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DETAILED SPECIFICATION FOR COMMON METER READING INSTRUMENT (CMRI)

(A). SCOPE AND OBJECTIVE:--

This outlines the basic requirements of Common Meter Reading Instrument as a TWO way communicating interface between various make Static Energy Meters and a Base Computer station for the purpose of exchange of data.

It shall be a Meter Reading Instrument with necessary accessories and software which should be capable of interrogating with various makes of AC static energy meters when loaded with the corresponding meter's specific software called meter reading instrument program with standard/manufacturer specific protocol including DLMS protocol as per IS 15959:2011 with latest amendment.

(B). REFERENCES OF NATIONAL AND INTERNATIONAL STANDARD (LATEST AMMENDMENTS / REVISIONS thereof)

- (1) CBIP Technical Report No:111 Specification for Common Meter Reading Instruments (CMRI)
- (2) IEC 529 Degree of protection provided by enclosures.
- (3) IS 12063:1987 Classification of degrees of protection provided by enclosures of electrical equipment.
- (4) IS 9000:1979 Basic environmental testing procedures for electronic and electrical items.
- (5) IEC 1000 Electromagnetic compatibility.
- (6) IEC 1000-4-2:1995 electrostatic discharge immunity test.
- (7) IEC – 1000-4-3 : 1995 – Radiated, radio – frequency electromagnetic field immunity test, Magnetic immunity test as per IEC 60687/1992 Protection against Electro Magnetic interference
- (8) CISPAR 22: Limits and method of measurement of radio disturbance characteristics of information technology equipment.
- (9) IS 15959:2011 : Data Exchange for Electricity Meter Reading, Tariff and Load Control- Companion Specifications.

(C). GENERAL REQUIREMENTS :--

1. Suitable Hand Held Equipment (CMRI) for Data Retrieval should be offered for retrieval of data stored in the meter for dumping it to BCS and getting analysis and print out subsequently. The necessary software for transfer of data to the storage media and reading it on the standard IBM compatible PC shall also be supplied.
2. The CMRI shall be handy and small in size. CMRI shall be able to withstand repeated drop up to 2 (Two)-meter height on concrete surface without physical damage or loss of data. It shall be immune to impact, vibration and bumping due to transport.
3. Display: - A minimum of 3.5 inch graphical color display with suitable resolution for minimum 15 lines and 40 characters per line of the screen shall be provided. The size of the character shall be easily readable and can be enlarged as per requirement. The

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contrast and intensity control to get a clear display in varying ambient light shall be provided. Preferably LCD Display with backlit facility.

4. Input/Output Port: - The CMRI shall have minimum two Input/Output ports. One shall be serial port RS232 compatible and one shall be USB port used for meter/BCS communication purpose. Communication ports shall be suitable for retrieving data from existing all make of 1 phase and three phase static meters installed in PGVCL. The other port shall be provided to connect peripheral such as bar-code reader, printer etc. if required. Separate port/Pin shall be provided for internal battery charging.
5. Physical Interface: - The CMRI shall be provided with detachable cable(s) for providing connectivity with the optical port of the energy meter and the CMRI. For ease of use it will be preferable to have twin optical head suitable for connection with PACT/IEC1107/ANSIC ports or open Protocol.
6. Suitable cables for communication between Meter and CMRI as well as CMRI and Base Computer shall be provided. The communication shall be RS232. End of cable shall have 9 pin D type connectors/USB connectors as per requirements.
7. For CMRI program preferably window base / DOS Version 3.0 /higher operating system which is suitable for different BCS windows operating system shall be used.
8. The CMRI shall have adequate Memory to store at least 500 nos. of meters full data including billing data, load survey data in of three electrical parameters (KW, KVA and KVAR), tamper data etc. at a time.
9. A Real Time Clock shall be provided in CMRI and shall have continuous battery backup. It should not reset when battery is discharged or removed. The clock shall have minimum 30 years calendar. The time drift of Real Time clock considering all influencing quantities shall not exceed 3 minute per year.
10. The CMRI shall be powered with rechargeable battery housed in CMRI enclosure. The average life of charged battery shall be at least 10 hours of continuous use.
11. The CMRI shall be a single instrument suitable to be carried in hand from one meter installation to the next in-order to down load/up load data from/to meters manufactured by different/various meter manufacturers with adequate data Security and facility of fraud prevention but without interfering/disturbing the working of any particular meter's system.
12. Data collected in CMRI shall be secure permanently even when battery is discharged or removed.

(D). **OTHER REQUIREMENTS :-**

1. Size: - Common CMRI shall be handy and small in size for ease of carrying. The maximum dimension shall not exceed 250 x 100 x 60 mm (LxWxH). However the display part could be wider.
2. Weight: - Weight of the common CMRI including the weight of battery shall not exceed 1.0 Kg.

