

### Technical Explanatory Note

**Name of Work:** Improvement of power supply arrangement at KMPD Railway station

#### **Schedule I(Supply)**

Sl. No.	Specification
1	<p>The price shall cover supply of LT distribution panel consisting of 2 nos. 4 pole microprocessor release 400A MCCB with breaking strength 50kA, 1 no. 4 pole 250A thermal magnetic release MCCB with breaking strength 36kA, 1 no. 4 pole 160A thermal magnetic release MCCB with breaking strength 36 kA, 1 no. 4 pole thermal magnetic release 125A MCCB with breaking strength 36 kA and 2 nos. 4 pole 63A MCB. The LT panel shall include 1 set of TPN (4 pole) Copper busbar of 400A capacity with current density of 1.6 Ampere/Sqmm. with superior quality PVC insulating sleeves and fixed on supporting structure with suitable rated Epoxy type insulator. Individual feeder connection to busbar shall be made by means of riser connections of suitable rated solid copper bars. The LT panel shall be floor mounted type, totally enclosed, fabricated by powder coated CRCA sheet steel of 2 mm thickness, indoor service, cubicle pattern, hinged type door at front &amp; bolted back cover, dust &amp; vermin proof by providing appropriate gaskets complete with internal wiring, instrument wiring, earthing terminals and powder coating painted for anti-corrosive property. All incoming feeders to be interlocked.</p> <p>The MCCBs shall be suitable for 415V, 50Hz, 3 phase AC supply, manually operated type with trip free, quick make and break switching mechanism with current limiting design features, adjustable overload setting, short circuit setting. Incomer MCCBs shall have earth tripping and under voltage release feature. The MCCB shall be provided with Rotary Handles Operating mechanism. The handle shall give indication of ON, OFF &amp; TRIPPED. Neutral shall be defined &amp; capable of offering protection. The MCCBs should confirm to IS:13947 (Part 2) or IS/IEC:60947 (Part 2) - 2003 with latest amendment if any.</p> <p>The LT panel shall comprise of Digita multifunction meter (DFM) 01 No. per Incoming &amp; Outgoing MCCB. Three phase DFM shall have 4 or more Rows or Column LED/LCD display for display of Voltage, Current, Frequency, Power factor, kW, kVAR, kWh, kVAh, kVARh, ON-Hours, Phase Angle, and THD with Modbus RS 485 port having accuracy classof 0.5S, site adjustable CT secondary, Flush mounting, 128 samples/cycle, power supply 110V-230V AC/DC. Each line will display a group of different parameters., phase indication lamps, suitable nos. of instrument protection fuses, suitable nos. bottom entry type cable tray with cable gland nuts/plates of suitable size as per requirement of site. Suitable nos. of CTs shall be provided for energy meter and all the ammeters as per ISS.</p> <p>Aluminum Earth bus of minimum cross section 50 x 6mm, shall run throughout the length at the bottom of the panel and shall have 02 earthing terminals.</p> <p>All the connection wires provided shall be of PVC insulated FRLSH copper cable of 1100 V grade with suitable ampere rating and secured properly with insulation.</p> <p>Selector switches shall be provided for voltmeter &amp; ammeter.</p> <p>Size of MS channel used shall be 75 mm x 40 mm.</p> <p>Terminal arrangements:- Each feeder unit shall be provided with compression gland complete with gland armour clamp to receive 4 core 1100V grade cables.</p> <p>Suitable arrangements shall be provided for earthing the frame work and metal parts of switchgear in accordance with IE Rules.</p> <p>Size of the panel (Minimum): (H x W x D) = 1800 mm x 1500 mm x 600 mm</p> <p>Cost of all the above items including protection relays and accessories for complete assembly of LT panel as per site requirement has been included in the price. Manufacturer of the complete <b>LT panel should have CPRI test certification</b> for above range of specifications.</p> <p>Drawing of LT panel along with arrangement of MCCBs, meters, bus-bars, selector/ control switches, angles, channels, frame work etc. with all details to be prepared by the contractor and got approved by concerned ADEE(G).</p> <p>Inspection to be done by consignee.</p>
2	<p>The price shall cover supply of outdoor type 11 KV 3 pole drop out (D.O.) fuse set complete with porcelain base, fuse &amp; bottom, MS channels of size 100 mm X 50 mm and fasteners etc. The DO fuse set shall be rated for highest system voltage of 12 KV, rated frequency - 50 Hz, rated current shall be 100A or as per rated capacity of Transformers (as advised by consignee) to be connected with the system. DO fuse should conform to latest IS spec. All the MS Nuts, Bolts, washers etc. shall be galvanised. The D.O. fuse set shall be complete with all the components necessary for smooth and trouble free operation. The top and bottom fusing assembly shall be made of copper alloy and contacts shall be suitable for all weather operation with anti-corrosive features. The complete fusing assembly shall be robust in design for precise opening and closing operation.</p> <p>Make of D.O. fuse set: RAYCHEM/ JAYSHREE/ LAMCO/ Transpower or reputed make as approved by Sr.DEE(G)/CKP or his authorised representative.</p> <p>Inspection to be done by consignee.</p>

