

## Addendum

**Sub: Bid identification No. CMD/MPPK/PROJ/FS/02/10-11**

### Volume I

#### Section 2

A) ITB 14.1(b) - Words “ along with Bid” are replaced by words “within twenty eight days of the date of notification of award to the successful bidder”

Following sentence is added at the end of first para.

“Bidder is required to furnish a certificate alongwith Bid that all materials and plants conform to Guaranteed Technical Particulars (GTP) and technical drawings of each item as given in Vol II of Bidding document.

#### Section 3

**A.** 2.3.2 Annual turnover

The words “Sales in supply of materials and equipments” are replaced by words “turnover 50% of bidding amount”.

**B.** 2.4.1 General Experience - In sub clause (a) (ii) add words after ACSR/AAA Conductor “or VCB or Energy Meter or AB Cable XLPE”

In column of joint venture under heading ‘All partners combined’ words “Not applicable” is replaced by words “Must meet requirement” and under heading ‘each partner’ words “Must meet requirement” is replaced by words “Not applicable”

2.4.2 (a) “ Contract of similar nature” – Words “the plants as described in the scope of supply of plant and services in sec 6 employers requirements attached to Vol.1 of Bid document” is replaced by words by “sub transmission and distribution electrical network”.

**C.** 2.4.2 (b) Experience in key activity –After AB Cable XLPE, add words as follows

Energy Meter (Nos.) 100000

or

VCB (Nos.) 500

**D.** 2.5 Personnel– The words “It may be mentioned that the person supervising the project should hold Class A license from the Govt. of Madhya Pradesh” is replaced by the words “The person supervising the work on behalf of Contractor is required to have Class A license from any state Govt. / Govt. of India at the time of bidding, However, A class license is required to be obtained from Govt. of Madhya Pradesh within three months from the date of signing of Contract Agreement.

**E.** 2.7 Sub contractors – Notes mentioned below table in para (a) “Minimum criteria will be 50% of the highest quantities required in any particular lot included in the Bid” and in para

(b) "Minimum criteria will be 25% of the lowest quantities required in any particular lot included in the Bid" are deleted .

**F. 2.7(a)** "for supply of plant –

(i) S.No.1 of Table – after words 25 KVA add words "and above"

(ii) S.No.8 of Table – figure '9980' is replaced by figure '7000'

(iii) Add at footnote " for PCC Poles" Pole factories of Employer allotted to private firms or any new pole factories promoted by successful Bidders are exempted from minimum criteria

## **Section – 4**

**A. Letter of Bid –**

Para (b) is modified to read as under

'We offer to carry out Survey, Consumer Indexing, Asset Mapping, supply of material and plants, its installation, pre commissioning and commissioning of following plant and services in conformity with the Bidding document.'

In para (c) the words "[amount of foreign currency in words],[amount in figure]" are deleted.

**B. Price Schedule –**

Schedule No 2 – words 'asset mapping' after words 'consumer indexing' are added.

**C. Add following sub clauses 8 to 13 after sub clause 7 in PREAMBLE. –**

**8.** The Contractor should quote same rate for identical common item( appearing in different schedules) for example the Bidders has to quote same rate for 140 Kg PCC Pole in schedule number 2-A, 3-A , 4-A, etc.. In case there is difference in rates for identical item in different schedules, the highest rate will be considered for bid evaluation purpose, however the Contract shall be awarded on minimum rate quoted for that particular item.

**9.** The Bidder shall quote only one tax that is either VAT or CST for each item, the bids will be evaluated on the basis of the tax so quoted. The "C" form will be issued wherever applicable.

**10.** In case the Contractor supplies/procures material from out of state of Madhya Pradesh on which VAT was quoted earlier in the bid documents, the Contractor shall be paid only concessional CST applicable on such material. However, payment of such CST shall be restricted to the actual concessional CST applicable on such material or VAT amount quoted by the contractor in his bid, whichever is lower. In such cases, necessary C form will be issued on Contractor's request.

**11.** In case the Contractor supplies/ procures the material within the state of MP on which CST was quoted earlier in the bid documents, the Contractor shall be paid only VAT applicable on such material. However, payment of such VAT shall be restricted to the actual VAT applicable on such material or CST amount quoted by the Contractor in his bid, whichever is lower. However no 'C' form will be issued in such cases.

12. In case Goods & Service Tax (GST) Act is introduced by the Central or the State Govt. during the course of execution of this works contract which results in the changes in the tax rates then an equitable adjustment in the Contract Price shall be made in accordance to sub-clause 14.4 of GCC.

13. That the service tax shall be paid as applicable by the employer on erection, commissioning subject to the condition that the Contractor must be registered with the Central Customs and Excise Department for payment of service tax.

- D. Schedules of Rates & Prices – Schedule No. 1 , Schedule No2 & Schedule No. 3 are modified and enclosed with this addendum as enclosure 1 .
- E. Form PER – 1 : Proposed Personnel – The para at the end reading as “It may be mentioned that the person supervising the work on behalf of the Bidder must hold Class A license from the Govt. of Madhya Pradesh” is replaced by “The person supervising the work on behalf of Contractor is required to have Class A license from any State Govt. / Govt. of India at the time of bidding. However ‘A’ class license is required to be obtained from Govt. of Madhya Pradesh within three months from the date of signing of Contract Agreement.

## **Section 6**

- A Section-2.3 survey – Second para of sub section 2.3.1(i) is amended to read as follows; ‘the data as above shall be prepared on shape file and same ought to be made CYMDIST compatible or any other equivalent or superior GPS compatible software for simulation, network analysis, and ‘what if’ analysis purpose.
- B Sub Clause 2.3.9 – Figure ‘or 1:25000’ is substituted by figure ‘1; 50000’,
- C Sub Clause 2.3.10- Word “digital” is replaced by “Autocad”
- D Sub clause 2.3.12 – The words “Formats of consumer indexing and assets mapping will be finalized before start of survey with Employer/ Project Manger” are replaced by words ‘Formats for consumer indexing and assets mapping are enclosed in Annexure D’.
- E Sub Sec 2.4 “Employers Requirement”  
New sub clause (j-1)reading as follows is added-  
  
‘(j-1) Installation and commissioning of energy meter on existing / shifted distribution transformer of abadi area.’
- F Following sub clause is added after sub clause (n)  
  
**‘Demonstration of distribution loss on each distribution transformer of abadi area**  
  
(o) The Contractor has to demonstrate that the distribution loss of each distribution transformer feeding to abadi area after commissioning of the facilities or part thereof, is not more than 12% on each transformer for three consecutive months. However upto 15 % of distribution transformer is within the loss range of 12% to 20% is acceptable.
- G Sub clause 5.1 – Form of Performance Security –Words “The Project Manager” are replaced by “Project Director(FS)”

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H\_\_\_ A new table 'Lot wise Consumers' is added at the end of existing table in Annexure A –

**Lot Wise Consumers**

<b>Sl No</b>	<b>Lot</b>	<b>No of existing Consumers</b>
1	Indore & Depalpur	135556
2	Mhow & Pithampur	123382
3	Dhar & Manawar	158167
4	Rajgarh	102013
5	Barwani & Sendhwa	140685
6	Khargone I & Khargone II	110922
7	Barwaha & Mandeshwar	131202
8	Khandwa I & Khandwa II	98285
9	Burhanpur	77960
10	Ratlam	71168
11	Jaora & Alot	104461

The data given above are estimated numbers. The bidder will be required to carry out the survey to determine the actual numbers. Any estimation made on the basis of above data is not the responsibility of the Employer.

I Details of 11 kV Feeders' lengths which have been erroneously left blank in existing table in Annexure A –

**Section -6 Annexure –'A'**

Sr. No.	Lots No	Feeder Name	Length K.M.
1	<b>LOT NO.-II</b>		
		Panda-I	2.5 KM
		Panda-II	2.85 KM
		Panda -III	3.12 KM
		Semelda II/Lohari	13.1 KM
		Imlipura Feeder II	17.5 KM
		Pipal Khut	9.2 KM
		Water work feeder	4.9 KM
		Punarwas feeder I	17.8 KM
		Punarwas feeder II	8.9 KM
2	<b>LOT NO.-III</b>		
		Khachroda	12.0 KM
		Mundla	Nil(deleted)
		Paikunda	13.0 KM
		Muradka	14.0 KM
		Ratanpura	4.0 KM
		Karoda	6.0 KM
		Palwada	11.0 KM
		Nalccha	8.5 KM
		Dongargaon	8.5 KM
		Bhamori	5.0 KM
3	<b>LOT NO.-IV</b>		
		Akoliya	12.0 KM
		Panchrundi	13.0 KM
		Girwaniya	11.0 KM
		Mogra FDR	5.0 KM
		Talawadi FDR	11.0 KM
		Tanda	5.0 KM
		Barda	16.0 KM
		Banki B	4.0 KM
		F.D.R.	3.0 KM
		Khandwa	7.0 KM
4	<b>LOT NO.-V</b>		
		Petrolium	3.0 KM
5	<b>LOT NO.-VII</b>		
		Choli Gaon	30.00 KM
		Kawana	14.5 KM
		Singun	8.1 KM
		Narmada	2.0 KM
		Jalkoti	12.0 KM
6	<b>LOT NO.-VIII</b>		
		Bharbharad	17.8 KM
		Palasi	9.0 KM
		Sirra	14.5 KM
		Attar	15.5 KM
		Bhamzar	11.5 KM

### Annexure-F

#### Formats for collecting Infrastructure data ( GPS Survey)

<b>GPS Survey Attributes</b>			
<b>Equipment</b>	<b>Attributes</b>	<b>Selection Attributes</b>	<b>Remarks</b>
<b>33/11 kv Substation</b>	<b>Substation Name</b>		
	GPS Co-ordinates		
<b>11 KV Feeder</b> 11 kV Pole	<b>Name</b>		
	Pre Pole No		
	Pole No		
	GPS Co-ordinates		
	Pole Type	Rail/RSJ/H-Beam/PCC/Others	
	Pole Condition	OK/Leaning/Damage	
	Pole Location	Starting/Intermedite/Tap/End point/Cut-point	
	Pole Structure	SP/DP/TP/FP/SIX POLE	
	Pole Height(For Non-PCC Poles)	8/9/10/11/13m	
	Pole Earthing	Provided/Not Provided	
	Any Equipment Mounted	Yes/No	
		(If Yes)DT/CT-PT/HTC/AB Switch/Others	
	Insulator Condition	OK/Damage	
	No of damaged insulators		
	No of ckt	Single/Composite	
		If Composite(2HT/1HT-1LT/2LT)	
Stay Sets	Nos		
	Condition(OK/Loose/Damage)		
Line Type	OH/UG/ABC		
Conductor	Type ACSR/AAAC		
	Size(Squirrel/Weasel/Rabbit/Racoon/Dog)		
Joints in the span	Yes/No		
	If required whether provided/Not		
Guarding	Provided/Not Provided		
	Type(Carpet/Box)		
Any Crossing	Yes/No		
	If Yes Road/Railway/Nala/Power Line/Others		

		Minimum Ground Clearance Met/Extension of height required	
	Approx Distance From previous pole	Specify distance in Meters	
	Whether any intermediate pole is required	Yes/No	
<b>Distribution Transformer</b>	DistributionTransformer Substation Location Name		
	Substation Code No.		
	Pre pole no		
	Pole No.		
	GPS Co-ordinates		
	DT Make		
	DT SI No		
	DT Mounted on	DP/TP/FP/Plinth	
	DT ID Code		
	DT Capacity	16/25/63/100/160/200/315 KVA	
	DT Meter Available	Yes/No	
	Earthing Condition	OK/Requires renovation	
	AB Switch	Yes/No	
	AB Switch Condition	OK/Damage	
	DO Fuse Condition	OK/Damage	
	Lightning Arrestor	Provided/Not Provided	
		If yes, in how many phases	
	Condition of Connectors for Xmer Studs	OK/Requires renovation	
	LT Distn Box	Provided/Not Provided	
	If provided its Condition	OK/Requires renovation	
	Size of cable	300/150/120/95/70/25/16 mm <sup>2</sup>	
	Condition of LT Cable	OK/Requires replacement	
	No of Outgoing Circuits	One/Two/Three	
<b>LT Circuit</b>	<b>Name</b>		
LT Pole	Pre Pole no		
	Pole No		
	GPS Co-ordinates		
	Pole Type	Rail/RSJ/H-Beam/PCC/Others	
	Pole Condition	OK/Leaning/Damage	
	Pole Location	Starting/Intermediate/Tap/End point/Cut- point	
	Pole Structure	SP/DP/TP/FP/SIX POLE	

	Pole Height(For Non-PCC Poles)	8/9/10/11/13m	
	Pole Earthing	Provided/Not Provided / Damaged	
	LT X arm	One/Two/Three/U-Clamps	
	Insulator type	Pin/Shackle	
	Nos. of damaged Insulators		
	Stay Set	Nos	
		Condition(OK/Damaged)	
	No of ckt	Single/Composite	
		If Composite(2HT/1HT-1LT/2LT)	
	Stay Sets	Nos	
		Condition(OK/Loose/Damage)	
	Line Type	OH/UG/ABC/PVC Cable/other	
	If Conductor is used	Type ACSR/AAAC	
		Size(Squirrel/Weasel/Rabbit/Racoon/Dog)	
		Line Configuration1Ø2W/ 1Ø3W/ 3Ø4W/ 3Ø5W	
	If Cable is used	Whether AB /PVC Cable.	
		Cable size in sq. mm	
	Joints in the span	Yes/No	
	Guarding	Provided/Not Provided / not provided but required	
		Type(Carpet/Box)	
	Separator	Required/Not required	
		If required whether provided/Not	
	Any Crossing	Yes/No	
		If Yes Road/Railway/Nala/Power Line/Others	
		Minimum Ground Clearance Met/Extension of height required	
	Approx Distance From previous pole	Specify distance in Meters	
	Whether any intermediate pole is required	Yes/No	
	<b>No of Existing Consumers</b>	<b>Nos. / Load</b>	
	BPL Domestic	Nos. / Load	
	APL Domestic	Nos. / Load	
	Commercial	Nos. / Load	
	Industrial	Nos. / Load	
	Agriculture	Nos. / Load	
	Other	Nos. / Load	
	<b>PPC ( Prospective Potential Consumer)</b>	Nos. / Load	

	BPL Domestic	Nos. / Load	
	APL Domestic	Nos. / Load	
	Commercial	Nos. / Load	
	Industrial	Nos. / Load	
	Agriculture	Nos. / Load	
	Others	Nos. / Load	
Signature of The Contractor's representative Name & Agency Code		Signature of the Supervision Consultant Representative with Name	

**Note-** Consumer details to be given in separate format, given in this section

### Annexure F ( Continued)

#### Format for collecting Consumer information ( For Consumer Indexing)

Consumer Survey					
1	Consumer Service No.				
2	Consumer's Name				
3	Father's Name				
4	Address				
5	Contact No.				
6	Landmark				
7	Distribution X-mer Location Name				
8	Distribution X-mer Location code				
9	LT Circuit No./Name				
10	Pole No.				
11	Category	BPL/SC/ST / Others			
		If BPL – SC/ST/Others			
		If BPL than BPL card no			
12	Type of connection	TC/Permanent			
13	Purpose	Domestic/Non-Domestic/Industrial/Ag/Others			
14	Sanctioned Load (In watts)				
15	Actual Load Found (In watts)	Type of Load	No	Watt	Total Load in watts
		Bulb			
		Tube light			
		Fridge			
		Cooler			
		Motor			
		Other			
Total Load					
16	Supply Type	Single Phase/Three Phase			
17	Whether Metered	Yes/No			
	Location of Meter	Call Bell/Inside/Outside			

	What is the height of installation of meter (in meters)		
	Whether Meter Box Provided	Yes/No/Not Provided but is required	
	Type of Meter	EM/Electronic/MRI Compatible	
	If MRI Compatible than type of communication port	Infrared / LPR (RF) / Optical	
	Meter Make		
	Meter S.No.		
	Capacity		
	If CT Meter then CT Ratio		
	Meter Sealing Status	Only Body sealed/Body & Terminals Sealed/Terminals not sealed	
	Meter Working Condition	Ok/stopped/Burnt	
18	Service Line- Type	Armoured/Unarmoured	
	Length of service line in meters		
	Condition of service line	Ok/Required to be changed	
19	Consumer Earthing	ok/Damaged	
	Signature / Name Of The Consumer	Signature of the Contractor's representative Name & Agency Code	Signature of the Supervision Consultant Representative with Name

## **Section 8 .-**

**A** - The definition of Operational Acceptance in sub clause GCC 1.1 of SCC Sec 8 is deleted.

**C** - GCC 14.3 (ii) The existing sub clause is replaced by the sub clause reading as follows:

'The service tax shall be paid at applicable rate(s) by the Employer to the Contractor on erection and commissioning subject to the condition that the Contractor must be registered with the Central Customs and Excise Department for purpose of service tax.'

### **D - GCC 14.5 add new clause**

**(i)** The Contractor should quote same rate for identical common item( appearing in different schedule) for example Contractors has to quote same rate for 140 Kg PCC Pole in schedule number 2-A, 3-A , 4-A, etc.. In case there is difference in rates for identical item in different schedules, the highest rate will be considered for bid evaluation purpose; however the Contract shall be awarded on minimum rate quoted for that particular item.

**(ii)** The Contractor shall quote only one tax that is either VAT or CST for each item, the bids will be evaluated on the basis of the tax so quoted. The "C" form will be issued wherever applicable.

**(iii)** In case the Contractor supplies/procures material from out of state on which VAT was quoted earlier in the bid documents, the Contractor shall be paid only concessional CST applicable on such material. However, payment of such CST shall be restricted to the actual concessional CST applicable on such material or VAT amount quoted by the contractor in his bid, whichever is lower. In such cases, necessary C form will be issued on Contractor's request.

**(iv)** In case the contractors supply/procures the material within the state of MP on which CST was quoted earlier in the bid documents, the Contractor shall be paid only VAT applicable on such material. However, payment of such VAT shall be restricted to the actual VAT applicable on such material or CST amount quoted by the contractor in his bid, whichever is lower. However no C form will be issued in such cases.

**(v)** In case Goods & Service Tax (GST) Act is introduced by the Central or the state Govt. during the course of execution of this works contract, then the taxation part shall be revised accordingly for the performance of balance work including supply of material, erection in accordance to sub-clause 14.4 of GCC.

(vi) That the service tax shall be paid as applicable by the employer on erection, commissioning subject to the condition that the contractor must be registered with the Central Customs and Excise Department for payment of service tax.

E - GCC 25.3.1 of SCC is deleted.

F - GCC Clause 28 of SCC - "This clause is deleted" is deleted.

G- GCC 21.3.3 Clause 21 of SCC – Delete word "VCBs"

## **Section 9 – Contract Agreement –**

**A** – In sub clause 2.1 of Article 2, the word "Price Schedule No. 5" is replaced by the words "Price schedule No 3 "

**B-** In sub clause 2.2 of Article 2, the word "reimburse" is replace by the word "make payment".

**C** - "Appendix 1 – Terms & Procedure of Payment"

In sub clause 1.2 the words 'seventy (70)', is replaced by words 'seventy five (75).

Sub clause 1.3 is modified to read as follows:

1.3 (a) Balance fifteen (15) percent of Contract Price of distribution transformers, AAA conductor, AB cable and LT energy meters along with the amount of the taxes shall be released within forty five (45) days after Operational Acceptance, on submission of bills.

(b) For the rest of the plant, seventy five (75) percent of the Contract Price alongwith the taxes, as applicable, shall be released within forty five (45) days of the Commissioning of the plant, on submission of the bills.

(c) Balance fifteen (15) percent of the Contract Price for the rest of the plant alongwith the taxes, as applicable, shall be released within forty five (45) days of the Operational Acceptance, on submission of the bills.

(d) However in case of 11 KV feeder supplying power to agricultural pumps, as defined in sub clause 2.3 (a),

(i) Balance fifteen (15) percent of Contract Price of distribution transformers, AAA conductor, AB cable and LT energy meters along with the amount of the taxes shall be released within forty five (45) days after Commissioning of the plant and on submission of bills.

(ii) 90 % of the Contract Price for the rest of the plant alongwith the taxes as applicable, shall be paid within 45 days of commissioning of the plant upon submission of bills.

**D** – The existing sub clause 2.2 is modified to read as follows:

2.2 (a) On Commissioning of the 11 KV feeder, 75% of the installation charges (including service tax) for the plant, as per the contract, shall be paid progressively upon certification by the Employer's representative for the quantum of work

commissioned within 45 days upon submission of documents specified in payment procedure.

(b) On Operational Acceptance of the 11KV feeder, balance Fifteen (15%) percent of installation charges (including service tax) of the plant shall be released after Operational Acceptance within 45 days from the date of production of bill by the contractor.

(c) However in case of 11 KV feeder supplying power to agricultural pumps, as defined in sub clause 2.3 (a), 90 % of the installation charges (including service tax) for the plant, as per the contract, shall be paid progressively upon certification by the Employer's representative for the quantum of work commissioned within 45 days upon submission of documents specified in payment procedure.

E – 8.0 Validity of Price variation

Add words “of individual item on which PV is admissible” after words ‘1% of the Contract Price’ in sub clause 8.1 (a)

#### **Appendix 4 – Time schedule**

F - Clause 10.1 is modified to read as follows:

**10.1** The time for survey, consumer indexing, and assets mapping; Completion and Commissioning of Facilities of all the Lots is eighteen (18) months from effective date as per following schedule:

Stage I - 70% survey, consumer indexing, and assets mapping; and Completion and Commissioning of Facilities or part thereof to the extent of 10% of the contract price within six (6) months of Effective Date.

Stage II – 100% (cumulative) survey, consumer indexing and assets mapping within 9 months and Completion and Commissioning of the Facility or part thereof to the extent of 50% (cumulative) of the Contract Price within twelve (12) months of Effective Date.

Stage III – Supply, installation testing, completion and commissioning of the Facility or part thereof to the extent of 100% (cumulative) of the Contract price within eighteen (18) months of Effective Date.

**G-** Words ‘six (6)’ are replaced by words ‘nine (9)’ in sub clause 10.3

**H - Words ‘twenty four (24)’ are replaced by words ‘eighteen (18)’ in sub clause 10.4**

I - Appendix 5

In the note under sub clause 11.1 the words ‘LT meter single phase’ are replaced by words ‘LT consumer meters’.

J – Appendix 6 the word ‘sag’ in the note below the table is deleted.

**K - A new Appendix after Appendix 7 read as follows is added.**

#### **14 Appendix 8 - Functional Guarantee**

**14.1 (a)** On commissioning of 11 kV feeder and all the associated work like distribution transformers, LT line, whether new or replacement of conductor, replacement of service lines and replacement/ shifting of energy meters (Facility or part thereof)

as specified in, sub clause 2.3 (b) of Appendix 1 above, the distribution loss will be brought down to maximum 12% in each distribution transformer connected to such 11 kV feeder. The distribution loss shall be calculated as follows:

% distribution loss = (Units sent out from LT side of the distribution transformer - units billed to all consumers connected to that transformer) x 100 / Units sent out from LT side of the distribution transformer.

(b) the Functional Guarantee shall not apply to the 11 KV feeders and the associated works as defined in sub clause 2.3 (a) of Appendix 1 of Sec 9.

**14.2** On commissioning of 11 kV feeders supplying power to 'abadi' area of the village distribution loss shall be calculated for a period of three (3) months for the distribution transformers connected to such feeder. Period of three months shall be reckoned from the month following the month in which 11 kV feeder was commissioned.

**14.3** Liquidated Damages as per the formula given below shall be payable by the Contractor where the distribution loss in a distribution transformer is in excess of 12%.

Liquidated Damages (Rs.) = 0.15 x Contract Price of works as specified in sub clause 2.3 (b) of Appendix 1 of Sec 9 x (Number of distribution transformers where distribution loss are in excess of 12% / total number of distribution transformers connected to such 11 KV feeder).

In case the percentage of distribution transformer where the distribution losses are more than 12% but within 20%, does not exceed 15% of total number of distribution transformers connected to such 11 kV feeder, Liquidated Damages shall not be levied.

**14.4** Liquidated Damages on account of distribution loss shall not be more than 2.5% of the Contract Price as a whole. *This liquidated damages is in addition to LD as mentioned in Vol.-I, Section-8, SCC Sub clause, GCC-26.2*

**14.5** Liquidated Damages shall be recovered from the pending bills of the Contractor or from the performance Guarantee. Once, Liquidated Damages have been recovered, operational acceptance for that particular feeder shall be conveyed in writing to the Contractor.

## Volume II

### Section 1 – Commercial Questionnaire

**A** – At Sl. No. 27, the word “experience of 5 years” is replaced by “experience of 3 years”

**B** – In Section 4 – Bidding Forms - Typological mistake in Sl. No. 31 should be read as 34 and further numbering is done in ascending order up to 49.

**C** – After re-numbering, Sl. No. 34 (old S.No.31) following sentences are added –

(i) Please confirm that Excise Duty, Sales Tax and VAT are indicated separately in Schedule No.1?

(ii) Please confirm that service tax is indicated separately in Schedule no 2.

(iii) Please confirm that you have quoted same rate for identical common item appearing in different schedules as per requirement of sub clause 8 Price Schedule section -4 Volume – I .

**D** - Sl. No. 35 (old S.No.32), words “clause ITB 39.1” is replaced by words “clause ITB 39.3”

**E** - Sl.No.47 (old Sl.No.44(b)) words ‘as prevailing on first working day of the month one month prior to date of bid opening’ are replaced by words ‘as per appendix 2 Price Escalation Section-9 of Vol.-I’.

### Section 2 – Technical Questionnaire

**A** - In Sl No 6, words “Twenty Four (24)” is replaced by the words “Eighteen (18)”

**B**- In Sl No 10, Words “or any other equivalent or superior software” **are added after word “Cymedist”**

**C** - In Sl No 18, Delete word “ No ADB/HVDS/EZ-3 Each of the earthing pole is to be connected through GS flat 25X6 mm. (PI check)

**D** - In Sl No 19 vi, words “ three years from the date of commissioning ” are replaced by words “seven hundred twenty days from the completion of facility or six hundred ninety days from the date of Operational Acceptance”

**E** - In Sl No 20 i, words clause ITB 16.1(d) “and “forty five (45) days” by words “ITB 14.1(b)” and “ twenty eight (28) days” respectively.

### Section - 3 – Schedule

**A** - In main Schedule indicating quantities for different Lots (S. N. 1 to 23), new schedules 24 & 25 are added as **enclosure – 2**.

**B** - In Material & Erection schedules (1-A to 23-A), new schedules 24-A & 25-A are added as **enclosure – 3**

**C** - The modified format of schedule (1-A to 23-A) is enclosed as **enclosure -4**

**D** - Sl no 17 of Schedule and Schedule 17-A  
Delete – Other than below poverty line consumers

**E** – In main Schedule indicating quantities for different Lots (S. N. 1 to 23), Particulars of S.N. 9, 10, 11, 12 & 13 written as ‘3- phase 4-wire’ is replaced by “3- phase 5-wire”.

**F** - In main Schedule indicating quantities for different Lots (S. N. 1 to 23), Add words “for renovation of existing distribution transformer and” after word ‘schedule’ in particular of S.N. 20.

**Section - 4 – Technical specification of material.**

- A) SI.No.9 – 11 kV Isolators – 9.9 Post Insulators – 2<sup>nd</sup> line – word “two” is replaced by “three”.
- 9.8.1 Connectors – 2<sup>nd</sup> line – words “AAA Raccoon/ Dog conductor” is replaced by words “ACSR Panther”
- B) SI.No.12 – The “type & rating” for 11 KV VCB which is to be added at the beginning of the specification is enclosed as **enclosure - 5**.
- C) SI No 13, Sub Clause 13.14.2 “ Feeder Protection” 3<sup>rd</sup> line- Words “2% to 200%” are replaced by words “2% to 150%”.

D) Technical specification of three phase whole current meter is added as SI. No. 42.(**enclosure –6**)

E) Technical specification – SI no 39  
In the first para of the technical specification of 3 phase 4 wire tri vector Energy meter for DTR metering, after the words 3x240 volt the word ‘ 40-200 A’ after the word ‘Static’ the word ‘(electronics)’ and after word ‘GSM Modem’ word ‘(GPRS enabled)’ may be added”. The GTP stands modified to that extent.

F) SI. No. 6 (11KV Pin insulator) the required technical specification of 11KV porcelain pin insulator is replaced by 11KV composite polymer pin insulator, the technical specification is enclosed as **enclosure-8**

G) Item SI No.7 (GS Pin for 11KV Pin Insulator is deleted)

H) SI. No. 8 (gapless 9KV lighting arrester) - The required technical specification of gapless 9 KV lightning arrester is replaced by 9 KV Polymer Lightning Arrester, the technical specification is enclosed as **enclosure-9**.

I) Item S.No.19 - DANGER BOARD – The plate shall be made from mild steel sheet of atleast 1.6mm thick or FRP based sheet moulding compound ( SMC ) of 2.00 mm thickness ( SMC as per IS:13410 )

J) Item S.No.32 - NUMBER PLATE – The technical specification of Number plate is deleted.

**K) Item S.No. 36 – Specification for accessories (clamps etc. suitable for AB cable)**

**(i) 36.4 suspension clamp assembly – Specifications amended to read as follows:**

**‘SUSPENSION CLAMP ASSEMBLY:**

- a) The suspension clamp shall conform to NFC 33-040 standard.
- b) The suspension clamp shall provide sufficient flexibility to allow for movement of clamp at both straight run and angle locations.
- c) The suspension clamp shall be capable of holding bare Al. Alloy messenger wire size of 50/ 35 /25 sq.mm.
- d) The suspension clamp shall have good finish and shall be free from all flaws, sharp radius of curvature and edges shall be suitably rounded off.
- e) The design of clamp shall be bolt-less, neutral messenger should be fixed by an adjustable grip device. There should not be any loos-able part in the process of clamping.
- f) The Suspension clamp shall be made fully of insulating type of mechanically strong and weather resistant plastic for protection of phase cable.
- g) The suspension clamp shall be provided with suitable Eye Hook & Pole Clamp to erect them on 8M PCC / Girder Poles having top and bottom dimensions as

per NFC 33-040 standard. However, the size and no. of pole clamps should be got confirmed invariably before supply.

h) The performance/ test requirements shall be as per NFC 33-040 standards.'

