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ANNEXURES- 1

1.0 Scope

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading supply at stores of FPI for Overhead Lines with all accessories and necessary training for trouble free & efficient performance. This shall be either with or without communication accessories based on tender requirements.

It is not the intent to specify completely herein all the details of tech design and construction of 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 manner acceptable to the TPCODL/TPNODL/TPSODL/TPWODL, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble free operation. 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.

All necessary mounting fixture in scope of supplier

2.0 APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest editions of the following Standards /IEC and shall conform to the regulations of local statutory authorities.

IEC 60068-2-2	Electronic Equipment & Product Standards – For Dry Heat
IEC 60068-2-30	Electronic Equipment & Product Standards - Damp heat cyclic Test
IEC 60950	Information Technology equipment - Safety
IEC 61000-2	Electromagnetic compatibility for low-frequency conducted disturbances and signaling in public low power supply systems
IEC 61000-4	EMC - Testing & Measurement
IEC 61000-6	EMC- Immunity for Residential, Commercial and light industrial environments.
IEEE 495-2007	Testing faulted circuit indicator
IEC 60529	Degree of Protection.
IEC 60060-1	High-voltage test techniques – Part 1: General definitions and test requirements
IEC 60068-2-52	Salt mist, cyclic (sodium chloride solution)
IEEE Std 495	IEEE Guide for Testing Faulted Circuit Indicators
IEC 60870-5	Communication protocol.

Note- In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3.0 CLIMATIC CONDITIONS AT THE INSTALLATION

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	100%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL/TPNODL/TPSODL/TPWODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

Note: Climatic Condition will be considered as per respective Discoms TPCODL/TPNODL/TPSODL/TPWODL.

4.0 GENERAL TECHNICAL REQUIREMENTS

Sr. No	Parameter Description	Requirement	As offered by Bidder
1	Offered Model no. or type of FPI for Overhead lines along with Make	Bidder to submit followings, a. Make b. Model no./Type	
2	Application	Product shall be suitable for application on overhead lines of different size conductors and ABC	
3	Power	Self- powered for normal functioning without external auxiliary power for FPI	
3	Supply voltage Suitability	Suitable for 7 KV to 33 KV overhead conductors	
4	Power Frequency	50Hz	
5	Ingress Protection of enclosure	IP65 or better	

6	Short – circuit withstand	25kA/170 ms	
7	Suitable diameter of jaw	Suitable for Conductor- Dog, Wolf, Panther, Goat, Zebra	
8	Conformal coating	The relay PCB should have conformal coating	
	Fault Detection Parameters		
9	Current setting Trigger value	100 A to 800 A steps of 100 A and Manually or Automatic Mode- Can be set on site remotely	
10	Transient faults detection feature	This feature can be made On or Off, Manually and Remotely as per application site need.	
11	Minimum fault current impulse filter time	60 to 300ms (To filter inrush current)	
12	Beacon Flash Indication Duration (user settable)	30 min to 720 min in steps of 30 min - Manual and Remote Settable	
13	Inrush transient restraint	2 sec	
	Reset (Permanent Fault)		
14	Auto-reset on restoration on supply	Should auto-reset after 30 seconds delay and within one min of supply restoration.	
15	Pre-set Timer Reset	30 min to 360 min in steps of 30 min - Manual and Remote Settable	
16	Manual Reset (Local and Remote both)	Manual and Remote Resettable	
	Fault indication		
17	Fault Indications	a. Bright Red flash light (LEDs) for permanent faults, b. Preferably Green LED for transient fault with different blinking rate c. Preferably Yellow LED for low battery indication Bidder to submit the offered equipment details of features for indication of above faults categories.	
18	Light Power	40 Lumens	
19	Visibility Angle	360 Degree	
20	Flash Period for permanent faults	1 flash every 3 sec and/or Red flashing LED	
21	Flash Period for transient faults	2 flash every 12 sec and/ or Green flashing LED	
22	Standard total flash duration	Min. 1000 Hrs under permanent fault operation	
23	Battery low indication	The FPI should have low battery indication Local and remote alert (Bidder to submit details of provision)	
24	Internal Battery of FPI	Lithium Ion rechargeable battery (Shall recharge from line current)	

