STANDARD TECHNICAL SPECIFICATION FOR UNDERGROUND L.T (1.1 KV Grade) CABLEFAULT LOCATING EQUIPMENT AND OTHER ACCESSORIES

TECHNICAL PROPOSAL AND SPECIFICATION

1. GENERAL REQUIREMENTS :

The cable fault locator shall be capable of locating /detecting all underground LT distribution (PVC/XLPE insulated) power cable fault upto 1.1 KV network. The equipment shall be properly wired and capable of detecting open circuit/short circuit /low insulation /lashing/earth /Series Resistance type cable faults in underground cable.The equipment shall be capable to deliver high output energy that is necessary to ascertain easily to condition and breaking down faults in power cables,joints and terminations and long cable network. The equipment should be capable of detection of faults in mix cables of PVC& XLPE. All constituent part of the equipment for cable fault locating set shallbe independent and separate innature for easytransportation. The dimension and weight of entire set of LT Cable fault locator shall be such that the entire set can be conveniently accommodated in a standard TATA SUMO Jeep/Bolero Jeep along with 2(Two) Testing Personnel and the entire set can be placed in such vehicle and be removed on regular basis without any hassles for cable fault location at site. The each components of the test set shall be robust in nature so that the same can endure the vibration and mechanical shocks for such movements on regular basis. The cable fault locator set shall be such that light drizzle can not cause any harm to the set even if the set remains in open area while at site for some time. The LT cable fault locator shall be capable of pre locating and pinpointing of faults in 4(Four) core LT Power cable of sizes 10 Sq. mm. to 400 sq mm.and single core cable upto 1000 Sq. mm.. In both cases the length of cable may be up to 4 Km.

The Cable fault locator shall consists of the following components which, if required, shall be used in conjunction with other:

a) Time Domain Reflectometer suitable forL.V. Power Cable with required accessories.
b) HV Surge Wave Tester or Impulse Generator with minimum 20mitre H.T cableand other required accessories.
c) Cable fault pinpointing set with headphone and sensing mechanism (with rod).

Test Technique:

Test technique should be based on differential arc reflection so as to eliminate unwanted and confusing reflection leaving only locations of fault. This differential arc reflection technique should be possible without a need to use extra channel of healthy phase.

Multi trace capturing (atleast ten) should be possible with single shot of HV in arc reflection method and users should be able to select the best trace out of all stored traces.

Fault conditioning (prove/burn and A.R.M) and fault pre location techniques (TDR,ARM and ICE) should be integrated to one package /unit for ease of use. Selection ofHV operations should be easy to use to avoid confusion without Human intervention.

Built in arc reflection filter or arc stabilization unit should be an inductive filter circuit, so that the output pulse has minimum attenuation in it.

The unit shall be versatile, capable and supportive to locate fault in a wide variety of power L.V.distribution cable networks through modern, integrated coupling for multiple cable testing and fault locating technologies to reduce the fault locating time. The unit shall be complete in all respect with the necessary items , accessories and test techniques and shall be ideal to ensure its maximum performance to detect faults of conditions for short , medium or long underground distribution cable networks .

2.1 H.V Surge wave tester or Impulse Generator

1. Surge Voltage Range:-
   a) 0-3 KV/4KV continuously adjustable. Voltage range beyond 0-3 KV/4 KV may also be acceptable but one step shall be of range 0- 3KV/4KV.