**(ii) 36.5 anchoring clamp/dead end clamp assembly – Specification are amended to read as under:**

**'ANCHORING CLAMP/ DEAD END CLAMP ASSEMBLY:**

(a)The anchoring clamp/ dead end assembly shall conform to NFC 33-041 standards.

(b)The anchoring clamp (dead end assembly) shall be capable of holding bare Al. Alloy messenger wire size of 25sq.mm, 35sq.mm and 50sq.mm respectively.

(c) The anchoring clamp/ dead end assembly shall have good finish and shall be free from all flaws, sharp radius of curvature and edges shall be suitably rounded off.

(d)The design of clamp shall be boltless i.e. no tools required to clamp the messenger wire. Wedge type clamps shall be used for clamping the messenger without damaging the strands of the bare messenger. The clamp shall be of aluminium body with fully insulating type of mechanical and weather resisting thermoplastic wedges.

(e)The Anchoring Clamp shall be supplied with a stainless steel flexible Rope to connect the Tension Clamp to the Eye Hook. The flexible Rope forming part of clamp should be of length to maintain at least 150mm distance between Eye Hook and body of clamp. The rope should have sufficient flexibility to ease the torsional movement of the ABC system

(f)The anchoring clamp/ dead end assembly shall be provided with suitable Eye Hook & Pole Clamp to erect them on 8M PCC/ Girder Poles having top and bottom dimensions as per NFC 33-041 standards. However, the size and no. of pole clamps should be confirmed invariably before supply.

(g)The performance/ test requirements shall be as per NFC 33-041 standards.'

L) Item S.No. 37 – LT distribution Box spring loaded for Three & Single phase –

**(i) 37.2 Material & Construction of the enclosure –** the specification is modified to read as under –

The box (enclosure) shall be made of UV resistant Fire Retardant Polycarbonate or thermosetting plastic (Glass reinforced polyester Sheet Moulding Compound) SMC conforming to IS-13410:1992 capable of withstanding boiling water for 10 minutes without deformation of box material. The heat deflection temperature of the box material should be 125<sup>0</sup>C @ 0.45 mpa. The flammability rating of the material as per UL 94 should be V0. The process adopted for manufacture of these boxes should be injection/Hot press Compression moulding process.

(ii) 37.2 (b) The Dimension & General details shall be as per GTP and specs. approved by the purchaser and suitable to purchaser's requirement.

a)The internal dimensions of the box (enclosure) for single phase 1 incoming and 5 outgoing should be :350x270x200 mm ±5%

b)The internal dimensions of the box (enclosure) for three phase 1 incoming and 2 outgoing should be: 400x300x200 mm ± 5%.

The other Dimensions & General details shall be as per Specification / GTP.

(iii) 37.3(a) – Components – may be read as under –

'The box shall have concealed type hinges, no screws/rivets visible from outside.'

**The opening of the box cover should be from downside to upside, Lock and key arrangement with push button. Side opening of box is not acceptable.**

(iv) 37.6 – Type test on Distribution box is modified to read as under: –

The following tests have to be done on any one model of spring loaded constant pressure multi connection busbar in insulated box from NABL accredited laboratories only. In absence of these tests the tender will be liable for rejection.

S N	Standard	Clause	Requirement	Test Particulars		
				Type	Routine	Acceptance
1	IS:14772	7	Marking	T		A
2	AS per specs & GTP	-	Dimensions	T	-	A
3	IS:14772	9	Protection against electric shock	T	R	-
4	IS:14772	12	Resistance to aging to humid conditions, to ingress solid object & to harmful ingress of water IP:55	T	-	-
5	IS:14772	13	Test for mechanical strength	T	-	-
6	IS:14772	14	Resistance to heat	T		
7	IS:14772	16	Resistance to rusting	T		
8	IS:14772	17	Resistance to tracking	T		
9	IS:14772/ IEC 695-2-1		Glow wire test at 95°C	T		
10	IS:8623		Verification of dielectric properties	T		
11	IS:13411		Heat deflection test of 150°C at 0.45 MPa	T		
12	IS:4249	3.5.1	Test for self extinguishing properties	T		
13	IS:11731-II		Flammability test	T		
14	Of/ At NABL Lab		Enclosure material identification	T		A
<b>Following tests are to be conducted for bus bar</b>						
15			Temperature rise at 200 Amp	T		
16	IS:2683-I		Verification of electric properties of molded casing of bus bar at 2.5KV	T		
17	IS:11000-I/ IEC 695-2-1		Glow wire test at 95°C of molded casing of bus bar	T		
18	Of/ At NABL Lab		Bus bar casing material identification	T		A

**General construction practice –**

Following new paras are added:

- a) Sl.No. 16 construction practice for laying consumer service line, and
  - b) Sl.No. 17– Meter Board
- as **enclosure – 7**

**Specification for 100KVA 11/.4KV Transformer Distribution cum Protection Box – Enclosure-10**

**Drawing –**

Following new drawings are added–

- (i) Drawing No. 51 – Drawing for earthing arrangement at road crossing .
- (ii) Drawing No. 52 – Lightning Arrestors
- (iii) Drawing No. 53 – Meter Board .
- (iv) Drawing No. 54 – Consumer Service Line
- (v) Drawing No.55 – 11 KV V Cross Arm & Clamps
- (vi) Drawing No.56 – 100KVA Distribution Box.
- (vii) Drawing No.39(Rev) – Danger Board

**ENCLOSURE - 1**

1/3

<b>Schedule -1 Schedule of Rates &amp; Prices for Plant supplied from within the country</b>										
S.N.	Description	Unit	Quantity	TOTAL Ex works cost of respective schedule in Rs	TOTAL Excise Duty of respective schedule in Rs	TOTAL CST of respective schedule in Rs	TOTAL VAT of respective schedule in Rs	TOTAL Any other tax / duty of respective schedule in Rs	Total cost of respective schedule inclusive of all taxes & duties in Rs <b>(5+6+7+8+9)</b>	Total cost of the material for full quantity inclusive of all taxes & duties in Rs <b>(10 X 4)</b>
1	2	3	4	5	6	7	8	9	10	11
1	Schedule - 1 A									
2	Schedule - 2 A									
.....	.....									
.....	.....									
23	Schedule 23-A									
<b>TOTAL Rs.</b>										
<p>Place :</p> <p>Date :</p> <p style="text-align: right;">Signature of Bidder</p> <p><b>Note :</b></p> <ol style="list-style-type: none"> <li>1 In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .</li> <li>2 Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy &amp; soft copy the rates indicated in hard copy as above shall prevail .</li> <li>3 Col. No. 4 - Lot wise quantity is to be taken from Respective schedules (1 to 23 ) Section-3 Volume 2</li> <li>4 Col. No. 5 - Total Ex-works cost of respective schedule is to be filled in this column.</li> <li>5 Col. N. 6,7 &amp; 8 -Total Excise Duty , CST and VAT of respective schedule is to be filled .</li> <li>6 Col. No. 9 - Total any other taxes &amp; duty of respective schedule is to be filled .</li> </ol>										

Schedule -2 Schedule of Rates & Prices for installation including survey, consumer indexing, asset mapping, erection , commissioning & other services								
S.N.	Description	Unit	Quantity	Total Erection Cost of respective schedule in Rs	Total Service tax of respective schedule in Rs	TOTAL Any other tax / duty of respective schedule in Rs	Total erection cost of respective schedule inclusive of all taxes & duties in Rs (5+6+7)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs (8 X 4)
1	2	3	4	5	6	7	8	9
1	Schedule - 1 A							
2	Schedule - 2 A							
.....	.....							
.....	.....							
23	Schedule 23-A							
TOTAL								

Place :  
Date :

Note : Signature of Bidder

- 1 In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .
- 2 Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .
- 3 Col. No. 4 - Lot wise quantity is to be taken from Respective schedules (1 to 23 ) Section-3 Volume 2
- 4 Col. No. 5 - Total erection cost of each respective schedule **excluding** all taxes & duties to be filled in this column.
- 5 Col. N. 6 -Total service tax of respective schedule is to be filled in this column.
- 6 Col. N. 7 -Total any other tax / duty of respective schedule is to be filled in this column.
- 7 No cost towards railway crossing clearance , forest clearance & electrical inspectorate clearance for charging lines & sub stations is to be loaded in price schedule . These charges shall be reimbursed on actual basis .

<b>Schedule No. 3 - GRAND SUMMARY</b>		
Schedule No.	TITLE	TOTAL IN Rs
1	Plant supplied from within the Employer's country	
2	Installation including survey , consumer indexing , asset mapping, erection , testing , commissioning & other services	
<b>GRAND TOTAL</b>		
<p>In words Rs .....</p> <p>Name of Bidder - .....</p> <p>Signature of Bidder .....</p> <p>Note :-</p> <ol style="list-style-type: none"> <li>1. The above Grand Total to be carried forward in letter of Bid</li> <li>2. Schedule 1,2&amp; 3 are to be furnished separately for each lot namely LOT no I , II , III .</li> </ol>		

**ENCLOSURE - 2**

(iv) Add following schedule after sl no 23

**Schedule S.No. 24 & 25.**

S. No.	Particulars	Unit											
			Lot I	Lot II	Lot III	Lot IV	Lot V	Lot VI	Lot VII	Lot VIII	Lot IX	Lot X	Lot XI
24	Providing three phase new connection as per schedule-24(A)	No	167	146	278	171	337	330	189	434	154	139	137
25	Replacement of single phase/ 3 phase stop / defective meter as per schedule-25(A)	No	1673	1464	2785	1719	3372	3301	1893	4346	1547	1393	1378

**ENCLOSURE - 3****MATERIAL & ERECTION SCHEDULE 24 - A****Providing new three phase connection**

Schedule of works for supply of materials , survey, erection, installation & commissioning of three phase new connection with meter in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST				GRAND TOTAL COL Rs ( 11+16 )	
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)		Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	New service connection with service line of 4.0 sq mm. four core aluminum conductor, armoured, PVC cable, 25 meter length.	No	1													
3	Shackle insulator 65x50mm	No	2													
4	PVC Bushes	No	2													
5	GI wire 10 SWG for support of service line , pipe & earthing	Kg	3													
6	Meter Board madeup of Fiberglass Reinforced Polyster (FRP) based sheet moulding compound (SMC) conforming to IS:13410 (1992). Minimum thckness 2.5 mm Size of meter board 400x400x28 mm. for fixing of meters along with earthing GS nuts and bolts and 2 washers. and 4 anchor bolts 6 mm	No	1													
7	Kit kat 32 Amps.	No	3													
8	Earthing connector	No	1													
9	G.I. Pipe 40mm for service line ISI mark "B" grade	Mtr	3													
10	G.I. Socket with band 40mm	No	2													
11	Wall clamp / hooks for pipe	No	2													

12	LT energy meters, 3Ø (phase) 4 wire ,10-40 amps Max. with poly carbonate cover.	No	1															
13	Sunderies ( for cement, tap, clips etc.)	LS	1															
	Note:	<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>						
	(1) Meter is to be installed at call bell/assessable location.	Place :																
	(2) Length of the service line indicated above is average. The Contractor will be paid for the service length as indicated above irrespective of the actual length of wire used.	Date :																Signature of Bidder
	<b>Note :</b>																	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

MATERIAL & ERECTION SCHEDULE 25 - A																
Replacement of Stop / Defective single phase/ three phase meter																
Schedule of works for supply of materials , survey, erection, installation & commissioning of new Single phase/ Three phase meter against stop / defective meters in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8 +9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Meter Board madeup of Fiberglass Reinforced Polyster (FRP) based sheet moulding compound (SMC) conforming to IS:13410 (1992). Minimum thckness 2.5 mm Size of meter board 400x400x28 mm. for fixing of meters along with earthing GS nuts and bolts and 2 washers. and 4 anchor bolts 6 mm	No	1													
2	Kit kat 32 Amps.	No	3													
3	LT energy meters, 3Ø (phase) 4 wire ,10-40 amps Max. with poly carbonate cover.	No	1													
4	LT energy meters, 1Ø phase, 30 amps Max. with poly carbonate cover.	No	1													
5	Internal wiring for three phase supply with PVC cable, unarmoured stranded copper conductor, four core 6.0 sq.mm. length limited to maximum of 5 meter per connection.	No	1													
6	GI wire 10 SWG	kg	3													
Note:				TOTAL OF COL. 11							TOTAL OF COL 16					
(1) Meter is to be installed at call bell/assessable location.		Place :														
(2) Length of the service line and for internal wiring indicated above is average. The Contractor will be paid for the service length and the internal wiring as indicated above irrespective of the actual length of wire used.		Date :														Signature of Bidder
(3) All old materials ie service wire, internal wiring material, energy meter etc are to be returned to the area stores of the Employer.																
<b>Note :</b>																
1 In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																
2 Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																
3 Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																
4 <b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																
5 <b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																
6 <b>Col. No. 12</b> - Description shall be as under -																
i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India )																
ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works .																
iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance																

	& Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .

## ENCLOSURE - 4

<b>MATERIAL &amp; ERECTION SCHEDULE 1 - A</b>																
<b>Extension of 11 KV Bay in Existing 33/11 KV sub station</b>																
Schedule of works for supply of materials , survey, erection, installation & commissioning of 11 KV additional bay in existing 33/11 KV sub station in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex work s cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VA T per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8 +9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax /duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Bus bar structure for additional bay on 11 KV side double welded RS Joist 175x85 mm 8.0 M long (328 Kg)	No	2													
2	R.S. Joist 175x85 8 Mtr long for Metering DP	No	2													
3	DC cross arm galvanized channel 100x50x6mm 4.8 M centre (99.84 Kg) for bus bar. (Drg.No.DISCOM/WZ/1 )	Set	6													
4	DC cross arm galvanized channel 100x50x6mm 8 feet centre 2.8 Mtr 56.3 Kg	Set	1													
5	DC cross arm galvanized channel 100x50x6mm 8 feet centre 2.8 Mtr 56.3 Kg for ME mounting	Set	1													
6	11 KV disc insulator	No	21													
7	11 KV strain hardware suitable for ACSR conductor 200 sq. mm. Panther.	No	21													
8	11 KV pin insulator	No	3													
9	11 KV LA,	No	3													
10	11KV isolator (600 amp)	Set	1													
11	Terminal clamps for isolator suitable for ACSR conductor 200 sq.mm, Panther.	No	6													
12	Cement for concreting of structure (concrete mixture 1:3:6)	cmt	1.9													
13	ACSR conductor 200 sq. mm. Panther	Km	0.1													
14	Terminal clamps for jumpering of ACSR conductor 200 sq. mm Panther.	No	12													
15	11KV feeder control VCB	No	1													
16	11KV Control panel.	No	1													
17	11KV combined CT/PT unit 200/100/5 amp.	No	1													
18	HT tri vector meter (110V/ -5 amp)	No	2													

19	Cement for VCB foundation (concrete mixture 1:3:6)	cmt	3.5															
20	Copper Control cable 2 core 2.5 sq. mm (unarmoured)	Mtr	50															
21	Copper Control cable 4 core 2.5 sq. mm (unarmoured)	Mtr	80															
22	Copper Control cable 8 core 2.5 sq. mm (unarmoured)	Mtr	50															
23	Copper Control cable 12 core 2.5 sq. mm (unarmoured)	Mtr	120															
24	Galvanized Nuts & bolts with washer.	Kg	20															
25	Painting of structure & bay indication board	LS	LS															
26	Cable trench for laying control cable alongwith cover for cable trench of pre-cast concrete.	Mtr	50															
Note: HT Tri-vector energy meter is to be installed in the Control room.																		
<b>TOTAL OF COL. 11</b>											<b>TOTAL OF COL 16</b>							
Place :																		
Date :																		
<b>Note :</b>																		
																	Signature of Bidder	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	<b>Col. No. 5</b> - Price shall include all custom duties and CST , VAT and other taxes already paid or payable <b>on the components raw materials used in the manufacture or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under -																	
	i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India )																	
	ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works .																	
	iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

**MATERIAL & ERECTION SCHEDULE 2 - A****11 KV Lines on 140 Kg 8 Mtr long PCC pole**

Schedule of works for supply of materials , survey, erection, installation & commissioning of new 11 KV 3 phase line on PCC pole 140 Kg 8 Mtr long (maximum span 83 mtrs) in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long (Drg.No.DISCOWZ/9)	No	12													
2	Backfilling of PCC pole with boulders and ramming.	Set	12													
3	11 KV V-cross arm galvanized angle 65x65x6 mm (11 Kg) (Drg. no. DISCOM/WZ/55)	Set	12													
4	Back clamp galvanized MS Flat 50x6 (1.2 Kg) (Drg. no. DISCOM/WZ/55)	No	12													
5	11KV Top clamp galvanized angle 65x65x6mm (3 Kg) (Drg. no. DISCOM/WZ/55)	No	12													
6	11 KV Pin insulator	No	36													
7	AAA conductor 55 sq. mm. Rabbit with 3% sag.	Km	3.1													
8	Jointing sleeves suitable for AAA conductor 55sq. mm Rabbit.	cmt	6													
9	Earthing set (coil earth) (Drg.no.DISCOWZ/46)	No	12													
10	Galvanised stay set 16mm complete with turn buckle, stay insulator and anchor plate . (Drg. no. DISCOM/WZ/29)	Set	4													
11	Stay clamp galvanized flat 50x6mm (1.35 Kg)	Set	4													
12	Stay wire 7/3.15 mm. (5.5 Kg) per stay set.	Kg	22													
13	Stone block /RCC base plate size 450X450X75 mm ( 3 no per stay & 1 no per pole for base padding as per drawing no .DISCOM/WZ/47 & 48)	No	24													
14	Anti-climbing devices	No	12													

15	11KV danger board (Drg. No. DISCOM/WZ/39)	No	12														
16	Numbering on poles	No	12														
17	Binding wire and tape	Kg	3														
18	Galvanized nuts & bolts with washer (assorted size)	Kg	14														
		<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>					
Place :																	
Date :																	
<b>Note :</b>																	Signature of Bidder
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																
3	<b>Col. No. 5</b> - Price shall include all custom duties and CST , VAT and other taxes already paid or payable <b>on the components raw materials used in the manufacture or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																

**MATERIAL & ERECTION SCHEDULE 3 - A****11 KV DP Structure on 140 Kg 8 Mtr long PCC pole**

Schedule of works for supply of materials , survey, erection, installation & commissioning of new 11 KV DP Structure 4 feet centre on PCC pole 140 Kg 8 Mtr long at every 1.6 Km of new 11 KV 3 Phase line in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long	No	2													
2	DC cross arm 4 feet centre galvanized channel 100x50x6 mm 2.2 M (53.4 kg) (Drg. No. DISCOM/WZ/20)	Set	1													
3	11KV disc insulator	No	6													
4	11KV strain hardware	No	6													
5	11KV pin insulator	No	2													
6	Horizontal and cross bracing set 4 feet centre with 4 back clamps made out of horizontal and cross bracing galvanized angle 50x50x6 mm (45 Kg) (Drg. No. DISCOM/WZ/20)	Set	1													
7	Galvanized stay set 16 mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	6													
8	Stay clamp for PCC pole 140 Kg 8.0 M long galvanized flat 50x6mm (1.35 Kg)	Set	6													
9	Stay wire 7/3.15 mm. (5.5 kg per stay)	Kg	33													
10	Cement concreting for pole and base padding @ 0.5 & 0.05 cmt per pole respectively (Concrete mixture 1:3:6).	cmt	1.1													

11	Cement for concreting of stay @ 0.3 cmt. per stay (Concrete mixture 1:3:6).	cmt	1.8																
12	Earthing set (coil earth) (Drg. no. DISCOM/WZ/46)	No	2																
13	Anti-climbing devices	No	2																
14	11KV danger board (Drg. no. DISCOM/WZ/39)	No	1																
15	Galvanized nuts & bolts with washer. (assorted size)	Kg	6																
16	Numbering on DP	No	1																
17	PG clamp, Aluminium grade T-1F as per IS 8309	No	6																
			<b>TOTAL OF COL. 11</b>											<b>TOTAL OF COL 16</b>					
Place :																			
Date :																			
<b>Note :</b>		Signature of Bidder																	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot . Location of the DP will be decided after actual survey .																		
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																		
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <i>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</i>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																		
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

**MATERIAL & ERECTION SCHEDULE 4 - A****11 KV DP for Tapping point on main 11 KV line on 140 Kg 8 Mtr long PCC pole**

Schedule of works for supply of materials , survey, erection, installation & commissioning of single PCC pole 140 Kg 8 Mtr long in between 11 KV 3 Phase main feeder for erection of 11 KV DP for tap line in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long	No	1													
2	11KV V-cross arm galvanized angle 65x65x6mm (11 Kg) (Drg. no. DISCOM/WZ/55)	No	1													
3	11KV top clamp galvanized angle 65x65x6mm (3 Kg) (Drg. no. DISCOM/WZ/55)	No	1													
4	Back clamp galvanized Flat 50x6 mm (1.2 Kg)	No	1													
5	11KV DC Cross Arm 4 ft centre, galvanized channel 100x50x6mm 2.2M (53.4Kg)	Set	1													
6	11KV pin insulator	No	6													
7	Horizontal and cross bracing set 4 feet centre with 4 back clamps made out of horizontal and cross bracing galvanized angle 50x50x6 mm (45 Kg) (Drg. No. DISCOM/WZ/20)	Set	1													
8	11KV disc insulator	No	3													
9	11KV strain hardware	No	3													
10	Galvanized stay set 16 mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	2													
11	Stay clamp galvanized flat 50x6mm (1.35 Kg)	Set	2													
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	11													

13	11KV danger Board (Drg. No. DISCOM/WZ/39)	No	1																
14	Anti-climbing device	No	2																
15	Galvanized nuts & bolts with washer	Kg	5																
16	Earthing set (coil earth) (Drg. no. DISCOM/WZ/46)	Set	1																
17	Cement concreting for pole and base padding @ 0.5 & 0.05 cmt per pole respectively (Concrete mixture 1:3:6).	cmt	0.6																
18	Cement for concreting of stay @ 0.3 cmt per stay (Concrete mixture 1:3:6)	cmt	0.6																
19	AAA conductor 55 sq.mm Rabbit for jumpering.	Mtr	6																
20	Numbering on pole	No	1																
21	PG clamp, Aluminium grade T-1F as per IS 8309	No	3																
Note: (1) Location of tapping DP will be decided as per actual survey.				<b>TOTAL OF COL. 11</b>								<b>TOTAL OF COL 16</b>							
(2) Arrangement of tapping location is indicated in drg no. DISCOM/WZ/21.																			
Place :																			
Date :																			
<b>Note :</b>												Signature of Bidder							
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot . Location of the DP will be decided after actual survey .																		
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																		
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																		
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

**MATERIAL & ERECTION SCHEDULE 5 - A****Raising the height for vertical clearance of 11 KV line**

Schedule of works for supply of materials , survey, erection, installation & commissioning for raising the height of 11 KV line on PCC pole 140 Kg 8 Mtr long for proper vertical clearance of line in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Extension cross arm made up of RS joist 1.5 M long 150x75 mm size (23Kg) with drilled holes for top clamp and V-cross arm fitting (if ground clearances is not sufficient; Drg. no. DISCOM/WZ/17).	No	2													
2	Guarding cross arm made up of Galvanized angle 65x65x6 mm 2.25 M long (13.2 Kg)	No	2													
3	Back cleats/clamp for tightening the guarding cross arm made up of Galvanized angle 50x50x6 - 200 mm long with drilled holes or clamp made up of Galvanized flat 50x6 mm	No	2													
4	I-bolt of Galvanized round bar 16 mm dia. rod fully threaded 380 mm long with galvanized nuts 2 Nos. in each bolt	No	8													
5	GI wire 8 SWG for guarding (one span of 67 M long)	Kg	17													
6	GI wire 3.15 mm. for lacing 1 M apart throughout the span.	Kg	16													
7	Galvanized Stay set 16 mm complete with turn buckle, stay insulator, anchor plate and I bolt. (Drg. no. DISCOM/WZ/29)	Set	2													
8	Stay wire 7/3.15 mm. (5.5 kg per stay)	Kg	11													
9	Stay clamp Galvanized flat 50x6 mm 1.35 Kg)	Set	2													
10	GI wire for lacing binding 24 SWG	Kg	1.5													
11	Cement concreting of stay @ 0.3 cmt per stay having concrete ratio 1:3:6	cmt	0.6													

12	Galvanized nuts and bolts with washer ( assorted size)	Kg	5															
13	Aluminum binding wire & tape	Kg	1															
14	Anti-climbing devices.	No	2															
15	Pipe earthing for road crossing etc on either side as per Drawing DISCOM/WZ/51	No	2															
Note: Location of road crossing where extension of height is required will be decided after actual survey.																		
<b>TOTAL OF COL. 11</b>											<b>TOTAL OF COL 16</b>							
Place :																		
Date :																		
<b>Note :</b>																		
																	Signature of Bidder	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

<b>MATERIAL &amp; ERECTION SCHEDULE 6 - A</b>																
<b>25 KVA 11/0.433 KV , 3 phase Distribution Transformer sub station</b>																
Schedule of works for supply of materials , survey, erection, installation & commissioning 25 KVA 11/0.433 KV Aluminium wound 3 phase distribution transformer sub station on PCC pole 140 Kg 8 Mtr long in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	25 KVA 11/0.4 KV Aluminium wound conventional type outdoor 3 phase distribution transformer with accessories.	No	1													
2	PCC pole 140 Kg 8.0 M long	No	2													
3	DC cross arm 8ft centre galvanized channel 100x50x6 mm 2.8 M (56.3 Kg)	Set	1													
4	11KV disc insulator.	No	3													
5	11KV strain hardware	No	3													
6	11KV DO fuse mounting DC cross arm galvanized channel 75x40x6 mm 2.8 M and bracing angle 35x35x5 mm with back clamp for supporting DO (28Kg)	Set	1													
7	11KV DO fuse unit	No	3													
8	11KV DO fuse wire 1.5 Amp	No	3													
9	Transformer clamping set galvanized angle 50x50x6 mm 1.4 M (6.5 Kg)	Set	1													
10	Galvanized stay set 16 mm complete with turn buckle and anchor plate (Drg. no. DISCOM/WZ/29)	Set	4													
11	Stay clamp PCC pole 140 Kg 8 M long galvanized flat 50x6 mm (1.35Kg )	Set	4													
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	22													
13	Concreting of pole and base padding @ 0.5 & 0.05 cmt per pole respectively (Concrete mixture 1:3:6)	cmt	1.1													
14	Cement for concreting of stay set @ 0.3cmt per stay (concrete mixture 1:3:6)	cmt	1.2													
15	Transformer belting galvanized angle with 2 cross fixing galvanized angle 50x50x6mm and back clamp (35.25 Kg)	Set	1													
16	Transformer mounting 8ft centre galvanized channel 100x50x6mm 2.8M (53.6Kg)	Set	1													
17	11KV danger board (Drg. No. DISCOM/WZ/39)	No	1													
18	Earthing for transformer substation (Drg. no. DISCOM/WZ/ 28 & 49)	Set	1													

19	Anti climbing devices.	No	1																
20	11KV LA	No	3																
21	Galvanized nut & bolts with washer	Kg	14																
22	Protection box (as per TS) containing 3nos. single pole MCCB 40amps rating, all accessories and wiring. (Drg. No. DISCOM/WZ/50)	No	1																
23	AB cable 25 sq mm for connecting 2 nos. LT feeder	Mtr	20																
24	PVC Aluminium cable armoured, 25 sq. mm. 4 core connecting LT bushing to energy meter and meter to MCCB.	Mtr	3																
25	LT Three Phase 4 wire 3x240 volts 40-200 Amp Static (Electronic) Tri-Vector energy meter of class 1.0 accuracy with GSM Modem (GPRS enabled)	No	1																
Note: Arrangement of DP structure for distribution transformer is indicated in Drg. No. DISCOM/WZ/2.																			
<b>TOTAL OF COL. 11</b>											<b>TOTAL OF COL 16</b>								
Date :																			
Signature of Bidder																			
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																		
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																		
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																		
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

**MATERIAL & ERECTION SCHEDULE 7 - A****Installation of 11 KV AB Switch on 11 KV line**

Schedule of works for supply of materials , survey, erection, installation &amp; commissioning of 11 KV AB Switch for sectionalizing 11 KV in rural area under 11 KV Feeder Separation Programme of O&amp;M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST				GRAND TOTAL COL Rs ( 11+16 )	
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)		Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	11 KV AB switch complete with square rod, pipe and handle (Drg. no. DISCOM/WZ/5)	Set	1													
2	Galvanized Angle 50x50x6 mm, 450 mm (2Kg) for tightening AB switch	No	3													
3	Galvanized angle 50x50x6 mm, 600 mm (2.7 Kg) for middle support	No	3													
4	Galvanized channel 75x40x6 mm 600 mm (4.5 Kg) for handle support.	No	2													
5	Galvanized angle 50x50x6 mm, 250 mm (1.125 Kg) for back support	No	2													
6	Galvanized nuts & bolts with washer (assorted size)	Kg	8													
7	T-clamp for jumper	No	6													
8	AAA conductor 55 sq. mm. Rabbit.	Mtr	8													
<b>Note:</b> Location for installation of 11KV AB switch will be decided after actual survey.				<b>TOTAL OF COL. 11</b>							<b>TOTAL OF COL 16</b>					
Place :																
Date :																
Continue page												Signature of Bidder				
<b>Note :</b>																
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .															
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .															
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>															
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .															
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.															
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .															
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .															

