

PASCHIM GUJARAT VIJ COMPANY LIMITED

REGD. & CORPORATE OFFICE:- "PASCHIM GUJARAT VIJ SEVA SADAN"
OFF NANA MAVA MAIN ROAD, LAXMINAGAR, RAJKOT-360004

CIN U40102GJ2003SGC042908

Telephone Nos:-0281-2380425/427/2360182

Fax No:-0281-2368175

Website:-www.pgvcl.com

E-mail:-proc.pgv@gmail.com

SPECIFICATION FOR Multipurpose Precision Locator for Cables and Pipes below Ground

1. SCOPE

The Specification covers design, manufacturing Factory testing and supply of Multipurpose and Multi-function instrument for Pipe and Cable Location below ground with ability to detect faults of Underground cable with inbuilt GPS System, Receiver and Transmitter and should be equipped with Data export Software as per standard mentioned in this specification with latest amendment if any.

2. GENERAL REQUIREMENT:

The Unit will be extensively used in Outdoor application and on rough Routs, hence must be compact and sturdy in design with water proof body. The display must be clearly visible from reasonable distance and can be clearly readable in dark light also. The instrument must be easily in operation and should not be too heavy to handle.

3. SERVICE CONDITION:-

The Instrument used in operation of the Distribution system shall be suitable for use under following conditions.

a.	Maximum ambient temperature	50° C
b.	Minimum ambient Temperature	0° C
c.	Maximum daily average ambient temperature	40° C
d.	Altitude	0 to 1000 meter
e.	Average Rainfall	150 Cm
f.	Maximum yearly average air temp.	35° C
g.	Maximum soil temperature at cable depth	30° C
h.	Relative Humidity	up to 95%
i.	Maximum Wind Pressure	150 Kg/cm ²
j.	Maximum soil thermal resistivity	150° C cm/watt

4. APPLICABLE STANDARDS:-

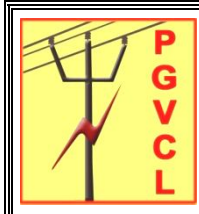
- (1) EN 61010-1 for Safety requirement of Electrical Equipment
- (2) EN 61326-1 Electrical Equipment for Measurement and Control
- (3) EN 300 330 Harmonized standard for Short range Radio equipment Device
- (4) EN 300 440 and 489 Electromagnetic Compatibility and for Broad band Data Transmission
- (5) EN 60529 for Degree of Protection
- (6) EN 60068-2008 for Dynamic Loading
- (7) EN 60068 for Severity Test
- (8) EN 300 019 for Environment Engineering and Environment Testing
- (9) ISO 9001:2008 for Manufacturing. **Valid and Notarized Copy of same is to be submitted.**

Any International OR Indian Standard equivalent to above is acceptable.

Company's Round Seal

Date:

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5. CONFIGURATION

The Instrument must have following configurations.

- All Options can be enabled or disable on the locator or by using PC Software
- The Equipment must support English language and other as per Suppliers configuration
- Operating Frequency of Instrument will be 50 Hz
- All locations can be individually enable or disabled.
- All active frequencies and passive modes can be individually enabled or disabled.
- Instrument must be capable to give strike/Alert and with features to enable or disable the same.
- Instrument must be equipped with Guidance arrow or Null Arrows
- Internal/External GPS setting features (Could connect over Bluetooth) with features of Reset and Off.
- The instrument must support Data export protocol of PPP/ASCII formats as per PGVCL requirements.
- Instrument must be capable for correct/update locator real time clock either by Software or GPS Signals.
- It must have feature to reset Current Direction phase analysis.

6. TECHNICAL REQUIREMENTS

Following are the basic Technical requirements.

