

RD400 Digital Series User Guide

Revision 2 8/2000

RD400 Digital Series User Guide

Trouble Shooting

When reporting any problem to your Radiodetection Dealer/Supplier it is important to quote the following:

Receiver Serial Number.

Software Revision Number.

Software Revision Number is displayed on the LCD during switch on.

Warning

Radiodetection Receivers detect almost all buried cables and most conductors, but there are some which do not radiate signals and which Radiodetection Receivers cannot detect. Radiodetection Receivers do not indicate whether a signal is from a single cable, several buried side by side or one above another.

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

Reduce audio level before using headphones.

Ni-Cad batteries should be disposed of in accordance with your Company's work practice, and/or the relevant law or guidelines in your country.

Warning

The operation of any cable and pipe locator may be affected when used in close proximity to ferrous materials such as manhole covers and parked cars. Keep a one or two meter distance from these objects when taking critical measurements such as depth and current readings. Standing too close to the locator when wearing steel toe capped boots may also affect the readings.



This instrument, or family of instruments, will not be permanently damaged by reasonable electrostatic discharge and has been tested in accordance with IEC 801-2. However, in extreme cases temporary malfunction may occur. If this happens, switch off, wait and switch on again. If the instrument still malfunctions, disconnect the batteries for a few seconds.

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About this User Guide

This User Guide is divided into sections as follows:

RD400 Digital Receivers

These sections detail where to find and how to use the various operating controls and features, etc., relevant to each Receiver in the RD400 Digital Series range.

As there are several RD400PXL-2 variants, some of the features described in the PXL-2 Receiver Section may not be available. Refer to the product label for features available.

Receiver Use

This section describes how to locate, trace, pinpoint, measure depth/current and find current direction using the RD400 Digital Series Receivers.

RD400 Transmitters

These sections detail where to find and how to use the various operating controls and features, etc., relevant to each Transmitter in the RD400 Series range.

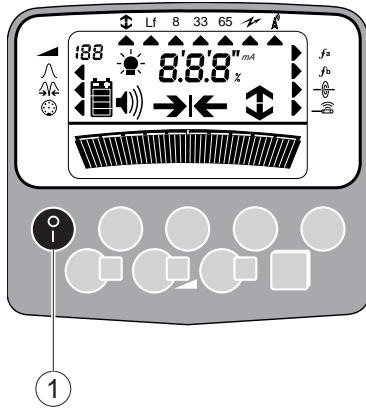
Transmitter Use

This section describes how to apply a signal to a target line using the RD400 Series Transmitters.

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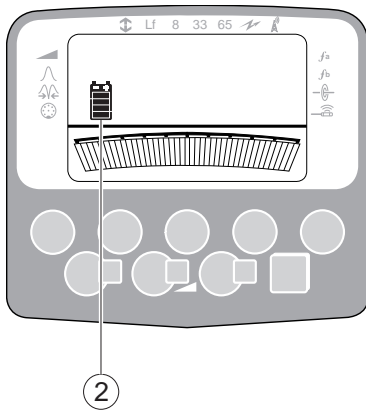
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RD400PXL-2 Precision Locator



On/Off (1)

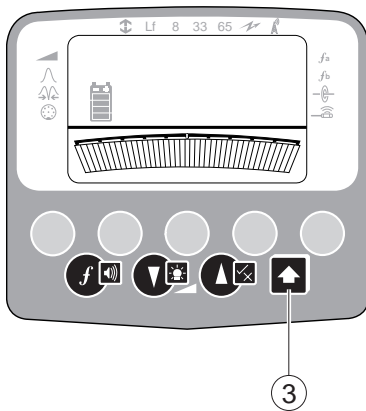
One press for On, further press for Off. If after 5 minutes no control key has been pressed, there is an audible warning followed by auto switch Off.



Batteries (2)

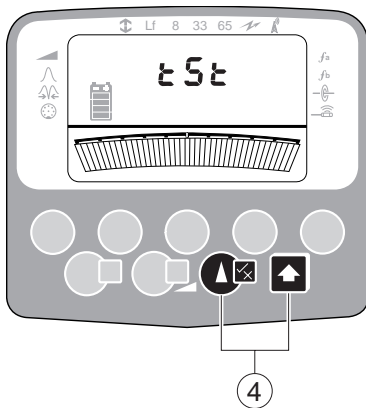
Display provides 4 segment continuous indication of battery status. When battery replacement is necessary, display shows flashing battery symbol and 'Lo bat' followed by Receiver switching off.

Unscrew battery compartment cover and replace 12 x LR6 (AA) Alkaline batteries. Observing correct battery polarity as indicated on battery holder.



Shift Key (3)

Provides access to secondary functions on some keys.



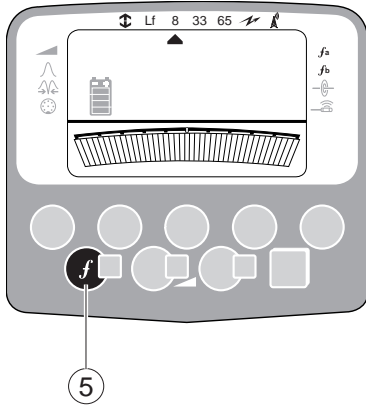
Self Test (4)

Press to initiate Self Test while Shift is held down - 'tSt' is displayed momentarily followed by 'PAS' (Pass) or 'FAL' (Fail). If the Receiver fails the Self Test consult your Dealer/Supplier.

Note:

This does not confirm the calibration of the Receiver.

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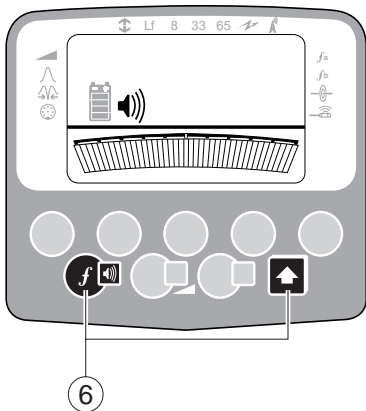
Frequency/Mode (5)

Moves the mode pointer through choice of modes available from those indicated along top of display and custom frequencies (f_a / f_b) on the right.

Selects Power or Radio (passive modes) and frequencies corresponding to Transmitter (active modes).

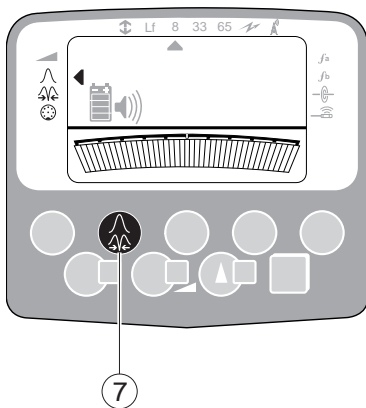
Frequencies/Modes available:

-  CD frequency
- Lf** Low frequency
- 8** 8192 Hz
- 33** 32768 Hz
- 65** 65536 Hz
-  Power
-  Radio
- f_a User defined frequency
- f_b User defined frequency



Speaker (6)

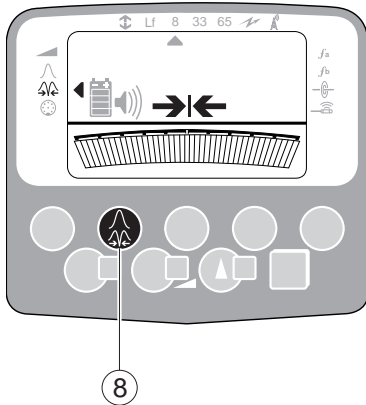
Press to increase or decrease loudspeaker level while Shift key is held down.



Peak/Null (7)

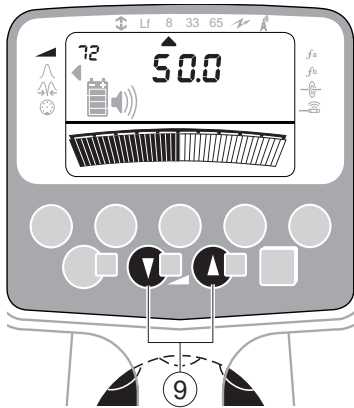
Press to select either Peak response, Null response or Accessory Socket (if an accessory is connected). The pointer indicates selection.

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Left/Right Indication (8)

Indicates direction to target line in Null mode when Receiver is used to locate with internal aerials or A-frame, except in Power mode.



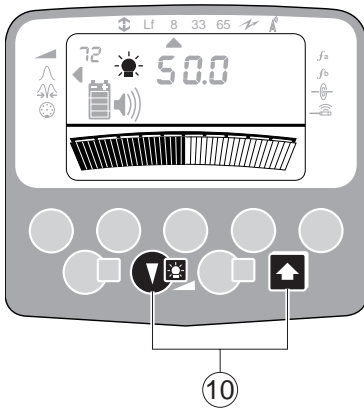
Gain Down/Up (9)

Press either key (or operate touch gain control, if fitted) to increase or decrease Receiver gain.

If bargraph indicates full scale press Down arrow key to automatically reduce indication level.

A numeric representation of meter deflection percentage is displayed above bargraph.

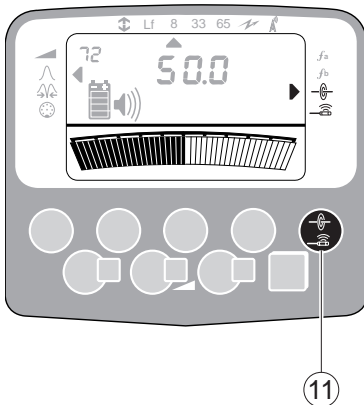
Actual Receiver gain level (0 to 100) is displayed next to Gain symbol.



Backlight (10)

One press for On, further press of Off while Shift key is held down.

Defaults of Off at switch on to conserve batteries.



Line/Sonde (11)

Press to select Line or Sonde mode. The pointer indicates selection.



Warning

Failure to select appropriate Line/Sonde mode will result in incorrect depth estimation.

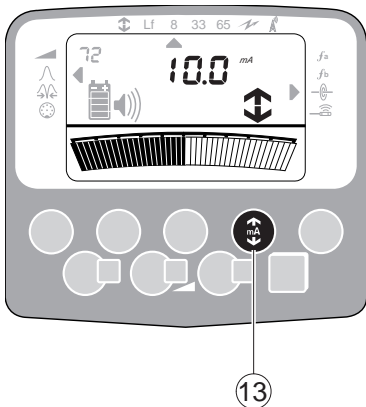
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Depth (12)

Press to display depth from Receiver to target line/sonde when directly over line/sonde.

Depth measurement may not be available in all Modes on some PXL-2 models



Current (13)

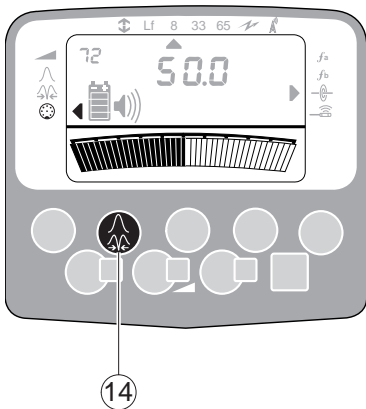
Press once to obtain current value (mA) of active target line signal when directly over line, except in Power or Radio modes.

