

## Technical Bid

Sr. No.	Material	Qty.	Unit
1	HIGH PRECISION 0.2S CLASS ABT AND HT (TOD) TARIFF AND SKADA COMPLIANT TRUE IMPORT/EXPORT 4 QUADRANT SUMMATION ENERGY METERING SYSTEM WITH TWO NUMBER FEEDER MODULES HAVING FEEDER SUMMATION FEATURES ALONG WITH ESSENTIAL ACCESSORIE SOFTWARE CONFIRMING TO FOLLOWING High Precision 0.2S Class ABT & HT (TOD) tariff Compliant microprocessor/ micro controller based true import / export 4 quadrant integrated summation Energy Metering System with availability of phase wise voltage & current profile having two numbers feeder modules, both the modules completely wired & ready for use condition, having feeder summation features suitable for existing TWO numbers 100 KV HWP (Thal) feeders (along with Accessories / Software essential for giving desired performance), with minimum three number decimal digits for MD display, having remote communication facility through additional optically isolated RS 232 front communication ports confirming to IS-14697, IEC 60687, other relevant Indian & international standards, this system should have SKADA compatibility & all the provisions to integrate completely with existing MSEDCL metering / energy audit network & their existing data acquisition systems / software etc. to give desired performance.	2	ST
2	CONTROL METERING PANEL	2	NO
3	PT CHANGEOVER SWITCH	2	NO
4	GSM MODEM	4	NO
5	INSTALLATION AND COMMISSIONING	2	NO
	<b>Note:</b> 1. Party Shall submit dully filled, sealed & signed copy of attached specifications sheet/scope. 2. Party shall submit sealed & signed copy of HSE requirement for acceptance.		
	<b>Deviation If any (Mentioned anywhere else is not consider):</b>		
	<b>Company Seal, Sign and Stamped</b>		

**THECNICAL SPECIFICATIONS: PART – I**

**FOR SUPPLY, ERECTION, TESTING AND COMMISSIONING OF 0.2S ACCURACY CLASS ABT & HT (TOD) TARIFF COMPLIANT TRI-VECTOR , APEX SUMMATOR METER SUITABLE FOR CAPTIVE POWER PLANTS (CPP), RECIPIENT USERS, INDEPENDENT POWER PRODUCERS (IPP) / GENERATORS AND INTER UTILITY ENERGY EXCHANGE FOR RCF (THAL).**

**(Note: Bidder shall write COMPLIED in offer column along with data wherever required, else shall indicate deviation.)**

<b>SR. NO.</b>	<b>RCF REQUIREMENT</b>	<b>OFFER (&amp; DATA wherever required)</b>
<b>1.00</b>	<b>SCOPE :</b>	
<b>1.01</b>	<p>This specification covers design, manufacture, testing at manufacturer's works, packing, delivery, installation &amp; commissioning of Apex Summator , ABT type, 4 Quadrant, Import -Export, High Precision 0.2S Class ABT &amp; HT (TOD) tariff Compliant microprocessor / micro controller based Tri-vector Meter (along with Accessories / Software essential for giving desired performance) having remote communication facility through RS485 / RS232 and optically isolated RS 232 front communication ports confirming to IS-14697, IEC 60687, other relevant Indian &amp; international standards, this document and all the technical particulars agreed upon by the bidder during tender evaluation stage. Offered tri-vector meter should have all the provisions to integrate completely with existing MSEDCL / MSETCL metering / energy audit network &amp; their existing data acquisition systems / software etc. to give desired performance.</p> <p>The offered Apex Summator meter shall be suitable for TWO feeders and shall be of approved makes as per MSEDCL/MSETCL.</p> <p>The supplied APEX Summator meter shall be suitable for the KVAH based billing system being proposed by MSEDCL. The Meter shall comply all the technical specifications &amp; requirements of MSEDCL.</p>	
<b>1.02</b>	<p>The offered meter should be suitable for frequency linked ABT (Availability Based Tariff) compliant HT consumer (TOD) tariff metering services. The meter will be installed at 100 KV switchyard of M/s Maharashtra State Electricity Distribution Company Ltd. Located at Thal in RCF (Thal) Complex.</p>	
<b>1.03</b>	<p>It is not the intent to specify completely herein all details of the design and construction of equipments. However, the equipment shall confirm in all respects to high standards of engineering, design, and workmanship mentioned in Clause-8.0 and shall be capable of performing in continuous commercial operation up to the supplier's guarantee in a manner acceptable to RCF, Thal (purchaser) as well as M/s MSEDCL / MSETCL, who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which, in their judgment, is not in accordance therewith.</p>	
<b>1.04</b>	<p>The equipments offered shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of supplier's supply, irrespective of whether those are specifically brought out in this specification and / or in the commercial order or not.</p>	
<b>1.05</b>	<p>However, in their own interest, the bidders are advised to undertake a survey of MSEDCL / MSETCL (Thal) Sub-station, Taluka: Alibag where meters are required to be provided to study &amp; understand all the technical / administrative / procedural requirements necessary for execution of this order to be acceptable to M/s MSEDCL / MSETCL.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
1.06	<p>It will be suppliers' responsibility to get the materials accepted by M/s MSEDCL / MSETCL, for which the successful bidder has to coordinate with the Superintending Engineer (PC), MSEDCL / MSETCL, Pen circle-Antore Road, Pen, District-Raigad (Maharashtra). However, RCF, Thal shall provide all necessary assistance in this regard as explained under Clause No. 9.03 of this Technical specification part - I sheet.</p> <p>Any other item not included but required for satisfactory performance of the equipments supplied shall be in the bidders scope of supply.</p>	
2.0		
	Scope also includes rerouting CT, PT, Power supply cables required for installation of summation meter, cable glanding and termination. Earthing of panel is in bidders scope.	
	Scope excludes supply of CT PT cable, Power supply cables.	
3.00	<b>SCHEDULE OF REQUIREMENT :</b>	
3.01	<p>The requirement of Tri-vector Meters along with necessary Accessories / Software etc. to be supplied and their delivery period is within 6 weeks from the date of LOI / Purchase Order which ever is earlier. Vender has to provide requisite accessories / components / software etc. to ensure that the equipment offered should have all the provisions to integrate completely with existing MSEDCL / MSETCL metering / energy audit network &amp; their existing data acquisition systems / software etc. to give desired performance.</p>	
3.02	<p>These meter's data shall be made available every 5 seconds to the local P.C. available at MSEDCL / MSETCL (Thal) switchyard or other places. Data from all such meters is also to be made available on-line at Central Monitoring station i.e. MSETCL, Kalwa.</p> <p>However, in their own interest, the bidders are advised to undertake a survey of MSEDCL / MSETCL (Thal) Sub-station where meters are required to be provided to study &amp; understand all the technical / administrative / procedural requirements necessary for execution of this order to be acceptable to M/s MSEDCL / MSETCL.</p>	
3.03	<p>To meet above requirements along with others, following also shall be provided:</p> <ul style="list-style-type: none"> <li>(i) Adequate no. of communication ports to meet the specified requirements</li> <li>(ii) Suitable Test Terminal blocks wherever required.</li> <li>(iii) Customization of Online Monitoring and Data Analysis Software.</li> <li>(iv) Operational and maintenance manuals including drawings</li> <li>(v) List of spares and consumables</li> <li>(vi) Continued technical support</li> </ul>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
4.00	<p><b>SERVICE CONDITIONS :</b>  The meters to be supplied against this specification shall be required to operate satisfactorily and continuously under the following tropical conditions. Tri-vector Meters shall be capable of maintaining required accuracy under hot, tropical and dusty climate conducive to rust &amp; fungus growth.</p> <ul style="list-style-type: none"> <li>(i) Maximum Ambient Air Temperature : 50° C</li> <li>(ii) Maximum Ambient Air Temperature in closed Box : 55 to 60° C</li> <li>(iii) Minimum Ambient Air Temperature : 0° C</li> <li>(iv) Average Daily Ambient Air Temperature : 40° C</li> <li>(v) Maximum Relative Humidity : 10% to 100%</li> <li>(vi) Max. Altitude above mean sea level (m) : 1000</li> <li>(vii) Average Annual Rainfall (mm) : 2000</li> <li>(viii) Seismic level : 0.3g</li> </ul>	
5.00	<b>STANDARDS :</b>	
5.01	<p>The rating, performance and testing of the Tri-vector Meters along with Accessories / Software shall conform in all respects to the latest version available of the relevant Indian/International Standard Specifications incorporating latest amendments thereto unless otherwise specifically mentioned in this specification, including</p> <ul style="list-style-type: none"> <li>(i) IS: 14697 (1999): AC static transformer operated Watt-hour and VAR-hour meters for class 0.2S.</li> <li>(ii) IEC 60687: Alternating Current Static watt-hour meters for measurement of active energy, class 0.2.</li> <li>(iii) IEC 1268: Alternating current static VAR hour meters for reactive energy.</li> <li>(iv) IEC 60297: Dimensions of mechanical structure of 482.6 mm (19”) series – panels &amp; racks.</li> <li>(v) IS: 9000: Basic environmental testing procedures for electronic &amp; electrical items.</li> <li>(vi) CBIP technical report No. 88: Specification for AC static electrical energy meters to be referred for immunity against AC &amp; DC magnetic induction of external origin.</li> </ul>	
5.02	The meters shall have Type Test certificates (as per IS 14697/IEC 687) from a laboratory approved by NABL such as ERDA, CPRI, ETDC, ERTL etc.	
5.03	<p>Equipment conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above also is acceptable. In case that case salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule.</p> <p>Copy of such standards with authentic English Translations, shall be furnished along with the offer. In case of conflict the order of precedence shall be (i) IS, (ii) IEC, (iii) other standards. In case of any difference between provisions of these standards and provisions of this specification shall prevail.</p>	
6.00	<p><b>GUARANTEED TECHNICAL PARAMETERS :</b>  The Tri-vector Meters along with Accessories / Software etc. covered in this specification shall confirm to the Guaranteed technical parameters listed in <b>Annexure-1</b> which has to be filled and submitted along with the offer.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.00	<b>GENERAL TECHNICAL REQUIREMENTS FOR THE METER &amp; ITS ACCESSORIES / SOFTWARES. :</b>	
7.01	<p><b>General Technical Parameters of the Meter</b></p> <ul style="list-style-type: none"> <li>(i) Configuration: The meters shall be of 3 Phase 4 Wire type suitable for connection to 3 Phase 4 Wire system.</li> <li>(ii) Accuracy : The meter should be of class 0.2S or better accuracy for measurement of Active / Reactive &amp; Apparent energy as per relevant standard without any drift with time.</li> <li>(iii) Rated CT Secondary Current : 1 Amps (CTR – 200/1A)</li> <li>(iv) Rated PT Secondary Voltage : (PTR – 100KV/110V) <ul style="list-style-type: none"> <li>(a) 110 / <math>\sqrt{3}</math> Volts for 3 Phase 4 Wire System</li> <li>(b) 110 Volts for 3Phase 3 Wire System</li> </ul> </li> <li>(v) Auxiliary AC Supply : Single phase 230 Volts <math>\pm</math> 15%</li> <li>(vi) Auxiliary DC Supply : 110 Volts <math>\pm</math> 15%</li> <li>(vii) System Frequency : 50 Hz, <math>\pm</math> 5%</li> <li>(viii) The meter should be suitable for working with above supply variations as well as IS specified variations in CT / PT supply without damage and without degradation of its metrological characteristics.</li> <li>(ix) The meter should continue to function properly even after failure of one or two phases of PT supply.</li> <li>(x) In case of complete supply failure the computation of average frequency shall be done for the period during which PT supply was available in the 15-minute block.</li> </ul>	
7.02	<p><b>General Technical Requirements of the Meter</b></p> <ul style="list-style-type: none"> <li>(i) The meters will be suitable for being connected directly through its terminal block to <ul style="list-style-type: none"> <li>(1) Single-phase AC auxiliary power supply or DC supply.</li> <li>(2) Voltage Transformers (VTs) having a rated secondary line- to- line voltage of 110 V, and</li> </ul> </li> <li>(ii) Current Transformers (CTs) having a rated secondary current of 1A</li> <li>(iii) The meters shall be capable of being powered up with standard 230 Volt AC auxiliary supply and 110 Volt DC supply of the substation so that metering core of PT is not loaded and in case of shut down on feeder/breaker, meters can be interrogated locally or remotely. In case of failure of any one of the supplies, the system shall automatically switch over to other supply source to power up the metering system.</li> <li>(iv) The meter should be capable to withstand surges and voltage spikes by providing necessary isolation and/or suppression system built-in the meter.</li> <li>(v) Tri-vector Meters shall be suitable for measurement of energy under balanced and unbalanced load over a power factor range from zero (lagging) through unity to zero (leading).</li> <li>(vi) The meter should start accurately registering energy at 0.1% of <math>I_b</math> up to 120% of <math>I_b</math>.</li> <li>(vii) The burden on the PT circuit and CT circuit shall preferably be in the range of 1 VA per phase.</li> </ul>	

