

**Government of India : Department of Space  
MASTER CONTROL FACILITY  
SALAGAME ROAD, HASSAN – 573 201 (KARNATAKA)**

**TENDER NOTICE NO. 001 DTD. 26.4.2009**

**BRIEF TENDER NOTICE**

On behalf of President of India, Purchase & Stores Officer, Master Control Facility (MCF), Hassan – 573 201 (Karnataka) invites sealed tenders in TWO-PART for the supply of following item.

Sl.No.	Ref. No.	Item Description	Quantity	Tender cost (Inclusive of Sales Tax) Non-refundable
1	MHDI 2009009064	Replacement of Air Conditioning Plant (SCC-A & SCC-B) at M.C.F. Hassan.	1 Job	Rs.218.00

**NOTE : TWO PART BID SYSTEM. INSTRUCTIONS ARE PART OF THE TENDER DOCUMENTS**

**DUE DATE FOR SUBMISSION OF TENDER : 29<sup>TH</sup> JULY 2009 AT 16.00 HRS. (IST)**  
**OPENING OF VALID TENDER : 30<sup>TH</sup> JULY 2009 AT 10.00 HRS. (IST)**

**NOTE:**

1. Tender documents are also available on ISRO Web site of [www.isro.gov.in](http://www.isro.gov.in) Tender Notice No.001 dtd. 26.4.2009. Interested tenderers may, at their option, download the tender documents from website and submit offers along with prescribed tender cost (in form of Bank Draft) as per details in the tender notification. The Demand Draft should be sent in a separate cover with a covering letter along with the cover containing the quotation.
2. Tender fee shall be payable only in the form of bank draft drawn in favour of Accounts Officer, Master Control Facility payable at Hassan. No other mode of payment for tender fee is acceptable.
3. Vendors/firms name and tender no. shall be indicated on the reverse side of the Demand Draft.
4. While requesting for tender documents, please do not superscribe tender number and due date on the envelope. Instead indicate "Request for Tender Documents".
5. Detailed specification, terms and conditions are furnished in the tender documents.
6. DD should not be dated prior to the date of advertisement / intimation / website.
7. MCF will not be responsible for non-receipt of tender documents/offers due to postal delay/loss in transit.

8. Quotations received without payment of tender fee will be treated as unsolicited.
9. The technical offer shall carry a minimum validity of 120 days from the date of opening.
10. Quotations received after the due date and time will not be considered.
11. While submitting your offer please superscribe tender no and due date on the envelope. Addressed to Purchase & Stores Officer, Master Control Facility, Salagame Road, Hassan – 573 201 (Karnataka).
12. If tender opening date happens to be public holiday tender will be opened on the next working day & interested Vendors may depute their Representatives to attend the Public Tender Opening.
13. Request for the extension of the due date will not be considered.
14. Purchase & Stores Officer, MCF shall reserves the right to accept or reject any tenders in part or full without assigning any reasons thereof.
15. Those who do not utilise the website shown at clause 01 above can also buy the Tender documents from Purchase & Stores Officer, Master Control Facility, Salagame Road, Hassan – 573 201 (Karnataka) on payment of Non-refundable tender fee as indicated above, on all working days between **1400Hrs to 1600Hrs**.

\* \* \*

## **ANNEXURE-I**

The scope shall broadly consists of:

- 1.Design, Supply, Installation, Commissioning and Testing of Microprocessor based Air-cooled condenser, Multiple refrigeration circuit,
  - i) Packaged air conditioning units -3 Nos. of capacity 22TR/ each for SCC- A plant and
  - ii) Packaged air conditioning units -3 Nos. of capacity 16.5 TR/ each for SCC- B plantComplete with all necessary accessories.
- 2.Supply & Installation of GSS supply air ducting complete with all required accessories.
- 3.Supply & Installation of Motorized damper, fire/smoke dampers, Pan humidifiers, Heaters with all required accessories.
- 4.Supply, Installation, Commissioning and Testing of necessary software/hardware for Remote Monitoring & Controlling of complete A/C system.
- 5.Supply of Electrical control panel complete with all interlock and safety features for SCC- A and SCC- B plant as per Annexure- II & III respectively.
6. Installation & Commissioning at MCF, Hassan.
- 7.Acceptance tests as per MCF requirement.

