RADIODETECTION®

SPX TECHNOLOGIES

RD8200® SG

Locator Specification

Precision locators

RD8200SG 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 and mapping 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 with lithium-ion battery pack Charger and mains lead Phone holder USB lead User Guide Rechargeable battery instruction sheet

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	<2.5 seconds
2.8 Maximum depth readout[2]	Metric: Cable / Pipe: 30m Sonde: 19.5m Imperial: Cable / Pipe: 98' Sonde: 64'

3. GNSS

3.1 Service Support	• GPS: L1C/A, L2C • GLONASS: L1OF, L2OF • Galileo: E1B/C, E5b
3.2 Convergence time RTK	< 10 sec
3.3 Position accuracy RTK	0.01m + 1ppm CEP
3.4 Acquisition	Cold starts 24s Aided starts and reacquisition 2s *Timings stated are best case and dependent upon atmospheric conditions, baseline length, GNSS antenna, multipath conditions, satellite visibility and geometry*
3.5 SBAS	Augmentation Systems (where available)
3.6 RTK Correction Service	NTRIP and RTCMv3.X messaging standards
3.7 GNSS settings	RTK/Reset/Off
3.8 GNSS Antenna	Integrated, precision tuned helical antenna Built-in low-noise amplifier (LNA)
3.9 LED Indicator	Solid – RTK fix Flashing – RTK float Off – all other conditions

4. Locate Functions

<table>
<tr><td>4.1 Active Locate Modes</td><td>Five:
• Peak
• Peak+™ (choice of combined Peak & Guidance or Peak & Null)
• Guidance
• Broad Peak
• Null</td></tr>
<tr><td>4.2 Gain control</td><td>Guidance Mode: Automatic
Other modes: Manual gain using “+” or “-“ with one touch to return to center (50% of Full Scale)</td></tr>
<tr><td>4.3 Custom locate frequencies</td><td>Up to 5 additional frequencies in the range 50Hz to 1kHz at 1Hz resolution</td></tr>
<tr><td>4.4 Active locate frequencies</td><td>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*</td></tr>
<tr><td>4.5 Sonde Frequencies</td><td>4 Frequencies:
512Hz, 640Hz, 8kHz and 33kHz</td></tr>
<tr><td>4.6 Fault Find</td><td>8KFF and CDFF
Locate insulation sheath faults on pipes and cables to 10cm / 4" accuracy using the accessory A-Frame and a compatible transmitter</td></tr>
<tr><td>4.7 Current Direction™ (CD) Signal Pairs</td><td>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</td></tr>
<tr><td>4.8 Passive Locate Modes</td><td>• Power
• Radio
• CPS – cathodic protection system
• CATV – Cable TV
• Passive Avoidance – simultaneous locate of power and radio</td></tr>
<tr><td>4.9 Power Filters™ function</td><td>Switch out of sensitive Power Mode to locate on any of 5 individual mains harmonic frequencies:
<table>
<tr><th>HARMONIC</th><th>50 Hz regions</th><th>60 Hz regions</th></tr>
<tr><td>Primary</td><td>50 Hz</td><td>60 Hz</td></tr>
<tr><td>3rd</td><td>150 Hz</td><td>180 Hz</td></tr>
<tr><td>5th</td><td>250 Hz</td><td>300 Hz</td></tr>
<tr><td>7th</td><td>350 Hz</td><td>420 Hz</td></tr>
<tr><td>9th</td><td>450 Hz</td><td>540 Hz</td></tr>
</table></td></tr>
<tr><td>4.10 Information displayed</td><td>• 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
• Bluetooth® wireless technology status
• GNSS satellites in view
• GNSS status
• 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
• StrikeAlert® warning
• Overload warning
• Swing warning</td></tr>
</table>

*Only available on FCC models

4.11 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
4.12 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 14 Compatible Accessories – for a complete list of locator accessories

5. Locate Function Enhancements

5.1 Strike*Alert*	Audio and visual warning when a cable or pipe less than 30cm deep is detected. Operates in Active and Passive locating modes
5.2 Haptic Vibration	Handle vibrates when Strike*Alert,* Swing and Overload warnings activated
5.3 Swing Warning	Audio and visual warning when the user is swinging the locator excessively
5.4 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
5.5 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.
5.6 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
5.7 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
5.8 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
5.9 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
5.10 Survey Measurements	Store up to 1,000 survey points within the locator, and append GNSS data from internal GNSS Export data immediately or as a batch over Bluetooth
5.11 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"
5.12 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
5.13 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
5.14 Integrated GNSS option	Faster surveying using integrated GNSS – no need for a separate hand-held device

