AN ISO 9001 & 14001 COMPANY

TENDER DOCUMENT

TENDER No: WRO/CON/681/0168

FOR

‘Supply, installation, erection, testing and commissioning of ‘Air Conditioning & Ventilation System’ for the project of “Overhaul Complex Package Civil-III for Hindustan Aeronautics Ltd. (HAL)” at Ojhar, Nashik.”

VOLUME – III

PRICE BID/BILL OF QUANTITIES
1. Rates to be quoted in this tender shall be inclusive of all taxes and duties including GST.
2. The bidder has to show GST /Tax considered separately for reference.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit rate in fig (Rs)</th>
<th>Unit rate in Words (Rs)</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply, installation, testing and commissioning of Air cooled CEILING CONCEALED DUCTABLE SPLIT UNIT with all the accessories and following components.</td>
<td></td>
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<tr>
<td></td>
<td>Indoor evaporating unit comprising of DX cooling coils blowers, electric motor with distributor and expansion valves, insulated sand-witched drain tray, 20 Micron HDPE washable filters, DIDW dynamically balanced centrifugal blower, electrical junction box complete as per technical specifications.</td>
<td></td>
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<tr>
<td></td>
<td>Outdoor condensing unit comprising of energy efficient SCROLL compressor's, tube and finned type condenser coils, propeller / axial type consenser fan and motor, pressure switches, HP/LP cutouts, safety controls, in built thermal/temperature protection and accessories like liquid line solenoid valve, oil sepratores, oil receivers, sight glass, liquid line indicator, filter drier etc, factory fabricated and completely wired control panel with switchgear components and necessary first charge of eco-friendly refrigerant gas and oil.</td>
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<tr>
<td></td>
<td>Refrigerant piping interconnecting condensing unit and indoor unit using hard drawn copper tubes with soldered / brazed socket fittings for suction and liquid lines duly insulated with 9-mm thick Cellular rubber foam / Nitrile Rubber insulation. The insulation shall be provided with a &quot;polyshield&quot; (srim fibre glass fabric) protective coating and finished with a coat of activated resin. PVC Drain pipeline to be connected from indoor unit to nearest darinage line.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Distance between indoor &amp; outdoor units to be estimated from tender drawings.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Name of The Work :  AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE - CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

<table>
<thead>
<tr>
<th>Complete electrical incoming and outgoing power wiring/cabling of Al. &amp; control wiring of copper required from indoor and outdoor units and also earthing of the complete system with 8 G G.I. Wire and strip.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical control Panel will be complete with necessary incoming MCCB, Power ON/OFF indications, starters, fuses, switches, timers, over-load relays, contactors, push button, and indicating lamps, ON/OFF and trip indications, single phasing preventer, auto restart etc and also with remote control and cording. The unit shall have microprocessor based controller and other interlocking for safety controls as per technical specifications.</td>
<td></td>
</tr>
<tr>
<td>Complete clamping and saddling of refrigerant &amp; drain piping and cabling covered with P.V.C conduiting.</td>
<td></td>
</tr>
</tbody>
</table>

Following are the capacities:

| a) CSDU - 8.3 TR (Scroll Compressor) | Nos 2.00 |
| b) CSDU - 7.5 TR (Scroll Compressor) | Nos 3.00 |
| c) CSDU - 5.5 TR (Scroll Compressor) | Nos 6.00 |

2 Supply, installation, testing and commissioning of WALL MOUNTED FANS:

Direct Driven - Propeller type Axial fan with sturdy MS steel frame with Rubber cushion and bolts for wall mounted installation. The Fan blades are Aluminum in construction, Motor is PSC IP 44 protection, single phase 220/1/50, mounting bracket, safety grill on suction side and birdscreen on the discharge side, power cable and accessories like Back draft dampers and wiremesh complete as per technical specifications.

| a) 500 CFM with 5mm WC TSP (EXHAUST AIR FAN) | Nos 10.00 |
| b) 560 CFM with 5mm WC TSP (EXHAUST AIR FAN) | Nos 9.00 |

