



भारतीय प्रबंध संस्थान इन्दौर

प्रबंध शिखर, राऊ-पीथमपुर रोड, इन्दौर - 453 556 (म.प्र.), भारत

INDIAN INSTITUTE OF MANAGEMENT INDORE

Prabandh Shikhar, Rau-Pithampur Road, Indore - 453 556 (M.P.), India

Re-Tender

Re-invitation of notice inviting limited tender for Construction, Installation, testing & commissioning of Electrical control panels and LT cabling, lighting fixtures etc. works at IIM Indore.

Ref: NIT No. IIMI/Project/04/2015/16

The Chief Engineer, IIM Indore on behalf of the Director, IIM Indore invites sealed Item rate limited tender from reputed & eligible contractors/panel manufacturers provided he/they meet the eligibility criteria as stipulated in the NIT fulfilling the pre-qualification criteria enumerated below for the following work and will be received at the office of "The Chief Engineer, Indian Institute of Management Indore, Prabandh Shikhar, Rau - Pithampur Road, Indore 453556 (M.P.)" up to 03.00 P.M. on July 7, 2015. Tender will be opened at 3:30 PM on the same day.

Name of Work	Amount of Estimate (Rs)	Amount of Earnest Money Deposit (Rs.)	Tender processing fee (Rs.)	Time Allowed for Completion
Construction, Installation, testing & commissioning of Electrical control panels and LT cabling, lighting fixtures etc. works at IIM Indore.	28,99,058/-	Nil	Nil	30 Days

2.1 (a) Eligibility criteria: (The necessary annexure are also to be enclosed.)

- i) **The bidder should have valid class 'A' electrical license OR CPRI/ERDA approved type test certificate.**
- ii) **The tenderer should have completed 02 similar works of value 18 lacs OR 03 works of value 12 lacs during last three years (From June 1, 2012 to May 31, 2015).**
- iii) **Documentary proof of service tax no. and PAN need to be enclosed.**

2.1 (b) The tenderer shall be submitted in two different envelopes

- **Envelope 1-Pre qualification document**
- **Envelope 2- Financial bid in the BoQ schedule.**

These two envelopes be put in another envelope and submit/send to the mentioned address.

2.2 IMPORTANT CONTRACT DATA

Important contract data is summarized as under;

2.2.1	Name of work	Construction, Installation, testing & commissioning of Electrical control panels and LT cabling, lighting fixtures etc. works at IIM Indore.
2.2.2	Source of Funds	IIM Indore
2.2.3	Area / District Covered under the Bid	IIM Indore Campus, Indore
2.2.4	Type of work	Construction, Installation, testing & commissioning
2.2.5	Implementation Period	30 Days
2.2.6	Defect liability Period	One year
2.2.7	Communication for Site	Project Office, IIM Indore
2.2.8	Notification of revised Bid	June 26, 2015
2.2.9	Estimated Cost	Rs. 28,99,058/-
2.2.10	Earnest Money Deposit	Nil
2.2.11	Tender Processing Fee	Nil
2.2.12	Form of Securities	N.A.
2.2.13	Bid Validity	Ninety days
2.2.14	Submission of Bid	Up to July 7, 2015 till 3.00 P.M.
2.2.15	Opening of the Bid (Date & time)	July 7, 2015 at 3.30 P.M.
2.2.16	Place of Opening of Bids	Project Department, IIM Indore (M.P.)
2.2.17	Performance Guarantee	<p>The successful tenderer, after award of work will be referred to as the contractor, shall deposit an amount equal to 5% of the tendered and accepted value of the work (without limit) as performance guarantee in one of the following forms:</p> <p>(i) Government securities.</p> <p>(ii) Fixed Deposit Receipt (FDR) of a Scheduled Bank.</p> <p>(iii) An irrevocable bank guarantee bond of any scheduled bank or the State Bank of India in the prescribed form given in</p>

		Annexure. Within a period ranging of 10 days of issue of the letter of acceptance. This period can be further extended at the written request of the contractor by the Engineer-in-charge for a maximum period of 15 days with late fee @ 0.1% per day, of performance guarantee amount. The letter for commencement of work shall be issued to the contractor only after he/she submits the performance guarantee in an acceptable form.
2.2.18	Security Deposit	The security deposit shall be collected by deductions from the bill of the contractors a sum @ 2.5% of the gross amount of the bill. Such deductions shall be made unless the contractor has deposited the amount of security at the rate mentioned in Government securities or Fixed Deposit Receipts. This is in addition to the performance guarantee that the contractor is required to deposit. And this shall be retained till the defect liability period.
2.2.19	Contract Agreement	At the time of notification of award, the contractor shall arrange supply of non-judicial stamp paper of value Rs.100/- or as per the rules/regulation of the local Govt. and execute the Contract Agreement with in 10 days.
2.2.20	Other	<p>a) The successful bidder shall submit a power of attorney authorizing the signatory of the bid to sign and execute the contract.</p> <p>b) The bidder shall have to provide PAN No. Under income tax Act.</p> <p>c) Contractor shall be agreeable with the conditions as mentioned in the document.</p> <p>The bidder shall have the EPF A/C No, if applicable.</p>

3.1 LATE BIDS:

Any bid received by the Employer after the deadline of submission of bids prescribed in clause 2.2.14 will be returned unopened to the bidder.

3.2 Other conditions

- 3.2.1 The specifications, Terms & Conditions, other regulations which are not herein mentioned will be guided by relevant CPWD / BIS /Other Central Govt. norms applicable for IIM Indore & the decision in this regard will be guided by the decision of the respective authority of IIM Indore which shall be final and binding to the contractor.
- 3.2.2 For any amendments or additional information in respect of this notification will be published only in the website <http://www.iimidr.ac.in/iimi/index.php/tenders> under the caption "Construction, Installation, testing & commissioning of Electrical control panels and LT cabling, lighting fixtures etc. works at IIM Indore."
- 3.2.3 For any further details, please contact to the Project Department, IIM Indore. Phone no. 0731-2439620.

TECHNICAL SPECIFICATIONS FOR ELECTRICAL CONTROL PANEL

1. SCOPE:

This scope shall cover design, manufacture, check test, and supply, installation, testing and commissioning of electrical control panel as described in this specification as per drawings and schedule of quantities.

Panels shall be supplied with the following:

- a) Complete switchgears as per approved drawing, BOQ, bus bar, enclosure and metering and controlling accessories.
- b) The base channel frame with hardware, nuts, bolts, washers etc.
- c) Commissioning spares.
- d) All relevant drawings, data and instruction manuals.