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7.02	<p>(viii) Meters should be draw out type modular units, rack mounted system (having provision for mounting at least two independent metering modules) with facility of automatic CT shorting. These metering racks shall be installed in suitable metering cubicles.</p> <p>(ix) Meters should have facility for dynamic compensation of phase &amp; ratio errors of CT / PTs through password protected software configuration.</p>	
7.03	<p><b>General Mechanical Requirements</b></p> <p>(i) The energy meters shall be suitable for indoor installation confirming to IP- 51, connected with the secondary side of outdoor current and voltage transformer.</p> <p>(ii) The meters shall be Panel-mounting type.</p> <p>(iii) All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure reliability, longer life and sustained accuracy.</p> <p>(iv) The meter should be compact and reliable in design, rugged for operating in polluted, dusty non-air-conditioned areas. Tri-vector Meters shall also be capable of proper functioning in an environment where switching take place in the EHV/HV system.</p> <p>(v) All parts, which are subject to corrosion under normal working conditions, shall be protected effectively.</p> <p>(vi) All insulating material used in the construction of the meter shall be non hygroscopic, non-aging and of tested quality.</p> <p>(vii) The meter and its casing and components shall ensure reasonable safety against the spread of fire. They should not be ignited by thermal overload of live parts in contact with them.</p> <p>(viii) Tri-vector Meters shall be designed and constructed in such a way as to avoid introducing any danger in use and under normal conditions so as to ensure specially</p> <ol style="list-style-type: none"> <li>(1) Personnel safety against electric shock</li> <li>(2) Personnel safety against effects of excessive temperature.</li> <li>(3) Protection against spread of fire</li> <li>(4) Protection against penetration of solid objects, dust and water.</li> </ol> <p>(ix) Temperature sensors / temperature indicating stickers should be provided in physical form for sensing of highest temperature of the meter.</p> <p>(x) The bidder shall furnish detailed dimensional drawings of the meter and its mounting arrangement along with the offer.</p>	
7.04	<p><b>Metering Components</b></p> <p>Tri-vector Meter should be manufactured using SMT (Surface Mount Technology) components and by deploying automatic SMT pick and place machine and re-flow solder process. Further, the bidder should own or have assured access (through hire, lease or sub-contract) of above facilities. Quality should be ensured at the following stages:</p> <p>(i) At PCB manufacturing stage, each board shall be subjected to computerized bare board testing.</p> <p>(ii) Prior to final testing and calibration, all meters shall be subjected to aging test (i.e. meters be kept in chambers for at least 24 hours at 50 Deg. C (+/- 5 Deg C) temperature and atmospheric humidity) to eliminate infant mortality.</p>	

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7.04	<p>(iii) The calibration of meters must be carried out in-house only using fully computerized set up.</p> <p>(iv) Reference standard to be used for calibration shall be of 0.02 Class or better.</p> <p>(v) The bidder shall use ASICs, ICs, micro controllers / microprocessors, PCBs and other discrete components manufactured by reputed firms from across the world.</p>	
7.05	<p><b>Terminal Block</b></p> <p>(i) The terminal blocks shall be of high grade non-hygroscopic, low tracking property fire resistant, reinforced high grade engineering plastic conforming to relevant clauses of IS/IEC.</p> <p>(ii) The terminals shall be marked properly on the terminal block for giving external connections.</p> <p>(iii) The meter shall have nickel-plated brass terminals for proper termination.</p> <p>(iv) The terminal shall be designed to accommodate conductor in such a way that firm connections can be established with suitable lugs.</p> <p>(v) Suitable Test terminal blocks should be provided.</p> <p>(vi) The terminals shall have suitable construction with barriers and cover, to provide a secure and safe connection of CTs and PTs through stranded copper conductors up to 4 mm<sup>2</sup>.</p> <p>(vii) The manner of fixing the terminals shall ensure adequate and durable contact such that there is no risk of loosening or undue heating.</p> <p>(viii) The terminals and connections shall be suitable to carry up to 200 % of I<sub>b</sub> continuously.</p> <p>(ix) All parts of each terminal shall be such that the risk of corrosion resulting from contact with any other metal part is minimized.</p>	
7.06	<p><b>Sealing Arrangement</b></p> <p>(i) The meter cover shall have at least two sealing screws; sealing arrangement should be accessible from front only.</p> <p>(ii) Separate sealing arrangements shall be provided for terminal cover.</p> <p>(iii) The sealing arrangement should be suitable for application of Polycarbonate seals.</p> <p>(iv) The manufacturer shall provide his own seals on each meter before dispatch.</p>	
7.07	<p><b>Anti-Tampering Features</b></p> <p>(i) The meter shall have following anti-tampering features.</p> <p>(1) The meter shall not get damaged even if any phase and neutral are interchanged.</p> <p>(2) The meter should comply with EMC requirements as stipulated in CBIP 88 (with latest amendments).</p> <p>(3) The meter shall detect CT polarity reversal and record the same with the date and time for all occurrences and restoration with total number of such occurrences during the above period for all phases.</p> <p>(4) The meter shall work correctly irrespective of the phase sequence of supply.</p> <p>(5) In the case of 3 phase, 4 wire system, the meter shall keep working even in the presence of any two wires i.e. even in the absence of neutral and any one or two phases.</p>	

