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1.0 SCOPE

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store and performance of 415Volts ACDB with all accessories and necessary training for trouble free & efficient performance. It is not the intent to specify completely herein all the details of tech design and construction of material. However, the material shall conform to practices consistent with sound environmental management and local statues. It is also expected that equipment shall comply 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 TPSODL, 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.

2.0 APPLICABLE STANDARDS

The equipment covers by this specification shall unless otherwise stated, be designed, manufactured & tested in accordance with the latest edition of the following standards /IEC and shall conform to the regulation of local statutory authorities.

a)	IS 13947 / IEC 60947	:	Specification for Low voltage Switchgear and Control gear
b)	IS 2705	:	Current transformer
c)	IS 694-1990	:	PVC insulated cables for working voltage upto and including 1100V
d)	IS 2629-1985	:	Recommended practice for Hot Dip Galvanizing of Iron & Steel.
e)	IS 2633-1986	:	Tests for uniformity of zinc coating
f)	IS 5578-1984	:	Guide for marking of insulated conductors
g)	IS 11353-1985	:	Guide for uniform system of marking and identification of conductors and apparatus terminals.
h)	IEC 60060	:	High-voltage test techniques
i)	IEC 61010-1	:	Safety requirement for electrical equipment for measurement and laboratory use.
j)	IEC 62052–11	:	Electricity metering equipment (a.c.) – General requirements, tests and test conditions
k)	IEC 62053–22	:	Static meters for active energy (Class 0.2 S and 0.5 S)
l)	IS 14697	:	AC Static Transformer Operated Watt-hour and Var-hour Meters, Class 0.2S and 0.5 S - Specification
m)	IS 12063 / IEC 60529	:	Classification of degrees of protection provided by enclosures of electrical equipment
n)	IS 8623	:	Specification for Low-Voltage Switchgear and Control gear Assemblies
o)	IEC 60664	:	Insulation co-ordination within low voltage systems including clearances & creepage distances for equipment.
p)	IS 14772-2000	:	General requirements for enclosures for accessories for household and similar fixed electrical installation.

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3.0 CLIMATIC CONDITIONS OF THE INSTALLATION:

The material shall be suitable for following climatic conditions.

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	95%
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)

TPSODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed up to 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.

4.0 GENERAL TECHNICAL REQUIREMENTS

Sl no	Description	Requirement
4.1	Switchgear Panel	
4.1.1	Architecture	Metal-clad air insulated
4.1.2	Normal Service condition	Indoor
4.1.3	No of phases	Three
4.1.4	Rated Voltage	415
4.1.5	Rated Frequency	50 Hz
4.1.6	Rated Impulse withstand Voltage	8 kVP
4.1.7	Rated insulation voltage	690 V
4.1.8	Main Bus Bar Continuous rated current	2500A
4.1.9	Busbar Material & Current Density	Aluminium, 1.0A/Sqmm
4.1.10	Degree of protection for enclosure for meters	IP 54
4.1.11	Temperature Rise	The maximum permissible temperature rise for bus bar and terminals shall be 45 deg C & 65 deg C at an ambient temperature not exceeding 50 deg C

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Sl no	Description	Requirement							
4.2	Item/ Panel Reference	Incomer	Bus-Coupler	Outgoing					
4.2.1	Circuit Breaker Type/ Rating (A)	2000A ACB	2000A ACB	Bus Section I			Bus Section II		
				1250A ACB	800A ACB	400A MCCB	1250A ACB	800A ACB	400A MCCB
4.2.2	Quantity (Nos.)	2	1	1	1	1	1	1	1
4.2.3	Nos of Poles	TP	TP	TP	TP	TP	TP	TP	TP
4.2.4	Type of release	Microprocessor Based Release(O/C,S/C&E/F) Protection		Microprocessor Based Release(O/C,S/C&E/F) Protection		Thermal magnetic Release (O/C,S/C) Protection	Microprocessor Based Release(O/C,S/C&E/F) Protection		Thermal magnetic Release (O/C,S/C) Protection
4.2.6	Rated Voltage	415 V							
4.2.7	Rated Ultimate Short circuit breaking Capacity (Icu)	50kA				25kA	50kA		25kA
4.2.13	Cast Resin type CT (3 Nos/ Incomer) - ratio, Burden	2000/5A, CL-1.0 10VA 2	-	1200/5A, CL-1.0 10VA	800/5A, CL-1.0 10VA	400/5A, CL-1.0 10VA	1200/5A, CL-1.0 10VA	800/5A, CL-1.0 10VA	400/5A, CL-1.0 10VA
4.2.14	Metering	Digital Multifunction meter (VAF)(CL-1)	-	Digital Multifunction meter (VAF)(CL-1)	Digital Multifunction meter (VAF)(CL-1)	Digital Multifunction meter (VAF)(CL-1)	Digital Multifunction meter (VAF)(CL-1)	Digital Multifunction meter (VAF)(CL-1)	Digital Multifunction meter (VAF)(CL-1)
4.2.15	Panel illumination and space heating	To be provided by the bidder in each cable alley							
4.2.16	Feeder Description Name plate	To be provided by the bidder for each feeder.							
4.2.17	Make	ACB- Siemens, L&T, ABB, C&S, Schneider, Havells MCCB- Siemens, L&T, ABB, C&S, Schneider, Havells MCB- Siemens, ABB, Legrand, Schneider, Havells							