3	<p>The price shall cover supply of outdoor type Air break gang operated (vertical strike) isolating switch of 200A capacity for 11kV, AC, 50 Hz, 3 phase system conforming to IS 9920 (part -1) 2002 with latest amendment if any. The equipment should be complete with post insulator, M.S. Channels, steel frame made of two channel supports, breaking contacts (male &amp; female), operating rod (30 mm hollow with suitable thickness) &amp; locking arrangement etc. Cost of all the above items along with accessories are included in the price.</p> <p>Make of AB switch: RAYCHEM/JAYSHREE/APC/LAMCO/Transpower or reputed make as approved by Sr.DEE(G)/CKP or his authorised representative.</p> <p>Inspection to be done by the consignee.</p>
4	<p>The price shall cover supply of 150 mm (NB) 'B' class GI pipe which should be screwed &amp; socketed type with clean finished end. The GI pipe should conform to IS 1239 (part-1) : 2004 with latest amendment if any. The cost of all materials including GI clamping arrangement suitable for pole/ any other structure with erection cost and make good of damage if any due to work also included in the price.</p> <p>Make: Tata / Jindal / Bansal / Utkarsh India / Surya / Apollo</p> <p>Inspection to be done by consignee.</p>
5	<p>The price shall cover the supply of outdoor type feeder pillar box with 200A, 4 pole bus-bar conforming, to IS8623:1993 with latest amendment if any and HRC fusing arrangement. The pillar box should include 4 nos Copper bus bar each of 200A capacity secured properly with insulators, minimum gap of 32 mm between bus-bars, nut - bolt arrangement on each bus bar at suitable distance. The outdoor type Pillar box shall be made of 14 SWG CRCA sheet steel of size 600 mm x 300 mm x 700 mm (W x D x H), Singles/double door operated with locking arrangement. The pillar box should be painted with one coat of red oxide and two coats of enamel paint of smoke grey shade applied through spray. The cables to be connected through 3 nos. 200A capacity HRC fuse for incoming and 3 sets of 100A capacity HRC fuse for outgoing with suitable size of terminal lugs/sockets duly crimped, cable glands provided at entry and exit points at bottom, The pillar box should be provided with two nos. of earthing terminals connected to earth pit with 6 SWG GI wire.</p> <p>Inspection to be done by consignee</p>
6	<p>The price shall cover supply of outdoor type apparatus case/ location box of size 960 mm x 610 mm x 1410 mm (W x D x H) complete with hinged type front &amp; back door with lock &amp; key arrangement, 315A capacity 4 pole Aluminium bus-bar, MS flat fixed on suitable capacity insulator for fixing of switch gears. The location box shall have 3 nos. 200A HRC fuse units for incoming supply and 9 nos. of 100A / 63A fuse units (as advised by consignee) for out going supply. The bus-bar shall be properly insulated with colour coded heat shrinkable sleeves and separated with minimum 32 mm gap between the bus-bars and shall have suitable size of holes for incoming &amp; outgoing cable connections through fusing arrangement. The location box shall be made of 14 SWG MS sheet steel phosphated and powder coating painted with weather proof properties and provided with suitable size gland for cable entry at the bottom. The location box shall be provided with suitable supporting structure for holding the incoming and outgoing cables. The location box shall be provided with suitable size of metal plate with 'Danger' mark for 440V. All the items used shall conform to latest IS specification.</p> <p>Drawing of location box/ apparatus case to be prepared by the contractor and got approved by concerned ADEE(G) before supply.</p>
7	<p>The Astronomical timer panels shall be suitable for 24 hour programme &amp; as per latitude angle of the site area. It shall be wall/ floor mounted in suitable size enclosure with IP 66 protection . It should be complete with 65A TP contactor and 63A TPN MCB with all accessories for Auto/ manual switch ON /OFF mode. The timer panel shall be provided with suitable metal structure for erection on wall/ ground. The panel shall conform to IS/IEC 61439 &amp; 60529 and equipped with in-built short circuit protection, class H insulation. The panel shall be made of 2 mm thick CRCA sheet steel. FRLSZH wire shall be used for internal wiring.</p> <p>Dimension - (H x W x D) 600 mm x 600 mm x 300 mm</p> <p>Inspection to be done by consignee.</p>
8	<p>The price shall cover supply of 11 meter long galvanised R.S. Joist (rolled - steel joist) of size 200 x 100 mm having weight 25.4 kg/m (or heavier) with +2.5% tolerance over total weight &amp; as per IS:2062 Grade "A" with latest amendment. Distinct non-erasable embossing is to be made on each R.S joist mentioning - Name &amp; logo of the manufacturer, B.I.S Logo (ISI mark) if applicable and size of the R.S joists.</p> <p>The design of galvanised R.S. Joist shall be as advised by consignee.</p>