CD – Read

Press the Current key twice to select Current Direction indication when in CD mode. Current Direction will be indicated by the forward/backward arrows on the LCD.

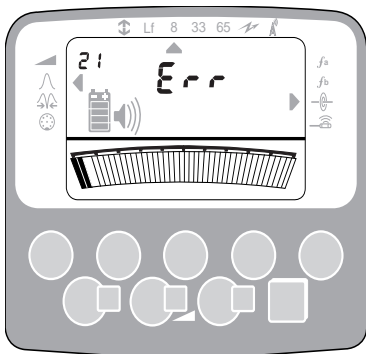
CD – Reset

Hold down Shift key and press Current Key, LCD will display “rSt”.



Accessory Socket (14)

Pointer indicates when Accessory Socket has been selected. On some Receiver variants selection is automatic when accessory is connected and on others selection must be made by pressing Peak/Null key.



Error Codes

Error Codes are displayed where gain dB level normally appears accompanied by an “Err” message.

Operational Errors

Error #9 – Indicates that signal is too small or too large to measure Depth/Current. Check Transmitter settings.

Error #11 – Indicates a strong overhead signal.

Error #21 – Indicates that depth to target line/Sonde is beyond Depth measurement range.

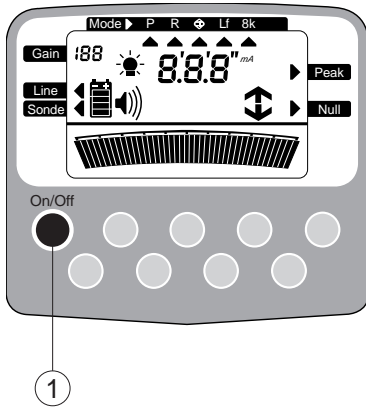
Error #22 – Indicates CD signal missing in CD mode.

Error #44 – Indicates Lf signal missing in CD mode.

Equipment Errors

When Error codes #15, #16, #17, #18, #19, #23 and #24 are displayed you must consult your Dealer/Supplier.

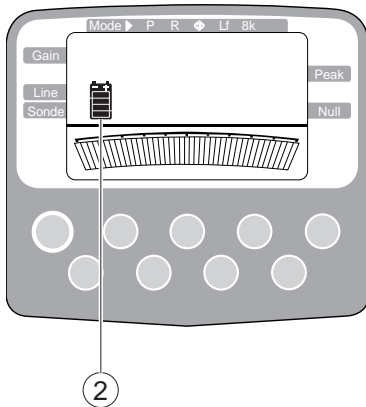
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RD432PDL Precision Locator

On/Off (1)

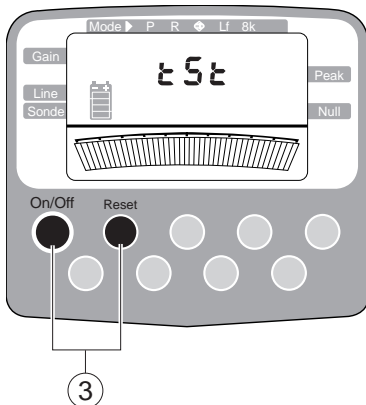
One press for On, further press for Off. If after 5 minutes no control key has been pressed, there is an audible warning followed by auto switch Off.



Batteries (2)

Display provides 4 segment continuous indication of battery status. When battery replacement is necessary, display shows flashing battery symbol and 'Lo bat' followed by Receiver switching off.

Unscrew battery compartment cover and replace 12 x LR6 (AA) Alkaline batteries. Observing correct battery polarity as indicated on battery holder.

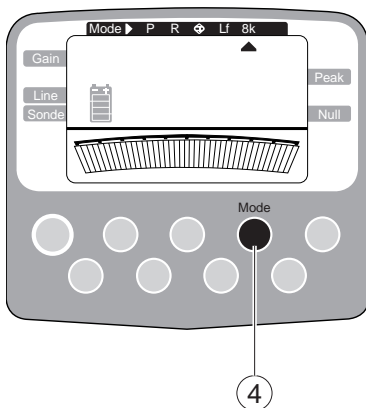


Self Test (3)

With the Receiver switched Off, press and hold the Reset and On/Off keys until - 'tSt' is displayed momentarily followed by 'PAS' (Pass) or 'FAL' (Fail). If the Receiver fails the Self Test consult your Dealer/Supplier.

Note:

This does not confirm the calibration of the Receiver.



Mode (4)

Moves the mode pointer through choice of modes available from those indicated along top of display. Selects Power or Radio (passive modes) and frequencies corresponding to Transmitter (active modes).

Frequencies/Modes available:

P Power

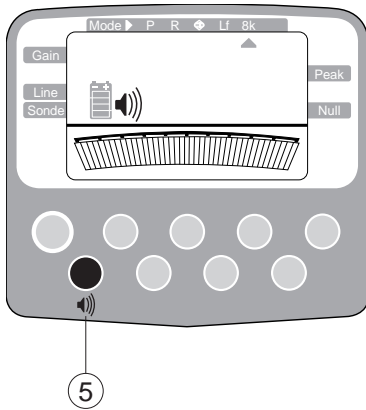
R Radio

 CD frequency

Lf Low frequency

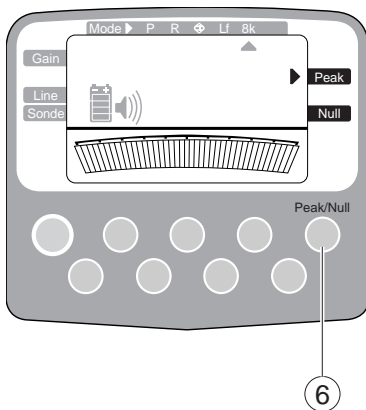
8 k 8192 Hz

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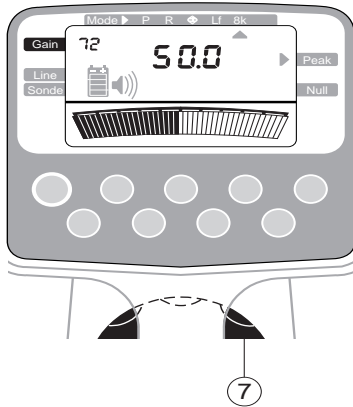
Speaker (5)

Press to increase or decrease loudspeaker level.



Peak/Null (6)

Press to select either Peak or Null response. The pointer indicates selection.



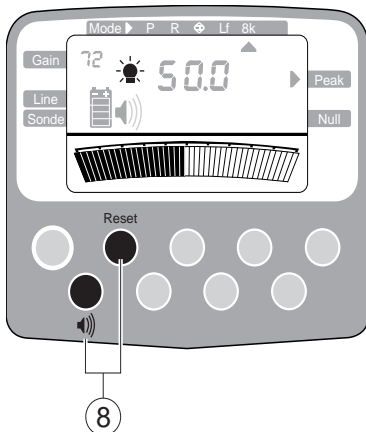
Touch Gain Control (7)

Turn clockwise/anticlockwise to increase/decrease Receiver gain level (0 to 100).

If bargraph indicates full scale reduce indication level using the Touch Gain Control.

A numeric representation of meter deflection percentage is displayed above bargraph.

Actual Receiver gain level (0 to 100) is displayed on LCD top left.



Backlight (8)

Press and hold Reset key and press Speaker key (if backlight option available).

Defaults to Off at switch on to conserve batteries.

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Line/Sonde (9)

Press to select Line or Sonde mode. The pointer indicates selection.



Warning

Failure to select appropriate Line/Sonde mode will result in incorrect depth estimation.



Depth (10)

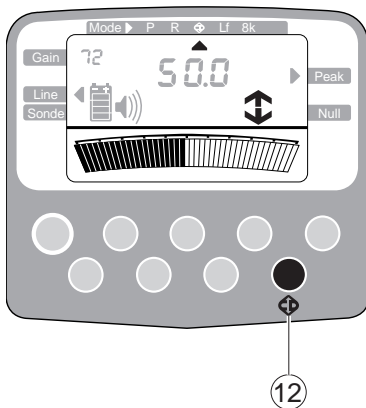
Press to display depth from Receiver to target line/sonde when directly over line/sonde.

Depth measurement is not available in Power or Radio modes.



Current (11)

Press to obtain current value (mA) of active target line signal when directly over line, except in Power or Radio modes.



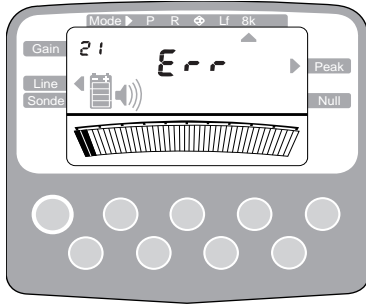
CD (12) - Read

Press to indicate Current Direction. Display indicates 'cd' for a short time followed by forward or backward arrow.

CD - Reset

To reset Current Direction, press and hold the Reset key and press the **CD** key, lcd will display 'rSt'.

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Error Codes

Error Codes are displayed where gain dB level normally appears accompanied by an 'Err' message.

Error #9 - Indicates that signal is too small or too large to measure Depth/Current. Check Transmitter settings.

Error #11 - Indicates that Receiver is being moved during Depth measurement.

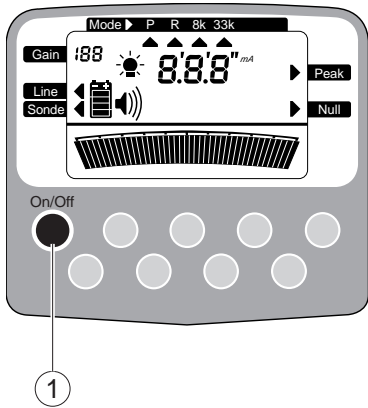
Error #12 - Indicates too much interference from external power source to measure Depth.

Error #13 - Indicates too much interference from external power source to measure Current.

Error #20 - Indicates that current to be measured is out of Receiver range.

Error #21 - Indicates that depth to target line/Sonde is beyond Depth measurement range.

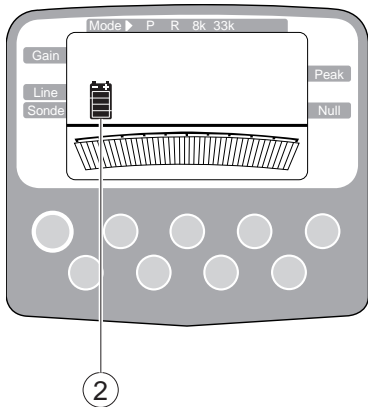
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RD400PXL Precision Locator

On/Off (1)

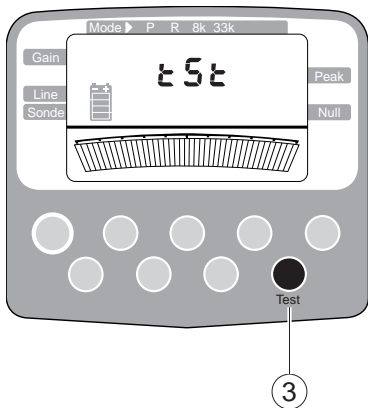
One press for On, further press for Off. If after 5 minutes no control key has been pressed, there is an audible warning followed by auto switch Off.



