RADIODETECTION

RD5100™ H_2O

Multifunction precision cable and pipe locator

User Guide

PART NO. 90/UG112INT/01

SPX

Preface

About this guide

CAUTION: This guide provides basic operating instructions for the RD5100H$_2$O locator and transmitter. It also contains important safety information and guidelines and as such should be read in its entirety before attempting to operate the RD5100H$_2$O locator and transmitter.

This guide is intended as a quick reference guide only. For detailed instructions, including the use of accessories, please refer to the RD5100H$_2$O locator operation manual, which is available for download from: **www.radiodetection.com**

Certificates of conformity for the RD5100H$_2$O locator and transmitter can be found at: **www.radiodetection.com**

⚠ WARNING: Direct connection to live conductors is POTENTIALLY LETHAL. Direct connections to live conductors should be attempted by fully qualified personnel only using the relevant products that allow connections to energized lines.

⚠ WARNING: The transmitter is capable of outputting potentially lethal voltages. Take care when applying signals to any pipe or cable and be sure to notify other technicians who may be working on the line.

⚠ WARNING: Risk of Hearing Loss. The locator emits noise levels which can cause partial or total hearing loss. When using headphones these must have an independent volume control. Set the volume level to its lowest value before donning the headphones.

⚠ WARNING: This equipment is NOT approved for use in areas where hazardous gases may be present.

⚠ WARNING: When using the transmitter, switch off the unit and disconnect cables before removing the batteries.

⚠ WARNING: The RD5100H$_2$O locator will detect most buried conductors but there are some objects that do not radiate any detectable signal. The RD5100H$_2$O, or any other electromagnetic locator, cannot detect these objects so proceed with caution. There are also some live cables which the RD5100H$_2$O will not be able to detect in Power mode. The RD5100H$_2$O does not indicate whether a signal is from a single cable or from several in close proximity.

⚠ CAUTION: Batteries can get hot after prolonged use at full output power. Take care while replacing or handling batteries.

3 Year Extended Warranty

The RD5100H$_2$O locator and transmitter are covered by a 1 year warranty as standard. Customers can extend their warranty period to a total of 3 years by registering their products within 3 months of purchase.

Visit **https://portal.radiodetection.com/** to create your company portal account, and use the Product page to register your locator or transmitter.

Information on how to create a company account can be obtained from: **https://support.radiodetection.com**

From time to time Radiodetection may release new software to improve the performance or add new functionality to its products. By registering, users will benefit from email alerts advising about new software and special offers related to its product range.

Users can opt-out at any time from receiving software and technical notifications, or just from receiving marketing material by contacting Radiodetection.

eCert

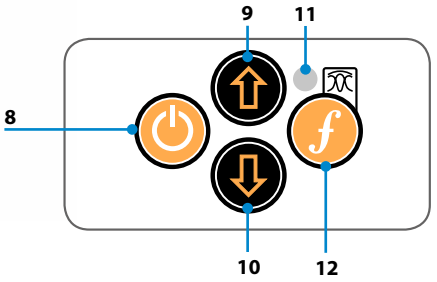
The RD5100H$_2$O locator is safety equipment which should be regularly checked to ensure its correct operation.

eCert[1] provides a thorough test of the RD5100H$_2$O's locating circuitry, and supplies a Radiodetection Calibration Certificate when a positive test result is obtained.

Refer to the RD5100 Manager[1] operation manual for further details. Additional purchase may be required.

