



OPERATOR'S MANUAL



Cat. No.

M12 PL: M12™ Pipeline Locator



WARNING To reduce the risk of injury, the user must read and understand the operator's manual





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M12 PL : M12™ Pipeline Locator

English

GENERAL POWER TOOL SAFETY WARNINGS

⚠️WARNING Read all safety warnings, instructions, illustrations, and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire, and/or serious injury. **Save all warnings and instructions for future reference.** The term "power tool" in the warnings refers to your mains-operated (corded) power tool or battery-operated (cordless) power tool.

WORK SAFETY AREA

- **Keep the work area clean and well lit.** Cluttered or dark areas invite accidents.
- **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Power tools create sparks which may ignite the dust or fumes.
- **Keep children and bystanders away while operating a power tool.** Distractions can cause you to lose control.

ELECTRICAL SAFETY

- **Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.** Unmodified plugs and matching outlets will reduce the risk of electric shock.
- **Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges, and refrigerators.** There is an increased risk of electric shock if your body is earthed or grounded.
- **Do not expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.
- **Do not abuse the cord. Never use the cord for carrying, pulling, or unplugging the power tool. Keep cord away from heat, oil, sharp edges, or moving parts.** Damaged or entangled cords increase the risk of electric shock.
- **When operating a power tool outdoors, use an extension cord suitable for outdoor use.** Use of a cord suitable for outdoor use reduces the risk of electric shock.
- **If operating a power tool in a damp location is unavoidable, use a ground fault circuit interrupter (GFCI) protected supply.** Use of an GFCI reduces the risk of electric shock.

PERSONAL SAFETY

- **Stay alert, watch what you are doing, and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.
- **Use personal protective equipment. Always wear eye protection.** Protective equipment such as a dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.
- **Prevent unintentional starting. Ensure the switch is in the off position before connecting to a power source and/or battery pack, picking up or carrying the tool.** Carrying power tools with your finger on the switch or energizing power tools that have the switch on invites accidents.
- **Remove any adjusting key or wrench before turning the power tool on.** A wrench or a key left attached to a rotating part of the power tool may result in personal injury.
- **Do not overreach. Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.

- **Dress properly. Do not wear loose clothing or jewelry. Keep your hair and clothing away from moving parts.** Loose clothes, jewelry, or long hair can be caught in moving parts.
- **If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used.** The use of dust collection can reduce dust-related hazards.
- **Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles.** A careless action can cause severe injury within a fraction of a second.

POWER TOOL USE AND CARE

- **Do not force the power tool. Use the correct power tool for your application.** The correct power tool will do the job better and safer at the rate for which it was designed.
- **Do not use the power tool if the switch does not turn it on and off.** Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
- **Disconnect the plug from the power source and/or remove the battery pack, if detachable, from the power tool before making any adjustments, changing accessories, or storing power tools.** Such preventive safety measures reduce the risk of starting the power tool accidentally.
- **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.** Power tools are dangerous in the hands of untrained users.
- **Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.** Many accidents are caused by poorly maintained power tools.
- **Keep cutting tools sharp and clean.** Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.
- **Use the power tool, accessories, and tool bits, etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.** Use of the power tool for operations different from those intended could result in a hazardous situation.
- **Keep handles and grasping surfaces dry, clean and free from oil and grease.** Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.

BATTERY TOOL USE AND CARE

- **Recharge only with the charger specified by the manufacturer.** A charger that is suitable for one type of battery pack may create a risk of fire when used with another battery pack.
- **Use power tools only with specifically designated battery packs.** The use of any other battery packs may create a risk of injury and fire.
- **When the battery pack is not in use, keep it away from other metal objects, like paper clips, coins, keys, nails, screws, or other small metal objects, that can make a connection from one terminal to another.** Shorting the battery terminals together may cause burns or a fire.
- **Under abusive conditions, liquid may be ejected from the battery; avoid contact. If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help.** Liquid ejected from the battery may cause irritation or burns.

- **Do not use a battery pack or tool that is damaged or modified.** Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion, or risk of injury.
- **Do not expose a battery pack or tool to fire or excessive temperature.** Exposure to fire or temperature above 265°F (130°C) may cause an explosion.
- **Follow all charging instructions and do not charge the battery pack or tool outside the temperature range specified in the instructions.** Charging improperly or at temperatures outside the specified range may damage the battery and increase the risk of fire.

SERVICE

- **Have your power tool serviced by a qualified repair person using only identical replacement parts.** This will ensure that the safety of the power tool is maintained.
- **Never service damaged battery packs.** The service of battery packs should only be performed by the manufacturer or authorized service providers.

SPECIFIC SAFETY RULES FOR PIPELINE INSPECTION SYSTEMS

- **Always check the work area before beginning a job. Do not allow the tool to contact electrical, chemical, or moving hazards.**
- **To reduce the risk of fire, personal injury, and product damage due to a short circuit, never immerse your tool, battery pack or charger in fluid or allow a fluid to flow inside them.** Corrosive or conductive fluids, such as seawater, certain industrial chemicals, and bleach or bleach-containing products, etc., can cause a short circuit.
- **Recharge battery packs only with the charger specified for the battery.** For specific charging instructions, read the operator's manual supplied with your charger and battery.
- **Always use common sense and be cautious when using tools.** It is not possible to anticipate every situation that could result in a dangerous outcome. Do not use this tool if you do not understand these operating instructions, or you feel the work is beyond your capability; contact Milwaukee Tool or a trained professional for additional information or training.
- **Maintain labels and nameplates.** These carry important information. If unreadable or missing, contact a MILWAUKEE service facility for a free replacement.
- **⚠️WARNING** Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
 - lead from lead-based paint
 - crystalline silica from bricks and cement and other masonry products, and
 - arsenic and chromium from chemically treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well-ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

