

RADIODETECTION®

PCM^x locator specification

Pipeline Current Mapper



SPX®

PCMx Pipeline Current Mapper Specification

1. Product Summary

1.1	Product Overview:	PCMx is a multi-purpose Pipeline Current Mapper and precision locator. With the magnetometer foot attached the PCMx can be used to conduct pipeline coating surveys including ACCA, ACVG and depth of cover. With the foot removed the PCMx is a precision locator with the functionality of an RD8100PDLG
1.2	Product Descriptions:	Pipeline Current Mapper Multi-purpose Pipeline Current Mapper and Precision Locator Cable and Pipe Precision Locator
1.3	Intended Use:	Detecting and pinpointing coating faults on buried pipes and cables Creating survey records of buried pipes and cable locations Locating the position / path, and centerline depth of buried pipes and cables
1.4	Standard Equipment:	Locator including removable magnetometer foot Li-Ion rechargeable battery pack and mains charger Quick Start User Guide Mini USB 2.0 compliant data cable

2. Performance

2.1	Sensitivity:	2mA at 1 meter (4Hz magnetometer) 5 μ A at 1 meter (33kHz locate)
2.2	Dynamic range:	140dB RMS/ $\sqrt{\text{Hz}}$
2.3	Selectivity:	120dB
2.4	Depth measurement precision ¹ :	$\pm 3\%$ @ 2 meters and $\pm 5\%$ @ 3 meters
2.5	Locate accuracy:	$\pm 5\%$ of depth
2.6	4Hz current accuracy:	$\pm 5\%$ @ 1 meter depth with 1 Amp
2.7	Active locate filter bandwidth:	$\pm 3\text{Hz}$, $0 < 1\text{kHz}$ $\pm 10\text{Hz}$, $\geq 1\text{kHz}$
2.8	Start-up time:	<1 second
2.9	Maximum depth readout ² :	Metric: Cable / Pipe: 20m Sonde: 20m Imperial: Cable / Pipe: 65' Sonde: 65'

3. Locate Functions

3.1	Active Locate Modes:	Five: <ul style="list-style-type: none">• 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 in RD8100 mode

3.4 4Hz survey mapping frequencies:	For conducting ACVG and ACCA surveys		
	Mode	PCMx	RD8100 PDLG
	ELF (4Hz + 98Hz/128Hz)	•	
	ELCD (4Hz + 8Hz + 98Hz/128Hz)	•	
	LFCD (4Hz + 8Hz + 512/640Hz)	•	
	8kHz	◆	
◆ Requires a 4Hz signal from a PCM transmitter and an 8kHz boost locate signal from a second transmitter			
3.5 Active locate frequencies:	For locating pipes and cables		
	Mode	PCMx	RD8100 PDLG
	Custom frequencies		5
	ELF (98/128Hz)	ELF/ELCD	•
	512Hz	LFCD	•
	570Hz		•
	577Hz		•
	640Hz	LFCD	•
	760Hz		•
	870Hz		•
	920Hz		•
	940Hz		•
	8kHz (8192 Hz)	•	•
	9.8kHz (9820 Hz)		•
	33kHz (32768Hz)		•
	65kHz (65536Hz)		•
	83kHz (83077Hz)		•
	131kHz (131072Hz)		•
	200kHz (200000Hz)		•
3.6 Sonde Frequencies:	Use to trace or locate non-conductive utilities		
	Mode	PCMx	RD8100 PDLG
	512Hz		•
	640Hz		•
	8kHz (8192Hz)		•
33kHz (32768Hz)		•	
3.7 Fault Find:	Use to locate and pinpoint coating faults on pipes and cables		
	Mode	PCMx	RD8100 PDLG
	ACVG	•	
	8kHz Fault Find		•
CD Fault Find		•	