Batteries (2)

Display provides 4 segment continuous indication of battery status. When battery replacement is necessary, display shows flashing battery symbol and 'Lo bat' followed by Receiver switching off.

Unscrew battery compartment cover and replace 12 x LR6 (AA) Alkaline batteries. Observing correct battery polarity as indicated on battery holder.

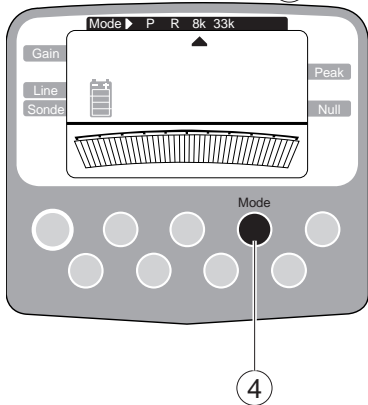


Test (3)

Press to initiate Self Test - 'tSt' is displayed momentarily followed by 'PAS' (Pass) or 'FAL' (Fail). If the Receiver fails the Self Test consult your Dealer/Supplier.

Note:

This does not confirm the calibration of the Receiver.



Mode (4)

Moves the mode pointer through choice of modes available from those indicated along top of display. Selects Power or Radio (passive modes) and frequencies corresponding to Transmitter (active modes).

Frequencies/Modes available:

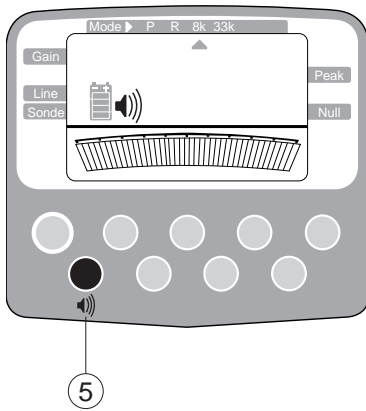
P Power

R Radio

8 k 8192 Hz

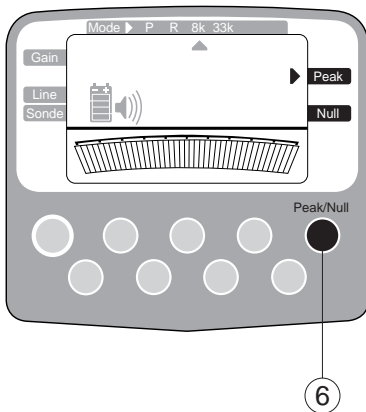
33 k 32768 Hz

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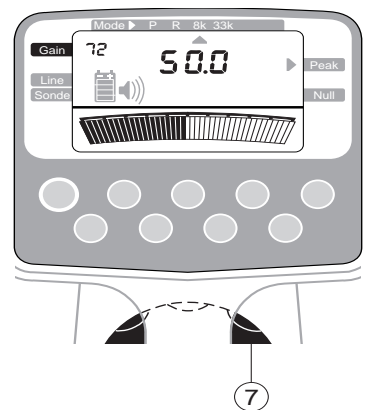
Speaker (5)

Press to increase or decrease loudspeaker level.



Peak/Null (6)

Press to select either Peak or Null response. The pointer indicates selection.



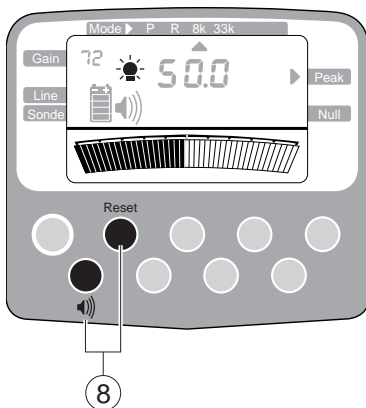
Touch Gain Control (7)

Turn clockwise/anticlockwise to increase/decrease Receiver gain level.

If bargraph indicates full scale reduce indication level using the Touch Gain Control.

A numeric representation of meter deflection percentage is displayed above bargraph.

Actual Receiver Gain level (0 to 100) is displayed on LCD top left.



Backlight (8)

Press and hold Reset key and press Speaker key (if backlight option available).

Defaults to Off at switch on to conserve batteries.

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Line/Sonde (9)

Press to select Line or Sonde mode. The pointer indicates selection.



Warning

Failure to select appropriate Line/Sonde mode will result in incorrect depth estimation.



Depth (10)

Press to display depth from Receiver to target line/sonde when directly over line/sonde.

Depth measurement is not available in Power or Radio modes.



Current (11)

Press to obtain current value (mA) of active target line signal when directly over line, except in Power or Radio modes.

Error Codes

Error Codes are displayed where gain dB level normally appears accompanied by an 'Err' message.

Error #9 - Indicates that signal is too small or too large to measure Depth/Current. Check Transmitter settings.

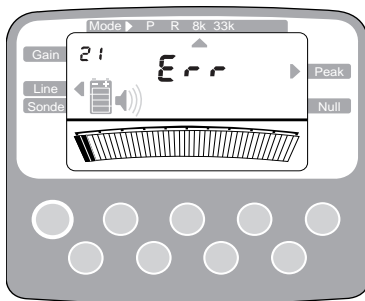
Error #11 - Indicates that Receiver is being moved during Depth measurement.

Error #12 - Indicates too much interference from external power source to measure Depth.

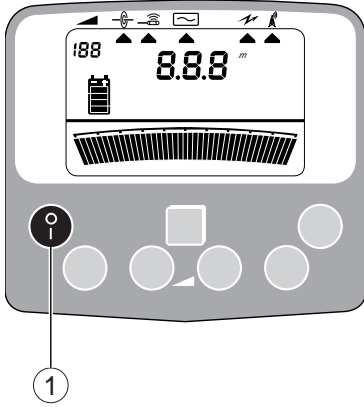
Error #13 - Indicates too much interference from external power source to measure Current.

Error #20 - Indicates that current to be measured is out of Receiver range.

Error #21 - Indicates that depth to target line/Sonde is beyond Depth measurement range.



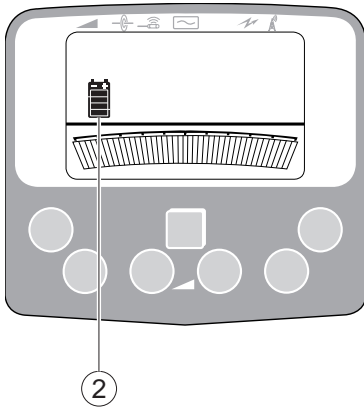
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RD400SL2 Locator

On/Off (1)

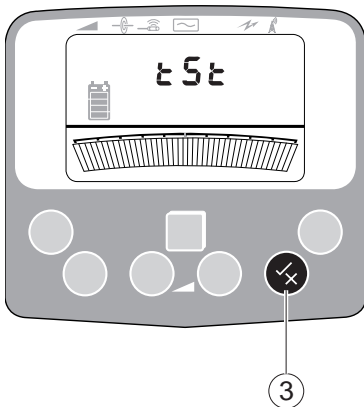
One press for On, further press for Off. If after 5 minutes no control key has been pressed, there is an audible warning followed by auto switch Off.



Batteries (2)

Display provides 4 segment continuous indication of battery status. When battery replacement is necessary, display shows flashing battery symbol and 'Lo bat' followed by Receiver switching off.

Unscrew battery compartment cover and replace 12 x LR6 (AA) Alkaline batteries. Observing correct battery polarity as indicated on battery holder.

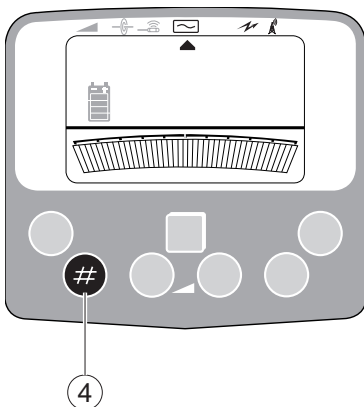


Self Test (3)

Press to initiate Self Test - 'tSt' is displayed momentarily followed by 'PAS' (Pass) or 'FAL' (Fail). If the Receiver fails the Self Test consult your Dealer/Supplier.

Note:


This does not confirm the calibration of the Receiver.



Mode (4)

Moves the mode pointer through choice of modes available from those indicated along top of display. Selects Power or Radio (passive modes) and Transmitter frequency (active mode).

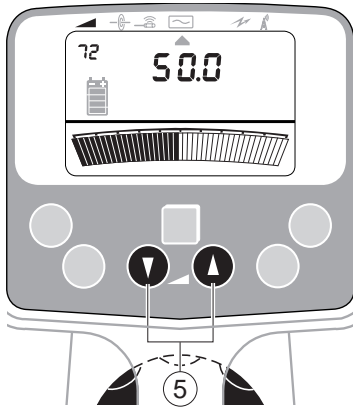
Frequencies/Modes available:

 8192 Hz (8 kHz)
or 32768 Hz (33 kHz)

 Power

 Radio

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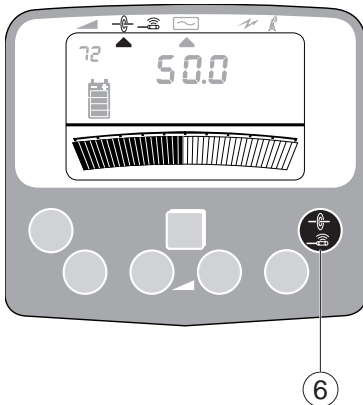
Gain Down/Up (5)

Press either key or operate Touch Gain Control, if fitted to increase or decrease Receiver gain.

If bargraph indicates full scale press Down Arrow Key to automatically reduce indication level.

A numeric representation of meter deflection Percentage is displayed above bargraph.

Actual Receiver Gain lever (0 to 100) is displayed Below Gain symbol.



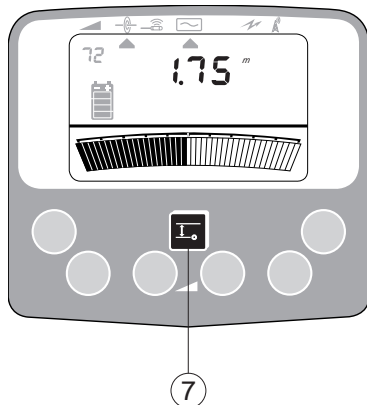
Line/Sonde (6)

Press to select Line or Sonde mode. The pointer Indicates selection.



Warning

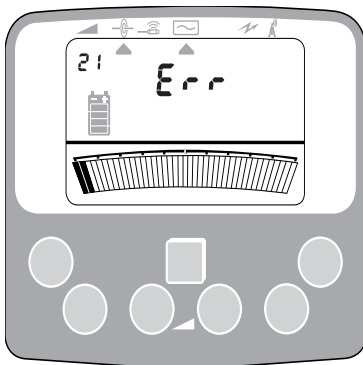
Failure to select appropriate Line/Sonde mode will result in incorrect depth estimation.



Depth (7)

Press to display depth from Receiver to target line/sonde when directly over line/sonde.

