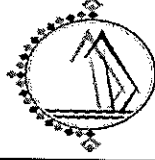


Office of Executive Engineer (M&E)
Administrative Office building,
Off Shore Oil Terminal,
Vadinar - 361010.



Phone : +91-288-2573033
Fax :
Email : megr1.oot@deendayalport.gov.in
Website : www.deendayalport.gov.in

EXPRESSION OF INTEREST

Sub: Conversion of Overhead Power Distribution System to Underground Cabling Power Distribution System in Port Colony OOT, Vadinar.

(This Notice is issued only to elicit Expression of Interest from the parties interested in the work and does not constitute any binding commitment from the Deendayal Port Authority to proceed with the work or invite any or all the parties in the subsequent bidding process. Public Tenders will be issued subsequently)

SECTION - I

Deendayal Port Authority (DPA) invites expression of interest from the Electrical Contractors and having experience in the Works relating to Conversion of Overhead Power Distribution System to Underground Cabling Power Distribution System.

Scope of the Work:

Conversion of Overhead Power Distribution System to Underground Cabling Power Distribution System in Port Colony OOT, Vadinar. (Cable shall be provided by DPA)

The party shall submit quotation in the format provided at **as Attached**.

Interested Parties are requested to submit EOI in hard copy not later than **17:00 hours** IST on **21/11/2024**.

The Firms may also submit their suggestions and views, if any, that can be considered for the Project, in a separate sheet.

Address for communication:

M & E Division,
Administration Office Building,
Offshore Oil Terminal,
Deendayal Port Authority,
Vadinar, Dev Bhoomi Dwarka - 361010.
Tel: 0288-2573033
Email: megr1.oot@deendayalport.gov.in

LETTER OF TRANSMITTAL
(On Firm's Letterhead)

To

The Executive Engineer (M&E)
Administration office Building,
Offshore Oil Terminal,
Deendayal Port Authority,
Vadinar, Dev Bhoomi Dwarka – 361010.

Sub: Conversion of Overhead Power Distribution System to Underground Cabling Power Distribution System in Port Colony OOT, Vadinar.

Sir,

Having examined the details given in EOI Notice and EOI document for the above project, I/we hereby submit our Expression of Interest and the relevant information.

1. I/We hereby certify that all the statements made and information supplied in the enclosed form and accompanying statements are true and correct.
2. I/We have furnished all information and details necessary for EOI and have no further pertinent information to supply.
3. I/We also authorize Deendayal Port Authority or their authorized representatives to approach individuals, employers and firms to verify our competence and general reputation.
4. I/We submit the following certificates in support of our suitability and capability for having successfully provided the services along with prescribed format.
5. We understand that DPA will be at liberty to finalize requirements and issue public tenders for the work.

Seal & Signature(s) of Applicant(s)

Enclosures:

Date of submission:

BOQ of Conversion of Overhead to Underground Cabling System in Port Colony OOT, Vadinar.

Sr. No.	Description of Items	Unit	Rate	Qty.	Amount
1	Providing of Precast Cable Trench with Cover slab for cable laid underground system. including all local & central taxes, transportation and freight charges inspection charges, loading / unloading charges, conveyance to the site of work. & stacking the same in closed shade duly protecting from sunrays, rain & theft or physical damage, etc. complete. Quantity as per actual. as per Technical Specification no.01 The Precast trench size is as mentioned below:				
	(a) Width:600 mm, Depth:600mm, Length: as per site requirement/available size, Cover slab Thickness: 150mm as Available	Meter		500	
	(b) Width:300 mm, Depth:600mm, Length: as per site requirement/available size, Cover slab Thickness: 150mm as Available	Meter		2600	
2	Excavation of Hard and soft soil, RCC Road crossing and wall crossing for installation work for laying of Precast Cable Trench. Quantity as per actual.				
	(a) Excavation of hard and soft soil Width:700 mm, Depth:700mm	Meter		300	
	(a) Excavation of hard and soft soil Width:400 mm, Depth:700mm	Meter		2100	
	(b) Excavation of RCC Road crossing Width:700 mm, Depth:700mm	Meter		200	
	(c) Excavation of RCC Road crossing Width:400 mm, Depth:700mm	Meter		500	
3	Laying of Precast Cable Trench with Cover slab for cable laid underground system. including back filling with Crushed stone sand work as per instruction of Site Engineer and as per site condition for laying of Precast cable trench work etc. complete. Quantity as per actual.as per Technical Specification no.02				
	(a) Width:600 mm, Depth:600mm, Length: as per site requirement/available size, Cover slab Thickness: 150mm as Available	Meter		500	
	(b) Width:300 mm, Depth:600mm, Length: as per site requirement/available size, Cover slab Thickness: 150mm as Available	Meter		2600	
4	Providing of standard lengths High Density Polyethylene (HDPE) Pipes. Confirming to IS 14930 part II (amended up to date), including all local & central taxes, transportation and freight charges inspection charges, loading / unloading charges, conveyance to the site of work. & stacking the same in closed shade duly protecting from sunrays, rain & theft or physical damage, etc. complete. Quantity as per actual. as per Technical Specification no.03 HDPE pipe size is as mentioned below:				
	(a) 150 mm nominal outer diameter	Meter		2500	
	(b) 120 mm nominal outer diameter	Meter		5000	
5	Excavation of Hard and soft soil, RCC Road crossing and wall crossing for installation work for laying of HDPE pipe for Under Ground Cabling system. Quantity as per actual.				
	(a) Excavation of hard and soft soil Width:300 mm, Depth:300mm	Meter		4500	
	(b) Excavation of RCC Road crossing Width:300 mm, Depth:300mm	Meter		3000	
6	Laying of standard lengths High Density Polyethylene (HDPE) Pipes. including back filling work. Confirming to IS 14930 part II (amended up to date) in Excavated Trench.				
	(a) 150 mm nominal outer diameter	Meter		2500	
	(b) 120 mm nominal outer diameter	Meter		5000	
7	Providing, Installation, testing and commissioning of Main Distribution Panel. Main Distribution Panel consisting of arrangement of Outgoing feeder with indication lamps and Multifunction meter of MCCBs with all necessary protection relays, metering and control systems. (a) Rating of Incomer 1000 Amps 433V 50KA 4P Electrical Draw Out (EDO) Air Circuit breaker(ACB) with microprocessor based release for over current, short circuit and earth	Nos.		01	

	<p>fault protection. - PR 121 (Make: ABB, L&T, SIEMENS, C&S Qty. 01 Nos.</p> <p>(b) 4 pole 1000A Bus Coupler Qty. 01 Nos.</p> <p>(c) Rating of Outgoing MCCB TPN 250 A, 35KA (microprocessor based release O/L with Ics = 100% Icu).Qty. 09 Nos. Each</p> <p>(d) 4 pole 63 Amp. MCB type C Qty. 01 Nos Each</p> <p>(e) Digital Timer with 50A 3pole power Contactor set for Street Light Feeder Qty. 01 Each. as per Technical Specification no.04</p>				
8	<p>Providing, installation, testing and commissioning of Auxiliary Distribution Panel. Auxiliary Distribution Panel consisting of arrangement of Outgoing feeder with indication lamps and Multifunction meter of MCCBs with all necessary protection relays, metering and control systems.</p> <p>(a) Rating of Incomer 800 Amps 433V 50KA 4P Electrical Draw Out (EDO) Air Circuit breaker(ACB) with microprocessor based release for over current, short circuit and earth fault protection.- PR 121 (Make: ABB,L&T, SIEMENS,C&S Qty. 01 Nos.</p> <p>(b) 4 pole 800A Change Over Switch Qty. 01 Nos.</p> <p>(c) Rating of Outgoing MCCB TPN 250 A, 35KA (microprocessor based release O/L with Ics=100% Icu).Qty. 10 Nos. Each</p> <p>(d) 4 pole 63 Amp. MCB type C Qty. 01 Nos Each</p> <p>(e) Digital Timer with 50A 3pole power Contactor set for Street Light Feeder Qty. 01 Each. as per Technical Specification no.05</p>	Nos.		01	
9	<p>Providing, installation, testing and commissioning of Outdoor type feeder pillar panels suitable for AC 440 V, 50 HZ supply, Outdoor panel consisting of arrangement of Outgoing feeder with indication lamps and Multifunction meter.</p> <p>(a) Rating of incomer MCCB TPN 250 A, 35KA (Microprocessor based O/L, Earth fault with Ics = 100% Icu), Qty. 01 Nos. each Feeder Pillar.</p> <p>(b) Outgoing MCCB, 80KA, of 4 Pole 125A rating of 09 nos. each Feeder Pillar.</p> <p>(c) Outgoing MCB, 80KA, of 4 Pole 63A rating of 01 nos. Each Feeder Pillar as per Technical Specification no.06</p> <p>(d)</p>	Nos.		16	
10	<p>Laying & Installation, Testing and Commissioning of Al. conductor, armoured, XLPE insulated, PVC sheathed, 1.1KV cable in Pre cast ready-made underground trench / duct / HDPE pipe etc. and refilling of trench with Crushed stone sand as per site requirement. With necessary clamps and hardware for cable laying. Quantity as per actual. The cable size is as mentioned below:</p>				
	(a) 3.5Cx240 Sq.mm cable	Meter		1500	
	(b) 3.5Cx120 Sq.mm cable	Meter		3000	
	(c) 3.5Cx 70 Sq.mm cable	Meter		500	
	(d) 3.5Cx 35 Sq.mm cable	Meter		5000	
	(e) 4 Cx 16 Sq.mm cable	Meter		2500	