- Minimum Depth measurement for Detection for any Pipeline or Cable below ground is minimum 15 Meters and above with accuracy tolerance of $\pm 3\%$ and locate accuracy with $\pm 5\%$ of Depth.
- Instrument must have Sensitivity of not more than 6E-15 Tesla and 5 micro amp at 1 Meter.
- The Sonde Detection Capabilities should be up to 19 Meters
- The instrument must have start up time not more than 1 Sec
- The Dynamic Range must be 140db rms per Hz Sq. Rt. With Selectivity up to 120 db/Hz
- For Dead Power Cable Location tracing, minimum 9 Low Frequency up to 1 Khz and for Active Power Cable Location, minimum Five high Frequency up to 200 KHz with Five Custom frequencies and filter bandwidth Tolerance of $\pm 3\text{ Hz} < 1\text{ KHz}$ and $\pm 10\text{ Hz} \geq 1\text{ KHz}$
- It must have equipped with Four Sonde Frequencies of 512 Hz, 640Hz, 8 KHz and 33 KHz.
- The instrument must be capable to locate Faulty Location up to 8 KHz Frequency with Current Direction.

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- Signal Pair Frequency for Current Direction should be up to 460 Hz/920 Hz.
- Instrument must be capable to switch out of Sensitive Power mode to locate any Harmonics frequencies as mentioned below.
 - Primary : 50 Hz
 - Third : 150 Hz
 - Fifth : 250 Hz
 - Seventh : 350 Hz
 - Ninth : 450 Hz
- Instrument must throw an Audio and Visual Warning when a Cable or Pipe is detected within 30 cm in both active as well as passive mode.
- The instrument must have Dynamic Overload protection and should automatically manages the system gain to compensate strong signals.
- The current and its direction must be displayed with Arrow when located.
- Instrument must simultaneously detect the depth and current
- The instrument must have storage capacity of minimum 1000 survey points and Data records.
- The Accuracy of Fault Finding is not more than 100 mm.

Over and above, any additional features according to product design and for better performance for the application are acceptable narrating the benefits of such additional features Prior approval is required.

7. DISPLY PARAMETERS:

Following Parameters are required to be displayed during operations.

- 1) Signal Strength(Graphical as well as numeric Value)
- 2) Mode Indication(Peak, Null, Guidance with Arrows)
- 3) Line or Sonde Locate Type
- 4) Proportional Left/Right Indication
- 5) Compass with full 360 Degree Line Direction indicator
- 6) Indication for Accessories in Use
- 7) Depth and Current Read out
- 8) Gain Level (in db)
- 9) Selected Frequency
- 10) Battery Condition
- 11) Speaker Volume
- 12) Operating Frequency
- 13) Bluetooth Status
- 14) GPS Satellites in view
- 15) GPS Status
- 16) Configuration Menus and Submenus
- 17) Software Version
- 18) Last Calibration date
- 19) Survey Measurement Counter
- 20) Current Direction Mode Indicator
- 21) Current Direction Arrows

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- 22) Fault Find Mode Indicator
- 23) Transmitter communication Status
- 24) Transmitter Standby Status
- 25) Strike Alert Warning
- 26) Overloading Warning

Over and above any other additional parameters useful in application and as per product Design is acceptable.

8. CONSTRUCTION:

The Housing and construction	Injection Molded ABS Plastic with must be compatible to IP 65
Display	High Contrast monochrome
Speaker	Built in Water proof Speaker with headphone socket
Battery	Rechargeable Lithium Ion Battery pack having weight not more than 2.0 Kg with AC and DC charging options with Minimum One Year Warranty
Charging Time	Not be more than 4.0 Hrs.
Run Time Capacity (Continuous)	Not less than 35 Hrs.
Battery Life	Minimum 25 Hours
Overall instrument dimension	Not more than 700 mm X 300 mm X 150 mm
Overall weight	3.0 Kg

9. AUDIO OUTPUT TONES:

The Instrument must deliver following Audio Output Tones while in Operations.

Power/Passive Avoidance/Radio Modes	Real Sound derived from detected Electromagnetic Signal
Peak Modes	Synthesized Audio tone Proportionate to Signal Strength
Guidance Mode	Cont. Tone when Inst. is to the Left of Target, intermittent tone When Right of Target
Null Node	Synthesized Audio tone Proportionate to Signal Strength Low Pitch to Left of Target High Pitch to right of Target
Strike Alert Warning	Audio feedback for Manu Navigation

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10. CONNECTIVITY and GPS:

