SPX®

RD8100™ Locator Specification

Radiodetection®

RD8100 Locator Specification

1. Product Summary

1.1 Product Descriptions:	**Multi-purpose Precision Locator** **Cable and Pipe Locator** **Locate System Receiver** **Multi-function Precision Locator**
1.2 Intended Use:	**Locating the position / path of buried pipes and cables** **Detecting and pinpointing insulation faults on buried pipes and cables** **Creating survey records of buried pipes and cable locations**
1.3 Standard Equipment:	**Locator** **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]:	**± 3%**
2.5 Locate accuracy:	**± 5% of depth**
2.6 Active Locate filter bandwidth:	**± 3 Hz, 0 < 1kHz**
2.7 Start-up time:	**± 10 Hz, ≥ 1kHz**
2.8 Maximum depth readout[2]:	**Metric: Cable / Pipe: 30m Sonde: 19.5m** **Imperial: Cable / Pipe: 98' Sonde: 64'**

3. Locate Functions

3.1 Active Locate Modes:	**Five:** ▪ **Peak** ▪ **Peak+™ (choice of combined Peak & Guidance or Peak & Null)** ▪ **Guidance** ▪ **Broad Peak™** ▪ **Null**
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 Custom locate frequencies	**Up to 5 additional frequencies in the range 50Hz to 1kHz at 1Hz resolution**

3.4 Active locate frequencies: Up to 24:

RD8100 MODEL	PXL	PXLG	PDL	PDLG	PTL	PTLG
Custom frequencies	5	5	5	5	5	5
ELF (98/128Hz)			●	●	●	●
512Hz			●	●	●	●
570Hz			●	●	●	●
577Hz	●	●	●	●	●	●
640Hz	●	●	●	●	●	●
760Hz			●	●	●	●
870Hz	●	●	●	●	●	●
920Hz			●	●		
940Hz	●	●	●	●	●	●
1090Hz					●	●
1450Hz					●	●
4kHz (4096Hz)	●	●				
8kHz (8192Hz)	●	●	●	●	●	●
8440Hz					●	●
9.8kHz (9820Hz)			●	●	●	●
33kHz (32768Hz)	●	●	●	●	●	●
65kHz (65536Hz)	●	●	●	●	●	●
82kHz (82000Hz)					●	●
83kHz (83077Hz)	●	●	●	●	●	●
131kHz (131072Hz)	●	●	●	●	●	●
200kHz (200000Hz)	●	●	●	●	●	●

3.5 Sonde Frequencies: All models: Four

- 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*

RD8100 MODEL	PXL	PXLG	PDL	PDLG	PTL	PTLG
8kHz Fault Find			●	●	●	●
CD Fault Find			●	●	●	●

3.7 Current Direction™ (CD) Signal Pairs: *Confirm operator is following the target pipe or cable with CD arrows and a compatible transmitter*

RD8100 MODEL	PXL	PXLG	PDL	PDLG	PTL	PTLG
219.9Hz / 439.8Hz					●	●
256Hz / 512Hz			●	●	●	●
280Hz / 560Hz					●	●
285Hz / 570Hz			●	●	●	●
320Hz / 640Hz			●	●	●	●
380Hz / 760Hz			●	●	●	●
460Hz / 920Hz			●	●		
680Hz / 340Hz					●	●
800Hz / 400Hz					●	●
920Hz / 460Hz					●	●
968Hz / 484Hz					●	●
1168Hz / 584Hz					●	●
1248Hz / 624Hz					●	●
4096Hz / 8192Hz 4kCD			●	●	●	●

3.8 Passive Locate Modes:

RD8100 MODEL	PXL	PXLG	PDL	PDLG	PTL	PTLG
Power	●	●	●	●	●	●
Radio	●	●	●	●	●	●
CPS (Cathodic Protection System)			●	●	●	●
CATV (Cable TV)			●	●	●	●
Passive Avoidance (Combined Power + Radio)			●	●	●	●

3.9 Power Filters™ function:

Switch out of sensitive Power Mode to locate on any of 5 individual mains harmonic frequencies:

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

3.10 Information displayed:

- Signal strength - moving bar graph and numeric value
- Mode indication
  (Peak, Null, Guidance, Broad Peak, 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
- Depth and current readout (Line location)
- Depth readout (Sonde location)
- Gain level (in dB)
- Frequency selected
- Battery condition
- Speaker volume
- Operating frequency
- Bluetooth status
- GPS satellites in view (where fitted)
- GPS status (where fitted)
- Configuration menu and submenus
- Software version
- Last calibration date
- Survey measurement counter
- Current Direction mode indicator
- Current Direction arrows
- Fault Find mode indicator
- Transmitter communication status
- Transmitter standby status
- Strike*Alert*™ warning
- Overload warning