3 Supply, installation, testing and commissioning of ROOF MOUNTED FANS:
## Name of The Work:
AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE -CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

### Roof mounted weather resistant Exhaust fans complete with Aluminum / GS housing, centrifugal backward curved aluminum wheel, curb cap with prepunched mounting holes, TEFC motor, IP 55 protection and class F insulation, belt/direct drives (adjustable pulley and motor plates incase of belt drives), isolated on shaft mounts, bird screen, wire mesh, corrosion resistant fasteners, electrical items including motor junction box, power cables, drain arrangements, accessories like back draft dampers.

### Scope of works shall also include the necessary flashing works for the fans with GI adapter, roof curb, corrugated GI and sealant to prevent rain water ingress.

### 7000 CFM @ 12 mm WC TSP; 1.5 KW

| Nos | 36.00 | - |

### 4 VENTILATION UNIT

Installation, testing and commissioning of Ventilation air unit comprising of spark resistant SISW fan complete with dampers, cowl & bird mesh, prefILTER (20 micron) sections with filters, Fan section with SISW centrifugal fan and IP 55, Class F, TEFC fan motor suitable for 415V, 3 Ph, 50 Hz. power supply. The Fan shall be spark resistant design with belt drive packages, mounting frame work, cushy foot mounts complete as per technical specifications. The unitwise details are as follows:

| a) 4000 CFM with 50mm WC TSP | Nos. | 1.00 | - |
| b) 4500 CFM with 50mm WC TSP | Nos. | 2.00 | - |
| c) 4500 CFM with 40mm WC TSP | Nos. | 1.00 | - |
| d) 1700 CFM with 50mm WC TSP | Nos. | 1.00 | - |
| e) 1700 CFM with 40mm WC TSP | Nos. | 1.00 | - |
| f) 2000 CFM with 40mm WC TSP | Nos. | 1.00 | - |

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Signature of Bidder

Signature of EPIL
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>g)</td>
<td>2000 CFM with 50mm WC TSP</td>
<td>2.00</td>
<td>-</td>
</tr>
<tr>
<td>h)</td>
<td>6500 CFM with 50mm WC TSP</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>l)</td>
<td>7800 CFM with 50mm WC TSP</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>j)</td>
<td>7800 CFM with 40mm WC TSP</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>k)</td>
<td>8700 CFM with 50mm WC TSP</td>
<td>2.00</td>
<td>-</td>
</tr>
<tr>
<td>l)</td>
<td>9350 CFM with 50mm WC TSP</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>m)</td>
<td>32000 CFM with 50mm WC TSP</td>
<td>3.00</td>
<td>-</td>
</tr>
</tbody>
</table>

**5 Supply, installation, testing and commissioning of AIR DISTRIBUTION SYSTEM**

Machine made Rectangular GSS Ducting complete with GI turning vanes, epoxy coated angle iron flanges, support channels, suspenders, cross ties, cradles, threaded rods, anchor fasteners, bolts, lock nuts, PVC gaskets, adhesives, Unit Canvas connections, sealants as scheduled and as per IS / SMACNA. The ducting works to include angles / frames to support the main ducts from the ceiling duly painted with epoxy (2 coats) painted as per the requirement at site. The Angle sizes shall comprise of 50x50x5; 30x30x5; 25x25x3. Scope of work to include the round collars for connecting the main/branch ducts and spill air boxes. (Rubber pads to be provided between the ducts and angle support for the large size ducts) complete as per technical specifications.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Cost</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>24 G SQM</td>
<td>535.00</td>
<td>-</td>
</tr>
<tr>
<td>b)</td>
<td>22 G SQM</td>
<td>516.00</td>
<td>-</td>
</tr>
<tr>
<td>c)</td>
<td>20 G SQM</td>
<td>585.00</td>
<td>-</td>
</tr>
</tbody>
</table>
### Name of The Work: AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE-CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