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7.07	<p>(6) In the case of 3 phase, 3 wire meters even if reference Y phase is removed, the meter shall continue to work.</p> <p><b>(ii) Tamper Data information</b></p> <p>(1) Voltage failure count (phase wise)  (2) Current failure count (phase wise)  (3) Voltage unbalance (phase wise)  (4) Current unbalance (phase wise)  (5) Current reversal (phase wise)  (6) First and last occurrences of tamper with date &amp; time  (7) Last restored tamper with date &amp; time, Total number of tamper count  (8) All the billing commercial parameters recorded before tampering.</p>	
7.08	<p><b>Name Plate and Marking</b></p> <p>(i) Tri-vector Meters shall have a nameplate clearly visible and effectively secured against removal, indelibly and distinctly marked with all essential particulars as per relevant standards.</p> <p>(ii) The marking shall be indelible, distinct &amp; readable from outside the meter.</p> <p>(iii) The rating plate of the meter shall be as per purchaser's design. The aesthetics and layout of the rating plate shall be approved by the purchaser.</p> <p>(iv) The marking on every meter shall be in accordance with relevant clauses of IS: 14697/1999. In addition to the standard, the following shall be marked on the nameplate.</p> <p>(1) Manufacturer's name, place of manufacturer &amp; trade mark  (2) Tri-vector Meter type  (3) Number of phases and wires  (4) Serial number  (5) Month and Year of manufacture  (6) Reference voltage, PT ratio &amp; frequency  (7) Rated Current (Basic current &amp; Maximum current)  (8) Tri-vector Meter constant (impulse / Unit (kWh / kVARh)  (9) Accuracy Class of the meter  (10) A text "Property of M/s MSEDCL / MSETCL."  (11) Principal unit(s) of measurement  (12) BIS mark</p>	
7.09	<p><b>Connection Diagram</b></p> <p>i Every meter shall be indelibly marked with connection diagram, which shall be attached to the meter.</p> <p>ii In case any special precautions need to be taken at the time of testing the meter, the same shall be indicated along with the circuit diagram.</p>	
7.10	<p><b>Quantities to be Measured</b></p> <p>The meter shall be capable of measuring and displaying the following electrical quantities within specified accuracy limits for poly-phase balanced or unbalanced loads at all power factors. The measurement shall be carried out on 3 phase, 4-wire principle with an accuracy as per class 0.2S of IS 14697.</p> <p>(i) Active energy measurement in all four quadrants (Import / export at all power factors).</p>	



SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.10	(ii) In case of ABT meters, the meters shall display on demand the 15 minute Active energy (Import and Export will be displayed in separate registers) for the previous 15-minute block.	
	(iii) The meter shall continuously compute the average of the RMS values of the three line-to-neutral VT secondary voltages as a percentage of 63.5 V, and display the same on demand.	
	(iv) The meter will display the three instantaneous voltages & currents for all three phases.	
	(v) In case of ABT meters, the meter shall count the number of cycles in VT output during each successive 15-minutes block, and divide the same by 900 to arrive at the average frequency. This shall be stored in the meter's memory directly or as a 2-digit code. The average frequency of the previous 15-minutes block shall also be displayed, on demand in hertz.	
	(vi) The meter will measure & display cumulative active energy, apparent energy, reactive (lag) energy, reactive (lead) energy in both import and export mode. Apparent power shall be computed as, $KVA = \sqrt{(kW^2 + (kVAr \text{ lag}^2 + kVAr \text{ lead}^2))} / KW$	
	(vii) The meter shall also compute the reactive power on 3-phase, 4-wire principle, with an accuracy as per IS14697 and integrate the reactive energy algebraically into two separate registers, one for the period for which the average RMS voltage is higher than 103.0% and the other for the period for which the average RMS voltage is below 97.0%. When lagging reactive power is being sent out from the substation, these two reactive registers shall move forward. When reactive power flow is in the reverse direction, reactive registers shall move backwards.	
	(viii) Lagging and leading reactive power flow in event of active energy import and export events will be recorded as separate cumulative registers. These registers will be – Reactive lag while active import, Reactive lead while active import, Reactive lag while active export and Reactive lead while active export.	
	(ix) The three line-to-neutral voltage shall be continuously, monitored and an indication shall be provided (Display/LED) for healthiness of the same. In case any of these falls below 70%, the same shall be indicated through the display/LED. The time blocks in which such a voltage failure occurs/persists shall also be recorded in the meter's memory. The reactive energy registers specified in clause 7.10-vii shall remain stay-put while VT supply is unhealthy.	
	(x) The meter shall compute the maximum demand of Apparent Power with integration period of 15 minutes for both import and export.	
	(xi) The meter shall compute power-on/power-off hours based on the duration for which at least one phase supply was available to the meter.	
	(xii) The meter shall indicate and record the total resultant quantities of fundamental frequency and harmonics or alternatively the meter shall record fundamental frequency quantities and harmonics related quantities (such as MWh, MVAh and MVARh) separately.	

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7.10	<p>(xiii) The meter shall be compatible with frequency linked Availability Based Tariff (ABT) as well as TOD tariff. For TOD tariff meter shall have the provision to define minimum four (maximum eight) TOD registers for different import / export energies &amp; MD in 24 Hrs cycle &amp; data should be able to retrieve by methods explained under various clauses in this specification sheet.</p> <p>TOD Definition Numbers of TOD defined</p> <table border="1" data-bbox="370 520 1227 785"> <thead> <tr> <th>Day Type</th> <th>Start Time</th> <th>End Time</th> <th>Rate Reg</th> <th>MD Reg</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0:0:0</td> <td>6:0:0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>6:0:0</td> <td>9:0:0</td> <td>2</td> <td>2</td> </tr> <tr> <td>1</td> <td>9:0:0</td> <td>12:0:0</td> <td>3</td> <td>3</td> </tr> <tr> <td>1</td> <td>12:0:0</td> <td>18:0:0</td> <td>2</td> <td>2</td> </tr> <tr> <td>1</td> <td>18:0:0</td> <td>22:0:0</td> <td>4</td> <td>4</td> </tr> <tr> <td>1</td> <td>22:0:0</td> <td>24:0:0</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Day Type	Start Time	End Time	Rate Reg	MD Reg	1	0:0:0	6:0:0	1	1	1	6:0:0	9:0:0	2	2	1	9:0:0	12:0:0	3	3	1	12:0:0	18:0:0	2	2	1	18:0:0	22:0:0	4	4	1	22:0:0	24:0:0	1	1	
Day Type	Start Time	End Time	Rate Reg	MD Reg																																	
1	0:0:0	6:0:0	1	1																																	
1	6:0:0	9:0:0	2	2																																	
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1	18:0:0	22:0:0	4	4																																	
1	22:0:0	24:0:0	1	1																																	

**7.11 Quantities to be Displayed**

Auto scroll display that shows the parameters and scrolled automatically after predetermined duration. In case the meter offered is modular, rack mounting, draw-out type, display unit common for all the meters housed in a rack may also be accepted provided the same enables reading individual meter through suitable push buttons. This should have provisions for

- (2) LCD Test pattern
- (3) Date
- (4) Time
- (5) Rising demand with elapsed time apparent while active import
- (6) Rising demand with elapsed time apparent while active export
- (7) Total active import energy register
- (8) Reactive Import While Active Import Energy Register
- (9) Reactive Export While Active Import Energy Register
- (10) Apparent While Active Import Energy Register
- (11) TOD Apparent While Active Import MD Register(Reg 0-24hrs) with Date & Time
- (12) Total Active Export Energy Register
- (13) Reactive Export While Active Export Energy Register
- (14) Reactive Import While Active Export Energy Register
- (15) Apparent While Active Export Energy Register
- (16) TOD Apparent While Active Export MD Register(Reg 0-24hrs) with Date & Time
- (17) Number of MD resets
- (18) History TOD Apparent While Active Import MD Register(Reg 0-24hrs) with Date & Time
- (19) story TOD Apparent While Active Export MD Register(Reg 0-24hrs) with Date & Time
- (20) Last MD reset date
- (21) Last MD reset time
- (22) TOD Total Active Import Energy Register(Reg 1)
- (23) TOD Total Active Import Energy Register(Reg 2)
- (24) TOD Total Active Import Energy Register(Reg 3)
- (25) TOD Total Active Import Energy Register(Reg 4)
- (26) TOD Reactive Import While Active Import Energy Register(Reg 1)
- (27) TOD Reactive Import While Active Import Energy Register(Reg 2)
- (28) TOD Reactive Import While Active Import Energy Register(Reg 3)
- (29) TOD Reactive Import While Active Import Energy Register(Reg 4)
- (30) TOD Reactive Export While Active Import Energy Register(Reg 1)
- (31) TOD Reactive Export While Active Import Energy Register(Reg 2)
- (32) TOD Reactive Export While Active Import Energy Register(Reg 3)
- (33) TOD Reactive Export While Active Import Energy Register(Reg 4)
- (34) TOD Apparent While Active Import Energy Register(Reg 1)
- (35) TOD Apparent While Active Import Energy Register(Reg 2)
- (36) TOD Apparent While Active Import Energy Register(Reg 3)
- (37) TOD Apparent While Active Import Energy Register(Reg 4)
- (38) TOD Apparent While Active Import MD Register(Reg 1)
- (39) TOD Apparent While Active Import MD Register(Reg 2)
- (40) TOD Apparent While Active Import MD Register(Reg 3)
- (41) TOD Apparent While Active Import MD Register(Reg 4)
- (42) Last Bill Period Import Avg.PF
- (43) TOD Total Active Export Energy Register(Reg 1)