3.11 Audio output tones:

Power / Passive Avoidance / Radio modes:
Real Sound™ derived from detected electromagnetic signal

Peak / Peak+ modes and CPS / CATV 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

3.12 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

CD / CM clamp: Used to measure locate current and to confirm target cable using Current Direction

4. Locate Function Enhancements

4.1 Strike*Alert*:	Audio and visual warning when a cable or pipe less than 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 Current Direction™ (CD):	▪ Measures the direction of current flowing in buried pipes or cables to ensure that an operator is able to identify and follow the target utility ▪ Provides operator with arrows indicating the direction of current flowing in the located pipe or cable to confirm that they are following the target utility
4.4 iLOC™:	Metric: Remote transmitter control from up to 450m away[3] Imperial: Remote transmitter control from up to 1400' away[3] Control transmitter frequency, power level and SideStep
4.5 SideStep™:	Enables locating where other signals are interfering, and without compromising the optimum locate frequency
4.6 Simultaneous depth and current readout:	Remotely shifts the locate and transmitter frequency by several Hz, out of the bandwidth of other locate signals that may be interfering with the locate
4.7 Survey Measurements:	Both utility depth and locate signal current are displayed simultaneously, giving the operator more information to help them to follow the target utility
4.8 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 Fault find accuracy: Metric: 100mm Imperial: 4"
4.9 4kHz locate frequency and 4kHz CD:	Designed for tracing higher impedance lines such as twisted pair telecoms or street lighting over distance Combine with Current Direction to help trace the target utility through dense or complex infrastructure
4.10 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
4.11 Integrated GPS option:	Faster surveying using integrated GPS – no need for a separate hand-held device

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 with the exception of Peak Mode can be individually enabled or disabled
5.5 Active frequency selection:	All active frequencies available can be individually enabled or disabled
5.6 Passive mode selection:	All passive modes can be individually enabled or disabled
5.7 Strike*Alert*:	Enable / disable
5.8 Peak+ arrow selection:	Guidance arrows or Null arrows Selected using the locator menu or with a long press of the antenna key
5.9 GNSS ('GPS') settings:	Internal / External (connect over Bluetooth) / Off / Reset SBAS On / Off
5.10 Bluetooth:	On / Off
5.11 Data export protocols supported:	PPP / choice of 3 ASCII formats. Optionally append positional data
5.12 Time / date setting:	Correct or update locator real-time clock using the RD Manager PC software or GNSS signals
5.13 CD Reset:	Reset CD phase analysis with a single long press of the frequency key

6. Connectivity

6.1 Wireless connections:	Bluetooth class 1
6.2 iLOC™ remote transmitter control range[3]:	Metric: Up to 450m Imperial: Up to 1400'
6.3 iLOC remote transmitter control functions:	Set transmitter frequency Set transmitter power output level Transmitter standby SideStep
6.4 Wired connections	**Mini-USB:** Connect to a PC to configure and update locator, and to retrieve usage log and survey measurement data **3.5mm Stereo jack:** Connect wired headphones **Accessory port:** Connect Radiodetection accessories

7. Data capabilities and GNSS ('GPS')

7.1 On-board GNSS ('GPS') module option:	GNSS data automatically added to Survey Measurements every time locate data is saved, and every second on usage-logging data Accurate to 3m CEP with SBAS enhancement available Links to GPS, GLONASS and Galileo networks Positional data enhancement systems (where available) ▪ WAAS – North America ▪ EGNOS – Europe ▪ MSAS – Japan ▪ SBAS (satellite based augmentation system) SBAS can be enabled or disabled in locator menu
7.2 Link to external GNSS ('GPS'):	Over Bluetooth ▪ Connect to an external GNSS enabled device to combine survey measurements with that device's GNSS data on the external device
7.3 External GNSS position read-in to locator memory:	Over Bluetooth from compatible mobile device / PDA running the SurveyCert+™ app. ▪ Connect to an external GNSS device to read positional positioning from that device and combine with the locator's survey measurement data on board the locator
7.4 Survey measurement capacity:	Up to 1,000 data records

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

7.6 Survey measurement export options:	Bluetooth – 'live,' per measurement Bluetooth – batch export USB – selectable / batch export
7.7 Bluetooth survey measurement data protocol options:	PPP ASCII (choice of 3 formats) Optional GPS data appended

7.8 Usage-logging and GNSS ('GPS'):

RD8100 MODEL	PXL	PXLG	PDL	PDLG	PTL	PTLG
Usage-logging		●		●		●
On-board GNSS ('GPS')		●		●		●

7.9 Usage-logging memory:	4 GB
7.10 Usage-logging capacity:	Over 500 days, measured at 8 hours use per day
7.11 Usage-logging capture rate:	1/ second

