RADIODETECTION®

SPX®

RD8200™ locator specification

Precision locators

RD8200 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 cables and pipes Detecting and pinpointing insulation faults on buried cables and pipes Creating survey records of buried cables and pipes locations
1.3 Standard Equipment	Locator Quickstart guide Type C to USB A 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	± 3Hz, 0 < 1kHz ± 10Hz, ≥ 1kHz
2.7 Start-up time	<1 second
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	21 Frequencies: ELF (98/128Hz), 512Hz, 570Hz, 577Hz, 640Hz, 760Hz, 870Hz, 920Hz, 940Hz, 1090Hz, 1450Hz, 4096Hz, 8kHz, 8440Hz, 9820Hz, 33kHz, 65kHz, 82kHz, 83kHz, 131kHz and 200kHz
3.5 Sonde Frequencies	4 Frequencies: 512Hz, 640Hz, 8kHz and 33kHz
3.6 Fault Find	8KFF and CDFF Locate insulation sheath faults on pipes and cables to 10cm / 4" accuracy using the accessory A-Frame and a compatible transmitter

3.7 Current Direction™ (CD) Signal Pairs

14 CD Pairs:
219.9/439.8Hz, 256/512Hz, 280/560Hz, 285/570Hz, 320/640Hz, 380/760Hz, 460/920Hz, 4096/8192Hz, 680/340Hz (INV), 800/400Hz (INV), 920/460Hz (INV), 968/484Hz (INV), 1168/584Hz (INV), 1248/624Hz (INV),
Confirm operator is following the target pipe or cable with CD arrows and a compatible transmitter

3.8 Passive Locate Modes

- **Power**
- **Radio**
- **CPS – cathodic protection system**
- **CATV – Cable TV**
- **Passive Avoidance – simultaneous locate of power and 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**
- **Swing warning**

3.11 Audio output tones

Volume level:
VOL0, VOL1, VOL2, VOL3, VOL4 and VOL5

Audio Level Pitch:
Low and High

Audio feedback for menu navigation

Strike*Alert* audio warning
Swing audio warning

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

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 Please refer to Section 13 Compatible Accessories – for a complete list of locator accessories

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 Haptic Vibration	Handle vibrates when Strike*Alert,* Swing and Overload warnings activated
4.3 Swing Warning	Audio and visual warning when the user is swinging the locator excessively
4.4 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
4.5 Overload warning	If the RD8200 becomes overloaded, users will be alerted by a flashing mode icon. Both the depth and current measurements will be disabled in the event of an overload.
4.6 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
4.7 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
4.8 SideStep™	Enables locating where other signals are interfering, and without compromising the optimum locate frequency 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
4.9 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
4.10 Survey Measurements	Store up to 1,000 survey points within the locator, and append GPS data from internal GPS (if fitted) or external GNSS sources over Bluetooth® Export data immediately or as a batch over Bluetooth
4.11 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"
4.12 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
4.13 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
4.14 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 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 Swing warning	Enable / disable
5.9 Haptic vibration	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
5.10 iLOC Connectivity	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
5.14 Audio	Set audio tone frequency level high or low

6. Connectivity

6.1 Wireless connections	Bluetooth 2.0 – SPP profile, class 1 BLE 5.0
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	**Type C 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') option	GNSS data automatically added to Survey Measurements every time locate data is saved, and every second on usage-logging data Accurate to 2.5m CEP with SBAS enhancement available Supports GPS and GLONASS satellites constellations SBAS - Augmentation systems (where available) ▪ WAAS – North America ▪ EGNOS - Europe ▪ MSAS – Japan ▪ GAGAN – India
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	▪ 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[4]
7.4 Usage-logging memory	4 Gb
7.5 Usage-logging capacity	Over 500 days, measured at 8 hours use per day
7.6 Usage-logging capture rate	1 / second

7.7 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
Strike*Alert* status
Bluetooth status
Fault find arrow
Sidestep status
Language
Depth units
Power setting
Compass setting
CD reset status
Swing angles
Utility

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

7.8 Survey measurement capacity	Up to 1,000 data records	
7.9 Survey measurement data captured	**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 **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)
7.10 Survey measurement export options	Bluetooth – 'live,' per measurement Bluetooth – batch export USB – selectable / batch export	
7.11 Bluetooth survey measurement data protocol options	PPP ASCII (choice of 3 formats) Optional GPS data appended	

8. Power options

8.1 Alkaline	2 × D-Cell (MN1300 / LR20) alkaline batteries (standard)
8.2 Rechargeable	Custom Lithium-Ion (Li-Ion) battery pack 2 × D-Cell (MN1300 / LR20) Nickel Metal Hydride (NiMH) batteries
8.3 Battery run-time (continuous)[5]	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 water[6] 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[7]	Metric: -20°C to 50°C Imperial: -4°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: 2.6kg Imperial: 5.7lb

10. RD Manager™ Online Supporting PC Software

10.1 Operating System Compatibility	Microsoft® Windows® 10 64-bit
10.2 Locator system compatibility	Radiodetection RD7200 and RD8200 Precision 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 ▪ 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 Radio	FCC, IC
12.4 Environmental	WEEE compliant ROHS compliant
12.5 Manufacturing	ISO 9001:2015

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: 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

	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
							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
13.8	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
13.9	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	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 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 RD8200 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] RD Map+ required with premium subscription.

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

[6] 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.

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

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