

7. Loc3-5Tx Transmitter

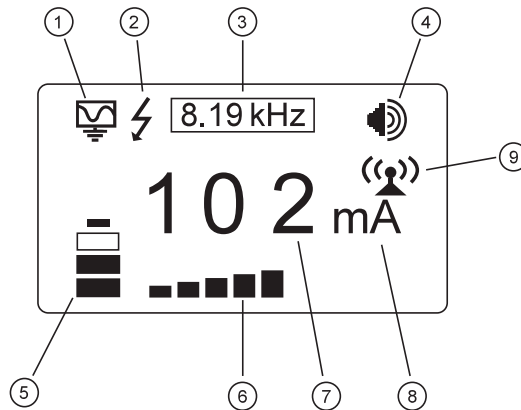
7.1 Loc3-5Tx Transmitter Overview

The Loc3-5Tx transmitter is a rugged portable transmitter powered by alkaline “D” cells or Li-Ion rechargeable batteries. The following describes the features and uses of the transmitter.



- A USB socket is mounted inside the battery compartment and is used for transmitter's firmware upgrade.
- The beeper is positioned behind a small hole on one side of the housing.

7.1.1 Display

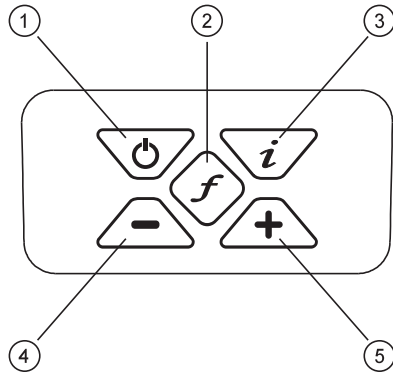


1	Mode Indication Icon	
2	High Voltage Warning* (output is enabled for high voltage)	6
3	Frequency Being Transmitted	7
4	Loudspeaker Level	8
5	Battery Status	9
		6
		7
		8
		9

***External Voltage Warning**

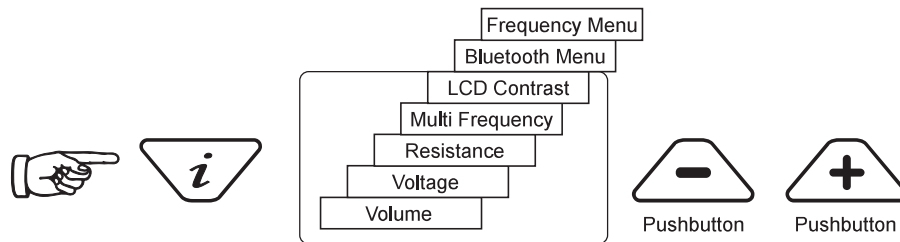
The transmitter checks the line when connected. If the line is carrying voltages in excess of 25V, it will display the “high voltage” warning icon, and not allow the transmitter to operate. In addition, the transmitter is protected in the event of excessive voltage or voltage spikes on the line.

7.1.2 Pushbuttons



1	On/Off Control
2	Frequency Select
3	Information (Volume, Volts, Ohms, Multi Frequencies LCD Contrast, Bluetooth Menu, Frequency Menu)
4	Output Decrease/Navigate through menu
5	Output Increase/Navigate through menu


7.1.3 Information Pushbutton



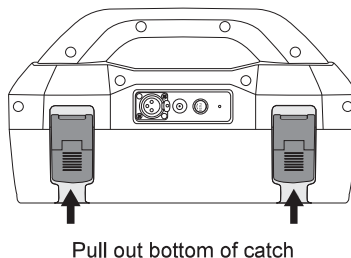
When the “i” (information) pushbutton is pressed, the display will show the audio volume level , use the “+” and “-” pushbuttons to increase/reduce the volume or turn the beeper off (off – low – medium – high).

By pressing the “i” (information) pushbutton the display can be toggled to show “voltage” and “resistance”. The display indicates mA, as the default, and volts or ohms when selected.

7.2 Transmitter Battery

 By default, transmitters are shipped with eight D cell alkaline batteries. A rechargeable Li-Ion (Lithium-Ion) battery kit is available as an accessory. The battery status is displayed on the left side of the display. The letters “LP” will appear when the battery status reaches only one bar. At this battery level the max output current and power is limited.