7.12 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 CD phase Overload status Dynamic Overload Protection Status	Keys pressed Audio status Volume Menu in use Battery status User warnings status StrikeAlert status Bluetooth status Fault find arrow Sidestep status Language Depth units Power setting Compass setting CD reset status **Logging Units:** Date and time	**With a GNSS fix:** Latitude Longitude Altitude GNSS mode GNSS date and time Horizontal Dilution Geoid DGPS Time and ID Geoid Units GNSS fix Number of satellites Altitude units Time reference

8. Power options

8.1 Alkaline battery options:	2 × D-Cell (MN1300 / LR20) alkaline batteries (standard)
8.2 Rechargeable battery options:	Custom Lithium-Ion (Li-Ion) battery pack 2 × D-Cell (MN1300 / LR20) Nickel Metal Hydride (NiMH) batteries
8.3 Battery run-time (continuous)[4]:	Li-Ion pack: 35 hours 2 × Alkaline D-Cells 13 hours
8.4 Battery chemistry identification:	Lithium-Ion pack: Automatic sensing NiMH / Alkaline: Software switchable
8.5 Charging options (Li-Ion pack):	Mains charger: 100-250 Volts AC, 50/60 Hz Automotive charger: 12-24V DC
8.6 Charging time (Li-Ion pack):	3 hours to 80% from empty with maintenance trickle charging thereafter

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: 1.8kg Imperial: 4.0lb **With D-cell alkaline batteries fitted:** Metric: 1.9kg Imperial: 4.2lb

9.4 Ingress Protection rating:	IP65 Protected against dust ingress and jets of water5 applied from any direction
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[6]:	Metric: -20 to 50°C Imperial: 14 to 122°F
9.8 Storage temperature:	-20 to 70°C
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: 2.6kg Imperial: 5.7lb

10. RD Manager™ Supporting PC Software

10.1 Operating System Compatibility:	Microsoft® Windows® XP, 7, 8, 8.1, 32 and 64-bit versions
10.2 Locator system compatibility:	Radiodetection RD8100 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 ▪ Survey measurements data collation and export ▪ User account management ▪ CALSafe™ maintenance schedule enforcement ▪ Product registration for extended warranty ▪ Locator software update ▪ Contact Radiodetection ▪ Book a service
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:	R&TTE Directive 1999/5/EC Low Voltage Directive: 2006/95/EC EMC Directive: 2004/108/EC Declaration of conformity is available from www.radiodetection.com
12.3 Radio:	FCC, IC
12.4 Environmental:	WEEE compliant ROHS compliant
12.5 Manufacturing:	ISO 9001:2008

13. Compatible Accessories

	Accessory	Part description	Part number
13.1	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
13.2	Lithium-Ion battery chargers	Li-Ion automotive charger Li-Ion mains charger	10/RX-ACHARGER-LION 10/RX-MCHARGER-LION
13.3	Alkaline battery trays	2 × D Cell battery tray (MN1300 / LR20)	10/RX-2DCELL-TRAY
13.4	Transportation and storage accessories – *For combined locator and transmitter*	Soft Carry Bag Wheeled Flight Case Hard Case	10/LOCATORBAG 10/RD7K8KCASE 10/RD7K8KCASE-USA
13.5	Locator signal clamps *– For identification and location of utilities*	Metric: 50mm Locator Clamp Imperial: 2" Locator Clamp Metric: 100mm Locator Clamp Imperial: 2" 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

	Accessory	Part description					Part number
13.6	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
13.7	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
							8	10/SONDE-STD-8
							512	10/SONDE-STD-512
		Slim Sonde	22	7/8	3.5	11½	33k	10/SONDE-SLIM-33
		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
13.8	Submersible antennas:	640 / 512Hz Submersible DD Antenna 8kHz Submersible DD Antenna						10/RX-SUBANTENNA-640 10/RX-SUBANTENNA-8K
13.9	Flexitrace™ *– Use with a transmitter to trace small diameter pipes*	FlexiTrace 50m / 165' FlexiTrace 80m / 260'						10/TRACE50-GB 10/TRACE80-GB
13.10	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
13.11	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
13.12	Headphones	Recommended for use in noisy environments						10/RX-HEADPHONES
13.13	Warning Triangle	Three sided folding warning sign						10/WARNING-TRIANGLE
13.14	PDAs	GPS PDA with SurveyCERT™+						10/RX-PDA
13.15	Calibration Certificates	Locator Calibration Certificate, per unit (request with initial locator order) eCert™ Calibration Credit						97/RX-CALCERT 10/RX-ECERT

● Available feature

All specification are measured in test conditions, at 21°C / 70°F, and fitted with 2 × good quality alkaline batteries 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 RD8100 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] Tested with clear line-of-sight. Range is dependent on electrical environment and weather conditions. For optimum range, face the locator toward the transmitter and raise the transmitter 2' / 60cm from the ground.

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

[5] 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

[6] At very low temperatures, battery life will be degraded and measurement precision may be reduced.