MAHAVITARAN
Maharashtra State Electricity Distribution Co. Ltd.

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SPECIFICATION NO. MSEDCL/MMC/MSC-III/BATTERY SOH ANALYZER /02

DATE: 28.02.12

TECHNICAL SPECIFICATIONS

FOR

BATTERY STATE OF HEALTH ANALYZER

REQUIRED IN

33KV SUB-STATIONS

FOR CHECKING OF BATTERY CONDITION

TECHNICAL SPECIFICATION FOR BATTERY STATE OF HEALTH ANALYZER REQUIRED IN 33 KV SUB-STATIONS FOR CHECKING BATTERY CONDITION

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TECHNICAL SPECIFICATION FOR BATTERY STATE OF HEALTH ANALYZER TO BE USED IN 33KV SUBSTATIONS FOR CHECKING BATTERY CONDITION

1.0 SCOPE:

1.1 This specification covers design, manufacture, testing & supply of Battery state of health (SOH) Analyzer for 33kV substation batteries at various sites in Maharashtra state.

1.2 The material offered shall conform to relevant standard and of high quality and workmanship capable to perform continuous and satisfactory operations in the actual service conditions at site.

2.0 SERVICE CONDITIONS:

The equipment to be supplied against this specification shall be suitable for satisfactory operation under the following tropical conditions.

Sr. No.	Particulars	Specified value
1	Maximum Ambient Temperature (Degree C)	50
2	Minimum Ambient Temperature (Degree C)	3.5
3	Relative Humidity (%)	10 to 100
4	Maximum altitude above mean sea level meter	1000
5	Moderately hot and humid tropical climate conducive to rust and fungus growth	

3.0 STANDARDS:

Unless otherwise specified elsewhere in the specifications the equipment shall confirm to the relevant IEC/IS/IEEE standard with the latest revisions if any at the time of placement of the order. All components used in the manufacture of the equipment shall be precise with high standard of accuracy.

4.0 GENERAL REQUIREMENTS:

4.1 Battery state of health (SOH) analyzer is based on the principle of applying low frequency AC Voltage signal of known frequency & amplitude across the cell/battery terminals and observing the AC current that flow in response to it. This enables the user to measure Voltage, conductance, AC ripple voltage & current, DC voltage of all lead acid battery. AC ripple is one of the major concern in lead acid batteries which in turn leads to premature failure of battery. Battery state of health (SOH) analyzer shall be capable of detecting the depth of AC ripple current/voltage on individual cell/Battery in advance to avoid occurrences of premature failure of battery & shall indicate the cell/Battery condition directly on the display.

4.2 The unit design shall be simple & robust which could be easily handled & maintained & shall withstand abnormal environmental condition like AC ripple, Vibration & harmonics.

4.3 The battery state of health (SOH) analyzer shall be protected for (a) DC over voltage protection. (b) Reverse polarity protection (c) Short circuit protection & AC over/under voltage protection.

4.4 The equipment shall work suitably through internal battery back up by 9.6 V 1600mAH NiMH swappable inbuilt battery. A 220-250 V AC battery adaptor shall be suitable for charging the inbuilt battery. The unit shall be supplied with an additional external battery pack of 9.6 V 1600mAH for continuous testing in remote areas to avoid power drain of inbuilt battery.

4.5 The equipment should have facility to enter details such as location, battery manufacturer, battery model & other required information in the equipment before testing & shall give all the test results such as voltage, conductance with standard deviations & battery condition massage wherever necessary on screen & in memory. These results shall be recorded in the file format so as to transfer the data on PC. The equipment shall display the direct condition of the battery/cell along with the other information.

4.6 The equipment shall have facility to print the data through RS 232 IR printer provided/attached with the equipment.

4.7 The equipment shall be supplied with following required accessories.

1) IR printer (Pocket Card reader one unit)
2) Battery adapter of 220-250V to charge 9.6 V,1600 mAH battery
3) Data Cables for transfer of data
4) Additional Rechargeable Battery (9.6 V,1600 mAH)
5) Test probes one set
6) Multiple Plugs One set
7) Screw driver one piece
8) Operating & instruction manual
9) Instrument handling bag
10) Calibration certificate
11) Other accessories such as printer roll etc.

4.8 The equipment shall be housed in Acid resistant ABS plastic casing of suitable size.

5.0 TECHNICAL SPECIFICATIONS :

The technical specifications of the equipment shall be as follows.