1.2 GENERAL SPECIFICATIONS:

- 1.2.1 The Panels shall be metal clad, totally enclosed, rigid, floor mounting, air insulated, cubicle type suitable for operation on three phase, 415 V, 50 Hz., and short circuit level as mentioned in the drawings. The indoor panel shall have IP55 protection class construction. The painting of all the metal part shall be as per the painting specification defined in specification.
- 1.2.2 Panels shall be designed to withstand heaviest condition at site, with maximum expected ambient temperature of 50° c., 100% humidity and salty, dusty weather.

1.3 STANDARDS AND CODES:

The Panels shall comply with the latest edition of relevant Indian Standards and Indian Electricity Rules and Regulations. The following Indian standards shall be complied with:

- IS: 4237 - General requirements for switchgear and control gear for Voltages not exceeding 1000 V AC or 1200 V D.C.
- IS: 375 - Switchgear bus bars, main connection and auxiliary wiring, marking etc.
- IS: 2147 - Degree of protection provided by enclosures for Low voltage switchgear and control gear.
- IS: 8197 - Terminal marking for electrical measuring instrument and their accessories.
- IS: 2551 - Danger notice plates
- IS: 10118 - Code of Practice for selection, installation and maintenance of switchgear and control gear.
- IS: 8623 - Specification for factory built assemblies of switchgear and control gear for voltage up to and including 1000 V AC and 1200 V D.C.
- IS: 8828 - Miniature circuit breakers.
- IS: 2705 - Current transformers
- IS: 3155 - Voltage transformer
- IS: 3231 - Electrical relay
- IS: 1248 - Indicating instruments
- IS: 722 - Integrating instruments
- IS: 6875 - Control switches and push buttons

IS: 1822 - AC motor starters of voltage not exceeding 1000 V Indian Electricity Act and Rules (as amended up to date) and approval of FIA of India.

1.4 **DESIGN CRITERIA:**

The electrical control Panel shall be used to control the pumps at pump houses and Air conditioning outdoor units at terrace of Admin Block and Visiting faculty Block at IIM Indore. The Air conditioning outdoor units control panel shall be of double door type with IP 65 Protection class. The above panel will be installed at terrace of the buildings.

For continuous operation at specified ratings, the temperature rise of various equipment / components shall be limited to the permissible values stipulated in relevant standards and/or this specification.

All equipment and components thereof shall be capable of withstanding the mechanical forces and thermal stresses of the short circuit currents listed in the Appendices without any damage or deterioration of the materials.

If required, surge protective devices shall be included in the scope of supply to limit over voltage.

1.5 **CONSTRUCTION:**

CUBICLE TYPE PANELS:

a) **STRUCTURE:**

The Panel shall be metal clad enclosed and be fabricated out of high quality CRCA sheet, suitable for indoor installation having dead front operated and floor mounting type. The design construction shall be such as to allow extension at either end.

All CRCA sheet steel used in the construction of Panels shall be 2 mm. thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet steel shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal. The Panels shall be totally enclosed, completely dust and vermin proof, conforming to degree of protection IP-55. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be fully gasketed with neoprene rubber in single piece, joint less and shall be lockable.

All panels and covers shall be properly fitted and secured with the frame and holds in the panel correctly positioned. Fixing screws shall enter into holes, taped into an adequate thickness of metal or provided with bolts and nuts. Self-threading screws shall not be used in the construction of Panels. A base channel of 75 mm x 40 mm. shall be provided at the bottom. A clearance of 300 mm. between the floor of the Panels and the bottom of the lower most units shall be provided.

Panels shall be preferably arranged in multi-tier formation. The Panels shall be of adequate size with 20% space to accommodate possible future additional switchgear. The size of the Panels shall be designed in such a way that the internal space is sufficient for hot air movement and the electrical component does not attain temperature more than 45°C. All the electrical component shall be rated for 50°C.

Knock out holes of appropriate size and number shall be provided in the Panels in conformity with the number, and the size of incoming and outgoing cables.

Alternately, the Panels shall be provided with removable sheet steel plates at top and bottom to drill

holes for cable entry at site.

The Panels shall be designed to facilitate easy inspection, maintenance and repair. The panels shall be sufficiently rigid to support the equipment without distortion under normal and under short circuit condition. They shall be suitably braced for short circuit duty.

1.6 PROTECTION CLASS:

The Panel shall have protection class of IP 55 or IP65 as mentioned in BoQ..

1.7 PAINTING

The painting shall be with powder coated after proper cleaning, seven tank process Siemens gray (RAL-7032) colour Paint shade powder coated. The thickness of painting shall be between 70-80 microns.

1.8 CIRCUIT COMPARTMENTS:

Each circuit breaker and switch fuse unit shall be housed in separate compartments and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly interlocked with the breaker / switch fuse unit in `ON` and `OFF` position. Safety interlocks shall be provided for air circuit breaker to prevent the breaker from being drawn out when the breaker is in `ON` position.

The door shall not form an integral part of draw out position of the circuit breaker. All instruments and indicating lamp shall be mounted on the compartment door. Sheet steel barriers shall be provided between the tiers in a vertical section.

1.9 INSTRUMENT COMPARTMENTS:

Separate adequate compartment shall be provided for accommodating instruments, indicating lamps, control contactors / relays and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker / switch fuse unit, busbar and connections.

1.10 BUSBARS:

The busbar shall be air insulated and made of high quality, high conductivity, high strength Aluminium. The busbar shall be of 3 phases and neutral system with separate neutral and earth bar. The bus bar and interconnection between bus bars and various components shall be of high conductivity Aluminium. The busbar shall be of rectangular cross-section designed to withstand full load current for phase bus bars and half rated current for neutral bus bars and shall be extensible on either side. The busbar size shall be as per drawing. The busbar shall have uniform cross-section throughout the length.

The bus bars and interconnections shall be insulated with heat shrinkable PVC sleeve and be colour coded in red, yellow, blue and black to identify the 3 phases and neutral of the system if specified in datasheet. The busbar shall be supported on unbreakable, non-hygroscopic SMC insulated supports at sufficiently close intervals to prevent bus bars sag and shall effectively withstand electromagnetic stresses in the event of fault level of 50KA.

The bus bar shall be housed in a separate compartment. The bus bar shall be isolated with 3 mm thick Bakelite sheet to avoid any accidental contact. The bus bar shall be arranged such that minimum clearance between the bus bars to be maintained as below:

Between phases	: 25 mm minimum
Between phase and neutral	: 25 mm minimum

Between phases and earth	: 25 mm minimum
Between neutral and earth	: 20 mm minimum

Minimum current rating for vertical bus-bars shall not be less than 2000A.