5.0 GENERAL CONSTRUCTION

5.1 SWITCHGEAR

The switchgear panel shall be of sheet steel construction and shall be dust and vermin proof and shall be suitable for indoor installation. The panels shall be of Metal Clad compartmentalized, free standing, continuous from rear, modular type. The switchgear panels shall be rigid without using any external bracing. The switchboard panels should comply with relevant IS/IEC and revision thereof and shall be designed for easy operation maintenance and further extension. Bus bar, metering, circuit breaker chamber, cables and cable box chamber should have proper access for maintenance, proper interlocks should be provided. Metal enclosed switchgear shall be so designed that normal service, inspection and maintenance operations including visual

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checking of phase sequence, earthing of connected cables, locating of cable faults, voltage tests on connected cables can be carried out safely.

Panels shall have structural steel frame-work enclosed on all sides by CRCA sheet steel of minimum thickness as specified below:

Frame: 2 mm

Doors & Covers: 2 mm

Removable gland plate: 3 mm

Panels shall consist of a front portion with equipment mounted on it and wiring access from rear. All doors, cut-outs and removable covers shall be gasketed all round by neoprene cork gaskets. Each panel section shall be provided with thermostat-controlled space heater with ON/OFF switch. CFL Lamp shall be provided with door switch for each panel for cubicle interior illumination.

Panels shall be mounted and bolted to a common base channel of height 75mm. The channel in turn shall be fixed to the foundation bolts at site. All foundation equipment, anchor bolts etc. including the supporting channel shall be furnished by successful bidder in advance for completion of Civil Works prior to dispatch of panels. The bottom plates of the panels shall be fitted with removable gland plates of not less than 3mm in thickness, for fixing the cable glands, the size of which shall suit the purchaser's external cables to the panels.

Each Indicating instruments and meters shall be at a suitable height so that the lettering on the dials can be easily read. Control switches/push buttons shall be conveniently located for ease of operation. The centre lines of the switches, push buttons and indicating lamps shall not be at a height more than 1800mm also shall not be less than 300mm that of the lowest unit. MCB with neutral link shall be provided at the panel for incoming AC supplies. Push buttons shall be made of non-hygroscopic material. All other insulators shall also be made of non-hygroscopic material.

All components of the same rating and construction which may be needed to be replaced shall be interchangeable. If there are removable parts with different ratings and if parts are interchangeable within the assembly of metal enclosed switchgear and control gear, any possible combination of removable and fixed parts shall withstand the rated insulation level specified for fixed parts concerned. While making the general arrangement, consideration will be given to the place of sectionalizing to select the location where the minimum electrical connections are transferred from one section to other section.

All the components of a module will be mounted on a component plate using machine screws and taped holes (except the components mounted on the door) to ensure vibration free operation. Circuit breakers shall be mounted such that they are accessible from the front of the panel. These components plates should be fixed with bolts for easy replacements. Standardization will be adopted while making these plates so that the component plates of the same size modules. can be changed from one module to other.

Interlocks between different components shall be provided for safety and ease of operation. The withdrawal or engagement of only incomer and bus coupler circuit breaker shall be impossible unless it is in open position. All instruments shall be non-draw-out type and safeguard in every respect from damages. The operation of a circuit breaker shall be impossible when it is in closed position. It shall be impossible to close the incoming and bus coupler circuit breaker in service position unless it is connected to auxiliary circuit.