	<p>(44) TOD Total Active Export Energy Register(Reg 2)  (45) TOD Total Active Export Energy Register(Reg 3)  (46) TOD Total Active Export Energy Register(Reg 4)  (47) TOD Reactive Export While Active Export Energy Register(Reg 1)  (48) TOD Reactive Export While Active Export Energy Register(Reg 2)  (49) TOD Reactive Export While Active Export Energy Register(Reg 3)  (50) TOD Reactive Export While Active Export Energy Register(Reg 4)  (51) TOD Reactive Import While Active Export Energy Register(Reg 1)  (52) TOD Reactive Impol While Active Export Energy Register(Reg 2)  (53) TOD Reactive Import While Active Export Energy Register(Reg 3)  (54) TOD Reactive Import While Active Export! Energy Register(Reg 4)  (55) TOD Apparent While Active Export Energy Register(Reg 1)  (56) TOD Apparent While Active Export Energy Reglster(Reg 2)  (57) TOD Apparent While Activq Export Energy Register(Reg 3)  (58) TOD Apparent While Active Export Energy Register(Reg 4)  (59) TOD Apparent While Actr've Export MD Register(Reg 1)  (60) TOD Apparent While Active Export MD Register(Reg 2)  (61) TOD Apparent While Active Export MD Register(Reg 3)  (62) TOD Apparent While Active Exqort MD Register(Reg 4)  (63) Last Bill Period Export iye.pf  (64) High Resolution Total Active Import Energy register  (65) High Resolution Reactive Import while Active Import Energy register  (66) High Resolution Reactive Export While Active Import Energy register,  (67) High Resolution Apparent While Active Import Energy Register  (68) High Resolution Total Active Export Energy Register  (69) High Resolution Reactive Export while Active Export Energy Register  (70) High Resolution Reactive Import while Active Export Energy Register  (71) High Resolution Apparent While Active Export Energy Register</p>	
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SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.12	<b>Energy Load Survey</b> (i) The meter should log following parameters on 15-minutes average basis for minimum 31 days. (1) Total Active Import Energy Register (2) Reactive Import While Active Import Energy Register (3) Reactive Export While Active Import Energy Register (4) Apparent while Active Import Energy Register (5) Total Active Export Energy Register (6) Reactive Export While Active Export Energy Register (7) Reactive Import While Active Export Energy Register	
	(ii) Following data should be recorded permanently (1) Meter make & Sr. No. (2) Prevailing integration period (3) Automatic re-setting date & time (4) Meters constant i.e. Nos of pulses per unit Or Nos of units per pulse.	
	(iii) Data logging should be on first in first out (FIFO) basis.	
	(iv) It should be possible to transfer this data to a hand held Meter Reading Instrument / Data Collection Device or a PC.	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.12	(v) Vender has to provide requisite components / software etc. to ensure that the equipment supplied should have all the provisions to integrate completely with existing MSEDCL / MSETCL metering / energy audit network & their existing data acquisition systems / software etc. to give desired performance.	
	(vi) The equipments supplied should have the facility to display the data in graphic form through existing Base Computer Software (BCS), export the data so collected into Microsoft Excel / desired software.	
7.13	<p><b>Billing Parameters</b></p> <p>(i) The offered metering system shall have capability to store daily mid night values of following parameters for minimum 35 days.</p> <ol style="list-style-type: none"> <li>(1) Total Active Import Energy Register</li> <li>(2) Total Active Export Energy Register</li> <li>(3) Apparent While Active Import Energy Register</li> <li>(4) Apparent While Active Export Energy Register</li> </ol> <p>(ii) The metering system shall store following parameters corresponding to defined billing dates</p> <ol style="list-style-type: none"> <li>(1) Active Energy Import</li> <li>(2) Active Energy Export</li> <li>(3) Reactive Energy (lag) Import</li> <li>(4) Reactive Energy (lag) Export</li> <li>(5) Reactive Energy (lead) Import</li> <li>(6) Reactive Energy (lead) Export</li> <li>(7) Apparent Energy Import</li> <li>(8) Apparent Energy Export</li> <li>(9) Maximum Demand of Import KVA</li> <li>(10) Maximum Demand of Export KVA</li> <li>(11) Average power factor (import)</li> <li>(12) Average power factor (export)</li> </ol> <p>(iii) It should be possible to transfer this data on to a computer or to a hand held Meter Reading Instrument (MRI) / Data Collection Device (DCD) as and when required.</p> <p>(iv) It should be possible to export the data so collected into Microsoft Excel. The vendor will provide necessary facilities for ensuring the same.</p>	

**7.14****Maximum Demand Registration**

The meter shall continuously monitor and calculate the average demand in KVA during the integration period set and the maximum, out of these shall be stored along with date and time when it occurred in the meter memory. The maximum registered value will also be made available on meter display.

The rising demand under the current integration period shall be displayed along with the elapsed time. The demand integration period shall be set for 15 minutes. It shall be possible to program to 30 minutes and 60 minutes in future. MD Sliding period shall be Zero Minute.

The time measurement should be independent of line frequency. It should be possible to set time and date from the master through software password security.

The meter shall display the maximum demand reset count. Meter should also keep the record of (data and time) of last two maximum demand reset.

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.15	<p><b>MD Reset</b> The meter should have any of the following MD resetting options</p> <ol style="list-style-type: none"> <li>(1) Automatic reset on a particular day of the month.</li> <li>(2) Resetting through a hand held terminal or Computer capable of communicating with the meter with explicit password protection. The vendor will provide necessary facilities specifically for resetting MD through MRI / Computer.</li> <li>(3) Manual Reset through sealable push button provided on meter front.</li> </ol>	
7.16	<p><b>Memory</b> The meter should have non-volatile memory, backed up by a Lithium Battery with back up period of TWO years. These batteries shall not require replacement for TEN years so long as PT supply interruption does not exceed TWO years. This will ensure that the registered parameters will not be affected by loss of power. It should be capable of storing minimum following parameters automatically for each 15 minutes successive integration block, so that in event of failure / damage of the meter the last reading of billing quantities must not be lost</p> <ol style="list-style-type: none"> <li>(1) Cumulative Total Active Energy Import</li> <li>(2) Cumulative Total Active Energy Export</li> <li>(3) Average system frequency</li> <li>(4) Cumulative Reactive Energy lag while active Import</li> <li>(5) Cumulative Reactive Energy lead while active Import</li> <li>(6) Cumulative Reactive Energy lag while active export</li> <li>(7) Cumulative Reactive Energy lead while active export</li> </ol>	
7.17	<p><b>Communication facilities</b></p> <ol style="list-style-type: none"> <li>(i) The meter shall be provided with a galvanically isolated optical communication port. (Such as IEC, PACT, ANSI etc) with removable cover and with locking arrangement so that it can be easily connected to a MRI / laptop / computers for data transfer as well as for receiving instructions / information.</li> <li>(ii) The optical communication port shall also have a sealing provision.</li> <li>(iii) The meter shall also be provided with an additional suitable communication port for networking of meters for remote collection of data on open communication protocol (e.g. Modbus).</li> <li>(iv) It shall be possible to obtain all instantaneous parameters, all cumulative energies and previous 15 minutes parameters (active energies, reactive energies, apparent energies &amp; average frequency) through the communication port using Modbus protocol.</li> <li>(v) Additional Communication port shall also be provided for connecting to local PC.</li> </ol>	
7.18	<p><b>Display</b> The meter shall have a minimum 6 digit Liquid Crystal Display (LCD) &amp; identifiers shall be provided for legend. The LCD shall be industrial grade with extended temperature range.</p>	
7.19	<p><b>Output Devices and Meter Constant</b></p> <ol style="list-style-type: none"> <li>(i) The meters shall have test output device (LED or other similar device) for testing/checking the accuracy of active energy &amp; reactive energy.</li> <li>(ii) This device should be suitable for use with sensing probe used with test benches or reference standards.</li> </ol>	



SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.19	(iii) The test output device should have constant pulse rate i.e. no. of pulses / unit (kWh, kVArh,) and its value (meter constant) should be indelibly printed on the rating plate.	
7.20	<p><b>Real Time Clock</b></p> <p>(i) The meter offered should have a real time clock and calendar based on a quartz crystal, independent of power supply frequency of AC Aux. Supply.</p> <p>(ii) A lithium (maintenance-free) battery of long life (minimum ten years) shall be provided for operation of time clock. It should be possible to select the various time zones for various seasons of the year through suitable software built into the electronic register.</p> <p>(iii) The error/drift of the clock shall not be more than one minute per year.</p> <p>(iv) It should be possible to reset Real Time Clock of the meter through a manually triggered command from Base Computer Software.</p> <p>(v) It shall be possible to synchronize clocks of all the meters either with BCS Clock or through GPS clock.</p>	
7.21	<p><b>Self-diagnostic features</b></p> <p>(i) The meter shall be capable of conducting continuous and automatic monitoring of the healthiness of its various electronic devices and circuits and any malfunctioning/discrepancy shall be displayed in the form of anomaly string.</p> <p>(ii) The meter shall have internal diagnosis feature to monitor micro control functions to ensure integrity of data and to prevent loss of any data.</p> <p>(iii) In case of any abnormality in the operation of the equipment, a brief description indicating the type of error that has occurred should be displayed.</p>	
7.22	<p><b>Failure Detection Features</b></p> <p>The meter shall have the following special features to detect failure of the power system:</p> <p>(i) The meter shall be capable of recording &amp; displaying failure information along with the date and time of all failure occurrence and restoration for the following</p> <p>(1) Phase wise voltage failure (Phase Voltage &lt; 70% of Vref)</p> <p>(2) Last 10 power failures</p> <p>(ii) The three line to neutral voltages shall be monitored continuously. In case any of these falls below 70% of Vn, the date and time of occurrence of such event shall be logged along with the duration for which the voltage stays below the threshold.</p> <p>(iii) When all the voltages are not available, power off event will be detected and power on event shall be detected when supply is restored. The power on and off event shall be logged with date and time and duration</p> <p>(iv) Total 100 events (minimum) of anomalies with date and time shall be stored and made available through the CMRI on first in first out basis.</p> <p>(v) Meter should record all the above mentioned events on the basis of first in first out along with date &amp; time and snap shots of individual voltages, currents, power factors at the time of event logging and restoration of normal supply.</p> <p>(vi) It shall be possible to retrieve the failure data through optical port to a common meter-reading instrument or directly to the computer.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.23	<p><b>Compatibility for external influencing signals</b></p> <p>The meter shall be capable to protect against adverse effect of AC/DC abnormal external magnetic field as per IS: 14697 &amp; latest CBIP recommendations. The meter shall not generate noise, which could interfere with other equipment.</p> <p>The meter shall be designed in such a way that conducted or radiated electromagnetic disturbance as well as electrostatic discharge do not damage or substantially influence the meter and its performance.</p> <p>The disturbances to be considered are:-</p> <ol style="list-style-type: none"> <li>(1) Harmonics</li> <li>(2) Voltage dips and short interruptions</li> <li>(3) Conducted transients</li> <li>(4) D.C. and AC magnetic fields</li> <li>(5) Electromagnetic fields</li> <li>(6) Electrostatic discharges</li> </ol>	
7.24	<p><b>Mounting arrangement for meters</b></p> <p>The meter shall be of conventional casing suitable for flush mounting &amp; suitable for wire-up in a cubicle for which suitable panel shall be supplied by the contractor.</p> <p>Panel shall be of simplex type. The overall panel dimension shall be suitable to accommodate meter modules. The slot (cut outs) for inter panel wiring shall be spaced at 300 mm from top edge of the side panel and their size shall be 80 mm (H) x 300 mm(W).</p> <p>Panels shall be completely enclosed and shall be dust, moisture and vermin proof to meet the requirements of IP 31 of IS 2147.</p> <p>The panels shall be free standing, floor mounting type, with rigid, structural frames, enclosed completely with specially selected, smooth finished, rolled sheet steel of thickness not less than 3mm for front and 2.0 mm thick for sides, top &amp; bottom portions and the doors to ensure Tamper Resistant design.</p> <p>There shall be sufficient reinforcement to ensure level surfaces, resistance to vibration, and rigidity during transportation, installation and operation.</p> <p>All doors and removable covers shall be gasketed all around with neoprene gaskets. Ventilating louvers, if provided, shall have screens and filters.</p> <p>Design, material selection and workmanship shall be such as to result in neat appearance both inside and outside with suitable epoxy painting, with no weld, rivets or bolt heads apparent from outside and with all exterior surfaces true and smooth.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.24	<p>Interior Lighting and Heating:</p> <p>a) Each Panel/ Desk shall be provided with lighting fixture rated for 240 V A.C. supply, controlled by panel door switch and fuse.</p> <p>b) Each Panel/ Desk shall be provided with 240V, 50 Hz, 15Amp 3 pin receptacle and switch.</p> <p>Each Panel/ Desk shall be provided with one space heater along with its control switch.</p>	
7.25	<p><b>Earthing :</b></p> <p>Each Panel/ Desk shall have earthing provisions with earth bus of copper having size not less than 25 x 3 mm securely fixed to (inside) base of panels for which necessary hardware shall be included in the scope of supply. Provision shall be kept to extend the earth bus bars to future adjoining panels.</p> <p>All metallic cases of meters and other mounted equipments shall be connected to earth bus by copper wires of size not less than 2.5 sq<sup>2</sup> The colour of insulation for earthing wires shall be Green.</p>	
7.26	<p><b>Panel internal wiring:</b></p> <p>All wiring (including for test terminal blocks) shall be carried out with 660V grade single core multi-strand flexible copper conductor wires with P.V.C. insulation and shall preferably be flame, vermin and rodent proof. The current carrying capacity of wire shall be adequate for the duty assigned to it and shall have sufficient flexibility to facilitate proper termination at any location. Colour coded wires (R,Y,B) shall be used for CT, VT Secondary connections having size not less than 2.5 sq<sup>2</sup></p>	
7.27	<p><b>Software</b></p> <p>(i) Following software should be supplied free of cost for smooth integration completely with existing MSEDCL / MSETCL metering / energy audit network &amp; their existing data acquisition systems / software etc. to give desired performance</p> <p>(1) Software (preferably Window based) for reading &amp; programming the meter contents in the MRI.</p> <p>(2) Window based computer software for accepting data from MRI and downloading instructions from base computer to MRI and also for communicating meter through its optical or RS232 / RS485 port for downloading all data from the meter to PC / Laptop.</p> <p>(3) Necessary software for loading application program via communication port.</p> <p>(4) Suitable BCS software for polling metered data from remote center.</p> <p>(5) Suitable ASCII file format compatible to MSETCL / MSEDCL billing software for automatic billing of consumer.</p> <p>(ii) Any essential software to be provided on chargeable basis may be mentioned separately.</p>	
7.28	<p><b>Meter Reading Instrument</b></p> <p><b>(It is an OPTIONAL requirement for which bidder shall submit quotations.)</b></p> <p>The bidder shall ensure that equipment supplied has all the provisions necessary to integrate with existing system for giving desired performance and has to offer all</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
7.28	<p>the hardware and software required for collecting the data from the meter and transferring the same to the central control station on online as well as on demand basis.</p> <p>Incase vender is asked to supply the Portable/hand-held data collection device(DCD)/Meter Reading Instrument(MRI), same shall be tailor-made as per relevant standards for down loading all data stored in a meter’s memory, and faithfully transferring it to the local PC. Each device shall at least comprise of the following:</p> <ol style="list-style-type: none"> <li>(1) A lead with optical head for coupling it to the meter</li> <li>(2) A lead for plugging it to a personal computer</li> <li>(3) An internal battery for powering the device</li> <li>(4) A case for safely carrying it about</li> <li>(5) A battery charger</li> </ol> <p>The total arrangement shall be such that one (1) operator can carry out the whole operation himself, in about 5 minutes, per meter.</p> <p>The DCD/MRI shall have a key for starting the data tapping from the coupled meter’s memory, a key to start data transfer to the PC, and a lamp, which would light up on completion of data collection, remain ‘on’ while the data is held in the device and would go ‘off’ when all data has been transferred to the PC. DCD / MRI shall also have the necessary provision for meter clock correction and for specifying the dates from which to which, the data stored in a meter’s memory is to be tapped. DCD/MRI shall be supplied along with the necessary software including suitable ASCII file for communicating with the meter as well as the existing local MSETCL / MSEDCL Computers.</p> <p>No computation shall be made in the Data Concentrator Unit. All the computations are to be done in the Tri-vector Meter itself.</p>	
8.00	<p><b>QUALITY ASSURANCE PLAN :</b></p> <ol style="list-style-type: none"> <li>(i) The manufacturer shall have a well-organized Quality Assurance Program (QAP) based on ISO 9000 Series to assure that items and services comply with this specification.</li> <li>(ii) All design, manufacturing, processing, testing and inspection operations affecting the equipment or material shall be governed by Quality Assurance procedures in accordance with the directives of the ISO 9001 standards as well as should also confirm to all the requirements mentioned under various clause of this technical specification part - I.</li> <li>(iii) All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure reliability, longer life and sustained accuracy.</li> </ol>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
<b>9.00</b>	<b>TESTS &amp; INSPECTIONS :</b>	
<b>9.01</b>	<p><b>Type Test Certificates</b> The meters shall be fully type tested as per relevant standards IS: 14697 / IEC 60687 from a laboratory approved by NABL such as ERDA, CPRI, ETDC, ERTL etc. The type test reports of the offered meters shall be submitted along with the offer, which shall not be more than 5 years old.</p>	
<b>9.02</b>	<p><b>Acceptance and Routine Tests</b> All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the supplier in the presence of RCF (Thal) (purchaser) &amp; MSEDCL / MSETCL representative for which supplier shall give advance intimation to RCF (Thal) / MSEDCL / MSETCL to enable them to depute their representative for witnessing the tests.</p>	
<b>9.03</b>	<p><b>Acceptance by MSEDCL / MSETCL</b> Complete technical specification of the ABT compliant tri-vector meter for HT metering services has been prepared based upon the technical specifications provided by M/s MSETCL, Kalwa.</p> <p>It will be suppliers' responsibility to get the materials accepted by M/s MSEDCL / MSETCL, for which the successful bidder has to coordinate with the Superintending Engineer (PC), MSEDCL / MSETCL, Pen circle-Antore Road, Pen, District-Raigad (Maharashtra) for obtaining their clearance / acceptance before shipment of the meters to the purchaser's address.</p> <p>However, bidder's role will be limited up to (i) sending inspection calls, arranging to &amp; fro travel and appropriate stay for only MSEDCL / MSETCL officials, (ii) sending inspection call to RCF (Thal) (for joint inspection along with MSEDCL / MSETCL) with sufficient advance intimation for enabling to make proper travel plans.</p> <p>HWB (DAE) takes responsibility to contact / visit MSEDCL / MSETCL officials personally at Mumbai &amp; Pen offices to expedite timely inspection of the ordered meters as per the technical specifications / drawings / IS-14697 which are part of this tender and any delay from the part of MSEDCL / MSETCL / RCF in this regard will not be accounted on the bidder.</p> <p>However, the acceptance of any material prior to shipment shall in no way relieve the Contractor of any of his responsibilities for meeting all the requirements of the specification and shall not prevent subsequent rejection if such materials are found to be defective.</p>	
<b>10.00</b>	<p><b>COMPLETION SCHEDULE :</b> The Work is to be successfully completed within Six (6) weeks from the date of issue of Letter of Intent (LOI) / Purchase Order whichever is earlier. The time and date of completion of the work shall be deemed to be the essence of the Contract. The successful bidder shall so organize his resources and perform so as to complete the work not later than the aforesaid date.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
11.00	<p><b>PERFORMANCE GUARANTEE :</b> The equipment shall be guaranteed for satisfactory performance for a period of <b>66</b> months from the date of receipt at site in good condition or <b>60</b> months from the date of commissioning whichever is earlier.</p> <p>In case of failure within this period the supplier will make good the faulty equipment at no extra cost to the purchaser. The warranty period of the repaired / replaced meters shall be considered from the date of replacement / repair.</p>	
12.00	<p><b>DOCUMENTATION :</b> The Tenderer had to furnish all drawings conforming to relevant Indian / international standards. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in Metric System of Units.</p>	
12.01	<p><b>Along with offer / quotation</b></p> <ol style="list-style-type: none"> <li>(1) Type test certificates for the offered meter &amp; its accessories etc.</li> <li>(2) Detailed dimensional drawings of the meter &amp; accessories.</li> <li>(3) Detailed dimensional drawings of the mounting panel.</li> <li>(4) Literature / pamphlets etc. for the offered equipments.</li> <li>(5) Supporting documents for qualifying requirement as per PQC.</li> </ol>	
12.02	<p><b>After placement of purchase order</b> The successful Tenderer shall, within 15 days of placement of order, submit 4 prints and two good quality reproducible of the final versions of drawings <b>as agreed upon by the bidder</b> during tender evaluation stage for RCF (Thal) &amp; MSEDCL / MSETCL use.</p>	
12.03	<p><b>Before material dispatch</b></p> <ol style="list-style-type: none"> <li>i. Four sets of nicely printed and good quality bound volumes of <b>Erection, Operation &amp; Maintenance Manuals</b> for Tri-vector meter, Accessories / Software etc. in English language, shall be submitted by the supplier to RCF (Thal), prior to the dispatch of the equipment. The manual shall contain all the GA &amp; other drawings and brief design basis &amp; other information required for understanding of the equipment, erection, operation and maintenance of the ABT meter. The manual shall also contain the guaranteed technical particulars, detailed trouble shooting guidelines, detailed parts list along with their purchase code numbers, list of recommended spares if any, all the approved drawings, type / routine / acceptance test reports etc.</li> <li>ii. The supplier shall submit detailed packing list in advance for reference.</li> </ol>	
12.04	<p><b>Along with material dispatch</b></p> <ol style="list-style-type: none"> <li>i. Four copies of Type / Routine / Acceptance test certificates, duly approved by RCF (Thal) &amp; MSEDCL / MSETCL, along with dispatch clearance shall accompany the dispatched consignment.</li> <li>ii. Packing list.</li> </ol>	
13.00	<p><b>PACKING AND FORWARDING :</b></p> <ol style="list-style-type: none"> <li>i. The equipments shall be packed as per standard practice suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit,</li> </ol>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
13.00	<p>due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting shall be provided. Any material found short inside the packing cases shall be supplied by supplier without any extra cost.</p> <p><b>i.</b> Each consignment shall be accompanied by a detailed packing list containing the following information :</p> <p><b>ii.</b> Name of the consignee, (b) Details of consignment, (c) Destination, (d) Total weight of consignment, (e) Bill of material indicating contents of each package.</p> <p><b>iii.</b> Consignment should be addressed to :</p> <p style="text-align: center;">The Chief Material Manager (S) Rashtriya Chemicals and Fertilizers Ltd., Thal Po. RCF (Thal), Taluka - Alibag Distt. Raigad – 402208, Maharashtra.</p>	
14.00	<p><b>TRAINING :</b></p> <p><b>i.</b> The successful Bidder shall provide in plant training, at no extra cost to RCF (Thal) to at least two RCF / MSETCL / MSEDCL engineers to be nominated by RCF (Thal) for TWO days. The scope of the training shall cover familiarization of general design, application, installation testing and commissioning, operation and maintenance of the ABT Tri-vector Meters.</p> <p><b>ii.</b> To and fro travel expenses, lodging and boarding charges and allowances for out of pocket expenses in respect of the trainees, shall be borne by respective organizations. However the supplier shall provide for suitable facilities for the stay as well as to and fro transport to place of training.</p> <p><b>iii.</b> The period and programme of training shall be mutually discussed and finalized by RCF (Thal) with the supplier/s.</p>	

