MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

THREE PHASE POWER QUALITY ANALYZER

TECHNICAL SPECIFICATION NO.

CE/QC-T/MSC-II/TP PQA,
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1.00 SCOPE

This specification covers the design, engineering, supply and installation of Three Phase Power Quality Analyzer of class A certified for AC balanced / unbalanced loads of HT Consumers. The analyzer should be suitable for connection to 3 phase 4 wire system. Power Quality Analyzer shall monitor, record and analyze Harmonics generated by HT consumers at the MSEDCL interface metering point. The Harmonics and other electrical parameters should be made available at the utility server for further analysis in real time & analysis of harmonics should be as per IEEE 519 standard.

Power Quality Analyzer shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to purchaser, who will interpret the meaning of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble free operation.

2.00 APPLICATION

Use on HT consumer installations for real time harmonic monitoring.

3.00 SERVICE CONDITIONS

Power Quality Analyzer must perform satisfactorily under Non-Air Conditioned environment. Analyzer to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

Environmental Conditions

(a) Maximum ambient temperature	55^0 C
(b) Maximum ambient temperature in shade	50^0 C
(c) Minimum temperature of air in shade	5^0 C
(d) Maximum daily average temperature	40^0 C
(e) Maximum yearly weighted average temperature	32^0 C
(f) Relative Humidity	10 to 95 %
(g) Maximum Annual rainfall	1450 mm
(h) Maximum wind pressure	150 Kg/m^2
(i) Maximum altitude above mean sea level	1000 mtrs
(j) Isoceraunic level	50 days/year

(k) Seismic level (Horizontal acceleration) 0.3 g

(l) Climate: Moderately hot and humid tropical climate conducive to rust and fungus growth.

4.00 APPLICABLE STANDARDS

The Power Quality Analyzer shall conform in all respects including performance and testing thereof to the latest relevant and applicable Indian / International Standards to be read with up to date and latest amendments / revisions thereof:

Purpose	Applicable
IEC 61000-4-1	Electromagnetic compatibility (EMC)-Part-4-1:Testing and measurement techniques-Overview of IEC 61000-4 series
IEC 61000-4-7	Electromagnetic compatibility (EMC)-Part-4-7: Testing and measurement techniques- General guide on harmonics and inter-harmoincs and instrumentation
IEC 61000-4-30	Electromagnetic compatibility (EMC)-Part-4-30: Testing and measurement techniques- Power quality measurements methods
IEC 61010-1	Safety Requirement
En 50160	Voltage Characteristics in Public distribution system

In case of any difference between provisions of these standards, the provisions of this specification shall prevail.

5.00 GENERAL TECHNICAL REQUIREMENTS

1.	Type of installation	Indoor/Outdoor
2.	TYPE	POWER QUALITY ANALYZER FOR THREE PHASE, FOUR WIRE BALANCED / UNBALANCED LOADS OF HT CONSUMERS
3.	FREQUENCY	50 HZ ± 5%
4.	ACCURACY CLASS	CLASS A CERTIFIED
5.	RATED VOLTAGE	0-600 V AC L-N

6.0 DESIGN AND CONSTRUCTION

6.01 The Analyzer shall accurately measure voltage (V), current (A), power factor, active energy (kWh), apparent energy (kVArh), reactive energy

(kVArh lag and kVArh lead separately) along with voltage and current harmonics in the system.

6.02 The analyzer shall use 10A Clamp / Split-Core CT and the combined accuracy of all electrical measurement shall be of accuracy class 0.5.

6.03 The analyzer body shall be type tested for IP51 degree of protection as per IS: 12063 against ingress of dust, moisture & vermin. The type test certificate shall be submitted along with the offer

6.04 The analyzer shall measure True RMS phase to phase as well as phase to neutral voltage with minimum and maximum values.

6.05 The analyzer shall measure True RMS phase to phase as well as phase to neutral current with minimum and maximum values and phase displacement.

6.06 The analyzer shall indicate angle displacement between voltage and current as well as three phase voltage sequence.

6.07 The analyzer shall measure active, reactive and apparent power per each phase and also total values for three phases.

6.08 The analyzer shall measure voltage and current harmonics minimum upto 50^{th} order for each phase expressed as a percentage of fundamental.