FEDERAL COMMUNICATIONS COMMISSION

⚠ WARNING This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

SYMBOLLOGY



Volts



Direct Current



Federal Communications Commission



Do not allow the battery to contact corrosive or conductive fluid



To prevent electric shock, do not allow product to contact live electrical parts



Chemical Burn Hazard - Keep away from children

SPECIFICATIONS

Volts	12 DC
Battery Type.....	M12™
Charger Type.....	M12™
Recommended Ambient	
Operating Temperature.....	-20°C to 50°C (-4°F to 122°F)

M12™ BATTERIES

⚠WARNING Recharge only with the charger specified for the battery. For specific charging instructions, read the operator's manual supplied with your charger and battery.

Removing/Inserting the Battery

To **remove the battery**, push in the release buttons and pull the battery pack away from the tool.

⚠WARNING Always remove battery pack before changing or removing accessories. To **insert the battery**, slide the pack into the body of the tool. Make sure it latches securely into place.

⚠WARNING Only use accessories specifically recommended for this tool. Others may be hazardous.

ONE-KEY™

To learn more about the ONE-KEY™ functionality for this tool, please reference the Quick Start guide included with this product or go to milwaukeetool.com/One-Key. To download the ONE-KEY™ app, visit the App Store or Google Play Store from your smart device.

ONE-KEY™ Indicator

Solid Blue	Wireless mode is active and ready to be configured via the ONE-KEY™ app.
Blinking Blue	Is actively communicating with the ONE-KEY™ app.
Blinking Red	Tool is in security lockout and can be unlocked by the owner via the ONE-KEY™ app.

INTERNAL BATTERY



Chemical Burn Hazard. This device contains a lithium button/coin cell battery. A new or used battery can cause severe internal burns and lead to death in as little as 2 hours if swallowed or enters the body. Always secure the battery cover. If it does not close securely, stop using the device, remove the batteries, and keep it away from children. If you think batteries may have been swallowed or entered the body, seek immediate medical attention.

An internal battery is used to facilitate full ONE-KEY™ functionality.

To replace the battery:

1. Remove the battery pack.
2. Remove the screw(s) and open the battery door.
3. Remove the old battery, keep it away from children, and dispose of it properly.
4. Insert the new battery (3V CR2032), with the positive side facing up.

Close the battery door and tighten the screw securely.

MAINTENANCE

⚠WARNING To reduce the risk of injury, always unplug the charger and remove the battery pack from the charger or tool before performing any maintenance. Never disassemble the tool, battery pack or charger. Contact a MILWAUKEE service facility for ALL repairs.

MAINTAINING TOOL

Keep your tool, battery pack and charger in good repair by adopting a regular maintenance program. Inspect your tool for issues such as undue noise, misalignment or binding of moving parts, breakage of parts, or any other condition that may affect the tool operation. Return the tool, battery pack, and charger to a MILWAUKEE service facility for repair. After six months to one year, depending on use, return the tool, battery pack and charger to a MILWAUKEE service facility for inspection.

If the tool does not start or operate at full power with a fully charged battery pack, clean the contacts on the battery pack. If the tool still does not work properly, return the tool, charger and battery pack, to a MILWAUKEE service facility for repairs.

⚠WARNING To reduce the risk of personal injury and damage, never immerse your tool, battery pack or charger in liquid or allow a liquid to flow inside them.

CLEANING

Clean dust and debris from vents. Keep handles clean, dry and free of oil or grease. Use only mild soap and a damp cloth to clean, since certain cleaning agents and solvents are harmful to plastics and other insulated parts. Some of these include gasoline, turpentine, lacquer thinner, paint thinner, chlorinated cleaning solvents, ammonia and household detergents containing ammonia. Never use flammable or combustible solvents around tools.

REPAIRS

For repairs, return the tool, battery pack and charger to the nearest service center.

ACCESSORIES

⚠WARNING Use only recommended accessories. Others may be hazardous. For a complete listing of accessories, go online to www.milwaukeeetool.com or contact a distributor.

WARRANTY - AUSTRALIA and NEW ZEALAND

Please refer to Australian and New Zealand warranty supplied with tool. This warranty applies only to product sold by authorised dealers in Australia and New Zealand.

SERVICE - AUSTRALIA and NEW ZEALAND

MILWAUKEE® prides itself in producing a premium quality product that is Nothing But Heavy Duty™. Your satisfaction with our products is very important to us! If you encounter any problems with the operation of this tool, please contact your authorised **MILWAUKEE®** dealer.

For a list of **MILWAUKEE®** dealers, guarantee or service agents please contact **MILWAUKEE®** Customer Service or visit our website.

(Australia Toll Free Telephone Number 1300 645 928)

(New Zealand Toll Free Telephone Number 0800 645 928)

or visit milwaukeetool.com.au/milwaukeetool.co.nz.

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1. Introduction

1.1 The M12™ Pipeline Locator

The M12™ PIPELINE LOCATOR is designed to locate the sonde position and trace the push cable of the PIPELINE INSPECTION SYSTEMS REEL.

1.2 M12™ Pipeline Locator Overview



1.	LCD	3.	Handle
2.	Button pad: 2a Menu button 2b Mode button 2c Up button 2d Select button 2e Power button 2f Down button	4.	Battery compartment
		5.	Locator stem
		6.	ONE-KEY LED
		7.	Speaker

2. The M12™ Battery

Removing the battery	
	
Undo the locking fastener and open the battery compartment.	Pull the battery from the socket while squeezing the M12™ battery tabs together.