**Note: Bidder must submit duly filled, signed & stamped on each pages of this specification sheet along with his offer.**

**TECHNICAL SPECIFICATIONS PART – II**  
**FOR SUPPLY, ERECTION, TESTING AND COMMISSIONING OF AUTOMATIC**  
**REMOTE METER READING SYSTEM SUITABLE FOR 0.2S ACCURACY CLASS ABT**  
**& HT (TOD) TARIFF COMPLIANT TRI-VECTOR METERS FOR RCF (THAL).**

(Note: Bidder shall write **COMPLIED** in offer column along with data wherever required, else shall indicate deviation.)

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
<b>1.00</b>	<b>SCOPE :</b>	
<b>1.01</b>	<p>This specification covers design, manufacture, testing at manufacturer's works, packing, delivery, installation &amp; commissioning of High Precision Automatic Meter Reading system (along with Accessories / Software essential for giving desired performance) confirming to relevant Indian &amp; international standards for 0.2S Class ABT &amp; HT (TOD) tariff Compliant microprocessor/ micro controller based Tri-vector Meters at MSEDCL / MSETCL THAL switchyard to enable effective surveillance and remote metering of all parameters of energy consumption.</p> <p>The Remote Metering System consists of a remote unit(s) having telemetering circuit which receives the signals generated by the electronic meters fitted with an external or internal built in Modem. The remote units are connected to the control station through a dedicated communication link which should be Mobile link, i.e. GSM MODEM. Such communication system between the meter and the MSETCL / MSEDCL control center through the remote metering system makes it easier for the center to retrieve/poll data relating to billing data, load survey data, temper data, snap shot of instantaneous data and energy consumed as recovered by the meter.</p> <p>Offered system should have all the provisions to integrate completely with existing MSEDCL / MSETCL metering / energy audit network &amp; their existing data acquisition systems / software etc. to give desired performance.</p> <p>The offered meter reading system shall be as per the approved makes of MSEDCL/MSETCL and shall comply to the requirements of MSEDCL/MSETCL standards in all sense.</p>	
<b>1.02</b>	<p>The offered system should be suitable for frequency linked ABT (Availability Based Tariff) compliant HT consumer (TOD) tariff metering services for wheeling of energy from captive power plant at Heavy Water Plant (Manuguru) in Andhra Pradesh to Heavy Water Plant (Thal), Maharashtra, through National / Andhra Pradesh &amp; Maharashtra state grid networks of PGCIL/ Transco /Discom etc. The meter will be installed at 100 KV switchyard of M/s Maharashtra State Electricity Distribution Company Ltd. Located at Thal in RCF (Thal) Complex.</p>	
<b>1.03</b>	<p>It is not the intent to specify completely herein all details of the design and construction of equipments. However, the equipment shall confirm in all respects to high standards of engineering, design, and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee in a manner acceptable to RCF (Thal) (purchaser) as well as M/s MSEDCL / MSETCL, who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which, in their judgment, is not in accordance therewith.</p> <p>Any other item not included but required for satisfactory performance of the equipments supplied shall be in the bidders scope of supply.</p>	