25	Life of the Battery	More than 10 years	
26	FPI Battery capacity	Bidder to mentioned details of voltage and Ah rating	
27	Operation Temperature	-5 deg. C to +70 deg. C or better	
28	Storage Temperature	-5deg. C to +70 deg. C or better	
29	Suitability for Wind Resistance	For wind pressure 200kg/sq m up to an elevation of 10 mts	
30	Weight of FPI unit	Bidder to submit details of offered product	
31	Size of FPI unit (Dimensions)	Bidder to submit details of offered product	
32	Fixing on line conductor	Should be Easy to fix with hot stick	
33	FPI power up current	FPI should be power up with Minimum 20A line current & battery power shall be used only after fault	
For communicable FPI			
34	Data Transmission/collector Unit package	This package shall include, a) Data Collector or Communication unit b) Battery bank, c) Resin cast PT for auxiliary supply. d) 4G Modem/RTU for SCADA communication e) Communication cables and supply cables f) Installation hardware with GI material for all equipment (Bidder to mention the package details along with Make and model of equipment)	
35	Inbuilt Radio range	100 meter (A short-range radio interface shall be embedded in this Fault Passage Indicator/ Fault Sensing Indicator so that to allow it communicate with the 2G/3G/4G/4G LTE, etc. communication interface)	
36	Communication Unit devise interface	A GSM/GPRS communication interface, pole-mounted, acting as a communication gateway between Fault Passage Indicators using short-range radio and the remote control centre using GSM/GPRS communication. Inbuilt modem shall support all technology i.e. 2G, 3G, 4G & 4G LTE, etc.	
37	The communication unit protocol with server	The communication unit should provide data to SCADA in IEC-60870-5-104 and MQTT over the Ethernet port.	
38	Line Loading data	FPI should transmit real time line loading (phase wise), fault data to ADMS through FPI over IEC-60870-104 and MQTT.	

39	The DCU communication compatibility (if required)	Compatible to send data over 2G/3G/4G/RF modem connected to the Ethernet port of the modem	
40	Data Transmission rate	Data Transmission rate over Ethernet should be 10/100Mbps	
41	Multi master reporting	One DCU (if required)/FPI should report at least 8 master with single CASDU	
42	FPI Data downloading at site	a. Data downloading from FPI to Laptop should be possible over any non-proprietary protocol. b. LAPTOP software to be provided free of cost & should be compatible with windows 10 and latest edition	
43	Self-diagnostic alerts in DCU (if required)	DCU Door open alarm, Battery charger failure, LT Supply failure, Battery low alarm, DCU Malfunction	
44	Communication unit battery back up	Battery (Along with charger) backup of 4 hrs should be provided for automation unit. Aux PT should be Ph-Ph . Aux Supply :VDC 24 or higher	
45	Installation supervision	The bidder shall provide installation supervision	
46	SCADA integration of data.	The scope shall include the data integration up to SCADA.	
47	DCU and Modem	Remote Configuration should be compatible	
48	For Modem (4G)	Provision required for Automatic restart (configurable)	

5.0 General construction

1. The Overhead Fault Passage Indicator shall locate the passage of faults on overhead lines. The FPI shall indicate transient faults and permanent faults on the O/H lines. The transient fault detection feature should have disable feature with manual as well as remote settable.
2. The Overhead Fault Passage Indicator shall operate on passing over of the absolute threshold current (user settable).
3. Current peaks, caused by switching on power equipment like transformers etc. can reach the operating point of FPI and may lead to a wrong evaluation, to avoid this, the incoming impulse must be filtered internally.
4. The filtration shall be such that the fault will only be indicated by FPI, if the current impulse lasted longer than the pre adjusted minimum impulse duration.
5. This duration should be internal set as 60ms minimum or/and can be adjustable in range of 60 to 300ms based on equipment in network application.
6. The faults are indicated by all FPI indicators placed on line between the source input side and up to the location of the fault. Such that the fault location shall be between the last flashing FPI and the next non-flashing FPI which is in standby mode.