The rear of the ACDB shall have bolted covers in sections except cable chamber. Single line diagram for power distribution and wiring diagram for power and control shall be provided inside the panel. All retaining catches, screws and bolts for doors and covers shall be hot dip galvanized screws and bolts shall be captive. All hardware for the complete equipment including foundation bolts, lifting lugs & cable termination lugs etc. shall be supplied along with the panels.

All LT design shall ensure conformity to IEC-60947. The supplier shall submit Type Test report from CPRI/ERDA to prove the above. Auxiliary and control equipment installed on the panel shall be suitably protected against disruptive discharge from main circuit. Buses shall be insulated with insulating sleeves, wherever bare conductor is employed. The switchgear panel shall withstand 50KA for 1 sec.

Degree of Protection for the enclosure shall be IP54 and that of partitions shall be IP4X. Compartment shall have its own front located, outward opening lockable hinged door with concealed hinges and bolted back cover. The door shall have interlocking facility with the ACB or its handle such that the door can be opened only if the ACB is in 'OFF' position. De- interlocking arrangement shall also be provided. Partitions of metal-clad switchgear and control gear shall be metallic and earthed.

Control supply in individual bay shall to be distributed through MCBS of suitable rating for individual control function like:

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Trip Circuit (Only for I/CS & B/C)

Close Circuit (Only for I/Cs & B/C)

Spring charging circuit (Only for I/Cs & B/C)

Heating and Lighting Circuit

MCB shall be rated for 10kA short circuit rating. It shall be quick make, quick break, and independent manual type with trip free feature. MCB shall have the following:

Over current protection

ON/OFF Trip position Indicators Auxiliary contact block (Wherever required)

Wherever CB contacts are to be multiplied, latch type relay shall be used for contact multiplication. Auxiliary contact multiplier relays shall be reputed make and selected on the basis of continuous current carrying capacity and rated voltage. The fluctuation in voltage level shall be accounted for (+/-) 10% continuously.

All equipment mounted on front side of panel. shall have Individual nameplates with equipment designation engraved. The termination links for cables shall be segregated in vertical plane. The bidder shall deliver to site completely assembled, wired, tested panels and only the interconnecting cables shall be connected at site.

Cable entry arrangement shall be from bottom and suitable for 1.1KV XLPE armored external cables of sizes as mentioned in the specification. Removable CRCA gland plate of 3mm with cable holes to suit the cable sizes and with 2mm neoprene type gasket of non-inflammable and insulating vermin proof material shall be provided. A minimum distance of 250mm will be provided between the gland plate and the nearest terminal for proper dressing and termination of the cable.

5.2 Circuit Breaker

a) The circuit breaker shall be Fixed type with inbuilt Protective release, Manual & Electrically Operated ACB The I/Cs and B/C ACBS and rest O/Gs ACB & MCCB shall be fixed type and Electrical & Mechanical interlocks shall be provided for only incomers & bus couplers. Detail scheme shall be finalized during engineering. Comprehensive interlocking system to prevent any dangerous or inadvertent operation shall be provided. The spare contact of breakers, Local/ Remote switches to be wired up to the terminals.

5.3 BUSBAR

a) Bus bars and all other electrical connections between various components shall be made of Aluminium of rectangular cross-section with current density of 1 A/mm2, shall be suitable for 3 phase, 4 wire, 400 volts 50 Hz AC supply and have a fault withstanding capacity of 50 KA for 1 second. The bus bars shall be insulated with heat shrinkable and colour coded insulating sleeves, except at the points of connections. The Main bus bar shall be of ample capacity to carry the rated current of 2500A continuously without excessive heating and for adequately meeting the thermal and dynamic stresses in the case of short circuit in the system. Neutral Bus bar shall have a rating of not less than that of the associated phase bus bars. All bus bars shall be rigidly and firmly mounted and shall be capable of withstanding short circuit stresses and vibrations. The bus bars shall be extensible on both sides depending upon layout.

b) Minimum electrical clearances shall be maintained between phases, neutral and body as per relevant IS however the minimum clearance between phase to phase and phase to ground shall be 25.4mm & 19.4mm respectively.

c) The Bus bars shall run in a separate bus bar chamber using suitable Bus bar support of non-hygroscopic, non-combustible, material such as DMC/ SMC at sufficiently close intervals to prevent bus bar sag. All bus bar joints. shall be provided with high tensile steel bolts (electro plated with suitable metal such as Nickel Cadmium), spring washer and nuts so as to ensure good contact. Alternatively, electroplated/ tinned brass bolts shall be used. The joints shall be formed with fish-plates on either side of bus bar to provide adequate contact area. Bus supports shall be provided on either side of joints. Max. Unsupported distance from the joints and between two supports shall not exceed 450mm.