7.2.1 Removing the Battery Tray

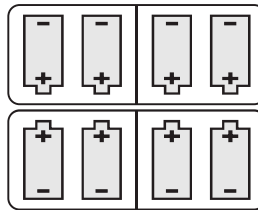


7.2.2 Replacing the Alkaline Battery

- To access batteries – undo the two latches that are locking the battery cover.
- To remove batteries – remove the battery holder from the inside of the unit.
- Replace batteries with new batteries of the same type, be sure not to mix old and new batteries.
- **Do not** use rechargeable batteries in the alkaline battery tray. Ensure that batteries are inserted the correct way (see label and molded “-” and “+” in the bottom of the tray).
- Refit the battery tray – then close the battery cover.



WARNING
Alkaline Batteries – insert alkaline batteries (x 8) as shown:



7.2.3 Rechargeable Batteries

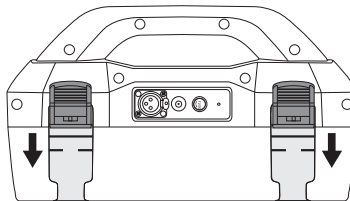
- **Do not** attempt to replace the rechargeable batteries or remove battery covers – return to Vivax-Metrotech or a Vivax-Metrotech approved service centers for replacement.



WARNING
Use only Vivax-Metrotech recommended charger.

7.2.4 Re-fitting the Battery Tray

To close the battery tray – slide the transmitter (TX) onto tray, it will locate itself in the correct position, then close the catches.



Push up button underneath the catch – where holding that up push in the bottom of the catch. You will hear a positive “click”.

7.2.5 Rechargeable Battery Pack Charging and Disposal

Follow the instructions in the General Safety & Care section portion of this document.

Only use the battery charger supplied with the battery. Using a non-approved charger may damage the battery pack and could cause overheating.

The rechargeable battery pack must be connected to the transmitter in order to charge. Connect the charger to the charging socket on the inside of the transmitter and connect the charger to a suitable mains socket.

The LED on the charger will show a red light indicating that the charge cycle is in progress. When the batteries are fully charged the LED will change to green.

**NOTE**

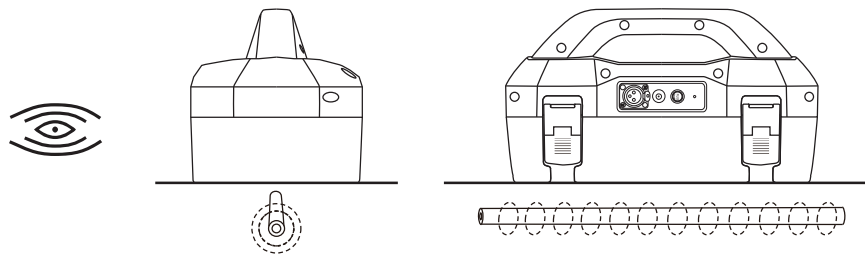
Rechargeable pack cannot be charged from a 12V DC source.

7.3 Transmitting Modes

The transmitter has three transmitting modes, which are selected automatically.

7.3.1 Induction Mode

This uses an internal antenna to induce a locating frequency onto the target pipe or cable (line). “Induction” mode is automatically selected if no connection accessories are plugged into the “output socket”. An icon indicating “Induction” mode shows on the display. The icon flashes when the transmitter is transmitting. In order to generate successful induction, the transmitter should be positioned over and with the handle perpendicular to the target line.



“Induction” mode is generally used when no access is available to make a direct connection, or a clamp connection. When using induction it is very likely that the signal being induced onto the target line will also be induced onto other lines in the area, and onto above ground features such as wire fences. This can influence the accuracy of the location, depth and current measurements. “Induction” mode is also the least efficient way of applying the transmitting signal to the target line. The distance located with “Induction” mode is generally much less than that achieved with a direct connection or clamp connection.

“Induction” mode generally works better in higher frequencies. The advantage of induction is that no access is required to “connect” the transmitter, making it a very quick process. The antennas on the transmitter are tuned to induce specific frequencies or range of frequencies. Therefore only a limited number of frequencies can be selected in “Induction” mode.