<b>SR. NO.</b>	<b>RCF REQUIREMENT</b>	<b>OFFER (&amp; DATA wherever required)</b>
<b>1.04</b>	<p>The required system shall comprise of following:</p> <p>(1) Built in GSM MODEM of External GSM MODEM</p> <p>(2) GSM MODEM each to be supplied at :</p> <ul style="list-style-type: none"> <li>➤ Consumer Meter Unit</li> <li>➤ Master information center (MIC) - Located at MSETCL /MSEDCL switchyard at THAL.</li> <li>➤ Meter to be hooked / connected directly to MIC-DIC through suitable GSM media.</li> </ul> <p>(3) The meter must have RS232 serial port for connection of external MODEM for communication system.</p> <p>(4) Appropriate Software.</p> <p>(5) The equipments offered shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of supplier's supply, irrespective of whether those are specifically brought out in this specification and / or in the commercial order or not.</p>	
<b>1.05</b>	<p>The AMR system shall be required to :</p> <p>(1) Down load all relevant data from the meter (CMU) installed at consumer premises.</p> <p>(2) Transform the data into signals suitable for transmission through the selected communication media – GSN/PSTN.</p> <p>(3) Transmit in to the above information centers of MGVCL.</p> <p>(4) Transform the data into a format suitable for report generation, control from the computer system at any of above information centers.</p> <p>(5) Shall transform the data into a format suitable for management information load monitoring , load surveying evaluation of temper attempts etc.</p>	
<b>1.06</b>	<p>However, in their own interest, the bidders are advised to undertake a survey of MSEDCL / MSETCL (Thal) Sub-station, Taluka: Alibag where this system is required to be provided to study &amp; understand all the technical / administrative / procedural requirements necessary for execution of this order to be acceptable to M/s MSEDCL / MSETCL.</p>	
<b>2.00</b>	<p><b>SERVICE CONDITIONS :</b></p> <p>The offered equipments should be able to give desired performance under service conditions described under Clause No. 4.00 technical specification part – I.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
<b>3.00</b>	<b>GENERAL TECHNICAL REQUIREMENTS :</b>	
<b>3.01</b>	<p><b>(i) Automatic Meter Reading system</b></p> <ol style="list-style-type: none"> <li>(1) The system must have security features to prevent any access by unauthorized personnel to the data, hardware &amp; software.</li> <li>(2) The system must have security features for restricting MSETCL / MSEDCL / MSETCL personnel from performing activities which are not within their authorization.</li> <li>(3) The communication links between CMU &amp; MSETCL / MSEDCLs various information centers must be fully encrypted as per relevant Data Encryption Standards (DES)</li> <li>(4) Security of Data in transit must be provided by using standard protocols Error detection and correction protocols &amp; security measures.</li> </ol>	
<b>3.02</b>	<p><b>(ii) Consumer Meter Unit (CMU)</b></p> <p>The CMUs intended for Remote Communication will be equipped with features to answer a Remote Request for Meter Reading. The CMUs shall also be programmable to answer to Remote Request in all specified time slots i.e. meter shall be required to answer during any time i.e. 24 hrs.</p> <p>The CMU shall</p> <ol style="list-style-type: none"> <li>(1) Be able to call back MSEDCL / MSETCL's information centers to dump the reading into the computer system, in any time slot specified by MSEDCL / MSETCL.</li> <li>(2) Be provided with indication / display that Remote communication is in progress.</li> <li>(3) Have a RTC &amp; calendar in the meter and shall continue to maintain the clock &amp; calendar even when power is out.</li> <li>(4) Be provided the requisite facilities to acknowledge the receipt of command.</li> <li>(5) The meter data can be retrieved by any of the receipt of command.</li> <li>(6) The Central station computer remotely through the suitable modem viz. GSM Modem network by just dialing the phone number of the meter and specifying the information to be retrieved.</li> <li>(7) Collect data as per time interval defined by the user. The user can change the interval as and when required. The change should be sent to the Communicator Box as an SMS or data call.</li> <li>(8) The user can also send query to the box and collect the necessary data.</li> <li>(9) The data collected should be encrypted so that no external interference can affected the security of the data. The manipulation with the data collection is not possible.</li> <li>(10) All the parameters, instantaneous, billing, tamper and load survey parameters listed under technical specification part-I shall be available by Remote interrogations from the information center.</li> <li>(11) The information center should be able to dial up the meter at any point of time to retrieve/ down load all metered date including load survey and tamper data through the base/information center P.C. software.</li> </ol>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
3.03	<p><b>(iii) Communication Interface</b></p> <p>The remote communication shall be over RS232 / RS485 interface.</p> <p>(1) The supplier shall have to supply all information center base computer software free cost. Any software used in interface unit and base computer must be submitted with offer, failing which the offer will not be considered.</p> <p>(2) The Base Computer Software (BCS) in case of Data collection centers described as above shall be featured for Auto Scheduling for polling and interrogation of any data from the CMU automatically at pre defined / required time of the day (i.e. Programmable)</p> <p>(3) The user can also send query to the box and collect the data.</p> <p>(4) The data collected should be encrypted so that no external interference can affect the security of the data. The manipulation with the data collection is not possible.</p>	
3.04	<p><b>(iv) Modem</b></p> <p>The modem shall be used at the consumer meter terminals and at the MSDCL / MSETCL'S Information centers for transforming the signal and transmitting through the selected medium. A standard Hayes compatible Modem shall be used for communication. The Modem shall :</p> <p>(1) Have connector interface to RS232/ RS485</p> <p>(2) Work in dial up/polling mode.</p> <p>(3) Have auto dial/polling, redial, dial linking, call status display, auto parity and data rate selection and non-volatile memory for Modem option parameters.</p> <p>(4) Support serial binary and asynchronous data format for data transfer.</p> <p>(5) Have a facility of error correction as per Microcom Network protocol Clause No3, 4 and 5.</p> <p>(6) Have a rechargeable battery backup.</p> <p>(7) Not be susceptible to electromagnetic and other interference from near by monitors and power supplies.</p> <p>(8) Have data compression facility as per MNP or CCIT standard.</p> <p>(9) Have command buffer of minimum 40 characters.</p> <p>(10) Have LCD indications for transmitting data, receiving data, off hook etc.</p> <p>(11) Have adjustable data rate.</p> <p>(12) In case of external MODEM, once installed shall be enclosed by the sealable terminal cover thereby preventing any access to the Model and the cable once the terminal cover is sealed.</p> <p>(13) It is preferred to use only GSM type Modem so as to avoid any access for the consumer to fiddle with the metering and thereby protecting revenue.</p>	
3.05	<p><b>(v) SOME OF THE SALIENT FEATURES &amp; SPECIFICATIONS FOR REFERENCE FOR THE MODEM</b></p> <p>(1) Automatic wide supply voltage range 85V AC – 280V AC.</p> <p>(2) Non-Transparent data transmission at 1200/24/4800/9600 bps selectable.</p>	

SR. NO.	RCF REQUIREMENT	OFFER (& DATA wherever required)
3.05	<ul style="list-style-type: none"> <li>(3) Ability to operate with tailor made SCADA packages.</li> <li>(4) Using GSM system for wireless communication.</li> <li>(5) Operating temperature: -20 to + 60 degree C.</li> <li>(6) Relative humidity : 100%</li> <li>(7) Dust/ Moisture resistance : As per IP51</li> <li>(8) Enclosure: Metallic with power coated paint.</li> <li>(9) Connection : RS232/ female DE9</li> <li>(10) Network Interface: FME – male Antenna connection.</li> <li>(11) Interference Immunity: IEC801.4, High immunity to noise.</li> <li>(12) Power output: 2 Watt.</li> <li>(13) Power consumption : Not more than 5VA with input of AC, 50 Hz, 63.5 or 110 volts</li> <li>(14) Cellular Network type ; GSM</li> <li>(15) Cellular Data Service : Radio link protocol.</li> <li>(16) Data SIM card : Mini SIM plug in/removal</li> <li>(17) Antenna: 2db self earthing elevated feed.</li> <li>(18) Baud rate of the modem should be changeable. It should work on more than 300 to 115300. However it should be noted that typically modem works on 9600 baud rate.</li> <li>(19) In order to make optimum use higher baud rate shall be preferred. The low baud rate may result in to loss or hanging/hampering of retrieved information. The product being offered should work on the faster speed of even 115200 bps also.</li> </ul>	
3.06	<p><b>(vi) Base Computer Software (BCS)</b>  The data from various sites should be collected manually or automatically at information center on a PC/server. The PC/server will have GSM connectivity and it will collect data from various meters.</p>	
3.07	<p><b>(vii) Features of data collecting software:</b></p> <p><b>(1) Date collection :</b></p> <ul style="list-style-type: none"> <li><b>i</b> The software should have facility to dial a particular meter or group of meters and collect data as and when required. The user can also set a time at which it should dial and collect data automatically.</li> <li><b>ii</b> The user can collect all data or specific data from the meter.</li> <li><b>iii</b> The data collected can be evaluated for analysis of load pattern, tamper attempts/events or other consumer related activities.</li> </ul> <p><b>(2) Reports.</b></p> <ul style="list-style-type: none"> <li><b>i</b> Reports should be generated as per the requirement of MSEDCL/MSETCL who shall provide details of formats and specifications for the required reports.</li> <li><b>ii</b> The software should be user friendly and should be menu driven. It should be easy to generate reports and to get any consumer information.</li> <li><b>iii</b> It should I have in-built facility to export data to MS-Excel format.</li> </ul>	

<b>SR. NO.</b>	<b>RCF REQUIREMENT</b>	<b>OFFER (&amp; DATA wherever required)</b>
<b>3.08</b>	<b>(viii) SIM CARD SPECIFICATIONS</b> MSEDCL / MSETCL will provide SIM cards for IU and also for receiver at control station. These SIM cards should of standard sizes that are used in GSM mobile phones. SIM card should operate on 5V/ 10V.	
<b>3.09</b>	<b>(ix) Communication system :</b> The bidder shall offer cellular phone as a communication media, i.e. GSM, which shall ensure reliability of data transmission at a competitive price	
<b>4.00</b>	However bidder may offer suitable communication system through cabling etc. in place of mobile communication system, confirming to all the communalization requirements mentioned above.	