Depth measurement is not available in Power or Radio modes.



Error Codes

Error Codes are displayed where gain dB level normally appears accompanied by an 'Err' message.

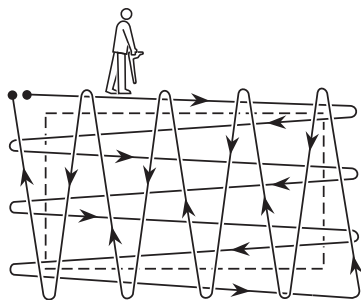
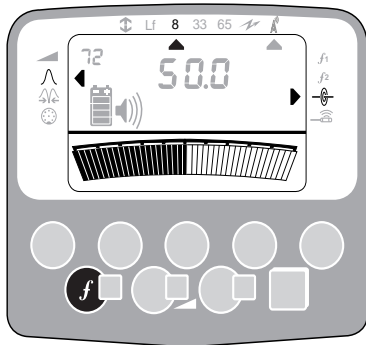
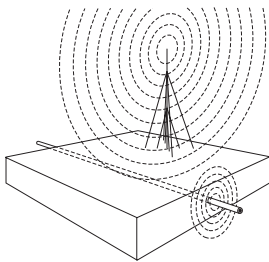
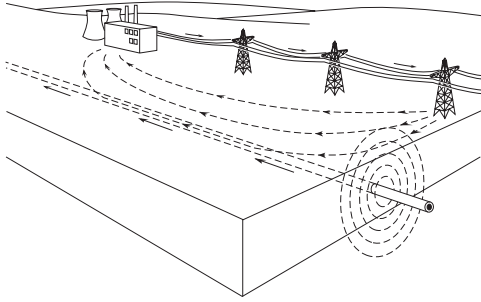
Error #9 - Indicates that signal is too small or too large to measure Depth. Check Transmitter settings.

Error #11 - Indicates a strong overhead signal. Error #11 – Indicates a strong overhead signal.

Error #21 – Indicates that depth to target line/Sonde is beyond Depth measurement range.

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Receiver Use

Locate

Switch Receiver On. Options and facilities available are indicated during display test.

Check Receiver battery indicator shows at least one bar.

If required, initiate a Self Test.

Power Mode

Some cables radiate power energy signals.

Radio Mode

Some cables or other buried metal utility lines do not radiate power energy signals but can be detected by locating re-radiated radio signals.

No transmitter is needed to locate in the Power and Radio modes.

Active Mode

Apply the transmitter signal and switch on. Select desired frequency. Refer to 'Tx Use' section.

Select the required transmitter frequency on the receiver.

Select Peak and Line modes.

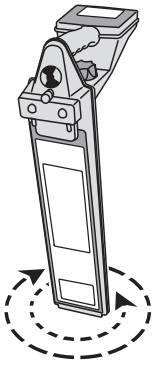
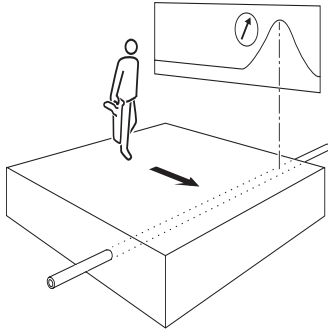
Adjust gain so bargraph is approximately mid scale.

Holding Receiver blade vertical at all times, sweep area to be excavated with a steady and deliberate motion.

If necessary adjust gain to keep meter on scale.

RD400 Digital Series User Guide

When a signal is detected continue along search route until signal strength reduces, returning to position where signal is strongest.

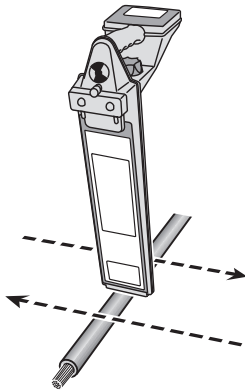


Pinpoint

Rotate Receiver through 90° until minimum signal is detected.

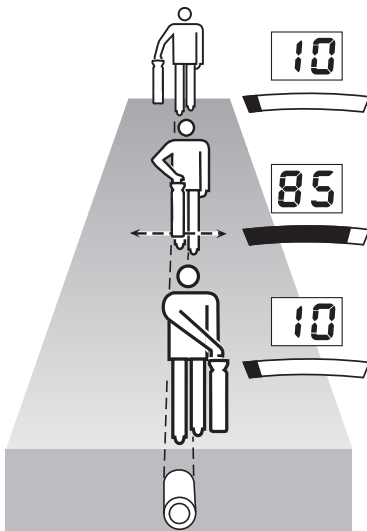
Receiver blade is now in line with target line.

Rotate Receiver back through 90° so that blade is again across target line.



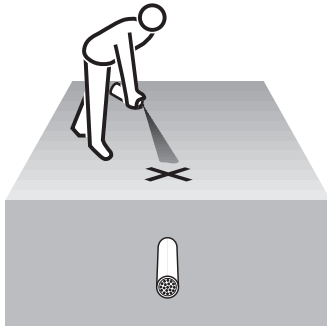
Move Receiver side to side and observe maximum response over centre of signal.

Receiver blade is now over target line and across it.



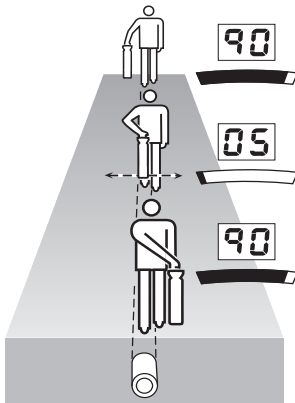
Moving Receiver steadily from side to side, follow line of maximum response, keeping blade vertical and across the target line.

RD400 Digital Series User Guide



Mark target line position with chalk or paint.

Continue sweeping the area, following grid pattern.



Null

Select Null mode.

Walk along path of target line. Minimum response with an increased response each side indicates position of target line.



When the Receiver blade is across the target line, on some receivers, the Left/Right arrows on display will point in the direction of the target line.

Stop every 10 - 20 paces and check position. Periodically switch back to Peak to confirm position.

Note:

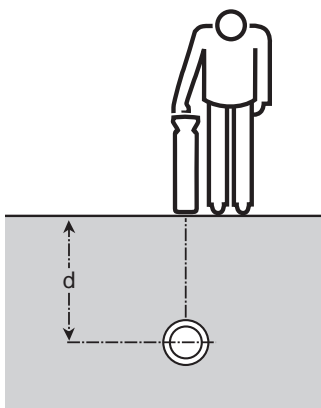
Although the Peak position of a line is more difficult to identify, it is usually more accurate than the Null position.

Depth Reading to a Line

Depth readings can only be accurately performed when using the active transmitter mode.

Pinpoint target line as previously described. Hold Receiver vertically with blade resting on the ground.

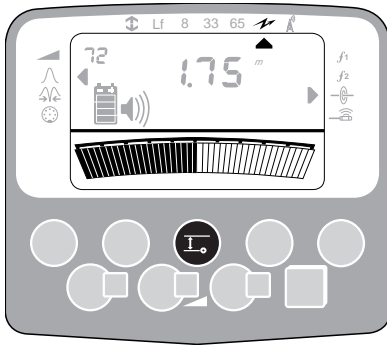
Ensure Line mode is selected. Momentarily press the Depth key. Depth reading is displayed for a few seconds.



Warning

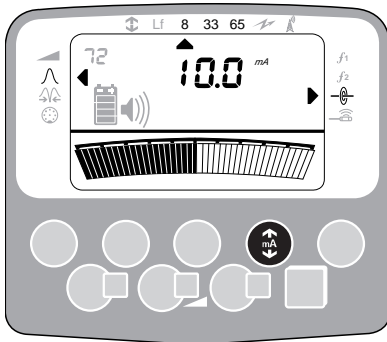
Certain conditions can cause depth errors.

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Depth in Power Mode

As current on power cables may fluctuate Depth readings in Power mode are NOT as reliable as active transmitter Depth measurements.

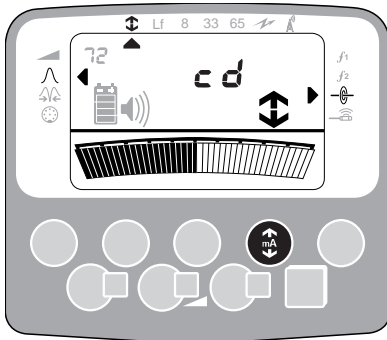


Current (RD400PXL-2, RD432PDL and RD400 PXL)

Active signal current can be measured in the same active locating modes available with the Depth feature.

Pinpoint the target line as previously described.

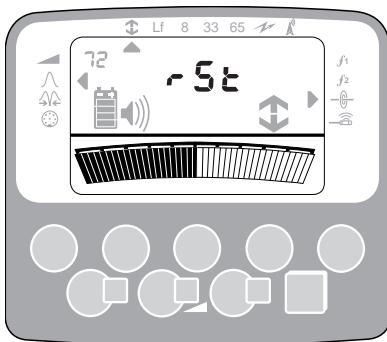
Press the Current key once. Current reading is displayed for a few seconds.



CD (RD400PXL-2 and RD432PDL)

Set Transmitter to provide a CD signal.

Using Frequency/Mode key select CD mode, hold Receiver over target line close to, and with back to, Transmitter.

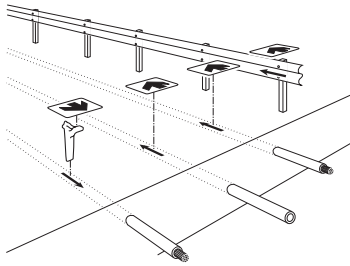


CD - Reset

Before using Current Direction information a CD reset must be carried out. (Refer to the appropriate Receiver section).

When reset, Receiver will indicate target line current direction flowing away from Transmitter.

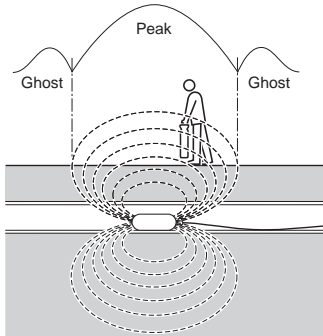
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CD - Read

The current direction of a line can be verified by using conductors to which the signal has coupled such as a railway line, a continuous metal fence or a highway crash barrier.

The CD arrows will show a reverse current direction, with respect to the target line, on these conductors.



Pinpointing a Sonde

Select Sonde and Peak modes, set Receiver to Sonde frequency.

Holding Receiver blade vertically and IN LINE with Sonde, move from side to side to obtain a Peak response.

Note:

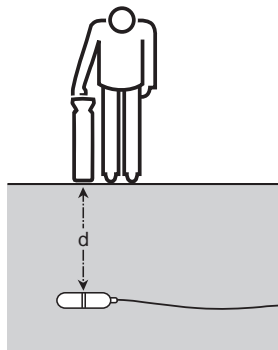
Ghost peaks will be found either side of main Peak response.

Move Receiver backwards and forwards to obtain a second Peak response.

Rotate Receiver clockwise and anticlockwise to obtain a third Peak response.

The Receiver is now directly over and in line with Sonde.