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3. Enclosure: - The casing shall be of electrical insulating material of high stability and mechanical strength. The degree of protection shall be **Level (1)IP 54 Level (2)IP 54 depending on requirement as per IEC 529 / IS 12063. The CMRI enclosure shall be Solvent resistant and same shall be provided with a suitable holding strap.**
4. CMRI shall be able to withstand harsh field environment without physical damage or loss of data. The tests for this requirement shall be complied as given under CI. No: 5.0 of CBIP Technical Report No: 111
5. Display:-The display of CMRI shall have following minimum features.
 - a. Readability shall be ensured under any varying ambient light condition through very efficient LCD **or LED** display with backlit facility..
 - b. CMRI shall also be provided with Graphic capability having screen of equivalent pixels handled by conventional PC monitor.
 - c. The CMRI shall be able to provide power supply for optical sensor used for meter reading application.
6. Climatic requirement: - As per CI. No: 4.1.8 of CBIP Technical Report No: 111.
7. CMRI should have user friendly key board with soft keys for alpha-numeric and symbolic keys. For ON-OFF operation of CMRI, red marking switch shall be provided. Also one alternating arrangement for ON-OFF operation to be provided from key board in case of failure of main ON-OFF switch.
8. Interface between Meter and CMRI: - This interface consists of two parts.
 - a. Optical cable of the length of Minimum 1 meter having optical sensor on one end and suitable male connector on other end, to be provided by the supplier for collecting data from meter to CMRI. Optical sensor shall be suitable to collect data from all make of 1 phase and three phase static meters with different protocols installed in PGVCL. The configuration of connector shall be as described under CBIP Report – 111.
 - b. CMRI should able to retrieve data from RS232/ RS485 port of meters. Suitable cable shall be provided by the supplier.
 - c. Another suitable cable of the length of minimum 1.5 meter having compatible connectors to be provided by the supplier to dump data to Base Computer system for view and analysis of the data. Male & female connectors shall be as per Appendix – “A” and “B” of CBIP Tech Report No: 111.
 - d. Both above cables shall be made of flexible material and shielded and the two ends of both cables shall be stress relieved.
9. Interface between CMRI and Base Computer: - Suitable cable for communication between CMRI and Base Computer station shall be provided. This communication shall be serial RS232.
10. Operating system:- For the use of different make meter’s CMRI program in One CMRI, the DOS version 3.0 or higher operating system shall be used. The facility to upgrade the BIOS/OS by a CMRI supplier shall be available without exposing the hardware of CMRI. The additional program necessary to transfer application program with serial ports shall be provided.

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11. Memory: --The CMRI shall have minimum memory capacity of 512 MB Static RAM/NAND Flash with battery backup and upgradeable. The BIOS/OS shall be on FLASH/EEPROM memory.
12. Communication: -- The CMRI shall be required to communicate in following different modes.
 - (a) Downloading/Uploading data from/to the meter
 - (b) Uploading/Downloading data to/from the base computer station.
 - (c) CMRI shall have flexible Baud rate from **300 Baud to 38400 Baud** to meet with the above communication needs.
13. The CMRI shall have the facility to get its time set from the base computer station after due authentication through protected Password.
14. Power Supply: - The CMRI shall have following features for its power requirements.
 - (i) The CMRI shall be provided by rechargeable battery housed in its enclosure.
 - (ii) The average capacity of a charged battery shall be sufficient to communicate continuously 10 hours with the meters and base computer station or while communicating through optical interface of Meters
 - (iii) There shall be a provision to charge the CMRI battery without being removed it from CMRI. A suitable battery charger for automatic charging of CMRI battery shall be provided. There shall be provision for auto cutoff of charging when battery is fully charged. BAT charging status/full charge indication should be provided
 - (iv) Provision of Auto Power Save shall also be provided so that in case of NO activity, the instrument shall go in to Power Save Mode for saving of power. Battery charging shall be last more than one month, even when CMRI is not in use.
 - (v) The battery used for data retention in Static RAM shall have a minimum of Five years backup capacity.
 - (vi) The CMRI shall have a battery low indication and automatic cutoff to avoid battery drain.
15. Communication Protocol and Software:--

CMRI Protocol: - This may be as per offer software :-

 - (I) CMRI must be embedded DOS 3.0 or higher operating system.
 - (II) Necessary software for loading application program via a serial port for uploading and down loading between CMRI and base computer station shall be provided.
 - (III) CMRI shall have capability to download data for all types of 1 phase and three phase static meters with different non-standard/standard protocols supplied by different manufacturers and installed in PGVCL.
16. There shall be provision to view list of all meter data file with date stored in CMRI.
17. There should display separate indication for successful OR unsuccessful data downloading in CMRI from meter.
18. There should be provision to know the numbers of meter data downloaded in CMRI. Count should increase after successful data download. Remaining available memory space is also to shown.

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19. There shall be provision for deleting one OR multiple OR all meter data after confirmation.
20. Guarantee : CMRI and its all accessory including Battery shall be guaranteed for five years from date of supply. Any defective parts/ whole CMRI shall be repaired/replaced within 15 days after reporting of defect to the supplier. Also, supplier has to provide minimum five year service support after expiry of the guarantee period. Company address, Phone No. & e-mail address is to be mentioned on each CMRIs for communication to convey defect/problem to the supplier.
21. Literature for easy understanding of functionality of CMRI, down loading of meter data, uploading of software, deleting of data etc. to be provided with each CMRI. Supplier has also provide training for use of CMRI at minimum three different offices/training centers of PGVCL free of cost as and when PGVCL desire.
22. Type Tests: -- All type test certificates for the following tests as prescribed under CBIP Tech Report No: 111, conducted at any Govt. Testing House must be submitted along with the Technical Offer for supply of meters.

Sr	Name of Test	No as per CBIP Tech Report No:111
1	Free Fall Test	5.1.1
2	Shock Test	5.1.2
3	Vibration Test	5.1.3
4	Tests of protection against penetration of dust and water	5.2.1
5	Dry Heat Test	5.2.2
6	Cold Test	5.2.3
7	Damp Heat Cyclic Test	5.2.4
	Test for Electromagnetic Compatibility (EMC)	
8	Test of Immunity to Electrostatic Discharge	5.3.1
9	Test of Immunity to Electromagnetic HF Fields	5.3.2
10	Radio Interference Measurement	5.3.3

- (23) Types of Optical Ports: -- Since different meter manufacturers use different type of optical port, the scope is left to discretion of supplier subject to compliance to all above requirements.
- (24) Sample verification of CMRI shall be carried out by PGVCL for all above functionalities. If sample is found fail to comply PGVCL technical specifications, the offer of the bidder shall not be considered.

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