Installing the battery	Battery status
	
Line up the battery and press into the battery compartment. Press until the locking click sound is heard.	The battery status is always shown in the upper right corner of the LCD. Each segment represents 25% of the battery life.

The M12™ Pipeline Locator is powered by an M12™ BATTERY. The battery condition is always shown on the LCD in the status bar on the Pipeline Locator.

⚠WARNING Recharge only with the charger specified for the battery. For specific charging instructions, read the operator's manual supplied with your charger and battery.

3. M12™ Pipeline Locator Setup

This section of the manual covers setting up the features and options of the M12™ Pipeline Locator.

3.1 Power on/off

Press the **Power**  button on the M12™ Pipeline Locator. The buttons will illuminate, showing that the power is on.

3.2 M12™ Pipeline Locator First Time Setup

All the settings are saved into the M12™ Pipeline Locator's memory and will remain there until changed. The initial settings will set the FREQUENCIES, VOLUME, BACKLIGHT TIMERS, SOUND CONFIGURATION, UNITS OF MEASURE, POWER TIMER, and LANGUAGE.

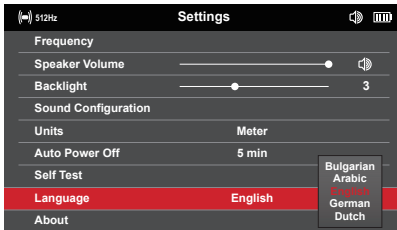
3.3 Navigating through the Settings Menu

	MENU Button - Press to enter the menu options. Also, use to step back (return) to the previous screen.
	UP and DOWN Navigation Buttons - Press the Up-Down buttons to move vertically through the menu and to lower and raise the sensitivity while locating.
	SELECT Button - Press the SELECT button to accept the menu options.

3.4 Setting the LANGUAGE

It is recommended to set your LANGUAGE first so that the other menus can be easily read and understood.

1. Press the Menu button  to enter **SETTINGS**.
2. Scroll down to **LANGUAGE**, press the **SELECT** button to enter the LANGUAGE sub-menu.



3. Press the UP/DOWN buttons to highlight the LANGUAGE.
4. Press SELECT start the LANGUAGE change.

3.5 Setting the FREQUENCY

The option sets the PASSIVE, ACTIVE, and SONDE frequencies.

1. Press the Menu button **≡** to enter **SETTINGS**.
2. Scroll to **FREQUENCY**, press **SELECT** to enter the sub-menu.
3. Use the **UP/DOWN** buttons to move through the choices while using the **SELECT** button to fill the checkboxes selecting that frequency.

Freq Settings	
	512Hz ☒
	640Hz ☐
	33kHz ☒
	33kHz ☐
	83kHz ☒
	50Hz ☐
	60Hz ☒
	RF ☒

4. Press the MENU button when finished to return to the main menu.

3.6 Setting the SPEAKER VOLUME

1. Press the Menu button **≡** to enter **SETTINGS**.
2. Scroll to **SPEAKER VOLUME**, press **SELECT**.
3. Press the **UP/DOWN** buttons to adjust the speaker volume.
4. Press the **SELECT** button to save the speaker volume setting.
5. Press the MENU button again to return to the locate screens.

Settings	
Frequency	
Speaker Volume	
Backlight	3
Sound Configuration	
Units	Meter
Auto Power Off	5 min
Self Test	
Language	English
About	

3.7 Setting the BACKLIGHT options

1. Press the Menu button **≡** to enter **SETTINGS**.
2. Scroll to **BACKLIGHT**, press **SELECT**.
3. Press the **UP/DOWN** buttons to adjust the BACKLIGHT level.
4. Press the SELECT button to save the setting.

Settings	
Frequency	
Speaker Volume	
Backlight	3
Sound Configuration	
Units	Meter
Auto Power Off	5 min
Self Test	
Language	English
About	

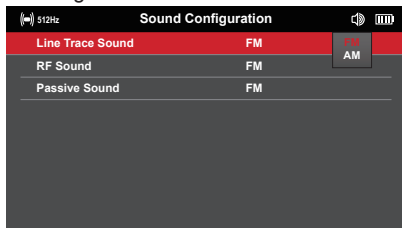
3.8 Setting the SOUND CONFIGURATION

FM - Frequency Modulated - The sound pitch changes with the signal strength

AM - Amplitude Modulated - The sound volume changes with the signal strength

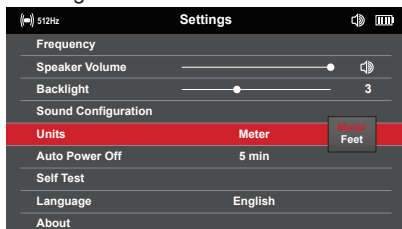
Real - The sound is derived directly from the received signal

1. Press the Menu button  to enter **SETTINGS**.
2. Scroll to **SOUND CONFIGURATION**, press **SELECT**.
3. Use the **UP/DOWN** buttons to select an option, press **SELECT** to enter the sub-menu.
4. Use the UP/DOWN buttons to select the choice, press **SELECT**.
5. Press the MENU button again to return to the locate screens.