3.8	Current Direction™ (CD) Signal Pairs:	Identify target pipe or cable amongst a number of parallel utilities		
		Mode	PCMx	RD8100 PDLG
		4Hz / 8Hz	•	
		256Hz / 512Hz		•
		285Hz / 570Hz		•
		320Hz / 640Hz		•
		380Hz / 760Hz		•
		460Hz / 920Hz		•
		4096Hz / 8192Hz 4kCD		•
3.9	Passive Locate Modes:	Use passive signals to locate when an active signal connection is not possible		
		Mode	PCMx	RD8100 PDLG
		Power	•	•
		Radio		•
		CPS (Cathodic Protection System)	•	•
		CATV (Cable TV)		•
		Passive Avoidance (Combined Power + Radio)		•
3.10	Power Filters™ function:	RD8100 PDLG mode only: 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
3.11	Information displayed:	<ul style="list-style-type: none"> • 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 • GPS status • Configuration menu and submenus • Software version • Last calibration date • Survey measurement counter • Current Direction mode indicator • Current Direction arrows • A-Frame indicator • Fault find direction arrows • Fault find dBmV • Transmitter communication status (Tx-5B, Tx-10B) • Transmitter standby status (Tx-5B, Tx-10B) • StrikeAlert™ warning • Overload warning 		

3.12 Audio output tones:	<p>Power / Passive Avoidance / Radio modes: Real Sound™ derived from detected electromagnetic signal</p> <p>Peak / Peak+ modes and CPS / CATV modes: Synthesized audio tone proportional to signal strength</p> <p>Guidance mode: Continuous tone when locator is to the left of target, intermittent tone when to the right of target</p> <p>Null mode: Synthesized Audio tone proportional to signal strength. Low pitch to left of target, high pitch to right of target</p> <p>StrikeAlert audio warning</p> <p>Audio feedback for menu navigation</p>
3.13 Accessory locate functions: RD8100 mode	<p>Locator clamps: Used to identify individual target cable(s) in a bundle or cabinet using signal strength read-out</p> <p>Stethoscopes: Used to identify individual target cable(s) in a bundle or confined space such as a cabinet using signal strength read-out</p> <p>CD / CM clamp: Used to measure locate current and to confirm target cable using Current Direction</p>

4. Locate Function Enhancements

4.1 StrikeAlert: RD8100 mode	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™:	<p>40dB, automatic</p> <ul style="list-style-type: none"> 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):	<ul style="list-style-type: none"> 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™: RD8100 mode (with Tx-5B and Tx-10B)	<p>Metric: Remote transmitter control from up to 450m away³</p> <p>Imperial: Remote transmitter control from up to 1400' away³</p> <p>Control transmitter frequency, power level and SideStep</p>
4.5 SideStep™: RD8100 mode (with Tx-1, Tx-5 and TX-10)	<p>Enables locating where other signals are interfering, and without compromising the optimum locate frequency</p> <p>Shifts the locate and transmitter frequency by several Hz, out of the bandwidth of other locate signals that may be interfering with the locate</p>
4.6 4.6 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
4.7 Survey Measurements:	Store up to 10,000 survey points within the locator including data from internal GPS if used. Export data individually or as a batch over Bluetooth®
4.8 Fault Find:	<p>Use an accessory A-Frame to detect and pinpoint coating and insulation faults</p> <p>PCMx mode: Apply an ELCD or LFCD signal using a Tx-25 or Tx150 transmitter</p> <p>RD8100 mode: Apply a Fault Find signal with a Tx-5 and Tx-10 transmitter</p> <p>Fault find accuracy:</p> <p>Metric: 100mm</p> <p>Imperial: 4"</p>
4.9 4kHz locate frequency and CD: RD8100 mode (with Tx-1, Tx-5 and TX-10)	<p>Designed for tracing higher impedance lines such as twisted pair telecoms or street lighting over distance</p> <p>Combine with Current Direction to help trace the target utility through dense or complex infrastructure</p>
4.10 Peak+ mode:	Use the accurate Peak bar graph, 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 PCM Manager for Windows 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	StrikeAlert:	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 / Off / Reset
5.10	Bluetooth:	On / Off
5.11	Data export protocols supported:	Choice of 2 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, Bluetooth Low Energy (BLE)
6.2	Log transfer to mobile app	Transfer of records to mobile app.
6.3	iLOC™ (Tx-5B andTx-10B) remote transmitter control range ³ :	Metric: Up to 450m Imperial: Up to1400'
6.4	iLOC (Tx-5B andTx-10B) transmitter control functions:	Set transmitter frequency Set transmitter power output level Transmitter standby SideStep
6.5	Wired connections	Mini-USB 2.0: 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) <ul style="list-style-type: none"> • 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 via mobile app <ul style="list-style-type: none"> • Connect an external GNSS enabled device to PCM Manager for mobile devices to combine external GPS data with survey measurements
7.3	Survey measurement capacity:	Up to 10,000 data records in Survey mode