Pinpoint and mark at regular intervals.



Depth Reading to a Sonde

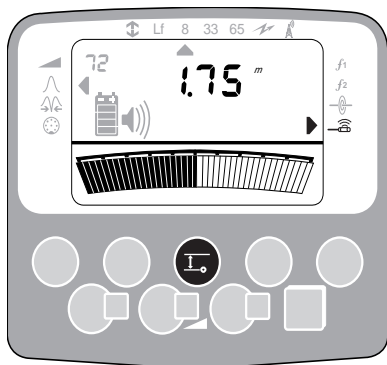
Pinpoint the Sonde.

Hold Receiver vertically with blade resting on the ground.

Ensure Sonde mode is selected.

Press the Depth key. Depth reading is displayed for a few seconds.

For further information refer to Sonde User Guide.



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RD Accessory A-Frame

The Accessory A-Frame can be used to find cable faults to ground in two ways, the CD signal method and FF signal method.

This User Guide describes both methods and assumes the Receiver used is the RD432PDL-2 and the Transmitter is the RD433HCTx-2.

Transmitter Setup

The only method of Transmitter signal application that can be used for fault finding is by direct connection to the defective cable or to the sheath.

Connect the Connection Cable to the Transmitter. Clip the Red lead to the defective cable or cable sheath cleaning the area if necessary to ensure connection is good. Extend the Black lead of the Connection Cable as far as possible and at 90° to the probable route of the target cable then clip to a grounding point such as a Ground Stake. Do not clip earth lead to water pipe or buried cable which could carry the signal.

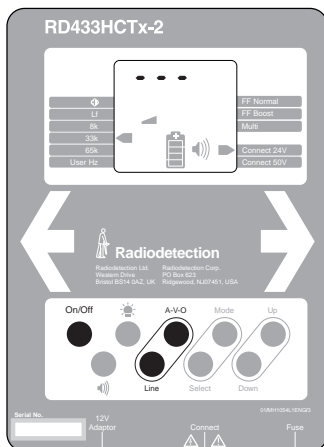
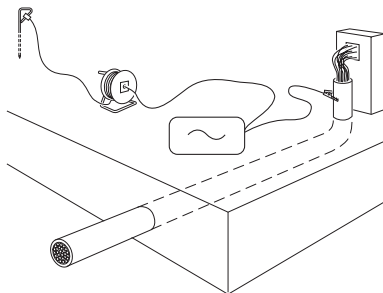
Note:

In situations where the target cable route is erratic or unpredictable, it may be advisable to carry out a trace and mark the cable route. Then return and follow the marked route carrying out FaultFind checks at regular survey intervals.

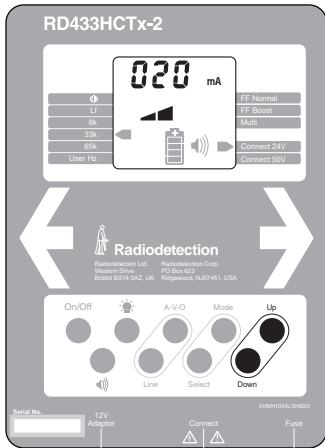
Switch the Transmitter On.

Using the Transmitter A-V-O key, select the Ohms mode, '- - -' is displayed. Press and hold the Line key until the resistance reading is displayed.

If the resistance is higher than 20 kilohms, 'Or' (Over Range) will be displayed.

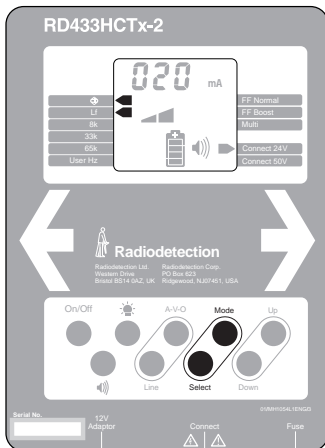


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Press the A-V-O key to display current (mA). Press the Up or Down keys to set the required output current level (typically 20 mA). In situations where there is a high degree of interference selecting a higher current may be desirable.

If it is not possible to obtain sufficient current, check connections to cable/sheath and Ground Stake. If necessary change position of the ground stake or pour water around the stake in dry or sandy conditions.



Cable Fault Finding with the A-Frame

CD Signal Method

Carry out the procedure in the 'Transmitter Setup' section.

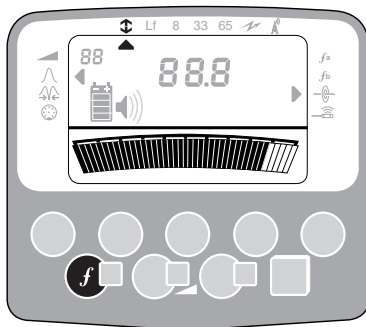
Using the Transmitter Mode key, move the pointer so it points to the CD icon, the pointer will flash.

Press the Select key to set the Transmitter to the CD mode, the pointer will stop flashing.

Note:

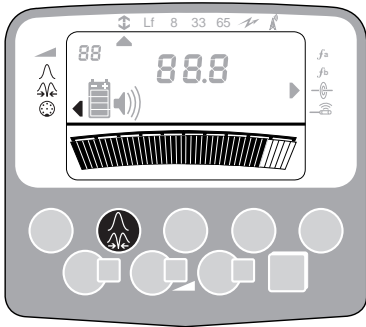
Lf will also be selected as the CD signal utilizes this frequency.

Connect the A-Frame to the Accessory Socket of Receiver.



Switch the Receiver On and select CD using the 'f' key.

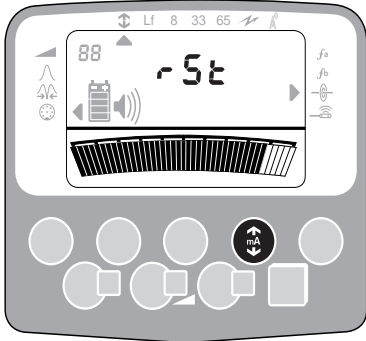
RD400 Digital Series User Guide



Pressing the Peak/Null key selects either Peak, Null (standard locate modes) or the Accessory Socket when A-Frame is connected.

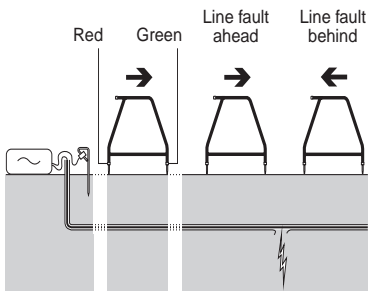
Use the Receiver in the Peak or Null mode to locate the cable.

Using the Peak/Null key, select the Accessory Socket mode and push the A-Frame spikes into the ground, near the Transmitter Ground Stake, with the Red spike nearer the Ground Stake.



Adjust Receiver gain to give a bar graph indication of approximately 80%.

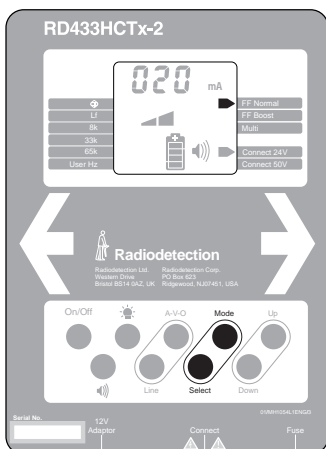
Press the Current key twice to display CD mode. Press and hold the Shift key then press the Current key, this resets CD, indicated by 'rSt' being displayed. The CD arrow should now point away from the Ground Stake.



Follow the cable route pushing the A-Frame spikes into the ground at regular intervals and check for a forward pointing arrow. When the backward pointing arrow is displayed move the A-Frame backwards or forwards, as indicated by the direction of the arrow, until the exact point is found where the arrow changes direction.

The centre line of the A-Frame is now directly over the fault provided that the operator is pinpointing the fault above the known cable location.

If the location of the cable is not certain, use Peak mode to pinpoint the cable, then return to the CD mode to pinpoint the fault again.



FF Signal Method

Carry out the procedure in the 'Transmitter Setup' section.

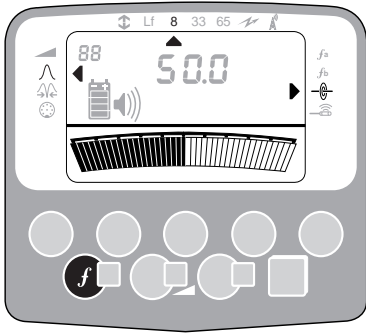
Using the Mode key, move the pointer so that it points to FF Normal or FF Boost, the pointer will flash.

Note:

The selection of FF Normal or FF Boost depends on the previously measured fault resistance. As a guide, select FF Normal for faults below 5 kilohms.

Press the Select key to set the Transmitter to the chosen FF mode, the pointer will stop flashing.

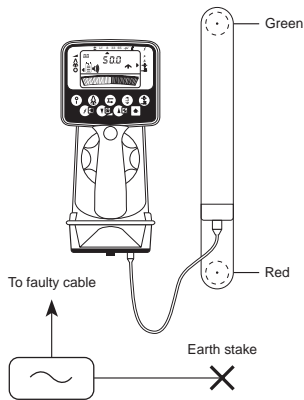
RD400 Digital Series User Guide



Connect the A-Frame to the Receiver Accessory Socket.

Switch the Receiver On and select 8 kHz using the 'f' key.

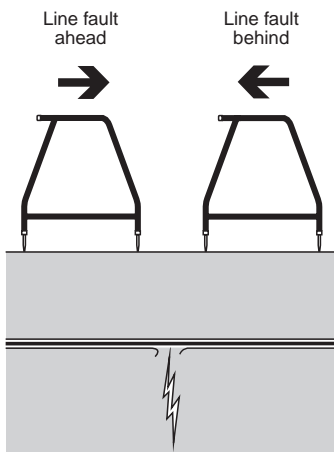
Using the Peak/Null key, select Peak or Null and trace the route of the suspect section of cable.



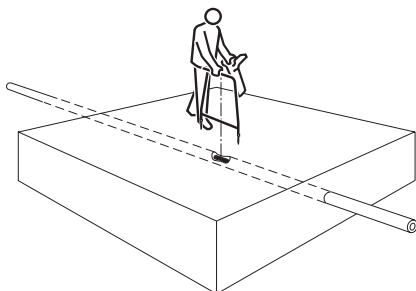
Using the Peak/Null key select Accessory Socket and push the A-Frame spikes into the ground, near the earth stake of the transmitter, with the red spike nearer the ground stake.

The Receiver display will indicate the 'dB' level with a forward pointing arrow.

Note:
Both the meter bargraph and audio are disabled during FF.

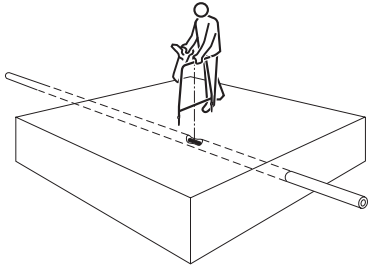


Follow the cable route pushing the A-Frame spikes into the ground at regular intervals and check for a forward pointing arrow. When the backward pointing arrow is displayed move the A-Frame backwards or forwards, as indicated by the direction of the arrow, until the exact point is found where the arrow changes direction.