2. Output Capacity : Minimum 500joules at 3KV/4 KV fullrange. Fault burning facility should be integrated.

3. Current output : Shall have current that corresponds to 500 Joules at any selective voltage output

4. Impulse frequency : 20, 30 imp. /Min

5. Indication : Meter to indicate output KV and overheat LED indication, Precision of KV meter should be <=1.5%

6. Power Supply : 230 V± 10%, 50 HZ with external isolating transformer.

7. Degree of Protection : IP 51

8. Accessories :
   a) 20 meters screened HV cable with clamp (assembled on a drum) – The HV

Cableshall have insulation of at least 6 KV grade and shall have sufficient durable insulation property so as to ensure safety of operator and others who may come in contact with the HV cable when operating at highest operating voltage. The HV cable shall be flexible in nature so that it's insulation property does not detoriate due to bending.

b) 20 meter 10sqmm earthing cable (assembled on a drum).

c) 20 meter mains supply cable(assembled on a drum)

2.2 Pre-location (Micro processor based) :

2.2.1) High Voltage Method:Single impulse method, multiple impulse method (SIM/MIM) and Impulse current method (ICM) for determination of high resistive faults with the use of Time Domain Reflectometer in conjunction with Impulse Generator Set for pre location of LT cable fault.

Specification of the instrument:-

1) Memory :-can store at least 100traces.

2) MeasuringRanges : 0-4KM (min)

3) SamplingRate : 200 Mhz(5 nano -seconds)(min).

4) Resolution :- <=0.5 meter (at v/2 = 80 m/us).

5) Accuracy : -<=0.5%

6) Modes : -TDR, impulse current MIM, SIM,ICM.

7)Type of protection :-IP54.

8) Display :-LCD TFT colour display .

9) Colour Setting :- Automatic .

10) Gain range Setting : - Automatic

11) Sensitivity of Input Divider : -0-20db

12) Pulse width of transmitting pulse : -40ns-10µs

13) The Time Domain Reflectometer shall be used either in stand alone mode or inconjunction with the Impulse Generator Set in SIM/MIM/ICM mode for prelocation of L.T. cable fault.

2.3 Pin pointing:

2.3.1 Acoustic Method:-

Specification of Instrument:-

1) The unit shall be light weight and to be provided in a suitable carrying case to holdall the components and sensitive to detect direction of the faults up to a minimumdistance of 20 feet. The set shall be suitable for pinpointing all the faults those may occur in L.T. system including dead short circuit between phase(s) & earth and open circuit of phase(s) conductor with normal adequate insulation.

2) There shall be back ground interference elimination via selectable filter band.

3) Acoustic Mute Function :-To locate fault in crowded area.

4) Acoustic Frequency Range :-20 Hz to 20KHz.

5) Display indication :-

a) LCD bar-graph displays with back light facility/any other digital display.

b) Indication of signal strength of acoustic and magnetic channels.

c) Internal battery level status.

6) Controls :- Separate controls for acoustic and magnetic signal.

7) Power Supply :- Dry Cell/Rechargeable battery.

8) Accessories :-Ground Microphone, connection leads, special head phone, caringsticks, carrying case.

9) Degree of Protection : IP 54

10) The unit shall have arrangement for receiving the Electromagnetic and audio signals generated from low resistance faults due to application of voltage and propagated thorough surrounding soil/bricks/sand/concrete structure etc. for the purpose of pinpointing of fault.

11) Fault distance shall be displayed when reaching near the fault.

12) Acoustic pin pointing combined with propagation time measurement (withindication of fault distance).

2.4Cable Drum for HV surge wave tester or Impulse Generator

20meter HVcable,earthing cable and power cable each.

2.5Type Test

Type Test Certificates for Degree ofProtection IP 51 for Impulse Generator set and IP54 for other components conducted from third party NABL accrediated laboratory or from equivalent international laboratory conductedwithin last 5(five) years are required.The same Type Tests certificates are to be submitted for EMI and EMC for Impulse Generator set.

