TECHNICAL SPECIFICATIONS

FOR

THREE PHASE ENERGY METER
Technical Specifications for Three Phase Energy Meter

The equipment covered by these broad specifications shall conform to the requirements stated in latest editions of relevant Indian/IEC Standards and Regulations.

2.0 STANDARDS APPLICABLE:

Unless specified elsewhere in this specification, the performance & testing of the meters should conform to the following Indian/International standards, to be read with up to date and latest amendments/revisions along with additional requirements at Annexure-I.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Reference Detail</th>
<th>Reference Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IS 13779 (1999)</td>
<td>A.C. Static Watt hour meter class 1.0 and 2.0</td>
</tr>
<tr>
<td>4</td>
<td>IS 9000</td>
<td>Basic Environmental testing procedure for electrical and electronic items.</td>
</tr>
<tr>
<td>6</td>
<td>IS11000 (1984)</td>
<td>Fire hazard testing</td>
</tr>
<tr>
<td>8</td>
<td>IEC 62053-21 (2003)</td>
<td>A.C.Static Watt hour meter for active energy Class 1.0 and 2.0</td>
</tr>
<tr>
<td>10</td>
<td>IEC 60068</td>
<td>Environmental testing</td>
</tr>
</tbody>
</table>

2.0 GENERAL TECHNICAL REQUIREMENTS:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Standard Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of the meter</td>
<td>Three phase four wire, whole current meter, direct reading type</td>
</tr>
<tr>
<td>2</td>
<td>Accuracy Class</td>
<td>1.0</td>
</tr>
<tr>
<td>3</td>
<td>Basic Current (Ib) &amp; rated max. current (Imax)</td>
<td>Ib =20 Amp, Imax= 100 Amp</td>
</tr>
<tr>
<td>4</td>
<td>Operating Voltage</td>
<td>Voltage +20 % to -40 % of Vref. However the meter should withstand the maximum system voltage</td>
</tr>
<tr>
<td>5</td>
<td>Operating Frequency</td>
<td>F= 50 Hz ± 5 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Power consumption per phase</td>
<td>As per IS</td>
</tr>
<tr>
<td>7</td>
<td>Starting Current</td>
<td>0.2 % of $I_b$</td>
</tr>
<tr>
<td>8</td>
<td>Short time over current</td>
<td>3000 A for 0.01 sec</td>
</tr>
<tr>
<td>9</td>
<td>Influence of heating</td>
<td>External surface of the meter shall not exceed 20 K at 45° C ambient temperature</td>
</tr>
<tr>
<td>10</td>
<td>Rated impulse withstand voltage</td>
<td>8 KV</td>
</tr>
<tr>
<td>11</td>
<td>AC withstand voltage for 1 minute</td>
<td>4 KV</td>
</tr>
<tr>
<td>12</td>
<td>Insulation resistance</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>Between Frame &amp; voltage &amp; current Circuit</td>
<td>5 M Ohm</td>
</tr>
<tr>
<td>b</td>
<td>Between each current Circuit &amp; other circuit</td>
<td>50 M Ohm</td>
</tr>
<tr>
<td>13</td>
<td>Mechanical requirement</td>
<td>As per Clause of 12.3 of IS 13779</td>
</tr>
<tr>
<td>14</td>
<td>Resistance to heat &amp; fire</td>
<td>Shall not be ignited by thermal overload &amp; material shall be fire retardant</td>
</tr>
<tr>
<td>15</td>
<td>Protection against penetration of dust &amp; water</td>
<td>Degree of protection IP: 51 as per IS 12063 w/o suction in meter</td>
</tr>
<tr>
<td>16</td>
<td>Resistance against climatic influence</td>
<td>Clause 12.6 of IS: 13779</td>
</tr>
<tr>
<td>17</td>
<td>Electromagnetic compatibility</td>
<td>Requirement shall be as per CBIP technical report no. 325</td>
</tr>
<tr>
<td>18</td>
<td>Power factor range</td>
<td>Zero Lag - Unity- zero Lead</td>
</tr>
<tr>
<td>19</td>
<td>Energy measurement</td>
<td>Fundamental energy + Energy due to harmonics</td>
</tr>
<tr>
<td>20</td>
<td>Test Output Device</td>
<td>Flashing LED visible from the front</td>
</tr>
<tr>
<td>21</td>
<td>Billing Data</td>
<td>a) Meter serial number, Date and time, KWh, KVAh, Power factor, MD in KW &amp; KVA, History of KWh, KVAh &amp; MD of both for last 6 months along with TOD readings. KVAh is computed based on KVARh and KWh. If Power factor is 1 or leading then, KVAh shall be treated equal to KWH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) All these data shall be accessible for reading, recording, and spot billing by downloading through optical port on CMRI or Laptop computers at site.</td>
</tr>
</tbody>
</table>
| 22 | MD registration | a) Meter shall store MD in every 30 minutes period along with date & time. At the end of every 30 minutes new MD shall be previous MD and store whichever is higher and the same shall be displayed.  
(b) it should be possible to reset MD automatically on the defined date. |
<p>| 23 | Auto reset of MD | The MD resetting shall be automatic at the 1st of the month i.e. 0000 hours of 1st of the month. Manual MD reset button shall not be available. Provision shall be made to change MD reset date through MRI even after installation of meter on site. |
| 24 | TOD metering | Meter shall be capable doing TOD metering for KWH, KVAH &amp; MD in KW &amp; KVA with 6 time zones wherever applicable. It shall be possible to reconfigure the meters for TOD Tariff, billing date, RTC etc. through proper authentication process via communication port. |
| 25 | Climatic condition | The meter should function satisfactorily with temperature ranging from 0-60°C and humidity upto 95% |
| 26 | Calibration | Meter shall be calibrated at factory and modification in calibration shall not be possible at site by any means. Certified by manufacture |
| 27 | Meter Sealing | As per IS 13779 &amp; CEA metering regulation 2006 |
| 28 | Memory | Non-volatile memory independent of battery backup, memory should be retained upto 10 year in case of power failure. |
| 29 | Battery | In case battery removal or total discharge same should not affect the working &amp; memory of the meter |
| 30 | Load Survey | 60 Days Load Survey for KW, KVA, Voltage, Current of each phase, with 30 minutes integration period |
| 31 | Connection diagram | Shall be provided on terminal cover |
| 32 | Initial Startup of meter | Within 5 sec after ref voltage is applied to the meter terminal |
| 33 (a) | internal dia of the terminal hole | As per CBIP |
| 33 (b) | Depth of the terminal hole | 25 mm |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Clearance between adjacent terminal</td>
<td>10 mm</td>
</tr>
<tr>
<td>35</td>
<td>Display</td>
<td>LCD (6 Digit ), Height 10 mmX6 mm, pin type, viewing angle min 160 degrees</td>
</tr>
<tr>
<td>36</td>
<td>Security feature</td>
<td>Programmable facility to restrict the access to the information recorded at different security level such as read communication, communication write etc.</td>
</tr>
<tr>
<td>37</td>
<td>Software/ Communication Compatibility/ Communication port</td>
<td>Optical port with RS 232 compatible to transfer the data locally through CMRI &amp; remote through PSTN / Optical fiber / GSM / CDMA / RF / any other technology to the main computer. The Supplier shall supply Software required for CMRI (Atleast for Analogic &amp; SANDS make) &amp; for the connectivity to AMR modules. The software should be compatible to Microsoft Windows systems. The software should have polling feature with optional selection of parameters to be downloaded for AMR application. The Supplier shall provide meter reading protocols.</td>
</tr>
</tbody>
</table>
## Annexure-I