5.1 Trip Current and fault Types

5.1.1 Trip current for the FPIs shall be settable at site.

- 5.1.2 FPIs shall constantly monitor, measure the line current and evaluate the same. In case current exceeds a pre-set value, a fault has to be indicated. Alternatively, there shall also be an "Automatic Mode", in which the FPIs will get adapted to the service current.
- 5.1.3 The FPI shall detect and indicate phase to phase faults. In addition to this, the FPI shall also detect and differentiate between transient, temporary and permanent faults.
- 5.1.4 The FPI shall be equipped to filter out the inrush current due to transformer magnetizing currents thus avoiding the possible false indication of faults.

5.2 LED/Indication

1. The FPI shall indicate faults by means of bright red LED for permanent faults so that the indication is clearly visible during night times and by means of a red luminous flag, so as to be clearly visible in the bright sunlight during day times.
2. Alternately it is preferred that FPI shall have different color light (LEDs) for permanent faults, transient fault and low battery indication.
3. Bidders to mention the options provided for various faults and indication purposes.

5.3 Reset

1. Once the fault is cleared, the FPI shall reset itself upon the power return.
2. It shall also have a facility of resetting with settable time duration and manual reset.
3. If FPI is busy in flashing on transient fault and if the permanent fault occurs, the FPI shall automatically change the priority and shall start flashing differently to show the permanent fault; thus helping maintenance crew to review the priorities.

5.4 Battery

- 5.4.1 The FPIs shall be powered by inductive pickup from the 11kV conductor with a minimum operating current of 20A. During faults, when the system is down, FPIs shall be powered by lithium battery.
- 5.4.2 The lithium battery provided inside the FPI shall be replaceable type, in case of battery failures. The battery shall have a minimum indicating life of 10 years / 1000 hours.
- 5.4.3 Low battery alarm indication shall be provided on local as well as SCADA control station.

5.5 Data Transmission Unit (For communicable FPI)

- 5.5.1 The Data Transmission Unit contains Data Transmission Terminal Unit and PT for auxiliary supply. Bidder to mention the offered unit package.
- 5.5.2 The DTU receives the measurement and alarming data from the FPI through high frequency wireless module. The frequency band provided by the bidder shall be license free band and congestion free. Range of operation of 1 no DTU shall be 3 set (3 nos) of FPIs.
- 5.5.3 The bidder providing more range of operation shall be preferred. After storing and processing the data, it connects with the SCADA server through GSM/4G/GPRS network.
- 5.5.4 IEC 104 communication protocol to be used to transfer data to SCADA. It sends the monitoring data to the server and the control command sent by the server to achieve bidirectional controllable operation.
- 5.5.5 The Data Transmission Terminal Unit shall consist of minimum following:

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- a. Main Control board/PCB
- b. High Frequency wireless module
- c. GSM/4G/ GPRS Module
- d. Lead Acid Battery/ Battery arrangement to store power from PT

5.6 Remote Control Unit features (For communicable FPI)

- 5.6.1 The FPI shall be supplied along with suitable Remote Control Unit, having a LCD display, common for all the Overhead Fault Passage Indicator. The supplier shall supply one number of Remote Control Unit free of charge along with every 9 numbers of FPIs.
- 5.6.2 The FPI shall be equipped with remote Test and Reset features, so that the functionalities including status of battery and flag can be tested without removing the FPI from the line. The Remote Control Unit shall capable of performing the following operations:
- i) Perform Test / Reset operations by standing below the FPIs
 - ii) View settings of various parameters of the FPI like trip current, response time, reset time, temporary fault indication status, transient fault indication status, auto-reclosure support status etc.
 - iii) Set various parameters of the FPI like trip current, response time, reset time, temporary fault indication status, transient fault indication status, auto- reclosure support status etc.
 - iv) Perform battery check and flag check.
 - v) View real-time value of the current flowing though the 11kV line on which a particular FPI is installed. This current shall be indicated in terms of Amps (A).
 - vi) Operating range for the Remote Control Unit shall be minimum 30m radius.
- 5.6.3 The settings for the FPI shall be settable at site, without dismounting the FPI from the line. Following parameters shall be settable at time.
- Trip Current
 - Response Time
 - Reset Time
 - Turn On / Off indication for Transient Faults
 - Turn On / Off auto-reclosure support function