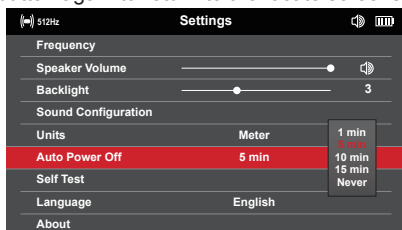
3.9 Setting the UNITS of measure

1. Press the Menu button  to enter **SETTINGS**.
2. Scroll to **UNITS**, press **SELECT**.
3. Use the **UP/DOWN** buttons select **METER** or **FEET**, press **SELECT**.
4. Press the MENU button again to return to the locate screens.



3.10 Setting the AUTO POWER OFF settings

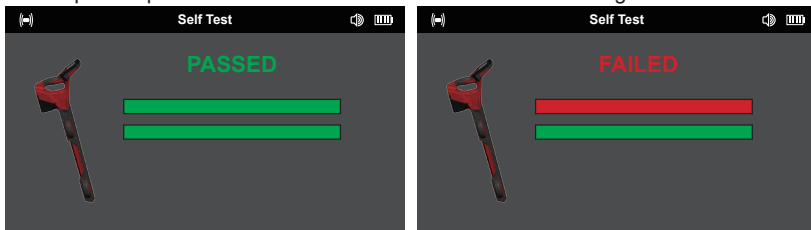
1. Press the Menu button  to enter **SETTINGS**.
2. Scroll to **AUTO POWER OFF**, press **SELECT**.
3. Use the **UP/DOWN** buttons select the time to turn off after no activity, press **SELECT**.
4. Press the MENU button again to return to the locate screens.



3.11 The SELF-TEST Function

The SELF-TEST function confirms that the locator is operating within its set parameters. The SELF-TEST should be run in an area free of interference from below ground or above ground utilities.

1. Press the Menu button  to enter **SETTINGS**.
2. Scroll to **SELF-TEST**, press **SELECT**.
3. Keep the Pipeline Locator still while the SELF-TEST is running.



The result will show a PASSED or FAILED screen.

3.12 The ABOUT Screen

The **ABOUT** screen shows the locator's serial number, calibration, and software information. You may be asked to provide information from this screen when requesting technical support.

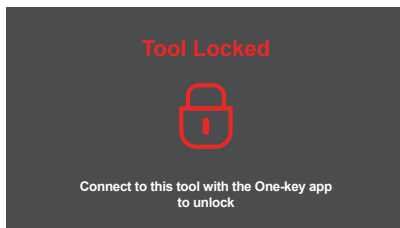
1. Press the Menu button  to enter **SETTINGS**.
2. Scroll to **ABOUT**, press **SELECT**.
3. Press the MENU button to return to the locate screens.

About	
Software Revision	1.00.001
Software Date	04/27/2020
Software Time	14:28:20.45
Calibration Version	999
Calibration Date	04/27/2020
Serial Number	103034508400
PCB Identifier	1

3.13 **ONE-KEY**

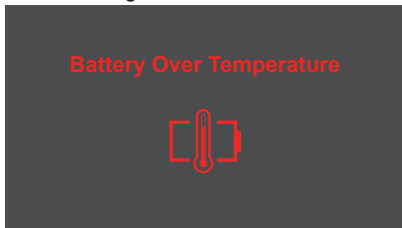
Functionalities for One-Key:

- Lock
- Unlock
- Find/blink LED



3.14 **Battery Temperature**

If the temperature reaches a high of 75° C / 167° F, this message will appear for 5 seconds, followed by the unit shutting down.



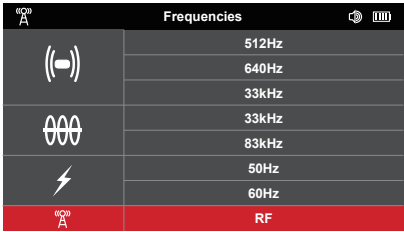
4. Sonde Locating

4.1 Navigating the Pipeline Locator menu

Repeatedly pressing the Mode  key will toggle through the selected locate modes and their selected frequencies.

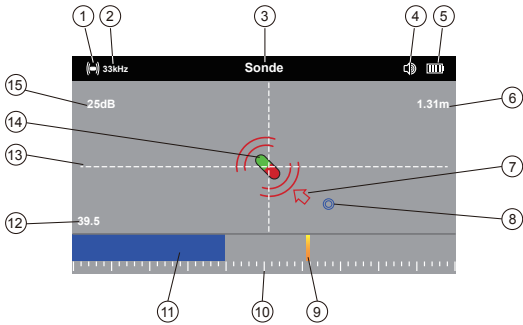
Alternately, pressing and holding the Mode  key will bring up the Shortcut menu. In this menu use the UP/DOWN keys to select the mode and its frequency to use, and then press the Mode key again. This will bring up that mode and frequency.

Pressing the Menu , Select , or Mode  buttons will exit this screen and return to the previous screen.



The shortcut menu screen

4.2 Sonde locate screens

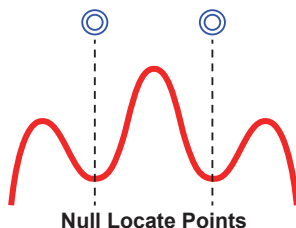


1.	Sonde icon	8.	Sonde forward or rear point
2.	Active sonde frequency	9.	Last peak indicator
3.	Sonde mode indicator	10.	Peak bar graph scale
4.	Speaker volume	11.	Peak bar graph bar
5.	Battery status	12.	Bar graph percentage
6.	Depth to the Sonde	13.	Crosshairs
7.	Sonde direction arrow	14.	Sonde indicator
		15.	Gain setting in dB

4.3 The Sonde Signal

The Sonde emits a large peak locate signal and two null points (forward or rear points) on each side of the peak. The deeper the Sonde is underground, the further apart these two null points will be.