6. Configurability

6.1 Phone operating system	Android™ iOS®
6.2 Option selection	All options can be enabled or disabled on the locator or using the RD Manager PC software
6.3 Languages supported	Fourteen: English, French, German, Dutch, Polish, Czech, Slovakian, Spanish, Portuguese, Swedish, Italian, Turkish, Russian, Hungarian
6.4 Mains power network options	50 Hz or 60 Hz
6.5 Mode selection	All locate modes can be individually enabled or disabled
6.6 Active frequency selection	All active frequencies available can be individually enabled or disabled
6.7 Passive mode selection	All passive modes can be individually enabled or disabled
6.8 Strike*Alert*	Enable / disable
6.9 Swing warning	Enable / disable
6.10 Haptic vibration	Enable / disable
6.11 Peak+ arrow selection	Guidance arrows or Null arrows Selected using the locator menu or with a long press of the antenna key
6.12 iLOC Connectivity	On / Off
6.13 Data export protocols supported	PPP / choice of 3 ASCII formats. Optionally append positional data
6.13 Time / date setting	Correct or update locator real-time clock using the RD Manager PC software or GNSS signals
6.15 CD Reset	Reset CD phase analysis with a single long press of the frequency key
6.16 Audio	Set audio tone frequency level high or low

7. Connectivity

7.1 Wireless connections	2 x Bluetooth 2.0 – SPP profile, class 1 2 x Bluetooth Low Energy 5.0
7.2 iLOC remote transmitter control range[3]	Metric: Up to 450m Imperial: Up to 1400'
7.3 iLOC remote transmitter control functions	Set transmitter frequency Set transmitter power output level Transmitter standby SideStep
7.4 Wired connections	**USB Data Port:** USB 3.1 Type-C socket – Used as a USB 2.0 slave port connection for data transfer and configuration to a PC. A male USB C to male USB A lead included as standard. • Rated voltage 48V ac/dc. • Rated current per contact 1.25A for power and 0.25A for data signals. • Dielectric Strength 100V ac. • Insulation resistance >100Mohm. **Accessory Port:** Neutrik (NeutriCON) RP8 way female – Bespoke connection for Radiodetection locator accessories only. • Power supply for accessory 6.6V dc (+/- 3.3V dc). • Rated voltage 50V ac. • Rated current per contact 7.5A (solder), 5A (crimp). • Dielectric Strength 1500V dc. • Insulation resistance >500Mohm. **3.5mm Stereo jack:** Connect wired headphones.

8. Data capabilities

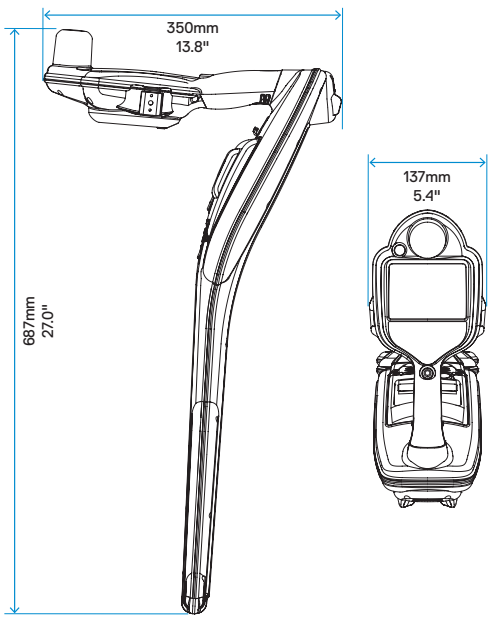
8.1 Usage-logging memory	4 Gb		
8.2 Usage-logging capacity	Over 500 days, measured at 8 hours use per day		
8.3 Usage-logging capture rate	1/second		
8.4 Usage parameters logged	Serial number Log reference and id Operating mode Locate frequency Sonde/line Signal strength Gain setting Depth Current Accessory 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 Date and time	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
8.5 Survey measurement capacity	Up to 1,000 data records		
8.6 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 Date and Time	**GNSS data:** Position Source Type Horizontal Accuracy Vertical Accuracy RTK fix time RTK correction age VDOP PDOP HDOP GPS day GPS month GPS year GPS UTC value Latitude Longitude GPS Fix Number of Satellites Altitude Altitude Units Geoid Geoid Units DGPS Time DGPS ID Time Indicator	
8.7 Survey measurement export options via RD Manager™ Online	Bluetooth – 'live,' per measurement Bluetooth – batch export		
8.8 Bluetooth survey measurement data protocol options	PPP ASCII (choice of 3 formats)		

9. Power options

9.1 Rechargeable	Custom Lithium-Ion (Li-Ion) battery pack
9.2 Battery run-time (continuous)[4]	Li-Ion pack: 18 hours
9.4 Charging options (Li-Ion pack)	Mains charger: 100-250 Volts AC, 50/60 Hz Automotive charger: 12-24V DC
9.5 Charging time (Li-Ion pack)	3 hours to 80% from empty with maintenance trickle charging thereafter