5.4 CURRENT TRANSFORMER

The Current transformer shall be Epoxy Cast resin type and rated for 50KA (1 Sec) with details as given in GTP. The CT control wiring shall be of 4 mm2 multi stranded copper wire with 1.1KV insulation grade. Al CTS shall be designed to carry continuously a current of 120% of the rated current.

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5.5 METERING. INSTRUMENTATION AND CONTROL DEVICES

5.5.1 MEASURING INSTRUMENTS

3-phase, 4-wire LT CT operated static multifunction meter with associated CT's (400/5 A, Class 0.5S, 15 VA) shall be provided for only incomers to record Current reading (Range -400A), voltage reading (Range 0-500V) and energy consumption. The multifunction meter shall necessarily have RS 485 Modbus serial port for communication with Purchaser SCADA. All meters shall be of flush mounting type with 96x96 sq. mm. The meter shall be enclosed in a dust tight housing providing IP5X or an equivalent provision to completely protect it against dust ingress, and shall protect in a way that performance doesn't get effected due to small dust also The design and manufacture of the meters shall ensure the preventing of fogging of instrument glass. Instrument meters shall be sealed in such a way that access to the measuring element and to the accessories within the case shall not be possible. Inbuilt selector switches shall be provided to be used on three phase supply The make of Energy meter & CT shall be duly approved by the Purchaser.

5.5.2 INDICATING LAMPS

The indicating lamps used in the panel will be pleasant looking, LED type indicating lamps in round shape and suitable for continuous operation at 85% to 110% of their rated voltage. They shall be provided with suitable series resistor and the bulb shall be replaceable from the front of the panel.

The selection of the colours of the indicating lamps will be as follows:

Red – ACB ON
Green ACB OFF
Amber ACB TRIP
Red, Yellow and Blue for incoming 3-ph supply indication.

The various feeders shall be assigned the indicating lamps as mentioned:

I/Cs – ON ,OFF,TRIP and 3-ph supply indications
B/C – ON, and OFF indications only
O/Gs- ON indication only

All color caps shall be similar and interchangeable and all LEDs shall be of same type and ratings. The LED lamps shall be furnished 20% in excess of actual numbers required and color caps shall be furnished 10% in excess of actual numbers used for each.

5.5.3 SELECTOR SWITCHES

Selector switches shall be of non-hygroscopic rotary type with enclosed contacts adequately rated for the purpose intended (min. acceptable rating is 10A continuous at 240V AC).

It shall be provided with escutcheon plates clearly marked to show the following three positions first one for 'LOCAL' second 'REMOTE' and the third being the 'OFF' position. Selector switches shall be provided with pistol grip type handles and shall be of the maintained contact stay put type.

5.6 PANEL WIRING

a) Panels shall be supplied completely wired internally to equipment and! terminal blocks and ready for the Purchaser's external cable connections at: the terminal blocks. The control wiring will be done with PVC single core flexible copper wires and properly dressing all the wires either in a PVC duct of liberal size or bunched together by PVC strapping taps and thereafter fastened to steel members of the panel. When panels are arranged to be mounted adjacent to each other all inter-panel wiring and connections between panels shall be provided by the Bidder.

b) All wiring shall be carried out with 1100 V grade, single core stranded copper conductor wires with PVC insulation. Extra flexible wires shall be used for wiring of devices mounted on moving parts such as swinging panels and doors. The minimum size of the stranded copper conductor used for panel wiring shall be as follows:

CT circuits: 4mm2 per lead
All circuits except CT circuits: 2.5mm2 per lead

c) Interconnections to adjacent panels shall be brought out to a separate set of terminal blocks located near the slots or holes meant for taking the interconnecting wires. Arrangements shall permit easy inter-connections to adjacent panels at site and wires for this purpose shall be provided by the bidder looped and bunched properly

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inside the panels. The unused instrument space on the front or rear of the panels shall be kept clear of wiring, to facilitate addition of devices without rewiring associated portion of the panels.
d) Wire terminations shall be made with solder less crimping type of (ring type lugs for all CT and pin type lugs for other circuits) tinned copper lugs which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations. Printed type PVC ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of all the control, instrumentation, and protection wiring. Ferrules shall fit tightly on the wires and shall not fall off when the wire is disconnected.
e) Internal wiring to be connected to external equipment shall terminate on terminal blocks. The terminal blocks for CTS shall be provided with test links and isolating facilities.
f) The Power interconnections shall be carried out by means of bolted connections with washers. The wiring shall be terminated by using crimping sockets. Under no circumstances the wiring should be under any kind of stress for which sufficient length of control wiring should be provided.