1 Contact Radiodetection for eCert and RD5100 Manager availability.

RD5100H_2O locator



Locator features

1. LCD.
2. Keypad.
3. Speaker.
4. Battery compartment (Mini USB-B connector inside)

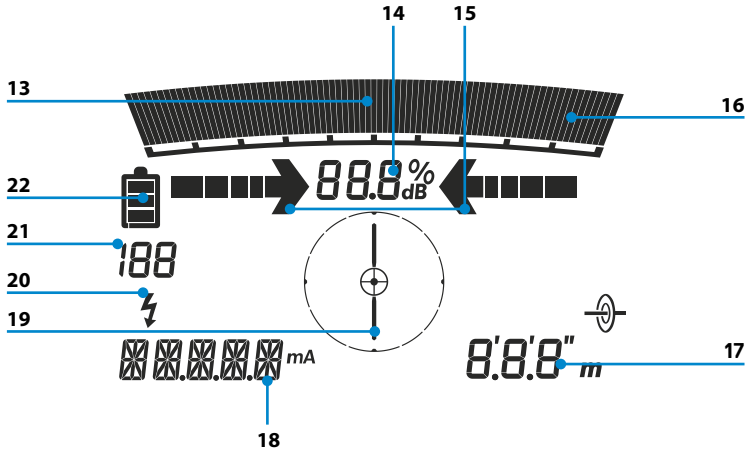
   Note: The RD5100H_2O is supplied with a Li-Ion rechargeable battery pack. It is possible to use alkaline or NiMh batteries by purchasing the optional battery compartment from Radiodetection.
5. Li-Ion battery charger socket.
6. Accessory socket.
7. Headphone jack.

Locator keypad

8. Power key.
9. Up arrow key.
10. Down arrow key.
11. Backlight sensor.
12. Frequency (mode) key.

Locator screen icons

13. Target position indicator: Indicates position of locator relative to target line.
14. Signal strength: Numerical indication of signal strength.
15. (Proportional) Left/Right arrows: Indicates the location of the target relative to the locator.
16. Signal strength: Bargraph with peak marker.
17. Depth: Indication of depth reading.
18. Current: Indication of signal current reading.
19. Compass: Displays the direction of the cable or pipe relative to the locator.
20. Power mode icon.
21. Gain: Numerical value of gain.
22. Battery icon: Indicates the battery level.



RD5100H$_2$OTx transmitter

Transmitter front panel

1. On/Off key.
2. On/Off red LED.
3. Alkaline battery warning red LED: Flashes when batteries are in use and are low.
4. Lithium Ion rechargeable battery warning red LED: Flashes when batteries are in use and are low.
5. Accessory socket for direct connection lead, signal clamp and charging internal Lithium Ion rechargeable battery pack.

Transmitter rear panel

6. Fuse holder.

Note: The transmitter is supplied with a non-fitted fuse for shipping and before use this will have to be inserted into the fuse holder.

7. Alkaline battery compartment: Requires 4 D-Cells (LR-20).

The RD5100H$_2$OTx transmitter incorporates a rechargeable Lithium Ion battery pack and this is the intended primary power source for the transmitter. When the Lithium Ion low battery level LED illuminates the user should either recharge the battery pack using the Radiodetection supplied charger or alternatively fit 4 alkaline batteries. If alkaline batteries are fitted to the transmitter, these will be detected automatically and the transmitter will take its power from the alkaline batteries. When the alkaline batteries are low, the alkaline low battery level LED will illuminate.

Your safety or the safety of others may be at risk if the RD5100H$_2$OTx is not used in accordance with the manufacturers' instructions.

Key to symbols used on the RD5100H$_2$OTx Transmitter:

SYMBOL	DESCRIPTION
	Refer to manual for specific safety instructions or advice.
	Accessory connection socket.
	Type and orientation of auxiliary battery: Standard D Cell (LR20), max 1.6V voltage per cell. For best performance use alkaline batteries.

RD5100H$_2$OTx Transmitter Technical Specification:

Frequency	83kHz (83,077Hz ±5Hz).
Nominal power output	1W in Direct Connect mode.
Batteries	Internal rechargeable battery, 4 x D-Cells (LR-20).
Warranty	12 months. 36 months.†
Compliance	FCC, RoHS, WEEE, CE.
Weight	1.6kg (3.5lbs) (including rechargeable batteries).
Environment	IP54.
Operating temperature range	-20°C to +50°C (-4°F to 122°F).
Storage temperature range	-40°C to +70°C (-40°F to 158°F).
Output voltage	Max 30V RMS (Direct Connect Mode).

