RADIODETECTION®

RD7100®

Electromagnetic and RF Marker locator

Technical specification

SPX®

RD7100 Electromagnetic and RF Marker locator technical specification

1. Product Summary

1.1 Product Descriptions	Precision Buried Utility Locator Precision Cable, Pipe and RF Marker Locator Locate System Receiver Utility Specific Precision Locator
1.2 Intended Use	Locating the position / path of buried cables, pipes and RF Markers Detecting and pinpointing insulation faults on buried pipes and cables Creating survey records of buried cables and pipes locations
1.3 Standard Equipment	Locator Lithium Battery pack Mains and Automotive chargers Quickstart guide Mini USB 2.0 compliant data cable

2. Performance

2.1 Sensitivity	6E-15 Tesla 5µA at 1 meter (33kHz)
2.2 Dynamic range	140dB rms/√Hz
2.3 Selectivity	120dB/Hz
2.4 Depth measurement precision[1]	Cable / Pipe / Sonde: ± 3% RF Markers: ± 15% ± 5cm – RF Marker Type dependent. Depth precision valid to: Near Surface: 2' / 60cm Ball Marker: 4.9' / 1.5m Mid-Range: 5.9' / 1.8m Full Range: 7.9' / 2.4m
2.5 Locate accuracy	± 5% of depth
2.6 Active Locate filter bandwidth	± 3Hz, 0 < 1kHz ± 10Hz, ≥ 1kHz
2.7 Start-up time	Less than 1 second
2.8 Maximum depth readout[2]	Cable / Pipe: 98' / 30m Sonde: 64' / 19.5m RF Markers: 16' / 5m

3. Locate Functions

3.1 Active Locate Modes	Up to 6, model dependent: ▪ Peak ▪ Peak+™ (choice of combined Peak & Guidance or Peak & Null) ▪ Guidance ▪ Null ▪ RF Marker ▪ Combined (Cable, Pipe and RF Marker)
3.2 Gain control	Guidance Mode: Automatic Other modes: Manual gain using "+" or "-" with one touch to return to center (50% of Full Scale)

3.3 Active locate frequencies

Up to 7:

RD7100 MODEL	DLM	PLM	TL
Active frequencies	6	5	7
512Hz	●	●	●
640Hz	●	●	●
8kHz (8192Hz)	●	●	●
33kHz (32768Hz)	●	●	●
65kHz (65536Hz)	●	●	●
83kHz (83077Hz)	●		
131kHz (131072Hz)			●
200kHz (200000Hz)			●

3.4 RF Markers

UTILITY	COLOR	FREQUENCY
French Power	Natural	40.0 kHz
General / Non-drinkable water	Purple	66.35 kHz
Cable TV	Black / Orange	77.0 kHz
Gas	Yellow	83.0 kHz
Telephone / Telecoms	Orange	101.4 kHz
Sanitary	Green	121.6 kHz
German Power	Blue / Red	134.0 kHz
Water	Blue	145.7 kHz
Electrical Power*	Red	169.8 kHz

*Use of the red Electrical Power (PWR) marker locate mode is subject to radio licensing restrictions for Short Range Devices in the EU and possibly other countries. It is the responsibility of the user to ensure that the red Power (PWR) marker locate mode is only enabled in countries where radio licensing restrictions do not apply at the operating frequency of 169 kHz.

3.5 Sonde frequencies

Up to 4:

RD7100 MODEL	DLM	PLM	TLM
512Hz	●		●
640Hz	●		●
8kHz (8192Hz)	●		
33kHz (32768Hz)	●	●	●

3.6 Fault Find

Locate insulation sheath faults on pipes and cables to 10cm / 4" accuracy using the accessory A-Frame and a compatible transmitter

RD7100 MODEL	DLM	PLM	TLM
8kHz Fault Find		●	●

3.7 Passive Locate Modes

RD7100 MODEL	DL	PL	TL
Power	●	●	●
Radio	●	●	●
CPS (Cathodic Protection System)	●		

3.8 Power Filters™ function

Switch out of Radiodetection's sensitive Power Mode to locate on any of 5 individual mains harmonic frequencies. (RD7100PLM only).