**MATERIAL & ERECTION SCHEDULE 8 – A**

**Replacement of existing AAAC/ACSR conductor by AAA conductor 55 sq.mm Rabbit on existing 11KV line**

Schedule of works for supply of materials , survey & replacement of existing AAAC/ACSR conductor by AAA 55 sq.mm rabbit conductor on existing 11 KV line in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Removal of existing AAAC/ACSR conductor from 11KV line.	Km Ckt	1	N/A						N/A						
2	Straightening of existing leaning poles and its back filling by boulders and ramming.	No	4	N/A						N/A						
3	Galvanized stay set 16 mm complete with turn buckle, stay insulator and anchor plate.	Set	2													
4	Stay wire 7/3.15 sq. mm. (5.5 Kg per stay)	Kg	11													
5	Stay clamp galvanized flat 50x6mm (1.35 Kg)	Set	2													
6	Stone block /RCC base plate size 450X450X75 mm ( 3 no per stay for base padding as per drawing no.DISCOM/WZ/ 47	No	6													
7	Stringing of AAA conductor 55 sq. mm Rabbit on existing 11KV poles with 3% sage.	Km	3.1													

8	Jointing sleeves suitable for AAA conductor 55sq.mm Rabbit.	No	6															
9	Binding wire and tape.	Kg	3															
	<b>Note:</b> (1) Replacement of conductor is to be done for identified main line excluding tap lines where the size of existing conductor is less than 55 sq. mm.	<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>						
	(2) Old replaced conductor is to be returned to concerned Area Stores of the employer.	Place :																
	(3) Damage/breakage to the extent of 2% of total quantity of poles shall be allowed. Damage / breakage beyond 2% of the total quantity shall be to the contractor's account	Date :																Signature of Bidder
	<b>Note :</b>																	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

<b>MATERIAL &amp; ERECTION SCHEDULE 9 - A</b>																
<b>LT line 3 phase 5 wire over head using AB cable XLPE 50 sq.mm on PCC pole 140 Kg 8 Mtr long</b>																
Schedule of works for supply of materials , survey, erection, installation & commissioning of LT line 3 phase 5 wire over head on PCC pole 140 Kg 8 Mtr long (maximum span 50 Mtr) using AB Cable XLPE 50 sq.mm in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long.	No	20													
2	Back filling of pole with bolder and ramming.	No	20													
3	Suspension clamp as per drawing no. DISCOM/WZ/34	No	15													
4	Dead end clamp as per drawing no. DISCOM/WZ/35	No	5													
5	Earth connector suitable for AB Cable with 6 sq.mm PVC wire for extending neutral from neutral / messenger wire to distribution box as per drawing no. DISCOM/WZ/32.	No	10													
6	Piercing connector Type –I suitable for AB cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no. DISCOM/WZ/ 40	No	4													
7	Piercing connector Type –II suitable for AB Cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no.DISCOM/WZ/ 40	No	16													
8	1100 Volts Grade AB XLPE cable 3x50 sq. mm. + 1x16 sq.mm +1x 35 sq mm including 3% sag	Km	1.03													
9	Galvanized stay set 16mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	9													
10	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	49.5													
11	Stay clamp galvanized flat 50x6 mm (1.35Kg)	Set	9													
12	Stone block / RCC base plate size 450x450x75 mm ( 2 no per stay and 1 no for pole ), drg. No. DISCOM/WZ/ 47 & 48	No	38													

13	Earthing set (coil earth) (Drg.no.DISCOM/WZ/ 46)	Set	5																		
14	Galvanized nut & bolts with washer (assorted size)	Kg	30																		
15	Numbering on PCC pole	No	20																		
16	LT danger board (Drg. no. DISCOM/WZ/ 38 )	No	20																		
17	Distribution Box three phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg. No. Discom/WZ/ 44) alongwith earthing with earth coil as per drawing.	No	2																		
18	Distribution Box single phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg no Discom/WZ/ 43 alongwith earthing with earth coil as per drawing.	No	8																		
19	AB Cable jointing kit of suitable size	Set	1																		
20	AB Cable end cap suitable size	Set	5																		
21	Anti-climbing devices @ 3.5 Kg_per pole.	No	20																		
22	Transfer of existing connections by way of disconnection and reconnection using service materials already in use.	No	20																		
Note: (1) Every fourth pole is to be earthed. (2) Arrangement of fixtures on the pole will be as given in Drg. No. DISCOM/WZ/25.																					
<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>											
Date :																					
<b>Note :</b>																					
																Signature of Bidder					
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																				
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																				
3	<b>Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																				
4	<b>Col. N. 6,7 &amp; 8 -The Excise Duty , CST and VAT may be quoted in respective coloumn .</b>																				
5	<b>Col. No. 9 - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes &amp; duty if loaded please indicate name of the tax &amp; present applicable tariff in percentage in separate sheet as encloser.</b>																				
6	<b>Col. No. 12 - Description shall be as under -</b>																				
	i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India )																				
	ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works .																				
	iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																				
7	<b>Col. No. 14 - Any other taxes &amp; duty if loaded please indicate name of the tax &amp; present applicable tariff in percentage in separate sheet as encloser .</b>																				

<b>MATERIAL &amp; ERECTION SCHEDULE 10 - A</b>																
<b>LT line 3 phase 5 wire over head using AB cable XLPE 25 sq.mm on PCC pole 140 Kg 8 Mtr long</b>																
Schedule of works for supply of materials , survey, erection, installation & commissioning of LT line 3 phase 5 wire over head on PCC pole 140 Kg 8 Mtr long (maximum span 50 Mtr) using AB Cable XLPE 25 sq.mm in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long.	No	20													
2	Back filling of pole with bolder and ramming.	No	20													
3	Suspension clamp as per drawing no. DISCOM/WZ/34	No	15													
4	Dead end clamp as per drawing no. DISCOM/WZ/35	No	5													
5	Earth connector suitable for AB Cable with 6 sqmm PVC wire for extending neutral from neutral / messenger wire to distribution box as per drawing no. DISCOM/WZ/32.	No	10													
6	Piercing connector Type –I suitable for AB cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no. DISCOM/WZ/ 40	No	4													
7	Piercing connector Type –II suitable for AB Cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no.DISCOM/WZ/ 40	No	16													
8	1100 Volts Grade AB XLPE cable 3x25 sq. mm. + 1x16 sq.mm +1x 25 sq mm including 3% sag	Km	1.03													
9	Galvanized stay set 16mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	9													
10	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	49.5													
11	Stay clamp galvanized flat 50x6 mm (1.35Kg)	Set	9													
12	Stone block / RCC base plate size 450x450x75 mm ( 2 no per stay and 1 no for pole ), drg. No. DISCOM/WZ/ 47 & 48	No	38													
13	Earthing set (coil earth) (Drg.no.DISCOM/WZ/ 46)	Set	5													
14	Galvanized nut & bolts with washer (assorted size)	Kg	30													
15	Numbering on PCC pole	No	20													

16	LT danger board (Drg. no. DISCOM/WZ/ 38 )	No	20															
17	Distribution Box three phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg. No. Discom/WZ/ 44) alongwith earthing with earth coil as per drawing.	No	2															
18	Distribution Box single phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg no Discom/WZ/ 43 alongwith earthing with earth coil as per drawing.	No	8															
19	AB Cable jointing kit of suitable size	Set	1															
20	AB Cable end cap suitable size	Set	5															
21	Anti-climbing devices @ 3.5 Kg_per pole.	No	20															
22	Transfer of existing connections by way of disconnection and reconnection using service materials already in use.	No	20															
Note: (1) Every fourth pole is to be earthed. (2) Arrangement of fixtures on the pole will be as given in Drg. No. DISCOM/WZ/25.																		
<b>TOTAL OF COL. 11</b>											<b>TOTAL OF COL 16</b>							
Date :																		
<b>Note :</b>																		
																	Signature of Bidder	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

<b>MATERIAL &amp; ERECTION SCHEDULE 11 - A</b>																
<b>Replacement of AAAC/ACSR conductor by AB cable XLPE 50 sq.mm on Existing three phase LT line</b>																
Schedule of works for supply of materials , survey & Replacement of existing AAAC/ACSR conductor by using AB Cable XLPE 50 sq.mm on existing existing 3 phase LT line(maximum span 50 Mtr) in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long.	No	5													
2	Back filling of pole with bolder and ramming.	No	5													
3	Removal of existing AAAC/ACSR conductor from LT line	Km Ckt	1													
4	Straightening of existing Leaning poles & its back filling by boulder & ramming	No	6													
5	Suspension clamp as per drawing no. DISCOM/WZ/34	No	15													
6	Dead end clamp as per drawing no. DISCOM/WZ/35	No	5													
7	Earth connector suitable for AB Cable with 6 sqmm PVC wire for extending neutral from neutral / messenger wire to distribution box as per drawing no. DISCOM/WZ/32.	No	10													
8	Piercing connector Type –I suitable for AB cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no. DISCOM/WZ/ 40	No	4													
9	Piercing connector Type –II suitable for AB Cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no.DISCOM/WZ/ 41	No	16													
10	1100 Volts Grade AB XLPE cable 3x50 sq. mm. + 1x16 sq.mm +1x 35 sq mm including 3% sag	Km	1.03													
11	Galvanized stay set 16mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	5													
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	27.5													
13	Stay clamp galvanized flat 50x6 mm (1.35Kg)	Set	5													
14	Stone block / RCC base plate size 450x450x75 mm ( 2 no per stay and 1 no for pole ), drg. No. DISCOM/WZ/ 47 & 48	No	15													

15	Earthing set (coil earth) (Drg.no.DISCOM/WZ/ 46)	Set	5																
16	Galvanized nut & bolts with washer (assorted size)	Kg	10																
17	Numbering on PCC pole	No	20																
18	LT danger board (Drg. no. DISCOM/WZ/ 38 )	No	20																
20	Distribution Box three phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg. No. Discom/WZ/ 44) alongwith earthing with earth coil as per drawing.	No	2																
21	Distribution Box single phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg no Discom/WZ/ 43 alongwith earthing with earth coil as per drawing.	No	8																
22	AB Cable jointing kit of suitable size	Set	1																
23	AB Cable end cap suitable size	Set	5																
24	Anti-climbing devices @ 3.5 Kg_per pole.	No	20																
25	Transfer of existing connections by way of disconnection and reconnection using service materials already in use.	No	20																
<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>									
Note : - (a) Every fourth pole of LT line to be earthed . (b) Damaged stays are to be replaced by new one as & where require . (c) Balance LT conductor , old LT cross arm / U clamps are to be return to concern area store of the employer . (d) Damage / breakage to the extent of 2% of the total quantity of poles shall be allowed . Damage / breakage beyond 2% of the total quantity shall be to the contractors account .																			
<b>Date :</b>															Signature of Bidder				
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																		
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																		
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
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6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

<b>MATERIAL &amp; ERECTION SCHEDULE 12 - A</b>																
<b>Replacement of AAAC/ACSR conductor by AB cable XLPE 25 sq.mm on Existing three phase LT line</b>																
Schedule of works for supply of materials , survey & Replacement of existing AAAC/ACSR conductor by using AB Cable XLPE 25 sq.mm on existing 3 phase LT line (maximum span 50 Mtr) in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long.	No	5													
2	Back filling of pole with bolder and ramming.	No	5													
3	Removal of existing AAAC/ACSR conductor from LT line	Km Ckt	1													
4	Straightening of existing Leaning poles & its back filling by boulder & ramming	No	6													
5	Suspension clamp as per drawing no. DISCOM/WZ/34	No	15													
6	Dead end clamp as per drawing no. DISCOM/WZ/35	No	5													
7	Earth connector suitable for AB Cable with 6 sqmm PVC wire for extending neutral from neutral / messenger wire to distribution box as per drawing no. DISCOM/WZ/32.	No	10													
8	Piercing connector Type –I suitable for AB cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no. DISCOM/WZ/ 40	No	4													
9	Piercing connector Type –II suitable for AB Cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no.DISCOM/WZ/ 41	No	16													
10	1100 Volts Grade AB XLPE cable 3x25 sq. mm. + 1x16 sq.mm +1x 25 sq mm including 3% sag	Km	1.03													
11	Galvanized stay set 16mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	5													
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	27.5													
13	Stay clamp galvanized flat 50x6 mm (1.35Kg)	Set	5													
14	Stone block / RCC base plate size 450x450x75 mm ( 2 no per stay and 1 no for pole ), drg. No. DISCOM/WZ/ 47 & 48	No	15													
15	Earthing set (coil earth) (Drg.no.DISCOM/WZ/ 46)	Set	5													

16	Galvanized nut & bolts with washer (assorted size)	Kg	10																
17	Numbering on PCC pole	No	20																
18	LT danger board (Drg. no. DISCOM/WZ/ 38 )	No	20																
20	Distribution Box three phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg. No. Discom/WZ/ 44) alongwith earthing with earth coil as per drawing.	No	2																
21	Distribution Box single phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg no Discom/WZ/ 43 alongwith earthing with earth coil as per drawing.	No	8																
22	AB Cable jointing kit of suitable size	Set	1																
23	AB Cable end cap suitable size	Set	5																
24	Anti-climbing devices @ 3.5 Kg_per pole.	No	20																
25	Transfer of existing connections by way of disconnection and reconnection using service materials already in use.	No	20																
				<b>TOTAL OF COL. 11</b>								<b>TOTAL OF COL 16</b>							
Note : - (a) Every fourth pole of LT line to be earthed . (b) Damaged stays are to be replaced by new one as & where require . (c) Balance LT conductor , old LT cross arm / U clamps are to be return to concern area store of the employer . (d) Damage / breakage to the extent of 2% of the total quantity of poles shall be allowed . Damage / breakage beyond 2% of the total quantity shall be to the contractors account .																			
<b>Date :</b>																			
																		Signature of Bidder	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																		
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3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																		
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

<b>MATERIAL &amp; ERECTION SCHEDULE 13 - A</b>																
<b>Replacement of AAAC/ACSR conductor by AB cable XLPE 16 sq.mm on Existing three phase LT line</b>																
Schedule of works for supply of materials , survey & Replacement of existing AAAC/ACSR conductor by using AB Cable XLPE 16 sq.mm on existing 3 phase LT line (maximum span 50 Mtr) in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8 +9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long.	No	5													
2	Back filling of pole with bolder and ramming.	No	5													
3	Removal of existing AAAC/ACSR conductor from LT line	Km Ckt	1													
4	Straightening of existing Leaning poles & its back filling by boulder & ramming	No	6													
5	Suspension clamp as per drawing no. DISCOM/WZ/34	No	15													
6	Dead end clamp as per drawing no. DISCOM/WZ/35	No	5													
7	Earth connector suitable for AB Cable with 6 sqmm PVC wire for extending neutral from neutral / messenger wire to distribution box as per drawing no. DISCOM/WZ/32.	No	10													
8	Piercing connector Type –I suitable for AB cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no. DISCOM/WZ/ 40	No	4													
9	Piercing connector Type –II suitable for AB Cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no.DISCOM/WZ/ 41	No	16													
10	1100 Volts Grade AB XLPE cable 3x16 sq. mm. + 1x16 sq.mm +1x 25 sq mm including 3% sag	Km	1.03													
11	Galvanized stay set 16mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	5													
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	27.5													
13	Stay clamp galvanized flat 50x6 mm (1.35Kg)	Set	5													
14	Stone block / RCC base plate size 450x450x75 mm ( 2 no per stay and 1 no for pole ), drg. No. DISCOM/WZ/ 47 & 48	No	15													
15	Earthing set (coil earth) (Drg.no.DISCOM/WZ/ 46)	Set	5													

16	Galvanized nut & bolts with washer (assorted size)	Kg	10															
17	Numbering on PCC pole	No	20															
18	LT danger board (Drg. no. DISCOM/WZ/ 38 )	No	20															
20	Distribution Box three phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg. No. Discom/WZ/ 44) alongwith earthing with earth coil as per drawing.	No	2															
21	Distribution Box single phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg no Discom/WZ/ 43 alongwith earthing with earth coil as per drawing.	No	8															
22	AB Cable jointing kit of suitable size	Set	1															
23	AB Cable end cap suitable size	Set	5															
24	Anti-climbing devices @ 3.5 Kg_per pole.	No	20															
25	Transfer of existing connections by way of disconnection and reconnection using service materials already in use.	No	20															
				<b>TOTAL OF COL. 11</b>							<b>TOTAL OF COL 16</b>							
Note : - (a) Every fourth pole of LT line to be earthed . (b) Damaged stays are to be replaced by new one as & where require . (c) Balance LT conductor , old LT cross arm / U clamps are to be return to concern area store of the employer . (d) Damage / breakage to the extent of 2% of the total quantity of poles shall be allowed . Damage / breakage beyond 2% of the total quantity shall be to the contractors account .																		
<b>Date :</b>																	Signature of Bidder	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

<b>MATERIAL &amp; ERECTION SCHEDULE 14 - A</b>																
<b>Replacement of AAAC/ACSR conductor by AB cable XLPE 16 sq.mm on Existing Single phase LT line</b>																
Schedule of works for supply of materials , survey & Replacement of existing AAAC/ACSR conductor by using AB Cable XLPE 16 sq.mm on existing Single phase three wire LT line (maximum span 50 Mtr) in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST				GRAND TOTAL COL Rs ( 11+16 )	
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)		Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long.	No	5													
2	Back filling of pole with bolder and ramming.	No	5													
3	Removal of existing AAAC/ACSR conductor from LT line	Km Ckt	1													
4	Straightening of existing Leaning poles & its back filling by boulder & ramming	No	6													
5	Suspension clamp as per drawing no. DISCOM/WZ/34	No	15													
6	Dead end clamp as per drawing no. DISCOM/WZ/35	No	5													
7	Earth connector suitable for AB Cable with 6 sqmm PVC wire for extending neutral from neutral / messenger wire to distribution box as per drawing no. DISCOM/WZ/32.	No	8													
8	Piercing connector Type –I suitable for AB cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no. DISCOM/WZ/ 40	No	4													
9	Piercing connector Type –II suitable for AB Cable with 6 sq. mm. PVC wire for extending phase supply from IPC to distribution box as per drawing no.DISCOM/WZ/ 41	No	8													
10	1100 Volts Grade AB XLPE cable 3x16 sq. mm. +1x 25 sq mm including 3% sag	Km	1.03													

11	Galvanized stay set 16mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	5																
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	27.5																
13	Stay clamp galvanized flat 50x6 mm (1.35Kg)	Set	5																
14	Stone block / RCC base plate size 450x450x75 mm ( 2 no per stay and 1 no for pole ), drg. No. DISCOM/WZ/ 47 & 49	No	15																
15	Earthing set (coil earth) (Drg.no.DISCOM/WZ/ 46)	Set	5																
16	Galvanized nut & bolts with washer (assorted size)	Kg	10																
17	Numbering on PCC pole	No	20																
18	LT danger board (Drg. no. DISCOM/WZ/ 38 )	No	20																
19	Distribution Box single phase including accessories for fixing with pole suitable for AB XLPE cable. ( Drg no Discom/WZ/ 43 alongwith earthing with earth coil as per drawing.	No	8																
20	AB Cable jointing kit of suitable size	Set	1																
21	AB Cable end cap suitable size	Set	5																
22	Anti-climbing devices @ 3.5 Kg_per pole.	No	20																
23	Transfer of existing connections by way of disconnection and reconnection using service materials already in use.	No	20																
<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>									
Note : - (a) Every fourth pole of LT line to be earthed . (b) Damaged stays are to be replaced by new one as & where require . (c) Balance LT conductor , old LT cross arm / U clamps are to be return to concern area store of the employer . (d) Damage / breakage to the extent of 2% of the total quantity of poles shall be allowed . Damage / breakage beyond 2% of the total quantity shall be to the contractors account .																			
<b>Date :</b>															Signature of Bidder				
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																		
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																		
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																		
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

**MATERIAL & ERECTION SCHEDULE 15 - A****Shifting of existing 11/0.433 KV three phase distribution transformer sub station to new location for separation of agricultural pump consumers from other categories of consumer**

Schedule of works for supply of materials , survey, shifting, reinstallation & commissioning of existing 11/0.433 KV 3 phase distribution transformer sub station on PCC pole 140 Kg 8 Mtr long in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1*	Shifting of 11/0.433 KV outdoor type, 3 phase distribution transformer with accessories.	No	1	NA						NA						
2	PCC pole 140 Kg 8.0 M long	No	2													
3	DC cross arm 8ft centre galvanized channel 100x50x6 mm 2.8 M (56.3 Kg)	Set	1													
4	11KV disc insulator.	No	3													
5	11KV strain hardware	No	3													
6*	11KV DO fuse mounting DC cross arm galvanized channel 75x40x6 mm 2.8 M and bracing angle 35x35x5 mm with back clamp for supporting DO (28Kg)	Set	1	NA						NA						
7*	11KV DO fuse unit	No		NA						NA						
8	11KV DO fuse wire 1.5 Amp	No	3													
9*	Transformer clamping set galvanized angle 50x50x6 mm 1.4 M (6.5 Kg)	Set	1	NA						NA						
10	Galvanized stay set 16 mm complete with turn buckle and anchor plate. (Drg. no. DISCOM/WZ/ 29)	Set	4													
11	Stay clamp PCC pole 140 Kg 8 M long galvanized flat 50x6 mm (1.35Kg)	Set	4													
12	Stay wire 7/3.15 mm. (5.5 Kg per stay)	Kg	22													
13	Concreting for PCC pole & base padding @ 0.5 & 0.05 cmt per pole respectively (Concrete mixture 1:3:6)	cmt	1.1													
14	Cement for concreting of stay set @ 0.3cmt per stay (concrete mixture 1:3:6)	cmt	1.2													
15*	Transformer belting galvanized angle with 2 cross fixing galvanized angle 50x50x6mm and back clamp (35.25 Kg) (Drg. no. DISCOM/WZ/4)	Set	1	NA						NA						



**MATERIAL & ERECTION SCHEDULE 16 - A****Renovation of damaged single phase service line with new service line & fixing of energy meter where-ever required at call bell / assessable location**

Schedule of works for supply of materials , survey, erection, installation & commissioning of single phase service (damaged) line alongwith enegy meter where-ever required in rural area under 11 KV Feeder Separation  
 Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST				GRAND TOTAL COL Rs ( 11+16 )	
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)		Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Replacement of damaged old service line with new service line of 2.5 sq mm. twin core aluminum conductor, armoured, PVC cable, 25 meter length.	No	1													
2	Internal wiring for single phase supply with PVC cable, unarmoured, stranded copper conductor , single core 2.5 sq mm., length limited to maximum of 5 meter per connection.	No	1													
3	Shackle insulator 65x50mm	No	2													
4	PVC Bushes	No	2													
5	GI wire 10 SWG for support of service line , pipe & earthing	Kg	3													
6	Meter Board madeup of Fiberglass Reinforced Polyster (FRP) based sheet moulding compound (SMC) conforming to IS:13410 (1992). Minimum thckness 2.5 mm Size of meter board 300x400x28 mm. for fixing of meters along with earthing GS nuts and bolts and 2 washers. and 4 anchor bolts 6 mm	No	1													
7	Kit kat 16 Amps.	No	1													
8	Earthing connector	No	1													
9	G.I. Pipe 20mm for service line ISI mark "B" grade	Mtr	3													

10	G.I. Socket with band 20mm	No	2															
11	Wall clamp / hooks for pipe	No	2															
12	LT energy meters, 1Ø phase, 30 amps Max. with poly carbonate cover.																	
13	Sunderies ( for cement, tap, clips etc.)	LS	1															
	Note:	<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>						
	(1) Meter is to be installed at call bell/assessable location.	Place :																
	(2) Length of the service line and for internal wiring indicated above is average. The Contractor will be paid for the service length and the internal wiring as indicated above irrespective of the actual length of wire used.	Date :																Signature of Bidder
	(3) All old materials ie service wire, internal wiring material, energy meter etc are to be returned to the area stores of the Employer.																	
	<b>Note :</b>																	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																	
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																	
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																	
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																	
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																	
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																	

<b>MATERIAL &amp; ERECTION SCHEDULE 17 - A</b>																
Providing single phase meter to unmetered connections																
Schedule of works for supply of materials , survey, erection, installation & commissioning of Single phase meter to unmetered connection in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....																
S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8 +9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Meter Board madeup of Fiberglass Reinforced Polyster (FRP) based sheet moulding compound (SMC) conforming to IS:13410 (1992). Minimum thckness 2.5 mm Size of meter board 300x400x28 mm. for fixing of meters along with earthing GS nuts and bolts and 2 washers. and 4 anchor bolts 6 mm	No	1													
2	Kit kat 16 Amps.	No	1													
3	LT energy meters, 1Ø phase, 30 amps Max. with poly carbonate cover.	No	2													
	Note:	<b>TOTAL OF COL. 11</b>							<b>TOTAL OF COL 16</b>							
	(1) Meter is to be installed at call bell/assessable location.	Place :														
	(2) Length of the service line indicated above is average. The Contractor will be paid for the service length as indicated above irrespective of the actual length of wire used.	Date :							<b>continue page</b>							Signature of Bidder
	<b>Note :</b>															
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .															
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .															
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>															
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .															
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.															
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .															
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .															

**MATERIAL & ERECTION SCHEDULE 18 - A**

**Renovation of existing 11 KV Bay in 33/11 KV sub station**

Schedule of works for supply of materials , survey, erection, installation & commissioning for renovation of 11 KV Existing bay in 33/11 KV sub station in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8 +9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	11KV feeder control VCB	No	1													
2	11KV combined CT/PT unit 100/50/5 amp.	No	1													
3	HT trivector meter (110V/ -5 amp)	No	1													
4	Cement for VCB foundation (concrete mixture 1:3:6)	cmt	3.5													
5	Copper Control cable 2 core 2.5 sq. mm (unarmoured)	Mtr	50													
6	Copper Control cable 4 core 2.5 sq. mm (unarmoured)	Mtr	80													
	Copper Control cable 8 core 2.5 sq. mm (unarmoured)	Mtr	50													
	Copper Control cable 12 core 2.5 sq. mm (unarmoured)	Mtr	120													
7	Galvanized Nuts & bolts with washer.	No	2													
9	Terminal clamps for jumpering of AAA conductor 85sqmm Racocon.	No	6													
10	AAA conductor Racocon 85 sq. mm.	Mtr	40													
	Note: (1) Lay put & arrangement will be as per drg. no. DISCOM/ WZ/ 1.	<b>TOTAL OF COL. 11</b>							<b>TOTAL OF COL 16</b>							
	(2)Tri-vector energy meter is to be installed in the Control room.															
	(3) If any existing material is damaged/ worn out and require replacement, then such materials may be included but it should be based on the actual survey and got approved by the Project Manager. Rates for such materials shall be as given in schedule 1 –A.															
	Place :															
	Date :															Signature of Bidder
	<b>Note :</b>															
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .															
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .															
3	<b>Col. No. 5</b> - Price shall include all custom duties and CST , VAT and other taxes already paid or payable <b>on the components raw materials used in the manufacture or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>															
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .															
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.															
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .															
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .															

**MATERIAL & ERECTION SCHEDULE 19 - A**

**Replacement of existing AAAC/ACSR conductor by PVC cable unarmoured , twin core 6.0 sq.mm on existing LT line**

Schedule of works for supply of materials , survey & replacement of existing AAAC/ACSR conductor by PVC cable unarmoured , twin core 6.0 sq.mm on existing LT line ( maximum span 50 Meter )in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )	
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X 4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	Removal of existing AAAC/ACSR conductor alongwith accessories from LT line.	km ckt	1														
2	Straightening of existing leaning poles and its back filling by boulders and ramming.	No	1														
3	PVC cable, 1100 Volts grade twin core, unarmoured, 6 sq. mm. with 3% sag.	km	1.03														
4	GI wire 8 SWG	Kg	75														
Note: (1) Existing LT shackle insulators & U clamps are to be used for fixing of PVC cable.				<b>TOTAL OF COL. 11</b>							<b>TOTAL OF COL 16</b>						
(2) Balance LT conductor, old LT cross arms / U clamps are to be returned to concerned Area Stores of the Employer.																	
(3) <b>This arrangement is to be done in cases where number of consumers to be served are not more than 2.</b>																	
		Place :															
		Date :								continue page						Signature of Bidder	
<b>Note :</b>																	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																

**MATERIAL & ERECTION SCHEDULE 20 - A**

**Renovation of existing Transformer and Installation and commissioning of energy meter on existing distribution transformer .**

Schedule of works for supply of materials , survey & installation & commissioning of energy meter and renovation of existing distribution transformer substation in abadi area in rural area under 11 KV Feeder Separation Programme of O&M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	XLPE insulated single core 50 sq mm cable	Mtr	20													
2	LT Three phase 4 wire 3x240 volts 40-200 Amp Static ( Electronic ) Tri-Vector energy meter of class 1.0 accuracy with GSM Modem ( GPRS enabled )	No	1													
3	Distribution Box suitable for 100KVA Transformer	No	1													
4	Painting of Distribution Transformer Body. Existing surface of the equipments sheets shall be de-rusted by means of emery paper / wire brush and then cleaned. Thereafter two or more coats of red oxide zinc chromate primer paint, using painting brush, till smooth final surface appears, shall be provided. The surface is thereafter painted with two or more coats of synthetic enamel paint by spray painting. The final shade of surface should be same as of original transformer.	No	1													
Note : Arrangement of DP structure for distribution transformer is indicated in Drawing No. DISCOM/WZ/2				<b>TOTAL OF COL. 11</b>							<b>TOTAL OF COL 16</b>					
Note :		Place :														
Note :		Date :														
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .														Signature of Bidder	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .															
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>															
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .															
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.															
6	<b>Col. No. 12</b> - Description shall be as under -															
	i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India )															
	ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works .															
	iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .															
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .															

**MATERIAL & ERECTION SCHEDULE 21 - A**

**HVDS System(Conversion of existing LT to HT line) on 140Kg. 8mtr long PCC Pole**

Schedule of work for supply of materials survey and erection of HVDS System(Conversion of existing LT to HT line) on 140Kg. 8mtr long PCC Pole in rural area under 11kV feeder separation programme of (O&M) Dn. (Name) of (Name) District.