Note: The entire scope of work shall be carried out in 2 Phases i.e. SCC-A & SCC-B.

### **General Conditions:**

- 1.The offer shall be submitted in **TWO PARTS** viz., Technical bid and Price bid separately. Otherwise offer shall be rejected.
- 2.Clause by clause compliance statement is mandatory. Wherever there are deviations or better specifications, such deviation may be highlighted with proper explanation.
- 3.If any clarification are required in respect of the tender enquiry, suppliers may visit MCF(with prior approval) before submitting the offers.
- 4.Technical offers shall carry a minimum validity of 120 days from the date of opening.
- 5.List of clients/installation may be enclosed.
- 6.Only those vendors who can support the spares supply for minimum 10 years after guarantee period may send their offers.
- 7.Items supplied shall be guaranteed for a period of 12 months from the date of commissioning and acceptance of the complete system by MCF.

8.Refrigerant pipe length, area of duct, size of the damper given in the technical specifications are approximate. It may slightly vary depending upon the site conditions. Payment will be made at actual as per the unit rate given in the suppliers offers.

9.Material unloading, shifting and lifting of equipments to the place of installation shall be the scope of supplier. (New package units for SCC- A Plant need to be installed in the first floor. Therefore necessary material lifting mechanism shall also be arranged by the supplier)

10.Part-F of Annexure- II & III is an OPTIONAL item, which will be included in the scope of supply, only if it is required by MCF. But Vendors shall necessarily furnish the Technical details and it should be QUOTED SEPERATELY in the price bid.

**Technical Specifications for SCC- A plant**

**Part- A: Microprocessor based fully automatic packaged air conditioning units:**

<b>Sl. No</b>	<b>Qty</b>	<b>Description of the Item</b>	<b>Unit Rate (Rs.)</b>	<b>Amount (Rs.)</b>
1.0	03Nos.	<p>Design, Supply, Installation, Commissioning and Testing of fully automatic, Microprocessor based, Air cooled condenser, multiple refrigeration circuit, packaged air conditioning units of 22 TR/each complete with all accessories, safety cut outs such as HP/LP switch, overload relays, single phasing protection, Thermostat etc., suitable to operate on round the clock basis.</p> <p>a) Conditioned air quantity to be delivered by evaporator blower of each unit: Not less than 14,000 CMH</p> <p>b) Type of Compressor: Hermetically sealed Scroll.</p> <p>c) Type of Condenser: Air cooled (Note: Distance of the outdoor unit location from the indoor unit is 15 RMT approximate)</p> <p>d) No. of refrigeration circuits in each unit: 2 independent circuits.(i.e. 11TR x 2)</p> <p>e) Inside environmental conditions to be met with two unit operation: Temperature:21+/-2°C Relative humidity :55+/-5%</p> <p>f) A/C units shall be provided with latest Micro processor controller which operates the A/C unit automatically for maintaining the required inside conditions. Auto-start with necessary time delay after power interruption shall be in built feature of the Microprocessor system. In addition to this, A/C units need to be Controlled and Monitored remotely. Hence, the Packaged units offered shall be compatible for the same. Necessary Software/Hardware for remote monitoring and controlling the complete AC system shall be supplied by the vendors. Approximate distance between A/C unit location and Remote console is 800 mtrs.</p> <p>g) <u>EXTERNAL OVERLOAD RELAY</u> of suitable range, for all compressors shall be provided in addition to inbuilt internal thermal protector.</p> <p>h) Separate hand operated selector switch, out side microprocessor controller circuit, <u>in separate panel</u> for Manual and Auto mode selection shall be provided.(This</p>		