Sr. No.	Parameters	Details
1.	Voltage	1.5 – 20 Volts DC
2.	Conductance	100- 19,999 Siemens
3.	Power Supply	Suitable rechargeable inbuilt battery source preferably 9.6 V 1600mAH NiMH swappable Battery
4.	Accuracy	± 2% across test range
5.	Voltage resolution	5mVDC
6.	Protection	i) AC over/Under voltage protection.
		ii) Reverse polarity protection
		iii) Short Circuit protection
		iv) DC Over voltage protection.
7.	Indication	Automatic indication of healthiness of the cell/ battery on visual & audible mode indicating Good/ Warning/Fail/capacity (in %)
8.	Display	LCD – FSTN,128 x 64 pixels 40 degree viewing angle, contrast ratio, 8 , Green LED backlight
9.	Keypad	Keypad should be suitable for entering required data in the equipment & also for transferring required data from equipment to PC
10.	User Programmable functions	Preset values for over 250 battery types. Low voltage alarm setting Low conductance warning Low conductance Failure Test Mode (Push Button/Auto start)
11.	Data transfer	Infra-red HP protocol, half-duplex IRDA protocol, RS-232 IR printer, Power sure software, Memory card.
12.	Test Data storage	500 string locations of 480 test results stored in memory card.
11.	Calibration	Auto- calibration prior to every test, no future calibration required.
12.	Environmental Operating Range.	0 to +50°C , 95% relative humidity non condensing
13.	Housing Material	Acid resistant ABS plastic
14.	Desired Size	230mm x 102mm x 65mm
15.	Operating Mode	Auto/ Manual Mode

6. TESTS:

6.1 TYPE TESTS

The equipment offered shall have CE marking preferably & shall pass all the required tests of EMC requirements as per IEC61326/EN61326 such as electrostatic discharge immunity test, radiated, Radio Frequency, electromagnetic field immunity test & radiated & conducted emission test as per the relevant standards and shall also pass Vibration Test, shock tests etc as per international standard. Equipment should have been successfully type tested for the tests in line with the relevant standard and technical specification. The bidder shall be required to submit complete set of the type test reports along with the offer.

In case the type tests are conducted earlier than five years, all the type tests as per the relevant standard shall be carried out at NABL approved laboratories in India by the successful bidder in presence of purchaser's representative free of cost before commencement of supply. The undertaking to this effect should be furnished along with the offer without which the offer shall be liable for rejection.

In absence of any standard for the equipment, calibration test on at least one of the equipment from the lot to be supplied, shall be carried out at NABL approved laboratories in India & shall pass the conformity & accuracy requirements as per this specification.

Even if the material has been type tested earlier, the purchaser reserves the right to demand repetition of one or more tests included in the list of type test on requisite number of samples from any of the lots during the tenure of the supply, at purchaser's cost in the presence of purchaser's representatives. For this purpose the bidder shall quote unit rates for carrying out each test included in the list of type tests as per relevant standard and the tender specification. If the material does not withstand the type test, then the material supplied till then will be liable for rejection.

6.2 ROUTINE & ACCEPTANCE TESTS:

The inspecting officer will carry out the routine & acceptance tests on the equipment as specified in the relevant standard with latest amendments and this technical specification.

1) Visual inspection
2) Performance test
3) Calibration test

In absence of any standard, test procedure for carrying out above tests shall be as follows:

6.2.1 VISUAL INSPECTION:

The inspecting officer shall check the equipment along with the accessories & marking as per the relevant clauses of this specification. The equipment shall be checked for proper working.

6.2.2 PERFORMANCE TEST:

The equipment shall be tested on a battery set of known capacity. Capacity of the battery set shall be confirmed by carrying out charge & discharge cycles as per the standards. Reading for capacity of the battery shown by the equipment shall be within ± 5 % of the actual capacity confirmed from charge, discharge cycles carried out on the battery. For this capacity test batteries shall be visually examined for terminal breakage, container cracks & leakage etc. The charged batteries shall be discharged at C10 rate current until the terminal voltage drops to 1.8 V per cell. For this purpose hourly voltage and specific gravity readings shall be recorded till the voltage drops to 1.9 V. Thereafter, readings at 15 minutes interval shall be recorded.

The capacity in ampere-hour shall be obtained by multiplying the discharge current by the total time of discharge in hours and the product so obtained shall be corrected to a temperature of 27^0C by the following formula:

$$\text{Capacity at } 27^0\text{C} = \frac{CT}{1 + 0.0043\ (t-27)}$$

Where CT is the observed capacity at t degree centigrade.

't' is the average electrolyte temperature during discharge period in degree centigrade.

7. TEST CERTIFICATES:

The tenderer shall furnish detailed type test reports of the offered equipment for the tests mentioned above in clause no. 6.1 of this specification. All these Type Tests shall have been carried out at any NABL/Govt. approved laboratories in India. These tests should have been carried out within 5 years prior to the date of opening of this tender.

