuV reading may drop. This is because when the spikes exactly straddle the fault, the signals on the spikes are opposite in polarity and cancel each other out.



Note – The alternating forward/backward arrow can also mean the fault is lying.

When over the fault, the dBuV reading will drop, and the arrow will flip backward, indicating that the fault's position 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.



Always disconnect or isolate target/faulty/suspected cables before connecting the transmitter to it. Never attach the transmitter to live cables.



If it is suspected that there is just one fault, insert the A-frame approximately one meter from the ground stake. Note the dBuV - this is approximately the maximum dBuV reading that will be measured over the fault.

7. Fault Locating with the vLoc3-Accessory A-Frame



Always be aware of the location of buried utilities, especially buried power lines when pushing the A-frame spikes into the soil.

The A-frame spikes are sharp. Always handle carefully to avoid injury.

Do not stand on the cross brace or put too much force on it as it will damage the A-Frame.

7.1 Using the Accessory A-Frame to Fault Find

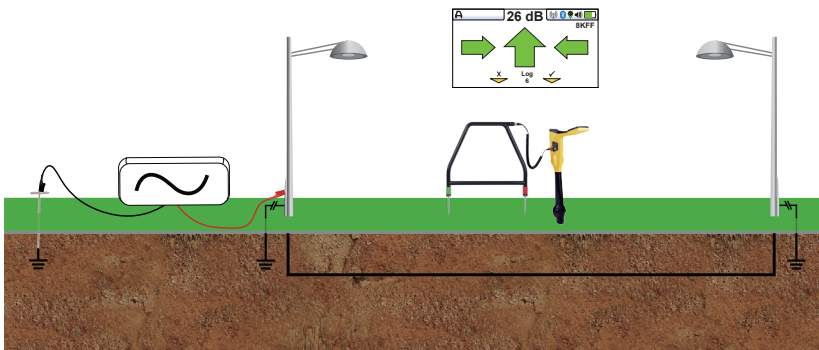
The analog A-frame accessory detects ground faults on pipes and cables. In the case of pipes, the faults consist of coating defects. In the case of cables, faults are usually caused by insulation damage that allows the metallic sheath (or internal conductor) to contact the ground.

It is intended to be used with the vLoc3 series range of locators and will require a fault find signal applied to the faulty conductor from a Vivax-Metrotech compatible transmitter.



Fault finding requires a non-standard signal "8kHz FF". (Or FF fault find signal but ensure the Rx and Tx settings are matched)

Please look at section 4.2.5, "Transmitter connection" to ensure the transmitter's proper connection. Make sure the receiver and transmitter are set for the same fault-finding frequency.



Plug the A-frame into the receiver accessory socket. When the receiver is switched on, it will automatically default to the A-frame screen.

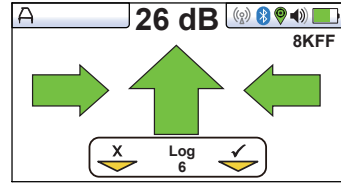
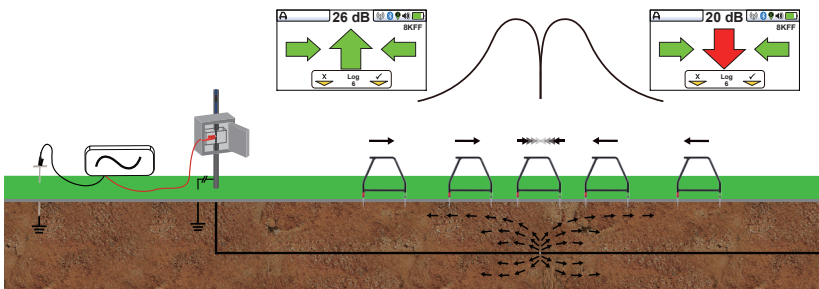


Image for reference only and may differ from the actual image

Remove the rubber spike covers from the A-frame.

Walk along the line's route, placing the A-frame's spikes in the ground with the green leg pointing away from the transmitter connection point every two or three paces.

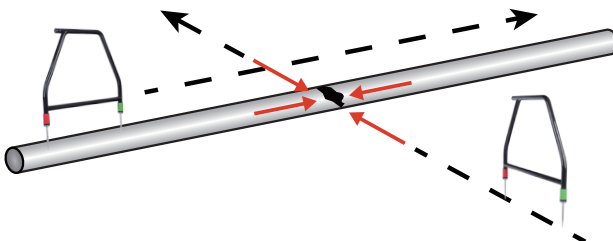
If starting near the transmitter, the arrow on the display will point away from the ground point. As the distance from the transmitter increases, the dB reading will reduce, and the arrow will eventually fluctuate or disappear altogether. This is because the fault location is further along the line. Use the left/right arrows to ensure the A-frame is positioned over the line and continue placing the A-frame in the ground every two or three paces. If necessary, use long presses of the "M" pushbutton to enter the locate screen allowing the user to confirm the position and depth of the target line. Use a long press of the "M" pushbutton to scroll through the screens to re-enter the A-frame mode.