11	Making of end termination of R, Y, B, N the following 1.1 KV XLPE Cable including supply of suitable cable glands, heat shrink insulation, tapes, lugs, sockets & other necessary materials as per instruction of the Site Engineer. Heat shrink insulation should be applied to the lugs. Quantity as per actual.			
	(a) 3.5Cx240 Sq.mm cable	Each		10
	(b) 3.5Cx120 Sq.mm cable	Each		40
	(c) 3.5Cx 70 Sq.mm cable	Each		10
	(d) 3.5Cx 35 Sq.mm cable	Each		120
	(e) 4 Cx 16 Sq.mm cable	Each		30
12	Providing & Making of straight through joint kit and other accessories for 1.1KV Al conductor armoured, XLPE insulated cable. Quantity as per actual. as per Technical Specification no.07 The cable size is as mentioned below:			
	(a) 3.5Cx240 Sq.mm cable	Each		05
	(b) 3.5Cx120 Sq.mm cable	Each		10
	(c) 3.5Cx 70 Sq.mm cable	Each		10
	(d) 3.5Cx 35 Sq.mm cable	Each		20
	(e) 4 C x 16 Sq.mm cable	Each		20
13	Providing and Fixing Chemical earthing as given below. Chemical Earthing using Electrode of size 80 mm dia,3 meter long connected with 25X3 mm Copper internal strip complete with excavation, civil works, Earthing chamber, cast iron cover with back fill compounds as per Technical Specification no.08	Each		36
14	Supplying and laying 50mm X 6mm G.I. strip at 0.5 metre below ground level / surface as strip earth electrode including jointing etc. as required. as per Technical Specification no.09	Meter		400
15	Construction of foundation etc. with M20 grade RCC complete with cantering, shuttering and reinforcement as per design, The Foundation of panel as per size of panel, as per Technical Specification no.10	Nos.		16
Street Light Connection				
16	(a) Laying of 1.1 KV 4C X16 sq. mm XLPE cable in HDPE pipe with earthing, jointing, looping as per street light pole location at site, termination at JB ends and street light connection, back filling of earth, compaction, levelling etc. complete. Quantity as per actual.	Meter		4500
	(b) Making of end termination of the following 1.1 KV XLPE Cable including supply of suitable cable glands, tapes, lugs, sockets & other necessary materials as per instruction of the Site Engineer. Quantity as per actual.	Nos.		250
	(c) Providing and installation of Street Light Junction Box with all necessary accessories including 1nos. 6A SP MCB C type including proper fixing inside junction box and 1 nos. 63A 4way pvc connector Each. complete on the existing pole/structure /structure as per instruction of Site Engineer and as per Technical Specification no.11&12	Nos.		250

	(d) Fixing of following type of supplied SMC Junction Box as per Technical Specification no.13 Quantity as per actual.	Nos.		250	
17	Dismantling of existing LT Distribution panel, LT overhead power Distribution lines complete with all associated items like Conductors, insulators, overhead cables, wires, studs, MS structure, LT box, switching box etc. and depositing the same in DPA Main Store including materials handling and shifting. Quantity as per actual.	Meter		3300	
Total Amount					

TECHNICAL SPECIFICATIONS

Technical Specification No. 01:

This includes Providing of single length Precast Cable Trench. The following cable trenches are to be provided.

Sizes of Trenches Type-A

Width:600mm, Depth:600mm, Length: as per site requirement/available size (Also variable based on project requirement)

Sizes of Trenches Type-B

Width:300mm, Depth:600mm, Length: as per site requirement/available size (Also variable based on project requirement)

Cover Slab thickness:150mm

MATERIAL SPECIFICATION

Concrete: Grade 40 to Grade 45

Steel: Fe500

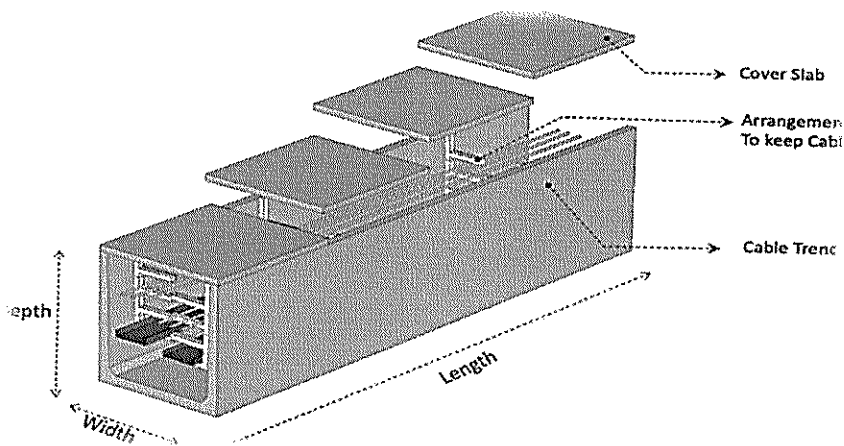
Structural design of the Cable Trenches is in accordance to: BS 5400: Part 4: 1990 | BD 31/01 | MS 1293: Part 1:1992, IRC 6-CI 214.1.1.3 | IS 456:2000

Density of backfill soil should be minimum 18 Kn/m³

Technical Specification No. 02:

This includes laying of single length Precast Cable Trench on Trenches are load. supposed to be kept on level and stable ground or timber bearer to avoid cracking due to undesired localized Trenches are to be laid on a layer of well compacted granular soil and there should be no settling of soil. For a cushioning effect and to level, it is better to put a layer of quarry dust. Backfill material adjacent to side wall should be of granular type.

Backfilling and compaction to be performed layer by layer alternatively on either side of the trench until the top of the trench. The work includes all material & labour required shall do as directed by Engineer-in-charge.



(Drawing 1.0)

Technical Specification No. 03:

Scope

This Specification covers design, manufacturing, testing, packing, supply of DWC HDPE Pipe.

Technical Parameters:

- a) DWC high density Polyethylene pipe shall have corrugation on outer wall but inner wall shall be plain conforming to IS – 14930 Part I and II amended from time to time.
- b) Terminology as defined in IS: 14930 shall be followed
- c) DWC HDPE pipe to be supplied shall be 'ISI' marked.
- d) Accessories like HDPE snap fit coupler with neoprene 'O' ring shall be part of supply to make the joints water / damp proof.

Code & Standards:

All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid. In case of conflict between this specification and those (IS: Codes, standards, etc.)

referred to herein, the former shall prevail.

- a) IS:14930Pt.-I: General requirements of Conduit System for Electrical and Communication installation
- b) IS:14930Pt.-II: Particular requirements of Conduit system for Electrical and Communication installation
- c) IS: 2530: Method for test for Polyethylene molding material and polyethylene compounds.
- d) IS:7328: HDPE materials for molding and extrusion
- e) IS:12063: Classification of degrees of protection provided by Enclosures of electrical equipment
- f) ASTM D 1693: Test method for environmental stress–Cracking of ethylene plastics
- g) ASTM D638: Standard test method for tensile properties of plastic
- h) ASTM D790: Test method for flexural properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- i) ASTM D 2240: Standard Test method for Rubber property.
- j) ASTM D648: Standard Test method for deflection temperature of Plastic under flexure load in the Edge Wise Position.
- k) IS:11000(Pt-2): Glow-wire Test and guidance test methods for fire /Sec-1) Hazard.

REQUIREMENT OF DWC HDPE PIPE

- a) **Visual Requirement:** The Pipe shall be checked visually for ensuring good workmanship that the ducts shall be free from holes, breaks and other defects. The ends shall be cleanly cut and shall be square with axis of the ducts.
- b) **Colour:** The colour of the pipe viz. Green, Orange, Blue, Yellow, Brown, Violet, Grey and Red. The purchaser shall specify the colour of the duct at the time of ordering.
- c) **Dimensions:** The dimensions of the DWC HDPE pipe shall be as per requirement /BOQ.
- d) **standards Length:** Duct up to 180 mm OD nominal size shall be supplied in standard length of 100 mtr. $\pm 1\%$ or 6 mtr $\pm 1\%$ and all other sizes will be supplied in standard length of 6 mtr. $\pm 1\%$

- e) **Compression Strength:** The conduit system shall have adequate mechanical strength. Conduits when bent or compressed either during, or after, installation according to manufacturer's instructions, shall not crack and shall not be deformed to such an extent that introduction of the insulated conductors or cables becomes difficult or that the installed insulated conductors, or cables are likely to be damaged while being drawn in. Compliance may be checked with the application of force which shall be at least 450 N, when reaching the deflection of 5%.
- f) **Impact Strength:** The conduit system shall have adequate mechanical strength.
- g) **Resistance to Flame Propagation:** Non flame propagating ducts shall have adequate resistance to flame propagation. Samples of DWC HDPE Ducts shall be checked by applying a 1KW flame.
- h) **Anti-Rodent Properties:** Safety of ducts from the direct attack of subterranean organism anti rodent material is of utmost importance. These ducts shall be evaluated for their safety against rodents before laying them in the fields.
- i) **Marking Identification:** The conduit shall be prominently marked at regular intervals along their length of preferably 1m but not longer than 3m using indelible ink with following.
 - Manufacturers name
 - Specification No.
 - Name of the duct with size
 - Lot No. of the Product
 - Date of manufacture
 - Purchaser's Name/symbol

DWC HDPE PIPE ACCESSORIES

The following accessories are required for jointing the ducts and shall be supplied along with the ducts against specific orders. The manufacturers shall provide complete procedure and method for installation of the accessories. The required quantities of accessories are to be mentioned by the purchasing authority in the purchase order.

- a) **Plastic Coupler:**

The coupler shall be of Push-fit type with O-ring. It is used for jointing two more ducts. The design of this shall be simple easy to install and shall provide air tight and water tight joint between the two ducts. The coupler shall insure that the two ducts are butted smoothly without any step formation in the inner surface. The coupler may be straight, bands, T-joints type as per requirements of purchaser.
- b) **End Cap:**

This cap made of suitable plastic material shall be fitted on the both ends of duct, coil after manufacturing the duct. This shall avoid entry of dust, mud/dirt in water in to the duct during the transit & storage.

Technical Specification No. 04:

The work includes supply, installation testing and commissioning of main Distribution Panel Indoor type, pedestal type fabricated from 2mm thick stainless-steel plate of 316 grades, along with suitable type of s/s angles, with double door. The entry of all the cable will be from bottom side. The panel shall be duly certified by CPRI/ERDA standard. The switchgear to be fixed is as follow:

- i) ACB electrical draws out type of 1000 Amps, 415V, 50HZ, 4pole 50kA with multi protection relay -1No.
- ii) 1000 Amps. Dicconnector Switch-1No.
- iii) MCCB 250 Amps, 415V, 50Hz, 35kA (microprocessor based release O/L with Ics= 100% Icu) with extended terminal -10Nos.
- iv) Bolted type Connector to connect 240 sqmm to 300 sqmm aluminum cable.
- v) Digital Multifunctional meter for Amp, volts, KWH, PF, Hz. etc.
- vi) 4 pole 63 Amp. MCB Qty.01 Nos Each
- vii) Digital Timer with 3pole power Contactor set for Street Light Feeder Qty.01 Each.

The work includes all material & labour required shall do as directed by Engineer-in-charge.

(Make: DPA Approved Make)

TECHNICAL SPECIFICATIONS OF MAIN DISRIBUTION PANEL			
Sr. no.	Technical parameters	As Per Specification	To Be Filled By The Supplier
	CONSTRUCTIONAL FEATURES		
1	Manufacturer's name	To be specified by supplier	
2	Rated operational voltage	415 V, 3 Ph., 4 wire, 50 Hz, AC	
3	Rated insulation voltage	1.1 KV	
4	Rated short time withstand current	35KA	
5	Rated current	As specified in Tender	
6	Sheet steel thickness	1.6mm (min.) CRCA for doors, 2.0mm for load bearing members and gland plates	
7	Degree of protection for enclosure	IP 52	
8	Compartmentalized single front	Single front	
9	Design Ambient temperature	50° Celsius	
10	Incoming Entry	Bottom Cable	
11	Outgoing cable entries	Bottom Cable	

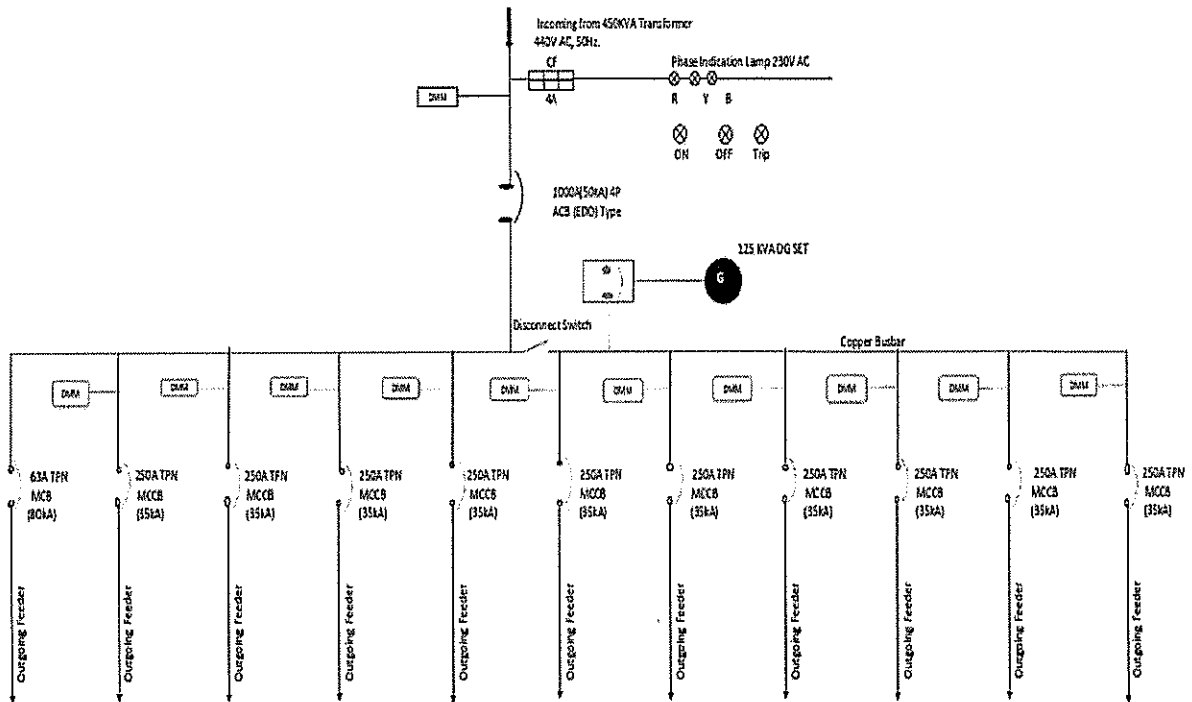
12	Dimensions (L x B x H)	Approximate dimensions shall be specified	
13	Approx. weight	Approximate weight shall be specified	
14	Paint shade	RAL 7035 / RAL 7032	
15	Min and Max Operating height	300 mm to 1800 mm from bottom of the base channel	
16	Required operating clearances front, sides & rear	To be specified by supplier	
17	Tier formation	Single tier for ACB feeders and multi-tier for others. Width of single vertical shall be 600 mm minimum for ACB feeders, 500mm minimum for MCCB feeders, maximum upto 5 feeders in vertical.	
18	Type of Mounting & cable entry	Floor mounting with base channel of 75 mm for PCC	
19	Type of termination all O/G cables	Above 100A Bus bar and others thru suitable rating stud type terminals shall be used	
20	Indication lamps	Indication (RYB & ON,OFF,TRIP) lamps at the Incoming and for outgoing (on) indication shall be provided.	
21	Door interlock	To be provided	
22	Minimum clearances in air		
23	a) between phases	25.4 mm	
24	b) between live parts and ground	19 mm	
25	1 minute PF withstand for main circuits	2.5 KV (RMS)	
26	All feeders shall be provided with ammeter, 3 CT as per tender.	To be provided by supplier	
	BUSBARS		
1	Material for main bus bar	Copper	
2	Cross - section of main bus bar	To be specified by the supplier- for current density 1A/ sq.mm at rated current	
3	Max Continuous current rating at design ambient temperature of main busbar inside the chamber	85° C	
4	Bus connections to circuit breakers	As per rated currents of circuit breakers	
5	rated short circuit current	35 KA	

6	Rated insulation voltage for Insulator supports	To be specified by supplier	
7	Material of main busbar supports	To be specified by supplier	
8	Materials of earth busbar	GI 50 x 6 mm (min.)/ Aluminium 50 X6 mm for PCC	
	AIR CIRCUIT BREAKER		
1	Make	DPA approved make	
2	Type	To be specified by supplier	
3	Type of breaker	Fully draw-out, air break	
4	Ambient temperature	50 degree centigrade	
5	Rated insulation voltage	To be specified by supplier	
6	Breaker rating	As per Single line Diagram	
7	Rated short-circuit making capacity	105 KA (peak)	
8	Rated ultimate short circuit breaking capacity	50 KA. 0	
9	Rated service short-circuit breaking capacity	50 KA	
10	Rated short time withstand current	50 kA for 1 Sec.	
11	Type of release Microprocessor based, protection functions O/C/SC/EF with options for both for inverse & definite time	The ACB- shall be Microprocessor based E/F, IEF, O/C, & S/C releases and shall be 4 pole for all incomer in PCC. The ACB shall be electrically operated, motorized spring charging along with manual spring charging in cases of electrical failure. Model no & relevant catalogues shall be submitted	
12	Rated current of over current trip device	To be specified by the supplier	
13	Features of o/c trip device	To be provided	
14	Function blocking selection	To be provided	
15	Fault visual indication	To be provided	
16	Self-test facility with breaker in isolated position	To be provided	
17	Visual indication for self-check	To be provided	

18	Site selectable inverse/definite time characteristic for E/F and S/C	To be provided	
19	Type for I/C feeders operation	Motorised	
20	Type for O/G feeders	MDO/ EDO as per SLD	
21	Trip free design	Trip free, stored energy	
22	Electrical and mechanical anti-pumping feature.	To be provided	
23	Auxiliary supply for Voltage & permissible range for spring charging motor, CLOSING & TRIPPING COIL	110 V, 1 Ph., 50 Hz., AC. Range : 70 - 110 % for trip coil, 80-100% for closing coil & spring charging	
24	Mechanical indicator for Spring charged / discharged, electrical indication for ON/OFF/TRIP	To be provided	
25	Shunt trip	To be provided in PCC	
26	Utilization category	B	
27	Quantity and rating	As per Tender	
	MOULDED CASE CIRCUIT BREAKERS (MCCBs)		
1	Make	DPA approved make	
2	Type	Air break	
3	Rated insulation voltage	To be specified by supplier	
4	Rated ultimate breaking capacity	35KA / 25KA	
5	Rated short circuit braking capacity	105 kA	
6	Rated service short-circuit capacity	35KA / 25KA	
7	Protective device type	The MCCB - shall be Microprocessor based O/C, & S/C releases for All incomers and outgoings in PCC/AC/ Heater panels. Model no & relevant catalogues shall be submitted	
8	Door interlock	To be provided	
9	Utilization category	B	
10	Visual indication for status (LED indication ON/OFF/TRIP)	To be provided	

CURRENT TRANSFORMERS		
1	Make	DPA approved make
2	Type	Tape Wound
3	CT secondary	5A
4	Accuracy Class for Metering	1, ISF < 5
5	One minute p.f. Withstand voltage	2.5 kV RMS
6	Burden	10 / 5 VA
7	Applicable standards	IS : 2705 (1992)
Ammeters / Voltmeters/MFM meters		
1	Make	To be specified by supplier
2	Type	Digital
3	Accuracy class	Cl-1
4	Size	96 x 96 mm

Main Distribution Panel Located at Electrical Control Room



(Drawing 2.0)

Technical Specification No. 05:

The work includes supply, installation testing and commissioning of Auxiliary Distribution Panel Indoor type, pedestal type fabricated from 2mm thick stainless-steel plate of 316 grades, along with suitable type of s/s angles, with double door. The entry of all the cable will be from bottom side. The panel shall be duly certified by CPRI/ERDA standard. The switchgear to be fixed is as follow:

- i) ACB electrical draws out type of 800 Amps, 415V, 50HZ, 4pole 50kA with multi protection relay -1No.
- ii) MCCB 250 Amps, 415V, 50Hz, 35kA (microprocessor based release O/L with Ics= 100% Icu) with extended terminal -10Nos.
- iii) Bolted type Connector to connect 240 sqmm to 300 sqmm aluminum cable.
- iv) Digital Multifunctional meter for Amp, volts, KWH, PF, Hz. etc.
- v) 4 pole 63 Amp. MCB Qty.01 Nos Each
- vi) Digital Timer with 3pole power Contactor set for Street Light Feeder Qty.01 Each.

The work includes all material & labour required shall do as directed by Engineer-in-charge.

(Make: DPA Approved Make)

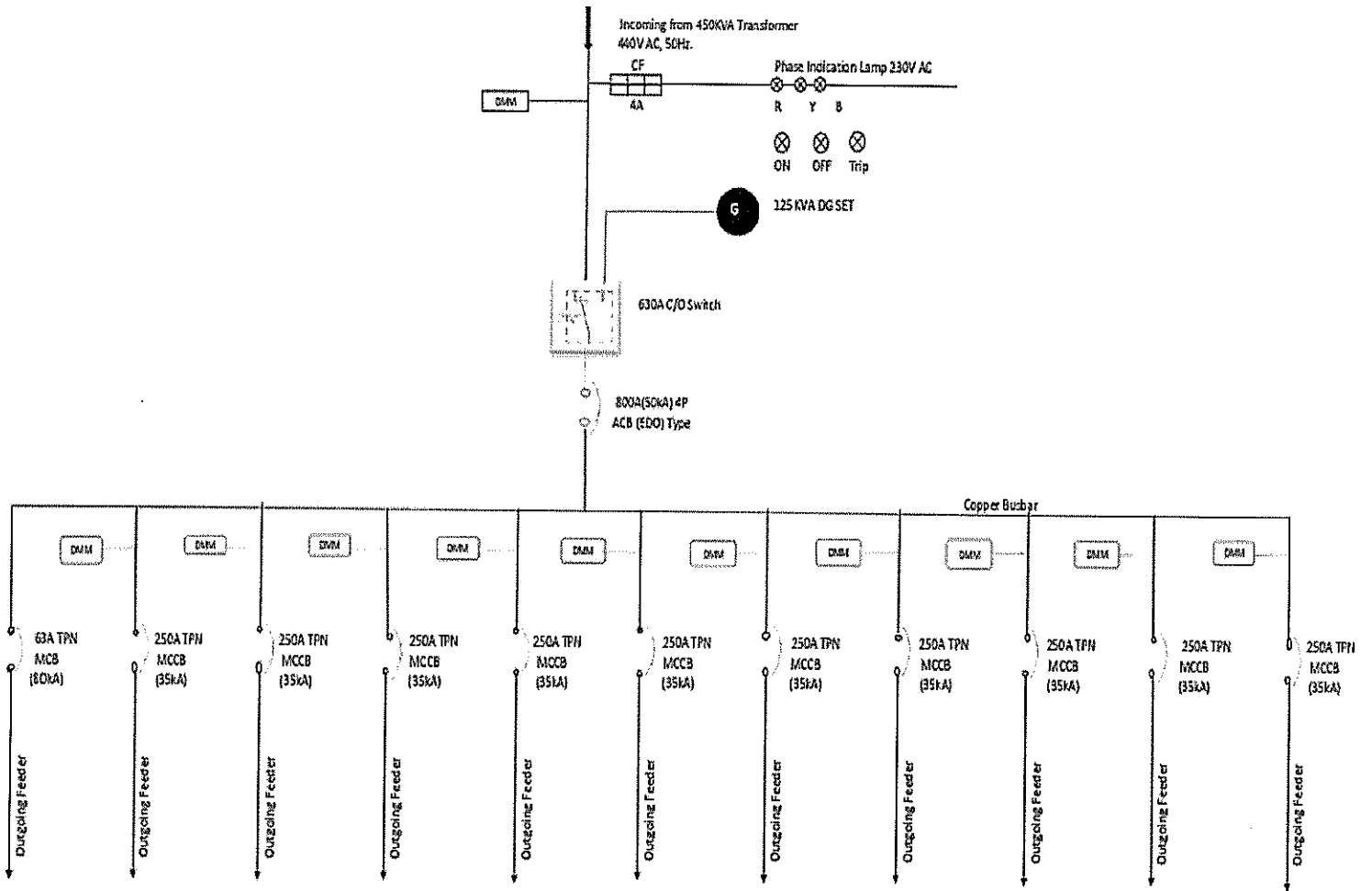
TECHNICAL SPECIFICATIONS OF AUXILIARY DISRIBUTION PANEL			
S. no.	Technical parameters	AS PER SPECIFICATION	TO BE FILLED BY THE SUPPLIER
	CONSTRUCTIONAL FEATURES		
1	Manufacturer's name	To be specified by supplier	
2	Rated operational voltage	415 V, 3 Ph., 4 wire, 50 Hz, AC	
3	Rated insulation voltage	1.1 KV	
4	Rated short time withstand current	35KA	
5	Rated current	As specified in Tender	
6	Sheet steel thickness	1.6mm (min.) CRCA for doors, 2.0mm for load bearing members and gland plates	
7	Degree of protection for enclosure	IP 52	
8	Compartmentalized single front	Single front	
9	Design Ambient temperature	50° Celsius	
10	Incoming Entry	Bottom Cable	
11	Outgoing cable entries	Bottom Cable	
12	Dimensions (L x B x H)	Approximate dimensions shall be specified	
13	Approx. weight	Approximate weight shall be specified	
14	Paint shade	RAL 7035 / RAL 7032	
15	Min and Max Operating height	300 mm to 1800 mm from bottom of the base channel	

16	Required operating clearances front, sides & rear	To be specified by supplier	
17	Tier formation	Single tier for ACB feeders and multi-tier for others. Width of single vertical shall be 600 mm minimum for ACB feeders, 500mm minimum for MCCB feeders, maximum up to 5 feeders in vertical.	
18	Type of Mounting & cable entry	Floor mounting with base channel of 75 mm for PCC	
19	Type of termination all O/G cables	Above 100A Bus bar and others thru suitable rating stud type terminals shall be used	
20	Indication lamps	Indication (RYB & ON,OFF,TRIP) lamps at the Incoming and for outgoing (on) indication shall be provided.	
21	Door interlock	To be provided	
22	Minimum clearances in air		
23	a) between phases	25.4 mm	
24	b) between live parts and ground	19 mm	
25	1 minute PF withstand for main circuits	2.5 KV (RMS)	
26	All feeders shall be provided with ammeter, 3 CT as per tender.	To be provided by supplier	
	BUSBARS		
1	Material for main bus bar	Copper	
2	Cross - section of main bus bar	To be specified by the supplier- for current density 1A/ sq.mm at rated current	
3	Max Continuous current rating at design ambient temperature of main busbar inside the chamber	85° C	
4	Bus connections to circuit breakers	As per rated currents of circuit breakers	
5	rated short circuit current	35 KA	
6	Rated insulation voltage for Insulator supports	To be specified by supplier	
7	Material of main busbar supports	To be specified by supplier	
8	Materials of earth busbar	GI 50 x 6 mm (min.)/ Aluminium 50 X6 mm for PCC	
	AIR CIRCUIT BREAKER		
1	Make	DPA approved make	
2	Type	To be specified by supplier	
3	Type of breaker	Fully draw-out, air break	

4	Ambient temperature	50 degree centigrade	
5	Rated insulation voltage	To be specified by supplier	
6	Breaker rating	As per Single line Diagram	
7	Rated short-circuit making capacity	105 KA (peak)	
8	Rated ultimate short circuit breaking capacity	50 KA	
9	Rated service short-circuit breaking capacity	50 KA	
10	Rated short time withstand current	50 kA for 1 Sec.	
11	Type of release Microprocessor based, protection functions O/C/SC/EF with provisions for both for inverse & definite time	The ACB- shall be Microprocessor based E/F, IEF, O/C, & S/C releases and shall be 3 pole for all incomer in PCC. The ACB shall be electrically operated, motorized spring charging along with manual spring charging in cases of electrical failure. Model no & relevant catalogues shall be submitted	
12	Rated current of over current trip device	To be specified by the supplier	
13	Features of o/c trip device	To be provided	
14	Function blocking selection	To be provided	
15	Fault visual indication	To be provided	
16	Self-test facility with breaker in isolated position	To be provided	
17	Visual indication for self-check	To be provided	
18	Site selectable inverse/definite time characteristic for E/F and S/C	To be provided	
19	Type for I/C feeders operation	Motorised	
20	Type for O/G feeders	MDO/ EDO as per SLD	
21	Trip free design	Trip free, stored energy	
22	Electrical and mechanical anti-pumping feature.	To be provided	
23	Auxiliary supply for Voltage & permissible range for spring charging motor, CLOSING & TRIPPING COIL	110 V, 1 Ph., 50 Hz., AC. Range : 70 – 110 % for trip coil, 80-100% for closing coil & spring charging	
24	Mechanical indicator for Spring charged / discharged, electrical indication for ON/OFF/TRIP	To be provided	
25	Shunt trip	To be provided in PCC	
26	Utilization category	B	
27	Quantity and rating	As per Tender	
	MOULDED CASE CIRCUIT BREAKERS (MCCBs)		
1	Make	DPA approved make	
2	Type	Air break	
3	Rated insulation voltage	To be specified by supplier	

4	Rated ultimate breaking capacity	35KA / 25KA	
5	Rated short circuit braking capacity	105 kA	
6	Rated service short-circuit capacity	35KA / 25KA	
7	Protective device type	The MCCB - shall be Microprocessor based O/C, & S/C releases for All incomers and outgoings in PCC/AC/ Heater panels. Model no & relevant catalogues shall be submitted	
8	Door interlock	To be provided	
9	Utilization category	B	
10	Visual indication for status (LED indication ON/OFF/TRIP)	To be provided	
	CURRENT TRANSFORMERS		
1	Make	AE / KAPPA / ADCON & DPA approved make	
2	Type	Tape Wound	
3	CT secondary	5A	
4	Accuracy Class for Metering	1, ISF < 5	
5	One minute p.f. Withstand voltage	2.5 kV RMS	
6	Burden	10 / 5 VA	
7	Applicable standards	IS : 2705 (1992)	
	Ammeters / Voltmeters/MFM meters		
1	Make	To be specified by supplier	
2	Type	Digital	
3	Accuracy class	Cl-1	
4	Size	96 x 96 mm	

Auxiliary Distribution Panel Located at Electrical Control Room



(Drawing 3.0)

LT Main Distribution Panel and Auxiliary Distribution Panel

1. Equipment Ratings

1.0.1 Voltage and Frequency

The low voltage switchgear and control gear ratings are defined on the individual data sheets. The equipment shall be capable of proper operation for voltage deviations of +/- 10% and frequency deviations of +/- 2%. In addition, contactors and relays shall be able to ride through voltage dips to 80% nominal, such as those experienced during motor starting. This system will be a 3 phase, 4 wire. The switchgear shall be rated at 415V AC, 50Hz.

1.0.2 Component Ratings

The type of components, number of poles/wires, voltage, frequency, trip or current ratings, and interruption capacity of the equipment shall be as specified in this document, on the datasheets or single line diagrams. The rating of each component shall be based on its installation in the switchgear or control gear assembly. Supplier shall provide de-rating information for all circuit breakers, starters, combination contactors, fused switches, and other components. Equipment of the same type, current rating, and circuit duty shall be interchangeable.

1.0.3 Short Circuit Breaking Capacity

The minimum short-circuit breaking rating of all low-voltage circuit breakers shall be such that the short circuit service breaking capacity must be equal to the percentage of the ultimate short circuit breaking capacity as specified on the datasheet.

1.0.4 Rated Short-Circuit Withstand Current

The rated short-circuit withstand current (I_{cw}) for all applicable components shall be equal to the short-circuit service breaking current with a time duration as specified on the data sheet.

1.0.5 Short Circuit Making Capacity and Power Factor

The rated short-circuit peak making capacity of a circuit-breaker shall not be less than its rated ultimate short-circuit breaking capacity, multiplied by the factor n based on IS 13947.

1.0.6 Bus Short Circuit Ratings

The bus bracing shall be capable of withstanding the mechanical and thermal effects of the maximum short-circuit withstand current and time, as specified on the data sheets, without damage or deformation, applied when the bus bars have reached thermal equilibrium with rated continuous current, at maximum ambient temperature.

1.0.7 Power Bus Current Ratings

Power bus bars shall be rated for the continuous current carrying capacity specified on the data sheets and single line diagrams. Unless otherwise noted, horizontal bus bars shall be of the same current rating throughout their length. All vertical bus bars shall have the same current rating throughout the switchboard.

1.0.8 Short Circuit Protective Device Ratings

Short-circuit protective devices shall be rated for the continuous current carrying capacity specified on the data sheets.

1.2 Enclosure

1.2.1 Construction

The switchgear shall contain a number of enclosures erected vertically to form a complete assembly with provisions for future extensions. Front and rear access shall be hinged doors. The switchboard shall comprise of standard prefabricated, cold rolled, sheet steel units of thickness not less than 2 mm (14 SWG)

The height of the switchboard shall be uniform throughout the length of the panel and shall not exceed 2400 mm. However height of the switchgear handle should be above 300 mm but below 1800 mm to facilitate easy operation without the aid of stool. Depth of the panel shall be adequate to gland all the incoming and outgoing cables.

The switchgear shall be provided with bottom cable entry facility with a 3mm thick removable gland plate with gasket.

1.2.2 Component Access

All components shall be easily accessible for maintenance. Front access only gear shall have all components and cable connections easily accessible from the front.

1.2.3 Number of Units per vertical section

The number of circuit breakers or motor controllers in a vertical tier shall be as per the supplier's standard design, unless specified otherwise.

1.2.4 Form of Separation

Switchgear and control gear shall have a form of internal separation as specified on the data sheet, based on IS 8623-1. Sheet-steel barriers shall be provided between the vertical sections and between the control compartments and the power compartments. Horizontal and vertical buses shall be isolated such that when the rear panel of a vertical section is open, the only exposed "live" bare parts will be the load terminals of feeder breakers.

1.2.5 Testing for Arc Due to Internal Fault

The equipment shall be designed and tested to meet the requirements of IS 8623 for arcing due to an internal fault such that the arc is confined in the section where it occurs and adjacent sections are not affected.

1.2.6 Ventilation

The enclosure shall be naturally ventilated. Non-ventilated or forced air cooling shall not be permitted unless approved by the Purchaser. When a transformer, variable speed drives (VSDs), or other heat producing equipment will be installed within the gear, Supplier shall provide internal heating calculations. Internal heat dissipation data shall be provided by the Supplier in any case.

1.3 Power Bus

Power Bus Bars

Power bus bars shall run the entire length of the equipment except where it is necessary to cut and provide splice plates for shipping sections. All primary and secondary bus elements and all horizontal and vertical buses shall be of copper material. Bus bars shall be single bus configuration designed and manufactured in accordance with IS 8623. All bus bar ends shall be drilled and supported to enable extension without modifications to the existing bars.

1.0.8 Neutral Bus Bar

The neutral bus bar shall run parallel with the power bus bars, run the length of the equipment, and shall be fabricated and plated with the same material as specified for the power bus. Neutral bus bar current ratings shall be equal to the phase bus bar current rating in vertical and horizontal bus bar system. The neutral conductor shall be marked 'N' and colored black and the earth conductor marked 'E' and twin colored, green/yellow. The terminals for external earth conductors shall be marked with the standard earthing symbol.

1.0.9 Joint and Bus Plating

All joints between vertical and horizontal power buses, multiple horizontal buses, and incoming connections shall be plated with tin or silver. All un-insulated bus shall also be plated with the specified material. Bus bar joints shall be made using high-tensile steel bolts (hydrogen relieved), nuts and washers. Provision shall be made in the bus bar compartment to allow access for inspection and maintenance of connections.

1.0.10 Bus Insulation

Unless specified as none (i.e. air insulated), power bus bar and neutral bus bar insulation shall consist of physical barriers between phases(isolated) or complete encapsulation with suitable dielectric material (fully insulated). For full insulation, the entire length of the power bus (i.e. horizontal and vertical sections including the neutral) shall be insulated for the rated voltage. Material and instructions necessary for insulation of all bus splices, connections, and terminations shall be supplied with the equipment. The bus bar insulation shall be continued into the main switching device compartment as far as practicable whereas the main and dropper bus bar insulation system shall use flame retardant, non hygroscopic and non-tracking material

1.0.11 Bus Bar Connections

Bus connections to and from circuit breaker units, fused units, or motor starters shall be insulated, as specified on the data sheets, and shall have a short circuit rating at least equal to the maximum specified short circuit current. The bus connections to the circuit breaker and fused units shall have a continuous current rating at least equal to the largest breaker or fuse which may fit into that particular section. The continuous current rating of the motor starter bus connections shall be equal to the maximum current drawn by the largest starter of the size that may fit into that particular section. Minimum Clearance between Phase to phase shall be 25 mm, Phase to Earth & Phase to Neutral shall be 19 mm

Shutters for Bus Contact Openings

Automatic shutters shall be provided for functional units, so that when a unit is removed, disconnected, or placed in the 'TEST' position, no live primary-circuit elements will be exposed. Each set of shutters shall be individually operated and activated by the movement of the withdrawable unit and shall not depend on gravity for operation. All shutters shall be pad lockable in the closed position. The bus contact openings for all withdrawable units shall automatically have an internal degree of protection; the type of protection shall be per supplier standard. Metallic parts shall be earthed.

1.0.12 Warning Labels

All covers providing access to bus bars shall carry a 'Caution – Risk of Electric Shock' warning label.

1.0.13 Phase Identification

Bus bar phase identification shall be R, Y, B, and N. Phase arrangement and primary circuit connections shall be clearly shown on Supplier's drawings.

1.0.14 Wiring

No wiring shall be contained within bus bar compartments, other than the phase connections to incoming and outgoing main circuits.

1.1 Earthing Bus Bar

1.1.8 Description

All switchgear and control gear compartments shall be earthed to a common earthing bus bar running the full horizontal length of the assembly fabricated from the material and sized as specified. Vertical earth bars shall be provided. The minimum area of the earthing bus bar shall be as specified on the datasheet. The earth bus bar material shall be tin plated copper.

1.1.9 Connections

The earth bus in each vertical section shall have at least six pre-drilled holes for terminating earthing conductors. All internal earthing connections shall be made at the factory.

1.1.10 External Cable

Each gland plate shall be bonded to the earth bus by connection complying with IEC 61439. Provision shall be made within each cable box for connection of all external cable earth cores.

1.1.11 Panel Earthing

Each end of the panel shall be earthed to the main earth grid. Supplier shall extend the earth bus outside of the panel for purchaser connect to the main earth.

1.1.12 Door Earthing

Each compartment door shall be earthed separately.

1.2 Wiring

1.2.8 General

All conductors shall be stranded copper with flame retardant, 600/1000 V insulation and continuous from terminal to terminal with no splicing. Conductor ends shall be fitted with a crimped terminating device with an insulated shank. Wiring shall be neatly bundled and secured with wire ties. Minimum conductor sizes for current transformer, for power circuits, for control circuits and for signal wiring to electronic instruments, shall be as per the data sheets.

1.2.9 Wire Markers

Wire markers shall be provided on both ends of all conductors, shall match the supplier's drawings, and shall be of the type specified in the purchaser requisition documents. Wrap-around, adhesive, and Snap-On markers are not acceptable. All wiring shall be marked on each end of the conductors with permanently-embossed wire markers of the heat shrinkable or slip on types.

1.2.10 CT Wiring and Protection

All CT circuit wiring shall be provided with a screw-type terminal and ring lugs. Where wiring passes through a metal sheet or barrier, bushings, grommets, or other mechanical protection shall be provided. Wiring across door hinges shall be protected from mechanical damage, preferably by the use of flexible conduit. CT mounted on the buses shall be supported and clamped adequately. CT shall be Cast resin type.

1.2.11 Earthing Wire

All earth circuit wiring shall have green/yellow insulation. The instrument compartment door should be earthed with flexible braided copper wire.

1.2.12 Power Supply Wiring

Wiring for circuits connected to bus-wired power supplies shall be protected by moulded case circuit breakers or fuses for each switchgear unit.

1.2.13 Inter-Wiring Ducts

All switchgear inter-wiring for interlocking, alarms, etc., shall be routed between compartments by means of a duct. Wiring ducts shall be accessible without the need to de-energize any circuits.

1.2.14 LSF Wiring and Ducts

All internal wiring shall be low smoke and fume (LSF) type wiring. Insulation shall be low smoke, zero halogen thermosetting insulation with an oxygen index of 30% minimum. All internal wiring ducts shall also be fabricated from LSF material.

1.2.15 Auxiliary Circuits of Draw out Units

The connections of the auxiliary circuits of draw-out units shall be of the plug-and- socket type, automatically operated by the unit.

1.2.16 Cable Screening and Segregations

The following cable segregation requirements shall be observed during construction of the switchboard:

- a) Low voltage, digital and analogue I/O cables shall be loomed separately from, and have maximum separation to main voltage cables.

- b) Unless approved by the Purchaser, all communications shall be run using screened twisted pair or fiber-optic cabling.
- c) Analogue signals not transmitted over the communications network shall be run via screened twisted pairs. Single wiring within equipment shall be manually twisted in pairs, with due care taken to minimize the length of any untwisted wiring.
- d) Incoming digital I/O (Input/Output) cables to the Intelligent Motor Controller (IMCS) shall be screened.
- e) Signal Cable screens shall only be single point earthed at the switchboard end. The screen to instrument earth bar connections shall be as short as practical. Screens on different analogue signal pairs shall be kept isolated except at earthing points.

1.3 Name Plates

1.3.8 General

Nameplates shall be placed on the outside of each cubicle door identifying the service by name and equipment number in accordance with the datasheets. All external nameplates shall be of an acrylic resin material. The language used shall be English and the background of the nameplate should be white with black letters to be used. The nameplate size and letters' height should be of the supplier's standard.

1.3.9 Fastening

Nameplates shall be attached to the enclosure by two stainless steel screws. Adhesive backing shall NOT be permitted unless approved by the Purchaser.

1.3.10 Component Nameplates

Nameplates shall identify each device on the instrument panel and other devices such as instrument transformers, secondary fuses, etc. inside the cubicle. Door-mounted components shall be identified both on the exterior panel door and internally. The positions of control and selector switches shall also be labelled. Nameplates shall remain in place when the component has been removed.

Warning and Caution Nameplates

In locations where dangerous situations may inadvertently be created, warning plates or caution notices shall be installed, identifying the danger points. This may be in a compartment or on the outside of an assembly. Warning plates or caution notices shall be engraved black lettering on yellow background. Applications include, but are not limited to the following:

- a) Incoming sources with potential for feedback from an alternate source.
- b) Termination points for all wiring brought to the switchgear from an external power source.

1.3.11 Danger Nameplate

Nameplate shall be engraved white letter on red background. The Nameplate shall comply with IS 2551.

1.4 Electrically Operated Circuit Breakers

1.4.8 General

The switchgear circuit interrupting device shall be of the draw out, air break, electrical type, with five-cycle closing and interrupting duty, and solid-state trip

unit with long-time, short-time and/or instantaneous, and earth fault protection as specified in this document, the datasheets, or single line diagrams. The utilization category for circuit breakers as per IS 13947 shall be Category B, suitable for continuous duty.

1.4.9 Electrically Operated Breakers

Switchgear main and tie circuit breakers shall be electrically operated. Electrically operated feeder circuit breaker shall be provided only when indicated in data sheet or Single Line Diagrams. Electrically operated circuit breakers shall have means of tripping when control power is not available. On electrically-operated circuit breakers, secondary disconnecting devices shall be provided for auxiliary functions and control circuits.

1.4.10 Circuit Breaker Positions

Circuit breakers shall be withdrawable to an isolated test position or disconnected position or completely withdrawn from the breaker cubicle. In the test position, the breaker shall be operable (with auxiliary circuits energized) but shall not energize the power circuit.

1.4.11 Interchangeability

Breakers shall be interchangeable with others of the same voltage, current, and breaking ratings. It shall not be possible to interchange breakers of different ratings.

1.4.12 Breaker Spring Charging

In addition to electrical spring charging using a motor, on the breaker control panel (face of the breaker), a handle for manually charging springs, a contact-position indicator, a charging mechanism position indicator, and pushbuttons for closing and tripping shall be provided. Spring mechanisms shall be arranged such that a closing operation cannot occur until the spring is fully charged.

1.4.13 Breaker Mechanism

Operating mechanisms shall be electrically and mechanically trip free, include an anti-pumping device, incorporate a local manual trip facility, and give positive indication of breaker position. Tripping mechanisms shall be provided with a mechanical tripping device. Operating mechanisms equipped for electrical closing shall include an interlock arranged such that closing cannot be initiated when a trip condition exists.

1.5 Control Switches, Push buttons and Indicating Lights

1.5.8 Instrument Switches

Pushbuttons and related control switches shall comply with IS 13947. All pushbutton switches, except stop switches shall have a full shroud to prevent inadvertent operation. Instrument switches shall be rotary-cam type with engraved dial plates. Switch escutcheon plates shall be clearly marked to show operating positions.

1.5.9 Circuit Breaker Controls

A circuit breaker control switch and a set of contact position indicating lights shall be provided on the cell door of each electrically operated circuit breaker. The switch handle shall be located along the vertical center line of the cubicle and shall not be located adjacent to meter switches.

1.5.10 Operating Handles

When the switchgear is equipped with several operating controls requiring manual operating handles, these handles shall be of different physical size and shape to minimize the possibility of operating errors, as specified.

1.5.11 Indicating Lights

All indicating lights shall be multi-LED type, providing long life capacity, and shall be removable from the front panel.

The indicating lights for circuit breakers shall be:

- a) RED "ON" when breaker is closed
- b) GREEN "ON" when breaker is opened
- c) WHITE "ON" when indicating trip circuits/lockout relays are operational (healthy)
- d) AMBER "ON" when breaker tripped (indicates trip by device other than control switch)

The indicating lights for motor feeders & contactors shall be:

- a) RED "ON" when contactor is closed (motor running or Feeder ON)
- b) GREEN "ON" when contactor is opened (motor stopped or Feeder OFF)
- c) AMBER "ON" when contactor tripped (indicates trip by device other than control switch).

Technical Specification No.06:

The work includes SITC of L.T Outdoor type feeder pillar. The LT feeder pillar panels to be for conversion of overhead power distribution network to underground Cable network at Vadinar colony, including supply of all Equipments/Materials, Erection (including Civil Works), Testing and Commissioning. The Feeder Pillar shall conform to the specific Technical installed requirement specified hereunder.

1. Rated Voltage - 415 V + 10%
2. Rated Frequency - 50 HZ
3. Continuous Current Rating - 250 Amps
4. Type - Out door
5. Mounting - On concrete foundation.
6. Suitable for - 3 ph 4 wire with earthed Neutral
7. Maximum system Voltage - 1.1KV
8. Rated short Circuit Level - 50KA @ 400V.

Feeder Pillar Box shall be suitable for the purpose for which we are intended to be used. Each feeder pillar shall be complete with following accessories:

- i) 4 Pole MCCB 200 Amps, 415V, 50Hz, 35KA with extended terminal series -01Nos.
- ii) Electrolytic copper bus bar of suitable size.
- iii) Digital timer with 24 hrs. day time setting with LCD display-1No.
- iv) Three phase contactor of 415v, 50HZ, 50Amp coil voltage 415v AC.-1No.
- v) 4Pole MCCB 125Amp D series, 35KA, 415volts, 50 HZ Din mounting-10Nos.
- vi) Bolted type Connector strip for connecting Incoming/Outgoing cable suitable for connecting 16 sq.mm to 120 sq.mm aluminum cables. The

work includes all material & labour required shall do as directed by Engineer-in-charge.

- vii) Din rail connector for terminating I/C & O/G cables, two no's earth connections, neoprene gasket on doors edge, lock & key arrangement.
- viii) Suitable capacity of Ammeter, Voltmeter, Selector switch, Phase indicators.

Feeder Pillar Box shall have access for sufficient ventilation and head description.

The cable entry and exit shall be from bottom of the panel. The design of the panel/box must be such as to facilitate easy removal of the cable during erection and repair by suitable bolting the box cover and sliding the bottom gland plates. The panel shall be provided with suitable gland and clamps for fixing the cable rigidly. The feeder pillar box shall be suitable for 1.1kV 4 core 120sqmm to 16 Sq.mm armored UG cable, clearance inside the box must be such as to offer fair working facilities during erection and maintenance. The inside surface of the box shall be insulated by fiber sheet to with stand 1.1 kV insulation to prevent flash over. The box shall be vermin proof and dust proof. Louvers of suitable size shall be provided in the side for ventilation and to prevent the entry of dust and insect. The box shall have double door (self-closing type) fitted with internal type door lock with common key for all the boxes and shall give maximum protection to the interior of the box. The feeder pillar boxes shall be made of 2.5 mm thickness SS sheet with permanent paint on clean surface after chemical treatment. The Feeder Pillar Box shall be suitable to mount on Cement concrete foundation. Necessary provision for foundation bolt in the pillar shall be made for SS foundation bolts.

The feeder pillar panel shall be designed to work satisfactorily under following service conditions:

	Indian Standard
Supply Voltage	3 phase neutral, AC 433Volt +/-10%
Supply Frequency	50 Hz +/-5%
Location of panel	Outdoor, on foot path or roadside
Pollution	Light Polluted and Dry
Incoming supply to feeder pillar panel	From compact s/s or Main feeder pillar
Ambient Temperature	Average 45 Deg C, Maximum 50 Deg C

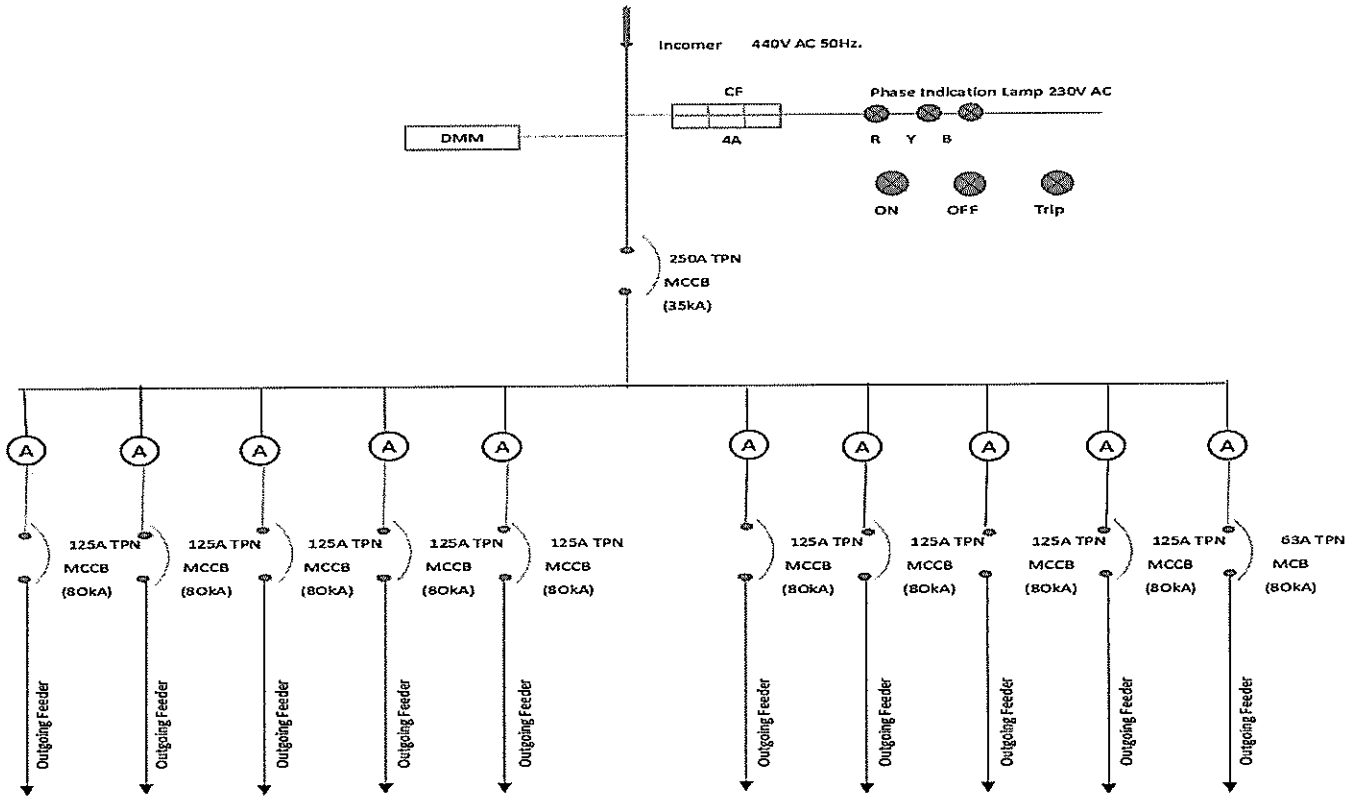
The feeder pillar panel construction shall confirm to following features: -

1	Panel Construction	Free Standing floor mounted with SS frame,
2	Welded Construction	Continuous welding from inside, Spot welding not acceptable.
3	Ingress Protection class for enclosure	IP 66 as per IS 12063
4	Material	SS sheet Steel of 304 Grade
5	SS Thickness	3mm - Support frames 2mm SS. - Covers, Doors & Canopy
6	Base frame for panel	3mm SS Channel 50mm height painted in Black Color
7	Bottom holes on four Sides	Oval Shape, for grouting bolts
8	Cable entry	From Bottom only

9	Lifting Lug	2 nos lug welded on top
10	Canopy on top	With minimum 10 Deg C slope extended 50mm outside panel front and rear
11	Door type for front & rear access	Centre Opening double leaf with insulating rubber grip handle
12	Door Opening angle	Min 120 Deg
13	External hardware	SS nut and bolts
14	Bus bar color coding for R, Y , B and Neutral	Heat shrinkable tape of color Red, Yellow, Blue & Black respectively.
15	Copper Bus Bar size in mm	50X10 mm for R,Y,B & N
16	BUS	Bolted type removable link to be provided at middle of all the phases and neutral bus bar, To adapt two incomers from separate source in case of exigency.
17	Bus bar arrangement	Horizontal, with R phase bus at top
18	Bus Bar support insulators	SMC / DMC, 1100v Grade
19	Cable size main Incoming for panel	4C X 120Sqmm cable Aluminum conductor
20	Outgoing cable for panel	4C X 70Sqmm cable , 4CX 35Sqmm cable & 4CX 16Sqmm.
21	Gland plate at panel bottom	SS, 3mm thick for multi core cable
22	Cable termination clearance from gland plate	300mm minimum
23	Labels for incoming and outgoing feeders	Sticker type labels inside panel doorm
24	Earth studs on both side of panel bottom	With M10 SS steel nut bolts
25	Flexible earth connection to doors	Flexible PVC Cu wire 2.5Sqmm green color
26	Panel minimum dimensions in mm	Width 1225, Depth 650 , Height 1650.
27	Holder for lamp panel	230v Incandescent lamp controlled through 2amp CB
28	Small power socket for panel	5/15 amp 3pin socket controlled through 16amp SPMCB
29	Marking for panel earth stud	Green letter 'E', on riveted AL label
30	Danger board in English and local language, riveted on doors	Red color background with black lettering on 1.6mm thick Al plate
31	Surface preparation for painting	Sand blasting or 7 tank process
32	Painting	Powder coated grade A polyester paint with min thickness 60 microns
33	Paint shade	Shade - 538 as per IS:5 - Post office red
33	Fluorescent strip painting on panel	50mm wide horizontal strip of fluorescent paint around panel in the middle of panel
34	Tolerances on panel	Maximum +/- 5mm

	dimensions	
35	Caution	No negative tolerance on bus bar dimensions and bus bar clearances.
36	Prototype panel	Prototype panel to be approved by DPA Electrical Deptt.

Outdoor Type Feeder Piller Panel



(Drawing 4.0)



Technical Specification No. 07:

CABLE JOINTING AND TERMINATION

- i. Crimping should be done only by using Hydraulic Crimping Tool. Crimping shall be all around the circumference of ferrules or line connectors and cable sockets should not be spot crimping.
- ii. In the case of XLPE cable jointing / termination shall be done by heat shrink type kits as specified in the BOQ.
- iii. The jointing kits shall provide effective and reliable stress control, superior surface protection, environmental sealing and increased dielectric strength.
- iv. Identification tags made from aluminum sheet shall be attached to the end of cable by means of binding wire and tags) 136
- v. L.T. Cable jointing shall be done by using heat Shrinkable Jointing Kit

These shall be of Heat Shrinkable type jointing kit complete with all the cable jointing accessories of appropriate size suitable for all type of underground cables as specified in the BOQ. The joining kit should provide effective and reliable stress control, superior surface protection, and moisture proof, environmental sealing and increased dielectric strength. The kit should meet I.E.C, IEEE -404 VDE 0278 and other International Standard.

Technical Specification No. 08:

This includes preparation of earth station with Earthing Rod with below Specification:(i) Earthing Type: Maintenance Free Earth electrode made of steel circular rod with molecularly bonded copper as per IEC 62561

Rod diameter: > 17 mm, Copper coating: 99% pure electrolyte copper, (iv) Length: > 3 meters / 10 feet.

Earth Enhancement Compound Composition: Graphite, Activated Carbon, Al Silicate CU Sulphate & Binding Agent Bentonite etc Material with below Specification:

- i. Chemical bag weight: 25 Kgs 2 bag each
- ii. Resistivity Value: < 2 Ohm
- iii. Environment Effects: ECO Friendly (Lead, Cadmium, Zinc Free Compound)

Earth Pit Cover with below Specification:

- i. Material Type: RCC > 450 x 450 mm,
- ii. Load Bearing Capacity: Upto 5 MT On Ground Level
- iii. Lid Lock System: Yes
- iv. UV Resistance: Yes
- v. Eco Friendly: Yes
- vi. Temperature: 5°C to 75°C

A Ready-made earthing chamber of minimum 30 cm x 30 cm shall be provided just below the ground surface and shall have RCC/CI cover of suitable size as directed. This also includes removing excess excavated soil from the site. The work shall be carried out to the full satisfaction of the Engineer-in-Charge. The work includes all labor and materials as directed by the Engineer-in-charge.

Technical Specification No. 09:

This includes supply at site, laying, fixing and connecting of G.I strip of size 25x5 mm from earth station/existing earthing system to H.T/L.T. panel, feeder pillars, switchgears, Power/Distribution transformer etc. as directed.

The G.I strip also shall be laid from earth station to HT/LT switch gears & transformers etc. directly connected to two separate and distinct main earths as directed and shall be clamped suitably on wall/floor or buried in the ground / pucca trench as directed. The work includes all material & labour required shall do as directed by Engineer-in-charge.

Technical Specification No. 10:

Providing and laying of cement concrete mix of proportion 1:1 1/2:3 consisting of ingredients of cement, sand and crushed graded trap stone metal etc. including mixing, disposing, consolidating, leveling, curing etc. DPA will not provide any material for the above.

Technical Specification No 11:

The work includes, Supply, Installation, testing & commissioning of, 16 Amp 1POLE MCB Din Type C Curve with MID TRIP features for main of street light pole, same is to be fixed in JB with proper wiring & lugging proper sizes of lugs. The rates shall be inclusive of all materials & Labors.

Technical Specification No. 12:

This item includes supply of Tamper proof, Shock proof and Rust proof SMC (Sheet Moulding Compound) Street light Junction box shall be supplied with 1 no. 1Pole 6A x 240V rating MCB & 1 no. 63A 4 way pvc connectors as directed.

The Junction box shall be in single piece without any joints having concealed hinges, mounting screws fitted from inside, metal hardware for wire seal, light weight and adequate space for fixing the cut outs & connector as directed.

The size of SMC Junction Box shall be 300mm. x 200mm. x 105mm. from outside. The size of the SMC Boxes above is tentative and minimum. The Contractor shall accommodate the MCB & 4way connector as directed in the box. However, contractor may increase the size if required to accommodate the MCB & connector to the actual requirement and relevant rules and regulations, for that no extra payment shall be made. The rates shall be inclusive of all the taxes, insurance, transportation, unloading, including VAT etc. as directed by Engineer-in-Charge.

Technical Specification No. 13:

This includes fixing of supplied Shock proof and Rust proof SMC (Sheet Moulding Compound) Street light Junction box on wall / structure/Pole as directed. The Junction Box shall be fixed rigidly on pole through suitable size of nut bolts/anchor fasteners/cemented wooden gutties and incase of pole it shall be fixed through suitable size of G.I. clamp at least 2mm. thick as directed. This includes with all material, labour tools & tackles including necessary wiring & connections with earth linking as directed by Engineer-In-charge

LT SWITCH BOARD

Applicable Standards

The LV SWBD shall comply with the following Indian Standards:

IS-5: Colors for ready mixed paints and enamels.

IS 1248: Direct Acting Indicating Analogue Electrical Measuring Instruments and their Accessories

IS 2705: Current Transformers

IS 2824: Method for determining the proof and the comparative tracking indices of solid insulating materials.

IS 3043: Code of practice for earthing

IS 3156: Voltage Transformers

IS 3231: Electrical relays for power systems protection

IS 3618: Phosphate treatment of iron and steel for protection against corrosion

IS 3716: Application guide for Insulation Coordination

IS 4146: Application guide for CT / VT

IS 5082: Wrought aluminum and aluminum alloy bars, rods, tubes and sections for electrical purposes

IS 5578: Guide for marking of insulated conductors

IS 6005: Code of practice for Phosphating of iron and steel

IS 8623: Specification for low voltage switchgear and control gear assemblies

IS 9676: Reference ambient temperature for electrical equipment

IS10118: Code of practice for selection, installation and maintenance for switchgear and control gear

IS 11353: Guide for uniform system marking and identification of conductors and apparatus terminals

IS 13234: Guide for short circuit calculations in three phase AC systems

IS 13703: Low voltage fuses for voltages not exceeding 1000 V AC or 1500 V DC

IS 13947: Specification for low voltage switchgear and control gear

IEC 60050-441: International Electro Technical Vocabulary Chapter 441: Switchgear, Control gear and Fuses

IEC 60073: Basic and Safety Principles for Man-Machine Interface, Marking and Identification - Coding Principles for Indicators and Actuators

IEC 60255: Measuring relays and Protection Equipment

IEC 60269: Low Voltage Fuses

IEC 60309: Plugs, socket-outlets and couplers for industrial purposes

IEC 60445: Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors

IEC 60529: Degrees of protection provided by enclosures (IP Code)

IEC 60947: Low-voltage switchgear and control gear

IEC 61000-2-2: Electromagnetic compatibility (EMC) – Part 2-2: Environment, Compatibility levels for low frequency conducted disturbances and signaling in public low-voltage power supply systems

IEC 61000-2-12: Electromagnetic compatibility (EMC) – Part 2-12: Environment,

Compatibility levels for low frequency conducted disturbances and signaling in public medium-voltage power supply systems

IEC 61000-3: Electromagnetic compatibility (EMC) Part 3, Limits

IEC 61000-4: Electromagnetic compatibility (EMC) Part 4, Testing and measurement techniques

IEC 61000-6-2: Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments

IEC 61000-6-4: Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments

IEC 61180: High-voltage test techniques for low-voltage equipment

IEC 61439-1: Low-voltage switchgear and control gear assemblies – Part 1:

General rules

IEC 61439-2: Low-voltage switchgear and control gear assemblies – Part 2:

Power switchgear and control gear assemblies

IEC 61439-6: Low-voltage switchgear and control gear assemblies - Part 6:

Bus bar trucking systems (bus ways)

IEC 61558: Safety of power transformers, power supplies, reactors and similar products

IEC 61641: Enclosed low-voltage switchgear and control gear assemblies -Guide for testing under conditions of arcing due to internal fault

IEC 61915-1: Low-voltage switchgear and control gear – Device profiles for networked industrial devices – Part 1: General rules for the development of device profiles

IEC 62026: Low-voltage switchgear and control gear-Controller-device interfaces (CDIs)

IEC 62208: Empty enclosures for low-voltage switchgear and control gear assemblies - General requirements and control gear assemblies - General requirements

IEC 62314: Solid-state relays

Sign & Seal of Contractor

Executive Engineer (M&E)
Deendayal Port Authority.