All bus bar connections shall be done by drilling holes in bus bars and connecting by chromium plated or tinned plated brass bolts and nuts. Additional cross-section of bus bar shall be provided in all Panels to cover up the holes drilled in the bus bar. Spring and flat washers shall be used for tightening the bolts.

All connections between bus bars and circuit breakers / switches and cable terminals shall be through Aluminium strips of proper size to carry full rated current. These strips shall be insulated with insulating tapes.

1.11 ELECTRICAL POWER AND CONTROL WIRING CONNECTION:

- i. Terminal for both incoming and outgoing cable connections shall be suitable for 1100 V grade, Aluminium / copper conductor PVC insulated and sheathed, armoured cable and shall be suitable for connections of solderless sockets for the cable size as indicated on the relevant drawings of the Panels.
- ii. Power connections for incoming feeders of the main Panels shall be suitable for 1100 V grade Aluminium conductor (LT XLPE/PVC) cables.
- iii. Both control and power wiring shall be brought out in cable alley for ease of external connections, operation and maintenance.
- iv. Both control and power terminals shall be properly shrouded.
- v. 10% spare terminals shall be provided on each terminal block. Sufficient terminals shall be provided on each terminal block, so that not more than one outgoing wire is connected per terminal.

Terminal strips for power and control shall preferably be separated from each other by suitable barriers of enclosures.

- vi. Wiring inside the modules for power, control, protection and instruments etc. shall be done with use of 660 / 1100 V grade, PVC insulated copper conductor cables conforming to IS : 694 and IS : 8130. Power wiring inside the starter module shall be rated for full current rating of respective contactor, but not less than 4.0 sq.mm. Cross-section area. For current transformer circuits, 2.5 sq.mm. Copper conductor wire shall be used. Other control wiring shall be done with 1.5 sq.mm. copper conductor wires. Wires for connections to the door shall be flexible. All conductors shall be crimped with solderless sockets at the ends before connections are made to the terminals.
- vii. Control power wiring and indicating lamps shall be protected by MCB.
- viii. Particular care shall be taken to ensure that the layout of wiring is neat and orderly. Identification ferrules shall be fitted to all the wire termination for ease of identification and to facilitate checking and testing.
- ix. Spring type washers shall be used for all copper and aluminium connections.
- x. Final wiring diagram of the Panels power and control circuit with ferrules numbers shall be submitted along with the Panels as one of the documents against the contract.

1.12 TERMINALS:

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformers for instruments metering shall be mounted on the disconnecting type terminal blocks. No direct connection of incoming or outgoing cables to internal components of the distribution board is permitted; only one conductor may be connected in one terminal.

1.13 WIREWAYS:

Horizontal PVC wire way with screwed covers shall be provided at the bottom/top to take interconnecting control wiring between different vertical sections.

1.14 CABLE COMPARTMENTS:

Cable compartments of adequate size shall be provided in the Panels for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate supports shall be provided in the cable compartments to support cables. All outgoing and incoming feeder terminals shall be brought out to terminal blocks in the cable compartment.

1.15 EARTHING:

i) GI earth bus of adequate size shall be provided in the Panels for the entire length of the panel. The framework of the Panels shall be connected to this earth bar. Provisions shall be made for connection from this earth bar on both sides of the panels to the main earthing bar coming from the earth pit. Door earthing shall be provided for all the compartments.

ii) The earth continuity conductor of each incoming and outgoing feeder shall be connected to this earth bar. The armoured shall be properly connected with earthing clamp, and the clamp shall be made for connection from this earth pit on both sides of the Panels.

iii) The earth continuity conductor of each incoming and outgoing feeder shall be connected to this earth bar. The armour shall be properly connected with earthing clamp, and the clamp shall be ultimately bonded with the earth bar.

1.16 LABELS:

Engraved metal labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangements of circuit inside the distribution board shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet.

1.17 NAME PLATE:

A name plate with the Panel's designation in bold letters shall be fixed at top of the central panel. A separate name plate giving feeder details shall be provided for each feeder module door.

Inside the feeder compartments, the electrical components, equipment, accessories like switchgear, control gear, lamps, relays etc. shall suitably be identified by providing stickers.

Engraved name plates shall preferably be of 3 ply, (Red-White-Red or Black-White-Black) lamicol sheet. However, black engraved Perspex sheet nameplates shall also be acceptable. Engraving shall be done with square groove cutters.

Name plate shall be fastened by counter sunk screws and not by adhesives.

1.18 DANGER NOTICE PLATES:

The danger notice plate shall be affixed in a permanent manner on operating side of the Panels.

The danger notice plate shall indicate danger notice both in Hindi and English and with a sign of skull and bones.

The danger notice plate, in general, shall meet the requirements of local inspecting authorities. Overall dimensions of the danger notice plate shall be 200 mm. wide x 150 mm. high.

The danger notice plate shall be made from minimum 1.6 mm. thick mild steel sheet and after due pre-treatment to the plate, the same shall be painted white with vitreous enamel paint on both front and rear surface of the plate.

The letters, the figures, the conventional skull and bones etc. shall be positioned on plate as per recommendation of IS: 2551-1982.

The said letters, the figures and the sign of skull and bones shall be painted in signal red colour as per IS: 5-1978.

The danger plate shall have rounded corners. Location of fixing holes for the plate shall be decided to suit design of the Panels.

The danger notice plate, if possible, should be of ISI certification mark.

Suitable Voltage rated rubber mats to be provided.

1.19 INTERNAL COMPONENTS:

- a) The Panels shall be equipped complete with all types of required number of Air circuit breaker, MCCB, MCB, contactors, relays, fuses, meters, instruments, indicating lamps, push buttons, equipment, fittings, bus bars, cable boxes, cable glands etc. and all the necessary internal connections / wiring as required and as indicated on relevant drawings. Components necessary for the proper and complete functioning of the Panels but not indicated on the drawings shall be supplied and installed on the Panels.
- b) All parts of the Panels carrying current including the components, connections, joints and instruments shall be capable of carrying their specified rated current continuously, without temperature rise exceeding the acceptable values of the relevant specifications at the part of the Panels.
- c) All units of the same rating and specifications shall be fully interchangeable.

1.20 COMPONENTS:

GENERAL:

The type, size and rating of the components shall be as indicated on the relevant drawings. While selection of the capacity of the components resulting from the prevailing conditions like ambient temperature shall be allowed for. The thermal and magnetic triprating shall be compensated for the ambient temperature. The ratings indicated on the drawing are ratings anticipated at prevailing site conditions.

MINIATURE CIRCUIT BREAKERS:

Miniature Circuit breakers shall be current limiting type conformed with British standard BS: 3871 (Part I) 1965 and IS: 8825. The housing of MCBs shall be heat resistant and having high impact strength. The fault current of MCBs shall not be less than 10 KA at 240 V. The MCBs shall be flush mounted and shall be provided with trip free manual operating mechanism with mechanical 'ON' and 'OFF' indications.