5.7 TERMINAL BLOCKS

a) The terminal blocks shall be 1100 V grade, 10 Amps rated, one piece. moulded, complete with insulated barriers, stud type terminals, washers, nuts and lock nuts and identification strips. Markings on the terminal strips shall correspond to wire numbers on the wiring diagrams. The terminal blocks shall be fully enclosed with easily removable covers and made of moulded non-inflammable plastic material.
b) All spare contacts of the panel mounted equipment and devices shall be wired up to terminal blocks. All the TB's shall be of single Decker type. ASB shall be provided with potential free contacts for Mains ON, I/C 1 ON, I/C 1 OFF, I/C 2 ON, I/C 2 OFF, B/C ON & B/C OFF etc. for Purchaser's SCADA. Supplier will provide wiring of these contacts up to terminal block in ASB.

5.8 Space Heaters

a) Strip type space heaters of adequate capacity shall be provided inside each panel to prevent moisture condensation on the wiring and panel mounted equipment. Space heaters shall be rated for 240V, 1Phase 50hz supply. Heaters inside the panels shall not be mounted close to the wiring or any panel mounted equipment. Heaters shall be complete with miniature circuit breaker on the phase and link on the neutral of the heater supply.
b) An adjustable type thermostat shall be provided in the heater control circuit with temperature range of 0-90 deg C.

5.9 Interior Lighting

Each Panel shall be provided with a 8W, 230, 1ph, 50hz CFL for the illumination of the panel during maintenance. The fitting shall be complete with switch-fuse unit and the switching of the fitting shall be controlled by the respective panel door switch.

5.10 Power & Control Supplies

The ASB shall be provided with necessary arrangement for receiving, distributing, isolating and fusing of AC supply for various control, Signaling, lighting and space heater circuits.

5.11 CABLE TERMINATION ACCESSORIES

The Purchaser’s external cable connections will be terminated on the terminal blocks provided in the control panel. All necessary cable terminating accessories such as gland plates, cable glands, crimp type tinned copper lugs, supporting clamps and brackets, wiring troughs and gutters etc for cables shall be included in the bidder’s scope of supply.

5.12 EARTHING

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a) All panels shall be equipped with a separate earth bus securely fixed along with the inside base of panels. When several panels are mounted adjoining each other, the earthy bus shall be made continuous. Provision shall be made on the earth bus bars of the end panels for connecting the same to the earthing grid.
b) An earthing conductor of 50X6 mm2 Al. (minimum) shall be provide extending the whole length of switchgear and control gear to sustain the rated short time withstand current. Every equipment mounted in the panel shall be directly earthed to this earth bus by distinct connections.
c) The earth bus shall be located at sufficient height from the gland plate and shall not be removable from the outside of cubicle. Door earthing shall also be provided with bolted lugs. The earth bus shall be identified by means of the sign I marked on the outer surface of ASB in a legible and indelible manner on the both side.

5.13 GALVANISING

a) All galvanizing shall be carried out by the hot dip process, in accordance with Specification ISO: 1460 or IS: 2629 amended to date. However, high tensile steel nuts, bolts and spring washers shall be electro-galvanized to service condition four. The zinc coating shall be smooth, continuous and uniform. It shall be free from acid spots and shall not scale, blister or be removable by handling or packing. There shall be no impurities in the zinc additives to the galvanic bath, which could have a detrimental effect on the durability of the zinc coating.
b) After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment except that nuts may be threaded after galvanization.
c) To avoid the formation of white rust, galvanized material shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization. The galvanized steel shall be subjected to test as per IS-2633 and BS:729 amended to date.

5.14 REMOTE MOITORING AND CONTROL PHILOSOPHY

a) The multi-function meter shall necessarily have RS485, MODBUS protocol for communication with purchaser's SCADA such that remote monitoring of its parameter is possible.

b) Contacts of O/G breaker for ON/OFF/TRIP indication status shall be wired up to the terminals.