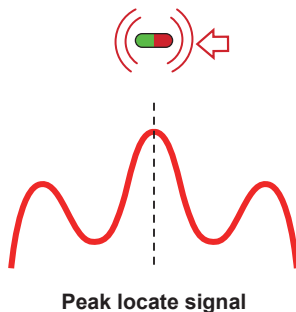
The screen of the Pipeline Locator displays the peak and null points as:



As the user approaches the Sonde, from either direction, the locator will pick up the rear or forward null locate point. The null locate points are identified by a blue double circle .

After the null locate point, an arrow will appear  directing the user toward the sonde location.

Following the arrow  will lead the user over the peak locate signal where the sonde icon will appear.

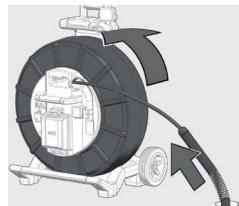


4.4 Set the mode and frequency of the Pipeline Locator

Switch on the Pipeline Locator and use the Mode  button to enter Sonde mode. Make sure that the Sonde **frequency matches** sonde frequency set in the WIRELESS MONITOR or PIPELINE INSPECTION APP.

4.5 Locating the Sonde

1. Activate the sonde (■) of the PIPELINE INSPECTION REEL through the M18™ WIRELESS MONITOR or PIPELINE INSPECTION APP.
2. Set the M12™ Pipeline Locator to sonde mode (■) and set the frequency to match that of the PIPELINE INSPECTION REEL.
3. Push the camera head into the pipe until it is level and zero out the distance counter. 
4. Push the Sonde 10 to 12 feet (3 to 4m) into the pipe.
5. Walk slowly in the direction of the arrow. 
6. The null point circle will appear on the screen, indicating the position of a null signal. Walk toward it and position it over the crosshairs. 
7. Walk slowly in the direction of the arrow until the sonde icon appears. Keeping the locator vertical, carry on walking toward the Sonde until it is positioned on the crosshairs. The locator is now over the sonde. 



5. Push Cable and Line Locating

5.1 Passive Versus Active Locating

	Active	Passive
Definition	- Active locating always requires a sonde or transmitter. Active locating is generally used to trace and pinpoint a specific buried line	- Used to mark the location of unidentified buried lines to avoid them. - Do not use to identify or trace specific lines.
Modes	Sonde Line trace 33kHz & 83kHz	Power: 50/60Hz Radio: 15 kHz – 27 kHz
Source	- PIPELINE INSPECTION REELS - M18™ WIRELESS MONITOR - PIPELINE INSPECTION APP - Sondes	Power* - transmission & distribution networks Radio* - high power, low frequency (LF) communication transmitting towers.
When to use	- Use to trace, identify & pinpoint a buried line. - When a depth measurement is required.	- Search for unknown buried lines when applying a transmitter signal is not practical. - For small, localized digging (planting a fencepost or road sign). - A last check before digging.

* Buried pipes and cables act as antennas that re-radiate the signal.
 Radio signals travel further distances if both ends of the utility are grounded.



Always **Call Before You Dig** and follow local, state, or national regulations and your company's safety and work practices.

5.2 Grounding Post

The grounding post must be used while using the LINE TRACE feature to trace push cable. The M18™ 500GB CONTROL HUB must be grounded to close the current loop to send out a good locate signal. Use the supplied grounding cable assembly with the ground stake to ground the CONTROL HUB to earth.