†Extended warranty available upon registration, within 3 months of purchase, at: https://portal.radiodetection.com/

Batteries

Internal Battery

The RD5100H$_2$OTx has an internal Li-Ion rechargeable battery and is supplied with bespoke charging equipment.

Use of alternative charging equipment is forbidden.

The internal battery has no user serviceable components and it must not be dismantled or modified as this will compromise safety.

If a battery failure is suspected, the equipment should be repaired using original spare parts by an authorized repairer.

Waste Lithium Ion batteries should not be placed in municipal waste, punctured, incinerated, crushed etc. They should be handled and recycled correctly.

Auxiliary Batteries

The RD5100H$_2$OTx has an option to bypass the Li-Ion battery by the installation of 4 standard alkaline D-Cells (LR-20) as illustrated on the product label. If installed the D-Cells (LR-20) take priority over the Li-Ion battery.

Do not mix D-Cell (LR-20) battery types.

Any D-Cell (LR20) with a max terminal voltage of 1.6V can be inserted, however, for best performance use alkaline cells.

Note: These cells will not be charged by the supplied charging equipment.

Note: Installing the first two D-Cells correctly, followed by two more inverted, allows D-Cells to be stored in the RD5100H$_2$OTx while it operates from the internal Lithium Ion battery. Turn the second two D-Cells around to the correct polarity to power the RD5100H$_2$OTx from the D-Cells.

Keypad actions and shortcuts

Switch the locator or transmitter on by pressing the ⏻ key. Once powered up, the keys function as follows:

Locator keys

KEY	● SHORT PRESS	▬ LONG PRESS
⏻	–	Switch power off
ƒ	Switch between Guidance and Power modes	–
⇧	Set gain to mid position and increases in 1dB increments in Power mode.	Rapidly increases gain in 1dB increments in Power mode.
⇩	Set gain to mid position and decreases in 1dB increments in Power mode.	Rapidly decrease gain steps in 1dB increments in Power Mode
Tip. Gain values set in Power Mode are stored internally and available when the unit is powered on		

Transmitter keys

KEY	● SHORT PRESS	▬ LONG PRESS
⏻	Power device On/Off	-

Before you begin

IMPORTANT

This guide is intended to be a quick reference guide. We recommend you read the full operation manual before you attempt to operate the RD5100H$_2$O locator.

First use

The RD5100H$_2$O locator and transmitter are powered by Lithium-Ion (Li-Ion) batteries. Fully charge each unit with their supplied battery chargers before use.

To fit the D cell batteries in the transmitter, unscrew the rear hinged battery cover. The battery compartment is located at the rear of the transmitter body. Unscrew the thumbscrew in a counterclockwise direction and open the cover. Insert four D-Cell Alkaline or NiMH batteries, taking care to align the positive (+) and negative (-) terminals as indicated. Replace the cover and hand tighten the thumbscrew in a clockwise direction.

Checking the system software version and last calibration date

To check which version of software is running on your locator and the date of the last calibration, press and hold the ƒ key when switching the locator on. This information may be asked for when contacting Radiodetection or your local representative for technical support.

System setup

Regional and operational requirements are factory configured, no set-up is required.

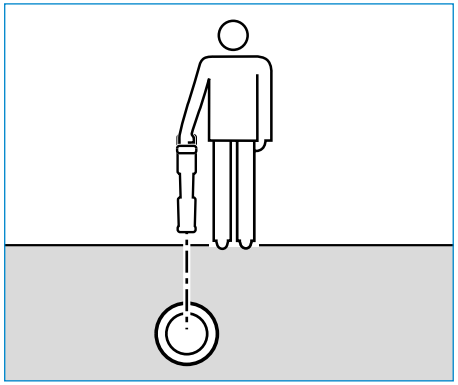
Locating pipes and cables

For more detailed descriptions of using the locator and transmitter, and for detailed locate techniques, refer to the Operation Manual.

The RD5100H$_2$O locator is designed to operate with the 'blade' of the locator perpendicular to the path of the cable or pipe being located.

Locating with Active Frequencies

An active frequency (83kHz) is applied to the target pipe or cable using the transmitter, and provides the most effective way of tracing buried pipes or cables.