- The Equipment must be compatible to Bluetooth class 1 wireless connections.
- Remote Transmitter control Range must be up to 450 Meter
- The equipment must have USB Port for the connection with PC to configure and update and to collect the Data Log and survey measurement data.
- The equipment must be integrated with GPS to have accurate details of GPS on each survey measurement and such data must be added automatically every time when located Data is saved.
- It must have external link with Bluetooth and compatible Mobile Device to combine survey Measurements.
- Minimum up to 1000 Data records can be preserved.
- Following Standard data must be captured during operation
 - Log
 - Survey Reference
 - Antenna Mode
 - Depth
 - Current (mA)
 - Frequency in use (Hz)
 - Sonde/Line
 - Signal Strength
 - Gain setting
 - Compass
 - Arrow Readout
 - Current Direction Phase
 - Battery Level
 - Volume
 - Date and Time

Any other Data as per Design of Product and useful to this application are acceptable.

- Following GPS data with Internal or External connection must be captured during operation.
 - GPS Mode
 - GPS Data and Time
 - GPS Distance (m)
 - Latitude Angle
 - Latitude Direction
 - Longitude Angle
 - Longitude Direction
 - Satellite in Use
 - DGPS Time
 - DGPS ID

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➤ Time reference

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- The Data can be exported through Bluetooth (Live or Batch Export) and USB.
- Equipment must have Usage Logging Memory with minimum 4 GB and capacity over 500 Days and minimum 8 Hrs. measurement per Day with Capture rate of 1 per Second.
- Equipment must have logged of Usage parameters also as mentioned below.
 - Serial Number
 - Log reference and ID
 - Operating Mode
 - Locate Frequency
 - Signal Strength
 - Gain Setting
 - Depth
 - Current
 - Accessory in Use
 - Antenna Mode
 - Compass Angle
 - Overload Status
 - Dynamic Overload protection
 - CD Phase
 - Keys Pressed
 - Audio Reset
 - Volume
 - Manu in Use
 - Status for Battery, warning, Strike alert, Bluetooth, CD Reset
 - Fault Find Arrow
 - Language
 - settings

Any other Data as per Design of Product and useful to this application are acceptable.

- Equipment must have logged of Usage parameters in GPS mode also as mentioned below.
 - Latitude
 - Longitude
 - Altitude
 - GPS Mode
 - GPS Date and Time

Any other Data as per Design of Product and useful to this application are acceptable.

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11. SOFTWARE:

The software must be compatible to Microsoft windows all operating System with 64 bit version.

The Software must have following features.

- 1) Equipment Configuration
- 2) Remote Calibration
- 3) Factory Calibration retrieval
- 4) Usage-Logging Data collation and Export
- 5) Survey Measurement data collation and Export
- 6) User Account Management
- 7) Maintenance Schedule enforcement
- 8) Software update
- 9) Contact Radio detection
- 10) Book a Service

The Software must give output in .kml for Google Maps, .csv for Database and spreadsheet applications and .xls/.xlsx for Microsoft Excel application. The KML Export option must have customization facilities to change type, Colour, labels etc.

12. ACCESSORIES:

The Following Accessories are to be supplied with main Instrument.

- **Clamps**-used to identify individual Targets Cable in a bundle (Transmitter and Receiver) and associated accessories
- **Earthing Rod and Wire (Minimum 10 Meter in Length)** with associated accessories
- **Lithium-Ion Battery pack**- Rechargeable Battery Mains Kit and Battery Pack with automotive Charger
- **Calibration Certificates**
- **User Manuals with all Details and Preventive maintenance tips with Quick start Guide.**

13. PACKAGING:

The Instrument must be packed in such a way that there should be no damage done during Transportation. At the same time the packed unit should not become bulky make difficult to handle.

All other Accessories must be packed in Soft Bag and must be easy to open and handle. All other related accessories for entire unit must be supplied with pack as per Product support and Design.

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14. WARRANTY & TRAINING:

The Instrument must have 3 Years Standard Warranty with Maintenance schedule every Year.

The Instrument must be remotely calibrated using internet connection. As a safeguard of instrument it should be enable to prevent from operation beyond calibration schedule.

The instrument must pass Routine Test like locating Circuitry by applying Test Signals, and Test for Screen and Display functions.

Supplier/OEM has to provide comprehensive training for the complete operation of instrument.