(Note that the A-frame is not shown connected to the receiver to simplify the diagram)

Eventually, the A-frame will detect the fault signal and the "Fault Find" arrow will point forward. The dB reading will increase as the fault is neared. Maximum reading will be just before and just after the fault. When over the fault, the dB reading will drop and the arrow will flip backward indicating that the position of the fault has been passed. Continue moving forward. Reducing the distance between measurement points may be worth as the fault is neared.

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.





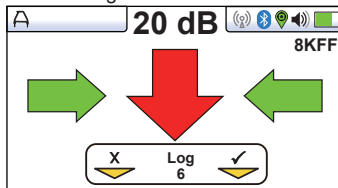
Always disconnect or isolate target/faulty/suspected cables before connecting the transmitter to it. Never attach the transmitter to live cables.



If it is suspected that there is just one fault, insert the A-frame approximately one meter from the earth stake. Note the dB reading - approximately the maximum dB reading measured over the fault.

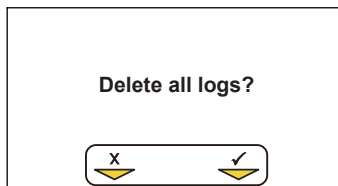
A-frame Datalogging

Data logging is possible when the A-frame is connected. Ensure the A-frame is located in the desired position with the pins firmly inserted in the ground.

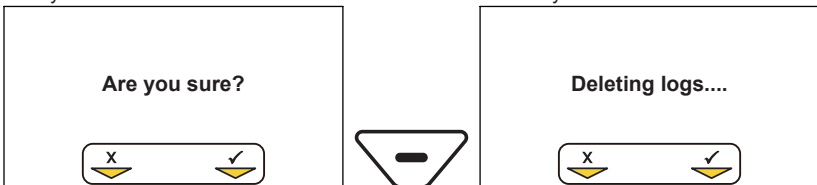


To record data, press the “+” button. The soft key on the display will momentarily go green, indicating that the data is stored, and the Log number will increment.



The data log can also be deleted from the Info screen. From the A-frame screen, press and hold the “-” key. The message below will be shown.




Press the “+” key to confirm. The locator will ask again, “Are you sure?”. Press the “-” key to delete or the “+” key to cancel the deletion and return to the locate/accessory screen.



8. Glossary

Active Locate	A locate where a transmitter is used to apply a signal to a buried pipe or cable, the position of which is then located by a receiver tuned to the same frequency.
Active Signal	The locator transmitter applies a signal to a buried line. Typical, this is a very precise frequency.
Attenuation	The reduction of an electromagnetic signal from a pipe or cable.
Clamp (or Coupler)	An accessory used to apply the transmitter signal to an insulated line, removing the need to connect the transmitter signal directly to a conductor or cable sheath.
Compass	Line direction indicator (although visually like a compass, this is the only relation to a compass.)
Coupling	The act of signals transferring to lines to which they were not originally applied. The coupling can be "direct" where the target line has an electrical connection to another line, or "induced," where the signal radiates from the target line to another line.
Display	The information visually available on the dot matrix display.
Line	A generic term for any buried pipe or cable.
Null	A minimum response to a buried line. 
Passive Locate	The receiver searches for a wide range of signals that radiate from buried pipes or cables. These signals come from various environmental sources and couple to the buried (& overhead) lines. Typical examples are 50 / 60Hz and LF/VLF radio.
Passive signals	A wide range of signals that radiate from buried pipes or cables. These signals come from various environmental sources and couple to the buried (& overhead) lines. Typical examples are 50/60Hz and LF/VLF radio.
Peak	A maximum response to a buried line. 
Pinpoint	Using a receiver to identify the exact position of a buried line.
Response	The indication that the receiver gives is caused by the signals it receives. This can be visual, audio, or both. Typically, it is displayed on the locator's dot matrix display and audibly from a loudspeaker in the receiver housing.
Search (sweep)	This describes looking for a buried line within a given area.
Sonde	A small transmitting coil may be built into a product such as a sewer camera or packaged as a small self-contained battery-powered transmitter. A receiver tuned to the same frequency can locate the Sonde's position and whatever it is attached to or in. Frequently used for locating sewer cameras and the nonmetallic pipes.
Target Line	The buried pipe or cable to be located.
Trace	Using a locator to following the path of a buried line.



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Illustrations used in this manual's preparation will inevitably show some resemblance to similar illustrations from other manufacturers. These manufacturers have permitted the use of their graphics. This statement is intended to attribute such credit.

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



Online Manual

Vivax-Metrotech Corporation

3251 Olcott Street, Santa Clara, CA 95054, USA

Toll-Free: 1-800-446-3392

Phone: +1-408-734-1400

Website: www.vivax-metrotech.com