The transmitter can apply a signal using three different methods:

Direct connection

In direct connection, you connect the transmitter directly to the pipe or cable you wish to survey using the red Direct Connect lead supplied. The black lead is generally connected to earth using the supplied ground stake.

The transmitter will then apply a discrete signal to the line, which you can trace using the locator. This method provides the best signal on an individual line.

⚠ WARNING: Direct connection to live conductors is POTENTIALLY LETHAL. Direct connections to live conductors should be attempted by fully qualified personnel only using the relevant products that allow connections to energized lines.

Induction

The transmitter is placed on the ground over or near the survey area, aligned at an angle of 90° in the horizontal plane with respect to the metal pipe under investigation.

Note. The correct transmitter orientation for induction is indicated on the transmitter body label with a blue arrow.

Select Guidance mode (83kHz frequency). The transmitter will then induce the signal indiscriminately to any nearby metallic conductor.

Transmitter Clamp

An optional signal clamp can be placed around an insulated live wire or pipe up to 215mm (8.5") in diameter to transfer the transmitter signal to the utility. This method of applying the transmitter signal is particularly useful on insulated live wires and removes the need to disconnect the supply to the cable.

⚠ WARNING: Do not clamp around uninsulated live conductors.

⚠ WARNING: Before applying or removing the clamp around a power cable ensure that the clamp is connected to the transmitter at all times.

Locating with Passive Frequencies

Passive frequency detection takes advantage of signals that are already present on buried metallic conductors. The RD5100H$_2$O supports Power passive frequencies. Power frequencies may be detected without the aid of the transmitter.

Locate Modes

The RD5100H$_2$O can operate in Guidance (83kHz) or Peak (Power) modes.

GUIDANCE: Proportional arrows and a ballistic 'needle' combine with audio left/right indication for rapidly tracing the general path of a buried utility.

PEAK: For accurate locating, the peak bargraph provides a visual readout of the signal strength. The peak signal is found directly over the buried utility. Peak mode is automatically selected in Power mode.

Depth, current and compass readouts

⚠ WARNING: Never use the depth measurement readout as a guide for mechanical or other digging activity. Always follow safe digging guidelines.

The RD5100H$_2$O locator can measure and display the utility depth, locate signal current and the relative orientation of the cable or pipe to the locator. This helps you to make sure that you are following the right cable or pipe, especially when other utilities are present.

The RD5100H$_2$O locator features TruDepth™, a feature that helps you to ensure the accuracy of your locates or Survey Measurements. The depth and current are automatically removed from the display when the locator is at an angle of more than 7.5° from the path of the cable or pipe being located, or when the locator determines that signal conditions are too poor for reliable measurements.

Using accessories

The transmitter is compatible with a range of accessories. For detailed information on using any of the accessories below please refer to the RD5100H$_2$O locator operation manual.

Transmitter signal clamps

When it is not possible to connect directly onto a pipe or cable, or induction mode is unsuitable, a transmitter signal clamp may be used. The clamp is plugged into the output of the transmitter and provides a means of applying a locate signal to an insulated live wire. This is particularly useful with live insulated cables as it removes the need to disable the power and break the line.

⚠ WARNING: Do not clamp around uninsulated live conductors.

⚠ WARNING: Before applying or removing the clamp around a power cable ensure that the clamp is connected to the transmitter at all times.

Sondes, Flexrods and FlexiTrace

Sondes are battery powered transmitters that are useful for tracing non-metallic pipes. They can be fixed to Flexrods to allow them to be pushed through pipes or conduits, and some are suitable for blowing through ductwork. The RD5100H$_2$O can detect a range of sonde frequencies, including those transmitted by flexiprobe™ pushrod systems and flexitrax™ crawlers.

For a detailed guide on locating sondes, please refer to the operation manual.

A FlexiTrace is a traceable fiberglass rod incorporating wire conductors with a sonde at the end. It is connected to the output of the transmitter and is typically used in small diameter, non-metallic pipes. The user has the option of locating the entire length of the cable or choosing to locate only the tip of the cable.