Supply, installation, testing and commissioning of Factory made Round Spiral GSS Ducting complete with one primer and two coats of enamel paint. Ducts supports and angles to be duly painted. Ducting works to include all hitech supports, GI bolts and nuts, PVC gaskets, flanges, sealants, adhesive, Canvas connections, as scheduled and as per IS/ SMACNA. The duct work rates to include angles/frames to support the main ducts from the truss and purlins duly painted with epoxy(2 coats) painted as per the requirement at site.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Units</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>24 G</td>
<td>SQM</td>
<td>522.00</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>22 G</td>
<td>SQM</td>
<td>1020.00</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>20 G</td>
<td>SQM</td>
<td>300.00</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>18 G</td>
<td>SQM</td>
<td>2270.00</td>
<td>-</td>
</tr>
</tbody>
</table>

Exposed Ducting - Supply, installation, testing and commissioning of Factory made Round Spiral GSS Ducting exposed to ambient, complete with one primer and two coats of enamel paint. Ducts supports and angles to be duly painted. Ducting works to include all hitech supports, suspenders, cross ties, GI bolts and nuts, PVC gaskets, adhesives, flanges, Canvas connections, sealants as scheduled and as per IS/SMACNA. The duct work to include angles/frames to support the main ducts from the truss and purlins duly painted with epoxy(2 coats) painted as per the requirement at site. Entire exposed duct to be insulated with 9mm thick Nitrile Rubber insulation as per specs and finished with 28 G aluminum cladding.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Units</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>22 G</td>
<td>SQM</td>
<td>70.00</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>20 G</td>
<td>SQM</td>
<td>60.00</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>18 G</td>
<td>SQM</td>
<td>840.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Unit</td>
<td>Quantity</td>
<td>Remarks</td>
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<tr>
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</tr>
<tr>
<td>8</td>
<td>Supply, installation, testing and commissioning of <strong>Volume control dampers</strong> of 1.2mm thick GSS blades, extended linkage rods for motorised operation, channels, flanges suitable for duct mounting and with a manual operating handle.</td>
<td>SQM</td>
<td>5.00</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Supply, installation, testing and commissioning of <strong>G.I Butterfly dampers</strong> suitable for circular ducts mounting with a manual operating handle.</td>
<td></td>
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<tr>
<td></td>
<td><strong>a)</strong> 300 mm dia</td>
<td>Nos.</td>
<td>5.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>b)</strong> 350 mm dia</td>
<td>Nos.</td>
<td>4.00</td>
<td>-</td>
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<tr>
<td></td>
<td><strong>c)</strong> 450 mm dia</td>
<td>Nos.</td>
<td>5.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>d)</strong> 550 mm dia</td>
<td>Nos.</td>
<td>3.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>e)</strong> 600 mm dia</td>
<td>Nos.</td>
<td>2.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>f)</strong> 650 mm dia</td>
<td>Nos.</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>g)</strong> 750 mm dia</td>
<td>Nos.</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>h)</strong> 800 mm dia</td>
<td>Nos.</td>
<td>3.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>i)</strong> 900 mm dia</td>
<td>Nos.</td>
<td>7.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>j)</strong> 1100 mm dia</td>
<td>Nos.</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>k)</strong> 1250 mm dia</td>
<td>Nos.</td>
<td>2.00</td>
<td>-</td>