HARMONIC	50 Hz regions	60 Hz regions
Primary	50 Hz	60 Hz
3rd	150 Hz	180 Hz
5th	250 Hz	300 Hz
7th	350 Hz	420 Hz
9th	450 Hz	540 Hz

● Available feature

3.9 Information displayed	▪ Signal strength - moving bar graph and numeric value ▪ Mode indication (Peak, Null, Guidance, Peak+ with option of Guidance arrows or Null arrows) ▪ Line or Sonde locate type ▪ Proportional left/right indication ▪ Compass: full 360° line direction indicator ▪ Accessories in use indication ▪ Accessory specific custom screen ▪ Simultaneous depth and current readout (Line location) ▪ Depth readout (Sonde location) ▪ Gain level (in dB) ▪ Frequency selected ▪ Marker Selected ▪ Battery condition ▪ Speaker volume ▪ Operating frequency ▪ GPS satellites in view (where fitted) ▪ GPS status (where fitted) ▪ Configuration menu and submenus ▪ Software version ▪ Last calibration date ▪ Fault Find mode indicator (model dependent) ▪ Strike*Alert*™ warning ▪ Overload warning
3.10 Audio output tones	**Power / Radio modes:** Real Sound™ derived from detected electromagnetic signal **Peak / Peak+ modes:** Synthesized audio tone proportional to signal strength **Guidance mode:** Continuous tone when locator is to the left of target, intermittent tone when to the right of target **Null mode:** Synthesized audio tone proportional to signal strength. Low pitch to left of target, high pitch to right of target **Strike*Alert* audio warning:** Audio feedback for menu navigation
3.11 Accessory locate functions	**Locator clamps:** Used to identify individual target cable(s) in a bundle or cabinet using signal strength read-out **Stethoscopes:** Used to identify individual target cable(s) in a bundle or confined space such as a cabinet using signal strength read-out

4. Locate Function Enhancements

4.1 Strike*Alert*™	Audio and visual warning when a cable or pipe less than 12" / 30cm deep is detected. Operates in Active and Passive locating modes
4.2 Dynamic Overload Protection™	40dB, automatic ▪ Automatically manages the system gain to compensate for strong signals e.g. from mains power or substations, to enable accurate locating
4.3 Simultaneous depth and current readout	Both utility depth and locate signal current are displayed simultaneously, giving the operator more information to help them to follow the target utility
4.4 Fault Find	Apply a Fault Find signal with a Tx-5 and Tx-10 transmitter, then use an accessory A-Frame to detect and pinpoint insulation faults (RD7100PLM and TLM models only) Fault find accuracy: Metric: 100mm Imperial: 4"
4.5 Peak+ mode	Use the accurate Peak bargraph, and add either proportional Guidance arrows for faster locating, or Null arrows to check for the presence of distortion

● Available feature

5. Configurability

5.1 Option selection	All options can be enabled or disabled on the locator or using the RD Manager PC software
5.2 Languages supported	Fourteen: English, French, German, Dutch, Polish, Czech, Slovakian, Spanish, Portuguese, Swedish, Italian, Turkish, Russian, Hungarian
5.3 Mains power network options	50 Hz or 60 Hz
5.4 Mode selection	All locate modes can be individually enabled or disabled
5.5 Active frequency selection	All active frequencies available can be individually enabled or disabled
5.6 Active RF Marker selection	All RF Markers can be individually enabled or disabled
5.7 Passive mode selection	All passive modes can be individually enabled or disabled
5.8 Strike*Alert*	Enable / disable
5.9 Peak+ arrow selection	Guidance arrows or Null arrows Selected using the locator menu or with a long press of the antenna key
5.10 Time / date setting	Correct or update locator real-time clock using the RD Manager PC software or GNSS signals (GPS/Logging enabled units)

6. Connectivity

6.1 Wireless connections	Bluetooth 2.0 – SPP profile, class 1
6.2 Wired connections	**Mini USB:** Connect to a PC to configure and update locator, and to retrieve usage log **3.5mm Stereo jack:** Connect wired headphones **Accessory port:** Connect Radiodetection accessories

7. Data capabilities and GNSS ('GPS')

7.1 Usage-logging and survey measurements

RD7100 MODEL	DLM	PLM	TLM
Usage-logging		●	●
Survey Measurement (to external device)	●	●	●

7.2 Usage-logging memory	4 GB		
7.3 Usage-logging capacity	Over 500 days, measured at 8 hours use per day		
7.4 Usage-logging capture rate	1/ second		
7.5 Usage parameters logged	Serial number Log reference and id Operating mode Locate frequency Sonde/line Signal strength Gain setting Depth Current Accessory in use Antenna mode Arrows readout Compass angle Overload status Dynamic Overload Protection Status	RF Marker Type Marker Depth Marker Signal Strength (%) Marker Gain (dB) Keys pressed Audio status Volume Menu in use Battery status User warnings status Strike*Alert* status Fault find arrow SideStep status Language Depth units Power setting	Compass setting **Logging Units:** Date and time **With a GNSS fix:** Latitude Longitude Altitude GNSS date and time Horizontal Dilution Geoid DGPS Time and ID Geoid Units GNSS fix Number of satellites Altitude units Time reference
7.6 DNSS ('GPS') support	Over Bluetooth via RD Map™ for Android ▪ Connect an external GNSS enabled device to RD Map for Android to combine external GPS data with survey measurements		
7.7 Survey measurement options	Bluetooth – 'live,' per measurement Bluetooth – batch export		