Plug / Live cable connector

The plug connector is connected to the output of the transmitter and is used to put a signal onto a line and trace it from a domestic mains plug to the service cable in the street.

The live cable connector can be used to apply a signal to a live cable. Only suitably qualified personnel should use this equipment.

Getting started with the RD5100H$_2$O

To power on or power off the locator and transmitter, press and hold the On/Off key for 2 seconds.

1. Switch on the locator using the On/Off key.
2. Once powered, the locator will automatically select the last mode used (Guidance or Power mode).
3. A momentary press of the Frequency key toggles between the two modes.
4. In Guidance mode the following features are displayed on the screen:

- Target Position Indicator
- Compass
- Numerical signal strength
- Proportional left/right arrows
- Active frequency icon
- Depth
- Current
- Battery level indicator for 10 seconds after a key press.

5. In Power mode the following features will be displayed:

- Bar graph signal strength indicator
- Numerical signal strength (percentage)
- Numerical gain setting
- Depth (metric or imperial, configuration dependent)
- Battery level indicator for 10 seconds after a key press.

Locating the Pipe or cable

Having chosen the method of applying the transmitter signal to the pipe or cable, the locator is now ready to use.

Note: When the locator is positioned at a specific distance from the target line, the depth and current values will automatically display, although these values will not be accurate until the locator is directly over the target line and correctly orientated.

When directly over the target line, both depth and current readings will be at their minimum. This can be a very useful feature when attempting to pinpoint the target line.

Note: To display depth and current readings, the locator must be orientated in line with the target by using the compass and left / right arrows. The compass feature and left / right arrows in Figure 2 show the locator directly in line with the target.

Figure 1:

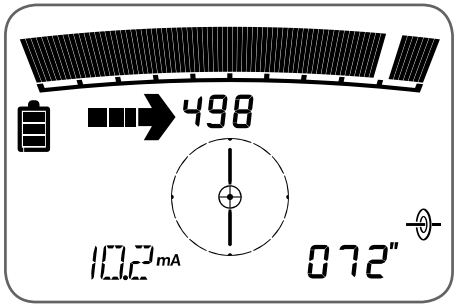


Figure 1 shows the locator in Guidance Mode with the locator positioned to the left of the target line.
In this position the Proportional Left arrow is displayed, indicating the direction in which the locator should be moved towards the target line. The target position indicator indicates the target positioned to the right of the locator and can be used to guide the locator towards the target line. The signal strength value will be displayed, indicating the strength of the signal from the target line. In this position the tone from the speaker of the locator will be continuous.

With the aid of the compass, the locator can be positioned in line with the target line enabling both depth and current readings to be displayed.

As the locator is moved towards the right, the tail on the proportional left arrow will reduce, the target position indicator will move from the right, towards the centre, the speaker tone will reduce and the numerical signal strength value will increase.

Use the proportional arrows, target position indicator and signal strength value to guide the locator directly over the target line.

Figure 2

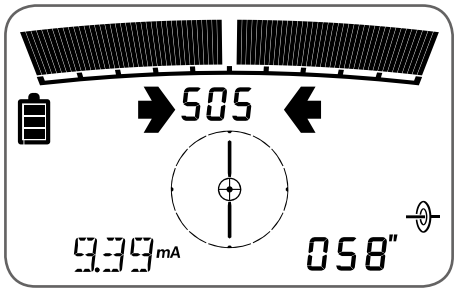


Figure 2 shows the locator in Guidance Mode and directly over the target line. In this position the left and right arrow heads will be displayed simultaneously, target position indicator in the centre, the signal strength value at its maximum, speaker tone silent and both depth and current readings at their minimum.