All the frequencies in favorite frequencies mode that are higher than 8 kHz can be selected by pressing “f” pushbutton in main display. Multiple induction frequencies are available based on the user selection. See section 1.4.2 for adding and removing frequency from the favorite frequencies list.

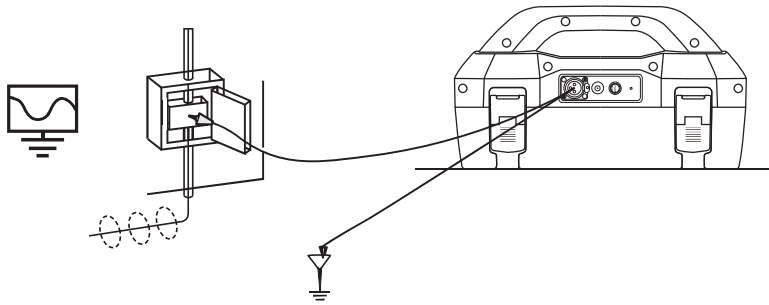
**NOTE**

For accurate location and depth measurement the locator receiver should be used no closer than 50ft (15m) from the transmitter.

7.3.2 Direct Connection Mode

By plugging in a connection lead to the output socket, “Direct connection” mode is selected. An icon confirming this is shown on the display. The wave in the icon fluctuate when the transmitter is transmitting. The direct connection lead consists of two cables, one (red clip) must be connected to the conductor being located, the other (black clip) to a suitable ground (a ground stake is provided with the transmitter). An auxiliary ground lead is also supplied. If the auxiliary ground lead is used, the ground clip of the connection lead (black clip) is attached to one end of the auxiliary ground lead.

A good connection is indicated by a change in beep rate from the speaker and the current reading on the display.



Whenever a direct connection can be safely made without the risk of injury, damage to customer's plant, or the transmitter, it is the best way of applying the transmitter's signal.

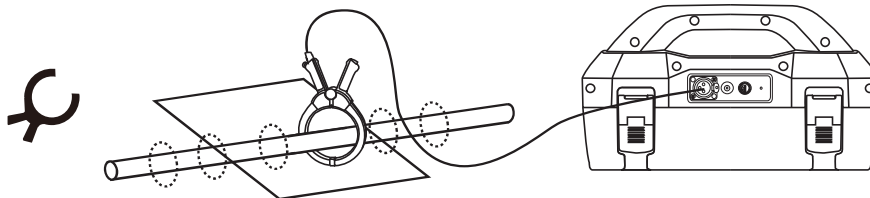
The coupling of the transmitted signal to other pipes and cables in the area will be much less than with induction, although where commonly bonded systems are encountered – coupling cannot be avoided.

The positioning of the ground connection can also influence the degree of coupling experienced. Ground connections generally should not be made to other pipes or cables, or above ground metallic structures such as wire fences. In general the lower the frequency is, the further the signal will travel, and the less signal coupling will occur. The most common frequencies used for direct connection are between 512 Hz/640 Hz and 8 kHz.

Regulations in many countries require that power output is limited above certain frequencies. The Loc3-5Tx enables frequencies below 45 kHz to be transmitted using as much as 5 watts output, but frequencies over 45 kHz are restricted to 1 watt. Using direct connection and the higher power at the low frequencies helps significantly in achieving greater location distances. Direct connections should not be made to cables carrying greater than 25V (or as your safety practices allow). The transmitter is protected (250V fuse) from stray currents that may exist on the target line.

7.3.3 Clamp Mode

Plugging the signal clamp supplied by Vivax-Metrotech into the output socket will place the transmitter in "Clamp" mode. An icon confirming this is displayed on the display. The icon flashes when the transmitter is transmitting. When using the clamp no ground connection is needed.



The clamp again is a precise way to apply the locating signal. It is generally used when access to the conductor cannot be achieved to make a direct connection (but there is sufficient access to place the clamp around the cable), or when it is not safe to make a direct connection because the target cable is carrying electricity.