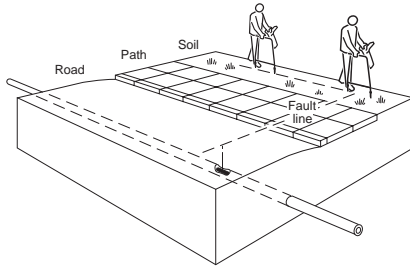
Midway between the spikes mark the ground with a line at 90° to the A-Frame.

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Rotate the A-Frame through 90° and FaultFind along the marked line, until the exact point is found where the arrow changes direction.

The centre line of the A-Frame is now directly over the fault.



Difficult Ground Conditions

If the cable runs under a paved surface, the fault can often be pinpointed by fault finding in the grass/soil adjacent to the paving. Reduce the distance between placing the spikes in the ground to allow for the increased distance to the actual fault position. Locate the cable using the Receiver in Peak mode. The fault is where the two lines cross.

If the cable runs under a road, use the equipment as normal on the road surface as it can sometimes detect signals when working on blacktop, concrete or paved surfaces. If necessary, try wetting the road surface. Pouring a very small amount of water around the bottom of the spikes before each FaultFind is generally enough.

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RD433HCTx-2 Multi-Frequency Transmitter

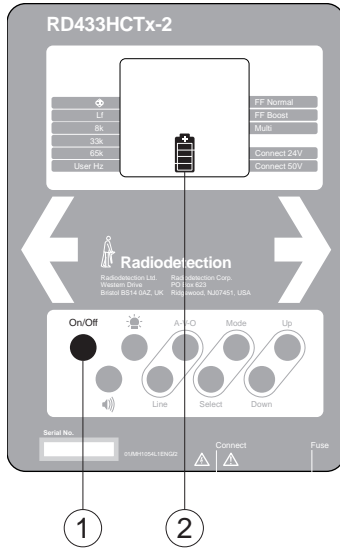
On/Off (1)

Turns the Transmitter On and Off.

Arrows on the main label indicate the required transmitter alignment for signal induction.

Batteries (2)

Continuous battery state is displayed on LCD during use. Low battery is indicated by flashing battery symbol on LCD and output signal pulses before switching transmitter off.

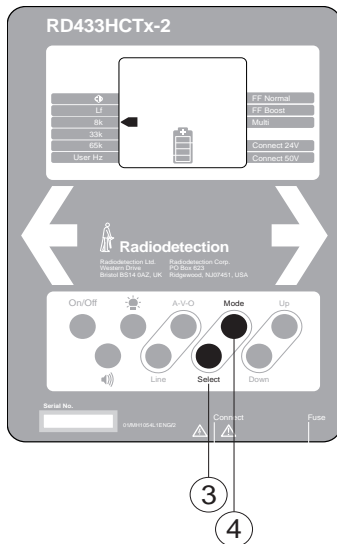


Mode (3)


Moves the mode flag to the required mode where it will flash until the Select key is pressed causing the flag to become solid and the Transmitter to provide an output.

Select (4)

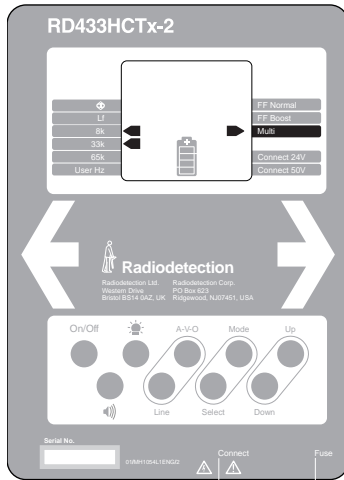
Selects the required mode. In User Hz mode pressing the Select key once will momentarily display the frequency selected.



Frequencies are:

	Current Direction	Direct Connection and CD Clamp only.
Lf	Low Frequency	Direct Connection and CD Clamp only.
8 k	8 kHz	Induction and Direct Connection.
33 k	33 kHz	Induction and Direct Connection.
65 k	65 kHz	Induction and Direct Connection.
User Hz	User defined Frequency	Direct Connection only.
FF Normal	Normal FaultFind	Direct Connection only.
FF Boost	Boost FaultFind	Direct Connection only.
Multi	Multi-Frequency	Direct Connection only.

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When Multi is selected, any combination of Lf, 8 k, 33 k and 65 k can be transmitted using Direct Connection. The selection procedure is as follows:

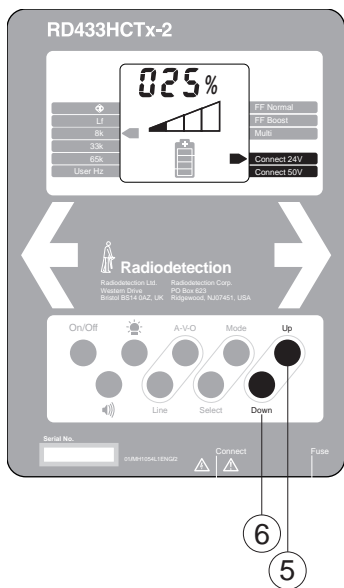
Using the Mode/Select keys select Multi. A flashing flag will appear next to Lf.

Using the Mode/Select keys select the first frequency.

Press the Mode key. A flashing flag will appear.

Using the Mode/Select keys select the second frequency.

Repeat as necessary to select the combination of frequencies required.



Up (5)

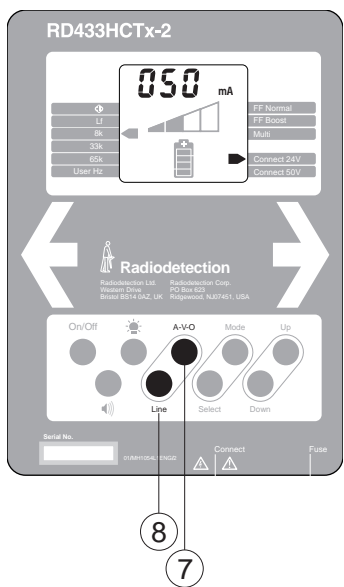
Increases the output signal level. In Connect 24 V/Connect 50 V modes, a four level output step chart is displayed, controlled by the Up and Down keys. At maximum level in Connect 24 V mode pressing Up key will select Connect 50 V at lowest level on step chart.

Down (6)

Decreases the output signal level. At minimum level in Connect 50 V mode pressing Down key will select Connect 24 V at highest level on step chart.

Note:

Output signal level is displayed as percentage in Induction mode.



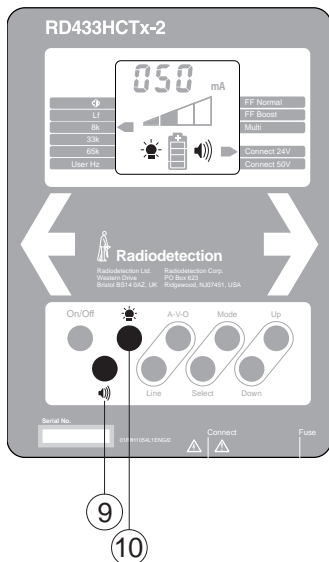
A-V-O (Amps-Volts-Ohms) (7)

Default mode displayed is output current (A), one press selects and displays voltage (V), a second press selects and displays load impedance (Ω), a third press returns to default mode.

Line (8)

Used in conjunction with A-V-O key. Press and hold the Line key to display the line voltage, in the V mode, and the line resistance, in the Ω mode.

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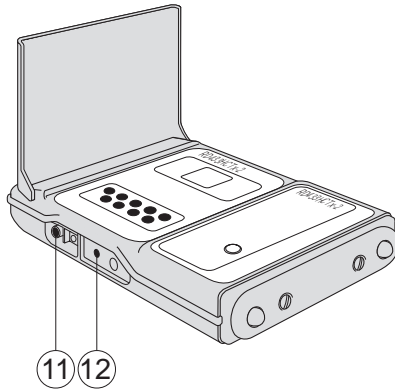


Speaker (9)

Press to adjust speaker level (Low, High or Off).

Backlight (10)

Turns Backlight On and Off.

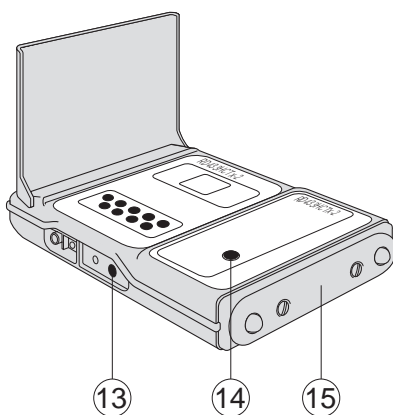


12 V Input Socket (11)

Optional input socket for external 12 V supply (e.g. car battery).

Connect Socket (12)

Socket which accepts Connection Cable or options such as Signal Clamp, Live Cable Connector or Live Plug Connector, which when connected, disables the Induction mode.



Fuse (13)

1 A anti-surge 20 mm fuse. Unscrew fuse holder for access. Replace only with fuse of same rating.

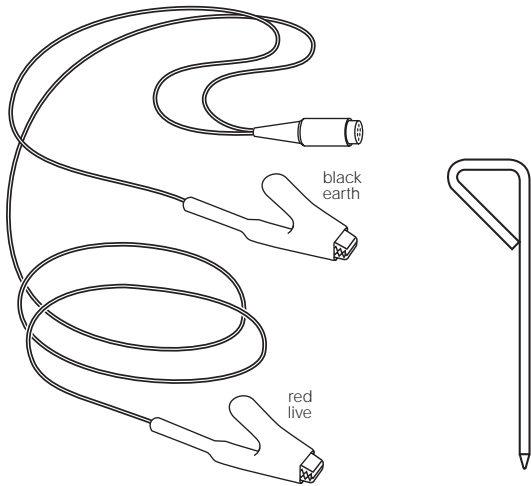
Security Tether Point (14)

Allows a chain etc. to be threaded through hole for tethering the Transmitter to telecom pole or other point for security.

Battery Access Cover (15)

Release the cover fasteners and replace 8 x (LR20) D cells. Observe correct battery polarity as indicated on instruction label.

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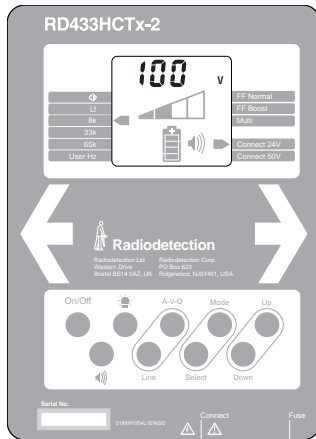


Connection Cable

Red cable connects the Transmitter signal directly to a target line. Black cable provides the ground return via Ground Stake.

Ground Stake

Ground Stake is for making a ground connection to provide a return signal.