9	<p>The price shall cover supply of desktop computer set with windows 11 operating system (original), MS office lifetime (original), Intel Core i5 processor (12th generation or latest), Wifi &amp; Bluetooth inbuilt, camera, 8GB (DDR4) RAM, 512 GB SSD, graphics card integrated, FHD display monitor with size 21.5 inch (or higher size), keyboard, mouse, Antivirus (3 year validity), mouse pad and all accessories.</p> <p>Make of desktop computer set including motherboard: HP/Dell/Asus/MSI/Acer</p> <p>Make of monitor: Dell/ Acer/ Asus/ HP/MSI</p> <p>Make of Hard drive: Seagate/ WD/ Toshiba/ Samsung</p> <p>Make of Keyboard/mouse: Lenovo/Logitech/Acer/Dell</p> <p>Model shall be as approved by Sr.DEE(G)/CKP or his authorised representative.</p>
10	<p>The price shall cover supply of wall-supported 6 mtr. long water proof, rust proof, shock proof, light weight, strong, safe &amp; durable FRP ladder.</p> <p>Make: Sintex or equivalent as approved by Sr.DEE/G/CKP or his authorised representative.</p>

#### Schedule II (Erection)

Sl. No.	Description of work
1	The price shall cover erection, testing & commissioning of 11kV/0.415kV, 250 kVA outdoor type transformer equipped with all safety devices, fittings and complete accessories including the cost of transportation to erection site, removal of existing old transformer if any, shifting of new transformer on new pit/ existing pit foundation, connection of Railway supplied cables for incoming & outgoing power supply arrangement, connection of HT bushings with suitable size conductors and insulators, earthing connection etc. as advised by consignee.
2	The price shall cover erection, testing & commissioning of LT distribution panel set at Sl.no. 1 of supply schedule I. Erection cost for LT distribution panel includes trenching in floor for cable laying & filling the same by coarse sand after cable connection/ laying, masonry work for mounting base with cement finishing in connection with the fixing of LT panel, connection of existing/ new LT cable with gland & suitable size end sockets. Connection of cables and wiring shall be done for complete commissioning of LT panel and all its components, incoming feeders, outgoing feeders and all the accessories. The cost of transportation of LT panel set to site (as advised by consignee) and supply of gland and sockets and all the accessories required for installation and commissioning of complete panel are also included in the price. Make good of any damage due to installation & commissioning of LT panel to be done by the contractor with supply of all the requisite materials required for the work and finishing as per original shape.
3	The price shall cover erection, testing & commissioning of 11 KV D.O. fuse set ( 3 nos. in a set) on pole structure with all the accessories including connection of copper jumper of suitable capacity as advised by consignee.
4	The price shall cover mounting/ fixing of Lightning Arrester on pole structure/ Gantry with supply of requisite materials including suitable clamping arrangement with necessary nuts, bolts, washers etc. The price shall also include the cost for connection with equipment & earthing as advised by consignee.
5	The price shall cover erection of 11 kV gang operated vertical strike AB switch (3 nos. in a set) on pole structure by suitable clamping arrangement including the supply of all accessories for connection with power supply arrangement, earthing connection, testing & commissioning of complete G.O.S.
6	The price shall cover erection, testing & commissioning of 11 KV grade Heat shrinkable Outdoor type End termination jointing kit suitable for 3 core 120 sqmm cable including all the requisite materials and consumable items for the work. Jointing work shall be done by expert Cable Joiner as per product specific instruction of jointing kit manufacturer. The work to be executed taking all safety measures as per shut down programme by consignee.
7	The price shall cover erection, testing & commissioning of 11 KV grade Heat shrinkable Straight through jointing kit suitable for 3 core 120 sqmm cable including all the requisite materials and consumable materials for the work. Jointing work shall be done by expert Cable Joiner as per product specific instruction of jointing kit manufacturer. The work to be executed taking all safety measures as per shut down programme by consignee.
8	The price shall cover provision of all requisite materials for laying of cables <b>along the road/ track</b> as per CEE /GRC's drawing No. CEE/G/A3/P-134, digging of cable trench in any kind of soil, removal of soil/ ballast, supply & provision of bricks, supply & spreading of sand, laying of cables, filling the trench with soil/ concrete as per site after completion of work, Connection of cables for power supply by use of proper size end termination sockets. The cost of suitable size cable end sockets, glands, transportation of cable to site of work from the concerned SSEE(G) store, sand, bricks and all the required materials for cable laying also included in the price.
9	The price shall cover provision of all requisite materials for fixing/ laying of cable <b>through GI pipe on pole/ PF shed structure or wall</b> by cleating with necessary clamping not more than 50 cm apart, PVC sleeve / Pipe should be used as per site requirement and as per advised by consignee. The cost of clamps of suitable size and PVC sleeve / pipe also included in the price.

10	The price shall cover provision of all requisite materials for laying of cables <b>across the road/ track</b> as per CEE /GRC's drawing. No. CEE/G/A3/P-134. The price is inclusive of cost for digging of cable trench in any kind of soil/concrete/road/drain etc. and laying of pipes. Price shall also cover filling up the trench with removed soil/ concrete as per site requirement after completion of work.
11	The price shall cover provision of all requisite materials for micro drilling for laying of cable in embedded area i.e. across the road/ track/ hard surface without causing any disturbance / damage on upper side of the earth by push system not less than depth of 1 mtr. below ground level. The price is inclusive of cost of suitable size ISI marked HDPE pipe/ GI pipe [as advised by concerned SSEE(G)] complying latest IS specification, making the tunnel, pushing the cable inside the tunnel through pipe protection, necessary jointing work and all other materials required for the work. Transportation cost of machine & tools required for the work has also been included in the price.
12	The price shall cover erection, testing & commissioning feeder pillar box of 200A capacity including muffing and connection of cables through gland at bottom. All the busbars and fuse units to be properly insulated and secured complying IE rules. All the incoming and outgoing cables to be connected with sockets. The cost of pillar box foundation, muffing with RCC cement work and all the accessories also included in the price.
13	The price shall cover erection, testing & commissioning of apparatus case/ location box complete set mounted on suitable height plinth made by casting with 1:3:6 (cement : sand : ballast) cement concrete. The erection cost also includes all the required materials necessary for erecting the location box and finishing the base. The price covers internal wiring, painting of unprotected parts as per requirement and connection of incoming and outgoing cables with gland and socket as advised by consignee and earthing connection as per IE rules.
14	The price shall cover erection of Galvanised stay set complete with all accessories including supply & casting of Guy foundation by cement & concrete in ratio of 1:3:6 (1 cement : 3 sand : 6 ballast) including supply of stay guy rod, stay wires, suitable turn buckle, GI clamp, nut, bolts complete with all other accessories. The erection of stay rod with wire and all accessories shall be done as advised by consignee.
15	The price shall cover erection of 11 KV Danger board which shall be fixed on pole/ wall / fencing above 2.5 to 3 meters from ground level (as advised by consignee) with clamping arrangement and covering of barbed wires on poles.
16	The price shall cover transportation of Rail pole in good condition from Rly. store or any Railway site to work site and cutting to size as advised by consignee. All the poles and its accessories shall be painted with one coat of red oxide and two coats of aluminium paint. The cost of paint also included in the price. Make and colour of paint to be approved by concerned ADEE(G).
17	The price shall cover excavation of suitable size pit in any kind of soil as available at site and erection of Rail/ Steel tubular pole, casting with cement concrete in ratio 1:3:6 (1 cement 3 sand 6 ballast) and muffing at the base of pole in size L X W X H = 1.5 ' X 1.5 ' X 1.5 ' with 6" slope on top cement finishing of the muffing. Casting of foundation shall be done as per length of the Rail pole as advised by consignee. After casting of foundation and muffing water curing shall be done as per extant procedure. Make of cement to be approved by concerned ADEE(G).
18	The price shall cover erection, testing & commissioning of Astronomical timer panel with all accessories. The cost also includes internal wiring of panel with contactor, MCB including foundation and masonry work of panel and connection of Railway supplied cable with suitable size end termination sockets (Cost of socket also included in price).
19	The price shall cover dismantling of existing ACSR conductor/ UG cables/ insulated cables and all the accessories of overhead wire system. The machinery and tools including gas cutting equipment etc. required for the work shall be arranged by the contractor along with man power and transportation. The price includes dismantling of OH conductor, G.I bracket, channels, Pin/Disc insulators, jumpers etc. and transportation to relevant store. The work shall be carried out observing safety, IE rules and as advised by consignee. The span of dismantling shall include all the conductors/ cables and all accessories in between two poles including parts mounted/ clamped on poles.
20	The price shall cover erection of R.S. joists with all accessories. The cost is inclusive of transportation and cutting, grooves, welding, concrete work, finishing work etc. as per site requirement as advised by consignee.
21	The price shall cover excavation of earth pit in any kind of soil / rock, transportation and erection of RS joist/ Rail/ G.I pole with cement concrete in the ratio 1:3:6, casting of foundation including re-filling and dressing of earth with contractor's labour, tools including supply of cement and all materials. Digging of pit, casting of foundation 0.8 mtr. x 0.8 mtr. x 1/6th part of pole with stone ballast of size 25 mm. and 12mm. thick cement plastering and neat cement finishing are also to be done for muffing by the contractor. The size of muffing shall be 500 mm. x 500 mm. x 500 mm. with proper slope towards top to be done by the contractor. All the foundations are to be cured as per norms. The price shall cover the cost of all materials required for the above work including labour charges, tools and plants. The work shall be completed observing safety, IE rules and as advised by consignee.

22	<p>The price shall cover supply and making of cement and mortar with ratio 1:3:6 and 12 mm. thick cement plastering and neat cement finishing are to be done for muffing around the pole by the contractor. The size of muffing shall be 500 x 500 x 500 mm or 450 x 450 x 450 mm or 300 x 300 x 300 mm or as per instruction of site engineer with proper slope towards top to be done by the contractor. All the foundations are to be cured as per norms. The price shall cover the cost of all materials required for the above work including labour charges, tools and plants. The work shall be completed observing safety, IE rules and instruction of Rly site engineer.</p> <p>Make of cement shall be as approved by concerned ADEE(G).</p>
23	<p>The price shall cover supply &amp; erection of GI structure for 4 pole/2 pole/gantry arrangement for installation of isolators, AB switch, CT, PT &amp; LA made of angles, channels &amp; other required ferrous parts including cutting, welding &amp; drilling. The price is inclusive of complete erection of the structure with necessary fabrication work as per site requirement and concrete foundation &amp; muffing work as advised by consignee. Before execution of work, the drawing with details of Pole/ gantry arrangement and all the Electrical equipment and accessories with size and dimensions to be prepared by the contractor and got approved by Sr.DEE(G)/CKP or his authorised representative. The price is inclusive of supply and erection of GI channels along with all accessories required thereof.</p>
24	<p>The price shall cover transportation of Railway supplied material in good condition from consignee store to erection site or from any site to Railway store as advised by consignee. The cost is inclusive of provision of suitable capacity vehicle in good condition along with tools, machines &amp; hydra crane etc. for loading, shifting and unloading. The cost of labour including driver and fuel charges, vehicle hiring charges are included in the price. No labour and tools from Railway shall be provided for the work. Shifting of Railway supplied items including heavy items such as transformer, HT/LT panel etc. shall be done following all safety measures for safe transporting without any damage to man and materials. The route for transport of materials shall be as per advice of consignee.</p>
25	<p>The price shall cover transportation of cables in rolls with or without wooden drums from any store of CKP Division to the site of works as advised by consignee. Transportation including loading and unloading has to be carried out by the contractor with own arrangement and Railway will not provide any assistance for the same. Cables to be transported in good condition and delivered taking all precautions while handling, loading &amp; unloading. Transportation shall be done as advised by consignee.</p>
26	<p>The price shall cover dismantling of concrete kerb stones / rail level platform stones/ concrete beams/slab or similar structure parts/stones without appreciable damage including stacking of serviceable material and disposal of unserviceable material as advised by concerned SSEE(G).</p>
27	<p>The price shall cover cement concrete work 1:2:4 (1 cement: 2 sand:4 ballast) for make good of damage due to work with supply of cement, sand &amp; ballast including labour as advised by concerned SSEE(G). The price includes all the necessary item &amp; labour required for the said work.</p> <p>Make of cement shall be approved by DEE(G)/CKP or his authorised representative.</p>