The clamp is a specialized inductive device (sometimes known as a toroid or coupler). All clamps are optimized to work at specific frequencies. In most cases clamps are designed to be used at frequencies generally between 8 kHz and 200 kHz. The transmitter will only allow the selection of a suitable range of frequencies for your clamp.



WARNING

When applying the clamp to cables that carry electricity – be sure to follow your company's safety instructions and procedures. Beware that if applied around a high voltage cable – that cable may induce a current in the clamp causing it to snap shut or jump quite dramatically – always apply clamps carefully.

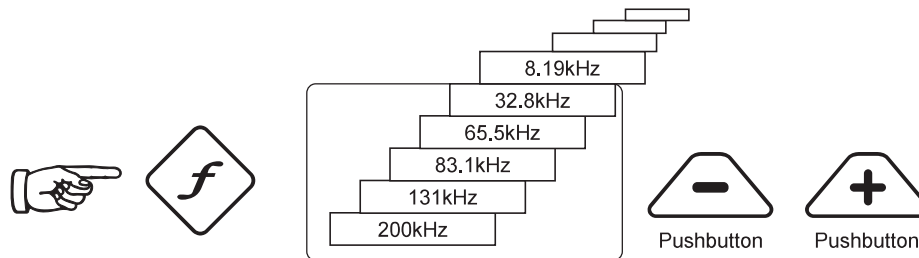
7.4 Frequencies

7.4.1 Frequencies and Power Output

The Loc3-5Tx transmitter is supplied with a predefined set of transmit frequencies. The most commonly used frequencies are preset by the factory. Additional frequencies can be added from the frequency select list. (See section 1.4.2 for access to this menu).

Example of standard frequencies/preset at the factory are:

- 512Hz (where electrical systems are 60Hz) direct connection – 5 watts.
- 640Hz (where electrical systems are 50Hz) direct connection – 5 watts.
- 8 kHz direct connection – 5 watt.
- 33 kHz direct connection – 5watt.
- 65 kHz direct connection – 1 watt.
- 83.1 kHz, 131 kHz direct connection – 1 watt (depending on region).
- 200 kHz direct connection – 1 watt (depending on region).
- Some other frequencies with 5Watt output:
 - o Direction connection: 256Hz, 491Hz, 982Hz, etc.
 - o Direct and clamp connection: 8.19 kHz, 8.44 kHz, 9.5 kHz, 9.82 kHz, 32.8 kHz, 38 kHz.
- Some other frequencies with 1W output: 89 kHz, 131 kHz, 200 kHz.
- Clamp connection: any frequency from 8 kHz up to the highest allowed frequency (depending on region).
- Induction Frequency: this transmitter is a broad-band induction unit. It means that user can select for the induction mode any frequency he wants, from 8 kHz up. (highest available frequency depends on region) NOTE: see section 1.4.2 for frequency activation procedure.



As with most manufacturers the clamps and induction antennas are tuned to specific frequencies, and do not work over the complete range of frequencies.

Frequencies are selected by pressing the “f” pushbutton which toggles through the available frequencies for the selection mode. The frequency is automatically selected if you don’t toggle past it within two seconds. The frequency is shown on the display.

NOTE:

The output current is shown in large characters on the display – to increase or reduce the power output press “+” or “-”. The vertical bar graph at the bottom of the display indicates which of the five current output steps is being used. If the transmitter can supply the requested current, the bar will turn black. If the bar does not turn black, improving the ground connections or wetting the ground where the earth stake is positioned, may help. However, it may not be able to achieve the current setting requested because the impedance of the line is too high for this setting. If this happens it is best to select a setting that has a black bar, this will ensure a stable output.

The current being transmitted will be limited by the impedance of the cable, therefore it is not unusual to increase the output level, but see no increase in the current displayed. This is not a fault with the transmitter.

The transmitter will always revert to first level output when switched on – this is a power saving feature – in most circumstances this output level is sufficient. Increasing the output power unnecessarily will reduce the battery life unnecessarily. All other settings remain the same as the last setting used.