7.4 On-board survey measurement data captured:	Log Record Serial Number Schema Log Reference Date Time Updated Master Mode Accessory Enabled Operating Mode Overload Flag Volume Battery Sonde/Line Accessory Type Antenna Mode Left/Right Arrows Compass Angle Protocol ID Locate Frequency Log ID Signal Strength Depth Current CD Phase FF or CD Arrows	Fault Find Phase Fault Find Signal Strike Alert Sounding Gain Temperature DOP Status Audio Indication GPS Mode CD Reset Key Stroke Menu Active Bluetooth Enabled SideStep Active Language Depth Units Power Setting Compass Enabled Horizontal Dilution Altitude GPS Fix Number of Satellites Latitude Longitude ACVG Magnitude PCMx Current 4Hz PCMx Phase 4Hz	
7.5 Survey measurement export options:	Bluetooth – 'live,' per measurement export and batch export USB – selectable / batch export		
7.6 Bluetooth survey measurement data protocol options:	ASCII (choice of 2 formats) Optional GPS data appended		
7.7 Usage-logging:	RD8100 mode		
7.8 Usage-logging memory:	4 GB		
7.9 Usage-logging capacity:	Over 500 days, measured at 8 hours use per day		
7.10 Usage-logging capture rate:	1/ second		
7.11 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	Rechargeable battery (standard):	Custom Lithium-Ion (Li-Ion) battery pack
8.2	Additional battery options:	2 x D-Cell (MN1300 / LR20) alkaline or Nickel Metal Hydride (NiMH) batteries
8.3	Battery run-time (continuous) ⁴ :	Li-Ion pack: 35 hours 2 x Alkaline D-Cells 13 hours
8.4	Battery chemistry identification:	Lithium-Ion pack: Automatic sensing NiMH / Alkaline: Operator set
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: 2.2kg Imperial: 4.8lb
9.4	Ingress Protection rating:	IP65: Protected against dust ingress and jets of water ⁵ applied from any direction
9.5	Display type:	High contrast custom made monochrome LCD
9.6	Audio options:	Built-in water-resistant speaker 3.5mm headphone socket
9.7	Operating temperature ⁶ :	Metric: -20°C to 50°C Imperial: -4°F to 122°F
9.8	Storage temperature:	Metric: -40°C to 70°C Imperial: -40°F to 158°F
9.9	Unit dimensions:	Magnetometer foot attached: Metric: 745mm x 286mm x 134mm Imperial: 29.3" x 11.3" x 5.3" Magnetometer foot removed: Metric: 648mm x 286mm x 125mm Imperial: 25.5" x 11.3" x 4.9"
9.10	Shipping dimensions:	Metric: 700mm x 330mm x 260mm Imperial: 27.6" x 13" x 10.2"
9.11	Shipping weight (including bag and battery):	Metric: 5.0kg Imperial: 11.1lb