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs (11+16)
				Ex work s cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs (10 X4)	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs (15 X 4)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	11 KV V-Cross Arm galvanized angle 65x65x6mm (12.3Kg.) Drg. No.Discom/WZ/14	Nos	16													
2	Back clamp galvanized angle 50x50x6mm (.675Kg.)	Nos	16													
3	11 KV Top-Clamp galvanized angle 65x65x6mm (3Kg.) Drg. No.Discom/WZ/13	Nos	16													
4	11 KV Strainset with Hardware	Nos	6													
5	11 KV G-I Pin with insulator	Nos	48													
6	Galvanized Stay Sat 16 mm Complete with turn buckle, stay insulator and anchor plate. (Drg. No. Discom/WZ/29	Set	4													
7	Stay Clamp Galvanized flat 50x6mm (1.35Kg.)	Nos	4													
8	Stay wire 7/3.15mm (5.5Kg.) Per stay	Kg	22													
9	Galvanized Nut & Bolt with washer (assorted size)	Kg	18													
10	AAAC Conductor rabbit with 3% sag	km	1.545													
11	PCC Pole 140Kg 8 mtr. long Drg. No.Discom/WZ/9 (Damaged+mid span+deteriated)	Nos	5													
12	Bakfilling of PCC pole with boulders and ramming.	Nos	5													
13	Concreting @ 0.2 Cmt./stay and .05 cmt Base padding per pcc pole	Cmt	1.05													
14	Stone block / RCC base plate size 450x450x75mm (3 No. per stay & 1 no. per pole for base padding as per drawing no. Discom/WZ/47 & 48)															
15	11KV danger board (Drg. No. Discom/WZ/39	Nos	16													
16	Binding wire & Tape	Kg	5													
17	Aluminum paint	Ltr	1													

18	Red oxide paint	Ltr	1																
19	Anti Climbing devices	Nos	16																
20	Earthing set (Coil Earth) (Drg. No.Disc0m/WZ/46	Nos	16																
21	Numbering of poles	Nos	16																
		<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>							
	<b>Note : LT to HT conversion :- 50% of old conductor of existing LT line will be re-used for converting from LT to HT line in villages.</b>	Place :																	
	Note :	Date :																	
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .	Signature of Bidder																	
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																		
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																		
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																		
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																		
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																		
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																		

**MATERIAL & ERECTION SCHEDULE 22 - A****Providing new Single phase connection**

Schedule of works for supply of materials , survey, erection, installation &amp; commissioning of single phase new connection with meter in rural area under 11 KV Feeder Separation Programme of O&amp;M Division ( Name ) District .....

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs ( 11+16 )
				Ex works cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs ( 10 X4 )	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs ( 15 X 4 )	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	New service connection with service line of 2.5 sq mm. two core aluminum conductor, armoured, PVC cable, 25 meter length.	No	1													
3	Shackle insulator 65x50mm	No	2													
4	PVC Bushes	No	2													
5	GI wire 10 SWG for support of service line , pipe & earthing	Kg	3													
6	Meter Board madeup of Fiberglass Reinforced Polyster (FRP) based sheet moulding compound (SMC) conforming to IS:13410 (1992). Minimum thckness 2.5 mm Size of meter board 300x400x28 mm. for fixing of meters along with earthing GS nuts and bolts and 2 washers. and 4 anchor bolts 6 mm	No	1													
7	Kit kat 16 Amps.	No	1													
8	Earthing connector	No	1													
9	G.I. Pipe 20mm for service line ISI mark "B" grade	Mtr	3													
10	G.I. Socket with band 40mm	No	2													
11	Wall clamp / hooks for pipe	No	2													

12	LT energy meters, single (phase) 30 amps Max. with poly carbonate cover.	No	1														
13	Sunderies ( for cement, tap, clips etc.)	LS	1														
	Note:	<b>TOTAL OF COL. 11</b>										<b>TOTAL OF COL 16</b>					
	(1) Meter is to be installed at call bell/assessable location.	Place :															
	(2) Length of the service line indicated above is average. The Contractor will be paid for the service length as indicated above irrespective of the actual length of wire used.	Date :															Signature of Bidder
	<b>Note :</b>																
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .																
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .																
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>																
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .																
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.																
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .																
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .																

**MATERIAL & ERECTION SCHEDULE 23 - A****11 KV Four Pole Structure on PCC Pole.**

Schedule of work for Supply of related material, survey including Installation & Commissioning of 11 kV, 3 Phase, four pole 8ft centre structure outside 33/11 kV S/s for new 11 kV feeder wherever erection of addl. Bay is not possible in rural area under 11 KV Feeder Separation Programme of O&M Dn. (name) of (name) District

S.N.	Particulars	Unit	Quantity	MATERIAL COST							ERECTION COST					GRAND TOTAL COL Rs (11+16)
				Ex work s cost per Unit	Excise duty per unit in Rs	CST per unit in Rs	VAT per unit in Rs	Any other tax / duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (5+6+7+8+9)	Total cost of the material for full quantity inclusive of all taxes & duties in Rs (10 X4)	Cost per unit in Rs	Service tax per unit in Rs	Any other tax/duty per unit in Rs	Total per unit rate inclusive of all taxes & duties in Rs (12+13+14)	Total cost of the erection for full quantity inclusive of all taxes & duties in Rs (15 X 4)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	PCC pole 140 Kg 8.0 M long	Nos	4													
2	DC cross arm 8 feet centre galvanized channel 100x50x6 mm 2.2 M (53.4 kg) (Drg. No. DISCOM/WZ/20)	Set	8													
3	11KV disc insulator	Nos	21													
4	11KV strain hardware	Nos	21													
5	11KV pin insulator	Nos	12													
6	11KV GS Pin	Nos	12													
7	Horizontal and cross bracing set 4 feet centre with 4 back clamps made out of horizontal and cross bracing galvanized angle 50x50x6 mm (45 Kg) (Drg. No. DISCOM/WZ/20)	Set	4													
8	Galvanized stay set 16 mm complete with turn buckle, stay insulator and anchor plate. (Drg. no. DISCOM/WZ/29)	Set	8													
9	Stay clamp for PCC pole 140 Kg 8.0 M long galvanized flat 50x6mm (1.35 Kg)	Nos	8													
10	Stay wire 7/3.15 mm. (5.5 kg per stay)	Kg	44													
11	Cement concreting for pole and base padding @ 0.5 & 0.05 cmt per pole respectively (Concrete mixture 1:3:6).	Cmt	2.6													
12	Cement for concreting of stay @ 0.3 cmt. per stay (Concrete mixture 1:3:6).	Cmt	2.4													
13	Earthing set (coil earth) (Drg. no. DISCOM/WZ/46)	Nos	4													
14	Anti-climbing devices	Nos	4													
15	11KV danger board (Drg. no. DISCOM/WZ/39)	Nos	1													
16	Galvanized nuts & bolts with washer. (assorted size)	Kg	10													
17	Numbering of 4 Pole structure	Nos	1													
18	PG clamp, Aluminium grade T-1F as per IS 8309	Nos	12													

		TOTAL OF COL. 11					TOTAL OF COL 16				
	Note : Location of 4 Pole structure will be decided after actual survey.	Place :									
	Note :	Date :									
1	In case the bidder is bidding for more than one (1) Lot, this schedule is to be filled up and signed separately for each Lot .										Signature of Bidder
2	Please provide soft copy in excel sheet of above schedule . If there is discrepancy in rates between hard copy & soft copy the rates indicated in hard copy as above shall prevail .										
3	Col. No. 5 - Price shall include all custom duties and CST , VAT and other taxes already paid or payable on the components raw materials used in the manufacture <b>or assembly of the item or the custom duties and other taxes already paid on previously imported item .</b>										
4	<b>Col. N. 6,7 &amp; 8</b> -The Excise Duty , CST and VAT may be quoted in respective coloumn .										
5	<b>Col. No. 9</b> - Contractor shall be responsible for payment of entry tax and shall include the same . Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser.										
6	<b>Col. No. 12</b> - Description shall be as under - i. Local handling, transportation & insurance ( cost from warehouse / factory to the final destination for plants from inside India ) ii. Installation charges which include GPS survey, consumer indexing , asset mapping , unloading at final destination , storage handling , insurance , erection, testing, commissioning & associated civil works . iii. Any other charges for services as specified in the bidding document excluding fee to be paid for Railway Line crossing clearance , forest clearance & Electrical inspectorate clearance for charging lines & sub stations which shall be reimbursed on actual basis .										
7	<b>Col. No. 14</b> - Any other taxes & duty if loaded please indicate name of the tax & present applicable tariff in percentage in separate sheet as encloser .										

**ENCLOSURE - 5****TECHNICAL SPECIFICATION FOR 11 KV V.C.B.****SCOPE :-**

This specification covers design, manufacturing, testing, of 11 KV Porcelain Clad Vacuum Circuit Breakers complete with all accessories required for its satisfactory operation for the Transmission/Sub T transmission solidly grounded system. The Breaker shall be used for Feeder Control/ protection in the system.

**TYPE AND RATING :-**

The circuit breaker shall be suitable for outdoor operation under the climatic conditions as specified in Tender Specification without any protection from sun and rain. The 11 KV circuit breakers shall have the following rating:-

s.n.	Particulars	11 KV	
i.	Number of Poles	3	
ii.	Frequency	50 cycles	
iii.	Nominal system voltage	11 KV	
iv.	Highest system voltage	12 KV	
v.	Interrupting capacity at nominal system voltage	500 MVA	
vi.	Rated continuous current	630 Amps	
vii.	Short-time current rating	25 KA for 1 sec.	.
viii.	L.I voltage withstand for one Minute	75 KVp	
ix.	Power frequency withstand voltage for one Minute	28 KV	
x.	Total break-time for any current up to the rated breaking current	5 cycles (max.)	
xi.	Control circuit voltage	30 Volt D.C.	
xii.	Operating duty for gang operation	O-0.3sec.-CO-3 min-CO	
	Minimum clearances		
a.	Phase to Phase	280 mm (-10 mm+...)	
b.	Phase to earth	190 mm	
c.	Creepage distance (min.)	300 mm	
d.	Between live parts & ground	2750 mm	

The above is minimum requirement. The suppliers may offer their standard design keeping in view our minimum requirements.

The circuit breakers shall comply with the requirements of IS:13118(1991) or IEC 62271-100 with latest amendment thereof.

**ENCLOSURE – 6****TECHNICAL SPECIFICATIONS FOR THREE PHASE LT STATIC WHOLE CURRENT SOLID STATE ELECTRONIC ENERGY METERS WITH BACKLIT LCD DISPLAY****1 SCOPE:-**

(a) This specification covers design, engineering, manufacture, stage-inspection, testing and supply of A.C. Three Phase 4 Wire current rating 10-40 Amperes solid state (static) whole current electronic LT energy meters of accuracy class 1.0 with backlit LCD display and communication port for data downloading as per requirement given in this specification. The meters shall be supplied in a push fit type meter box made of transparent engineering plastic, which shall be weather proof having flame retardant properties conforming to relevant specification. The meter and push fit type meter box shall be supplied in suitable packing so as to withstand transit shocks during road transport.

The meters should be suitable for single phase two wire system, capable to record and display monthly average p.f., energy in KWH, and demand in "KW" including other electrical quantities. The meters shall be capable to record over full power factor range of Zero Lag-Unity- Zero Lead, as per requirement given in this specification. These LT Meters should record total energy at basic frequency & harmonics. In addition the meters shall have provision for recording time of day (TOD) energy parameters.

(b) It is not the intent to specify completely herein all the details of the design and construction material. However, the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the Purchaser, who will interpret the meanings of drawings and specification and shall have the right to reject any work or material which in his judgment is not in accordance therewith. The offered materials shall be complete with all components, accessories and required software's necessary for their effective and trouble free operation in the System for measurement of electricity supplied to the consumers. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/ or the commercial order or not.

(c) **It is compulsory that the offered LT meters shall bear BIS certification i.e. the meters shall be ISI marked and the bidder shall have to furnish valid ISI license along with the offer, which, if considered necessary, may be verified by the Purchaser.**

**2 STANDARDS:**

These LT meters and the associated accessories shall conform in all respects to the following relevant Standard Specifications with latest amendment there to:-

Indian Standard No.	Title
IS:13779-1999 read with latest amendments	Specification for AC static watt hour meter for class 1 & 2
CBIP Technical report No.88 (with latest amendments)	Specification for AC static Electrical Energy Meters
IS:5133-1969 (Part II)	Specification for boxes for the enclosure of electrical accessories
IS:9000	Basic environmental and other Testing for Electronic & Electrical items.
IS:11731	Specification for engineering plastic
IS: 11000	Resistance to heat & fire
CEA Regulation	On installation of meters of. 17/03/06

**3 SERVICE CONDITIONS (CLIMATIC CONDITIONS):**

(i) The LT meters to be supplied against this specification should be capable of performing and maintaining required accuracy under extreme hot, cold, tropical and dusty climate and solar radiation typically existing in State of M.P. The LT meter shall be required to operate satisfactorily and continuously under the following tropical climatic conditions:

(a)	Maximum ambient air temperature	55°C
(b)	Maximum ambient air temperature in shade	45°C
(c)	Maximum temperature attainable by the meter exposed to sun	60°C
(d)	Minimum ambient temperature	(-) 5°C
(e)	Average daily ambient air temperature	40°C
(f)	Maximum relative humidity	95%
(g)	Number of months of tropical monsoon condition	4 months
(h)	Maximum altitude above mean sea level	1000 meters
(i)	Average annual rain fall	150 cms
(j)	Maximum wind pressure	200 kg/sq.m

(k)	Isokeraunic level (days per year)	40
(l)	Seismic level (horizontal accn.)	0.30 g
(m)	Permitted noise level	45db

All the parts & surface, which are subject to corrosion shall either be made of such material or shall be provided with such protective covering and finish, which ensures total protection from any injurious effect of humidity.

#### 4 PRINCIPAL PARAMETERS:

These LT meters shall conform to the following specific parameters:

Sl. No.	Item	Specification
1.	Type of installation	Indoor/Outdoor
2.	System voltage (phase to neutral)	3X240 V + 20% to - 40%; neutral solidly grounded.
3.	System frequency	50 Hz $\pm$ 5%
4.	No. of phases	3 Phase 4 wire (three phase + neutral)
5.	System earthing	Solidly grounded
6.	Resistance to surge voltage of 1.2/50 Micro sec.	As per relevant IS
7.	Test voltage at 50 Hz	4 KV RMS for 1 minute including latest amendments in relevant IS.

#### 5 CONSTRUCTIONAL REQUIREMENTS:

The meters including meter case and push fit type meter box shall be fully transparent designed and constructed in a manner to avoid any danger during use under normal working condition including personal safety against electric shock. The meter case and push fit type box should comply following parameters:-

##### Material Used for Meter case and Push Fit type Meter Box:

- i. The meters shall have a case, which shall be ultrasonically welded to the meter base so that access to the internal parts should not be possible without breaking the meter case. The material of meter body (base and cover) shall be made of Engineering plastic.
- ii. The meter casing material should be glass reinforced, flame retardant, unbreakable engineering plastic material to ensure high reliability, long trouble free life, safety against electric shock, spread of fire and effects of excessive temperature. The material should be corrosion resistant, inert to chemicals, oxidizing agents, petro-chemical products, acids, salts and ultraviolet radiation. The meter chamber shall be dust proof and moisture proof. The supplier should indicate hardness, melting temperature and tensile yield strength of the material and necessary test certificate of the same shall be furnished. The meter base and cover should be sturdy enough to prevent damage during transportation and installation.
- iii. The engineering plastic used shall conform to IS: 11731 besides meeting the test requirement of heat deflection test and as per IS 11000(Part2 sec1) for resistance to heat and fire as per glow wire test specified in the relevant standard.
- iv. All electrically live screws shall be of heavily tinned brass/nickel or zinc plated steel. All other screws shall be electro plated.
- v. The terminal inserts shall be of heavily tinned brass/ nickel or silver plated copper or zinc plated steel.
- vi. The meter shall conform to the degree of protection IP51 of IS: 12063 for protection against ingress of dust, moisture and vermin.
- vii. The meter should be immune against jump during sudden switching of heavy loads or transient voltage spikes.

#### 6 RATINGS:

The LT meters as specified in scope of this tender shall be rated as follows:

(a)	Voltage	3x240 V
(b)	Current	
(i)	Basic current (Ib)	10 A
(ii)	Rated max. continuous current (Imax)	40A
(c)	Frequency	50Hz
(d)	Accuracy	Class 1.0

**7 POWER SUPPLY VARIATION:**

The extreme power supply variations which the LT meter should withstand without damage and without degradation of its metering characteristics, as it operates under its normal operating conditions would be as under:

Voltage	+20% to – 40% of rated voltage
Current	120% of I <sub>max</sub> .
Frequency	± 5% of rated frequency
PF range	Zero (lag) – unity – Zero (lead)

The LT meter shall work over wide PF range and the limits of errors with the variation of PF shall be as per CBIP 88 (latest amendments)/IS: 13779

**8 POWER CONSUMPTION:**

**8.1 Voltage Circuit:** The active and apparent power consumption in each voltage circuit (per phase) including power supply of LT meter at reference voltage, reference temperature and reference frequency shall not exceed 1.5 Watts and 8 VA respectively as per IS:13779.

**8.2 Current Circuit:** The apparent power taken by each current circuit (per phase) at basic current, reference frequency and reference temperature shall not exceed 4 VA as per IS:13779.

**8.3 Auxiliary Power:** The LT meter shall draw power for working of electronic circuit from phase & neutral.

**9 STARTING CURRENT:**

The LT meter should start registering energy at 0.4% of basic current at UPF as per IS: 13779.

**10 RUNNING WITH NO LOAD:**

When 115% of rated voltage is applied with no current flowing in current circuit, the test output of the LT meter shall not produce more than one output pulse count as per IS: 13779.

**11 INFLUENCE QUANTITIES:**

The single & three phase LT meter shall work satisfactory with guaranteed accuracy as per limit prescribed in IS:13779 under presence of the following quantities:-

- (i) External magnetic field
- (ii) Electromagnetic field
- (iii) Radio frequency interference
- (iv) Vibration
- (v) Harmonic wave form
- (vi) Voltage fluctuation
- (vii) Electromagnetic high frequency field

**12 TEMPERATURE RISE:**

- (a) Under normal conditions of use at I<sub>max</sub> current, winding and insulation shall not reach a temperature, which might adversely affect the operation of these LT meters.
- (b) With each current circuit of the meter carrying rated maximum current and with each voltage circuit (and those auxiliary voltage circuits which are energized for periods of longer duration than their thermal time constant) carrying 1.20 times the rated voltage, the temperature rise of the external surface shall not exceed by more than 20°C, with the ambient temperature between 25°C to 45°C.

**13 LIMITS OF ERRORS:**

When the LT meter is under reference conditions, the percentage errors shall not exceed the limits as specified in IS:13779.

**14 DISPLAY:**

**14.1** The LT meters shall have bright LCD Electronic display with backlit & with minimum 6 digits to read up to one tenth of KWh with another digit for legend. The decimal digits shall be clearly distinguished from integer digits. The backlit should not glow during power off condition. The LCD shall be of STN (Super Twist Nematic) type designed suitably to withstand temperature of 80°C (storage) & 65°C (operation).

- (i) When the LT meter remains at a constant temperature of 65°C for a period of 30 minutes, the character of LCD should not deform.
- (ii) After keeping the LT meter at a constant temperature of 80°C for a period of 30 minutes and when restores at normal temperature, LCD display should work as in normal conditions.

The LCD display should have a wide viewing angle of 45° to 60° up to one-meter distance, for clear visibility of the display of the meter reading. Large viewing area with large display icons is desired. However, the display size area shall be approx 60x20 mm (1200 sq.mm.). The registered parameters shall not be affected by loss of power. The display shall not be affected by electrical and magnetic disturbances. The meter shall make use of non-volatile memory capable of storing and retaining all the

data required to be stored, without the help of any power source or battery back up and shall have a minimum retention time of 12 years under un-powered condition. The minimum character height X width shall be 8.5 X 5 mm. for whole digits of kWh Display. **Dot-Matrix type LCD display is not acceptable.** The accuracy of display for all parameters shall be matching with the accuracy class of meter as per IS.

14.2 The display of various parameters in push button mode shall be scrolling one after another. The display shall have ON time of at least 10 seconds for each measured value.

14.3 The meter shall be capable to measure and display continuously "Active Energy KWh" at all loads and in full power factor range of zero lag- unity- zero lead. The LT meter should also have provision for automatic recording and storing of required parameters meter at 24.00 Hrs on the last day of the month for each calendar month and the same should go to memory.

#### 15 DISPLAY SEQUENCE:

The Liquid Crystal Display register for single and three phase LT meter should display the measured value(s). The height of the display character should be minimum 8.5 mm. In addition display of the required parameters should be in two different modes as stated hereunder:-

##### 15.1 Auto scroll Display Mode:

The LT meters shall have following parameters in auto scroll display

- i) Date: DD: MM: YY      Real Time: HH:MM
- ii) Cumulative Active Energy KWH
- iii) Instantaneous load in KW by default and programmable to KVA.

##### 15.2 Display parameter (Push Button) Mode:

The display of the following parameters shall be scrolling one after the other through push button. The display shall have 'ON' time of minimum 10 seconds of each measured value, except LCD segment check. The LCD segment check shall be on meter display for minimum 2 seconds. Display parameters shall move forward if button is pressed prior to the programmed time for display of each parameter.

- (a) LCD segment check
- (b) Meter serial number
- (c) Real date and time (Date DD-MM-YY, Time HH-MM)
- (d) Cumulative active energy (KWH) register.
- (e) Maximum demand of the month in KW by default up to two decimal (since last auto reset) with date & time. The MD shall be programmable from KW to KVA with 15 minutes integration on sliding window principle with sub integration period of not greater than 5 minutes.
- (f) Cumulative active energy KWH for each calendar month for previous six months with programmed billing date .
- (g) Maximum Demand in KW by default up to two decimal (programmable for KVA when ever desired by the purchaser.) each calendar month for previous six months with date and time of such demand.
- (h) Average P.F. for each calendar month and for previous six months.
- (i) Tamper information- This shall be displayed when tampered with following.
  - (a) Date of last tamper occurrence.
  - (b) Time of last tamper occurrence.
  - (c) Number of time meter tampered.
- (j) Instantaneous phase voltage
- (k) Instantaneous line current
- (l) Instantaneous p.f. (With sign of lead/lag)
- (m) Instantaneous load in KW by default and programmable to KVA
- (n) High resolution Energy value (resolution will be sufficient to enable conduction of the starting current and accuracy test in less time.)

Since meters are required duly fitted with push fit type meter box, hence for reading purpose, an arrangement should be made on top cover of push fit type meter box with its mechanical connection to the meter's body as described in the Specification of meter box to activate the display push button of meter.

The display with push button shall be auto off type after completion of the display cycle it should revert back to normal auto scroll mode approximately after 10 seconds. Fresh button press will be required after resumption of auto scroll cycle to display the above parameters again.

##### 15.3 Meter Reading during Power Outage:

The meter shall have provision to read the meter in no-power condition. The same push button shall be used for display of parameters of auto scroll mode during power outage. **In any case, RTC Battery Power shall not be used for display under no-power condition.**

#### 15.4 **LCD Least Count:-**

The kWh display shall be with one decimal digit in push button mode and in auto scroll mode. The internal least count of the energy recording shall not be more than 0.01 KWh. and every 0.01 KWh, consumption shall be internally stored.

### 16 **COMMUNICATION CAPABILITY**

- 16.1 The meter shall have optical communication port or wireless communication facility for remote reading through LPR (low power radio) communication / infrared Communication Port. The meter shall have facility for communicating with a hand held terminal (HHT) i.e. Meter Reading Instrument (MRI) through this port to facilitate for auto-reading and downloading the data for billing and historical data to base computer. Arrangement shall be made to get such a reading even at the time of power failure. The interface for communication between MRI & Base computer shall be supplied free of cost. The software required for MRI and Base Computer System to use the remote reading feature with necessary security provisions shall also be supplied free of cost with the following features:
- In case the meter is fitted with optical port, the port shall be extended up to the surface of the meter box with the help of suitable interface cable and with suitable sealing arrangement. In case of infrared port, it should be possible to read the meter through external MRI via infrared media from a minimum distance of 1.5 metres in front of the meter box. In case the meter is fitted with LPR port, it shall be possible to read the meter via RF up to minimum 20 metres in any spherical direction from the meter. Longer communication range is preferred.
  - It should not be possible to reset the energy reading in the meter or make any change in the data stored in the meters either current or historical, with the MRI.
  - The infrared module or LPR module of the meter shall have no physical access from outside the meter.
  - Infrared transmitter and receiver should be compliant to the latest IrDA Physical Layer Standard.
  - The compatibility of transferring data from the meter to MRI and then to the base computer system (BC) should be easily established; any change in language or any other reasons, the supplier shall modify it at his own cost within the guarantee period.
  - For the purpose of data security, the data transfer from the meter to CMRI and further to Base computer should be fully secured and any unauthorized attempt/change in data should be indicated on computer system. There should be multi level password on the base computer system and in the meter to prevent any unauthorized change of billing parameters, resetting of demand and tamper information.

### 17 **BILLING POINT REQUIREMENTS:**

The predefined date and time for registering the billing parameters of energy, PF and MD as well as Tamper Count and Power-On hours details shall be at 00.00 hours of the first day of each calendar (billing) month and all the billing parameters shall be transferred to billing registers.

The above billing data, TOD register's data, tamper information and instantaneous parameters data shall all be retrievable through the meter's communication port through a common meter reading instrument (CMRI) and shall be transferred (downloaded) to a PC with Windows based software to get complete details in numerical and/or graphic form. The necessary base computer software (BCS) for this purpose shall be provided by the supplier with complete details.

### 18 **TOD TARIFF/DEMAND**

The meter should be capable of registering the time-of-day energy (TOD) and maximum demand. The time registers shall be programmable by the purchaser. The meter should have in-built capacity to define up to six registers. The meter should also have capacity to define multiple time zones within the registers. The change of the TOD time-period(s) or defining TOD registers should be possible through CMRI with special authenticated command from the BCS so that only authorized person(s) can make such changes. The main control of this system along with proper security password/code should be available on one or more computers located at the authorized location(s) as per the directions to be given by the Purchaser.

Provision should be made for automatic reset of maximum demand at the end of pre-defined period (e.g. end of the month). The billing parameter at the time of automatic reset of the maximum demand shall be programmable. The main control of this system along with proper security password/code should be made available on one or more identified computers located at the authorized location(s) as per the directions to be given by the Purchaser

Necessary compatible meter application software for various programmable features as discussed above in the meter and also necessary software for the IBM compatible computer to obtain various details as discussed above shall be provided by the supplier. No separate cost will be borne by the purchaser on this account.

**19 TEST OUTPUT DEVICE:**

The LT meters shall have a test out put device in the form of calibrating LED of red colour having minimum intensity 10 M (Milli-candela) accessible from the meter front and shall be capable of being monitored conveniently with suitable testing equipment while operating at site. The location of the calibrating LED should be such that the calibrating pulses can be sensed easily through sensor for site testing of the LT meter's accuracy.

The LT meters shall also give high-resolution energy values on the display The resolution will be sufficient to enable conduction of the starting current and accuracy test in less time.

**20 BASE COMPUTER APPLICATION SOFTWARE**

For efficient and speedy recovery of data read through CMRI/HHU, Base computer software shall be supplied having the following specifications stated as under:

The BCS software shall be user friendly Windows based. The Base Computer software shall give all details adequate for analysis. The software shall have the facility to convert all the consolidated information / data of selectable parameters into ASCII format. It should be possible for the Purchaser to generate its own DBF (data base files) to down load all the required information into it.

**Platform:** The BCS shall be executable on all WINDOWS system. The BCS shall be suitable to run on IBM compatible PC hardware platform.

**Meter Data Display:** The software shall show electrical condition existing at the time of reading the meter in tabular forms as well as graphical format (Phase diagram)

All the information about energy, maximum demand and their respective TOD register reading, billing register readings shall be shown in a manner which user can easily understand.

The software shall be capable of preparing CMRI to read the meter information or time setting of the meter.

**Support Display:** There shall be "user friendly" approach for viewing meter data for the reading collected now or for the reading collected in the past. All information about a particular consumer will be sorted out and available at one place so that locating any consumer's past data is easy. It shall be possible to retrieve/locate data on the basis of either one of the following particulars:

Consumer's ID/Numbers.

Meter Sr. No.

Date of meter reading.

Location.

The Data Transfer :It shall be possible to transfer data to and fro from CMRI through serial interface.

**Configurability:** It shall be possible to have selective printing of all available data of the meter. Print out shall not include anything and everything available with the BCS. The software shall support "print wizard" whereby user can decide what to print out. The use of the software need not revert back to the supplier of the software for modifying the software just to print what he desires.

BCS shall have facility to export data to ASCII or spreadsheet format for integrating with the purchaser's billing system. Here again an "Export wizard" or similar utility shall be available whereby user can select file format, what data to export, the field width selection etc.

**Security:** The BCS shall have multilevel password for data protection and security. The first level shall allow the user to enter the system. The different software features shall be protecting by different passwords. The configurable of passwords shall be user definable. The software installed on one PC shall not be copy able on another PC.

**Help:** The exhaustive online help shall be available with the software so that user can use all the features of the software by just reading the help contents.

**21 Common Meter Reading Instrument (CMRI)**

The Bidder should carefully note that

- a. The MRI shall be supplied in the ratio of **one** for **each 500 nos.** of meters free of cost along with battery charger.
- b. The MRI shall have facility to store minimum **1000 nos.** of meter's data. Further, there should be a facility in MRI to provide the transfer of meter data to computer through RS 232 or USB port.
- c. The MRI shall be capable for down loading readings of other makes of meters. The bidder shall give an undertaking to this effect.