6.09 The analyzer shall display waveforms of the measurements of voltage, current, power factor and harmonics.

6.10 The analyzer shall have facility to compute flickers in accordance with IEC-61000-4-15.

6.11 The analyzer shall measure the following:

1.	Apparent power (min / max, total)
2.	Active power and reactive power (min / max, total)
3.	Current (min / max, average)
4.	Voltage (min / max, average)
5.	Frequency (min / max, average)
6.	Total current harmonic distortion THD (I) (per phase)
7.	Total voltage harmonic distortion THD (V) (per phase)
8.	Power factor (min / max, average)
9.	Apparent energy (total)
10.	Active power and reactive energy (total)
11.	Harmonics (voltage, current, power, voltage-current phase difference) minimum up to 50^{th} order
12.	Inter harmonic (voltage/ current): 0.5th to 49.5th order
13.	Inrush current

14.	Dip, Swell, Interruption
15.	Flicker measurement

6.12 The analyzer shall have minimum 5.0 inch color LCD TFT display.

6.13 The analyzer shall have RS-485 Modbus Slave, serial interface for data transfer server.

6.14 One set of three CTs of 0.5 accuracy class shall be supplied with each analyzer.

7.0 GPRS COMMUNICATION

The Harmonic Analyzer shall have provision to transfer the data to a Web server of the MSEDCL using GPRS communication mode.

It should have RTC & on-chip data storage facility of minimum 4GB.

8.0 SOFTWARE

8.01 The analyzer shall have software for data collection, analysis, representation and verification.

8.02 The software shall be in house developed by the Bidder

8.03 The Licensed real time monitoring software will be hosted on MSEDCL server.

8.04 It should be capable to communicate with on field hardware at programmable logging interval of 1 min, 5 min, 15 min etc.

8.05 Software license will be handed over to MSEDCL at the time of handover

8.06 Software should be capable of tracking, monitoring & analysis the various electrical parameters like voltage, current, KW, KVA, Power Factor, KVAR, KWH, KVAH, Voltage & current harmonics

8.07 Software shall have ability to store historical data.

8.08 Software database & server will be provided by MSEDCL

8.09 It should generate the reports in compliance to IEEE 519 standard

8.10 It should generate the customized reports as per MSEDCL requirement

8.11 It should have provision to generate SMS & automatic emailing facility

9.0 MARKINGS

The analyzer shall be marked legibly with the following information:

i. Name or trade mark of manufacturer

ii. Year and month of manufacture

iii. Country of origin

iv. Type/model and serial number

10.0 CALIBRATION CERTIFICATES

The Power Quality Analyzer shall be supplied along with the valid calibration certificate as per relevant standards.

11.0 GUARANTEED TECHNICAL PARTICULARS

The tenderer shall furnish the particulars giving specific required details of meters in schedule `A' attached. The offers without the details in Schedule 'A' stand rejected.

12.0 PACKING:

The analyzer shall be suitably packed in corrugated boxes in order to avoid damage during transit or handling.

13.0 QUALITY CONTROL

The purchaser shall send a team of experienced engineers for assessing the capability of the firm for manufacturing of meters as per this specification. The team should be given all assistance and co-operation for inspection and testing at the bidder's works. 3 tender samples should be kept ready for assessing and testing. The tenderer has to give all facilities for carrying out the testing of these samples

14.0 TRAINING

The successful bidder shall depute their representative to train MSEDCL's Engineers at their works of familiarization of design, application, operation & maintenance of the instrument of purchaser as and when they will be called for at no extra cost.

15.0 ACCESSORIES

i. Power cables

ii. Voltage cables

iii. Carrying case

iv. Standard warranty certificate and installation manual

16.0 GUARANTEE

The instrument shall be guaranteed for a period of 2 years from the date of commissioning or two and half years from the date of receipt whichever is earlier. The instrument found defective within above guarantee period shall be replaced / repaired / rectified by the supplier free of cost, within one month of receipt of intimation. After the replacement / repairs / rectification, the accuracy shall not be

affected. Test certificate and calibration certificate shall invariably be submitted after rectification / repairs.

If defective equipment is not replaced / repaired / rectified within the specified period as above, the Company shall recover an equivalent amount plus 15% supervision charges from any of the bills of the supplier

17.0 SCHEDULES.

The tenderer shall fill in the following schedules, which are part and partial 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 and technical particulars. (As per GTP uploaded on e -tendering site)
Schedule 'C'	Tenderer Experience

The discrepancies if any between the specification and the catalogs and / or literatures submitted as part of the offer by the bidders, the same shall not be considered and representations in this regard shall not be entertained. If it is observed that there are deviations in the offer in Guaranteed Technical Particulars, then, such deviations shall be treated as deviation.