10. PCM Manager™ Supporting PC Software

10.1	Operating System Compatibility:	Microsoft® Windows® 7, 8, 8.1, 10, 32 and 64-bit versions
10.2	Functions:	<ul style="list-style-type: none"> • 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
10.3	Data export formats:	.kml for Google® Earth .csv/.xls/.xlsx for database and spreadsheet applications
10.4	KML data export options:	Filter usage-logging and survey measurement points on Google® Earth Select data to be tagged. Customize icon type / color, label type / color, line type / color

11. PCM Manager™ Supporting Mobile Application

11.1	Operating System Compatibility:	Google Android 5.0 and higher																																								
11.2	Functions:	<p>Live survey graphical view of:</p> <p>ACCA Current mA</p> <p>ACCA Logarithmic Current dBmA</p> <p>ACVG Voltage (surface voltage profile measured with A-frame)</p> <p>Loss millibels/meter or feet</p> <p>Depth to Pipe Centre (m or ft)</p> <p>Depth of Cover (to top of pipe, m or ft)</p> <p>Live Mapping of survey</p> <p>Data logging sounds (device announces with a sound when a record is received from the PCMx)</p> <p>Walk Forward (during a live survey to the next survey position)</p> <p>Walk Back (during a live survey to the last survey position)</p> <p>Walk To (any selected point in a saved survey)</p> <p>Survey Naming (up to 100 characters)</p> <p>Enter Pipe diameter (m or ft)</p> <p>Add Comments (add up to 100 characters to any survey point during live survey)</p> <p>Data Share (selected history points or multiple surveys by email or other available sharing services)</p> <p>Date Delete (delete individual points or completed surveys)</p> <p>Third Party Precision GPS (the App logs external precision GPS coordinates whenever a record is received from the PCMx)</p> <p>Unique record numbering invariant across cross-platform use</p>																																								
11.3	Survey data captured on mobile app: (Augmented log)	<table border="0"> <tr> <td>Start Symbol</td> <td>RTC year</td> </tr> <tr> <td>Format</td> <td>UTC</td> </tr> <tr> <td>Version</td> <td>RTC Updated flag</td> </tr> <tr> <td>Index</td> <td>Int GPS mode</td> </tr> <tr> <td>PCMx Operating mode</td> <td>Int GPS Latitude</td> </tr> <tr> <td>Locator Frequency</td> <td>Int GPS Longitude</td> </tr> <tr> <td>Alpha display</td> <td>Int GPS Fix</td> </tr> <tr> <td>LocData</td> <td>Int GPS no. of satellites</td> </tr> <tr> <td>Depth to pipe center</td> <td>Int GPS dilution</td> </tr> <tr> <td>dBµV</td> <td>Int GPS altitude</td> </tr> <tr> <td>Locate current A</td> <td>Ext GPS Latitude</td> </tr> <tr> <td>4 Hz Voltage phase</td> <td>Ext GPS Longitude</td> </tr> <tr> <td>Signal strength</td> <td>Ext GPS Fix</td> </tr> <tr> <td>Gain (dB)</td> <td>Ext GPS no. of satellites</td> </tr> <tr> <td>MF Foot attached</td> <td>Ext GPS dilution</td> </tr> <tr> <td>4Hz C-V Phase</td> <td>Ext GPS altitude</td> </tr> <tr> <td>4Hz Current (A)</td> <td>Pipe Diameter</td> </tr> <tr> <td>Current 4-8Hz Phase</td> <td>Survey name (0-100)</td> </tr> <tr> <td>RTC day</td> <td>COMMENT</td> </tr> <tr> <td>RTC month</td> <td></td> </tr> </table>	Start Symbol	RTC year	Format	UTC	Version	RTC Updated flag	Index	Int GPS mode	PCMx Operating mode	Int GPS Latitude	Locator Frequency	Int GPS Longitude	Alpha display	Int GPS Fix	LocData	Int GPS no. of satellites	Depth to pipe center	Int GPS dilution	dBµV	Int GPS altitude	Locate current A	Ext GPS Latitude	4 Hz Voltage phase	Ext GPS Longitude	Signal strength	Ext GPS Fix	Gain (dB)	Ext GPS no. of satellites	MF Foot attached	Ext GPS dilution	4Hz C-V Phase	Ext GPS altitude	4Hz Current (A)	Pipe Diameter	Current 4-8Hz Phase	Survey name (0-100)	RTC day	COMMENT	RTC month	
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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:	<ul style="list-style-type: none"> Remote calibration certification using an internet connection to Radiodetection Recommended schedule: annual, or at the beginning / end of a lease period
12.4	CALSafe™:	<ul style="list-style-type: none"> 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:	<p>On-unit</p> <p>Applies test signals to locate circuitry to confirm correct operation, as well as the typical tests for screen and DSP functions.</p> <p>Recommended schedule: weekly, or before each use.</p>
12.6	Storage recommendation:	<p>Store in a clean and dry environment.</p> <p>Ensure all terminals and connection sockets are clean, free of debris and corrosion and are undamaged</p>
12.7	Cleaning:	<p>Clean with a soft, moistened cloth. Do not use:</p> <ul style="list-style-type: none"> Abrasive materials or chemicals High pressure jets of water <p>If using this equipment in foul water systems or other areas where biological hazards may be present, use an appropriate disinfectant.</p>