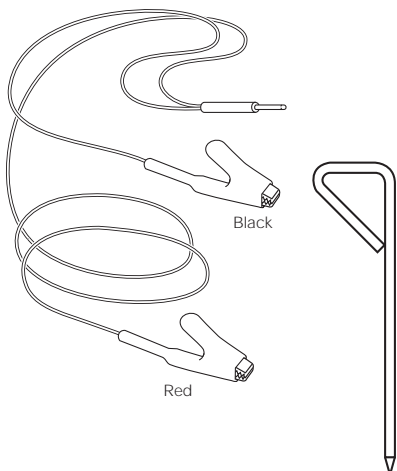
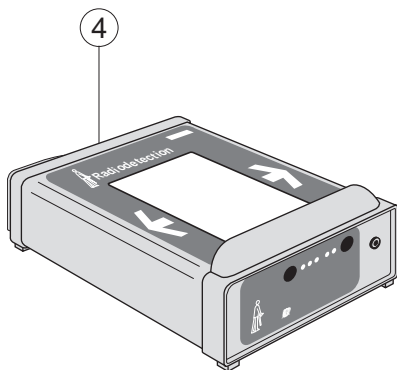
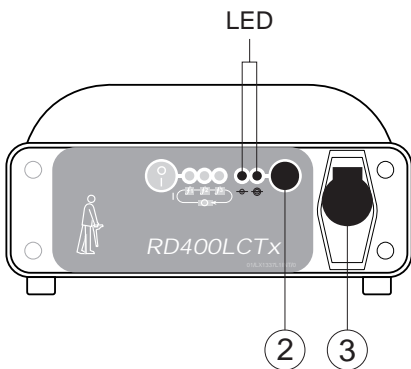
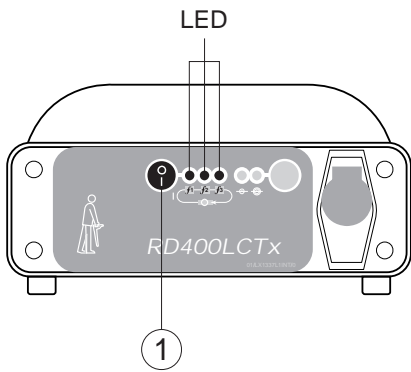
Live Cable Warning

Connection to a cable carrying a voltage exceeding 55 V causes an audio alarm to sound and voltage is displayed on the LCD. To reset alarm press Speaker key.

24 V Direct Connection Warning

Some telecom lines cannot allow line voltages which exceed 24 V to be placed on them. To cater for these lines refer to the Up and Down key options.

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RD400LCTx Lightweight Compact Transmitter

On/Off (1)

First press turns Transmitter On and selects first frequency (not available in Induction mode).

Second press selects second frequency.

Third press selects third frequency.

Fourth press turns Transmitter Off.

LEDs indicate which frequency has been selected.

Arrows on the instruction label indicate the required transmitter alignment for signal induction.

Power Select (2)

Selects either High or Low power level.

LEDs indicate which power level has been selected.

Connection Socket (3)

Accepts Connection Cable or optional accessories such as Signal Clamp, Live Cable Connector or Live Plug Connector, which, when connected, disables the Induction mode.

Batteries Access Panel (4)

No tone indicates that all batteries require replacing.

Unscrew fastener and replace 4 x LR20 (D) cells. Observe correct battery polarity as indicated on instruction label.

Loudspeaker

Emits a pulsing tone to indicate an induction output or satisfactory direct connection. Continuous tone indicates induction not available or bad connection.

Note:

Tone pulses continuously in Low Frequency mode.

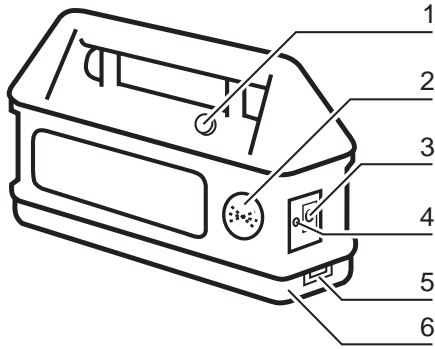
Connection Cable

Red cable connects the Transmitter signal directly to target line. Black cable provides the ground return via Ground Stake.

Ground Stake

Ground Stake is for making a ground connection to provide a return signal.

RD400 Digital Series User Guide



RD400STx Standard Power Transmitter

On/Off (1)

Combined On/Off and Signal Strength Control.

For Signal Induction align the Transmitter handle with the target line.

Loudspeaker (2)

Emits a continuous tone indicating satisfactory battery power. A lower pitch tone indicates successful direct connection to a target line.

The vane can be rotated to mute the loudspeaker tone.

Connection Socket (3)

Accepts the Connection Cable or optional accessories such as Signal Clamp, Live Cable Connector or Live Plug Connector which, when connected, disables the induction mode.

Ground Socket (4)

Accepts the green Ground Cable which provides a return path for a direct connection signal.

Battery Tray Retainers (5)

Low battery state is indicated by a break in the transmitted signal and the loudspeaker tone every 5 seconds. When the batteries are exhausted, the Transmitter stops transmitting and the loudspeaker emits a short pulse every 5 seconds.

Push retainers down and pull out to release the battery tray from the Transmitter. If the retainers are stiff press down on the handle.

Battery Tray (6)

Replace with 10 x LR6 (AA) alkaline batteries housed in reducer tubes or for longer battery life use 10 x LR20 (D) cell batteries without the reducer tubes.

Observe correct battery polarity as indicated on the battery tray.

A battery tray fitted with rechargeable D cells can be supplied as an option.

Direct Connection Cable (7)

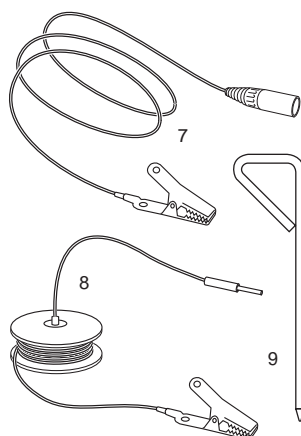
Connects the Transmitter Connection Socket signal directly to the target line.

Ground Cable (8)

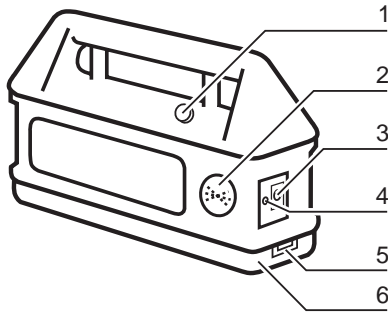
Connects the Ground Socket to the ground point/stake with 10 m (33 ft) of ground cable on a reel.

Ground Stake (9)

Ground Stake is for making a ground connection to provide a return signal path.



RD400 Digital Series User Guide



RD400SDTx Standard Power Transmitter

On/Off (1)

Combined On/Off and Signal Strength Control.

For Signal Induction align the Transmitter handle with the target line.

Frequency Select Switch (2)

Selects 8 kHz, 33 kHz or Dual Frequency modes. Dual Frequency is not suitable for induction, use only direct connection or signal clamp. Available signal strength is halved when both frequencies are applied.

Do not use the Dual Frequency application with the RD400SL.

Loudspeaker (3)

Emits a continuous tone indicating satisfactory battery power. A lower pitch tone indicates successful direct connection to a target line.

The vane can be rotated to mute the loudspeaker tone.

Connection Socket (4)

Accepts the Connection Cable or optional accessories such as Signal Clamp, Live Cable Connector or Live Plug Connector which, when connected, disables the induction mode.

Ground Socket (5)

Accepts the green Ground Cable which provides a return path for a direct connection signal.

Battery Tray Retainers (6)

Low battery state is indicated by a break in the transmitted signal and the loudspeaker tone every 5 seconds. When the batteries are exhausted, the Transmitter stops transmitting and the loudspeaker emits a short pulse every 5 seconds.

Push retainers down and pull out to release the battery tray from the Transmitter. If the retainers are stiff press down on the handle.

Battery Tray (7)

Replace with 10 x LR6 (AA) alkaline batteries housed in reducer tubes or for longer battery life use 10 x LR20 (D) cell batteries without the reducer tubes.

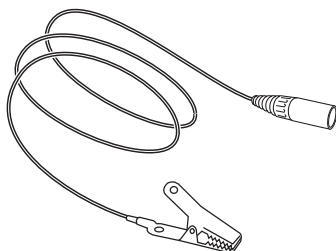
Observe correct battery polarity as indicated on the battery tray.

A battery tray fitted with rechargeable D cells can be supplied as an option.

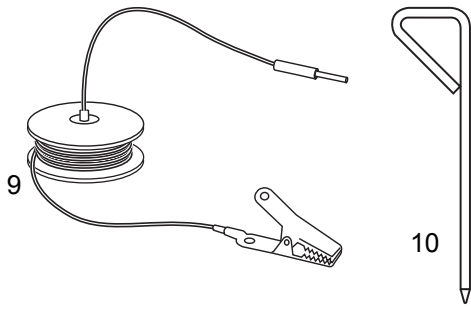
Direct Connection Cable (8)

Connects the Transmitter Connection Socket signal directly to the target line.

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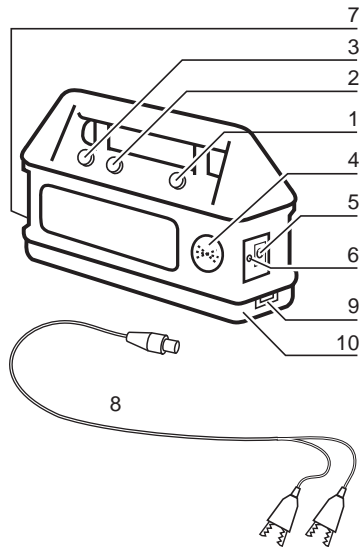
Ground Cable (9)

Connects the Ground Socket to the ground point/stake with 10 m (33 ft) of ground cable on a reel.

Ground Stake (10)

Ground Stake is for making a ground connection to provide a return signal path.

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RD400HPTx High Power Transmitter

On/Off (1)

Combined On/Off and Signal Strength Control.

For Signal Induction align the Transmitter handle with the target line.

Frequency Select Switch (2)

Selects 8 kHz, 33 kHz or Dual Frequency modes. Dual Frequency is not suitable for induction, use only direct connection or signal clamp. Available signal strength is halved when both frequencies are applied.

Do not use the Dual Frequency application with the RD400SL.

Impedance Match Switch (3)

Enables the Transmitter to make most efficient use of the available power. Start with low setting, if more signal needed increase. Monitor to check for more signal, i.e. lower pitch tone. If loudspeaker tone does not change, return to lower setting.

Loudspeaker (4)

Emits a continuous tone indicating satisfactory battery power. A lower pitch tone indicates successful direct connection to a target line.

The vane can be rotated to mute the loudspeaker tone.

Connection Socket (5)

Accepts the Connection Cable or optional accessories such as Signal Clamp, Live Cable Connector or Live Plug Connector which, when connected, disables the induction mode.

Ground Socket (6)

Accepts the green Ground Cable which provides a return path for a direct connection signal.

Power Socket - 12 V input only (7)

Accepts the 12 V External Supply Lead for connecting the Transmitter to an external 12 V supply (motor vehicle for example). The supply bypasses the battery pack.

12 V External Supply Cable (8)

Connects the Transmitter to an external 12 V supply.