SCHEDULE 'C'

TENDERER'S EXPERIENCE

Tenderer shall furnish here a list of similar orders executed / under execution for supply of Three Phase Power Quality Anayser by them to whom a reference may be made by purchaser in case he consider such a reference necessary.

Sr.no.	Name of client	Order No. & Date	Qty.Ordered	Qty.Supplied

NAME OF FIRM _____

NAME & SIGNATURE OF TENDERER _____

DESIGNATION _____

DATE _____

SCHEDULE – "A"
GUARANTEED AND TECHNICAL PARTICULARS

ITEM NAME	THREE PHASE POWER QUALITY ANALYZER	
SR. NO.	**PARTICULARS**	**GTP VALUES**
(1)	BIDDER NAME & ADDRESS	TEXT
(2)	TYPE / MODEL DETAILS OF EQUIPMENT	TEXT
(3)	OPERATING EXPERIENCE OF THE BIDDER	TEXT
(4)	ANALYZER SHAL MEASURE VOLTAGE CURRENT, POWER FACTOR, TRUE POWER AND APPARENT POWER ALONG WITH VOLTAGE AND CURRENT HARMONICS IN ELECTRICAL SYSTEMS	BOOLEAN
(5)	COMPLIANCE TO ALL APPLICABLE STANDARDS MENTIONED UNDER CLAUSE NO. 4.00	BOOLEAN
(6)	FREQUENCY	TEXT
(7)	ACCURACY OF POWER QUALITY ANALYZER	TEXT
(8)	RATED VOLTAGE	TEXT
(9)	VOLTAGE RANGE	TEXT
(10)	RATED CURRENT	TEXT
(11)	ANALYZER SHALL MEASURE TRUE RMS PHASE TO PHASE AS WELL AS PHASE TO NEUTRAL VOLTAGE WITH MINIMUM AND MAXIMUM VALUES	BOOLEAN
(12)	ANALYZER SHALL MEASURE TRUE RMS PHASE TO PHASE AS WELL AS PHASE TO NEUTRAL CURRENT WITH MINIMUM AND MAXIMUM VALUES AND PHASE DISPLACEMENT	BOOLEAN
(13)	ANALYZER SHALL INDICATE ANGLE DISPLACEMENT BETWEEN VOLTAGE AND	BOOLEAN

	CURRENT AS WELL AS THREE PHASE VOLTAGE SEQUENCE	
(14)	ANALYZER SHALL MEASURE ACTIVE, REACTIVE AND APPARENT POWER PER EACH PHASE AND ALSO TOTAL VALUES FOR THREE PHASES	BOOLEAN
(15)	ANALYZER SHALL MEASURE VOLTAGE AND CURRENT HARMONICS MINIMUM UPTO 50^{TH} ORDER FOR EACH PHASE EXPRESSED AS A PERCENTAGE OF FUNDAMENTAL	BOOLEAN
(16)	ANALYZER SHALL MEASURE ALL QUANTITIES MENTIONED IN CLAUSE NO. 6.11	BOOLEAN
(17)	ANALYZER SHALL MEASURE TOTAL HORMONICS DISTORTION (THD) OF VOLTAGE AND CURRENT	BOOLEAN
(18)	ANALYZER SHALL DISPLAY WAVEFORMS OF THE MEASUREMENTS OGF VOLTAGE, CURRENT, POWER FACTOR AND HARMONICS	BOOLEAN
(19)	ANALYZER SHALL HAVE MINIMUM OF 5.0 INCH COLOR TFT DISPLAY	BOOLEAN
(20)	CALIBRATION CERTIFICATE SUBMITTED ALONG WITH OFFER	BOOLEAN
(21)	CALIBRATION CERTIFICATE NOS. & DATE	TEXT
(22)	SUPPLIER AGREES TO SUPPLY ALL ACCESSORIES AS PER TECHNICAL SPECIFICATION	BOOLEAN
(23)	SUPPLIER AGREES TO DEPUTE THEIR REPRESENTATIVE TO EDUCATE ENGINEERS OF PURCHASER AS AND WHEN THEY WILL BE CALLED FOR AT NO EXTRA COST	BOOLEAN
(24)	GUARANTEE OF POWER QUALITY ANALYZER AS PER CLAUSE NO. 16.0 OF THIS SPECIFICATION	TEXT