13. Certification and Compliance

13.1	Standards:	
	<i>Safety:</i>	EN 61010-1:2010
	<i>EMC:</i>	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)
	<i>Environmental:</i>	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)
13.2	European directives:	Radio Equipment 2014/53/Eu Low Voltage Directive: 2014/35/EU EMC Directive: 2014/30/EU ROHS Directive: 2011/65/EU Declaration of conformity is available from www.radiodetection.com
13.3	Radio:	FCC, IC
13.4	Environmental:	WEEE compliant ROHS compliant
13.5	Manufacturing:	ISO 9001:2008

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-LION-K 10/RX-BATPACK-LION	
14.2	Lithium-Ion battery chargers	Li-Ion automotive charger Li-Ion mains charger				10/RX-ACHARGER-LION 10/RX-MCHARGER-LION	
14.3	Alkaline battery trays	2 x D Cell battery tray (MN1300 / LR20)				10/RX-2DCELL-TRAY	
14.4	Transportation and storage accessories	Soft Carry Bag Wheeled Flight/Hard Case				10/PCMXBAG 10/PCMXCASE	
14.5	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	
14.6	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	
14.7	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	¾	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	
	Slim Sonde	22	⅞	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	⅞	6	20	512	10/SONDE-BENDI-512
14.8	Submersible antennas:	640 / 512Hz Submersible DD Antenna 8kHz Submersible DD Antenna				10/RX-SUBANTENNA-640 10/RX-SUBANTENNA-8K	
14.9	FlexiTrace™ Use with a transmitter to trace small diameter pipes	FlexiTrace 50m / 165' FlexiTrace 80m / 260'				10/TRACE50-GB 10/TRACE80-GB	

Accessory	Part description				Part number	
14.10 Flexrods Fiberglass 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	1/4		10/FLEXRODF50-7
	100	320	7	1/4		10/FLEXRODF100-7
	150	485	7	1/4		10/FLEXRODF150-7
	60	195	9	3/8		10/FLEXRODF60-9
	120	390	9	3/8	10/FLEXRODF120-9	
14.11 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	
14.12 Headphones	Recommended for use in noisy environments				10/RX-HEADPHONES	
14.13 Warning Triangle	Three sided folding warning sign				10/WARNING-TRIANGLE	
14.14 Calibration Certificates	Locator Calibration Certificate, per unit (request with initial locator order)				97/RX-CALCERT	
	eCert™ Calibration Credit				10/RX-ECERT	

All specifications are measured in test conditions, at 21°C / 70°F, and fitted with Li-Ion battery 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 PCMX will locate to greater depths in the right conditions, but depth accuracy will be compromised. Depth measurement will not be displayed beyond this depth.

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, LCD screen performance may slow and measurement precision may be reduced