5.7 GSM/GPRS COMMUNICATION INTERFACE

Minimum No of TCP/IP Eather Port	3 (Among them one must be engineering port)
Data Transmission Rate of TCP/IP Eathernet Port	10/100Mbps.
Communication	Controller must have at least one TCP/IP Ethernet port to for communication with master station over IEC-60870-5-104 & MQTT. No external protocol converter will be accepted.
Master station communication protocol	Support IEC -60870-5-104/MQTT for communicating with master station. Preferably support FTP protocol to transfer disturbance recorder to remote

	server. Simultaneously communication facility to field engineer for faster local restoration
DATA Reporting	Device should support periodic data reporting configurable from 2 second to 1 hr interval and spontaneous data as well
	Digital data should have higher priority than analog data. The dead band for reporting analog data by exception shall be initially set to 1 % (in 1%) of full scale value.
Multi-Master reporting	8 master with single CASDU
CPU Processing Speed	32 bit ARM Core CPU operating @ minimum 450 MHz
RAM	64 MB
Modem	GPRS (2G/3/4G)/RF Modem to be connected in one Ethernet port for SCADA communication. Preferred modem make ARG-600 (ABB-2G/3G/4G LTE)
Controller	Must have External DI contact (to capture ON/OFF Status.) & DO for controls
Cyber Security	User level authentication, Disabling the DNS, Disabling/enabling/configurable TCP/UDP port,
Protection Features	PT Failure, Charger Failure, Battery Failure/Door lock alarm integrated to Controller
Minimum Event Storage Capacity	
Measurement Event	10000
System Event	1000
Alarm Event	1000
Normal Event	5000

Detailed hardware requirement and architecture will be decided at the time of detailed engineering phase prior to implementation.

5.8 SINGLE PHASE POTENTIAL TRANSFORMER SUPPLY KIT (PT)

1. This kit shall be composed of a PT and rechargeable battery. It shall be provided with a cable of minimum length 3m for connection to the GSM/GPRS communication interface installed on the same pole.
2. The mounting bracket for PT also need to be provided which shall be suitable for trapezoidal shaped RCC poles.

5.9 MEASUREMENTS

- 5.9.1 Event time-stamping, any change of state of information shall generate a time-stamped event stored in the GSM/GPRS interface memory.
- 5.9.2 The event storage capacity shall be at least 100 events.
- 5.9.3 Short-range radio- Short range radio shall use license-free radio frequency. It shall be designed so that to allow a maximum distance between GSM/GPRS interface and the Fault Passage Indicators equal to 100m or more.

5.10 COMMUNICATION WITH THE CONTROL CENTRE

1. Communication between the GSM/GPRS interface and the control centre shall be through GSM/GPRS network, dual-band 900 MHz – 1800 MHz, and using any standard protocol.
2. It shall allow communication in 2 ways:
 - At any time, based on configured periodic calls or on operator action, the GSM/4G/ GPRS interface shall be ready to receive a call from the control centre.
 - Whenever a monitored information declared as alarming in the GSM/4G/GPRS interface configuration changes status, the GSM/4G/GPRS interface shall make a call to the control centre and send it an alarm.
3. Each monitored information (fault current detection, voltage absence/presence, digital inputs etc...) shall be configurable as "alarming" when changing state, individually and independently of others.

CONFIGURATION AND MAINTENANCE

5.11

Equipment configuration and diagnostic shall be performed by connection of a laptop PC to the GSM/GPRS interface using the PC RS232 interface.