- d. The MRI shall have possibility to read all of the three communication types of meters purchased by MPPKVVCL Indore – optical port, infrared and LPR. MPPKVVCL Indore shall exchange the communication protocols of successful bidders.
- e. The optical, infrared and LPR mode of MRI shall have a feature to read multiple meters within the range without pre-programming the meter serial numbers in advance. Even in case of optical port, pre-programming the meter serial numbers in advance shall not be required.
- f. The data download time for wireless port (LPR / Infrared) shall not exceed 5 (+2) sec per meter and for optical port downloading time shall not exceed 5 Minute.
- g. In case of wireless port after successful downloading, indication shall be available on both meter and MRI and repeated downloading from the same meter shall be disabled for a minimum period of 5 min.
- h. The communication software shall be capable to transfer the billing data and meter serial number required for automatic Spot Billing Machine to automatically generate the energy consumption bills at consumer premises without any human intervention after the data is collected by the MRI. The MRI shall continuously transmit the data until an acknowledgement is received from the SBM (Spot Billing Machine). The manufacturer shall provide the protocol and other information to interpret the transmitted billing data. The data storage inside the MRI and communication of MRI with the meter shall be encrypted so that there is no possibility of tampering with the downloaded data.

It shall be responsibility of the meter manufacturer to provide the required software and all the facilities and support required by the purchaser, to use the CMRI for reading and retrieving the data from the meter and to download the data to Base Computer on free of cost basis till the expiry of guarantee period.

**21.1 Readings to be downloaded with CMRI:**

The CMRI should support in down loading all-important data stored in meter whether specified or not required essentially for deriving billing parameters including MD parameters that shall be by default in KW programmable to KVA respectively. The following minimum parameters should be downloaded by CMRI.

- i. Sr. No. of meter
- ii. Date & Time
- iii. Instantaneous current
- iv. Instantaneous voltage
- v. Cumulative Active energy (KWh)
- vi. MD during the month
- vii. Instantaneous load in KW
- viii. Instantaneous Power factor (sign of lag or lead)
- ix. Cumulative active energy in KWh for the last 6 months
- x. Maximum demand in KW for the last 6 months upto two decimal (It shall support MD in KVA if programmed)
- xi. Average PF of the last 6 months
- xii. TOD 1,2,---,6 Cum. KWh register(Programmable)
- xiii. TOD 1,2,---,6 MD register. in KW up to two decimal (Programmable)
- xiv. TOD 1,2,---,6 Billing MD registers
- xv. TOD 1,2,---,6 Billing KWh registers
- xvi. Phase wise power ON time in HH:MM in a calendar month for last 6 months
- xvii. Tamper information including cover open tamper

Any other information whether specified or not, which is in the opinion of manufacturer is necessary for satisfactory performance of the meter, the manufacturer shall indicate such features in their offer without demanding additional cost.

The LT meter shall possess a optical port or suitable fast and reliable Infrared/ RF communication port for automatic transfer of data from Meter to CMRI. Arrangement in the meter should be such that, in case of failure of power supply, it should be possible to download the data.

The CMRI shall possess easily replaceable battery and shall be capable of storing data for at least 1000 nos. meters at one time. In case of wireless communication port the data transfer rate (from meter to MRI) should be at-least 100 kbps. However, the total downloading time (from meter to MRI) shall not exceed 5 sec for all types of communication for each meter (with +2 sec. max tolerance time). In case of optical communication port the data transfer rate (from meter to CMRI) should not be less than 9.6 kbps. However, the total downloading time (from meter to CMRI) shall be approx. 5 Minute.

The CMRI shall possess a specific serial number, which cannot be changed/ altered.

The downloaded data along with date and time stamp of such reading shall remain on CMRI with suitable encryption and it should not be possible to pre-program or manipulate the recorded data on the CMRI before downloading the same with the serial number of CMRI on computer. The Supplier shall supply Software (compatible with Windows 98 system and/or higher) and training, free of cost for the use of software at multiple data collection and billing premises of the utility.

After successful downloading of meter data to CMRI, an indication on MRI or meter or both for confirmation of successful data transfer shall be provided. During this period the energy recording should not be affected.

Necessary upgrades shall be possible in CMRI software and shall be supplied free of cost for downloading simultaneously the existing parameters and any parameters added in future specifications of meters. A copy of operation manual shall be supplied along with each CMRI.

The Supplier shall provide meter-reading protocols free of cost, which shall not be complicated and shall be easily understandable by utility officials to ensure compatibility between meters and CMRIs of different makes.

**22 MAXIMUM DEMAND REGISTRATION AND MD RESETS:**

The Meter shall continuously monitor and calculate the maximum demand at the point of supply, during any consecutive 15 minutes during the calendar month as per sliding window principle with sub integration period not greater than 5 minutes. It shall store the maximum demand with date and time, when it occurred. The maximum demand shall automatically reset at 24.00 Hrs of the last date of each calendar month for which minimum 30 years calendar shall be programmed by the manufacturer.

Maximum demand of the month shall be in KW by default & up to two decimal digits. The MD shall be programmable from KW to KVA

**23 REAL TIME CLOCK AND BATTERY:**

The MD integration cycle shall be on the basis of Real time clock of the meter. The maximum drift in real time clock of the meter shall not exceed  $\pm 3$  minutes per year and crystal should be temperature compensated for temperature range of 0°C to 50°C. A lithium battery of adequate storage energy shall be used for energy supply to real time clock during no voltage or power off condition. The metering data stated above including integration etc shall be independent of battery. The minimum life of battery should be ten years.

**24 CALIBRATION:**

The meters should be software based factory calibrated and there shall not be any mechanical adjustment in calibration after freezing the parameters at works. This is to ensure that the meter cannot be calibrated at site.

**25 CONSTRUCTION:**

Meter shall be designed and constructed to be capable of withstanding all severe stresses and vibration and dust environments likely to be encountered in actual field conditions. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.

**26 TERMINALS AND TERMINAL BLOCK:**

26.1 The terminals may be grouped in a terminal block having adequate insulating properties and mechanical strength. The terminal block should be made from best quality non-hygroscopic, flame retardant material (capable of passing the flammability tests given in IS:11731) with nickel plated brass for connecting terminals. It shall be an integral part of the meter base.

26.2 Terminal holes shall be of minimum 9.5mm to accommodate the insulation of conductor and shall be of adequate length in order to have proper grip of conductor/crimping pins with the help of two screws such that there is no risk of loosening or undue heating. Electrical connection shall be so designed that contact pressure is not transmitted through insulating material. Required number of pins along with one additional pair shall be supplied with each meter.

26.3 Sufficient clearance shall be allowed between terminals. Further, the supporting webs between the two terminals of the terminal block should be sufficiently high to ensure that the two neighbouring terminals do not get bridged by dust or it is not possible to have flashed over between adjacent terminals of terminal block.

- 26.4 The terminals shall be of suitable rating to carry 200% of I<sub>max</sub> and shall be made of electro-plated (or tinned) brass.
- 26.5 All connection screws and washers should be tinned/ nickel-plated brass. The terminal screws shall not have pointed end at the bottom. All terminals shall have two screws. The terminals shall be properly bound in the insulating material of terminal block.
- 26.6 The terminal block shall have provision with single/two screws for fixing to the meter board. It shall not be possible to remove the meter from the hanging screw without removing the screws from the terminal block.
- 26.7 The voltage circuit and current circuit shall be solidly connected inside the meter body without any link. A firm connection shall be established within the meter case to energize the voltage/current circuit. The connections shall be as per the recommended methods given in IS-13779.

**27 CURRENT AND VOLTAGE CIRCUITS:**

The current and voltage circuits shall be made of appropriate material such as enamelled copper wire of EC grade. The current circuit shall be appropriately insulated and potential circuit shall be appropriately encapsulated. The cross section of current circuit shall be designed to withstand the temperature rise of 50°C over the ambient temperature at maximum current. PT less design shall be used for power supply to PCB. The meter design shall be based on CT or CT and shunt combination or shunts. It is necessary to ensure accurate recording by the meters during the condition when DC component exists in the load, EM CT/Shunt currents should be compared and higher of the two should be used for measurement. Specific confirmation shall be submitted by the bidders that accuracy of measurement will not suffer due to utilization of shunt on account of thermal variation and temperature coefficient up to an operational temperature of 80°C.

**28 CT/Shunt Fixing arrangement:-** The CTs/Shunts & other measurement devices when provided in the meter shall be mounted through proper fixing arrangement so that it should have a firm support and should not move from its position in any case.

**29 METER FIXING ARRANGEMENT:**

Every meter shall have at least three fixing holes one at the top and two at the bottom. The top hole shall be provided with a special clip at the back of the meter so that holding screw is not accessible after the fixing of the meters. The lower fixing screws shall be provided under the terminal block. The requisite fixing screws shall be supplied with each meter.

**30 CONNECTION DIAGRAM & TERMINAL MARKINGS:**

The connection diagram of the meter shall be clearly shown on the nameplate of meter and shall be of permanent nature. The meter terminals shall also be marked and this marking should appear in the above diagram.

**31 TERMINAL ARRANGEMENT:**

Connecting terminals of meter shall be in the following sequence:  
**R(in) R(out), Y(in) Y(out), B(in) B(out), N(in) N(out),**

**32 NON FLAMMABILITY:**

The terminal block, and the meter case shall be such as to ensure reasonable safety against spread of fire. It shall not be ignited by thermic over load of live parts in contact with them. To comply with this requirement, all the parts shall fulfill the conditions of the glow wire test as per relevant standard.

**33 SEALING ARRANGEMENT:**

33.1 The meters should be software calibrated at factory and sealed suitably before dispatch.

33.2 The meter shall be provided with 2 nos. polycarbonate tamper evident seals which shall be marked with "MPWZ", company logo and shall be additionally laser marked with serial no. matching with that of meter. The serial number of meter is to be laser –etched on the base as well as the cover of the meter box, and can be easily viewed to check duplication attempts for the purpose of keeping track of meter seals. All the seals should be provided on front side only. Access to the working part should not be possible without breaking the seals. Provision shall also be made to seal the extended optical port on the side of the meter box.

The provision shall also be made to provide additional lash wire seals on the meter by the MPPKVCL Indore

**34 TAMPER AND FRAUD PROTECTION:**

Logics for design of various tampers, the value of voltage, current, time etc. to be selected for design of tamper shall be done in consultation with the purchaser. It may be noted that the approved logics used in designing tampers are explained to our field officers, and based on their input the bidder have to modify logic if necessary (The last tamper date and time of occurrence and tamper counts must appear in the DISPLAY and rest of the details in VIEW PARAMETERS).

The meter shall record and store last 200 events of tampers (occurrence + restoration) along with date and time of occurrence and restoration of each and every event. The event recording shall be roll over type i.e. it shall always maintain record of last 200 events occurred of selected tamper for logging.

The tamper information shall be available along with date & time of occurrence and restoration of the event and phase indication on which tamper was attempted.

The meter shall to continue to register active energy accurately even under following conditions:

- 34.1 The meter should register energy consumption correctly in forward direction irrespective of the direction of current in the current circuit (i.e. main and load wire interchange ).
- 34.2 The meter should continue to record energy even when
- Any two phases are disconnected i.e. in presence of any one phase and neutral. Under this condition the meter should record correctly.
  - One phase and neutral are disconnected i.e. in presence of any two phases and the load is drawn through local earth. Under this condition, earth load LED indication shall appear on meter and the maximum limit of error allowed is  $\pm 3\%$  from the reference condition.
  - When incoming neutral is disconnected, outgoing neutral is connected to earth through resistance and load is connected to earth, the arrangement should be provided such that power LED starts blinking when incoming voltage is below 200 Volts. The energy register shall advance for low voltage up to 120 Volts in each phase.
- 34.3 **Current Imbalance (CT shorting/by-passing) :**  
In case of CT open or shorting, which may result in the current imbalance between the phases, the tamper indication should appear by means of measuring neutral current. Meter shall store the date & time of occurrence and restoration in the non-volatile memory.
- 34.4 **Power ON Time:** The meter shall have provision to record the phase wise power ON time in HH:MM in a calendar month for last 6 months
- 34.5 The meter should record energy as per IS for balanced and unbalanced load.
- 34.6 Meter should continue to record in unbalance load condition when neutral is removed. In this condition maximum limit of the error allowed is  $\pm 3\%$  from the reference condition.
- 34.7 The meter should record energy accurately irrespective of the phase sequence of supply.
- 34.8 The three phase LT meter should continue to function when DC signals through Diodes from any or all three phases are injected on the neutral of the meter.
- 34.9 **Cover opening :**  
If attempt is made to open the meter body, the meter shall **detect /log** with date and time of meter body opening tamper, even in absence of supply. **This tamper shall also be displayed on the meter LCD with tamper information.**
- 34.10 **DC Immunity:**  
The meter should not saturate on passing of direct current which can cause the meter either to stop recording or record inaccurately as per IS: 13779 (latest version).
- 34.11 **External Magnetic Influence:**  
The meter shall not get influenced by any external magnetic fields (AC Electro Magnet or DC Magnet) in accordance with the test procedures specified in IS: 13779 with its latest amendment for AC Magnetic Field. However, the meter alone should comply up to 0.27 Tesla DC.

The meter accuracy or accuracy in display under normal conditions shall not be affected by placement of a permanent magnet of not less than 0.27 Tesla anywhere on the surface of meter without meter box.

Meter shall have provision to record the tamper of abnormal magnetic induction with date and time of occurrence and restoration.

**On application of external DC magnetic field of higher intensity against which meter is not immune, the meter should log the events of abnormal magnetic induction with date and time.**  
The positive error may be beyond the limit of 4% but not exceeding power value equivalent to the product of rated voltage and maximum current.

**34.12 Application of abnormal voltage /frequency:**

A) The accuracy of the meter, Real time clock disturb, Memory data corruption, meter functioning hang up etc. should not occur with the application of abnormal voltage/ frequency such as spark discharge of approximately 35KV with 0.01-10 mm spark gap in any of the following manner when applied for 10 minutes:

- a) On any of the phases or neutral terminals
- b) On any connecting wires of the meter
- c) At any place in load circuit
- d) Spark on meter body.

B) Meter should also be immune for tamper by application of remote loop induction device (jammer).

**When meter is subjected to 35 KV high frequency and voltage burst and remote loop induction device (jammer), it should not hang and in case if it hang once it should remain hanged permanently.**

**34.13 EMC/EMI Test:**

The meter shall also pass all EMC/EMI tests as per IS:13779 with latest amendments.

**34.14 Further the bidder shall carefully note and confirm that:**

- (i).The measurement of meter shall not be influenced by injection of AC voltages/ chopped signal/DC signal and harmonics on the outgoing leads of the meter.
- (ii).The meter shall not get affected by any remote device.
- (iii)The bidder should furnish detailed explanation as to how the meter is able to detect/Protect recording the above tamper and fraud features with sketches and phaser Diagram. Additional features, if any, in the meter may also be clearly indicated.

Along with the tamper information, the meter shall also record the phase wise instantaneous values of voltages, currents and phase power factors to simulate and elaborate the existing condition during all type of tamper events.

**35 LED INDICATIONS :**

The following indications must be provided on the meter:

- (i) KWh indicator for Meter calibration - Red (Calibration LED-Imp/KWh)
- (ii) Input and output reversal - Yellow LED indicator or ICON on LCD  
Indication / current reversal
- (iii) Earth Tamper indication - Green LED indicator or Icon on LCD
- (iv) Power supply ON and Phase indication - LED or ICON on LCD for line1, 2 & 3.

All the LEDs shall be of low power consumption and distinctly visible from distance. Except KWh indicator, all the other indications may be provided as Icon on backlit LCD. The earth LED should glow only when measurement is through neutral circuit.

**36 SALIENT FEATURES:**

The meter shall have the following additional features.

**36.1** The meter shall be compact in design. The entire design and construction shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation/loading/unloading etc. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.

**36.2** The short time over current rating shall be 30 I<sub>max</sub> for one half cycle at rated frequency as per clause No.9.2.3 of IS:13779.

**36.3** The meters shall remain within  $\pm 1\%$  accuracy when tested at basic current at rated voltage at 0.3lag and 0.5 lead power factor.

- 36.4 Meter shall work within accuracy up to max. loading up to  $120\%I_{max}$ .
- 36.5 Even if phase to phase voltage (i.e. 440 Volts) is applied for 5 minutes between phase and neutral of the meter, the meter should not get damaged and continue to record correctly within class 1.0 accuracy after restoration of normal supply.
- 36.6 The meter shall also withstand impulse Voltage without any damage in accordance with the clause 12.7.6.2 of IS: 13779:1999.
- 36.7 The meter shall make use of Non Volatile Memory capable of storing & retaining all the data required to be stored, without the help of any power source or battery back up.
- 36.8 Computation of demand shall be on the basis of Real Time Clock of the meter itself.
- 36.9 Provision shall be there to do the billing operation automatically at a predefined date by programming the meter.
- 36.10 Meters covered under this specification shall be fully static type with non-volatile memory to register various billing parameters and complete with other features as detailed out in this specification. Any other design meeting technical specification or features/accuracy etc., better than this specification and manufactured as per relevant IEC/IS/CBIP report shall also be acceptable.
- 36.11 Meter shall be suitable for accurate measurement and display of energy and other billing parameters within the specified limits of errors under balance and unbalanced load conditions in a poly phase network.
- 36.12 Indication shall be provided on display to show the healthiness of phase voltage.
- 36.13 The meter shall be fully programmable by the user for TOD timing and billing dates etc. For security reasons the meter operating software should have at least "two level write protection" against any modification/editing of the parameters, data, settings etc. except those required for billing data, TOD metering.
- 36.14 The meter shall conform to the degree of protection IP 51 of IS: 12063/IEC: 529 for protection against ingress of dust, moisture and vermin's.
- 36.15 The meter base & meter cover shall be made of high grade, fire-resistant, non-inflammable high-grade and good quality engineering plastic.
- 36.16 The entire design and construction shall be capable of withstanding stresses likely to occur in actual service and rough handling transportation. The meter shall be convenient to transport and immune to shock and vibrations during transportation and handling.
- 36.17 The voltage circuit and current circuit shall be solidly connected inside the meter body without any link. A firm connection shall be established within the meter case to energize the voltage/current circuit. The connections shall be as per the recommended methods given in IS-13779

### 37 SELF DIAGNOSTIC FEATURE

The meter shall be capable of performing complete self-diagnostic check and continuously monitor all the circuits for any malfunctioning and ensure integrity of data memory location at all time. The meter shall have display indication for unsatisfactory/nonfunctioning/malfunctioning of the following:

- a) Time and date on meter display
- b) All display segments on meter display
- c) Real Time Clock (RTC) status in meter reading print out at BCS end
- d) Non-volatile Memory (NVM) status in meter reading prints out at BCS end.

### 38 ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE REQUIREMENT:

- 38.1 The meter shall meet EMI/EMC requirements as specified in the relevant standards and shall also be protected against radiated interference from either magnetic or radio frequency sources.
- 38.2 The offered whole current meter shall also withstand DC Immunity test for main and neutral circuit at  $I_{ref} = I_{max}/\sqrt{2}$  as per IS:13779 so as to ensure that the meter current circuits do not saturate on passing of direct current.

**38.3** The meter shall be designed in such a way that the conducted or radiated electromagnetic disturbances as well as electrostatic discharge do not damage or influence the meter.

**38.4** The disturbance(s) to be considered are:

- (i) Harmonics
- (ii) Voltage dips and short interruptions
- (iii) Fast transient burst test
- (iv) External D.C. and A.C. magnetic fields
- (v) Electromagnetic H.F. fields
- (vi) Electrostatic discharges
- (vii) Radio frequency interference suppression.

**39 GUARANTEED TECHNICAL PARTICULARS:**

The bidder shall furnish all the necessary information as desired in the Schedule of Guaranteed Technical Particulars and data, appended with this specification. If the bidder desires to furnish any other information(s) in addition to the details as asked for, the same may be furnished against the last item of that Annexure.

**40 NAME PLATE AND MARKING:**

Every meter shall have a name plate clearly visible and indelible and distinctly marked in accordance with IS:13779 (latest version). The following information should appear on the name plate affixed on to the meter:-

- (i) Manufacturer's name or trade-mark and place of manufacture.
- (ii) Designation of type
- (iii) Number of phases and number of wires for which the meter is suitable.
- (iv) Guarantee period – 5 years from the date of commissioning or 5-1/2 years from the date of supply , whichever occurs first.
- (v) Purchase Order No. & Date.
- (vi) Property of MPPKVCL Indore.
- (vii) Bar coding of SN, Month & Year of manufacture
- (viii) Sign of Insulation Class
- (ix) Connection diagram
- (x) Serial number, year and month of manufacture
- (xi) Principal unit in which the meter records Reference voltage
- (xii) Basic current and rated maximum current
- (xiii) Reference frequency in Hz
- (xiv) Meter constant (Imp/KWh)
- (xv) Accuracy class
- (xvi) Reference temperature
- (xvii) ISI mark and license number

**41 TESTS:**

**(A) Type Test:**

The type test certificate for all tests as indicated in IS:13779-1999 (with latest amendments) shall be furnished along with the bid. Type test certificates from any one of the standard laboratories NABL accredited for particular equipment/test shall only be considered. Type test report, amongst other details, should contain the following information clearly:

- (i) Type of meter and display
- (ii) Class of Accuracy.

Type test certificate from educational institute(s) will not be accepted. The type test certificate shall not be more than 24 months old as on the date of opening of bid.

**(B) Additional Type Test:**

In addition to the tests mentioned at **(A)** above, bidder shall have to furnish the type test reports of compliance of anti-tamper features as per tender specification.

**(C) Acceptance tests:**

All Acceptance tests as laid down in this tender specification shall be carried out.

**(D) Verification during Inspection:**

Inspecting officer shall verify that no DC supply/ signal is given to reference meter during the DC injection test. The accuracy of display parameters shall be verified at the time of inspection in line with class of accuracy of meter.

- i. Voltage variation test
- ii. Accuracy tests under all anti tamper conditions.
- iii. Permanent magnet test
- iv. Special accuracy test – the meters shall remain within  $\pm 1\%$  accuracy when tested at basic current at rated voltage at 0.3lag and 0.5 lead power factor.
- v. The accuracy of the meter, Real time clock disturb, Memory data corruption, meter functioning hang up etc. should not occur with the application of abnormal voltage/ frequency such as spark discharge of approximately 35KV with 0.01-10 mm spark gap in any of the following manner when applied for 10 minutes:
  - a) On any of the phases or neutral terminals
  - b) On any connecting wires of the meter
  - c) At any place in load circuit
  - d) Spark on meter body.
- vi. Immunity from remote loop induction device (jammer)

**The accuracy and above indicated parameters of meter shall be checked before and after the application of above device(s) with site conditions. It is desired that when meter is subjected to 35 KV high frequency and voltage burst and remote loop induction device(jammer) it should not hang and in case if it hangs once it should remain hanged permanently.**

**(E) Routine Tests:**

All the routine tests as stipulated in IS:13779 and in addition tamper and fraud protection tests as per TS shall be carried out and test certificates shall be furnished for approval of the Purchaser.

**42 TEST FACILITIES AVAILABLE WITH THE MANUFACTURER:**

The tests shall be carried out as per relevant Standards and test certificates shall be furnished for approval. The Supplier shall indicate the details of the equipment available with him for carrying out the various tests as per relevant Standards. The bidder shall indicate the sources of all materials.

Bidders should carefully note that the standard meters used for conducting tests shall be calibrated periodically at NABL Accredited Test Laboratories and test certificates shall be available at Works for verification by Purchaser's representative.

The Supplier/Manufacturer shall have at least the following testing facilities to ensure accurate calibration:

- (i) Insulation resistance measurement
- (ii) Running at no load
- (iii) Starting current test
- (iv) Limits of error
- (v) Power loss in voltage and current circuit
- (vi) Repeatability of error
- (vii) Transportation test
- (viii) Low load run test
- (ix) Heating test
- (x)

**43 INSPECTION:**

**43.1** The Purchaser's authorized representative may carry out the inspection at any stage of manufacture. The Supplier/Manufacturer shall grant free access to the Purchaser's representative at a reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the Purchaser shall not absolve the Supplier of his obligation of furnishing the equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

**43.2** All acceptance tests and inspection shall be made at the place of Supplier/Manufacturer. The Supplier shall provide all reasonable facilities without demanding any charge to the inspector representing the Purchaser to satisfy him that the equipment is being furnished in accordance with this specification.

43.3 The Supplier/Manufacturer shall keep the Purchaser informed in advance, about the manufacturing/readiness activities so that arrangement can be made for inspection.

43.4 The Purchaser reserves the right to insist for witnessing the acceptance/routine testing of the bought out items. The Supplier shall give 15 days advance intimation to enable the Purchaser to depute his representative for witnessing the acceptance and routine tests.

43.5 The Purchaser reserves the right to get type tests done in respect of any meter, or Box from any of the lots received at any Destination Stores at Supplier's expenses.

**44 SAMPLE:**

**Sample before Commencement of supplies:**

The Supplier shall submit sample of offered meter along with the meter box having all the features conforming to the prescribed specification for our approval before commencement of supply.

**45 RANDOM SAMPLE TESTING AFTER RECEIPT OF METERS AT STORES:**

The consignment of meters received at Area Store shall be accepted only after testing of sample meters at CPRI/ERDA/ERTL/any NABL accredited testing **laboratory** as stated in the Schedule-II(D). The sample meters shall be selected randomly from the lot and will be sent to CPRI for acceptance test as per relevant ISS and as per procedure prescribed in schedule-II(D). If the sample fails in the above tests, the entire lot will be rejected and testing charges shall be recovered from the supplier. Purchaser may select meters at random from a lot of meters supplied and sent to CPRI/ERDA/ERTL/any NABL accredited testing **laboratory for acceptance test as per relevant ISS. If the sample fails in the above tests, the entire lot will be rejected and testing charges shall be recovered from the Supplier.**

**46 QUALITY ASSURANCE PLAN:**

46.1 The designed life of the meter shall be minimum of 20 years and to prove the designed life, the firm shall have to follow at least the following Quality Assurance Plan:-

- (i) The factory shall be completely dust proof.
- (ii) The testing rooms shall be temperature and humidity controlled as per relevant standards.  
The testing and calibrating equipments should be automatic and all test equipment shall have their valid calibration certificates.
- (iii) Power supplies used in testing equipment shall be distortion free with sinusoidal, wave forms and maintaining constant voltage, current and frequency as per the relevant standards.
- (iv) During the manufacturing of the meters the following checks shall be carried out.
  - (i) Meter frame dimensions.
  - (ii) The assembly of parts shall be done with the help of jigs and fixtures so that human errors are eliminated.
  - (iii) The meters shall be batch tested on automatic, computerized test bench and the results shall be printed directly without any possibility of human errors.

46.2 The Supplier/Manufacturer shall furnish the following information. Information shall be separately given for individual type of meters offered.

- (i) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw material in presence of Supplier's representative and copies of test certificates.
- (ii) Information and copies of test certificates as in (i) above in respect of bought out accessories.
- (iii) List of manufacturing facilities available.
- (iv) Level of automation achieved and list of areas where manual processing exists.
- (v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
- (vi) List of testing equipments available with the Supplier for final testing of equipment specified and test-plant limitations, if any, vis-à-vis type, special acceptance and routine tests specified in the relevant standards and this specification. These limitations shall be very clearly brought out in schedule of deviations.

46.3 The Supplier/Manufacturer's laboratory must be well equipped for testing of the meters. They must have computerized standard power source and standard equipment calibrated not later than a year (or as per standard practice). The details of testing facilities available for conducting (a) The routine tests and (b) Acceptance tests shall be furnished in Schedule annexed with tender document.

**47 MANUFACTURING ACTIVITIES:**

- (i) All the materials, electronics and electrical components, ICs used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy.
- (ii) The Manufacturer should use Application Specific Integrated Circuit ASIC or Micro controller for metering functions.
- (iii) The electronic components shall be mounted on the printed circuit board using latest Surface Mounted Technology (SMT) except power components by deploying automatic SMT pick and place machine and re-flow solder process. The electronic components used in the meter shall be of high quality. Further, the Supplier should own or have assured access (through hire, lease or sub-contract) of the above mentioned facilities. The PCB material should be of glass epoxy FR-4 grade conforming to relevant standards.
- (iv) All insulating materials used in the construction of meters shall be non-hygroscopic, non-aging and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.
- (v) Quality should be ensured at the following stages :
  - (a) At PCB manufacturing stage, each board shall be subjected to bare board testing.
  - (b) At insertion stage, all components should undergo testing for conforming to design parameters and orientation.
  - (c) Complete assembled and soldered PCB should undergo functional testing using test equipments (testing jig).
  - (d) Prior to final testing and calibration, all meters shall be subjected to accelerated ageing test to eliminate infant mortality.
    - 1. The calibration of meters shall be done in-house.
    - 2. The Supplier/Manufacturer should submit the list of all components used in the meter along with the offer.
    - 3. A detailed list of bought-out items which are used in the manufacture of the meter should be furnished indicating the name of firms from whom these items are procured. The Supplier shall also give the details of quality assurance procedures followed by him in respect of the bought-out items.
    - 4. The details of testing facilities available for conducting the routine and acceptance tests and other special tests on the meter shall be furnished with the bid. The facility available if any for conducting type test may also be furnished.

**48 DOCUMENTATION:**

48.1 All drawings shall conform to International Standards Organization (ISO "A" series of drawing sheet/India Standards Specifications IS: 656. All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S.I. Units.

48.2 List of drawings and documents:

The Supplier/Manufacturer shall furnish the following:

- (i) Two sets of drawing clearly indicating the general arrangements, fitting details, electrical connections etc.
- (ii) Technical leaflets (user's manual) giving operating instructions.
- (iii) Three copies of dimensional drawings of the quoted item.

48.3 The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the Purchaser. All manufacturing and fabrication works in connection with the equipment prior to the approval of the drawing shall be at the Supplier's risk.