**GUARANTEED TECHNICAL PARTICULARS FOR MICROPROCESSOR BASED 0.2S  
ACCURACY CLASS ABT & HT (TOD) TARIFF COMPLIANT TRI-VECTOR METER & ITS  
ACCESSORIES / SOFTWARES FOR RCF (THAL).**

SR. NO.	DESCRIPTION	RCF (THAL) REQUIREMENT	OFFERED BY BIDDER
<b>A-</b>	<b>GENERAL PARTICULARS</b>		
1.	Type	High Precision 0.2S Class ABT & HT (TOD) tariff Compliant microprocessor/ micro controller based Tri-vector Meter (along with Accessories / Software essential for giving desired performance) having remote communication facility through RS485 / RS232 and optically isolated RS 232 front communication ports confirming to IS-14697, IEC 60687, other relevant Indian & international standards, having all the provisions to integrate completely with existing MSEDCL / MSETCL metering / energy audit network & their existing data acquisition systems / software etc.	
2.	Manufactures type & designation	Bidder to specify	
3.	Confirming to standards	IS:14697 (1999), IEC: 60687, IEC: 1036, IEC : 1268, IEC : 60297, IS: 9000, IS: 8161 (Draft), IS:13010, IS:12346, IS: 8686, IEC: 62053-22, CBIP technical report No.88, CEA notification dated 17.03.2006 on “standard for operation of meters” etc.	
4.	Performance of the equipments	The offered meter should be suitable for frequency linked ABT (Availability Based Tariff) compliant HT consumer (TOD) tariff metering services for wheeling of energy from captive power plant at Heavy Water Plant (Manuguru) in Andhra Pradesh to Heavy Water Plant (Thal), Maharashtra, through National / Andhra Pradesh & Maharashtra state grid networks of PGCIL/ Transco /Discom etc. Equipments offered should have provisions to integrate with existing MSEDCL / MSETCL metering / energy audit network & their existing data acquisition systems / software etc. to give desired performance as per technical specification.	
5.	Service conditions	Equipments offered should be suitable to service conditions as per Clause No. 4.00 of technical specification part - I.	

SR. NO.	DESCRIPTION	RCF (THAL) REQUIREMENT	OFFERED BY BIDDER
<b>B-</b>	<b>TECHNICAL PARAMETERS</b>		
1.	Configuration	The meters shall be of 3 Phase 4 Wire type suitable for connection to 3 Phase 4 Wire or 3 Phase 3 wire system.	
2.	Accuracy	The meter should be of class 0.2S or better accuracy for measurement of Active / Reactive & Apparent energy as per relevant standard without any drift with time.	
3.	Rated CT Secondary Current	1 Amps	
4.	Rated PT Secondary Voltage	(a) 110 / $\sqrt{3}$ Volts for 3 Phase 4 Wire System (b) 110 Volts for 3Phase 3 Wire System	
5.	Auxiliary AC Supply	Single phase 230 Volts $\pm$ 15%	
6.	Auxiliary DC Supply	110 Volts $\pm$ 15%	
7.	System Frequency	50 Hz, $\pm$ 5%	
8.	Load conditions	balanced and unbalanced load	
9.	Load Power factor	From zero (lagging) through Unity to zero (leading).	
10.	Load current I <sub>b</sub> range	0.1% to 120% of I <sub>b</sub> .	
11.	Burden on the PT and CT circuits	Preferably in the range of 1 VA per phase.	
12.	Mechanical design	Mechanical design should confirm to all the requirements as per Clause No. 7.03 of technical specification part - I.	
13.	Metering components	Metering components should confirm to all the requirements as per Clause No. 7.04 of technical specification part - I.	
14.	Terminal Block arrangements	Terminal Block arrangements should confirm to all the requirements as per Clause No. 7.05 of technical specification part - I.	
15.	Sealing Arrangements	Sealing Arrangements should confirm to all the requirements as per Clause No. 7.06 of technical specification part - I.	
16.	Anti-tampering features	Anti-tampering features should confirm to all the requirements as per Clause No. 7.07 of technical specification part - I.	
17.	Name plate and Marking arrangements	Name plate and Marking arrangements should confirm to all the requirements as per Clause No. 7.08 of technical specification part - I.	
18.	Connection Diagram details	Connection Diagram details should confirm to all the requirements as per Clause No. 7.09 of technical specification part - I.	
19.	Quantities to be measured	Quantities to be measured should confirm to all the requirements as per Clause No. 7.10 of technical specification part - I.	

<b>SR. NO.</b>	<b>DESCRIPTION</b>	<b>RCF (THAL) REQUIREMENT</b>	<b>OFFERED BY BIDDER</b>
20.	Quantities to be displayed	Quantities to be displayed should confirm to all the requirements as per Clause No. 7.11 of technical specification part - I.	
21.	Load survey	Load survey facility should confirm to all the requirements as per Clause No. 7.12 of technical specification part - I.	
22.	Billing parameters	Billing parameters should confirm to all the requirements as per Clause No. 7.13 of technical specification part - I.	
23.	Maximum demand registration	Maximum demand registration facility should confirm to all the requirements as per Clause No. 7.14 of technical specification part - I.	
24.	MD reset facility	MD reset facility should confirm to all the requirements as per Clause No. 7.15 of technical specification part - I.	
25.	Memory	Memory provisions should confirm to all the requirements as per Clause No. 7.16 of technical specification part - I.	
26.	Communication facility	Communication facility should confirm to all the requirements as per Clause No. 7.17 of technical specification part - I.	
27.	Display	Display facility should confirm to all the requirements as per Clause No. 7.18 of technical specification part - I.	
28.	Output devices & meter constant	Output devices & meter constant facility should confirm to all the requirements as per Clause No. 7.19 of technical specification part - I.	
29.	Real Time Clock facility	Real Time Clock facility should confirm to all the requirements as per Clause No. 7.20 of technical specification part - I.	
30.	Self-diagnostic features	Self-diagnostic features should confirm to all the requirements as per Clause No. 7.21 of technical specification part - I.	
31.	Failure Detection Features	Failure Detection Features should confirm to all the requirements as per Clause No. 7.22 of technical specification part - I.	
32.	Compatibility for external influencing signals	Compatibility for external influencing signals should confirm to all the requirements as per Clause No. 7.23 of technical specification part - I.	
33.	Mounting arrangement	Mounting arrangement should confirm to all the requirements as per Clause No. 7.24 of technical specification part - I.	
34.	Earthing	Earthing facility should confirm to all the requirements as per Clause No. 7.25 of technical specification part - I.	



<b>SR. NO.</b>	<b>DESCRIPTION</b>	<b>RCF (THAL) REQUIREMENT</b>	<b>OFFERED BY BIDDER</b>
<b>35.</b>	Panel internal wiring	Panel internal wiring should confirm to all the requirements as per Clause No. 7.26 of technical specification part - I.	
<b>36.</b>	Software	Software provided should confirm to all the requirements as per Clause No. 7.27 of technical specification part - I.	
<b>37.</b>	Meter Reading Instrument	Meter Reading Instrument should confirm to all the requirements as per Clause No. 7.28 of technical specification part - I.	

**SCHEDULE -I**

**LIST OF THE DEVIATIONS**

(To be filled in by the bidder)

<b>SR. NO.</b>	<b>DESCRIPTION OF THE DEVIATION ALONG WITH REFERENCES OF SUPPORTING DOCUMENTS</b>	<b>POINT NO. OF THE TECHNICAL SPECIFICATION FOR WHICH DEVIATION IS MENTIONED</b>

Date :

(Signature & Stamp of the Bidder)

**SCHEDULE –II**

**CHECKLIST FOR SUBMISSION OF THE TENDER**  
**(To be filled in by the bidder)**

<b>SR. NO.</b>	<b>DESCRIPTION</b>	<b>COMPLIANCE STATUS (Yes / No)</b>
<b>1.</b>	Bidder has the responsibility to get the material accepted by M/s MSEDCL / MSETCL.	
<b>2.</b>	Duly filled, signed & stamped Technical specification part - I & II are submitted or not?	
<b>3.</b>	DOCUMENTS as per Clause 12.01 of the technical specification part - I are submitted or not?	
<b>4.</b>	Duly filled, signed & stamped SCHEDULE-I is submitted or not?	
<b>5.</b>	Duly filled, signed & stamped SCHEDULE-II is submitted or not?	

Date :

(Signature & Stamp of the Bidder)

## **INSTALLATION OF ABT METER ALONG WITH PANEL AND ACCESSORIES**

1. Bidder shall Co-ordinate with MSEDCL/MSETCL for replacement of ABT meter.
2. Shutdown of feeder will be given one by one.
3. Bidder shall remove cable termination and tag cables of Check meter.
4. Bidder shall remove old check meter panel.
5. Bidder shall install new check meter panel along with all necessary accessories.
6. Bidder shall terminate all CT, PT aux supply cables etc.
7. After taking Check meter in operation, main meter panel clearance will be given.
8. Same procedure shall be repeated for Main Meter panel.
9. Care shall be taken so that there shall be no disturbance in main meter panel or inline feeder.
10. Installation shall be carried out under supervision of MSEDCL/MSETCL engineer.
11. Installation shall be completed within two days for each meter panel after site clearance from RCF.