The circuit breaker dollies shall be of the trip free pattern to prevent closing the breaker on a faulty circuit.

The MCB contacts shall be silver nickel and silver graphite alloy and tip coated with silver. Proper arc chutes shall be provided to quench the arc immediately. MCBs shall be provided with magnetic fluid plunger release for over current and short circuit protection. The overload or short circuit device shall have a common trip bar in the case of DP,TP and TPN miniature circuit breakers. All the MCBs shall be tested and certified as per Indian Standards, prior to installation.

FUSE:

Fuses shall be of high rupturing capacity (HRC) fuse links and shall be in accordance with IS: 2000-1962 and having high rupturing capacity of not less than 35 MVA at 415 V. The back-up fuse rating for each motor / equipment shall be so chosen that the fuse does not operate on starting of motors / equipment. HRC fuses shall be of the make as specified in Make of Material.

AIR CIRCUIT BREAKER:

CONSTRUCTION:

The ACBs shall have following features:

- Motorised with 240 V A.C. motor.
- 240 V A.C closing and shunt trip coil.
- Electrical Draw out type with "service", "test", "isolated" and "maintenance" position.
- Safety shutter of Fibre glass / polycarbonate sheet of 2mm thickness shall be provided.
- Safety shutter of Fibre glass / polycarbonate sheet of 2mm thickness shall be provided.
- Mechanically trip free plus anti-pumping feature is to be provided.
- Electrical trip free plus anti pumping shall be provided with relay ONLY and not by contactors.
- Electrical/Mechanical operation counter shall be provided.
- Door interlock with defeat features to be provided.
- ACB shall be lockable in isolation position.

RELEASE:

- Release shall be direct acting type, tripping ACB mechanically.
- Short circuit, overload and earth fault protection shall be provided.

ACB PERFORMANCE:

- ACB performance inside panels at ambient 45°C.
- Symmetrical breaking, 50KA.
- Making capacity peak 125 KA.
- Short time rating, 1sec. 50KA

MOULDED CASE CIRCUIT BREAKER:

- The moulded case circuit breaker (MCCB) shall be air break type and having quick make - quick break with trip free operating mechanism.
- Housing of the MCCB shall be of heat resistant and flame retardant insulating material.
- Operating handle of the MCCB shall be in front and clearly indicate ON/OFF/TRIP positions.
- The electrical contact of the circuit breaker shall be of high conducting non deteriorating silver alloy contacts.
- The MCCB shall be provided with microprocessor based release and electromagnetic short circuit protection device. All the releases shall operate on common trip busbar so that in case of operation of any one of the releases in any of the three phases, it will cut off all the three phases and thereby single phasing of the system is avoided.
- The MCCB wherever called for in the appended drawings shall provide an earth fault relay.
- The electrical parameters of the MCCB shall be as per the description given in BOQ/ relevant drawings.

CONTACTORS:

The contactors shall meet with the requirements of IS: 2959 and BS: 775.

The contactors shall have minimum making and breaking capacity in accordance with utilization category AC3 and shall be suitable for minimum Class II intermittent duty.

If the contactor forms part of a distribution board then a separate enclosure is not required, but the installation of the contactor shall be such that it is not possible to make an accidental contact with live parts. Each Contactor shall be provided with at least two (2) normally open and two (2) normally closed auxiliary contacts rated 10 A at V A.C

CURRENT TRANSFORMER:

Where ammeters are called for C.T.s shall be provided for current measuring. Each phase shall be provided with separate current transformer of accuracy Class 1 and suitable VA burden for operation of associated metering and controls. Current transformer shall be in accordance with IS: 2705 - 1964 as amended upto date.

Accuracy class of the current transformers shall be:

- Class PS for differential protection.
- Class 5P20 for other protection
- Class 1.0 ISP < 5 for metering

PUSH BUTTONS:

Push button shall be heavy duty, push to actuate type with integral escutcheon plate marked with its function. The contacts shall be of silver alloy and rated at 10 Amps. continuous current rating. The actuator shall of standard type and colour as per its usage for ON, OFF and TRIP.

INDICATING LAMPS:

Indicating lamps shall be of LED type, low voltage rated and shall be supplied complete with translucent covers to diffuse the lamplight.

Colour shade for the indicating lamps shall be as below – the LED shall be 22.5 mm and self coloured:

ON indicating lamp : Red

OFF indicating lamp : Green
TRIP indicating lamp : Amber
PHASE indicating lamp : Red, Yellow, and Blue

Digital Multi Function Meter:

The meter shall be of digital type with RS485 port. It should measure KW, KVA, KVAR, V, I, PF, Hz etc.

1.21 SHOP DRAWINGS:

Prior to fabrication of the Panels, the supplier / contractor shall submit the shop drawings in three sets for approval. The shop / vendor drawing consisting of G.A. drawing, sectional elevation, single line diagram, bill of material etc. and design calculations indicating type, size, short circuit rating of all the electrical components used, busbar size, internal wiring size, Panels dimension, colour, mounting details etc. The contractor shall submit manufacturer's catalogues of the electrical components installed in the Panels.

1.22 INSPECTION:

At all reasonable times during production and prior to transport of the Panels to site, the supplier / contractor shall arrange and provide all the facilities at their plant for inspection.

1.23 TEST CERTIFICATES:

Testing of Panels shall be carried out at factory and at site as specified in Indian standards in the presence of Client. The test results shall be recorded on a prescribed form and to be submitted to IIM Indore.

TECHNICAL SPECIFICATIONS FOR LIGHT FIXTURES

SCOPE:

Scope of work under this section shall include supply inspection / testing at suppliers / manufacturers premises at site, receiving at site, safe storage, transportation from point of storage to point of erection, erection and commissioning of light fittings, fixtures and accessories for back of the house area including all necessary supports, brackets, down rods and painting etc. as required.

STANDARDS:

The lighting and their associated accessories such as lamps, reflectors, housings, ballasts etc., shall comply with the latest applicable standards, more specifically the following:

Electric light fittings General and Safety requirements IS - 1913

Industrial lighting fittings with metal reflectors- IS - 1777

Decorative lighting outposts- IS - 5077

Flood lights IS - 10322 (Part-5, Section 5)

Luminaries for street lighting IS - 10322

Bayonet lamp holders IS - 1258

Bi-pin lamp holders for tubular- fluorescent lamps IS - 3323

Ballasts for use in fluorescent light fittings IS - 1534

Starters for fluorescent lamp IS - 2215

Ballast for HP MV lamps IS - 6616

Capacitors for use in fluorescent, HPMV & LP

Sodium Vapour lamps circuits IS - 1569

Tubular Fluorescent lamps IS – 2418
High pressure mercury vapour lamps IS – 9900
Tungsten filament general electric lamps IS – 418

LIGHT FITTINGS-GENERAL REQUIREMENTS

- a) Fittings shall be designed for continuous trouble free operation under atmospheric conditions without reduction in lamp life or without deterioration of materials and internal wiring. Outdoor fittings shall be weather-proof and rain proof.
- b) Fittings shall be so designed as to facilitate easy maintenance including cleaning, replacement of lamps / starters etc.
- c) All fittings shall be supplied complete with lamps. All mercury vapour and sodium vapour lamp fittings shall be complete with accessories like ballasts, power factor improvement capacitors, starters, etc. Outdoor type fittings shall be provided weather proof boxes.
- d) Fluorescent lamp fittings shall be complete with all accessories like ballasts, power factor improvement capacitors, starter's capacitors for correction of stroboscopic effect.
- e) Each fitting shall have a terminal block suitable for loop out connection by 1100V PVC insulated copper conductor wires up to 4 Sq.mm. the internal wiring should be completed by the manufacturer by means of standard copper wire and terminated on the terminal block.
- f) All hardware used in the fitting shall be suitably plated or anodized and passivated.
- g) Earthing Each lighting fitting shall be provided with an earthing terminal. All metal or metal enclosed parts of the housing shall be bonded and connected to the earthing terminal so as to ensure satisfactory earthing continuity throughout the fixture.
- h) Painting/Finish All surfaces of the fittings shall be thoroughly cleaned and degreased and the fittings shall be free from scale, rust, sharp-edges, and burrs.
- i) The housing shall be stove-enameled or anodized as required. The surface shall be scratch resistant and shall show no sign of cracking or flaking when bent through 90 deg. over 12 mm dia mandrel.

Decorative Type Fittings:

Decorative fluorescent fittings shall be provided with mounting / housing channel cum reflectors of CRCA sheet steel. Stove enamelled diffusers or, louvers shall be translucent white polystyrene.

Accessories for Light Fittings Reflectors:

The reflectors shall be made of CRCA sheet steel / aluminium / silvered glass / Chromium plated sheet copper as required. The thickness of reflectors shall be as per relevant standards. Reflectors made of steel shall have stove enamelled/epoxy coating finish. Aluminium used for reflectors shall be anodized/epoxy stove enamelled / mirror polished. The finish for the reflector shall be as specified. Thereflectors shall be free from scratches / blisters and shall have a smooth and glossy surface having optimum light reflecting coefficient. Reflectors shall be readily removable from the housing for cleaning and maintenance without use of tools.

Lamp/Starters Holders:

Lamp holders shall have low contact resistance and shall be resistant to wear. They shall hold lamps in position under normal conditions of shock and vibration prevalent in an industrial atmosphere.

Lamp holders for fluorescent lamps shall be of spring loaded bi-pin roar type. Live parts of the lamp shall not be exposed during insertion of removal of the lamp or after the lamp has been taken out.

Lamp holders for incandescent and mercury vapour lamps shall be bayonet type up to 100 W and Edison screw type for higher wattages.

Starter holders for fluorescent lamps shall be so designed that they are mechanically robust and shall be capable of withstanding shocks during transit, installation and use.

Ballasts:

The ballasts shall be designed for long life and low power loss. They shall be mounted using self-locking, anti-vibration fixtures and shall be easy to remove without dismantling the fittings. The enclosures shall be dust tight and non-combustible.

Ballasts shall be inductive, heavy duty type, filled with thermosetting, insulating, moisture repellent polyester compound filled under pressure of vacuum. Ballasts shall be provided with taps to set the voltage. The ballast wiring shall be of copper and they shall be free from dust. Separate ballast shall be provided in case of multi lamp fittings, except in case of 2 x 20 W fittings.

Starters:

Starters shall have bi-metal electrodes and high mechanical strength. Starters shall be replaceable without disturbing the reflector of lamps and without use of any tool. Starters shall have brass contacts and radio interference capacitor.

Capacitors:

The capacitors shall have a constant value of capacitance and shall be connected across the supply of individual lamp circuits.

The capacitor shall have a value of capacitance so as to correct the power factor of its corresponding lamps circuit to 0.95 lag or better. Capacitor shall be hermetically sealed preferably in a metal enclosure to prevent seepage of impregnant and ingress of moisture.

Lamps:

Incandescent lamps shall be clear type unless otherwise specified. Fluorescent lamps shall be "day-light colour" type unless otherwise specified and shall be provided with features to avoid blackening of lamp ends.

ALL lamps shall be colour corrected type.

Lamps shall be capable of withstanding vibrations prevalent in an atmosphere and connection at bend in wires and filament / electrodes shall not break under such circumstances.

PL lamps shall be energy effective compact single ended light sources in 9 to 11W ratings consisting of two narrow glass tubes welded together.

The lamp shall be complete with integral glow switch starter and capacitor and two pin electrical connections.

The lamp shall be colour rendered to give warm colour impression. The lamp shall have a long life and shall be energy efficient.

INSTALLATION:

The light fixtures and fittings shall be assembled and installed in position complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the construction manager / consultants. Pendant fixtures specified with overall stem lengths are subject to change and shall be checked with conditions on the job and installed as directed. All suspended fixtures shall be mounted rigid and fixed in position in accordance with drawings, instruction and to the approval of the construction manager / consultants. Fixtures shall be suspended true to alignment, plumb level and capable of resisting all lateral and vertical forces and shall be fixed as required.

All suspended light fixtures, fans etc, shall be provided with concealed suspension arrangement in the concrete slab / roof members. It is the duty of the contractor to make these provisions at the appropriate stage of construction. Exhaust fans shall be fixed at location shown on drawings. They shall be wired to a plug socket outlet at a convenient location near the fan. All switch and outlet boxes, for fans and light fittings shall be bonded to earth. The recessed type fixtures shall not be supported into the false ceiling frame work. This shall have independent from the socket of ceiling using conduit down rods / steel chain with provision for adjusting the level of fitting. Wires shall be connected to all fixtures through connector blocks. Wires brought out from junction boxes shall be encased in flexible pipes for connecting fixtures concealed in suspended ceiling. The flexible pipes shall be check-nut to the junction box with a brass bush. Double check nut at the fixture and flexible pipes, wherever used shall be of make and quality approved by the engineer in-charge.

LIST OF APPROVED MAKES

S.No.	ITEMS	APPROVED MAKES
1.	PVC pipes/trunking and accessories	Precision/Avonplast/Grand/AKG/ Kundan cab/Modi
2.	FRLS Copper multi-strand wires	Polycab/Finolex/KEI/RR KABEL
3.	Air circuit breaker (ACB)	Schneider/L&T/ Legrand/Siemens/ ABB/GE
4.	MCB/MCCB/RCCB/ELCB	Schneider/L&T/ Legrand/ Siemens /ABB/GE
5.	Industrial sockets	Legrand/Schneider/L&T
6.	Cable jointing lugs	Raychem/CCI- Xicom/Cabseal/Mseal/Denson
7.	U.G. Cables	Polycab/Finolex/KEI/RR KABEL
8.	Cable glands	Dowels/Braco/Siemens/Comet/Jainco
9.	Capacitor	Schneider/L&T/ ABB/ Siemens
10.	CT's/PT's	AE/Kappa/Pragati/Megavin/Reco
11.	APFC relay	L&T/Emerson/Alstom/GEC
12.	Contractor/timer/starter	L&T/Cuttler/ Schneider/ ABB/Siemens
13.	Ammeter/voltmeter/multifunction meter/frequency meter/power factor meter/ Indicating Lamp	AE/Rishab/Conzerve/ ABB/L&T/ Elmeasure
14.	LT panel/APFC Panel Manufacturer	CPRI/ERDA approved manufacturer
15.	Lighting Fixture	Wipro/Philips/CG/Bajaj

Schedule of Quantity

Name of Work: - Construction, Installation, testing & commissioning of Electrical control panels and LT cabling, lighting fixtures etc. works at IIM Indore

S.No.	Description	Unit	Qty	Rate (Rs.)		Amount (Rs.)	
				In figures	In words	In figures	In words
1	<p>Electrical control panel (For Fire pumps at Admin Block)</p> <p>Design, Fabrication, Supply, Erection, Testing and commissioning of Powder coated Main Distribution Panel fabricated out of 14 gauge CRCA sheet steel in cubical, compartmentalized, free standing floor /wall mounted, dust and vermin proof, with reinforcement of suitable size angle iron, channel, T -iron or flats as required. Single door, inbuild locking arrangement and mounted with following accessories and their connection etc. panel should be in front side openable and Cable gland plates shall be provided on top as well as bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specification and duly painted with powder coated paint double coat. Panels shall be suitable for 415V, 3-Phase, Four wires, 50 Hz supply complete with earth bus and lifting hooks as required. Approval shall be taken for each panel before fabrication. (All hardware like nuts and bolts used shall be Galvanized and Zinc passivated) (IP54 Protection).</p>	Set	1				
	INCOMING						
	1 No - 320 Amps, 3P,50 KA, MCCB						
	BUS BAR						
	1 Set- 400 Amps TPN Aluminium Bus bar.						
	INSTRUMENTS						
	01 set -Logic controller - Modicon M238 - 20 to 248 I/O, 0.3 μs per Instruction (Schneider Cat No. TM238LDD24DT)						

01 Nos.- SMPS 3A,24 Volt					
01 Nos. - relay board,8 channel,24 Volt DC 5A					
8 sets of Red and Green flush type push button.					
2 No. of CFL lamp with Holder, door switch and fuse					
2 Nos of Earth bus 50 x 6 mm GI Strips					
Terminal Block					
3Ph VAF, Class 1, 5A Digital voltmeter, Ammeter, frequency meter with built in selector switch					
3 Nos.-LED type, RYB indicating lamps with 2Amps,C -Curve ,10 KA,SP MCB's					
8 Nos. of each -LED type ON/OFF/TRIP indicating lamp with 2Amps,C -Curve ,10 KA,SP MCB's for control					
3 Nos. -300/5 A, 15 VA, CL1 Current Transformer, cast resin type					
OUTGOINGS					
Star Delta Starter					
3 Nos. - 63Amps, 3P, 10 KA, MCB, C- Curve					
9 No -32 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
3 Nos.- 20-33 Amp Direct Mounting Thermal overload relay					
3 Nos. - 80Amps, 3P, 50 KA, MCCB					
9 No -45 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
3 Nos.- 30-50 Amp Direct Mounting Thermal overload relay					
6 Nos. Star Delta Timer					
DOL starter					

	2 Nos. - 16Amps, 3P, 10 KA, MCB, C- Curve					
	2 No -12 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
	2 Nos.- 4.5-7.5 Amp Direct Mounting Thermal overload relay					
	1 Nos. - 100Amps, 4P, 25 KA, MCCB with thermal magnetic release					
	2 Nos. - 40Amps, 4P, 10 KA, MCB, C- Curve					
	8 Nos. SPP & dry run preventer (one in each outgoing)					
	8 Nos. Current sensor (one in each outgoing)					
	Note : Extended Rotary handle and suitable size of spreader link should be incorporate for all MCCB's.					
2	<p>Electrical control panel (For Treated water Admin Block)</p> <p>Design, Fabrication, Supply, Erection, Testing and commissioning of Powder coated Main Distribution Panel fabricated out of 14 gauge CRCA sheet steel in cubical, compartmentalized, free standing floor /wall mounted, dust and vermin proof, with reinforcement of suitable size angle iron, channel, T -iron or flats as required. Single door, inbuild locking arrangement and mounted with following accessories and their connection etc. panel should be in front side openable and Cable gland plates shall be provided on top as well as bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specification and duly painted with powder coated paint double coat. Panels shall be suitable for 415V, 3-Phase, Four wires, 50 Hz supply complete with earth bus and lifting hooks as required. Approval shall be taken for each panel before fabrication. (All hardware like nuts and bolts used shall be Galvanized and Zinc passivated) (IP54 Protection).</p>	Set	1			

INCOMING					
1 No - 63Amps, 3P,10 KA, MCB					
BUS BAR					
1 Set-100Amps TPN Aluminium Bus bar.					
INSTRUMENTS					
5 sets of Red and Green flush type push button.					
1 No. of CFL lamp with Holder, door switch and fuse					
2 Nos of Earth bus 32 x 6 mm GI Strips					
Terminal Block					
3Ph VAF, Class 1, 5A Digital voltmeter, Ammeter, frequency meter with built in selector switch					
3 Nos.-LED type, RYB indicating lamps with 2Amps,C -Curve ,10 KA,SP MCB's					
5 Nos. of each -LED type ON/OFF/TRIP indicating lamp with 2Amps,C -Curve ,10 KA,SP MCB's for control					
3 Nos. -60/5 A, 15 VA, CL1 Current Transformer, cast resin type					
OUTGOINGS					
DOL Starter					
5 Nos. - 16Amps, 3P, 10 KA, MCB, C- Curve					
2 No -09 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
3 No -12 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
02 Nos.- 4.5-7.5 Amp Direct Mounting Thermal overload relay					
03 Nos.- 6-10 Amp Direct Mounting Thermal overload relay					

<p>5 Nos. SPP & Dry run preventer relay (one in each outgoing)</p> <p>5 Nos. current sensor for dry run preventer (one in each outgoing)</p> <p>Note : Extended Rotary handle and suitable size of spreader link should be incorporate for all MCCB's.</p>					
<p>3</p> <p>Electrical control panel (For water & fire pumps at Faculty Residence Block)</p> <p>Design, Fabrication, Supply, Erection, Testing and commissioning of Powder coated Main Distribution Panel fabricated out of 14 gauge CRCA sheet steel in cubical, compartmentalized, free standing floor /wall mounted, dust and vermin proof, with reinforcement of suitable size angle iron, channel, T -iron or flats as required. Single door, inbuild locking arrangement and mounted with following accessories and their connection etc. panel should be in front side openable and Cable gland plates shall be provided on top as well as bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specification and duly painted with powder coated paint double coat. Panels shall be suitable for 415V, 3-Phase, Four wires, 50 Hz supply complete with earth bus and lifting hooks as required. Approval shall be taken for each panel before fabrication. (All hardware like nuts and bolts used shall be Galvanized and Zinc passivated) (IP54 Protection).</p> <p>INCOMING</p> <p>1 No - 250 Amps, 3P,50 KA, MCCB</p> <p>BUS BAR</p> <p>1 Set- 300 Amps TPN Aluminium Bus bar.</p> <p>INSTRUMENTS</p>	<p>Set</p>	<p>1</p>			

01 set -Logic controller - Modicon M238 - 20 to 248 I/O, 0.3 µs per Instruction (Schneider Cat No. TM238LDD24DT)					
01 Nos.- SMPS 3A,24 Volt					
01 Nos. - relay board,8 channel,24 Volt DC 5A					
20 nos. of each Red and Green flush type push button.					
2 No. of CFL lamp with Holder, door switch and fuse					
2 Nos of Earth bus 50 x 6 mm GI Strips					
Terminal Block					
3Ph VAF, Class 1, 5A Digital voltmeter, Ammeter, frequency meter with built in selector switch					
3 Nos.-LED type, RYB indicating lamps with 2Amps,C -Curve ,10 KA,SP MCB's					
10 Nos. of each -LED type ON/OFF/TRIP indicating lamp with 2Amps,C -Curve ,10 KA,SP MCB's for control					
3 Nos. -300/5 A, 15 VA, CL1 Current Transformer, cast resin type					
OUTGOINGS					
Star Delta Starter					
4 Nos. - 32Amps, 3P, 10 KA, MCB, C- Curve					
12Nos -25 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
4 Nos.- 20-33 Amp Direct Mounting Thermal overload relay					
4 Nos. Star Delta Timer					
DOL Starter					
6 Nos. - 16Amps, 3P, 10 KA, MCB, C- Curve					

	6 No -12 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
	6 Nos.- 4.5-7.5 Amp Direct Mounting Thermal overload relay					
	2 Nos. - 40Amps, 4P, 10 KA, MCB, C- Curve					
	4 Nos. Star Delta Timer					
	10 Nos. SPP & Dry run preventer (one in each outgoing)					
	10 Nos. current sensor (one in each outgoing)					
	Note: Extended Rotary handle and suitable size of spreader link should be incorporate for all MCCB's.					
4	<p>Fire pump control panel (For Booster Pump) Design, Fabrication, Supply, Erection, Testing and commissioning of Powder coated Main Distribution Panel fabricated out of 14 gauge CRCA sheet steel in cubical, compartmentalized, free standing floor /wall mounted, dust and vermin proof, with reinforcement of suitable size angle iron, channel, T -iron or flats as required. Single door, inbuild locking arrangement and mounted with following accessories and their connection etc. panel should be in front side openable and Cable gland plates shall be provided on top as well as bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specification and duly painted with powder coated paint double coat. Panels shall be suitable for 415V, 3-Phase, Four wires, 50 Hz supply complete with earth bus and lifting hooks as required. Approval shall be taken for each panel before fabrication. (All hardware like nuts and bolts used shall be Galvanized and Zinc passivated) (IP54 Protection).</p>	Set	8			
	INCOMING					

1 No - 63 Amps, 3P,30 KA, Thermal MCCB					
BUS BAR					
1 Set- 75 Amps TPN Aluminium Bus bar.					
INSTRUMENTS					
2 Nos of Earth bus 25 x 6 mm GI Strips					
2 Nos. of removable gland plates					
Terminal Block					
3Ph VAF, Class 1, 5A Digital voltmeter, Ammeter, frequency meter with built in selector switch					
02 nos. each Red and Green flush type push button					
3 Nos.-LED type, RYB indicating lamps with 2 Amps MCB's					
2 Nos. of each -LED type ON/OFF/TRIP of indication lamp					
3 Nos. -60/5 A, 15 VA, CL1 Current Transformer					
OUTGOINGS					
Star Delta Starter					
2 Nos. - 32 Amps, 3P, 10 KA, MCB, C- Curve					
6 No -25 Amps, 240 Volt AC,50 Hz coil voltage ,three pole power contactor					
1 Nos.- 14-23 Amp Direct Mounting Thermal overload relay					
1 Nos.- 9-15 Amp Direct Mounting Thermal overload relay					
2 Nos. Star Delta Timer					
2 Nos. SPP & dry run preventer (one in each outgoing)					

	Note : Extended Rotary handle and suitable size of spreader link should be incorporate for all MCCB's.					
5	<p>HVAC outdoor units electrical control panel (For Visiting Faculty Terrace)</p> <p>Design, Fabrication, Supply, Erection, Testing and commissioning of Powder coated Main Distribution Panel fabricated out of 14 gauge CRCA sheet steel in cubical, compartmentalized, free standing floor /wall mounted, dust and vermin proof, with reinforcement of suitable size angle iron, channel, T -iron or flats as required. Double door type, inbuild locking arrangement and mounted with following accessories and their connection etc. panel should be in front side openable and Cable gland plates shall be provided on top as well as bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specification and duly painted with powder coated paint double coat. Panels shall be suitable for 415V, 3-Phase, Four wires, 50 Hz supply complete with earth bus and lifting hooks as required. Approval shall be taken for each panel before fabrication. (All hardware like nuts and bolts used shall be Galvanized and Zinc passivated) (IP65 Protection).</p>	Set	1			
	INCOMING					
	1 No - 250 Amps, 4P,25 KA, Thermal magnetic release MCCB					
	BUS BAR					
	1 Set- 250 Amps TPN Aluminium Bus bar.					
	INSTRUMENTS					
	2 Nos of Earth bus 50 x 6 mm GI Strips					
	2 Nos. of removable gland plates					
	Terminal Block					

3Ph VAF, Class 1, 5A Digital voltmeter, Ammeter, frequency meter with built in selector switch with 2 Amps,10KA,C-curve MCB's						
3 Nos.-LED type, RYB indicating lamps with 2 Amps 10KA,C-curve MCB's						
1Nos.of each -LED type ON/OFF/TRIP of indication lamp Amps 10KA,C-curve MCB's						
01 No. Phase Failure Relay with Under & Over Voltage Relay setting (Variable), (Auto Reset, 4% - 20% Unbalance) with Neutral Fail Protection including ON delay timer						
01 No. Current sensor						
3 Nos. -150/5 A, 15 VA, CL1 Current Transformer						
OUTGOINGS						
7 Nos. - 40 Amps, 4P, ELMCB, 300 miliampere						
Note: Extended Rotary handle and suitable size of spreader link should be incorporate for all MCCB's.						

6	<p>HVAC outdoor units electrical control panel (For Admin block Terrace)</p> <p>Design, Fabrication, Supply, Erection, Testing and commissioning of Powder coated Main Distribution Panel fabricated out of 14 gauge CRCA sheet steel in cubical, compartmentalized, free standing floor /wall mounted, dust and vermin proof, with reinforcement of suitable size angle iron, channel, T -iron or flats as required. double door type, inbuild locking arrangement and mounted with following accessories and their connection etc. panel should be in front side openable and Cable gland plates shall be provided on top as well as bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specification and duly painted with powder coated paint double coat. Panels shall be suitable for 415V, 3-Phase, Four wires, 50 Hz supply complete with earth bus and lifting hooks as required. Approval shall be taken for each panel before fabrication. (All hardware like nuts and bolts used shall be Galvanized and Zinc passivated) (IP65 Protection).</p>						
	INCOMING						
	1 No - 500 Amps, 4P,35 KA, Thermal magnetic release MCCB						
	BUS BAR						
	1 Set- 500 Amps TPN Aluminium Bus bar.						
	INSTRUMENTS						
	2 Nos of Earth bus 50 x 6 mm GI Strips						
	2 Nos. of removable gland plates						
	Terminal Block						
	01No. 3Ph VAF, Class 1, 5A Digital voltmeter, Ammeter, frequency meter with built in selector switch with 2 Amps,10KA,C-curve MCB's						

	3 Nos.-LED type, RYB indicating lamps with 2 Amps 10KA,C-curve MCB's					
	1 Nos. of each -LED type ON/OFF/TRIP of indication lamp Amps 10KA,C-curve MCB's					
	01 No. Phase Failure Relay with Under & Over Voltage Relay setting (Variable), (Auto Reset, 4% - 20% Unbalance) with Neutral Fail Protection including ON delay timer					
	01 No. Current sensor					
	3 Nos. -400/5 A, 15 VA, CL1 Current Transformer					
	OUTGOINGS					
	12 Nos. - 40 Amps, 4P, ELMCB, 300 miliampere					
	Note: Extended Rotary handle and suitable size of spreader link should be incorporate for all MCCB's.	Set	1			
7	Supply and testing of following size XLPE Armoured cable, 1.1 KV grade multi-core copper conductor XLPE / PVC insulated and PVC sheathed armoured power cable conforming to IS 7098 (Part-1) / IS 1554 (Part -1) with upto date amendments as required.					
a	3Cx4 Sq.mm	Rmt	150			
b	3Cx6 Sq.mm	Rmt	245			
c	3CX10 Sq.mm	Rmt	110			
8	Supplying and making end termination with brass double compression gland and Copper lugs for following size of PVC insulated and PVC sheathed / XLPE copper conductor cable of 1.1 KV grade as required.					
a	3Cx4 Sq.mm	Set	8			
b	3Cx6 Sq.mm	Set	24			

c	3CX10 Sq.mm	Set	8				
9	supply, laying, testing of PVC flat sheathed with plain Cu conductor 3Cx 4sq mm for submersible motor including medium class PVC conduit with accessories etc. on surface or recessed as required.	Rmt	60				
10	supply, laying, testing of 4Cx 1.5sq mm round flexible copper control cables of 1.1 KV grade as confirming to IS :694 including medium class PVC conduit with accessories etc. on surface or recessed as required.	Rmt	180				
11	Supplying and installing following size of perforated pre-painted M.S. cable trays including horizontal & vertical bends, reducers, tees, cross members and other accessories as required duly suspended from the ceiling/laid on the floor with MS suspenders and including painting with perforation not more than 17.5%, in convenient sections, joined with connectors, including bolts & nuts, painting suspenders etc as required.						
a	100 mm width X 50 mm depth X 1.6 mm thickness	Mtr	40				
b	300 mm width x 50 mm depth x 1.6 mm thickness	Mtr	60				
12	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required.						
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	Rmt	100				
13	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.						
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	Rmt	505				

14	Supplying and laying 25 mm X 5 mm G.I strip at 0.50 meter below ground as strip earth electrode, including connection/ terminating with G.I. nut, bolt, spring, washer etc. as required. (Jointing shall be done by overlapping and with 2 sets of G.I. nut bolt & spring washer spaced at 50mm)	Rmt	150				
15	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	Rmt	80				
16	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	Rmt	150				
17	Supplying, installation, testing and commissioning of post top lantern fixture with 70Watt metal halide lamp Die-cast aluminium housing in epoxy polyester UV resistant powder coated finish High purity electrochemically brightened anodized aluminium reflector Top maintainable product with top opening die cast cover Anti-corrosive, stainless steel screws and silicone gaskets Hinge able housing for quick access to control gear compartment Clear PC diffuser IP 54 - dust proof and splash proof, color Black complete with fixing arrangement as required at site. (Wipro cat No.FPH68070 or equivalent in philips/CG/Bajaj)	Each	12				
18	Supplying, installation, testing and commissioning of LED Uplite (Philips cat No.BBP330 9XLED-HP/NW 220-240v IN),die-cast aluminium, stainless steel cover, silicone rubber, heat-resistant gasket, Transparent glass tempered with fixing arrangement as required at site.	Each	50				
Grand Total amount (Rs.)							
Amount In words:							

Undertaking: I/We agree to undertake above work at our quoted amount of Rs. _____/- inclusive of all charges i.e. supply, installation, testing, commissioning, transportation, Labour, levies, other applicable taxes, VAT, service tax etc.

Name:

Designation:

Seal & Signature