7.4.2 Most Used Frequencies (Frequency Selection) Feature

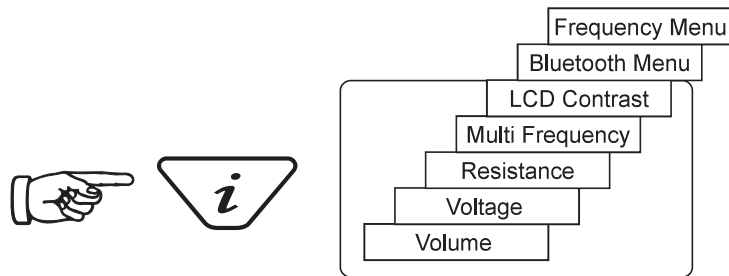
This feature can be used to allow operator to choose his most used frequencies from a list of possible frequencies. Once these frequencies are selected in the main menu, pressing the "f" pushbutton, user can scroll through them. At any time user can add or remove frequencies from the above list, following the below procedure. Maximum frequencies that can be appear in most used frequencies list is 12.

The advantage of this feature is that user can optimize the transmitter and activate at the main menu user's preferred frequencies, instead of having a whole list of frequencies that user has to scroll through.

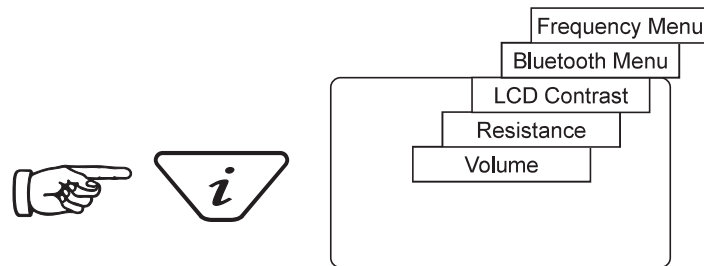
To enter the "Frequency Menu" proceeds as follows:

1. Press the "i" pushbutton four--six times (based on the mode that transmitter is in), until get to the "Frequency menu" sub-menu.

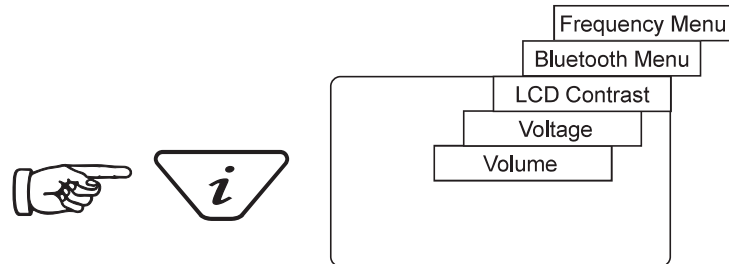
In Direct Connection mode,



In SD mode,

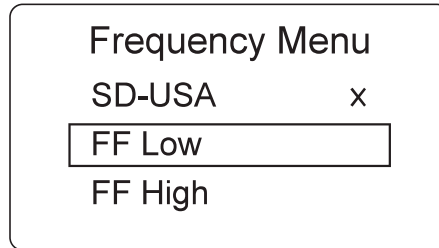


In Clamp mode,

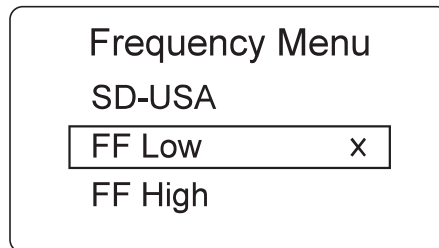


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2. Screen will show a list of frequencies available, with the central one in a box.



3. Pressing the " \triangleleft " or " \triangleleft " pushbuttons, you can scroll up or down through the available frequencies.
4. Once the wanted frequency is inside the box, press "f" pushbutton to select or deselect the frequency. An "x" will appear in the box for a selected frequency.



5. After selecting the frequencies, press the "i" pushbutton again to exit the "Frequency Menu" and return to the main display.
6. A particular frequency in the chosen list of frequencies can be selected from the main display screen by pressing the "f" pushbutton until the wanted frequency is displayed at the top of the main screen.

7.4.3 Multi-frequency Mode for Direct Connection

This feature can be used when user wants to energize on target two/three frequencies at the same time. Mainly, it can be used when user is not sure which frequency can be impressed better into the target. Multi frequency mode is not available in Fault Find and SD modes.