48.4 Approval of drawings by Purchaser shall not absolve the Supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirements of the latest revision of application standards, rules and codes of practices. The equipment shall conform in all respect to high standards of engineering, design, workmanship and latest revisions of relevant

standards at the time of ordering and Purchaser shall have the power to reject the materials which, in his judgment, is not fully in accordance therewith.

- 48.5 The successful Supplier shall, within 2 weeks of notification of award of contract, submit three sets of final versions of all the drawings as stipulated in the contract for Purchaser's approval. The Purchaser shall communicate his comments/ approval on the drawings to the Supplier within two weeks. The Supplier shall, if necessary, modify the drawings and resubmit three copies of the modified drawings for approval. The Supplier shall within two weeks, submit 10 prints and two good quality report copies of the approved drawings for Purchaser's use.
- 48.6 Sets of operating manuals/technical leaflets per 100 meters shall be supplied to each consignee in the first instance of supply. Additional copies of sets of operating manuals/technical leaflets in the numbers as may be desired by the purchaser shall have to be supplied to the consignee or field officers.
- 48.7 One set of routine test certificates shall accompany each dispatched consignment.
- 48.8 The acceptance test certificates in case of pre-despatch inspection or routine test certificates in cases where inspection is waived shall be got approved by the Purchaser
- 49 **GUARANTEE:**
- (i) The meters shall be guaranteed for a period of **5 years from the date of commissioning or 5-1/2 years from the date of supply, whichever occurs first.**
- (ii) The meter found defective within the above guarantee period shall be replaced by the supplier free of cost within one month of the receipt of intimation. If the defective meters are not replaced within the above specified period, the same shall be treated as breach of performance of the contract and shall be liable for consequential penal action.
- 50 **PACKING & FORWARDING:**
- 50.1 The equipment shall be packed in crates suitable for vertical/horizontal transport as the case may be, and suitable to withstand handling during transport and outdoor storage during transit. The Supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbol. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc., shall be provided. Any material found short inside the packing cases shall be supplied immediately by Supplier without any extra cost.
- 50.2 Each consignment shall be accompanied with a detailed list containing the following information.
- a) Name of the consignee
  - b) Details of consignment
  - c) Destination
  - d) Total Weight of Consignment
  - e) Handling and packing instruction
  - f) Bill of material indicating contents of each package
- 50.3 The packing shall be done as per the Manufacturer's standard practice. However, he should ensure the packing is such that the material should not get damaged during transit by Rail/Road.
- 51 **GENERAL :**
- 51.1 Principle of operation of the meter, outlining the methods and stages of computation of various parameters starting from input voltage and current signals including the sampling rate, if applicable, shall be furnished by the bidder.
- 51.2 The Supplier shall indicate the method adopted to transform the voltage and current to the desired low values with explanation on devices used such as CT, VT or potential divider as to how they can be considered superior in maintaining ratio and phase angle for variation of influencing quantities during its service period.
- 51.3 The Supplier shall furnish details of memory used in the meter.
- 51.4 The Technical Specification of Push Fit Type Meter Box Made Of Engineering plastic has been described in Schedule-II(B)
- 51.5 The procedure for Verification/Testing Of Material Supplied described in Schedule-II(D) shall be followed
- 51.6 It is mandatory to conform compliance of guaranteed technical particular of ac three phase electronic KWH meter with LCD display as per Schedule-III

### **TECHNICAL SPECIFICATION OF PUSH FIT TYPE METER BOX MADE OF ENGINEERING PLASTIC**

1. The meter box shall be weather proof, tamper proof and made of transparent engineering plastic conforming to IS: 11731. Type test of material is required to be furnished along with the sample.
2. The meter box should be unbreakable un-deformable and should withstand the temperature up to 140 deg. cent.
3. Thickness of the base should be at least 2 mm and cover should be of not less than 0.8 mm.
4. Clearance of 30 mm shall be maintained from top and both sides of the meter. However, the clearance at bottom should be of 75 mm. from the meter and 45mm from the terminal block. Besides, there should be minimum clearance of 15 mm in the front from the face of meter.
5. The top cover of the meter box should be of push fit type having at least 4 self locks so that once the top cover of the box is fitted with the base it cannot be removed without breaking the top cover. The cover and base shall have groove all along with the fitting edge, so that after fixing the top cover, no wire or any device can be, temporary or permanently, inserted in the box. The top cover of the box, provided with self-lock, should have arrangement/barrier so that after getting locked, it cannot be detached from latches even by applying external pressure through any means. The locks will be moulded in the cover and base and will not be separate pieces fixed later. There will be no holes to access the locks from any side.  
Additional provision to provide lash wire utility seals on meter box shall be made.
6. Meter shall be fitted with the base of box through unidirectional type screw or by some other better means in such a way so that once the meter is fitted with the base; it cannot be removed from the base and become an integral part with base. The meters shall be supplied duly mounted on the base of meter box and the cover shall be placed separately in the cartoon.
7. Suitable circular holes with adjustable cable glands shall be provided at the bottom of the meter box for inlet and outlet of consumer's service cables. The incoming and outgoing gland shall be positioned such that they disable direct access to terminals through glands.
8. The meter box cover or base shall have a barrier so positioned that any possibility of fiddling the meter terminal from outside of the meter box through cable entry holes is not possible. The barrier shall have reinforce/locked at both sides to restrict its movement up and down even by applying external pressure through any tools.
9. The top cover of meter Box should have spring loaded push button with spindle in moulded barrel perfectly in alignment to operate push button of the meter to read display parameter on push button mode.
10. The boxes shall be specific to the meter mounted in it. Thus, the Serial Number of the meter should be indelibly engraved /marked on the base of meter box as well as on the cover of meter box.
11. The box should have proper mounting arrangement so that it could be mounted on the wall or the pole, as the case may be.
12. The meter box comprises of base and cover shall pass the following tests;
  - i) **Unbreakability test**:- Shall not get damage or deform while dropping from a height of 10 ft. and hammered with 2 kg. hammer to test its unbreakability.
  - ii) **Boiling water test** :- It should pass the boiling water test as prescribed in IS:13010.
13. The overall dimensions of the meter box shall vary according to the different make of meters. However, it shall comply with the minimum requirements as described above.
14. The individual meter manufacturers shall submit the specific drawing and sample accordingly to accommodate there make meter only.

#### VERIFICATION/TESTING OF MATERIAL SUPPLIED

Three (3) sample meters shall be selected for conducting Type Test from the first lot of meters received in Contractor's stores by a committee constituted by Project Director (FS). The samples so selected shall be sealed by at least 3-4 seals/stickers by the committee members. The selected samples shall be sent with complete details for type test and additional test/special tests as per specification at CPRI, Bhopal / ERDA, Vadodara / any NABL accredited test house. The type test charges shall be borne by the contractor. The employer however in first instance may pay testing charges to the testing agency, which shall be recovered by The Director (Finance)/ Accounts Officer (Bills) from the bill of the supplier.

In case of successful type test results, supplies shall be continued. However, in case the meter(s) do not meet the requirement as per ISS/CBIP/Specification in type test(s), three more samples shall be selected from the supplies already received to get them type tested at contractor's cost. In case of repeat failure in type test(s), the order of balance quantity including the quantity lying unused in the stores/ field shall be cancelled.

On receipt of consignment of subsequent lot in Contractor's Stores, a set of 32 meters shall be selected randomly and sent to CPRI for conducting acceptance test as per the prescribed procedure

S.No	Particulars of tests	No. of samples to be tested
(i)	Starting Current test and No load test	32 Nos.
(ii)	AC high Voltage test, Insulation test, Limits of error, Test of meter constant, Power consumption test.	8 nos. out of above 32 Nos.
(iii)	Repeatability of error	3 nos. out of above 8 Nos.
(iv)	Voltage variation, Tamper & fraud protection, D.C. Immunity Test, Magnetic Immunity test (Permanent magnet test of 0.27 Tesla), Accuracy test after application of 440 Volts for 5 minutes, I <sub>max</sub> for 30 minutes test, D.C. Injection test, 35 KV abnormal high voltage/ frequency burst & loop induction device (Jammer) burst test, Shock test and Fast transient burst test.	3 nos. out of above 8 Nos.

Following procedure shall be adopted to clear the tested lot:

1. Failure of any 2 nos. meters shall be allowed out of 32 nos. of meters tested at sr. no. (i) of above table. Failure of more than 2 nos. meters, the further testing shall be suspended and lot shall be declared as fail.
2. Failure of any one meter shall be allowed out of 8 nos. of meters tested at sr. no. (ii) of above table. In case of failure in more than one meter, the further testing shall be suspended and lot shall be declared as fail.
3. No failure shall be allowed out of 3 nos. of meters tested at sr. no. (iii) of above table. In case of failure of any meter, the further testing shall be suspended and lot shall be declared as fail.
4. Failure of any one meter shall be allowed out of 8 nos. of meters tested at sr. no. (iv) of above table. In case of failure in more than 1 no. meter, further testing shall be suspended and lot shall be declared as fail.

In case of failure of samples of lot/ sub-lot in the test(s) detailed above, the similar testing procedure as described shall be repeated on another lot and if the lot fails consecutive second time the entire quantity of respective lot/sub-lot shall be rejected and shall have to be replaced by the supplier at his own cost. Repeated failure/poor results in the testing may render cancellation of order.

The supplies, at the option of employer, may be utilized in the field during the period of testing. In case of repeat failure in acceptance test(s), the order of balance quantity including the quantity lying unused in the stores/ field shall be cancelled. The guarantee period of quantity already supplied & used shall be doubled and payment for used meters shall be arranged after deducting 10% cost.

The employer also reserves the right to get additional samples for all or any of the selected tests at employer's cost at any independent test house at any stage of supply, if so considered necessary to ensure that the quality of meters being offered for inspection is same as already got type tested. In case of failure, the guarantee period of the quantity already supplied by the supplier shall be doubled and employer reserves the right to cancel the balance quantity.

However, employer may allow the contractor to re-offer the material after change/ modification in the design of meters. The balance material shall be accepted only after successful Type Testing. The Type Testing charges shall be borne by the supplier.

In case of successful test results, supplies shall be continued.

The decision of MPPKVCL Indore regarding verification/ Testing of meters shall be final and binding on the supplier and the MPPKVCL Indore shall not be required to give any reason(s) in writing or otherwise at any time for the rejection of material.

## ENCLOSURE - 7

### 16.0 CONSTRUCTION PRACTICE

#### 16.1 DRAWING OF SERVICE LINE:

The service line shall be drawn from the pole to the consumer end with the support of GI wire 10 Swg. While drawing the service line no load should come on the PVC cable. For this purpose, GI wire of 10 Swg. and the PVC cable will be held together by binding with GI wire 18 swg at an interval of 1 meter of the service line. At least two rounds of GI wire 18 swg shall be applied at each place. At the LT pole end, the PVC cable shall be connected to DB box. The GI wire supporting the cable should be tightened to the clamp already provided on the pole. In no case the GE wire shall be fixed directly to the pole. At the consumer end the service line will be fixed on special service clamp fitted on GI service pipe. The PVC cable will pass through GI Pipe. The GI wire 10 swg (carrying the PVC cable) will be fixed to the eye bolt with GI wire 18 swg. It may be noted that the PVC cable will not be tightened to the eye bolt but the GI wire.

- 16.1.1 The service line after passing through the pipe, shall run along the wall of the consumer's building. It will be fixed to the wall by use of steel clips used in the wiring.
- 16.1.2 The GI wire 10 swg will be connected to the neutral wire of the LT line and at the consumer's end will terminate at the earthing bolt on the meter board. It will be connected to the earthing bolt by formation an eye. For effective earthing, it should be firmly fixed with the earthing bolt. The earth wire of the consumer would also be connected to this earthing bolt.
- 16.1.3 It has to be ensured that while crossing the road or otherwise, a minimum ground clearance of 5.8 meter as per IE Rules 1956 is maintained.
- 16.1.4 The energy meter single phase or three phases shall be fixed at the front of the building at call bell location at eye level. The energy meters shall be supplied by the Contractor. **Contractor will be required to get meter tested at employer's testing lab (LTMT) prior to installation at consumer's premises . Contractor will be require to transport meters to & fro from his store site to employer's testing lab . Meter will normally be tested within seven days from date of handing over to DISCOM testing lab . However contractor is advised to take necessary advance action to have sufficient number of DISCOM tested meter , so that work may not be delayed on this account . Necessary seals shall be provided by the employer.** The meter board as per the drawing is to be used. The size of the meter board is 300 x 400 x 28 mm for single phase connection and 400 x 400 x 28 mm for three phase connection. The meter board is to be fixed to the wall by using anchor bolt of 6 mm. The hole in the wall for fixing the anchor bolt will be made by use of hammer drill only. No other method or simple drill machine shall be used. The GI wire will be fixed to the earthing bolt by formation of a hook.
- 16.1.5 The energy meter should be connected in upright position and it should not tilt or lean, one way or other.
- 16.1.6 The PVC cable is to be connected to the meter in such a way that the armoured sheath remains inside the poly carbonate cover and under no conditions, the PVC cable without armoured sheet is out of the poly carbonate box. Neutral will be connected directly to the main switch box of the neutral of the consumer end.
- 16.1.7 An installation report is to be prepared after installation of the energy meter. The name of the consumer, his service connection number, declared connected load, initial reading of the meter, make of the meter, meter number, meter constant and multiplying factor if any is to be recorded. The final reading of the replaced meter and its condition like meter is running or not condition of seals will be recorded. This report, to be prepared in two copies, is to be got signed by the consumer or his representative. A copy of this is to be handed over to the consumer.
- 16.1.8 In case of shifting of the meter, it becomes necessary to extend the internal wiring from the previous location of the meter to the new location of the meter, it will be done by the Contractor. In case of single phase connection, wiring shall be done by use of PVC copper cable, stranded conductor, unarmoured 1.5 sq. mm. In case of three phase connection, PVC cable, stranded copper conductor, unarmoured 4.0 sq. mm. will be used. The cable will be laid in the PVC casing of size 75x20x1 mm

for three phase connection and in case of single phase connection PVC case of 50x8x1 mm. The PVC casing shall be fixed to the wall by battens clip with steel nail and cable holder.

- 16.1.9 The consumer shall provide earthing at the new location as per IE Rules. The earth wire will be connected to the earthing bolt with the meter board.

#### **17.0 METER BOARD**

- 17.1 The meter board shall be made as per the drawing given in the bid document Volume II. The dimension of meter board for single phase and three phase meter will be 300x400x28 mm and 400x400x28 mm. The meter board will be provided with one GS nut & bolt 6 mm, 40 mm length along with 2 washers to serve as earthing bolt to which shall be connected the GI wire from the LT pole of the Employer and the earth wire of the consumer.
- 17.2 Fiberglass Reinforced Polyster (FRP) based sheet moulding compound (SMC) 2.5 mm thick conforming to IS:13410 (1992).
- 17.3 Each meter board shall be provided with 4(four) anchor bolts 6 mm as per specification given in sub clause 7.0 above.

#### **18.0 PAINTING OF EXISTING DISTRIBUTION TRANSFORMERS**

- 18.1 Existing surface of the Distribution Transformer sheets shall be de-rusted by means of emery paper / wire brush and then cleaned. Thereafter two or more coats of red oxide zinc chromate primer paint, using painting brush, till smooth final surface appears, shall be provided. The surface is thereafter painted with two or more coats of synthetic enamel paint by spray painting. The final shade of surface should be same as of original transformer.

**ENCLOSURE – 8****TECHNICAL SPECIFICATION FOR COMPOSITE POLYMER PIN INSULATORS FOR USE IN 11KV and 33KV SYSTEM****1.0 SCOPE::**

This specification covers design, manufacture, testing and supply of Composite Polymer Pin Insulators for use in the 11KV & 33KV overhead transmission lines. The Composite Pin Insulators shall be of the following type:-

- i) Long rod type Pin Insulators intended to be mounted rigidly on a supporting structure to support following size of conductor:-
- For 11KV AAAC Rabbit
  - For 33KV AAAC Dog

**2.0 APPLICABLE STANDARDS::****2.1 Standards:-**

Following Indian/International Standards, which shall mean latest revision, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification, shall be referred while accessing conformity of Insulators with these specifications.

- 2.1.1 In the event of supply of Insulators conforming to standards other than specified, the Bidder shall confirm in his bid that these standards are equivalent or better to those specified. In case of award, salient features of comparison between the standards proposed by the Bidder and those specified in this document will be provided by the Supplier to establish equivalence.

Sl. No.	Indian Standard Standard	Title	International Standard
1		Definition, test methods and acceptance criteria for composite Insulators for a. c. overhead lines above 1000V.	IEC:61109
2	IS: 731	Porcelain insulators for overhead power lines with a nominal voltage greater than 1000V.	IEC: 60383
3	IS:2071	Methods of High Voltage Testing.	IEC:60060-1
4	IS:2486	Specification for Insulator fittings for overhead power lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements locking devices.	IEC:60120 IEC:60372
5	-	Thermal Mechanical performance test and mechanical performance test on string Insulators units.	IEC:60575
6	IS: 13134	Guide for the selection of insulators in respect of polluted condition.	IEC: 60815
7	-	Characteristics of string insulator units of the long rod type.	IEC: 60433
8	-	Hydrophobicity Classification Guide.	STRI guide 1.92/1
9	-	Radio interference characteristics of overhead power lines and high voltage equipment.	CISPR 18.2 Part 2
10	IS:8263	Methods of RI Test of HV Insulators.	IEC:60437
11		Standard for Insulators- Composite- Distribution Dead-end Type.	ANSI C 29.13-2000
12	IS:4759	Hot dip zinc coatings on structural steel & other allied products.	ISO:1459
13	IS:2629	Recommended practice for Hot Dip galvanization for iron and steel	ISO:1461(E)
14	IS:6745	Determination of weight of zinc coating on zinc coated Iron and steel articles.	ISO:1460
15	IS:3203	Methods of testing of local thickness of electroplated coatings.	ISO:2178
16	IS:2633	Testing of Uniformity of coating of zinc coated articles.	
17	-	Standard specification for glass fiber standards.	ASTM D 578-05
18	-	Standard specification for compositional analysis by Thermo-gravimetry.	ASTM D 578-05
19	IS:4699	Specification for refined secondary zinc	

**3.0 TECHNICAL DESCRIPTION OF COMPOSITE INSULATORS::****3.1 Service condition:-**

The polymer Insulators to be supplied shall be suitable for satisfactory continuous operation under conditions as specified below:

(i)	Maximum temperature of air in shed	45°C
(ii)	Minimum temperature of air in shed	4°C
(iii)	Maximum relative humidity	95% (The humidity some time approaches saturation point)
(iv)	Minimum relative humidity	10 %
(v)	Average number of dust-storm days per annum	40 days
(vi)	Average number of rainy days per annum	90 days
(vii)	Number of months of tropical monsoon conditions per annum	3 months
(viii)	Average annual rainfall	1250 mm
(ix)	Maximum wind pressure	150 Kg / Sq. mm
(x)	Altitude not exceeding	1000 metres
(The limit of ambient temperature shall be 45°C peak and 35°C average over a period of 24 hours)		

### 3.2 Composite Insulators long rod type to support conductor on 11KV & 33KV Over head Power Lines:-

- 3.2.1 The Insulators shall be suitable for 3  $\Phi$ , 50 Hz, effectively earthed 11kV and 33kV O/H distribution system in a moderately polluted atmosphere.
- 3.2.2 Bidder must be an indigenous manufacturer and supplier of composite Insulators of rating 11KV or above OR must have developed proven in house technology and manufacturing process for composite Insulators of above rating OR possess technical collaboration/ association with a manufacturer of composite Insulators of rating 11KV or above. The Bidder shall furnish necessary evidence in support of the above along with the bid, which can be in the form of certification from the utilities concerned, or any other documents to the satisfaction of the owner.
- 3.2.3 Insulators shall have sheds with good self-cleaning properties. Insulator shed profile, spacing, projection etc, and selection in respect of polluted conditions shall be generally in accordance with the recommendation of IEC-60815/IS: 13134.
- 3.2.4 The size of Composite insulator, minimum creepage distance and mechanical strength along with hardware fittings shall be as follows:

SN	Type of composite Insulator	Nominal system voltage kV (rms)	Highest system voltage kV (rms)	Visible discharge test voltage kV(rms)	Wet power frequency withstand voltage kV (rms)	Impulse withstand voltage kV (rms)	Minimum creepage distance (mm)	Min. failing load KN
i.	11KV Pin Insulator	11	12	9	35	75	320	5
ii.	33KV Pin Insulator	33	36	27	75	170	900	10

**Note:** Creepage distances have been considered in line with IS-13134 (which specifies 20mm/ kV for moderately polluted environment and 25mm/KV for heavily polluted area)

### 3.3 Dimensional Tolerance of Composite Insulators :-

The tolerances on all dimensions e.g. diameter, length and creepage distance shall be allowed as follows in line with IEC 61109:

$\pm \{0.04d+1.5\}$  mm when  $d < 300$  mm,  
 $\pm \{0.025d+6J\}$  mm when  $d > 300$  mm.

Where, d being the dimensions in millimeters for diameter, length or creepage distance as the case may be,

However, no negative tolerance shall be applicable to creepage distance.

### 3.4 Corona and RI Performance:-

All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and not generate any radio interference beyond specified limit under the operating conditions.

#### 4.0 BASIC FEATURES::

##### 4.1 Design and construction:-

The Composite Pin Insulator shall have a core, housing & weather shed of insulating material and steel/aluminum alloy hardware components for attaching it to the support/conductor.

##### 4.1.1 Core:-

It shall be a glass-fiber reinforced epoxy resin rod of high strength (FRP rod). Glass fibers and resin shall be optimized in the FRP rod. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber or Boron free E-Glass and shall exhibit both high electrical integrity and high resistance to acid corrosion. The matrix of the FRP rod shall be Hydrolysis resistant. The FRP rod shall be manufactured through Pultrusion process. The FRP rod shall be void free.

##### 4.1.2 Housing (Sheath):-

The FRP rod shall be covered by a seamless sheath of a silicone elastomeric compound or silicone alloy compound of a thickness of 3mm minimum. It shall be one-piece housing using Injection Molding Principle to cover the core. The elastomer housing shall be designed to provide the necessary creepage distance and protection against environmental influences. Housing shall conform to the requirements of IEC 61109/92-93 with latest amendments.

##### 4.1.3 Weather sheds:-

The composite polymer weather sheds made of a silicone elastomeric compound or silicone alloy compound shall be firmly bonded to the sheath, vulcanized to the sheath or molded as part of the sheath and shall be free from imperfections. It should protect the FRP rod against environmental influences, external pollution and humidity. The weather sheds should have silicon content of minimum 30% by weight. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The interface, if any, between sheds and sheath (housing) shall be free from voids.

##### 4.1.4 End Fittings:-

End fittings transmit the mechanical load to the core. They shall be made of spheroidal graphite cast Iron, malleable cast iron or forged steel or aluminum alloy. They shall be connected to the rod by means of a controlled compression technique. The material used in fittings shall be corrosion resistant. As the main duty of the end fittings is the transfer of mechanical loads to the core the fittings should be properly attached to the core by a coaxial or hexagonal compression process & should not damage the individual fibers or crack the core. The gap between fitting and sheath shall be sealed by a flexible silicone electrometric compound or silicone alloy compound sealant. System of attachment of end fitting to the rod shall provide superior sealing performance between housing, i.e. seamless sheath and metal connection. The sealing must be moisture proof.

The dimensions of end fittings of Insulators has been shown in the drawing (11KV & 33KV both separately). Since we are purchasing these items for the first time, the drawing given is for indicative purpose. The details of end fittings for fixing the same with V-Cross Arms and top clamps are given below:-

Sl. No.	Item	Length of end fittings to be fixed	Min. threaded portion of end fittings	Dia of rod
i.	11KV	150 mm	100 mm	20 mm
ii.	33KV	150 mm	100 mm	24 mm

Upper end fittings shall be suitable to hold AAAC Dog for 33KV and AAAC Rabbit for 11KV. The size of the fittings shall be in such a way that conductor could be bound firmly so that it may not slip from the groove while in service even under adverse conditions.

#### 5.0 WORKMANSHIP::

5.1 All the materials shall be of latest design and conform to the best engineering practices adopted in the high voltage field. Bidders shall offer only such Insulators as are guaranteed by them to be satisfactory and suitable for continued good service in power transmission lines.

5.2 The design, manufacturing process and material control at various stages shall be such as to give maximum working load, highest mobility, best resistance to corrosion, good finish and elimination of sharp edges and corners.

5.3 The design of the Insulators shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration.

5.4 The core shall be sound and free of cracks and voids that may adversely affect the Insulators.

- 5.5 Weather sheds shall be uniform in quality. They shall be clean, sound, smooth and shall be free from defects and excessive flashing at parting lines.
- 5.6 End fittings shall be free from cracks, seams, shrinks, air holes and rough edges. End fittings should be effectively sealed to prevent moisture ingress; effectiveness of sealing system must be supported by test documents. All surfaces of the metal parts shall be perfectly smooth with out projecting points or irregularities, which may cause corona. All load bearing surfaces shall be smooth and uniform so as to distribute the loading stresses uniformly.
- 5.7 All ferrous parts shall be hot dip galvanized to give a minimum average coating of zinc equivalent to 610 gm/Sq.m, or 87 $\mu$  m thickness and shall be in accordance with the requirement of IS: 4759, The zinc used for galvanizing shall be of purity 99.5% as per IS: 4699. The zinc coating shall be uniform, adherent, smooth, reasonably bright continuous and free from imperfections such as flux, ash rust stains, bulky white deposits and blisters. The galvanized metal parts shall be guaranteed to withstand at least four successive dips each lasting for one H) minute duration under the standard preece test. The galvanizing shall be carried out only after any machining.

#### **6.0 EQUIPMENT MARKING::**

- 6.1 Each insulator unit shall be legibly and indelibly marked with the following details as per IEC-61109:
- (a) Month &Year of manufacture
  - (b) Min. failing toad/guaranteed mechanical strength in kilo Newton followed by the word 'KN' to facilitate easy identification.
  - (c) Manufacturer's name/Trade mark

#### **7.0 BID DRAWINGS::**

- 7.1 The Bidder shall furnish full description and illustration of the material offered.
- 7.2 The Bidder shall furnish along with the bid the outline drawing (3 copies) of each insulator unit including a cross sectional view of the long rod insulator unit. The drawing shall include but not be limited to the following information:
- (a) Long rod diameter with manufacturing tolerances
  - (b) Minimum Creepage distance with positive tolerance
  - (c) Protected creepage distance
  - (d) Eccentricity of the long rod unit
    - (i) Axial run out
    - (ii) Radial run out
  - (e) Unit mechanical and electrical characteristics
  - (f) Weight of composite long rod unit.
  - (g) Materials
    - (i) Identification mark
    - (ii) Manufacturer's catalogue number
- 7.3 After placement of award, the Supplier shall submit three sets of full dimensioned manufacturing insulator drawings containing all the details to The Project Director (FS-WZ), MPPKVCL, Indore.
- 7.4 After placement of award the Supplier shall also submit fully dimensioned insulator crate drawing for different type of Insulators for approval of the owner.

#### **8.0 TESTS AND STANDARDS::**

Insulators offered shall be manufactured with the same configuration & raw materials as used in the Insulators for which design & type test reports are submitted. The manufacturer shall submit a certificate for the same. The design & type test reports submitted shall not be more than 05 years old.

#### **8.1 Design Tests:-**

For polymeric insulators it is essential to carry out design test as per clause 4.1 of IEC 61109 / 92-93 with latest amendments. The design tests are intended to verify the suitability of the design, materials and method of manufacture (technology). When a composite insulator is subjected to the design tests, the result shall be considered valid for the whole class of insulators, which are represented by the one tested and having the following characteristics:

- Same materials for the core, and sheds and same manufacturing method;
- Same material of the fittings, the same design, the same method of attachment;
- Same or greater layer thickness of the shed material over the core (including a sheath where used);
- Same or smaller ratio of the highest system voltage to insulation length;

- Same or smaller ratio of all mechanical loads to the smallest core diameter between fittings
- Same or greater diameter of the core.

The tested composite insulators shall be identified by a drawing giving all the dimensions with the manufacturing tolerances.

Manufacturer should submit test reports for Design Tests as per IEC-61109 (clause- 5) along with the bid. Additionally following tests shall be carried out or reports for the tests shall be submitted after award of contract: UV test: the test shall be carried out in line with clause 7.2 of ANSI C29.13.

## 8.2 Type Tests:-

The tenderer shall furnish detailed type test reports of the offered composite Insulators as per clause 8.2 of the Technical Specifications at the NABL approved laboratories to prove that the composite Insulators offered meet the requirements of the specification. These Type Tests should have been carried out within five years prior to the date of opening of this tender. The following type tests shall be conducted on a suitable number of individual insulator units, components & materials and the test report should invariably be submitted with the bid:-

SN	Description of type test	Ten procedure/standard
1.	Dry lightning impulse withstand voltage test	As per IEC 61109 (clause 6.1)
2.	Wet power frequency test	As per IEC 61 109 (clause 6,2)
3.	Mechanical failing load test	As per IS:731 (Clause- 10.8.2)
4.	Radio interference test	As per IEC 61109 (clause 6.4)
5.	Recovery of Hydrophobicity test	Annexure-A This test may be repeated every 3 yrs by the manufacturer
6.	Chemical composition test for silicon content	Annexure-A Or any other test method acceptable to the owner
7.	Brittle fracture resistance test	Annexure - A

Note:- The purchase may like to conduct any other test(s) in addition to above tests at bidder's cost to establish the performance of material as per system requirement.

8.2.2 It shall be the option of the owner to accept the Insulators based on type test reports submitted by the manufacturer. The owner shall be free to repeat the type test & may witness the same.

**Note:** The owner, for the purpose of facilitating the type tests, may ask the bidders to quote test charges separately

8.2.3 All the type test given in Clause No. 8.2 in addition to routine & acceptance test shall be carried out on Pin Insulators wherever required.