**CONTROL HUB grounding
assembly**



**A Grounded M18™ 500GB
CONTROL HUB**

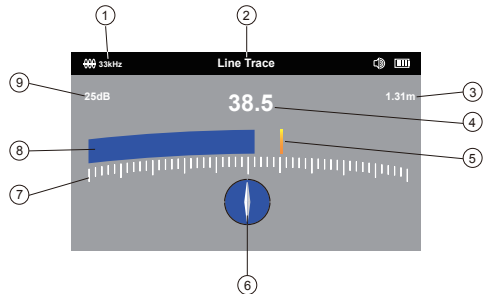
5.3 Applying the Transmitter Signal

In the M18™ WIRELESS MONITOR or PIPELINE INSPECTION APP

1. Select **LINE TRACE** , press the navigation dial.
2. Select a LINE TRACE frequency of 33kHz or 83kHz.

On the M12™ Pipeline Locator

5.4 The LINE TRACE Locate Screen

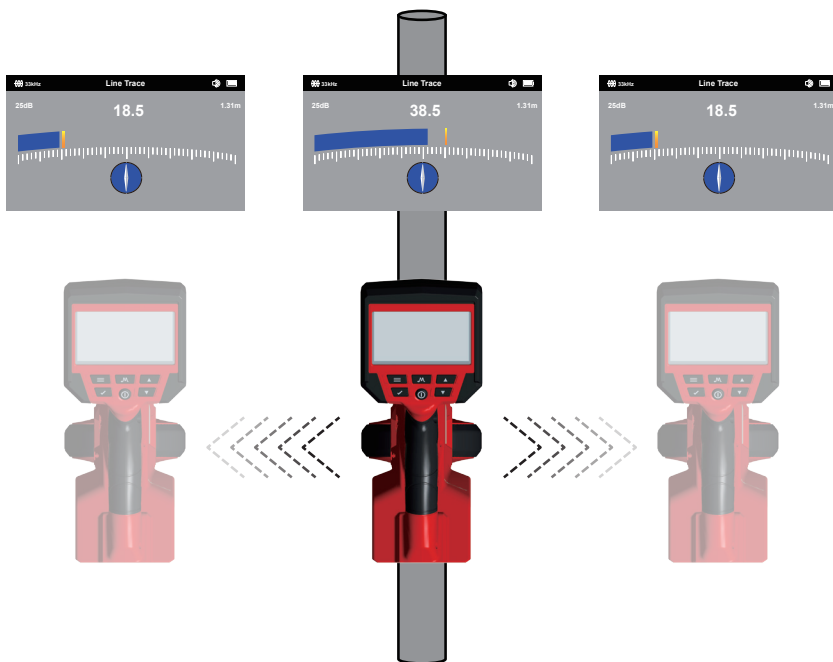


1.	Active line frequency	5.	Last peak indicator
2.	Pipeline Locator current mode	6.	Line direction indicator
3.	Depth of cover	7.	Bar graph scale
4.	Signal strength (mirrors # 8 bar graph)	8.	Bar graph (mirrors #4 signal strength)
		9.	Gain setting in dB

A Peak locator - The M12™ Pipeline Locator is a Peak locator. The antenna configuration provides a "Peak" or maximum signal response when directly on top of the sonde or push cable. On the Pipeline Locator display, the signal strength #4 and bar graph #9 will be at their maximum, or peak.

When at its peak, the last peak indicator, #5 will be left at the peak position, as a reference point before the bar graph and signal strength decline.

The line direction indicator, #6, will turn from a clear background to solid blue background when in line with the pushrod cable.



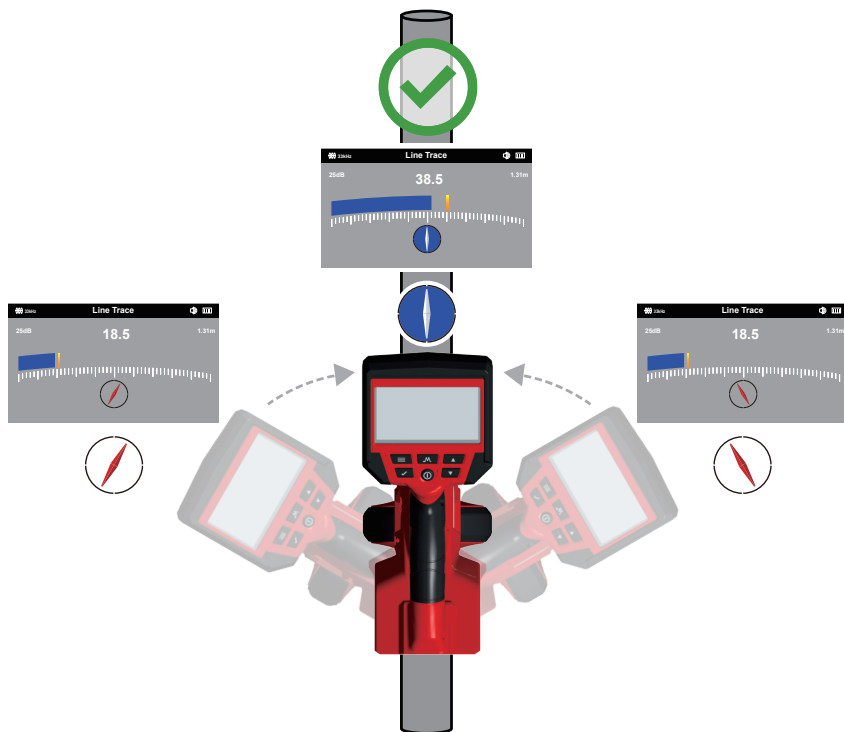
The signal strength (#4) and bar graph (#8) at their highest when over the utility

5.5 Tracing the Push Cable

1. Switch on the Pipeline Locator and use the Mode  button to put the Pipeline Locator into the **LINE TRACE** mode with the frequency matching the WIRELESS MONITOR or PIPELINE INSPECTION APP.

Line Direction Indicator - In the presence of a locate signal, the line direction indicator will align itself parallel to the pushrod cable being located. This ensures that the operator is aware of the direction of the pushrod cable.

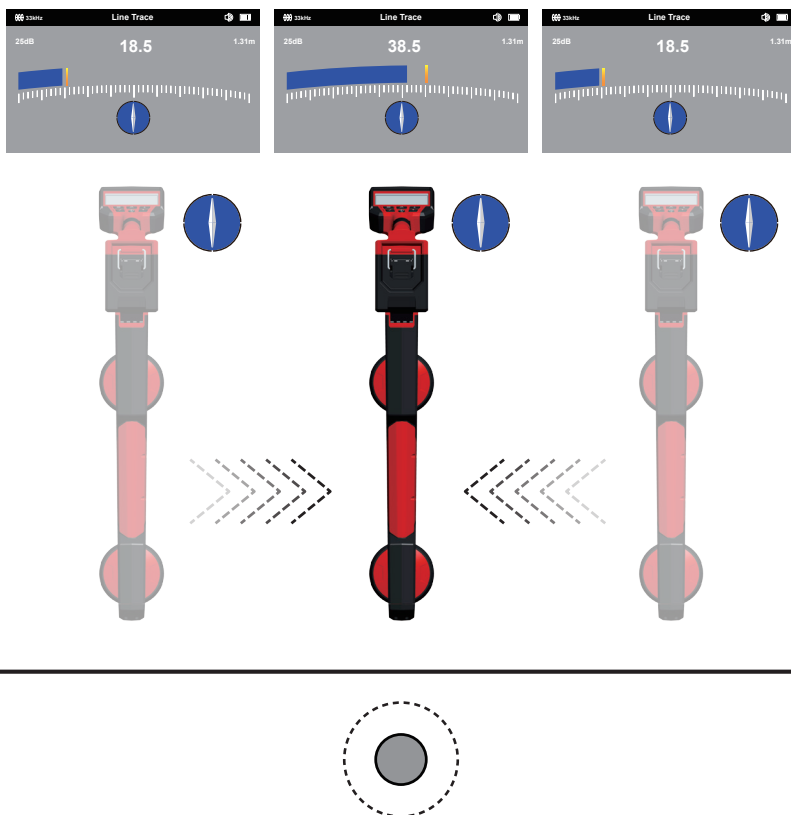
2. Find the pushrod cable direction - When the line direction indicator is in line with the Pipeline Locator's handle, this is the Indication of the direction of the pushrod cable. When the locator is in line with the push cable, the white section of the line direction indicator will turn blue. Pivot the Pipeline Locator and rotate it on its axis while watching the line direction indicator. When the handle is in line with the pushrod cable, the line direction indicator will flash and turn blue.