6.0 NAME PLATE & MARKING: -

The relay shall be provided with durable and legible nameplate sticker containing all parameters. The box of relay shall be provided with legible name plate sticker on box with minimum following information:

Manufacturer name & address,
Model No.
PO number & date
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The FPI shall be provided with durable and legible nameplate sticker containing all technical parameters.

Manufacturer's Name/Logo
Manufacturing year (YYYY)
Type/Model

The other material shall have details of PO and Property of TPCODL/TPNODL/TPSODL/TPWODL mention on the box or equipment as per suitability.

7.0 TESTS

All the Routine and acceptance tests shall be carried out in accordance with the relevant IS/IEC standards. All acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components within the relay enclosure shall have to be tested for Routine/acceptance and Type tests as per the relevant

standards. All Type tests as per latest IS / IEC shall have been carried out on relay as a whole as per relevant IS/IEC. Following tests shall be necessarily conducted on the equipment and its components.

Note- In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid..

7.1 TYPE TESTS

A) For FPI line unit:

Sr. no.	Test	Standard
1	HV voltage withstand test	IEC60060-1
2	Impulse Test	IEC60060-1
3	Power Frequency Magnetic Field Immunity	IEC 61000-4-8
4	Dry Heat Test	IEC 60068-2-2
5	Damp Heat Cyclic Test (With moisture at Upper temp 550C)	IEC 60068-2-30
6	EFT (Electrical Fast Transient) Immunity	IEC 61000-4-4
7	Surge Immunity Test	IEC 61000-4-5
8	Ingress Protection	IEC 60529
9	Salt mist, cyclic (sodium chloride solution) test	IEC 60068-2-52
10	Short Circuit Withstand test	IEEE 495 and IEC 62271-1

B) Other Accessories involved for communicable FPI shall have to be tested as per relevant IEC/IS and reports to be submitted along with Bid,

- Modem – OEM Type Test reports
- PT – OEM Type Test report
- Controller/data collector – OEM Type Test report

PT Type tests should be from CPRI/ERDA .Type Test validity as per CEA guidelines

- Lightning Impulse Test
- Power Frequency Withstand Test

7.2 ROUTINE TESTS

Following routine tests are to be done on 100% of the lot quantity

- Visual Inspection.
- Electric strength or AC voltage test
- Dimensional & Visual Checks
- Functional Test

7.3 ACCEPTANCE TESTS

A. FPI : Following test shall be conducted at factory acceptance of in presence of our inspectors.

Sr. No.	Test	Method	Requirement
1	Insulation Resistance Test	IEC 60950-1	Withstand & value >100MOhm
2	Electric Strength (2kV)	IEC 60950-1,	Withstand without any damage/flash.
3	Visual Checks	As per specs and approved documents.	Should meet requirements
4	Functional Test	As per approved documents and specification requirements	Should meet requirements

B. Other Accessories involved for communicable FPI shall have to be tested as per relevant IEC/IS and reports to be submitted along with Bid,

- a) Modem – OEM Type Test reports
- b) PT – OEM Type Test report
- c) Controller/data collector – OEM Type Test report

8.0 TYPE TEST CERTIFICATE

The Bidder shall furnish the type test certificates of the relay of same model as offered in bid for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA or any other International Laboratory as per the relevant standards of IS and IEC. Type tests shall have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPCODL/TPNODL/TPSODL/TPWODL .

Bids without all type test reports shall stand disqualified.

9.0 PRE-DISPATCH INSPECTION

Equipment shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPSODL/TPWODL . Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Supplier shall grant free access to the places of manufacture to TPCODL/TPNODL/TPSODL/TPWODL's representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPSODL/TPWODL or it's authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications.

Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/TPNODL/TPSODL/TPWODL . Following documents shall be sent along with material

- a) Routine Test reports
- b) MDCC issued by TPCODL/TPNODL/TPSODL/TPWODL
- c) Invoice in duplicate
- d) Packing list
- e) Drawings
- f) Delivery Challen
- g) Installation and maintenance Manual soft copy
- h) Other Documents (as applicable)

10.0 INSPECTION AFTER RECEIPT AT STORE

The material received at TPCODL/TPNODL/TPSODL/TPWODL Store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection.