## 8.3 Acceptance (sample) Tests

a.	Verification of dimensions	Clause 7.2 IEC: 61109
b.	Verification of the locking system (if applicable)	Clause 7.3 IEC: 61 109
c.	Galvanizing test	IS:2633/IS:6745
c.	Verification of tightness of the interface between end fittings & Insulator housing	Clause 7.4 IEC:61109 amendment 1 of 1995
d.	Verification of the specified mechanical load	Clause 7.4 IEC: 611 09 / IS:731

The test samples after having withstood the routine test shall be subjected to the following acceptance tests:-

### Routine Tests:-

SN	Description	Standard
1.	Identification of marking	As per IEC: 61 109 Clause 8.1
2.	Visual Inspection	As per IEC 61 109 Clause 8.2
3.	Mechanical routine test	As per IEC:61109 / IS:731

## 8.5 Tests during Manufacture

Following tests shall also be carried out on all components as applicable:-

a)	Chemical analysis of zinc used for galvanizing
b)	Chemical analysis, mechanical, metallographic test and magnetic particle inspection for malleable castings.
c)	Chemical analysis, hardness tests and magnetic particle inspection for forgings

- a) Chemical analysis of zinc used for galvanizing
- b) Chemical analysis, mechanical, metallographic test and magnetic particle inspection for malleable castings.
- c) Chemical analysis, hardness tests and magnetic particle inspection for forgings.

#### 8.6 Additional Tests:-

8.6.1 The Owner reserves the right at his own expenses, for carrying out any other test(s) of reasonable nature carried out at Supplier's premises, at site, or in any other place in addition to the aforesaid type, acceptance and routine tests to satisfy himself that the material comply with the Specifications.

8.6.2 The Owner also reserves the right to conduct all the tests mentioned in this specification at his own expense on the samples drawn from the site at Supplier's premises or at any other test center. In case of evidence of non compliance, it shall be binding on the part of the Supplier to prove the compliance of the items to the technical specifications by repeat tests or correction of deficiencies or replacement of defective items, all without any extra cost to the Owner,

#### 9.0 Quality assurance plan:-

9.1 The successful bidder shall submit following information to the owner:

- 9.1.1 Test certificates of the raw materials and bought out accessories.
- 9.1.2 Statement giving list of important raw materials, their grades along with names of sub-suppliers for raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of bidder's representative.
- 9.1.2 List of manufacturing facilities available.
- 9.1.3 Level of automation achieved and lists of areas where manual processing exists.
- 9.1.4 List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
- 9.1.5 List of testing equipments available with the bidder for final testing of equipment along with valid calibration reports.
- 9.1.6 The manufacturer shall submit Manufacturing Quality Plan (MQP) for approval & the same shall be followed during manufacture and testing,
- 9.1.7 The successful bidder shall submit the routine test certificates of bought out raw materials / accessories and central excise passes for raw material at the time of inspection.

#### 10.0 Guarantee:-

The Supplier of Insulators shall guarantee overall satisfactory performance of the Insulators for the period of 18 months from the date of supply.

#### 11.0 INSPECTION::

- 11.1 The owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where insulator, and its component parts shall be manufactured and the representatives shall have full facilities for unrestricted inspection of the Supplier's and sub-Supplier's works, raw materials, manufacture of the material and for conducting necessary test as detailed herein.
- 11.2. The material for final inspection shall be offered by the Supplier only under packed condition. The owner shall select samples at random from the packed lot for carrying out acceptance tests. The lot offered for inspection shall be homogeneous and shall contain Insulators manufactured in 3-4 consecutive weeks.
- 11.3 The Supplier shall keep the Owner informed in advance of the time of starting and the progress of manufacture of material in their various stages so that arrangements could be made for inspection.
- 11.4 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested unless the inspection is waived off by the owner in writing. In the later case also the material shall be dispatched only after satisfactory testing specified herein has been completed.

11.5 The acceptance of any quantity of material shall in no way relieve the Supplier of his responsibility for meeting all the requirements of the specification and shall not prevent subsequent rejection, if such materials are later found to be defective.

**12.0 PACKING::**

12.1 All Insulators shall be packed in strong corrugated box of min, 7 ply duly palletted or wooden crates. The gross weight of the crates along with the material shall not normally exceed 100 Kg to avoid handling problem. The crates shall be suitable for outdoor storage under wet climate during rainy season.

12.2 The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.

12.3 Suitable cushioning, protective padding, or dunnage or spacers shall be provided to prevent damage or deformation during transit and handling.

12.4 All packing cases shall be marked legibly and correctly so as to ensure safe arrival at their destination and to avoid the possibility of goods being lost or wrongly dispatched on account of faulty packing and faulty or illegible markings. Each wooden case/crate/corrugated box shall have all the markings stenciled on it in indelible ink.

12.5 The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

## Annexure-A

### Tests on Insulator Units

- 1     **RIV Test (Dry):-**  
The insulator string along with complete hardware fittings shall have a radio interference voltage level below 100 micro volts at one MHz when subjected to 50 Hz AC voltage of 10 kV & 30 kV for 11 kV & 33 kV class insulators respectively under dry condition. The test procedure shall be in accordance with IS:326B/IEC : 437/CISPr 18-2.
  
- 2     **Brittle Fracture Resistance Test:-**  
Brittle fracture test shall be carried out on naked rod along with end fittings by applying "1 n HNO<sub>3</sub> acid" (63 g conc. HNO<sub>3</sub> added to 937 g water) to the rod. The rod should be held at 80% of SML for the duration of the test. The rod should not fail within the 96 hour test duration. Test arrangement should ensure continuous wetting of the rod with Nitric acid.
  
- 3     **Recovery of Hydrophobicity & Corona test:-**  
The test shall be carried out on 4mm thick samples of 5cm x 7cm
  - i)     The surface of selected samples shall be cleaned with isopropyl alcohol. Allow the surface to dry and spray with water. Record the Hydrophobicity classification in line with STRI guide for Hydrophobicity classification.. Dry the sample surface.
  - ii)    The sample shall be subjected to mechanical stress by bending the sample over a ground electrode. Corona is continuously generated by applying 12 kV to a needle like electrode placed 1mm above the sample surface. The test shall be done for 100 hrs.
  - iii)   Immediately after the corona treatment, spray the surface with water and record the HC classification. Dry the surface and repeat the corona treatment as at clause 7 above. Note HC classification. Repeat the cycle for 1000 hrs. or until an HC of 6 or 7 is obtained. Dry the sample surface.
  - iv)    Allow the sample to recover and repeat hydrophobicity measurement at several time intervals. Silicone rubber should recover to HC 1 - HC 2 within 24 to 48 hours, depending on the material and the intensity of the corona treatment.
  
- 4     **Chemical composition test for Silicon content**  
The content of silicon in the composite polymer shall be evaluated by EDX (Energy Dispersion X-ray) Analysis or Thermo-gravimetric analysis. The test may be carried out at CPRI or any other NABL accredited laboratory.

## Annexure-B

**GUARANTEED TECHNICAL PARTICULARS OF 11KV & 33KV COMPOSITE POLYMER PIN INSULATORS**

(To be filled and kept in envelopes containing Technical Offer)

Sl. No.	Description	11KV	33KV
1.	Name of Manufacturer		
2.	Address:		
	(a) registered Office		
	(b) Factory		
3.	Type of Insulators		
4.	Standard specification to which the Insulators manufactured and tested		
5.	Name of material used in manufacture of the Insulator (with class / grade)		
(a)	Material of core rod		
(b)	Material of Housing & weather sheds (silicon content by weight)		
(c)	Material of end fittings : tongue/clevis		
(d)	Sealing compound for end fitting		
6.	Colour Glaze of Insulator		
7.	<b>Electrical Characteristics:</b>		
(a)	Nominal system Voltage (KV rms)		
(b)	Highest System Voltage (KV rms)		
(c)	Dry power frequency withstand (KV rms)		
(d)	Wet power frequency withstand (KV rms)		
(e)	Dry flash over voltage (KV rms)		
(f)	Wet flash over voltage (KV rms)		
(g)	Dry lightning impulse withstand voltage		
	(a) Positive		
	(b) Negative		
(h)	Dry lightning impulse flashover voltage		
	(a) Positive (KV peak)		
	(b) Negative (KV peak)		
(i)	RIV at 1 MHz when energized at 10kV/30kV (rms) under dry condition (microvolt)		
(j)	Creepage distance (min) mm		
8.	<b>Mechanical Characteristics:</b>		
	Minimum failing load (KN)		
9.	<b>Dimensions of Insulator:</b>		
i.	Weight (Kg.)		
ii.	Dia of FRP rod (mm)		
iii.	Length of ERP rod (mm)		
iv.	Dia of weather sheds (mm)		
v.	Thickness of housing (mm)		
vi.	Dry arc distance (mm)		
10.	Dimensioned drawings of Insulator (including weight with tolerances in weight) enclosed.		
11.	Method of fixing of sheds to housing specify ):- single mould or modular construction (injection moulding/compression moulding)		
12.	No. of weather sheds		
13.	Type of sheds		
	(i) Aerodynamic		
	(ii) With under ribs		
14.	Packing details		
	(a) Type of packing.		

Sl. No.	Description	11KV	33KV
	(b) No. of Insulators in each pack		
	(c) Gross weight of package		
15.	Any other particulars which the bidder may like to give.		

**ENCLOSURE – 9**

**TECHNICAL SPECIFICATION OF 9KV GAPLESS POLYMER  
LIGHTENING ARRESTORS**

**1. SCOPE:**

This specification covers design manufacture assembly, testing at manufacturers works supply and delivery of single phase outdoor metal oxide Polymeric housed distribution type gapless surge arresters for use in effectively earthed system with the transformer neutral effectively earthed with normal voltage of 11 KV for 9 KV Lightning arrestors. The rated voltage of Arrestors shall be 9KV (rms) for 11 KV system.

**2. CLIMATIC CONDITIONS:-**

(i)	Location	In the State of Madhya Pradesh, India.
(ii)	Maximum Ambient Air Temperature Deg. C	50
(iii)	Minimum Ambient Air Temperature Deg. C	2
(iv)	Average Daily Ambient Air Temperature Deg. C	32
(v)	Maximum Relative humidity (%)	90
(vi)	Average rainfall per annum (mm)	1200
(vii)	Maximum Altitude above mean sea level (meters)	Not more than 1000 meters (Average 200 to 600 Mtrs)
(viii)	Isoceraunic level (Day/annum)	20/50
(ix)	Maximum Wind Pressure (kg/sq.meters)	45
(x)	Seismic level (Horizontal acceleration)	0.1 g

**3. SPECIAL CONDITIONS:-**

The atmosphere at places is laden with dust in suspension during the dry months and subject to fog in cold months. The temperature variation between the daily minimum and maximum is large. Heavy lightning is usual in the area during the month of May to November. The area is also subjected to heavy monsoon rains 80% to 90% of the annual participation during the months of June to October.

**4. SYSTEM CONDITIONS:-**

(i)	Nominal system voltage	11KV
(ii)	Highest system voltage	12KV
(iii)	Frequency	50 Hz
(iv)	Fault level	250MVA

4.1 The system is 3 phase 50 Hz solidly grounded system with earth fault protection. The winding of transformer, which is to be protected, is connected in delta formation.

4.2 We will place one set of surge arresters at the entry of the each line (feeder) in the substation and one set near to the transformers for 33KV system & only one set each on 11 KV Distribution transformer.

4.3 The insulation level provided in our transformer is 170KVp for 33KV System and in case of 11KV System, 75KVp.

**5. STANDARD:-**

The surge arresters shall strictly conform to IEC 60099-4 /IS-3070 Part-3 - 1993 with latest amendment if any in all respects. Maximum residual voltage shall comply with the requirement given hereunder:-

The surge arresters meeting any other authoritative standards, which ensure equal or better performance than mentioned above, shall be acceptable.

6. The technical requirement have been detailed out below:

6.1 The supplier should offer nearest rating of surge arresters.

6.2 The transformers, which are to be protected having BIL 170 KVp for 33KV winding & 75 KVp for 11KV winding. We will be installing our LAs at a distance of 5/10 meters from transformer (another 5 meters be added towards height of LAs lead length and bushing of transformers). Considering 20% safe margin as per IEC the impulse voltage of more than 136 KVp should not appear across the 33 side of transformer. Similarly, impulse voltage of more than 60 KVp should not appear across 11KV winding of transformer.

## 6.3 Required Technical particulars:

S.No.	Particulars	Requirements
1.	Nominal system voltage	9KV
2.	Type of Arrestor	Gap-less (Metal Oxide)
3.	Applicable Standard	IEC 60099-4 IS 3070 Part-III latest Amendment.
4.	Rated Arrestor voltage KV rms	9
5.	Maximum continuous operating voltage KVrms	7.2
6.	Nominal discharge current rating (8/20 micro sec) KA	5.0
7.	Minimum discharge capability (KJ/KV)	NA
8.	Long duration discharge class	NA
9.	Maximum residual voltage at nominal discharge current of 8/20 micro sec. wave, KV peak	32
10.	Maximum steep current impulse residual voltage at nominal discharge current, KV Peak	38
11.	Maximum switching impulse residual voltage at 500 Amp. (Peak)	NA
12.	Minimum prospective symmetrical current (KA)	15
13.	Impulse high current short duration discharge of 4/10 micro sec. wave (KAP)	65
14.	Max. radio interference voltage at 1000 Hz (micro volts)	--
15.	Overall temporary over voltage withstand capacity (KVrms)	
	a) 1.0 Sec.	10
	b) 10.0 Sec.	9.5
	c) 100.0 Sec.	-
16.	Impulse withstand voltage (KVP)	75
17.	Current impulse withstand level	18 impulse of long duration Current 200 Amp peak for 2000 micro secs. As per IEC 99/4
18.	Pressure relief device	N.A.
19.	Disconnecting device	As per required specification IEC 99
20.	Min. creepage distance of porcelain housing (mm)	300
21.	Terminal arrangement	Built in clamping Type, can be adjusted for Horizontal & Vertical take off to suit conductor Size squirrel to raccoon.
22.	Earthing Terminal	The base of L.A. shall be provided with two separate terminal / distinctly marked for connection to earth

6.4 Residual voltage for 8/20 micro sec. wave of nominal discharge current KA are specified above, however, we will prefer still lower residual voltage to ensure better protection.

6.5 The requirement of energy is very specific based on our system. The firms are requested to offer nearest energy rating of LAs for both single and double shot.

- 6.6 Current impulse withstands level - The 9KV arrestors shall withstand 18 impulse of long duration current with a peak level of 200 Amp. & duration 2000 micro secs.
- 7.1 **DISCONNECTING DEVICE**:-  
The arrestor for 9 KV system be provided with a suitable disconnecting device. This shall be connected in series with the ground lead and should not effect the sealing system of the arrestor. The disconnecting device shall conform to the requirement specified in IS:3070 (Part-II)1993 & IEC 99 - 4 (1991-II) clause 5.12, 7.6.3.
- 7.2 A surge arrester having one or several non-linear metal-oxide resistors with highly non-linear voltage-current characteristics, connected in series, but having no integrated series or parallel spark gaps.
- 7.3 A surge arrester with a housing made of polymeric material without air voids neither between the housing and the metal-oxide resistors nor the housing itself.  
The surge Arrester housing shall be made with silicone Rubber (polymeric) of reputed manufacturer. The Silicone rubber used for housing should pass the tracking & erosion test of 4.5kv as per IEC 587. The surge arrester should be made without any internal gas volume.  
The adhesion between the polymeric housing and the metal-oxide resistors or any other metallic or non-metallic parts inside the housing must be strong enough, homogeneous, robust and resistant to thermal cycles and environmental stresses.
- 7.4 All the units of arresters of same rating shall be interchangeable type without adversely affecting the performance.
- 7.5 All necessary bolts, nuts clamps etc., required for mounting on support structure shall be included in the scope of supply.
- 7.7 The polymer material which is used for the arrester housing must be tracking and erosion resistant, stabilized against UV radiation and have proven records in similar applications (like MV/HV cable terminations, insulators and arresters) in country.
- 7.8 All exposed ferrous parts shall be hot dip galvanized as per **IS:2633**.
- 7.9 Line terminal pads and ground terminal pads should be hot dip galvanized.
8. **TERMINAL CONNECTORS**:-  
Terminal connectors shall be manufactured and tested as per **IS:5361** and should be type tested. The terminal connector drawings should be submitted separately with the tender documents.
- 8.1 All casting shall be free from blow holes, surface blisters, crakes and cavities. All sharp edges and corners shall be blurred and rounded off.
- 8.2 All current carrying parts shall be designed and manufactured to have minimum contact resistance.
- 8.3 The contact surface must be machined smooth to obviate excessive current density.
- 8.4 The terminal connector for connection of conductor should be suitable for ACSR Squirrel to Raccoon conductor with Universal take off arrangement (can be adjusted for both horizontal & vertical take off) and should have adequate current carrying capacity.
- 8.5 The terminal connector shall be manufactured out of Aluminum alloy grade LM 9 or 25 as per IS and by gravity die casting process only.
- 8.6 The base of the Polymer Lightning Arrester shall be provided with two separate terminal distinctly marked for connection to earth.
9. **NAME PLATE**:  
The arresters shall be provided with non-corrosive legible name plate fitted rigidly at arrester body with indelibly marked with the following information :-
- (i) PD [FS] MPPKVCL, Indore
  - (ii) Order No. & date.
  - (iii) Manufacturer's name or trade mark and identification Serial Number of the arrester.
  - (iv) Rated voltage.
  - (v) Maximum continuous operating voltage.
  - (vi) Type
  - (vii) Rated frequency

- (viii) Nominal discharge current
- (ix) Long duration discharge class
- (x) Rated Short Circuit current .
- (xi) B.I.L. of the equipment to be protected
- (xii) Year of manufacture

The nameplate should be fitted rigidly so that during life of arrestor, there should not be any possibility of removal of name plate.

#### 10. **DRAWINGS:-**

The supplier shall furnish two sets of following drawings for our approval before commencing the supplies:-

- i) General outlines drawings of the complete arrestor with technical parameters.
- ii) Drawings showing clearance from grounded and other live objects and between adjacent poles of surge arresters required at various heights of surge arresters.
- iii) Mounting clamp details of surge arresters.
- iv) Details of the terminal and ground terminals.
- v) Volt time characteristics of surge arresters.
- vi) The detailed dimensional drawing of polymeric housing such as ID, OD, thickness and insulator details such as height, profile of petticoats angle of inclination and gap between successive petticoats total creep age distance etc.

#### 11. **TESTS & TEST CERTIFICATES:**

- 11.1 Type Test Certificates :- The complete type test certificate from Govt. approved laboratories i.e. CPRI, NFL, NTL, ERDA etc. for the LAs of all the types/rating as per IEC 99/4 /IS 3070 (Part III) shall compulsorily be submitted in support of evidence of compliance of the specifications & guaranteed particulars. It should cover all the type tests as prescribed in Clause 7.1 of IEC 99/4 and IS-3070 (Part-III).

Note:- Type test report of manufacturer's laboratory shall not be acceptable.

#### 11.2 **TYPE TESTS:-**

- (A) The following type tests shall be made in accordance with Clause 7.1 of IEC 99/4/IS-3070 Part-III latest amendment:-

- 1. Insulation withstand test.
- 2. Residual voltage test
- 3. Long duration current impulse withstand test
- 4. Operating duty test
- 5. Test of Arrestor Dis-connectors (for 9 KV LAs)
- 6. Partial discharge test.
- 7. Accelerated ageing test
- 8. Power frequency voltage versus time characteristic.

- (B) The following additional tests are to be also made

- 1. Moisture ingress test
- 2. Weather aging test
- 3. Galvanising test on steel metal parts

- (C) For energy calculation, set of type test reports should be submitted.

#### 11.3 **ACCEPTANCE TESTS:**

The following tests as per clause 8.2 of IEC 99/4 and IS-3070 Part-I & Part-II shall be done on the lower whole number of the cube root of the number of arresters to be supplied.

- a) Power frequency reference voltage test at reference current on complete arresters.
- b) Lightning impulse residual voltage test at nominal discharge current on complete arresters.

- c) Partial discharge test.
- d) Galvanizing test on exposed steel parts.
- e) Visual/dimensional examination.

#### 11.4 **ROUTINE TESTS:-**

The following routine tests as per Clause 8.1 of IEC 99/4 / IS-3070 Part-1/Part-III are to be conducted by the manufacturer on offered lot for pre-despatch inspection. The lot offered without routine test reports shall not be considered & delay in acceptance of the offer will be on firm's account:-

- a) Measurement of the reference voltage on the complete arresters.
- b) Residual voltage test at nominal discharge current on the complete arresters or sections.
- c) Test to verify the efficacy of sealing.
- d) Partial discharge test

#### 12. **INSPECTION:-**

- 12.1 The purchaser's representative shall at all times be entitled to have access to the works and all places of manufacture where equipment/material shall be manufactured and the representative shall have full facilities for unrestricted inspection of the supplier's works raw materials and process of manufacture for conducting necessary tests as detailed herein.
- 12.2 The supplier shall keep the purchaser informed in advance of the time of starting and of the progress of manufacture of equipment/material in its various stages so that arrangements can be made for inspection.
- 12.3 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested, unless the inspection is waived off by the purchaser in writing. In the later case also, the equipment/material shall be dispatched only after satisfactory testing for all tests specified herein has been completed.
- 12.4 The acceptance of any quantity of material shall in no way relieve the supplier of any of his responsibilities for meeting all requirements of the specification, and shall not prevent subsequent rejection if such material is later found to be defective.
- 12.5 The number of sample selected to carry out the acceptance test shall be as per provision in the respective IS.
- 12.6. The purchaser has the right to have the tests carried out by an independent Agency subject to recovery of testing expenditure in case of failure, whenever there is dispute regarding the quality of supply.

#### **GUARANTEED TECHNICAL PARTICULARS OF 9KV POLYMER LIGHTNING ARRESTERS**

Sr. No.	Particulars	9 KV LA
1	Name of manufacturer & place of manufacture	
2	Type	
3	Model	
4	Applicable standard	
5	No. of units (no.)	
6	Rated voltage (KV rms)	
7	Rated frequency (Hz)	
8	Maximum continuous operating voltage (KV r m s)	
9	Maximum leakage current at continuous operating voltage (micro Amps)	
10	Temporary power frequency over voltage capacity (KV rms)	
(a)	For 0.1 sec.	
(b)	For 1 sec.	
(c)	For 10 secs.	

Sr. No.	Particulars	9 KV LA
(d)	For 100 secs.	
11	Nominal discharge current (KA)(8/20 micro sec wave)	
12	Energy class	
13	Minimum discharge capability (KJ/KV)	
(a)	For single impulse energy	
(b)	For 2 consecutive discharge with 50/60 sec. between them	
14	Maximum Switching Serge protection level at 500A	
15	Maximum equivalent front of wave protection level (KVp)	
16		
(a)	5 KA	
(b)	10 KA	
(c)	20 KA	
17	Maximum steep current Impulse residual voltage at nominal discharge current(KVP)	
18	Maximum switching impulse Residual voltage at 500 Amp. Peak	
19	Minimum prospective symmetrical current (KA)	
20	Impulse high current short duration discharge of 4/10 Micro sec wave (KAP).	
21	Long duration current impulse withstand :	
(a)	Current peak (Amps.)	
(b)	Virtual duration (Micro sec.)	
22	Maximum radio interference voltage at 100 KHz (micro volts/DB)	
23	Pressure relief device capability (Short circuit capability)	
(a)	High current (Amps.)	
(b)	Low current (Amps.) +	
24	Protective ratio (RDV/BIL)	
25	Total creepage distance mm	
26	Impulse withstand voltage Kvp.	
27	Reference current (MAP)	
28	Partial discharge i.e. PICO	
29	Power frequency withstand voltage of arrester Housing (KVrms)	
(a)	Dry	
(b)	Wet	
30	Lightning impulse withstand voltage of arrester housing (KVP)	
31	Current impulse withstand level	
32	Type of dis-connective device	
33	Dimensions of Arrester :	
(a)	Max. dia (mm)	
(b)	Complete height of arrester (mm) from base to line side(mm)	
(c)	Total creepage of distance of arrester housing (mm)	
(d)	Net weight of each arrester (Kg)	
34	Construction of arrester	
(a)	Material of valve	
(b)	Details of sealing	
(c)	Description of pressure relief system	
(d)	No. of unit per arrester	
35	Type & Dimensions of clamping bracket	
36	Material of Top & Bottom metal cap.	
37	Type of terminal arrangement (Whether as per tender Specification)	
38	Size of line/ground terminals	
39	Minimum recommended spacing between Centre to centre of LA. (mm)	
40	Clearance required from ground equipment at various heights of arrester units. (mm)	
41	Earthing arrangement provided for earthing side of arrester (whether as per our requirement)	

**ENCLOSURE - 10****TECHNICAL SPECIFICATION OF LT TRANSFORMER PROTECTION  
CUM DISTRIBUTION SYSTEM (FOR 100 KVA RATINGS)****1. SCOPE:**

This specification covers the design, manufacture, testing before dispatch, supply and delivery of 100 KVA L.T. Transformer Protection cum Distribution System.

**2. CLIMATIC CONDITIONS:**

The climatic conditions at site under which the equipment shall operate satisfactorily are as under :

1	Location	In the State of Madhya Pradesh, India
2	Maximum ambient air temp.	50 °C
3	Minimum Ambient Air Temperature	(-) 1 °C
4	Average Daily Ambient Air Temperature	32 °C
5	Maximum relative humidity	90% Sometimes approached to saturation.
6	Average rainfall per annum(mm)	Not more than 1000 mm (Average 200 to 600 mm)
7	Maximum Altitude above mean sea level (meters)	815
8	Isoceranic level (Day/annum)	120/50
9	Maximum Wind Pressure (Kg/Sq. meters)	45
10	Seismic level (Horizontal acceleration)	0.1 g

The system generally be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth unless otherwise specified.

**3. GENERAL REQUIREMENTS :**

SL. No.	Particulars	
i)	SCOPE	Manufacture, Testing & Supply of L.T. Transformer Distribution System

ii)	SYSTEM	415 Volts, AC 3 Phase 4 Wire 50 C/S with effectively grounded neutral system
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#### 4. SYSTEM DETAILS:

LT Transformer Distribution System mainly consists of following main items detailed below :

- 4.1 One chamber to house incoming, one Isolator double make double break type 250 A , as per IS/IEC60947-2:2003, Four Pole MCCB double make double break type 200 Amp. - 36 KA as per IS/IEC60947-2:2003 with Bus bar connection system. This chamber may be called CHAMBER NO. 1 or Protection Chamber.
- 4.3 Other chamber to house 6 numbers of Single Pole MCCB's 100 Amp. 36 KA double make/ double break capacity with outgoing Bus bar connections and neutral bus bar. This chamber may be called CHAMBER NO. 2 or Distribution Chamber. The MCCBs shall be confirming to IS/IEC60947-2:2003
- 4.4 Supporting MS Frame work for the above Chambers Nos. 1 to 2.
- 4.5 Spacers for connecting the chambers.
- 4.6 External Earthing Plate for earthing of connections.
- 4.7 Cable Clamps for incoming & outgoing cables.

Further details of the above are :

#### 4.1 CHAMBER NO. 1 : PROTECTION CHAMBER :

**4.1.1 Construction Features** : The box shall be adequately protected against rust, dust, water and corrosion both from inside and outside. The box shall be so constructed as to have roof tapering back side for easy flow of rain water.

**4.2.3 Dimensions** : Dimensions of the Chamber No. 2 or Protection Chamber will be as per drawing

**4.2.4 Thickness** : Base : 3.0 mm  $\pm$  0.25 mm  
Cover : 3.0 mm  $\pm$  0.25 mm

**4.2.5 MCCB** : Four Pole MCCB 200 Amp. - 36 KA

A four pole MCCB of rating 150 Amp. should be provided in this chamber for protection. The following make of MCCB shall be acceptable. : Siemens / L&T / ABB / GE POWER / MONTEL / SCHNEIDER / SPACEAGE Hyundai or any other make which conforms to the specifications.

Detailed technical parameters of Four Pole MCCB 200 Amp. MCCB - 36 KA as per Schedule - A.

**Four Pole Isolator 250 Amp**

A four pole Isolator of rating 150 Amp. should be provided in this chamber for protection. The following make of Isolator shall be acceptable. : Siemens / L&T / ABB / GE POWER / MONTEL / SCHNEIDER / SPACEAGE Hyundai or any other make which conforms to the specifications.

Detailed technical parameters of Four Pole Isolator 250 Amp. Isolator - as per Schedule-c.

**4.2.6 Mounting Arrangement of Four Pole MCCB 200 Amp. - 36 KA :** M.S. 2.0 mm  $\pm$  0.2 mm thick mounting bracket should be provided with proper mounting holes and clamps to accommodate four pole MCCB 200 Amp. - 36 KA. The plate should be zinc plated and yellow passivative.

**4.2.8 Arrangement of inter connection of Bus bar :**

Inter connection of bus bar should be done, and proper gap should be maintained between all phase and neutrals. DMC moulded support should be used to provide rigid support and insulation.

**Holes for incoming Cables :** For incoming cable 4 Nos. hole with insulated plastic glands on the base of the chamber shall be provided and gland plates with suitable holes for incoming cable shall be provided.

**4.1.9 Gland Plate :** M.S. 2.0 mm  $\pm$  0.2 mm thick zinc plated yellow passivated gland plate should be provided at the incoming side of the box i.e. at the bottom of the box.

**4.2.9 Hinges :** Two Nos. of hinges should be provided to join base with cover from one side in such a manner that no screw or rivets will be visible from outside. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box as per drawing

**4.2.10 Rubber Gasket :** The collar in the Base of Chamber shall be provided with good quality rubber 'O' ring. The design of lining shall be such that it provides proper sealing between the cover and base of chamber to avoid penetration of dust and ingress of water. This may be achieved by providing an U shape groove in the outer flange of the base and all around projection provided on the cover periphery, which keeps the 'O' ring pressed and

also to provide an outside caller to cover the groove. This will avoid ingress water, dust etc.