Pivot the Locator and rotate it on its axis while watching the line direction indicator.

3. Next, adjust the sensitivity control, using the "+" and "-" keys, so that the display indicates approximately 50%.
4. Keep the Pipeline Locator vertical, and in line with the push cable, move to the right side slightly. If the bar graph increases, you are moving toward the rod. If it decreases, you are walking away from it.

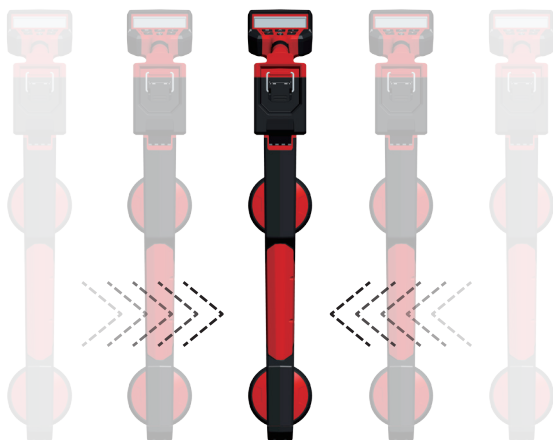
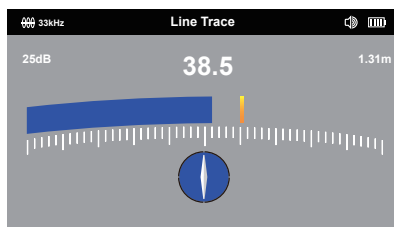
5 Push Cable and Line Locating



Move the locator side to side while looking for maximum response from the bar graph

5. Move toward the rod until a maximum signal is achieved. It may be necessary to reduce the sensitivity to keep the bar graph on the scale. This is normal and should be expected. Try to keep the Pipeline Locator vertical and avoid swinging it as this may create false readings.

5 Push Cable and Line Locating



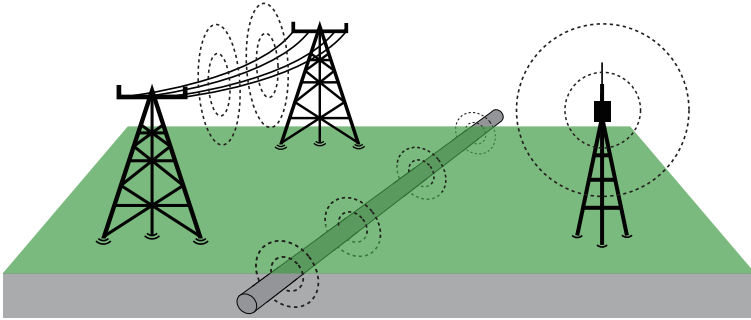
When on top of the pushrod the bar graph will be at its peak and the line direction indicator will turn solid blue with a white line indicating the direction of the pushrod

6. Move the locator side to side to ensure a maximum signal is detected. Use the peak level indicator to assist.

6. Passive Locating - Power & Radio

6.1 Passive Frequencies

Passive locating refers to the process of detecting signals that "naturally" occur on pipes and cables. These tend to fall into two categories, radio signals, and power signals.



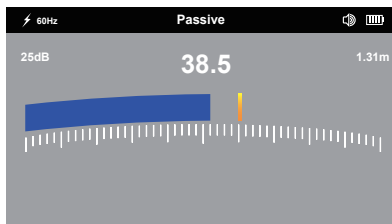
Sources of passive locate signals

Power signals are 50/60Hz signals created by power transmission cables. When electrical power is distributed throughout the network, some of the power finds its way back to the power station via the ground. These stray currents can jump onto pipes and cables and also create power signals. Note that there has to be electrical current flowing to create a detectable signal. For instance, a live cable that is not in use may not radiate a detectable signal. Also, a very well balanced cable, i.e., the same amount of current flowing in live and neutral, will cancel out and may not create a signal. In practice, this is unusual as there are usually enough imbalances in the cable to create a good detectable signal.

Radio signals are created by low-frequency radio transmitters that are used for broadcasting and communications. When the signals cross a long conductor such as a pipe or cable, the signals are re-radiated. It is these re-radiated signals that can be detected by the RF mode.