In addition to above, calibration test on at least one of the equipment shall be carried out on any NABL approved laboratories in India for confirming the accuracy requirements as per this specifications & relevant standards.

The successful tenderer shall take approval/waiver of type tests from C.E. (MMC), M.S.E.D.C.L. Prakashgad, Bandra, Mumbai, prior to commencement of supply wherever applicable.

8. MARKING:

The equipment shall be marked/screen printed with the following information:

i) Name of supplier & address.
ii) Make & Model No.
iii) Equipment Serial No.
iv) Voltage range.
v) 'Property of MSEDCL' mark with order reference.

9. INSPECTION:

The purchaser or his nominee shall have right of free access to the works of the manufacturer & to be present at all reasonable times and shall be given facilities by the manufacturer to inspect the manufacturing process at any stage of manufacture. He shall have the right to reject whole or part of any work or material that does not conform to the terms of the specifications. All the reasonable/complete facilities considered necessary for the inspection by the inspecting authorities shall be supplied by the manufacturer free of cost.

In case any unit tested & inspected in accordance with this specification fail to pass the requirements of the specifications, another two samples shall be selected from the same lot & inspected/ tested in accordance with the specifications. If one of the additional samples fails to pass the test, complete lot shall be rejected.

MSEDCL is not responsible for infringement of patents rights arising due to similarity in design, manufacturing process, designing the equipment with similar components and any other factor not mentioned herein which may cause such a dispute. The entire responsibility to settle any such dispute/matters lies with the manufacturer / supplier.

If the manufacturer is offering patented product or technology, he should give patent number and registration details.

10. TRAINING:

The manufacturer/supplier shall undertake to train Engineers/staff of MSEDCL at various sites/locations under MSEDCL's jurisdiction during the first year of service free of cost.

11. GUARENTEE:

The equipment offered shall be guaranteed for satisfactory performance for a period of 30 months from the date of receipt of complete equipment at site in good condition, or 24 months from the date of satisfactory commissioning, whichever is earlier. In case of failure within this period, the supplier shall make good the faulty equipment at no extra cost to the purchaser. Any damage or defect noticed during the period due to defective material or workmanship shall be replaced by the supplier on free of cost. The supplier will depute their engineer for inspection when called for to any location in MSEDCL & submit a report for necessary modifications/repairs covered under warranty.

In case of repeated failures, necessary changes in design on the units put in service/ in production line are to be made by the manufacturer free of cost. Tests on the equipments, if considered necessary are to be arranged/ conducted by the manufacturer.

12.0 SCHEDULES:

The tenderer shall fill in the following schedule, which is part and parcel of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be liable for rejection.

Schedule 'A' - Guaranteed Technical Particulars
Schedule 'C' - Tenderer's experience

SCHEDULE – A

GUARANTEED TECHNICAL PARTICULARS FOR BATTERY STATE OF HEALTH [SOH] ANALYZER

Sr.No.	Parameter Name	Parameter type
1.	Name of Manufacturer	Text
2.	Equipment detail & model no. etc.	Text
3.	Standard applicable for the equipment	Text
4.	Voltage Range	Text
5.	Conductance Range	Text
6.	Power Supply	Text
7.	Accuracy	Text
8.	Voltage resolution	Text
9.	Protection Provided	Text
10.	Indications Provided	Text
11.	Details of Display provided	Text
12.	Details of Keypad	Text
13.	Printer Details	Text
14.	User Programmable functions Provided	Text
15.	Whether Data transfer facility with RS - 232 port is available	Text
16.	Test Data storage capacity available	Text
17.	Is Auto Calibration facility prior to every test Provided	Text
18.	Environmental Operating Range	Text
19.	Housing Material	Text
20.	Operating Mode (Auto / Manual)	Text
21.	Size of the equipment (L x B x H in mm)	Text
22.	Total weight of the equipment	Text
23.	Whether accessories as specified in clause 4.7 of the specification are provided with the equipment.	Text
24.	Whether type test reports, calibration Test reports as applicable/ for the equipment offered are submitted if so Give details	Text

SEAL & SIGNATURE OF THE TENDERER

SCHEDULE – 'C'

SCHEDULE OF TENDERER'S EXPERIENCE

Tenderer shall furnish here a list of similar orders executed / under execution by him to whom a reference may be made by Purchaser in case consider such a reference necessary.

Sr. No.	Name of Client & Description order.	Value of order along with size & qty.	Period of supply and commissioning	Name & Address to whom reference may be made.
1	2	3	4	5

NAME OF FIRM_____

NAME & SIGNATURE OF TENDERER_____

DESIGNATION_____

DATE_____