**4.2.11 Ventilation :** Ventilation plugs (Elbow type) has to be provided having built in mesh to protect against entry of insects and lizards. These vents shall be fixed / tightened from inside facing down as not to allow water inside. These plugs will provide breathing inside the chamber. The IP rating of individual chambers should be IP 55 but the test has to be done on enclosures in which the holes have been blocked.

**4.2.12 Padlock Arrangement :** Pad lock arrangement should be provided to lock / seal the base and cover.

**4.2.13 Bus Bar :** Size of Bus Bar should have cross sectional area of 50 x4 mm  $\pm$  2.5% made of EC Grade copper Covered with Phase identification PVC Colour Coding Sleeves.

**4.2.14 Sealing Arrangement :** 2 Nos. of sealing bolts & nuts should be provided to seal the box and also to close the cover on base.

**4.3 CHAMBER NO. 2 : Six (6) Nos. 100 Amp. 36 KA Single Pole MCCBs, incoming and outgoing Bus bar connections and neutral bus bar.**

**4.3.1 Construction Features :** The base and cover should be made by means of MS sheet of IS: 2147/1962 or to equivalent any international standard.

The box shall be adequately protected against rust, dust, water and corrosion both from inside and outside. .

**4.3.3 Dimensions :** Dimensions of the Chamber No. 2 or Distribution System will be as per drawing

**4.3.4 Thickness :** Base : 3.0 mm  $\pm$  0.25 mm  
Cover : 3.0 mm  $\pm$  0.25 mm

**4.3.5 Mounting arrangement of Bus bar :** D.M.C. Moulded Bus bar holding supports should be mounted in the chamber so that all the bus bars can be interconnected through Chamber No. 1with Chamber No. 2 with proper gap and insulation. The cross sectional area of Bus bars is to be 50 x4 mm.

**4.3.6 MCCB :** Single Pole MCCB 100 Amp. - 36 KA

Six (6) numbers single pole MCCBs of rating 100 Amp. should be provided in this chamber. The following make of MCCB shall be acceptable : Siemens / L&T / ABB / GE POWER / MONTEL / SCHNEIDER/ SPACEAGE Hyundai or any other make which conforms to the specifications.

Detailed technical parameters of Single Pole MCCB 100 Amp. - 36 KA as per Schedule - B.

**4.3.7 Mounting Arrangement of Single Pole MCCB 100 Amp. - 36 KA :** M.S. 2.0 mm  $\pm$  0.25 mm thick mounting bracket should be provided with proper mounting holes and clamps to accommodate 6 numbers of single pole 100 Amp. MCCBs- 36 KA. The plate should be zinc plated and yellow passivative.

**4.3.9 Neutral Bar :** A pre drill and tapped neutral bar should be provided of cross sectional area 150 Sq. mm  $\pm$  2.5% to take the neutral for outgoing connections.

**4.3.10 Holes for incoming and outgoing :** For outgoing connections 9 number of holes with Engineering Plastic glands will be provided at the bottom of the chamber. A gland plate of M.S. 2.0 mm thick zinc plated yellow passivated should be provided.

**4.3.11 Hinges :** Two Nos. of hinges should be provided to join base with cover from one side in such a manner that no screw or rivets will be visible from outside. The cover should be closed from top to bottom with pull push facility separately for box no. 1 and box 2 with moving lever arrangement each side of box as per drawing

**4.3.12 Rubber Gasket :** The collar of the body shall be provided with good quality rubber 'O' ring. The design of lining shall be such that it provides proper sealing between the cover and base of chamber to avoid penetration of dust and ingress of water. This may be achieved by providing an U shape groove in the outer flange of the base and all around projection provided on the cover periphery, which keeps the 'O' ring pressed and also to provide an outside caller to cover the groove. This will avoid ingress water, dust etc.

**4.3.13 Ventilation :** Ventilation plugs (Elbow type) has to be provided having built in mesh to protect against entry of insects and lizards. These vents shall be fixed / tightened from inside facing down as not to allow water inside. These plugs will provide breathing inside the chamber. The IP rating of individual chambers should be IP 55 but the test has to be done on enclosures in which the holes have been blocked.

**4.3.14 Padlock Arrangement:** Pad lock arrangement should be provided to lock / seal the base and cover.

**4.3.15 Bus Bar :** Size of main Bus Bar should be 50X4 mm  $\pm$  2.5% and main bus bar should be connected to the 100 Amp. MCCB by means of copper strip of cross section of 45 sq. mm  $\pm$  2.5% made of EC Grade copper.

**4.3.16 Sealing Arrangement :** 2 Nos. of sealing bolts & nuts should be provided to seal the box and also to close the cover on base.

**4.4 Supporting MS Frame for Chamber Nos. 1 to 2 :**

MS Angle 30x30x5 mm  $\pm$  2.5% with 6 mm flats in between should be used to make the back frame of the entire system. It should be made in such a manner that entire back side edge / corner should be held by this frame rigidly. Each box is to be fixed at min. 4 places at Base.

MS Frame should be Hot Dip Galvanised material.

**4.5 Spacers for connecting the Chambers :**

For joining the Chamber No. 1 with Chamber No. 1; with Chamber No. 2 especially designed spacers are to be used with O ring all around on both sides to avoid ingress of water and dust. This spacer is sandwiched between 2 chambers in a fashion, so it fit into the groove provided on the sides of the chambers and duly bolted with each other. The spacers shall have openings for bus bars to pass through the joints and spacers.

**4.6 External Earthing Plate for Earthing :**

M.S. 2.0 mm  $\pm$  2.5% thick hot dip galvanised plate with 6 Nos. of M8x40 Nut, bolts and washer should be fitted on the bottom of chamber for providing earthing for outgoing connections.

**4.7 Cable Clamps for incoming Cables :**

Sufficient numbers of MS U Shaped bend clamps with bolts and nuts should be fitted on metal frame to hold and support the incoming cables firmly.

**4.8 Cable Clamps for outgoing Cables :**

Sufficient numbers of MS U Shaped bend clamps with bolts and nuts should be fitted on metal frame to hold and support the outgoing cables firmly.

\*\*\*\*\*

Note :

01. Tolerances for current carrying parts should be :

a) Thickness :  $\pm 2.5\%$

b) Length :  $\pm 2.5\%$

02. Tolerances for metal parts should be :

a) Thickness :  $\pm 2.5\%$

b) Length :  $\pm 2.5\%$

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**SCHEDULE - A**

**TECHNICAL SPECIFICATION FOR FOUR POLE MCCB 200 Amp - 36 KA  
FOR 100 KVA TRANSFORMER PROTECTION CUM DISTRIBUTION SYSTEM**

Application	Outdoor (enclosed).
Utilization category	'A' (IS: 13947-1993) as amended up to date
Type	Thermal-Magnetic trip free mechanism.
Number of poles	Four
Peak ambient temperature	50 °C.
Rated insulation level	600 V.
Rated operational voltage	433 V.
Continuous current rating	200A
Ultimate Short Circuit Breaking capacity (ICU)	36 KA
Rated service Short Circuit Breaking capacity (ICS)	36 KA
Application Standard	IS: 13947 Part-2 (latest) - 1993
Time current characteristics	To co-ordinate with HV fuse.
Durability (C-O Cycles)	
a) mechanical	8500
b) electrical	1500

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**SCHEDULE - B**

**TECHNICAL SPECIFICATION FOR MCCB - 100A  
FOR 63 KVA TRANSFORMER PROTECTION CUM DISTRIBUTION SYSTEM**

Application	Outdoor (enclosed).
Utilization category	'A' (IS: 13947-1993) as amended up to date
Type	Thermal-Magnetic trip free mechanism.
Number of poles	Single
Peak ambient temperature	50 °C.
Rated insulation level	600 V.
Rated operational voltage	433 V.
Continuous current rating	100A
Ultimate Short Circuit Breaking capacity (ICU)	36 KA
Rated service Short Circuit Breaking capacity (ICS)	36 KA
Application Standard	IS: 13947 Part-2 (latest) - 1993
Time current characteristics	To co-ordinate with HV fuse.
Durability (C-O Cycles)	
a) mechanical	8500
b) electrical	1500

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**SCHEDULE - C**

**TECHNICAL SPECIFICATION FOR Four Pole Isolator - 250A  
FOR 100 KVA TRANSFORMER DISTRIBUTION SYSTEM**

Application	Outdoor (enclosed).
Utilization category	'AC' 23 A asIS/IEC 60947-2:2003 as amended upto date
Type	Thermal-Magnetic trip free mechanism.
Number of poles	Four
Peak ambient temperature	50 °C.
Rated insulation level	750 V.
Rated operational voltage	690 V.
Continuous current rating	250A
Rated service Short Circuit making capacity (ICM)	30
Application Standard	IS: 60947-2:2003
Short time withstand current (A rms) ICW	<p>1 Sec-9000A</p> <p>3 Sec-5000A</p> <p>20 Sec-2300A</p> <p>30 Sec-1800A</p>

**GTP of DISTRIBUTION CUM PROTECTION BOX FOR 100 KVA 11/.4KV TRANSFORMER**

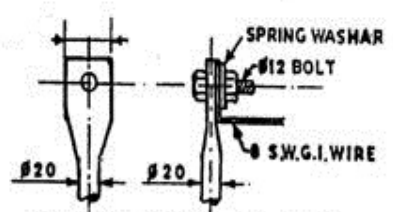
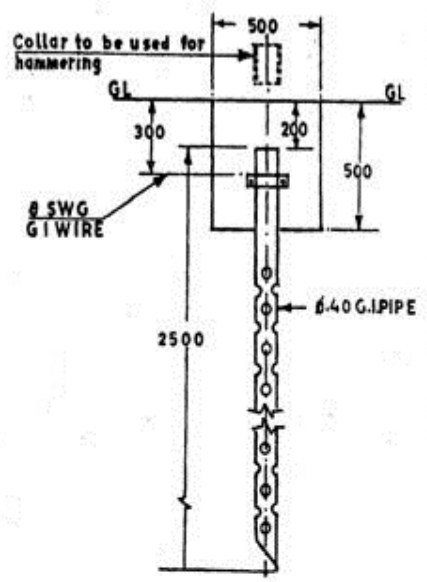
N	Particulars	Specification Details	Guaranteed Value
I	SYSTEM DETAILS		
	a) KVA	100 KVA	
	b) Voltage	415 V	
	c) Frequency	50 c/s	
	d) Full load current	140 A	
	e) No. of circuit on outgoing side	2 Nos. per Phase	
I	ISOLATOR	a) Triple Pole 250 Amps. of any approved brand on incoming side. b) Whether the Isolator meets the technical requirement of specification.	
I	a) Cross Section of the terminal strip of Isolator b) Length of the terminals of the Isolator c) Material of strip	50 x 4sq.mm.  80mm on incoming and 60mm on outgoing side.  Tinned copper	
I	DETAILS OF MCCB		
	i) Make of MCCB ii) No. of ckts. iii) Nominal current iv) No. of Poles	2 Nos./Phase  130 Amps.  Single Pole	
8	If the MCCB is of approved make (Then the details of guaranteed technical particulars need not be enclosed)		

N	Particulars	Specification Details	Guaranteed Value
9	terminal strip	50 x 4 sq.mm.	
1	of incoming side and outgoing side	Length of incoming side is 60 mm & outgoing side is 80 mm	
1	l of strip	Tinned copper	
V	BUS BAR DETAILS		
	1. Material  2. Size of the main bus bar  3. PVC Insulation of standard colour code is to be provided on the bus bar  4. Minimum clearance of the bus bar Top side, between the bus bar	Tinned copper  50X4 sq.mm.  Weather coloured sleeve insulation has been provided on the bus bar & at joints M-seal compound has been painted.  As per drawing	
V	ENCLOSURES		
1	Size	As per drawing	
2	Material	M.S. Sheet	
3	Thickness	3 mm of all sides	
4	Arrangement for Pad Lock	Arrangement for pad lock as per Drawing	
5	Auto Lock with push pull facility	To be provided	
6	Slopping of the roof	Slopping of 5° from the front to back	
7	Colour of the Box	Grey	

N	Particulars	Specification Details	Guaranteed Value
8	Bottom Plate	Bottom Plate	
9	Thickness	Should be made of 3 mm thick perforated and should be detachable.	
1	Additional Support	3 mm thick plain sheet	
1	Knock out holes	3 Nos. with PVC Glands. One no. suitable 150 sq.mm. on incoming side and 2 Nos. for outgoing side of 70 sq.mm. size	
1	Air Circulation	Both sides Ventilation	
1	Bottom Cleats	Four Bottom Cleats of 75x40x3 mm thick M.S. provided	
1	Instructions to Lineman in Hindi Provided	To be provided on the back of the door of the box.	
1	Hinges	Hinges of the door is to be provided with Brass tube	
1	Danger plate	Duly enameled on both sides.	
1	Identification plate	Identification plate is to be provided indicating the details as under :-	
		Name	
		Rating of Box	
		Sr. No.	
		Date of Manufacturing	
		Order No. & Date	
1	Nut & Bolts	All nuts & bolts of the current carrying part should be made of stainless steel	

N	Particulars	Specification Details	Guaranteed Value
		with washer.	
1	Earthing Bolts	Earthing bolts to be provided of 50 x 12 mm on each side with one spring washer & two plain washers	
2	Neutral Bus Bar	50X4 sq.mm. size or equivalent neutral bus bar to be provided along with lugs with steel washer	
2	Lugs on Incoming side	Bimetallic lugs suitable for 150 sq.mm. 3-1/2 Core on incoming side & 70 sq.mm. on outgoing side	
2	Cable Holding Clamp	Cable holding clamp of 2 mm thick with 4 mm base strip to be provided	
2	Opening of door from top to bottom with moving lever facility	As Per drawing	
V	SPECIAL REMARKS		

**EARTHING FOR ORDINARY SOIL  
WHERE PIPE COULD BE HAMERDE IN**

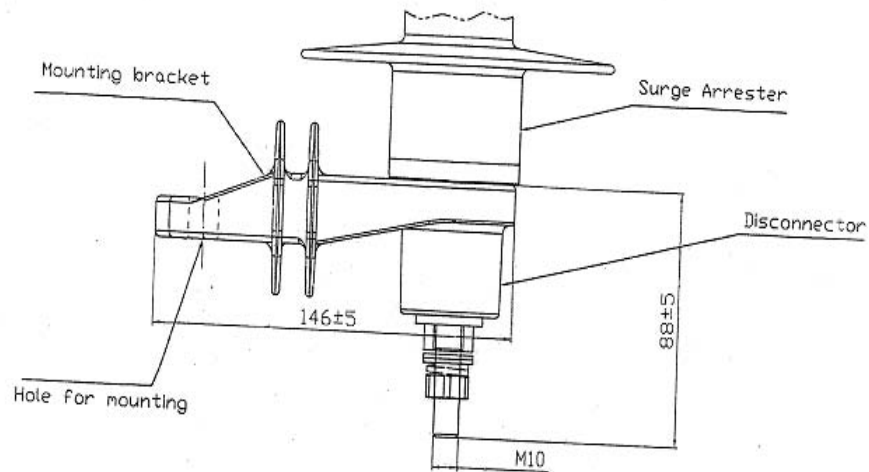


**TYPICAL DETAIL OF CON<sup>n</sup>  
FOR ROD EARTH**

- Note** 1. ALTERNATIVELY 20 G I ROD MAY BE USED INSTEAD OF PIPE  
 2. WATER TO BE POURED INTO SUMP TO KEEP THE SOIL SURROUNDING THE EARTH PIPE/ROD MOIST

ALL DIMENSIONS ARE IN M.M.

M.P.P.K. V.V.C. L. INDORE	
O/O CMD WZ	
	DATE
SCALE :- N.T.S.	DRG No. CMD/WZ/51



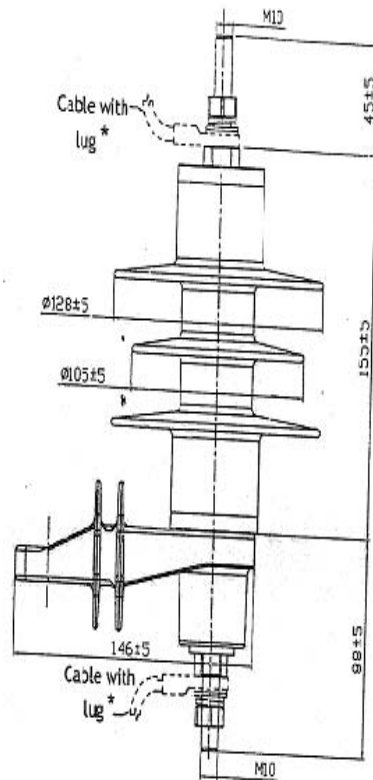
Notes :

- All dimensions in "mm"
- Disconnector integrated into bracket
- Dia 13 hole in bracket for mounting onto a channel in the field.

MPPKVCL INDORE  
DRAWING FOR BRACKET FOR  
11 KV LA  
DRG DISCOM/WZ/52(1)

MV SURGE ARRESTER  
TYPE : NDA  
MOUNTING BRACKET AND DISCONNECTOR

**MPPKVV Co.Ltd. Indore**  
**Drawing of Lightning Arrester**  
**Drawing No.DISCOM/WZ/52 (1)**



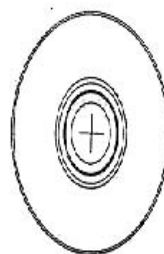
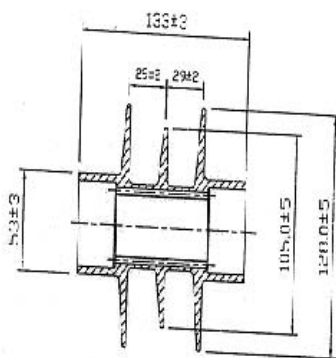
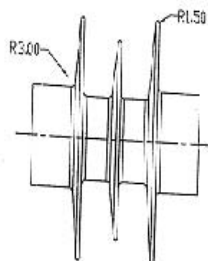
Notes :  
 All dimensions in "mm"  
 Nominal COV Uc = 8kV  
 Nominal Rating Ur = 10kV  
 Nominal discharge current = 5kA  
 Nominal creepage distance = 330mm  
 Nominal dry arcing distance = 163mm

MPPKVCL INDORE

DRG No. DISCOM/WZ/52(2)

MV SURGE ARRESTER  
 TYPE: NDA WITH DISCONNECTOR

**MPPKV Co.Ltd. Indore**  
**Drawing of Lightning Arrester**  
**Drawing No.DISCOM/WZ/52 (2)**



**Notes :**

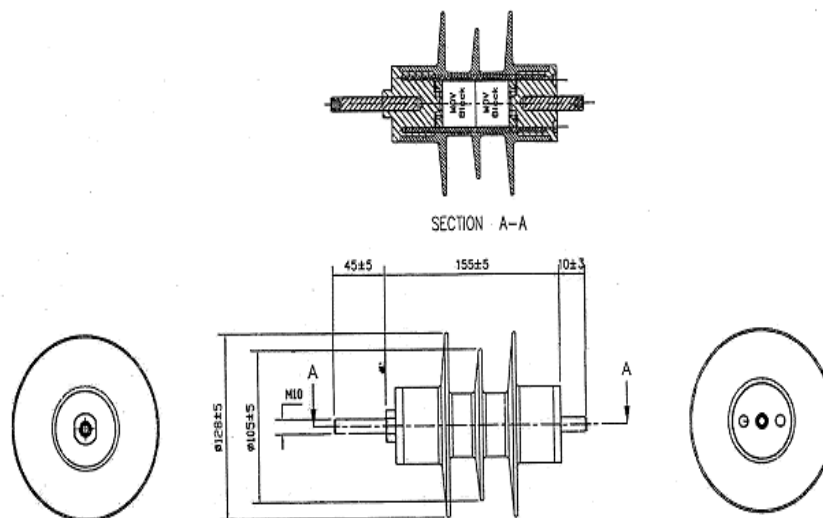
All dimensions in "mm"  
Material : Polymer - EVA

**MPPKVCL INDORE**

**DRG No. DISCOM/WZ/52(3)**

**MV SURGE ARRESTER  
TYPE : HOA  
HOUS NG DETAILS**

**MPPKVV Co.Ltd. Indore  
Drawing of Lightning Arrestor  
Drawing No.DISCOM/WZ/52 (3)**

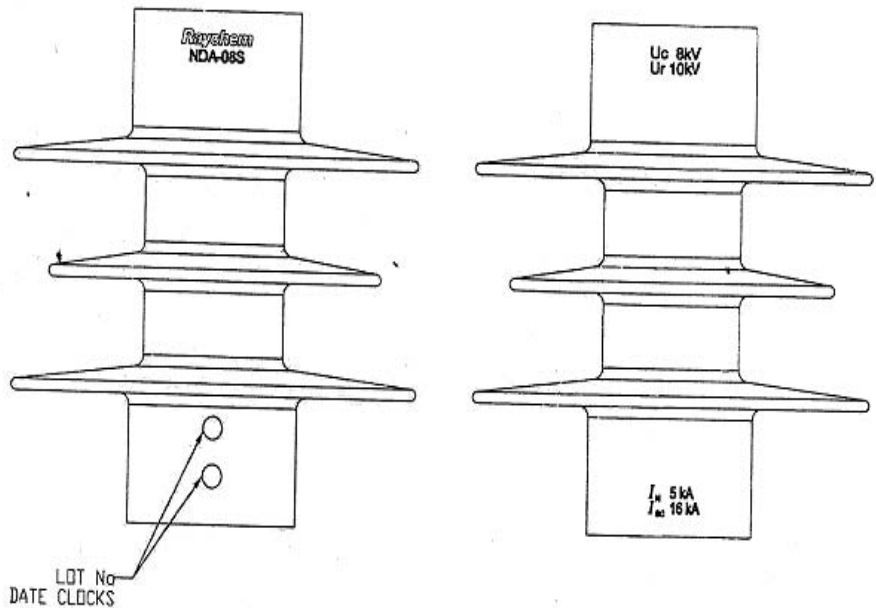


**Notes**  
 All dimensions in "mm"  
 Nominal COV Uc = 8kV  
 Nominal Rating Ur = 10kV  
 Nominal discharge current = 5kA  
 Nominal creepage distance = 330mm  
 Nominal dry arcing distance = 163mm

**MPPKVCL INDORE**  
 DRG No. DISCOM/WZ/52(4)

**MV SURGE ARRESTER**  
 TYPE : NDA  
 SECTIONAL VIEW

**MPPKVV Co.Ltd. Indore**  
**Drawing of Lightning Arrester**  
**Drawing No.DISCOM/WZ/52 (4)**

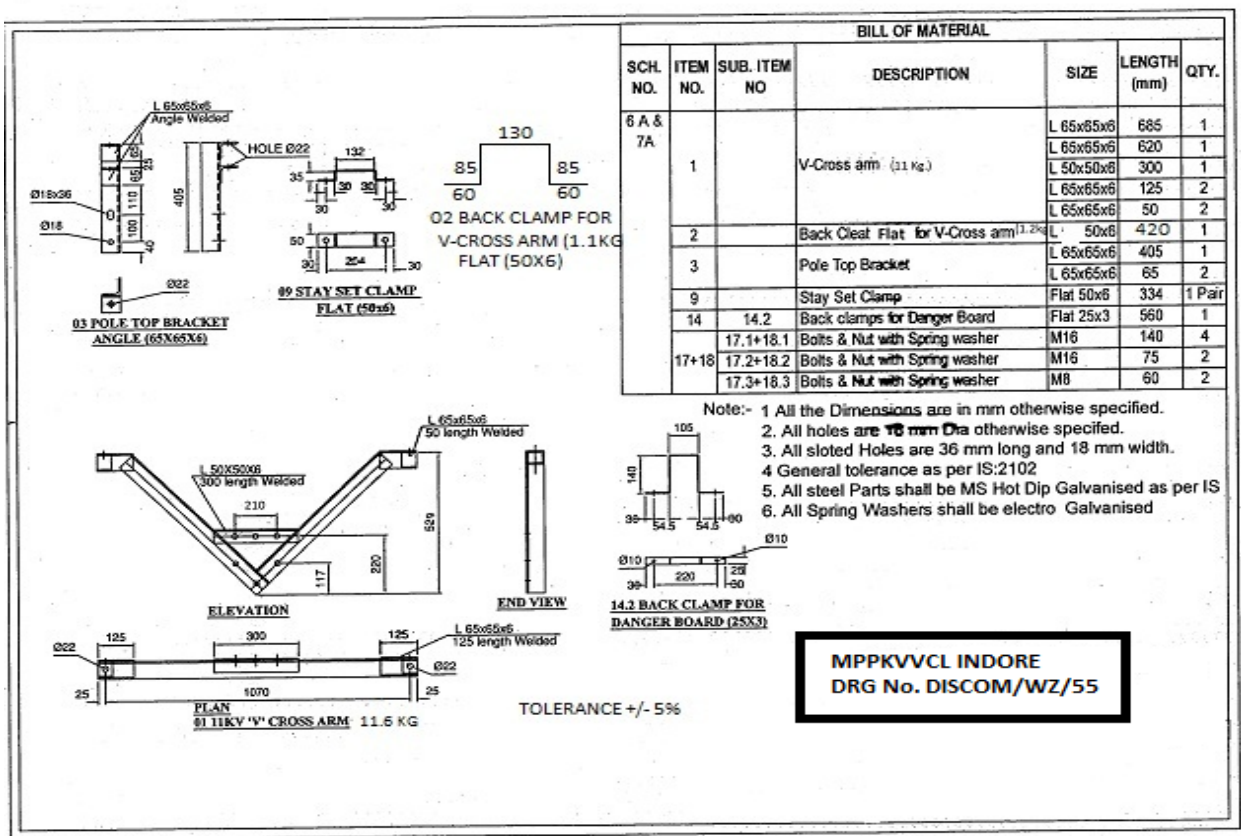


**Notes :**

- All markings are obtained during moulding itself.
- Markings : Raychem, Type, Ur (Rating), Uc (COV), In (Nom. discharge current), Isc (Short circuit capability), Mfg month & year

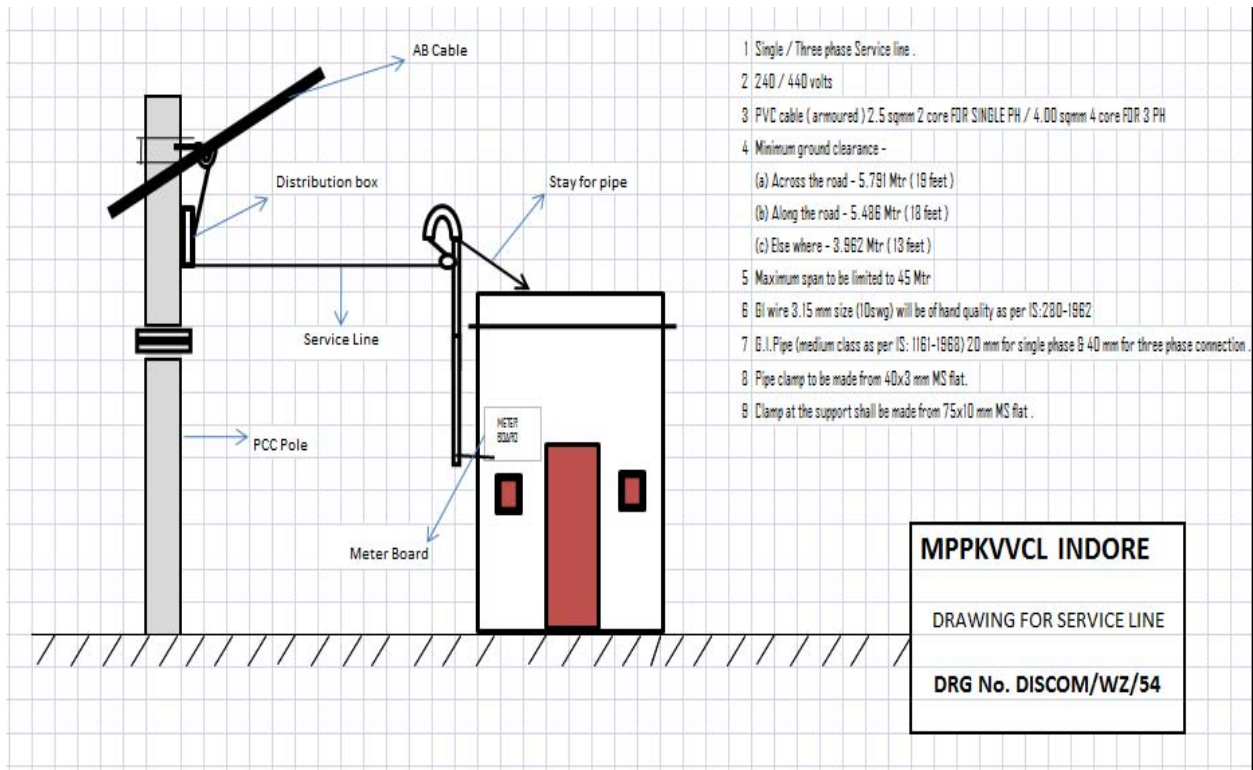
**MPPKVCL INDORE**  
 DRAWING OF  
 POLYMER 11 KV LA  
 DRG No. DISCOM/WZ/ 52(5)

**MPPKVV Co.Ltd. Indore**  
**Drawing of Lightning Arrestor**  
**Drawing No.DISCOM/WZ/52 (5)**



MPPKV Co.Ltd. Indore  
 Drawing of 11KV V Cross Arm  
 & various clamps  
 Drawing No.DISCOM/WZ/55





**MPPKV Co.Ltd. Indore**  
**Drawing of Service Connection**  
**Drawing No.DISCOM/WZ/54**

Drawing of Distribution Box for 100KVA 11/.4KV Transformer