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ANNEXURE A GUARANTEED TECHNICAL PARTICULARS

Sr. No.	Parameters	Specifications	Bidder's Remark
1.0	PERFORMANCE		
1.1	Sensitivity	5 Micro Amp at 1 Meter	
1.2	Dynamic Range	140 db	
1.3	Depth Range	Minimum 15 Meters and above with ± 3 % Tolerance and ± 5 % Locate Accuracy	
1.4	Passive Modes	Power, Radio, Passive Avoidance, CPS, CATV	
1.5	Active Modes	Peak, Peak and Null, Null, Guidance	
1.6	Current Direction Frequency	As defined	
1.7	Low, Medium and High Locate Frequency	As defined	
1.8	Signal Strength	Bar and Numeric	
1.9	Proportional Left/Right Arrows	As defined	
1.10	360 Degree Compass	As defined	
1.11	Simultaneous Depth and Current Reading	As defined	
1.12	Audio Visual warning	As defined	
1.13	High level electromagnetic interference stoppage	As defined	
1.14	Tone Change	As defined	
1.15	Gain Level (In db)	As defined	
1.16	Accessories in Use indication	As defined	
1.17	Battery Condition	As defined	
1.18	Speaker Volume	As defined	
1.19	CD Mode with Arrows	As defined	
1.20	Power Filter (Harmonic Frequency detection)	As defined	
1.21	Survey Measurement Logs	1000 Records	
1.22	In Built GPS	As defined	
2.0	Receiver		
2.1	Design and construction as per specification	Injection Molded ABS Plastic must be compatible to IP 65	
2.2	LCD Display	High Contrast monochrome	
2.3	Audio	Built in Water proof Speaker with headphone socket	
2.4	Operating Temperature	As Defined	
2.5	Storage Temperature	As Defined	
2.6	Battery	Rechargeable Lithium Ion Battery pack with AC and DC charging options (With Minimum One Year warranty)	

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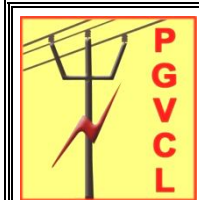
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2.7	Battery Life	Minimum 25 Hours	
2.8	Battery Weight	Not More than 2.0 Kg	
Sr. No.	Parameters	Specifications	Bidder's Remark
3.0	<u>Transmitter</u>		
3.1	Maximum Output Power	Not more than 10 W	
3.2	Maximum Voltage Output	Below 100 V	
3.3	Maximum Output Current	≤ 500 mA	
3.4	Active Frequencies	As per Specification	
3.5	Warning Signals in Low Battery Condition	To be Defined	
3.6	Battery	Rechargeable Lithium Ion Battery pack with AC and DC charging options (With Minimum One Year warranty)	
2.7	Battery Life	Minimum 25 Hours	
2.8	Battery Weight	Not More than 3.0 Kg	
4.0	<u>Warranty & Maintenance & Training</u>		
4.1	Warranty	3 Years	
4.2	Remote Calibration Check	Yes	
4.3	Test Signal to confirm correct Operation	Yes	
4.4	Prevention against operation beyond calibration schedule	Yes	
4.5	Training	Yes	
5.0	<u>Accessories</u>		
5.1	Clamps (Transmitter and Receiver)	Yes	
5.2	Lithium-Ion Battery pack	Yes	
5.3	Earthing Rod and Wire		
6.0	<u>Data Export Software</u>		
6.1	.xls/.xlsx for Microsoft Excel	Yes	
6.2	.csv for Database and spreadsheet applications	Yes	
6.3	.kml for Google Maps	Yes/No	

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ANNEXURE B

Bidder has to enclose following documents and has to confirm for the same.

Sr. No.	Particulars	Confirmation
1	Bidder has submit complete Details of Product with Catalogs and Broachers	Yes/No
2	Test Certificate from Govt. Approved Laboratory as per Standard Mentioned in the Specifications	Yes/No
3	Performance Certificate of Product from Any Utility. To be submitted with Bid.	Yes/No
4	List of Orders for the Supply of Same Products to SEB or Private Utility Or Firm. To be submitted with Bid.	Yes/No

ANNEXURE C

Bidder has to mention below deviation if any, quoting relevant clause of specification.

<u>Deviation</u>

Company's Round Seal

Date:

Place: