बी एच ई एल

भारत हैवी ईलैक्ट्रिकल्स लिमिटेड

BHARAT HEAVY ELECTRICALS LIMITED

पारेषण व्यापार अभियांत्रिकी प्रबंधन

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

					बनाया/ Prepared	जांचा/ Checked	स्वीकृती/ Approved
प्रलेख संख्या DOC. No	TB-393-553-01	Rev. No.	00				
TYPE/ प्रकार OF DOC.	TECHNICAL SPECIFICATION			हस्ता. / SIGN			
TITLE/ शीर्षक	AIR CONDITIONING SYSTEM FOR SWITCHYARD PANEL ROOM			नाम / NAME	AR	SKS	AS
				दिनांक/ DATE	06/06/17	06/06/17	06/06/17
				समूह/GROUP	TBEM	W.O. No	86008

ग्राहक/ CUSTOMER	**POWERGRID CORPORATION OF INDIA LTD. (POWERGRID)**
परियोजना/ PROJECT	**Substation package for extension of 400kV Tumkur Pooling Station (Pavagada) (Including transformer & reactor), Extension of 400/220kV Mysore substation and extension of 400/220kV Tumkur (Vasantnarsapur) (Including transformer) under transmission system for Ultra solar power park (2000MW) at Tumkur (Pavagada), Karnataka-Phase-II(Part-A)**
प्रपत्र संख्या/ NOA NO.	**CC-CS/ 702-SR2/ SS-3340/7/ G7/ NOA-I & II/ 7102 & 7103 DATED 16.12.16.**
स्थान/ STATION	**Tumkur (Pavagada), Tumkur (Vasantnarsapur) and Mysore**

विषय-सूचि/ CONTENTS

अनुभाग / Section	विवरण / Description	पृष्टसंख्या/ Page No
1	Intent, Design criteria, System requirement and scope	1-6
2	Equipment Specification (Powergrid's specification)	7-15
3	Project details and general technical requirements	16-17
4	Guaranteed Technical Particulars	18
5	Schedule to be filled by Bidder	19-24

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS

Distribution	To	TBEM	TBMM	TBQM	Vendor
	Copies	1	1	1	4

SECTION-1

INTENT, SYSTEM REQUIREMENT AND SCOPE

1.0.0 INTENT OF SPECIFICATION

1.1.0 This specification covers the manufacturing, inspection/testing, dispatch and erection, testing & commissioning at site of **Air-Conditioning System** as mentioned in different sections of this specification for **400/220 KV Sub-station extension at Tumkur (Pavagada), Mysore and Tumkur (Vasantnarsapur)** of Power Grid Corporation of India Limited (POWERGRID).

1.2.0 The requirements specified under '**SECTION 2, SECTION 3, SECTION 4 & SECTION 5**' of the specification shall be considered as part of this section. In case of variance between various sections, the requirements of **SECTION 1** shall prevail.

1.3.0 The Bidder shall be deemed to have understood completely all the tender drawings and documents and quoted accordingly.

1.4.0 The Contract shall be on unit rate basis for the quantities furnished by BHEL. During contract stage, quantities of various items of BOQ may vary to any extent and same rates will be applicable so far the resultant variation in total contract value is within ±20%. Variations beyond ±20% shall be negotiated mutually.

1.5.0 It is recommended that Bidders have no deviation on technical requirement & scope. Bidder shall submit signed and stamped copy of "Certificate of No deviation" (Schedule 1 of Section 5) for 'NIL DEVIATION'.

1.6.0 The term **'Owner/Customer'** appearing in this specification shall refer to **POWERGRID**, the term **'Purchaser'** shall refer to **BHEL** and the term **'Contractor'** shall refer to the successful Bidder.

1.7.0 The system / equipment shall be capable of performing the required duties as per the specification requirements.

2.0.0 AIR CONDITIONING REQUIREMENT

Air Conditioning System for Switchyard Panel Rooms

Air-conditioning units for switchyard panel room shall be set to maintain Dry Bulb temperature inside switchyard panel room below 24 °C.

Air-conditioning units for Switchyard Panel Rooms shall be designed to meet the conditions mentioned in the Cl No-3 of Powergrid's specification attached to section-2.

Standard drawings of Switchyard Panel Rooms of size 3.9X9 sqm & 3.9X6 sqm are also enclosed as a part of the specification for bidder's reference.

TUMKUR (PAVAGADA) EXTENSION S/s

3 nos. Switchyard Panel Rooms each of size 3.9X6 sqmt. (Under present scope)

MYSORE EXTENSION S/s

1 No. Switchyard Panel Room of size 3.9X9 sqmt. (Under present scope)

TUMKUR (VASANTNARSAPUR) EXTENSION S/s

1 No. Switchyard Panel Room of size 3.9X6 sqmt. (Under present scope)

Note – 2 nos. AC units with free cooling shall be installed in each Switchyard panel room.

3.0.0 ELECTRICAL SYSTEM REQUIREMENTS

Two nos. power supply units each of 32A, 3Ph shall be provided by BHEL in each of Panel rooms. Any MCB/TPN switch etc required to connect this power supply to AC units shall be supplied and installed by contractor.

Interfacing:

Each Controller shall have the following annunciation locally as well as sufficient potential free contacts to repeat these annunciations to remote display through Sub-station Automation System (SAS)

a) AC Compressor-1 On/Off

b) AC Compressor-2 On/Off

c) Switchyard panel room Temp. High alarm

4.0.0 SCOPE OF SUPPLY & SERVICES

The scope of equipment to be furnished and services to be provided under the contract are outlined hereinafter and the same is to be read in conjunction with the provisions contained in other sections/ clauses. The scope of work under the contract shall be deemed to include all such items, which although are not specifically mentioned in the bid documents and / or in Bidder's proposal, but are required to make the equipment/ system complete for its safe, efficient, reliable and trouble free operation. **NO EXTRA COST** implication to BHEL shall be considered during contract stage on account of supply & installation of these unaccounted items.

4.1.0 SCOPE OF SUPPLY

i. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawings.

ii. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Purchaser and valued at the rates and prices bid in the priced Bill of Quantities.

iii. A rate or price shall be entered against each item in the priced Bill of Quantities. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

iv. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

v. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.

vi. Miscellaneous items like hardware, fixtures etc. shall be deemed to be included under the relevant BOQ items and bidders shall consider the same while quoting for BOQ items.

Bill of Quantity for Airconditioning units in Switchyard Panel Rooms

Sl. No.	Item Description	Unit	Quantity	Sites
1A	Air Conditioning Unit with free cooling of ***2TR*** capacity with microprocessor based Controller for switchyard panel room of size 3.9X6 sqm.	Nos.	08	6 nos. for Tumkur (Pavagada) S/s and 2 nos. for Tumkur (Vasantnarsapur) S/s
1B	Erection, Testing & Commissioning (ETC) for above mentioned 2TR AC Units	Nos.	08	6 nos. for Tumkur (Pavagada) S/s and 2 nos. for Tumkur (Vasantnarsapur) S/s
2A	Air Conditioning Unit with free cooling of ***3TR*** capacity with microprocessor based Controller for switchyard panel room of size 3.9X9 sqm.	Nos.	02	For Mysore S/s
2B	Erection, Testing & Commissioning (ETC) for above mentioned 3TR AC Units	Nos.	02	For Mysore S/s

NOTES:

A. BIDDER SHOULD COMPYL ALL REQUIREMENTS GIVEN IN THIS SPECIFICATION AND ALSO SPECIAL CARE FOR TECHNICAL REQUIREMENT MENTIONED IN THE POWERGID'S SPECIFICATION, CL NO-3 ATTACHED WITH THE SECTION-2 WHILE QUOTING FOR ABOVE ITEMS.

B. ALL COMPRESSORS SHALL HAVE MINIMUM 5 YEARS WARRANTY FROM THE DATE OF COMMISSIONING.

4.2.0 SERVICES TO BE PERFORMED BY CONTRACTOR

4.2.1 Erection, Testing & Commissioning (ETC) requirements

a) The scope of ETC shall include erection, system testing and commissioning of the system. Unloading and storage is excluded from contractor's scope.

b) Laying and termination of power and control cables for the equipment under the scope of this specification.

c) Bidder shall arrange all machinery tools & tackles and consumables required for erection of the system.

d) PVC drain piping for the condensate drain, if required.

e) Refrigerant piping connections, if required.

f) Earthing of all equipments through GI Flat/Wire of suitable size shall be done by contractor, however earthing material shall be supplied by BHEL as a free issue item.

g) Bidder shall ensure that sufficient quantity of commissioning spares is made available for timely completion of commissioning of the system. These commissioning spare shall be in addition to mandatory spares.

h) Submission of following documents for approval.

1. Data sheet for 2TR/3TR Air-conditioning units with free cooling along with catalogue for the model being offered inline with Cl No. 3 of Powergrid's specification
2. Layout showing Location with all wall cut-out details for installation of Air-conditioning units with free cooling in the Panel rooms.

i) Any other service not explicitly illustrated herein but which may be required to complete the system with its desired functionality shall be deemed to be included in the scope of the bidder.

5.0.0 QUALITY & INSPECTION

The inspection of AC units shall be done as per technical specification/ approved technical data sheet/GA before dispatch clearance.

Contractor shall ensure to produce test certificates of AC units inline with technical requirement to satisfy customer.

6.0.0 HANDING & TAKING OVER

After successful commissioning, All the Air-Conditioning units will be put through a run test for a week as per the specification requirement. After successful completion, they will be handed over to customer.

SECTION-2

EQUIPMENT SPECIFICATION

Customer's (POWERGRID) standard specification is attached to this section. Kindly refer the applicable clauses for air conditioning system for switchyard panel room.

TECHNICAL SPECIFICATION FOR

AIR CONDITIONING SYSTEM

TABLE OF CONTENTS

Clause No.	Description	Page No.
1	General	1
2	Air Conditioning System for Control Room Building	1
3	Air conditioning system for switchyard panel rooms.	6

TECHNICAL SPECIFICATION FOR

AIR CONDITIONING SYSTEM

1 GENERAL

1.1 This specification covers supply, installation, testing and commissioning and handing over to POWERGRID of Air conditioning system for the control room building and switch-yard panel rooms.

1.2 Air conditioning units for control room building shall be set to maintain the inside DBT at 24 ^{o} C ± 2^{o}C and the air conditioning system for switch-yard panel rooms shall be set to maintain DBT inside switch-yard panel rooms below 24^{o}C.

1.3 ~~Controllers shall be provided in Control room and Battery room for controlling and monitoring the AC units in these rooms as detailed in clause no.2.3.4.~~

~~1.4~~ ~~Each switch yard panel room shall be provided with temperature transducer to monitor the temperature of the panel room. The Temperature transducer shall have the following specification:~~

~~Sensor~~	~~: Air temperature sensor (indoor use)~~
~~Output~~	~~: 4 to 20mA~~
~~Temperature range~~	~~: -5^{o}C to 60^{o}C~~
~~Resolution~~	~~: 0.1^{o}C~~
~~Accuracy~~	~~: 0.5^{o}C or better.~~

~~2 AIR CONDITIONING SYSTEM FOR CONTROL ROOM BUILDING.~~

~~2.1~~ ~~Air conditioning requirement of control room building shall be met using a combination of following types Air Conditioning units as required.~~

~~a) Ductable Split unit of 8.5TR.~~
~~b) Cassette type split AC units of 3TR.~~
~~c) High wall type split AC units of 2TR.~~

~~2.2~~ ~~**Scope**~~

~~The scope of the equipment to be furnished and services to be provided under the contract are outlined hereinafter and the same is to be read in conjunction with the provision contained in other sections/ clauses. The scope of the work under the contract shall be~~

deemed to include all such items, which although are not specifically mentioned in the bid documents and/or in Bidder's proposal, but are required to make the equipment/system complete for its safe, efficient, reliable and trouble free operation.

2.2.1 Required number of Ductable split type AC units of 8.5 TR capacity with air cooled outdoor condensing unit with semi hermetic/hermetic compressors including refrigerant pipes, controls, thermostats, filters, outlet dampers, etc.

2.2.2 Required number of Cassette type split AC units of 3TR capacity each complete with air cooled outdoor condensing unit having hermetically sealed compressor unit with cordless remote controller.

2.2.3 Required number of High wall type split AC units of 2TR capacity each complete with air cooled outdoor condensing unit having hermetically sealed compressor and high wall type indoor evaporator unit with cordless remote controller.

2.2.4 Copper refrigerant piping complete with insulation between the indoor and outdoor units as required.

2.2.5 First charge of refrigerant and oil shall be supplied with the unit.

2.2.6 GSS/Aluminium sheet air distribution ducting for distributing conditioned dehumidified air along with supply air diffusers and return air grilles with volume control dampers and necessary splitters etc., suitable fixtures for grilles/diffusers and supports for ducting complete with insulation.

2.2.7 Local start/stop facility for local starting/ stopping of all electrical equipment/ drives.

2.2.8 All instruments and local control panels alongwith controls and interlock arrangements and accessories as required for safe and trouble free operation of the units.

2.2.9 PVC drain piping from the indoor units upto the nearest drain point.

2.2.10 Supply and erection of Power and control cable and earthing.

2.2.11 MS Brackets for outdoor condensing units, condensers as required.

2.3 **Technical specifications.**

2.3.1 **Ductable split type AC units.**

2.3.1.1 Each Split Air conditioner shall have an indoor unit and an outdoor unit, designed to provide free delivery of conditioned air to the conditioned space. The indoor unit shall be suitable for mounting on the ceiling concealed above the false ceiling. Outdoor unit can be placed on the roof. Each unit shall include a primary source of refrigeration for cooling and dehumidification, means for circulation and cleaning air.

2.3.1.2 Cabinet

The cabinets housing the components of indoor units & outdoor units shall be of heavy gauge sheet steel and suitable for floor mounting/mounting from ceiling. The access panels shall be of easily removable type. The entire casing shall be lined with 25mm thick insulation of totally flame proof type. Suitable drain connection shall be provided for removal of condensate collected inside a tray under cooling coil.

2.3.1.3 Compressor

The compressor shall be Semi hermetically/hermetically sealed type and complete with drive motor. The compressor shall be mounted on spring inside the lower most section of the unit so that it is easily accessible for servicing.

2.3.1.4 Condenser

Air cooled condenser of adequate surface area shall be offered. The air cooled condenser shall be made of copper tubes with external fins.

2.3.1.5 Air Handling Fan

The air handling fan shall be centrifugal type complete with belt drive and electric motor.

2.3.1.6 Filter

Pre-filter at the suctions to remove dust particles down to 10 micron size with 90% efficiency and fine filters to remove dust particles down to 5 micron size with 99% efficiency at the outlet. All filters shall be of panel type.

2.3.1.7 Cooling Coil

Cooling coils shall be of direct expansion type and made of heavy gauge copper with aluminium fins. Rows shall be staggered in the direction of air flow. Separate tubings from the distributor shall feed refrigerant uniformly to different sections of the coil.

2.3.1.8 ~~Refrigerant Piping~~

~~Refrigerant piping shall be of heavy gauge copper to IS:2501 or IS:1239 heavy class seamless M.S. pipe complete with thermostatic expansion valve, liquid strainer, dehydrator, liquid line shut off valve, high and low pressure gauges.~~

~~2.3.1.9 Condensate Trays~~

~~An adequate method of condensate removal shall be provided. Condensate tray of adequate size, made of corrosion-resistant material or suitably treated with corrosion-resistant coating shall be provided. The tray shall be adequately insulated to avoid condensation over its external surface.~~

~~2.3.1.10 Refrigerant Strainer~~

~~A refrigerant strainer shall be provided in the liquid line immediately before the expansion device.~~

~~2.3.1.11 Vibration Isolator~~

~~A minimum of six 25 thick neoprene rubber pads shall be supplied for each unit.~~

~~2.3.1.12 Cooling capacity of 8.5TR unit shall not be less than 102000 btu/hr.~~

~~2.3.2~~ ~~**Cassette type split AC units**~~.

~~The Cassette type AC units shall be complete with indoor evaporator unit, outdoor condensing units and cordless remote control units.~~

~~2.3.2.1~~ ~~Outdoor unit shall comprise of hermetically/ semi hermetically sealed compressors mounted on vibration isolators, fans and copper tube aluminium finned coils all assembled in a sheet metal casing. The casing and the total unit shall be properly treated and shall be weatherproof type. They shall be compact in size and shall have horizontal discharge of air.~~

~~2.3.2.2~~ ~~Indoor units shall be of 4 way, ceiling mounted cassette type. The indoor unit shall be compact and shall have elegant appearance. They shall have low noise centrifugal blowers driven by suitable motors and copper tube aluminium finned cooling coils. Removable and washable polypropylene filters shall be provided. They shall be complete with multi function cordless remote control unit with special features like programmable timer, sleep mode etc.~~

~~2.3.2.3~~ ~~Cooling capacity of 3TR AC units shall not be less than 36000btu/hr.~~

and their EER shall not be less than 2.7.

2.3.3 **High wall type split AC units**

2.3.3.1 The split AC units shall be complete with indoor evaporator unit, outdoor condensing units and cordless remote control units.

2.3.3.2 Outdoor unit shall comprise of hermetically/semi hermetically sealed compressors mounted on vibration isolators, propeller type axial flow fans and copper tube aluminium finned coils all assembled in a sheet metal casing. The casing and the total unit shall be properly treated and shall be weatherproof type. They shall be compact in size and shall have horizontal discharge of air.

2.3.3.3 The indoor units shall be high wall type. The indoor unit shall be compact and shall have elegant appearance. They shall have low noise centrifugal blowers driven by suitable motors and copper tube aluminium finned cooling coils. Removable and washable polypropylene filters shall be provided. They shall be complete with multi function cordless remote control unit with special features like programmable timer, sleep mode and soft dry mode etc.

2.3.3.4 Cooling capacity of 2TR AC units shall not be less than 22000btu/hr. and shall have energy efficiency rating of 3star or above.

2.3.4 Controllers shall be provided in Control room and Battery room, one controller for each room, to control and monitoring of AC units and shall have the following facilities;

- Standby units shall come in to operation automatically whenthe running main unit fails
- Main and standby units shall be changed over periodically which shall be finalised during detailed engineering.
- Following alarms shall be provided:

a. Compressor On/OFF condition of each unit
b. Compressor failure of each unit
c. Power OFF to AC unit
d. High temperature in room.

2.4 The Split AC units shall be of Carrier, Voltas, Blue Star, Hitachi, Daikin, LG, National, O'General or Samsung make.

2.5 **Warranty**

All compressors shall have minimum 5 years Warranty from the date

~~of commissioning.~~

3 AIR CONDITIONING SYSTEM FOR SWITCHYARD PANEL ROOMS.

3.1 Air conditioning system shall be provided in the switchyard panel rooms used for housing control and protection panels. These panel rooms will be located in the switchyard area and generally unmanned. Therefore, the air-conditioning system shall be rugged, reliable, maintenance free and designed for long life.

3.2 Air conditioning system is required for maintaining the temperature below 24^{o}C for sub-station control and protection panels. This shall be achieved using Packaged AC units with free cooling arrangement as per clause 3.4. The system shall be designed for 24 Hours, 365 Days of the year operation to maintain the inside Switchyard panel rooms temperature for proper operation of the critical equipment.

3.3 Number and rating of the units for each panel room shall be as follows:

i. For panel room of length not more than 6 metres.: 2 nos. (1 working + 1 standby) AC units of 2TR capacity each.
ii. For panel room of length more than 6 metres.: 2 nos. (1 working + 1 standby) AC units of 3TR capacity each.

3.4 Technical specification for Packaged AC units with Free Cooling.

3.4.1 Each AC unit shall be complete with air cooled condensing unit with scroll compressor, direct expansion type evapourating unit and microprocessor controller. AC units shall be provided with free cooling arrangement. In free cooling mode, the refrigerant cycle of AC unit shall be switched off and outside air (after filtration) shall be circulated inside the conditioned space through the operation of dampers provided with suitable sensors. This mode shall come into operation in the following conditions;

i. When the ambient temperature is below a preset value, which is to be decided during detailed engineering.
ii. In case of failure of refrigeration system of both the units.

3.4.2 One of the air-conditioners shall be running at a time and shall maintain the required temperature. On failure of the running air-conditioner, the other air-conditioner shall start automatically. To ensure longer life of the system and to keep the AC units healthy, change over of the standby unit shall be done periodically through

the controller. Further, if inside temperature of the room reaches 35^{o}C due to any emergency condition, the standby air-conditioner shall also start running to maintain the temperature less than 24^{o}C and system shall generate an alarm for such a situation. After achieving this temperature, the standby unit shall again shut off. However any hunting situation shall be reported. No heating or humidification is envisaged for the air conditioning system inside the Switchyard panel rooms.

3.4.3 Packaged AC units with free cooling shall be designed for high sensitive cooling with sensible heat factor of 90% or above.

3.4.4 Each air conditioner shall be completely self-contained. All components of the units shall be enclosed in a powder coated cabinet. The unit shall be assembled, wired, piped, charged with refrigerant and fully factory tested as a system to ensure trouble free installation and start up. Suitable isolation or other by-passing arrangement shall be provided such that any unit/component could be maintained/ repaired without affecting the running standby unit.

3.4.5 The AC units shall be mounted on the wall and the maintenance of unit shall be possible from outside the Switchyard panel room.

3.4.6 Required Features of Various Components

The compressor shall be very reliable, trouble free and long life i.e. hermetically sealed Scroll type of reputed make suitable for continuous operation. Compressor should be installed on vibration isolated mountings or manufacturer's recommended approved mounting. Valve shall be provided for charging/topping up of refrigerant. The bidder shall furnish details of their compressor indicating the MTBF, life of compressor and continuous run time of compressor without failure. The contractor shall also furnish details of all accessories i.e. refrigeration system, evaporator coil, condenser coil, evaporator blower, filter, cabinet, indoor supply and return grill etc. during detailed engineering.

3.5 **Warranty**

All compressors shall have minimum 5 years Warranty from the date of commissioning

3.6 For owner's remote monitoring purposes, necessary digital inputs shall be provided for 'ON' and 'OFF' condition of each compressor.

SECTION-3

PROJECT DETAILS & GENERAL SPECIFICATION

1.0 SITE INFORMATION

Sl No	Particulars	Details
PROJECT DETAILS		
a)	Owner	Power Grid Corporation of India (POWERGRID)
b)	Customer	Power Grid Corporation of India (POWERGRID)
c)	Project Title	Substation Package for Extension of 400kV Tumkur Pooling station (Pavagada) (including transformer & Reactor), Extension of 400/220kV Mysore Substation and Extension of 400/220kV Tumkur (Vasantnarsapur) (Including Transformer) under Transmission System for Ultra Megar Solar Power Park (2000MW) at Tumkur (Pavagada), Karnataka-Phase-II (Part-A)
d)	Location	1. Tumkur (at Pavagada), Karnataka 2. Mysore, Karnataka 3. Tumkur (at Vasantnarsapur) (Existing Madhugiri Substation), Karnataka
e)	Transport Facilities	Road/ Train/Air Connectivity: Nearest Railway Station 1. Tumkur (at Pavagada), Karnataka: Hindupur (AP)/ Bengaluru 2. Mysore, Karnataka: Mysore/ Mysore 3. Tumkur (at Vasantnarsapur) (Existing Madhugiri Substation), Karnataka: Tumkur/ Bengaluru
SITE CONDITIONS		
a)	Max. Ambient air temp.	50°C
b)	Min. Ambient air temp.	0°C
c)	Max. design ambient emp.	50°C
d)	Average Humidity	Shall be provided during detailed engineering.
e)	Special corrosion conditions	Shall be provided during detailed engineering.
f)	Solar Radiation	Shall be provided during detailed engineering.
g)	Atmospheric UV radiation	Shall be provided during detailed engineering.
h)	Altitude above sea level	Less than 1000 meter above sea level (MSL)
i)	Snow Fall	NIL
j)	Seismic Zone	As per IS 1893
k)	Wind Zone	As per IS 875

MAIN ELECTRICAL PARAMETRS:		
a)	Fault Levels	Tumkur (Pavagada) 400kV: 50kA for 1 sec. 220kV: 40kA for 1 sec. Mysore 400kV: 40kA for 1 sec. Tumkur (Vasantnarsapur i.e. existing Madhugiri SS) 400kV: 50kA for 1 sec 220kV: 40kA for 1 sec

SECTION-4

GUARANTEED TECHNICAL PARTICULARS

Following to be submitted by the bidders at the time of the bid which are minimum information, however bidder may also furnish the other important technical details.

1	**Make**	
2.	**Model No. of unit**	
3.	**Capacity**	**2 TR/3TR**
4	**Type of AC**	**Air Conditioning unit with free cooling**
5	**Power Supply**	Three Phase, 32A current rating
6	**Evaporator unit**	As per system requirement
7	**Compressor warranty**	**5 years**
8	**Power supply for fan under free cooling mode (AC or DC)**	**AC**
9	**Refrigerant Piping**	As per system requirement
10	**Filters**	As per system requirement
11	**Programmable timer (Y/N)**	
12	**Sleep Mode(Y/N)**	
13	**Dry mode(Y/N)**	
14	**Dimension of unit**	
15	**Weight of unit**	
16	**Microprocessor Controller (Y/N)**	**Yes**
17	**Annunciation in controller for compressor on and off**	**Yes**
18	**High temperature alarm**	**Yes**
19	**NO/NC contacts in controller for repeating the annunciations of Compressor-1 & 2 On/Off and high temp. inside switchyard panel room**	**Yes**

Company Seal

Signature of the authorized representative of Bidder

Name _____

Designation_____

Place_____

Date _____

SECTION-5

SCHEDULES TO BE FILLED BY THE BIDDER

Schedule 1 Certificate of No Technical Deviation

Schedule 2 Schedule of unpriced quote

Schedule 3 Details of contact person both technical and commercial

Schedule 4 Enclosures to Specification

Drawings

SCHEDULE-1

CERTIFICATE OF NO TECHNICAL DEVIATION

We confirm that there are no deviations whatsoever and our offer is in full compliance with the specification. We also confirm that there are no deviations in any other form such as comments, variations/ GTP and/ or exceptions.

Signature of the authorized representative of Bidder

Name :

Designation :

Place :

Date :

Company Seal

SCHEDULE-2

Bidders shall attach signed and stamped **unpriced** copy of this BOQ with their technical offer:

Sl. No.	Item Description	Unit	Qty	Whether Unit Rates have been furnished in priced bid?
1A	Air Conditioning Unit with free cooling of ***2TR*** capacity with microprocessor based Controller for switchyard panel room of size 3.9X6 sqm.	Nos.	08	YES
1B	Erection, Testing & Commissioning (ETC) for above mentioned 2TR AC Units	Nos.	08	YES
2A	Air Conditioning Unit with free cooling of ***3TR*** capacity with microprocessor based Controller for switchyard panel room of size 3.9X9 sqm.	Nos.	02	YES
2B	Erection, Testing & Commissioning (ETC) for above mentioned 3TR AC Units	Nos.	02	YES

Signature of the authorized representative of Bidder

Name :

Designation :

Place :

Date :

Company Seal

SCHEDULE-3

DETAILS OF CONTACT PERSON BOTH TECHNICAL AND COMMERCIAL

Name

Address for correspondence

Phone No.

Fax No.

Email

Place

Date

Signature of the authorized representative of Bidder

Name----------

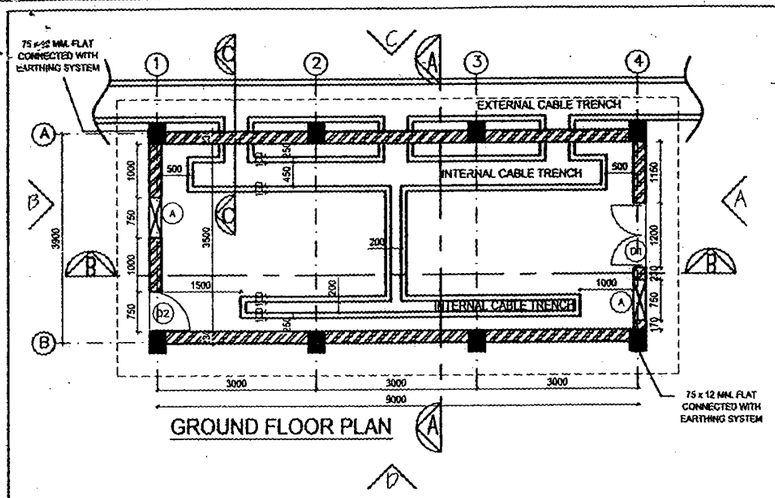
Designation----------

Company seal ----------

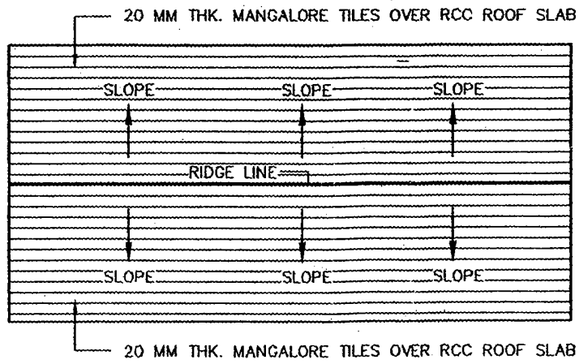
SCHEDULE-4

DRAWINGS

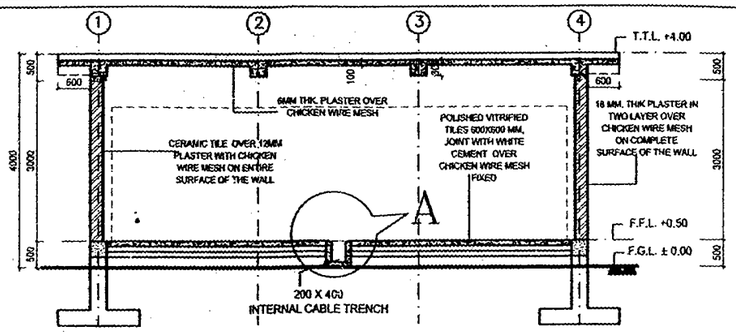
1)Architectural drawing of Switchyard Panel Room (C-ENGG-STD-PR-ARCH-3000)



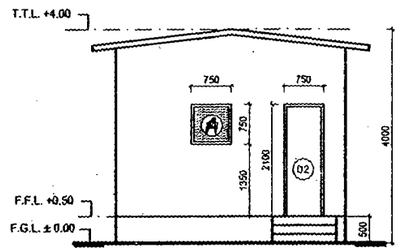
GROUND FLOOR PLAN



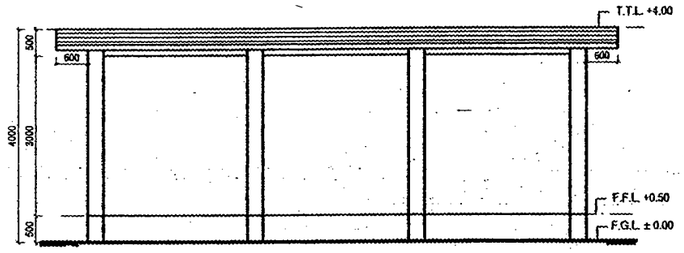
TERACE PLAN



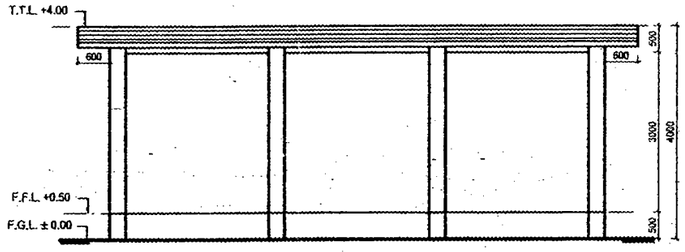
SECTION AT B-B



ELEVATION AT B-B



ELEVATION AT D-D



ELEVATION AT C-C

Door/Window Schedule

Doors

Typ.	Size	Description
D1	1200 x 2400	FIRE PROOF STEEL DOOR
D2	750 x 2100	FIRE PROOF STEEL DOOR

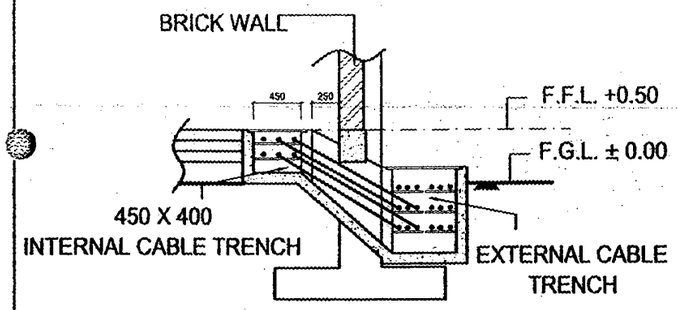
Windows

Typ.	Size	Lintel	Sill	Description
A	750 x 750	2100	1350	OPENING FOR FIXING AC

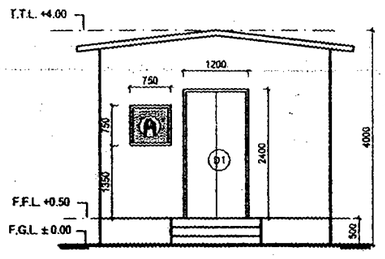
NOTE :-

1. ALL DIMENSIONS ARE IN MM. AND LEVELS ARE IN MTR.
2. OPENINGS ARE PROVIDED FOR INSTALLATION OF ACs. IN CASE ONE AC IS PROVIDED, OTHER OPENING SHALL BE CLOSED.
3. 22G x 12 MM. CHICKEN WIRE MESH TO BE PROVIDED FOR ALL WALL , FLOORING AND ROOF. CHICKEN WIRE MESH SHALL BE CONNECTED WITH EARTHING SYSTEM THROUGH 75 x 12MM FLAT FIXED ON DIAGONALLY OPPOSITE COLUMNS ON ITS OUTER SURFACE

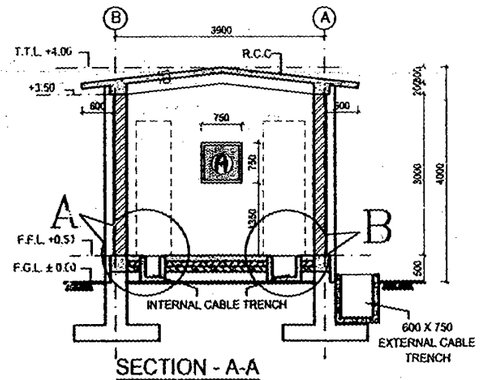
RELEASED FOR TENDER/CONSTRUCTION



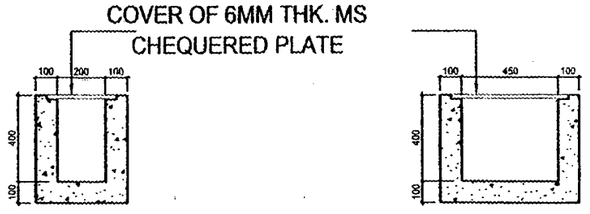
SECTION AT C-C



ELEVATION AT A-A



SECTION - A-A



DETAILS – A

DETAILS – B

REV.	DESCRIPTION	CIVIL.	REVD.	REVD.	MECH.	ELEC.	REVD.	APPD.	DATE.
0.		CLEARED BY							

POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

PROJECT : 400/220 KV SUB-STATION

TITLE : STANDARD SWITCHYARD PANEL ROOM
ARCHITECTURAL DRAWING OF PANEL ROOM

DRAWING NO. C-ENGG-STD-PR-ARCH-3000

SCALE 1:50

REV. 0