6.1.1 Locating Power or Radio Signals

1. Switch on the Pipeline Locator and use the Mode button  to enter the PASSIVE OR RF mode.

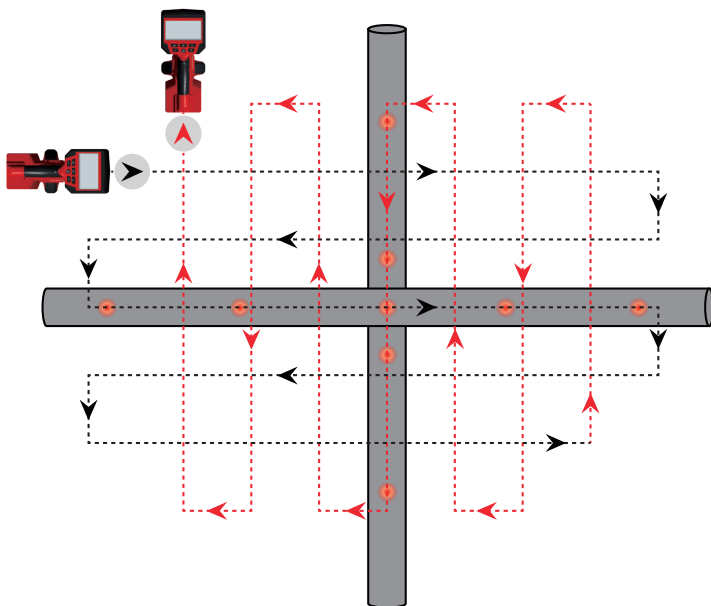


2. Hold the Pipeline Locator vertically and away from likely positions of cables or pipes.
3. Adjust the sensitivity using the "+" and "-" buttons so that the bar graph reading is just starting to show some movement. Note that the line direction indicator feature is not available for the Power or Radio modes.



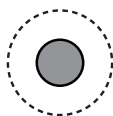
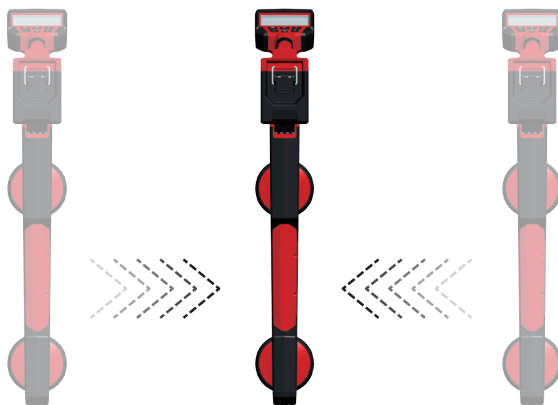
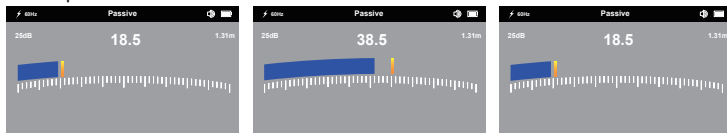
NOTE

Note that there will be no sound from the speaker until the meter reading is above approximately 10% of full scale.



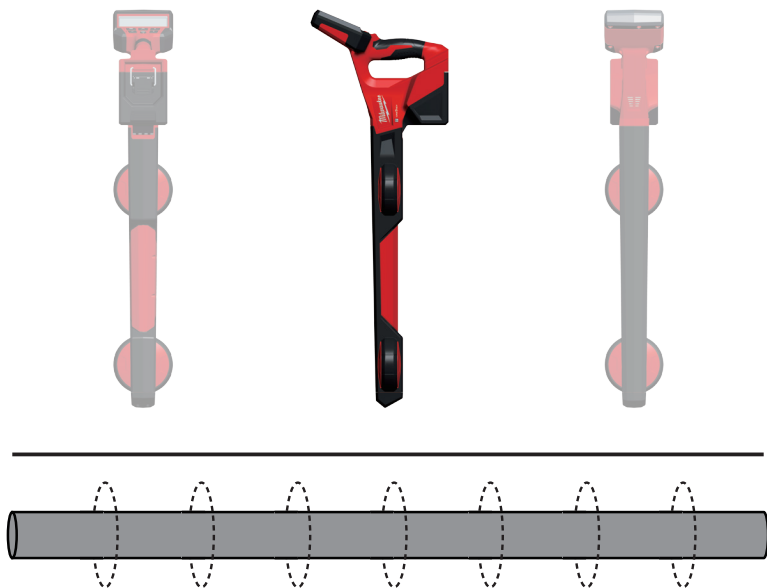
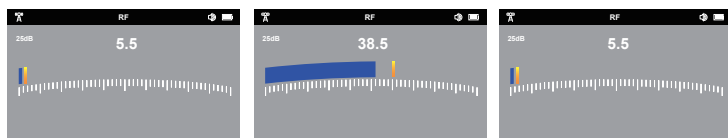
6 Passive Locating - Power & Radio

4. Keeping the Pipeline Locator vertical, walk across the area to be checked, keeping the orientation so that the blade is in line with the direction of walking (See diagram above).
5. Continue in a grid across the area.
6. If at any time, the meter reading starts to increase, carefully move the locator side to side to detect the maximum signal. Use the peak level indicator to help confirm the correct position.



Move the locator side to side while looking for maximum response from the bar graph.

6 Passive Locating - Power & Radio



7. Rotate the Pipeline Locator on its axis to obtain the maximum signal. The Pipeline Locator is now directly over the line and with the stem across the line.
8. The direction can also be found by rotating until the smallest signal is detected. The stem is then in line with the cable/pipe.
9. Continue to locate the position of the line at regular intervals until its course is known through the target area.

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