Figure 3:

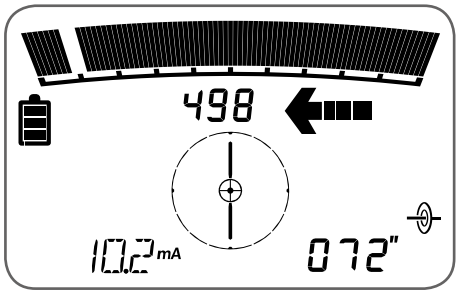


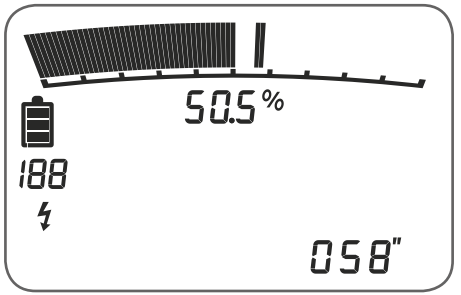
Figure 3 shows the locator in Guidance Mode and positioned to the right of the target line. In this position the Proportional Right arrow is displayed, indicating the direction in which the locator should be moved towards the target line. The target position indicator indicates the target positioned to the left of the locator and can be used to guide the locator towards the target line. The signal strength value will be displayed, indicating the strength of the signal from the target line. In this position the tone from the speaker of the locator will be pulsed.

With the aid of the compass, the locator can be positioned in line with the target line enabling both depth and current readings to be displayed.

As the locator is moved towards the left, the tail on the proportional right arrow will reduce, the target position indicator will move from the left, towards the centre, the pulsing tone from the speaker will reduce and the numerical signal strength value will increase.

Use the proportional arrows, target position indicator and signal strength value to guide the locator directly over the target line.

Figure 4:



With the locator powered up in guidance mode, a momentary press of the mode key will change the mode of operation to power mode. In this mode, the bar graph signal strength indicator, numerical signal strength (%), numerical gain setting and depth (m / ft) are available. The proportional left/right arrows and target position indicator will not be available (Refer to Figure 4).

Training

Radiodetection provides training services for most Radiodetection products. Our qualified instructors will train equipment operators or other personnel at your preferred location or at Radiodetection headquarters. For more information go to: **www.radiodetection.com** or contact your local Radiodetection representative.

Care and maintenance

The RD5100H_2O locator and transmitter are robust, durable and weatherproof. However you can extend your equipment's life by following these care and maintenance guidelines.

General

Store the equipment in a clean and dry environment.

Ensure all terminals and connection sockets are clean, free of debris and corrosion and are undamaged.

Do not use this equipment when damaged or faulty.

Batteries and power supply

Only use the rechargeable battery packs, chargers and power supplies approved by Radiodetection.

If not using rechargeable packs, use good quality Alkaline or NiMH batteries only.

Batteries should be disposed of in accordance with your company's work practice, and/or any relevant laws or guidelines in your country.

Cleaning

⚠ WARNING: Do not attempt to clean this equipment when it is powered or connected to any power source, including batteries, adapters and live cables.

Ensure the equipment is clean and dry whenever possible.

Clean with a soft, moistened cloth. Do not use abrasive materials or chemicals as they may damage the casing, including the reflective labels. Do not use high pressure jets of water to clean the equipment.

If using this equipment in foul water systems or other areas where biological hazards may be present, use an appropriate disinfectant.

Software upgrades

From time to time, Radiodetection may release software upgrades to enhance features and improve performance of the RD5100H_2O locator or transmitter. Software upgrades are free of charge and provided through a software manager Personal Computer (PC) application.

E-mail alerts and notification of new software releases are sent to all registered users.

Disassembly

Do not attempt to disassemble this equipment under any circumstances. The locator and transmitter contain no user serviceable parts.

Unauthorized disassembly will void the manufacturer's warranty, and may damage the equipment or reduce its performance.

Service and maintenance

Regularly check your equipment for correct operation by using eCert.

The locator and transmitter are designed so that they do not require regular recalibration. However, as with all safety equipment, it is recommended that they are serviced and calibrated at least once a year either at Radiodetection or an approved repair center.

NOTE: Service by non-approved service centers may void the manufacturer's warranty.

Details of Radiodetection offices and distribution partners can be found at **www.radiodetection.com**

Radiodetection products, including this guide, are under continuous development and are subject to change without notice. Go to **www.radiodetection.com** or contact your local Radiodetection representative for the latest information regarding the RD5100H_2O locator or any Radiodetection product.

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