● Available feature

7.8 Bluetooth survey measurement data protocol options	PPP ASCII (choice of 3 formats)	
7.9 Survey measurement data transmitted	**Standard data:** Log # Survey Reference Antenna Mode Depth Current (mA) Frequency in use (Hz) Sonde/Line Signal Strength (dBµV and %) Signal Strength (%) Gain Setting (dB) Compass (deg) Arrow readout CD Phase (deg) Accessory Type Battery level Volume Overload Flag RF Marker Type Marker Depth Marker Signal Strength (%) Marker Gain (dB)	**Usage-Logging Units:** Date and Time **With Internal or External GNSS Fix:** GPS Mode GPS Date and Time GPS Distance (m) Latitude Angle (deg) Latitude Direction Longitude Angle (deg) Longitude Direction GPS Fix Satellites in use Horizontal Dilution Altitude Value (m) Altitude Units Geoid Value (m) and Units DGPS Time DGPS ID Time Reference GPS Mode GPS Date and Time GPS Distance (m) Latitude Angle (deg)

8. Power options

8.1 Lithium-Ion (Li-Ion)	Custom Lithium-Ion (Li-Ion) battery pack
8.2 Alkaline	3 × D-Cell (MN1300 / LR20) alkaline batteries (standard)
8.3 Rechargeable	3 × D-Cell (MN1300 / LR20) Nickel Metal Hydride (NiMH) batteries
8.4 Battery run-time (continuous)[3]	Li-Ion pack: 22 hours 3 × Alkaline D-Cells: 15 hours
8.5 Battery chemistry identification	Lithium-Ion pack: Automatic sensing NiMH / Alkaline: Software switchable
8.6 Charging options (Li-Ion pack)	Mains charger: 100-250 Volts AC, 50/60 Hz Automotive charger: 12-24V DC
8.7 Charging time (Li-Ion pack)	3 hours to 80% from empty with maintenance trickle charging thereafter
8.8 Charging Temperature	Metric: 0°C to 45°C Imperial: 32°F to 113°F

9. Physical Characteristics

9.1 Design	Ergonomic, balanced and lightweight design for comfortable use during extended surveys
9.2 Construction	Injection Molded ABS Plastic
9.3 Weight	**With Lithium-Ion battery pack fitted:** Metric: 2.1kg Imperial: 4.2lb **With D-cell alkaline batteries fitted:** Metric: 2.3kg Imperial: 5lb
9.4 Ingress Protection rating	IP65* (see note) Protected against dust ingress and jets of water[4] applied from any direction *Note: The antenna loop is protected to IP55, as small amounts of dust can penetrate but its operation is not impacted
9.5 Display type	High contrast custom made monochrome LCD
9.6 Audio options	Built-in waterproofed speaker 3.5mm headphone socket
9.7 Operating temperature[5]	As a cable and pipe locator: Metric: -20°C to 50°C Imperial: -4°F to 122°F As a RF locator: Metric: -10°C to 50°C Imperial: 14°F to 122°F

9.8 Storage temperature	Metric: -20°C to 70°C Imperial: -4°F to 158°F
9.9 Unit dimensions	Metric: 648mm × 286mm × 125mm Imperial: 25.5" × 11.3" × 4.9"
9.10 Shipping dimensions	Metric: 700mm x 260mm × 330mm Imperial: 27.6" x 10.2" x 13"
9.11 Shipping weight (with batteries fitted)	Metric: 3.6kg Imperial: 7.9lb

10. RD Manager™ Supporting PC Software

10.1 Operating System Compatibility	Microsoft® Windows® 10 64-bit versions
10.2 Locator system compatibility	Radiodetection RD8100 and RD7100 Precision Locators RD7000+ and RD8000 Cable, Pipe and Marker Locators
10.3 Functions	▪ Locator configuration ▪ eCert™ remote calibration certification ▪ Factory calibration certificate retrieval ▪ Usage-logging data collation and export ▪ User account management ▪ CALSafe™ maintenance schedule enforcement ▪ Product registration for extended warranty ▪ Locator software update
10.4 Data export formats	.kml for Google® Maps .csv for database and spreadsheet applications .xls / .xlsx for Microsoft® Excel®
10.5 KML data export options	Filter usage-logging and survey measurement points on Google® maps. Select data to be tagged. Customize icon type / color, label type / color, line type / color