Battery Tray Retainers (9)

Low battery state is indicated by a break in the transmitted signal and the loudspeaker tone every 5 seconds. When the batteries are exhausted, the Transmitter stops transmitting and the loudspeaker emits a short pulse every 5 seconds.

Push retainers down and pull out to release the battery tray from the Transmitter. If the retainers are stiff press down on the handle.

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Battery Tray (10)

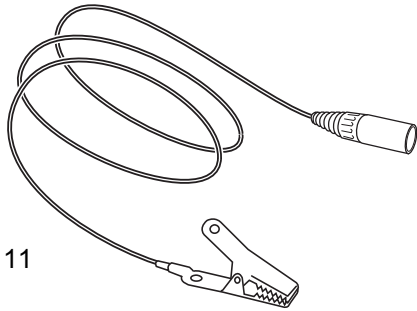
Replace with 10 x LR20 (D) cell batteries.

Observe correct battery polarity as indicated on the battery tray.

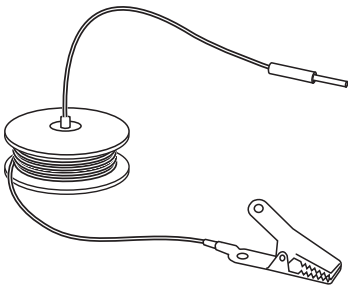
A battery tray fitted with rechargeable D cells can be supplied as an option.

Direct Connection Cable (11)

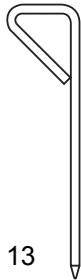
Connects the Transmitter Connection Socket signal directly to the target line.



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12



13

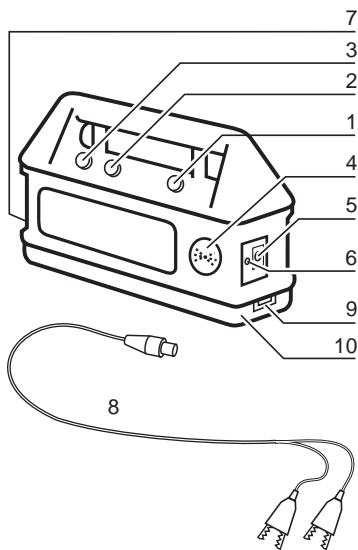
Ground Cable (12)

Connects the Ground Socket to the ground point/stake with 10 m (33 ft) of ground cable on a reel.

Ground Stake (13)

Ground Stake is for making a ground connection to provide a return signal path.

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RD433HCTx High Power Transmitter

On/Off (1)

Combined On/Off and Signal Strength Control.

For Signal Induction align the Transmitter handle with the target line.

Frequency Select Switch (2)

Selects 512 Hz or 640 Hz (according to model), 8 kHz or CD modes. In the Induction mode, only 8 kHz is available.

Impedance Match Switch (3)

Enables the Transmitter to make most efficient use of the available power. Start with low setting, if more signal needed increase. Monitor to check for more signal, i.e. lower pitch tone. If loudspeaker tone does not change, return to lower setting.

Loudspeaker (4)

Emits a continuous tone indicating satisfactory battery power. A lower pitch tone indicates successful direct connection to a target line.

The vane can be rotated to mute the loudspeaker tone.

Connection Socket (5)

Accepts the Connection Cable or optional accessories such as Signal Clamp, Live Cable Connector or Live Plug Connector which, when connected, disables the induction mode.

Ground Socket (6)

Accepts the green Ground Cable which provides a return path for a direct connection signal.

Power Socket - 12 V input only (7)

Accepts the 12 V External Supply Lead for connecting the Transmitter to an external 12 V supply (motor vehicle for example). The supply bypasses the battery pack.

12 V External Supply Cable (8)

Connects the Transmitter to an external 12 V supply.

Battery Tray Retainers (9)

Low battery state is indicated by a break in the transmitted signal and the loudspeaker tone every 5 seconds. When the batteries are exhausted, the Transmitter

stops transmitting and the loudspeaker emits a short pulse every 5 seconds.

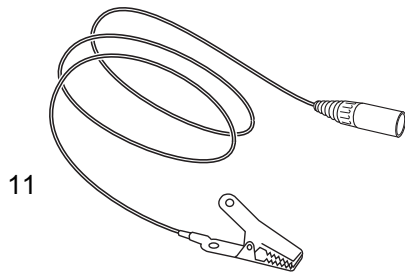
Push retainers down and pull out to release the battery tray from the Transmitter. If the retainers are stiff press down on the handle.

Battery Tray (10)

Replace with 10 x LR20 (D) cell batteries.

Observe correct battery polarity as indicated on the battery tray.

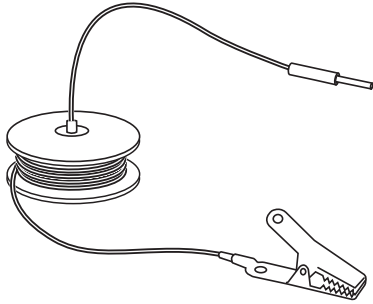
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Direct Connection Cable (11)

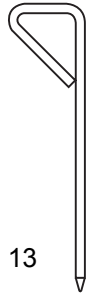
Connects the Transmitter Connection Socket signal directly to the target line.



12

Ground Cable (12)

Connects the Ground Socket to the ground point/stake with 10 m (33 ft) of ground cable on a reel.

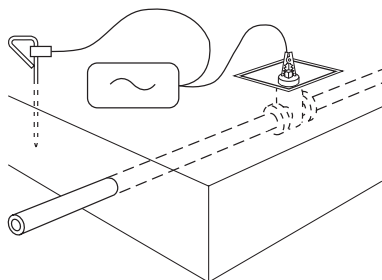
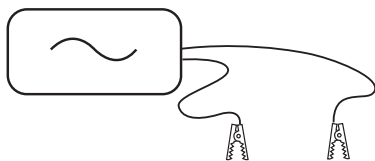
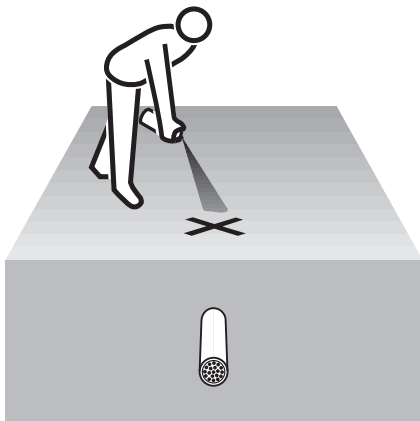
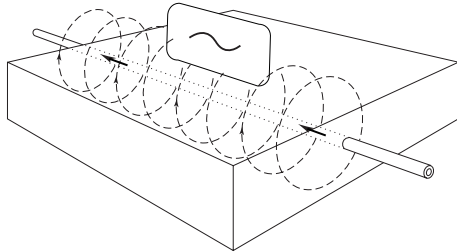


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Ground Stake (13)

Ground Stake is for making a ground connection to provide a return signal path.

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Transmitter Use

Induction

The Transmitter has an internal aerial that will induce a signal onto a line (or lines) directly below it, without the need for access to the line.

Generally, induction can only be used to depths of 2 m (6 ft).

Procedure

Switch on the Transmitter and place it directly above the target line (refer to the relevant Transmitter section for correct orientation).

Set Receiver sensitivity to mid-way and start locating line at least 10 paces away from the Transmitter.

Mark the ground where each peak response is detected by the Receiver.

Note:

Induction cannot be used to apply a signal to a line below reinforced concrete.

The Transmitter signal may be detected directly and not from the target line.

To check, point the Receiver directly at the Transmitter. If the Receiver signal strength increases, either reduce the transmitter power or increase the distance from the Transmitter.

If the Receiver signal strength decreases, the received signal is from the buried line.

Direct Connection

Suitable for use on continuous tracer wire, water and gas distribution systems, a telecom cable, and pipelines at a CP test or other access point.



Warning

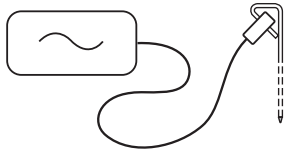
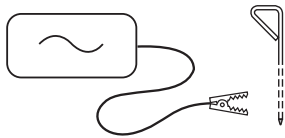
Should only be used on a power cable sheath by qualified personnel.

Procedure

Plug the Connection Cable into the Transmitter and to the target line. If necessary clean off paint, rust or scale to ensure good connection.

Clip the ground cable to an independent grounding point a few paces away and preferably at right angles to the probable route of the target line. Do not attach ground to water pipe or buried line which could carry the signal.

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A good connection is indicated by a change in loudspeaker tone. If there is no tone change, check the electrical contact and ground. If necessary change the position of the ground or tip water over the ground contact if placed in dry soil or sand.

Note:

A Receiver can detect a signal many times weaker than that necessary for a Transmitter tone change and short distances can be traced without a tone change from the loudspeaker.

Signal Clamp

The Signal Clamp safely applies a signal to a pipe or a live cable without interrupting the supply. It applies a very discriminating signal with reduced coupling to other conductors.

Warning

To avoid the risk of electric shock, the signal clamp must be connected to the transmitter before being placed around the pipe or cable.

Procedure

Connect the Signal Clamp to the Transmitter.

Place the Signal Clamp around the pipe or cable, ensuring the jaws are closed. Switch on the Transmitter.

A disconnected pipe or cable cannot generally be located using a signal clamp.

Note:

Do not make a ground connection from the Transmitter when using the Signal Clamp.

Live Plug Connector

Applies the Transmitter signal to a live domestic power socket and via the domestic wiring system onto the service cable and the supply cable in the street. The signal should be detectable on the supply system to a few hundred paces each side of the point of application.

Note:

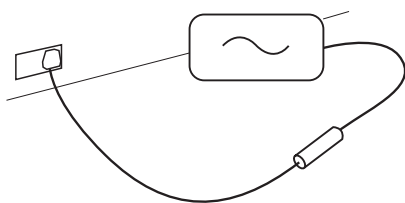
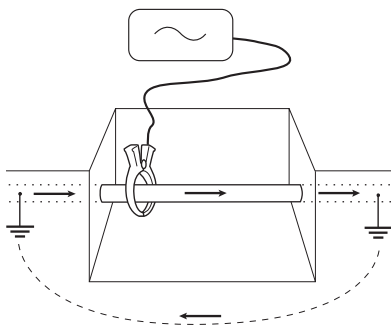
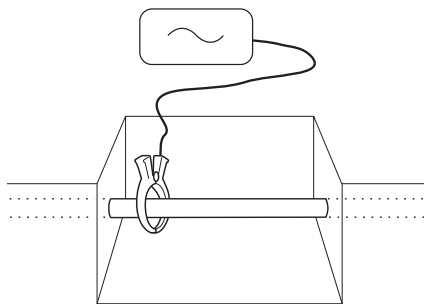
Do not connect the Transmitter to live cables without using a Plug Connector or Live Cable Connector.

Procedure

Connect the Live Plug Connector to the Transmitter and to the live domestic power socket. Switch on the socket.

Note:

Live Plug Connector contains a protection unit to protect the user and the Transmitter from mains voltage up to 250 V.



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