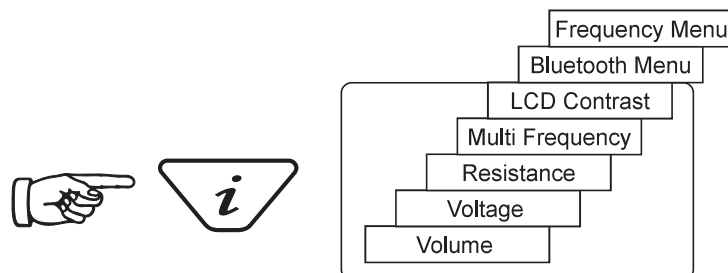


NOTE



- When using multi frequency mode, total power will be split between the activated frequencies.
- The frequencies have to be available in the main menu.

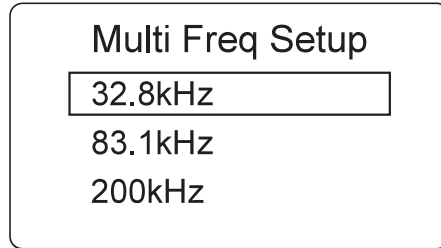
To enter the "Multi Freq. Setup" menu, proceeds as follows:

1. Press "i" pushbutton four times to get to the "Multi Frequency" screen and press "f" pushbutton to activate the multi frequency mode. An "x" symbol will appear indicate the multi frequency mode is activated. Press "f" pushbutton again to go in "Multi Freq. Setup" screen to choose the frequencies.

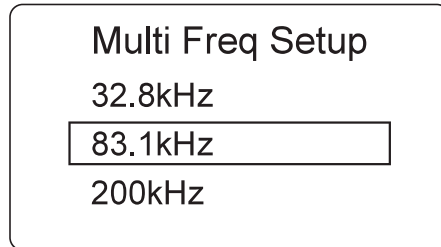


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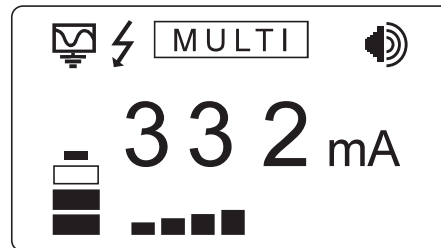
- Pressing the "" and "" pushbuttons to scroll through the available frequencies and bring the wanted one in the first box.



- Press "f" pushbutton to move the box down and the "" and "" pushbuttons to select the second frequency.





- Repeat step three to select the third frequency if needed.
- Press "i" pushbutton to return to main display. On the main display, "Multi" will appear indicating the multi frequency mode is active.



- The frequencies selected for multi frequency mode will be saved until changes are made even when the multi frequency mode is deactivated.

7.5 Transmitter Battery

7.5.1 Replacing Alkaline Batteries

- Replace with new batteries of the same type, be sure not to mix old and new batteries.
- Do not** use rechargeable batteries in the alkaline battery tray. Ensure that batteries are inserted the correct way (see label "" and "" on the side of the tray).
- Refit the battery tray, place it inside the housing and close the battery cover.



WARNING
Alkaline Batteries – insert alkaline batteries (x8) as shown.

7.5.2 Rechargeable Batteries

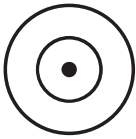
- **Do not** attempt to replace the rechargeable batteries or remove battery covers – return to Vivax-Metrotech or a Vivax-Metrotech approved service centers for replacement.



WARNING
Use only Vivax-Metrotech recommended charger.



WARNING
Charging socket.



The one pin plug is used for power in from charger (to charge rechargeable batteries).



NOTE
Rechargeable pack cannot be charged from a 12V DC source.

Contact Vivax-Metrotech or a Vivax-Metrotech approved service center for wiring diagram of plug, if attempting to repair any of the “charging” leads.

7.5.3 Battery Charging and Disposal

Follow instructions detailed in the General Safety & Care portion of this document.

Only use the charger supplied with the equipment. Using a non-approved battery charger may damage the batteries and cause overheating.

The charger is mains operated. Connect the charger to the battery pack at the rear of the transmitter. The LED on the charger will show a red light indicating that the charge process has started. When the LED changes to a green indicator the charge sequence is complete and the batteries will be fully charged.