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<tr>
<td></td>
<td><strong>l)</strong> 1300 mm dia</td>
<td>Nos.</td>
<td>12.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>m)</strong> 1450 mm dia</td>
<td>Nos.</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Supply, installation, testing and commissioning of <strong>Extruded Al. Powder coated louver</strong> with inclined blades for rain and dirt particle protection for Fresh air intake and exhaust. Louvers shall include and all necessary reinforcements and stiffeners for required spans/lengths.</td>
<td>SQM</td>
<td>144.00</td>
<td>-</td>
</tr>
</tbody>
</table>
**Name of The Work**: AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE -CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Specification</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Supply, installation testing and commissioning of Drum Jet Diffusers - Fully adjustable, long throw jet type. The Unit to be constructed from Aluminum extrusions and complete with brush strips, air tight seal with all fixing accessories.</td>
<td>The diffuser to be with Opposed blades dampers, adjustable drum, suitable for duct application, low noise and low friction type to meet a throw of 30 m Horizontal. Size: 794 x 271 (850 x 350) mm</td>
<td>Nos. 168.00</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Supply, installation, testing and commissioning of Square box with Circular SWIRL DIFFUSERS with adjustable blades complete with outer ring, discharge nozzle, suitable for vertical discharge and mounting heights of Approx. 13m and variation in supply temperatures between -10K to +15K. Rotating blades to be adjustable with an built in electric actuator. Accessories like top entry spigot, flange, lip seal etc. to be included. The outer ring with nozzle and central cover cap are of Aluminum material. The blades, casing, spigots are of GSS finished with factory standard powder coating and all fixing accessories.</td>
<td>800 mm Dia</td>
<td>Nos 64.00</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Supply, installation, testing and commissioning of Extruded Al. powder coated supply air diffusers with Al. opposed blade dampers and outer size 600 x 600, with all necessary screws for fixing complete as per specs. Neck sizes are as follows: 525 x 525 mm</td>
<td>525 x 525 mm</td>
<td>Nos. 30.00</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>Supply, installation, testing and commissioning of Extruded Al. powder coated Return air diffusers without dampers and outer size 600 x 600, with all necessary screws for fixing complete as per specs. Neck sizes are as follows: 525 x 525 mm</td>
<td>525 x 525 mm</td>
<td>Nos. 30.00</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>Supply, installation, testing and commissioning of Extruded Al. powder coated Supply Air Grills with dampers and all necessary screws for fixing complete as per specs.</td>
<td>SQM 1.50</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Name of The Work: AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE -CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Supply, installation, testing and commissioning of Extruded Al. powder coated Return Air Grills without dampers with and all necessary screws for fixing complete as per specs.</td>
<td>SQM</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Supply and installation of Door Grill with all necessary screws for fixing arrangements.</td>
<td>SQM</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Supply, installation, testing and commissioning of Fire dampers with fusible link with all necessary screws for fixing complete as per technical specifications.</td>
<td>SQM</td>
<td>31.00</td>
<td></td>
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<tr>
<td>19</td>
<td>Supply, installation, testing and commissioning of INSULATION</td>
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</tbody>
</table>

Thermal Insulation with Class O FM approved nitrile rubber insulation of specified thickness of ARMAFLEX/K FLEX APPROVED as per ASTM E 84 test & which should also meet NFPA 90A supplementary materials for air distribution system which should not absorb less 0.2% water by volume (ASTM c 209), should not support microbial growth (ASTM C1071, G21, G22) and should not emit objectionable odors (ASTM C 665) and should have thermal conductivity of 0.27 ( R - 2.78 in 3.4" thickness) and water vapor permeance of 0.10. Joints should be sealed with 50 mm wide 3 mm thick self adhesive tape (Black Cotton Tape not acceptable).

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Unit</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>9 mm Duct liner with Class O FM approved insulation of specified thickness of ARMAFLEX/K Flex Approved as per ASTM E 84 test &amp; which should also meet NFPA 90A supplementary materials for air distribution system which should not absorb less 0.2% water by volume (ASTM c 209), should not support microbial growth (ASTM C1071, G21, G22) and should not emit objectionable odors (ASTM C 665) and should have thermal conductivity of 0.27 ( R - 2.78 in 3.4&quot; thickness) and water vapor permeance of 0.10. Joints should be sealed with 50 mm wide 3 mm thick self adhesive tape.</td>
<td>SQM</td>
<td>9 mm</td>
<td>2930.00</td>
</tr>
<tr>
<td>b)</td>
<td>10 MM</td>
<td>SQM</td>
<td>639.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Set</td>
<td></td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>20</td>
<td>Testing, adjustment and balancing as per technical specifications and ASHRAE/SMACNA standards for Air distribution system for airconditioning and ventilation unit.</td>
<td>Set</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>HVAC ELECTRICAL WORKS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>MEDIUM VOLTAGE SWITCH BOARDS:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply, installation, Testing and Commissioning of 3 phase 415 V 4 wire Free Standing Floor mounted MV panels made out of 14 SWG CRCA sheet after seven tank process, painting with Epoxy powder coating with including all switchgear as detailed below. The panel shall consist of suitable rating TPN +E Electrolyte AL busbar (Busbar size should be based on 1A= 1.3 sq.mm for Main LT panel) supported with DMC/ SMC barriers and color coded with Heat shrinkable sleeves. The Metering shall be provided as specified. The panel shall have Short circuit with standing capacity of minimum 50KA and consist of the switchgear as mentioned below. The panel shall be mounted on channels grouted to the floor with all supports, hardwares and fixing material. The panel shall be got fabricated from manufacturers having CPRI Test certificate only. The M.V panels shall have at least two spare cubicles of the maximum rating. The size of all Panel Mounting Meters shall be 96 X 96 mm. All panels shall be as per specification and schematic drawing complete as required. All panels shall be of Top/Bottom Cable Entry only. Panels shall be extendable type on either ends. Every panel shall be provided with ON/OFF /Trip Indication with LED type lamps. Supply and fixing of steel supporting channels (Grip bolts required) for fixing on to floors with all supports, hardwares and fixing material.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Name of The Work:** AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE -CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

All Electrical Panel to be complete with incoming and outgoing feeders, MCCBs/MCB for main incomers, Busbar Aluminum, Disconnect switches, contactors, single phase preventor, starters, voltmeter, ammeters, contactor, connector, relays, push buttons, ON/OFF and trip indication, UVM, phase failure/reversal, adaptor boxes and ancillaries. All necessary spare feeders to be included in each Panel. (Only Power will be brought and terminated into each of these panels by electrical contractor).

### MAIN POWER CONTROL CENTER

#### a) PANEL # 1 WITH FOLLOWING INCOMER AND OUTGOING

<table>
<thead>
<tr>
<th>NO</th>
<th>INCOMER</th>
<th>OUTGOINGS</th>
</tr>
</thead>
</table>

**METERING**

Measuring parameters of Voltage, Current

- 125/5A, CL -1.0, 15 VA Resin Cast Current Transformers - 3 Nos
- 2A, Control Fuse Links with 20A Control Fuse Bases - 3 Nos

**BUS BAR:**

- 125A, Electrolyte Grade Aluminum Bus bars with 0.8A/Sq.mm Current density.

### b) PANEL # 2 WITH FOLLOWING INCOMER AND OUTGOING

<table>
<thead>
<tr>
<th>NO</th>
<th>INCOMER</th>
<th>OUTGOINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td>63A TPN, 415V, 25 KA moulded case Circuit Breakers with Micro Processor based releases for O/C, S/C &amp; S/T - 1 No</td>
<td>6A MCB - 2 Nos (Pumps per AHU)</td>
</tr>
</tbody>
</table>
Name of The Work : AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE -CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

<table>
<thead>
<tr>
<th>METERING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring parameters of Voltage, Current</td>
</tr>
<tr>
<td>63/5A,CL -1.0, 15VA Resin Cast Current Transformers - 3Nos</td>
</tr>
<tr>
<td>2A, Control Fuse Links with 20A Control Fuse Bases - 3 Nos</td>
</tr>
<tr>
<td>LED Type Indication Lamps for R, Y, B Phase Indication and Breakers ON / OFF / TRIP Indication</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUS BAR :</th>
</tr>
</thead>
<tbody>
<tr>
<td>63A, Electrolyte Grade Aluminum Bus bars with 0.8A/Sq.mm Current density.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTGOINGS :</th>
</tr>
</thead>
<tbody>
<tr>
<td>63ATPN, 415V, 25 KA MPCB - 1 Nos</td>
</tr>
<tr>
<td>6A MCB - 2 Nos ( Pumps per Supply AHU)</td>
</tr>
</tbody>
</table>

c) PANEL # 3 WITH FOLLOWING INCOMER AND OUTGOING

<table>
<thead>
<tr>
<th>NO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td></td>
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</table>

c) PANEL # 3 WITH FOLLOWING INCOMER AND OUTGOING

<table>
<thead>
<tr>
<th>INCOMER</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>METERING</th>
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<tbody>
<tr>
<td>Measuring parameters of Voltage, Current</td>
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<td>63/5A,CL -1.0, 15VA Resin Cast Current Transformers - 3Nos</td>
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<td>2A, Control Fuse Links with 20A Control Fuse Bases - 3 Nos</td>
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<td>LED Type Indication Lamps for R, Y, B Phase Indication and Breakers ON / OFF / TRIP Indication</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTGOINGS :</th>
</tr>
</thead>
<tbody>
<tr>
<td>63ATPN, 415V, 25 KA MPCB - 1 Nos</td>
</tr>
</tbody>
</table>

d) PANEL # 4 WITH FOLLOWING INCOMER AND OUTGOING

<table>
<thead>
<tr>
<th>NO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.00</td>
<td></td>
</tr>
</tbody>
</table>
Name of The Work: AIRCONDITIONING & VENTILATION SYSTEM FOR CONSTRUCTION OF HANGARS, UTILITY BUILDINGS AND ALLIED FACILITIES FOR PACKAGE-CIVIL-III (OVERHAUL COMPLEX) IN FACTORY AREA, HAL PROJECT, OJHAR, NASHIK.

<table>
<thead>
<tr>
<th>INCOMER</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100A, TPN, 415V, 25 KA moulded case circuit breakers with Micro Processor based releases for O/C, S/C &amp; S/T - 1 No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METERING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring parameters of Voltage, Current</td>
<td></td>
</tr>
<tr>
<td>100/5A, CL -1.0, 15VA Resin Cast Current Transformers - 3 Nos</td>
<td></td>
</tr>
<tr>
<td>2A, Control Fuse Links with 20A Control Fuse Bases - 3 Nos</td>
<td></td>
</tr>
<tr>
<td>LED Type Indication Lamps for R, Y, B Phase Indication and Breakers ON / OFF / TRIP Indication</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUS BAR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100A, Electrolyte Grade Aluminum Bus bars with 0.8A/Sq.mm Current density.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTGOINGS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100A TPN, 415V, 25 KA MPCB - 1 Nos</td>
<td></td>
</tr>
</tbody>
</table>

f) **PANEL # 6 WITH FOLLOWING INCOMER AND OUTGOING**

<table>
<thead>
<tr>
<th>INCOMER</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>63A, TPN, 415V, 10 KA MCB - 1 No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METERING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring parameters of Voltage, Current</td>
<td></td>
</tr>
<tr>
<td>63/5A, CL -1.0, 15VA Resin Cast Current Transformers - 3 Nos with Amp Meter</td>
<td></td>
</tr>
<tr>
<td>2A, SP MCB - 3 Nos With Volt Meter</td>
<td></td>
</tr>
<tr>
<td>LED Type Indication Lamps for R, Y, B Phase Indication and Breakers ON / OFF Indication</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>BUS BAR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>63A, Electrolyte Grade Aluminum Bus bars with 0.8A/Sq.mm Current density.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTGOINGS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 HP Starter Siemens type-3TW 42 90-1A -71- with ON/OFF indication - 10 Nos</td>
<td></td>
</tr>
</tbody>
</table>
### POWER AND CONTROL CABLES:

Supply, laying, testing and commissioning of following size 1.1KV Grade Aluminum XLPE / Copper Conductor XLPE insulated PVC Sheathed Armoured under ground cable and shall be laid in built up with cable trench/ Hume pipe or on cable tray (indoor/outdoor), complete with all installation, supporting, fixing materials and hardwares as required. The cable shall be conform to IS 1554 Part I.

<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 2R 3.5 Core x 50 Sqmm XLPE AL.AR Cable</td>
<td>115.00</td>
</tr>
<tr>
<td>b) 2R 3.5 Core x 35 Sqmm XLPE AL.AR Cable</td>
<td>1690.00</td>
</tr>
<tr>
<td>c) 2R 4.0 Core x 16 Sqmm XLPE AL.AR Cable</td>
<td>70.00</td>
</tr>
<tr>
<td>d) 3.0 Core x 6 Sqmm CU.AR Cable</td>
<td>50.00</td>
</tr>
<tr>
<td>e) 3.0 Core x 2.5 Sqmm CU.AR Cable</td>
<td>2522.00</td>
</tr>
</tbody>
</table>

### CABLE END TERMINATIONS:

Supply and termination with Double compression type brass gland, Bi-metallic Heavy duty lugs, insulation tape, identification tags etc., including Earthing of Gland.

<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 2R 3.5 Core x 50 Sqmm XLPE AL.AR Cable</td>
<td>12.00</td>
</tr>
<tr>
<td>b) 2R 3.5 Core x 35 Sqmm XLPE AL.AR Cable</td>
<td>88.00</td>
</tr>
<tr>
<td>c) 2R 4.0 Core x 16 Sqmm XLPE AL.AR Cable</td>
<td>12.00</td>
</tr>
<tr>
<td>d) 3.0 Core x 6 Sqmm CU.AR Cable</td>
<td>22.00</td>
</tr>
<tr>
<td>e) 3.0 Core x 2.5 Sqmm CU.AR Cable</td>
<td>162.00</td>
</tr>
</tbody>
</table>

### GI CABLE TRAYS:

GI PERFORATED CABLE TRAYS:

Supply & erection of the following sizes Hot dip galvanized G.I. perforated cable tray made of 2mm thick. The quoted price of cable tray items shall inclusive of all hardwares material, Elbow, cross, tee, bend, coupler plate with necessary grip bolts, grid plates and all other mounting, supports angle/channel & fixing accessories complete as required.

<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 600mm wide x 75 mm depth</td>
<td>1130.00</td>
</tr>
</tbody>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>b)</td>
<td>300mm wide x 50 mm depth</td>
<td>Rmt</td>
<td>325.00</td>
</tr>
<tr>
<td>c)</td>
<td>100mm wide x 50 mm depth</td>
<td>Rmt</td>
<td>278.00</td>
</tr>
<tr>
<td>25</td>
<td>DISCONNECT SWITCHES - PUSH BUTTON TYPE as per following specs:</td>
<td>Nos</td>
<td>30.00</td>
</tr>
</tbody>
</table>

UL, NEMA compliance Disconnect switches. Heavy-duty, horsepower rated for each AHU, single-throw knife switch with quick-make, quickbreak mechanism, capable of full load operations. Provide with contact arc-quenching devices, such as magnetic blowouts or snuffing plates. Provide self-aligning switchblades with silver alloy contact areas and designed so that arcing upon making and breaking does not occur on the final contact surfaces. Provide with high-pressure, spring-loaded contact. Mount switch parts on high-grade insulating base. Enclosure - NEMA I with hinged door, and defeatable interlock when switch is in "ON" position and can be positively padlocked in "ON" and "OFF" positions. Utilize NEMA 3R (rain-tight) enclosure for exterior installations.

Size, fusing, number of poles according to AHU/FAN ratings and use 3 pole plus solid neutral switches on four wire circuits and 3 pole switches on all other circuits, unless otherwise noted. Lugs must be UL listed for aluminum and/or copper conductors and be front removable. Provide starters/ contactors where required. All auxiliary items and push buttons with indication lamps to be included.

TOTAL AMOUNT--->

Signature of Bidder

Signature of EPIL