3.0 Note:

a) Each bidder shall fill up all the points as noted in the GTP including the model nos. of each components of the cable fault locator and it's accessories they are offering. Each and every components of the cable fault locator and it'saccessories shall be of own make of the bidder.However WBSEDCL may consider placement of order on the dealer on behalf of the said manufacturer

and / or they may be allowed to receive payment on behalf of the company provided that all responsibilities and guarantees as per terms of tender specification and order be under taken by the said manufacturer.

b) During Techno-commercial evaluation each bidder shall demonstrate each offered component of the cable fault locator and it's accessories bypre-locating/ pin pointingofthe entire ranges of LT cable faults those may occur in WBSEDCL system in real field and/or by simulation technique in presence of Testing Engineers of Distribution Testing Department, WBSEDCL. The demonstration shallbe comprehensive and in case it is found that it is not able to pre-locate and pinpoint of all types of faultand in case it is found that functioning of any component for which it is used is not satisfactory, the bidder will not be considered as technically successful bidder. The decision of WBSEDCL, will be final in this regard. For arranging such demonstration, 15(Fifteen) days advance intimation will be issued to the bidders fixing up the date for such demonstration. The bidder will have to report along with those instruments & their complete literatures and competent engineer for such demonstration to the Chief Engineer(Testing), Distribution Testing Department, on that particular day(s). If the bidder fails to be present for such demonstration on that particular day without sufficient reasons, their bid documents will be liable to be cancelled.

c) Each participating bidder shall have to upload the literatures & manuals of each and every components of the cable fault locator.

d) Each bidder shall submit satisfactory performance certificateof the offered set for not less than 2(Two) years from any power utilities, Govt. Departments.If the bidder can submit the Credential of the offered set from Power Utility or Government Departments supplied through Channel partners, those certificates will also be acceptable. In both cases offered set means any set with same model nos.as those of offered ones. However if same model is not available then other model complied with similar specification will also be acceptable.

e) Each and every components of the equipments shall be guaranteed for a period of 05(Five) years from the date of delivery of those equipments.

f) All the equipments supplied against this specification shall be guaranteed for a defect liability period of 60 months from the date of receive at DTD store duly passed acceptance testing at DTD lab after delivery covering the following points:

1)Any engineering error, omission, wrong provision, equipment failure etc. the equipment shall be attended by the bidder at free of cost during defect liability period.

2) For any defect in the kit during defect liability period repairing has to be completed within fifteen days. Otherwise substitute set of same type has to be provided within fifteen days from the date of reporting. It will be handed over back to supplier on repair & receipt of original set.

3) If any defect observed during defect liability period, it is bidder's responsibility to collect kit from site/ consignee to attend the same.

4) On each failure of test set, supplier shall submit detailed report of failure analysis to Distribution Testing Department, WBSEDCL..

g) After placement of P.O. to the successful bidder, the bidder will have to train our Engineers about the operation of entire range of the instrument as well as through physical demonstration at siteupto their full satisfaction.

h)Necessary life time licensed copy of interfacing and other software with test kit should be supplied free of cost with test equipment

GTP FOR LT (1.1 KV Grade) CABLE FAULT LOCATOR& OTHER ACCESSORIES

Sl. No.	Item to be replied	To be filled up by the Bidder
1	Name of the Manufacturer	
2.	Office Address	
3.	Manufacturing Unit Address	
4.	Whether the bidder is the OEM of the tendered items (Yes/No)	
	Whether the bidder has comprehensive service centre along with competent Engineers, if yes, mention the address.	
5	Model Names of the L.T. Cable Fault Locator and their Accessories offered by them(Mentioning Itemwise Model No.)	
	a)Time domain Reflectometer	
	b) Surge wave Tester or Impulse Generator	
	c)Cable fault pinpointing instrument with headphone d sensing rod.	
6.	Whether the Cable Fault Locator Assembly is capable of locating cable Fault for cables up to 1.1 KV Grade cable	
7.	Whether the Cable Fault locator assembly is capable of locating all types of faults including Pinpointing ofPVC/XLPELT Cables	
8.	Whether the Cable Fault locator assembly is capable of locating faults including pinpointing of all types that may arise in cable network as follows: a. Dead Earth Fault between Phase(s) &	