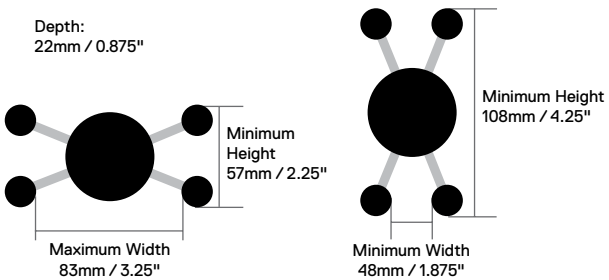
11. Warranty and Maintenance

11.1 Manufacturer's warranty duration	3 years standard, on registration
11.2 Recommended calibration and maintenance schedule	Annual, or at the beginning / end of a lease period if earlier
11.3 eCert remote calibration	▪ Remote calibration certification using an internet connection to Radiodetection ▪ Recommended schedule: annual, or at the beginning / end of a lease period
11.4 CALSafe™	▪ Can be enabled to prevent the locator operating when beyond a defined calibration / maintenance schedule ▪ Disabled by default ▪ 30-day countdown to calibration due date
11.5 Enhanced Self-Test	On-unit Applies test signals to locate circuitry to confirm correct operation, as well as the typical tests for screen and DSP functions. Recommended schedule: weekly, or before each use.
11.6 Storage recommendation	Store in a clean and dry environment. Ensure all terminals and connection sockets are clean, free of debris and corrosion and are undamaged
11.7 Cleaning	Clean with a soft, moistened cloth. Do not use ▪ Abrasive materials or chemicals ▪ High pressure jets of water If using this equipment in foul water systems or other areas where biological hazards may be present, use an appropriate disinfectant.

12. Certification and Compliance

12.1 Standards	
Safety:	EN 61010-1:2010
EMC:	EN 61326-1:2013 EN 300 330-2 (V1.5.1) EN 300 440-2 (V1.4.1) EN 301 489-3 (V1.6.1) EN 301 489-17 (V2.2.1)
Environmental:	EN 60529 1992 A2 2013 EN 60068-2-64:2008 Test Fh ESTI EN 300 019-2-2:1999 (per table 6) EN 60068-2-27:2009 (Test Ea) ESTI EN 300 019-2-2:1999 (per table 6)
12.2 European directives	Radio Equipment Directive – 2014/53/EU Low Voltage Directive – 2014/35/EU EMC Directive – 2014/30/EU RoHS – Restriction of Hazardous Substances – Directive – 2011/65/EU Declaration of conformity is available from www.radiodetection.com
12.3 Environmental	WEEE compliant ROHS compliant
12.4 Manufacturing	ISO 9001:2015

13. Compatible Accessories

Accessory	Part description	Part number
13.1 Phone support kit	Locator bracket adapter, arms and mobile phone holder – complete kit (see mobile phone holder dimensions 13.4)	10/RX-PHONE-HOLD-KIT
13.2 Tablet support kit	Locator bracket adapter, arms and tablet holder – complete kit	10/RX-TABLET-7-8-HOLD-KIT
13.3 Mobile device support bracket and arm	Locator bracket adapter and arms (needs either a Phone or Tablet holder)	10/RX-HOLDER-MOUNT
13.4 Mobile phone holder	Mobile phone holder (requires a mobile device support bracket and arm) 	10/RX-PHONE-HOLDER
13.5 Tablet holder	7"-8" Tablet holder (requires a mobile device support bracket and arm)	10/RX-TABLET-7-8-HOLDER
13.6 RAM Bracket adapter	Bracket adapter for RAM® mounts	10/RX-RAM-ADPT
13.7 RAM Bracket O-Ring set	Spare set of 2 O-rings	10/RX-RAM-ADPT-ORING
13.8 Lithium-Ion battery packs	Li-Ion rechargeable battery mains kit (Includes mains charger) Li-Ion rechargeable battery pack (no charger)	10/RX-MBATPACK-LION-K 10/RX-BATPACK-LION
13.9 Lithium-Ion battery chargers	Li-Ion automotive charger Li-Ion mains charger	10/RX-ACHARGER-LION 10/RX-MCHARGER-LION

Accessory	Part description						Part number
13.10 Alkaline battery trays	3 × D Cell battery tray (MN1300 / LR20)						10/RX-3DCELL-TRAY
13.11 Transportation and storage accessories – *For combined locator and transmitter*	Soft Carry Bag Wheeled Flight Case Hard Case						10/LOCATORBAG 10/RD7K8KCASE 10/RD7K8KCASE-USA
13.12 Locator signal clamps – *For identification and location of utilities*	Metric: 50mm Locator Clamp Imperial: 2" Locator Clamp Metric: 100mm Locator Clamp Imperial: 4" Locator Clamp Metric: 130mm Locator Clamp Imperial: 5" Locator Clamp CD and Current Measurement Clamp						10/RX-CLAMP-50 10/RX-CLAMP-2 10/RX-CLAMP-100 10/RX-CLAMP-4 10/RX-CLAMP-130 10/RX-CLAMP-5 10/RX-CD-CLAMP
13.13 Signal stethoscopes – *To locate and identify individual utilities e.g. within walls, congested areas or when cables/utilities are in close proximity to each other*	High Gain Stethoscope Large Stethoscope Small Stethoscope CD Stethoscope						10/RX-STETHOSCOPE-HG 10/RX-STETHOSCOPE-L 10/RX-STETHOSCOPE-S 10/RX-CD-STETHOSCOPE
13.14 Sondes *Battery powered signal transmitters for tracing or locating non-conductive utilities*		Diameter		Range		Freq (Hz)	
		mm	In	m	Ft		
	S6 Microsonde	6	¼	2	6½	33k	10/SONDE-MICRO-33
	S9 Minisonde	9	3/8	4	13	33k	10/SONDE-MINI-33
	S13 Super Small Sonde	13	½	2	6½	33k	10/SONDE-S13-33
	S18 Small Sonde	18	¾	4	14	33k	10/SONDE-S18A-33
	Standard C-Sonde	39	1½	5	16½	33k	10/SONDE-STD-33
						8k	10/SONDE-STD-8
						512	10/SONDE-STD-512
	Sewer Sonde	64	2½	8	26	33k	10/SONDE-SEWER-33
	Super Sonde	64	2½	15	50	33k	10/SONDE-SUPER-33
	Flexi Sonde	23	7/8	6	20	512	10/SONDE-BENDI-512
13.15 Submersible antennas	512Hz Submersible DD Antenna 640Hz Submersible DD Antenna 8kHz Submersible DD Antenna						10/RX-SUBANTENNA-512 10/RX-SUBANTENNA-640 10/RX-SUBANTENNA-8K
13.16 FlexiTrace™ – *Use with a transmitter to trace small diameter pipes*	FlexiTrace 50m / 165' FlexiTrace 80m / 260'						10/TRACE50-GB 10/TRACE80-GB
13.17 Flexrods – *Fibreglass rod used for propelling Radiodetection sondes through pipes to trace the path and locate blockages*	Length			Diameter			
	m	Ft		mm	In		
	50	160		4.5	3/16		10/FLEXRODF50-4.5
	80	260		4.5	3/16		10/FLEXRODF80-4.5
	50	160		7	¼		10/FLEXRODF50-7
	100	320		7	¼		10/FLEXRODF100-7
	150	485		7	¼		10/FLEXRODF150-7
	60	195		9	3/8		10/FLEXRODF60-9
	120	390		9	3/8		10/FLEXRODF120-9
13.18 A-Frame – *Used for locating sheath faults on cables and coating defects on pipelines*	A-Frame (includes A-Frame Lead) A-Frame Bag						10/RX-AFRAME 10/RX-AFRAME-BAG
13.19 Headphones	Recommended for use in noisy environments						10/RX-HEADPHONES
13.20 Calibration Certificates	Locator Calibration Certificate, per unit (request with initial locator order) eCert™ Calibration Credit						97/RX-CALCERT 10/RX-ECERT

All specification are measured in test conditions, at 21°C / 70°F, and fitted with fully charged Li-Ion battery pack unless otherwise noted.

[1] Based on volumetric testing at a known fixed depth. True depth accuracy depends on factors such as ground composition, utility characteristics and the locate frequency / signal strength employed. Always follow local safe digging guidelines.

[2] The RD7100M will locate to greater depths in the right conditions, but depth accuracy will be compromised. Depth measurement will not be displayed beyond these depths.

[3] To provide repeatable measurements, run-time is measured with GPS and Bluetooth functions switched to 'off'.

[4] Water projected by a nozzle at a pressure of 30kPa / 0.3 bar / 4.4 psi in accordance with BS EN 60529 1992 A2 2013.

[5] At very low temperatures, battery life will be degraded, LCD performance may slow and measurement precision may reduce.

RADIODETECTION

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