6.0 NAME PLATE AND MARKING

The identifying markings which shall be indelibly marked on fuse-base are given below:
On Fuse Base:

1. Manufacturer's name
2. Rated voltage
3. Rated current
4. Serial No
5. Property of "TPSODL"
6. Month & year of Manufacturing
7. Guarantee period
8. Po No & date.

7.0 TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by TPSODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the equipment and its components as specified in IEC 62271 standards.

7.1 TYPE TESTS

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Test to prove the capability of the main & earthing circuits to be subjected to be the rated peak and the rated short-time withstand currents.

a) Dielectric tests
b) Temperature rise test
c) Degree of protection test
d) Short circuit making & breaking capacities

7.2 ROUTINE TESTS

a) Dimensional and visual check for damages.
b) All main/auxiliary bus bars joints, wire terminations, nuts & bolts shall be checked and tightened
c) Mechanical operational tests
d) Test of auxiliary electrical devices
e) Dielectric tests
f) Measurement of resistance of main circuit
g) Verification of clearance & creepage distances
h) Verification of correct wiring continuity of protective circuit
i) Suitable injection tests for all measuring instruments to establish accuracy of calibration.
j) Tests after erection on site.

8.0 TYPE TEST CERTIFICATE

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA as per relevant IS.Type tests should 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, same shall be carried out without any cost implication to TPSODL.

9.0 PRE-DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPSODL's representatives at all times when the work is in progress. Inspection by the TPSODL or its authorized representatives shall not relieve the bidder 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 TPSODL.

Following documents shall be sent along with material:

a) Test reports
b) PO copy
c) MDCC issued by TPSODL
d) TPSODL Invoice in duplicate
e) Packing list
f) Inspection report
g) Delivery Challan
h) Other Documents (as applicable).

10.0 INSPECTION AFTER RECEIPT AT STORES

The material received at TPSODL store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and Contracts department.

11.0 GUARANTEE

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 12

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months from the date of commissioning or 48 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.

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.

12.0 PACKING

Supplier shall ensure that all material 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 bidder shall provide instructions regarding handling and storage precautions to be taken at site.

13.0 TENDER SAMPLE

NA

14.0 TRAINING

Not Applicable

15.0 QUALITY CONTROL

The bidder shall submit 'Quality Assurance Plan' followed in respect of bought out Items manufactured by him

a) Raw materials in process
b) Final inspection
c) Packaging
d) Marking.

As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPSODL reserves the sole rights for the type test of random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the bid, the complete Lot shall be rejected. TPSODL's nominated representative shall have free access to the bidder's works to carry out inspections.

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. 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 engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

16.0 MINIMUM TESTING FACILITIES

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards. In case of supply by the channel partner, the manufacturer shall have the in-house testing facilities to carry out the routine and acceptance tests.

17.0 MANUFACTURING ACTIVITIES

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer.

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The successful bidder will have to submit (after placement of RC/ PO) technical compliance document and drawing of Kit Kat Fuse as per RC line items for getting approval before mass manufacturing. Manufacturing mass quantity to start only after getting CAT-B/CAT-A approved drawings or as per intimation from TPSODL.

18.0 SPARES, ACCESSORIES AND TOOLS

Not applicable

19.0 DRAWINGS AND DOCUMENTS

Following documents shall be prepared based on TPSODL specifications and statutory requirements with complete BOM and shall be submitted with the bid:

a) General description of the equipment and all components including brochures.
b) Type test Certificates
c) Experience List.
d) Completely filled–in clause wise compliance of the specification.
e) Cross sectional drawing of the Kit kat Fuse.

FOLLOWING DOCUMENTS SHALL BE SUBMITTED AFTER THE PLACEMENT OF RC/PO

a. Completely filled in clause wise compliance of the Specification.
b. Type Test Certificates for each specified test if not submit during Technical Evaluation.
c. Drawing of Fuse.
d. Compliances of undertaking submitted during Technical Evaluation.

S.No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details of fuse wire.		√	√
4	Cross sectional area of the Kit kat fuse		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimensions		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.

20.0 GUARANTEED TECHNICAL PARTICULARS

Bidder to submit clause wise compliance of the Technical Specification.

21. SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH TECHNICAL BID)

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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:

Signature

Designation

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