	Earth. b. High resistance Earth Fault between Pahse(s) & Earth c. Dead Phase to Phase Fault d. Resistive Phase to Phase fault e. Open circuit fault in Phase(s) f. Open circuit fault in Phase(s) with both end short circuit to Earth f. Series Resistance faults g. Cable Sheath Faults h. Intermittent Faults between Phase(s) to Earth or Between Phases	
9.	a. Model no. of Surge Generator b. Range of Voltage that can be applied through surge Generator in different steps a. Whether 3 /4 KV can be generated in singlestep b.Maximum Voltage that can be applied in different steps, if existing c. Maximum energy output capacity in Joules at maximum range and at intermediate steps, if existing. d. Whether Fault Burning facility is integrated to the surge Generator e. Whether surge generator may be used for High voltage tests of UG LT cable f. Current output of impulse generator g. Whether the Impulse Generator is suitable for thumping h. Impulse frequency of Surge Generator per Minute i. Input Power Supply with frequency and whether there is any isolating Transformer j. Length of H.T. cable & earth cable associated with surge generator k. Voltage Grade of the H.T. cable associated with surge Generator and type of insulation. l. Whether that HT cable of Surge Generator conforms the relevant specification for Human safety. m. Whether the cable is wound on drum which is easily rotatable. n. Sizes of surge Generator and it's complete assembly o. Supply voltage of the surge generator p. Voltage grade of HV cable insulation	

	q. Whether the surge generator is suitable for application of High Voltage r. Degree of Protection of Surge Generator	
10.	a. Model no. of Time Domain Reflectometer b. Whether the TDR is capable of pre-location of cable fault by SIM, MIM & ICM mode of operation. c. Whether the TDR can be used in stand alone mode or in conjunction with the surge generator d. Memory capacity of TDR(In no. of traces those can be recorded) e.Minimum Length of cable for which the instrument is capable of pre-location of fault f.Sampling rate of TDR g. Method of Colour setting (Automatic/Manual) h. Gain range setting (Automatic/Manual or both) i.Display type j. Accuracy K. Resolution l. Type of Protection m.Sensitivity of Input devider n. Pulse width of Transmitting pulse o. Output impedance (Whether selectable) p. Supply voltage of the Time Domain Reflectometer. q. Degree of Protection	
	k.Whether the instrument can be operated with Rechargeable Battery	
	l. Whether the voltage can be varied continuously	
	m. Whether the menu can be controlled via one button operation	
	n. Whether it has built in arc reflection filter or arc stabilization unit should be an inductive filter circuit, so that the output pulse has minimum attenuation in it	
	Whether the TDR and Surge Generator are provided separately or in a composite box	
11.	Model no. of cable fault Pin pointing set	
	a.Weight and size of the instrument	
	b. Minimum Distance to which the	

	set can detect direction of fault	
	c. Whether the instrument has background interference elimination via selectable filter band	
	d. Whether the instrument has the facility of acoustic mute function to locate fault in crowded area.	
	e. Acoustic frequency range of the instrument	
	f. whether the display is LCD with back light facility	
	g.Whether the instrument has separate indication of acoustic, magnetic & battery status display.	
	h.Whether the instrument has separate control of acoustic & magnetic signals	
	i.Power supply of the instrument(Rechargeable Battery/Dry Cell)	
	j.Whether the instrument displays the distance of fault when reaching near the fault	
12.	Whether agreeable to demonstrate the equipment at the fixed date in WBSEDCL cable network	
13.	Whether agreeable to train WBSEDCL Engineers at their full satisfaction about operation of entire range of instrument and for physical demonstration of the equipment after placement of P.O, if qualified.	
14.	Whether agreeable to guarantee each and every components of the instrumentsfor 5 years.	
15.	Whether submitted satisfactory performance of each and every components of the equipment from any power utility/Govt. department for a period of 3 years.	
16.	Whether Type Test repotsfor IP 54 for Surge Generator, TDR & Pin Pointing unit conducted within last 05(Five) years have been submitted from NABL or equivalent International Laboratory.	

Signature of Company representative with seal