**Additional Requirement for Three Phase Whole Current Energy Meter**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Feature in addition to BIS</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Functional</td>
<td>0.2 % of $I_b$</td>
</tr>
<tr>
<td></td>
<td>• Starting current</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Measuring Parameters</td>
<td>Real time &amp; Date</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Cumulative kWh</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Other energy kVAh (Lag), kVARh (lead) &amp; kVARh (lag)</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Current Maximum demand in kW &amp; KVA</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Inst V, I &amp; Power Factor</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Maximum Demand</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Six month energy history</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Load Survey</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Time of Day tariff</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>On/ Off hours</td>
</tr>
<tr>
<td>3</td>
<td>Anti Tamper And Anti-Fraud Features</td>
<td>Reverse Phase Energy</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Phase sequence reversal</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Detection of missing potential</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Current Coil shorting</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Welded meter body</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Tamper History</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Energy computation during missing potential</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Power On/Off</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Abnormal Power Off</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Snap-on parameters</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Protection against HV spark/ ESD</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Low voltage event</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Low Power factor recording</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Top cover open</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Write Transactions</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Neutral Disturbance</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Only two Phase (One phase and one neutral missing)</td>
</tr>
<tr>
<td>4</td>
<td>Additional Features(Optional)</td>
<td>Mid night data</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>•</td>
<td>Net Metering</td>
</tr>
</tbody>
</table>