10. Physical Characteristics

10.1 Design	Ergonomic, balanced and lightweight design for comfortable use during extended surveys
10.2 Construction	Injection Molded ABS Plastic
10.3 Weight	**Lithium-Ion battery pack fitted:** Metric: 2.4kg Imperial: 5.2lb
10.4 Ingress Protection rating	IP65 Protected against dust ingress and jets of water[5] applied from any direction
10.5 Display type	High contrast custom made monochrome LCD
10.6 Audio options	Built-in waterproofed speaker 3.5mm headphone socket
10.7 Operating temperature[6]	Metric: -20°C to 50°C Imperial: -4°F to 122°F
10.8 Storage temperature	Metric: -35°C to 70°C Imperial: -31°F to 158°F
10.9 Unit dimensions	Metric: 687mm x 350mm x 137mm Imperial: 27.0" x 13.8" x 5.4"
10.10 Shipping dimensions	Metric: 737mm x 277mm x 396mm Imperial: 29.0" x 10.9" x 15.6"
10.11 Shipping weight	Includes: • RD8200SG with lithium-ion battery fitted • Mains charger + lead • RD8200SG Bag • Phone holder • User guide • RD8200SG box Metric: 5.5kg Imperial: 12.1 lb



11. RD Manager Online Supporting PC Software

11.1 Operating System Compatibility	Microsoft® Windows® 10 64-bit
11.2 Locator system compatibility	Radiodetection RD7200, RD8200 and RD8200SG Precision Locators
11.3 Functions	• Locator configuration • eCert® remote calibration certification • Factory calibration certificate retrieval • Usage-logging data collation and export • User account management • Locator software update • Survey Measurement retrieval
11.4 Data export formats	.csv for database and spreadsheet applications .xls / .xlsx for Microsoft® Excel® .kml for Google Earth™

12. Warranty and Maintenance

12.1 Manufacturer's warranty duration	3 years standard, on registration
12.2 Recommended calibration and maintenance schedule	Annual, or at the beginning / end of a lease period if earlier
12.3 eCert remote calibration	• Remote calibration certification using an internet connection to Radiodetection • Recommended schedule: annual, or at the beginning / end of a lease period
12.4 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
12.5 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.
12.6 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
12.7 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.

13. Certification and Compliance

13.1	Standards	
	CE Safety:	EN 61010-1:2010
	CE EMC:	ETSI EN 301 489-3 (V1.6.1) ETSI EN 301 489-17 (V2.2.1) EN 61326-1:2013
	CE RF:	ETSI EN 300 328V2.2.2 (2019-07) ETSI EN 300 413 V1.2.1 (2014-04) ETSI EN 300 330-2 (V1.5.1) ETSI EN 300 440-2 (V1.4.1)
	CE SAR:	EN 50566 EN 62479 IEC 62209-1528:2020
	ENV (Environmental):	EN 60529 1992 EN 60068-2-64:2008 Test Fh ETSI EN 300 019-2-2:1999 (per Table 6)
13.2	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
13.3	Radio FCC, IC	
	FCC EMC:	47CFR 15.107 47CFR 15.109 ICES-003 Issue 7, January 2020
	FCC RF:	47CFR 15.207 47CFR 15.209 RFC 15.247
	FCC SAR:	FCC 47 CFR part 2 (2.1093)
	ISED Certification No:	IC: 3893A-CLASSIC IC: 3147-BL652
	ISED SAR:	RSS-102 Issue 5, March 2015
13.4	Environmental	WEEE compliant ROHS compliant Altitude: up to 5000m Outdoor use Wet location
13.5	Manufacturing	ISO 9001: 2015

14. Compatible Accessories

	Accessory	Part description					Part number
14.1	Lithium-Ion battery packs	Li-Ion rechargeable battery mains kit (Includes mains charger) Li-Ion rechargeable battery pack (no charger)					10/RX-MBATPACK-V2-XX (XX = AU, EU, UK, or US) 10/RX-BATPACK-V2
14.2	Lithium-Ion battery chargers	Li-Ion automotive charger Li-Ion mains charger					10/RX-ACHARGER-V2 10/RX-MCHARGER-V2-XX (XX = AU, EU, UK, or US)
14.3	Transportation and storage accessories – *For combined locator and transmitter*	Soft Carry Bag					10/RD82SGBAG
14.4	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
14.5	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
14.6	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	4.5	14½	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
14.7	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
14.8	FlexiTrace™ *– Use with a transmitter to trace small diameter pipes*	FlexiTrace 50m / 165' FlexiTrace 80m / 260'						10/TRACE50-GB 10/TRACE80-GB

14.9 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
14.10 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
14.11 Headphones	Recommended for use in noisy environments				10/RX-HEADPHONES
14.12 Calibration Certificates	Locator Calibration Certificate, per unit (request with initial locator order) eCert Calibration Credit				10/CALCERT 10/ECERT-RD72/RD82

All specification are measured in test conditions, at 21°C / 70°F.

[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] To provide repeatable measurements, run-time is measured with backlight and vibration motor 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, LCD performance may slow and measurement precision may reduce.

RADIODETECTION®

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