If any deviation or anomaly observed at this stage same need to be rectified by bidder at bidders own cost at earliest.

11.0 GUARANTEE

1. Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the " Security cum Performance Deposit" as the case may be.
2. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser. Kindly add service . i.e bidder should report at site within 48 hr of complaint register.

12. PACKING

Bidder shall ensure that all equipment covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The packing should be in such manner that during storage of relay and its components should not be damaged. **No single use plastic to be used in packing material. Packing should be done with environment friendly recyclable materials.**

13.0 TENDER SAMPLE

Bidders to submit one sample of FPI at TPCODL/TPNODL/TPSODL/TPWODL for verification of all desired features.

For communicable FPI- Bidders to provide all required equipment and demo of one communicable FPI unit data communication and integration testing and only successful bidder shall be qualified for further processing.

Commissioning of one unit of FPI in case of new vendor to be done.

14. TRAINING

The bidder shall arrange to provide the operating training at TPCODL/TPNODL/TPSODL/TPWODL offices as and when required for better installation and usage of the product.

15.0 QUALITY CONTROL

The bidder shall submit with the offer, assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and after finishing, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's or its nominated representative engineer shall have free access to the manufacturer/sub-supplier's works to carry out inspections.

To ensure proper functioning of relay the bidder shall provide onsite training of TPCODL/TPNODL/TPSODL/TPWODL teams as and when required. To ensure quality of installations bidder shall provide supervision support during impartation.

16.0 TESTING FACILITIES

Bidder shall have adequate in-house testing facilities for carrying out all routine tests, acceptance tests and special test as per this document and accordance to relevant International / Indian standards as mentioned.

17.0 MANUFACTURING ACTIVITIES

1. The successful bidder will have to submit (after placement of RC) technical compliance document and drawing of cable as per RC line items for getting approval before mass manufacturing.
2. Manufacturing mass quantity to start only after getting CAT-A approved drawings or as per intimation from TPCODL/TPNODL/TPSODL/TPWODL.

18.0 SPARES, ACCESSORIES

The communication cable to be provided as spare for data downloading from controller on LAPTOP.

19.0 DRAWINGS & DOCUMENTS

Following drawings and documents shall be prepared based on TPCODL/TPNODL/TPSODL/TPWODL specifications and statutory requirements and shall be submitted with the bid:

- a) Completely filled in Technical compliance document for all clauses
- b) Any deviation sheet or No deviation
- c) General description of the equipment and all components including brochures.
- d) Experience List
- e) All set of Type test certificates & detailed reports
- f) Mounting drawing of PT & DCU unit at the time of evaluation.

Drawings / documents to be submitted for approval after the award of the contract are as under:

- a) Completely filled in Technical compliance document for all clauses
- b) General Arrangement drawing
- c) Type test reports if any pending.

All the documents & drawings shall be in English language.

After the receipt of the order, the successful bidder will be required to furnish all detailed drawings of components for TPCODL/TPNODL/TPSODL/TPWODL approval.

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Instruction Manuals: Bidder shall furnish softcopies and one hard copy manuals of Relay (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to relay.

20.0 GENERAL TECHNICAL PARTICULARS

Bidder to submit compliance to all above clauses and sub-clauses and shall furnish all desired details as technical compliance document.

21

SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S.No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:
Designation
Signature

Annexure-1 - Inspection & Quality Test Plan

Sr. No.	Test	Method	Requirement

1	Insulation Resistance Test	IEC 60950-1, IEC 60255-27	Withstand & value >100MOhm
2	Electric Strength (2kV)	IEC 60950-1, IEC 60255-27	Withstand without any damage/flash.
3	Visual Checks	As per specs and approved documents.	Should meet requirements
4	Functional Test	As per approved documents and specification requirements	Should meet requirements
5	Other parts of package of communicable FPI	a)Modem – OEM Test reports b)PT– OEM Test report c)Controller/data collector – OEM Test report	As per relevant standards and approved drawings and technical parameters