		<p>facility shall give the free option to run the unit either in Auto mode or in Manual mode at will bypassing the Microprocessor controller )</p> <p>i) Packaged A/C units shall be of Environment friendly Refrigerant gas.</p> <p>j)The noise level of indoor and outdoor units shall not exceed 70 db within 1 meter of the units</p>		
2.0	<p>90RMT (approx)</p> <p>90RMT (approx)</p>	<p>Supply, Installation &amp; Commissioning of HARD DRAWN GRADE 'L' Copper piping for Refrigerant lines, between Indoor and Out door units.</p> <p>i) Hot gas line-(15x2RMT)x3units</p> <p>ii) Liquid line-(15x2RMT)x3 units</p>		
3.0	Lot	<p>Supply, Installation &amp; Commissioning of Electrical cables between Indoor and Outdoor unit, pan humidifier, heaters etc.,</p> <p>Cables shall be Aluminum power cables confirming IS 7098 PT-1 with following specifications.</p> <p>Core color: Red, Yellow, Blue and Black</p> <p>Grade:1.1KV</p> <p>Aluminum conductor: stranded</p> <p>Inner sheath of PVC tape</p> <p>Insulation XLLPE</p> <p>Overall FRLS PVC outer sheathed</p> <p>Galvanized steel flat strip/round wire armored</p> <p>(Approximate distance between indoor unit to outdoor unit is 15 RMT)</p>		
4.0	03Nos.	<p>Design, Supply, Installation Testing and Commissioning of factory fabricated Motorized damper on the supply air outlet of each packaged air conditioner and complete as required.</p> <p>Damper Motors shall be electrically interlocked with the package unit so that damper motor gets ON at least 60-90 seconds <u>before</u> the blower fan gets ON. Similarly while switching OFF, Damper motor gets OFF at least 60-90seconds <u>after</u> the blower motor gets OFF</p>		
5.0	15 RMT (approx)	<p>Providing condensate water drain piping with 32 mm dia. PVC pipe with necessary bends/fittings complete as required</p>		



		<p>complete as required. One bank shall be manually operated and other two banks on thermostat and humidistat. Heaters shall be connected in equal capacity across each phase.</p> <p>Heaters shall be installed in the existing filter room with necessary MS frame work/insulators &amp; earthing. Heaters shall be electrically interlocked with the package unit to prevent from energizing unless air flow has been established.</p>		
4.0	01Set	<p>Supply, Installation , Commissioning &amp; Testing of: Pan humidifiers kit of adequate capacity and suitable for floor mounting for seasonal operation comprising immersion heater, float valve assembly, inlet make up and drain water connections, cabling and earthing etc. and complete as required with controls such as humidistat, geysers etc. (Necessary MS frame work/supports shall be provided)</p>		
5.0	01No.	<p>Supply &amp; Installation of Fresh air intake louvers made of extruded aluminum with bird/ insect screen with intake louvers. The lowest louvers of the assembly shall extend out slightly to facilitate disposal of rain water without falling on the wall on which it is mounted and complete with all aluminum construction volume control dampers.</p> <p>Size: 0.65 x 0.45 meters</p>		
6.0	01Set	<p>Supply &amp; Installation of 5 Micron filters, in the supply air path. (Micron filters shall be installed at existing filter room. Necessary MS frame work/Supports shall be provided)</p>		
7.0	Lot	<p>Painting of all equipments and all the accessories indicated in this work with one coat of primer and two coats of Anti rust/ Rust guard paint of approved quality and color and as directed by Head AC Division.</p>		
8.0	Lot	<p>All piping and cabling between Indoor and Out door units shall be routed through the MS trays with necessary supports / proper clamping and anti vibration rubber pads.</p>		
9.0	Lot	<p>Numbering for in door / out door units of the packaged A/C.</p>		
10.0	Lot	<p>Minor civil works like cutting away and making good of openings in walls, ceilings for passage of pipes, ducts, cables etc., complete as required, including arranging scaffolding if necessary.</p>		

**Part- C: Remote Monitoring & Controlling of complete A/C system, Hardware / Software**

Sl. No	Qty	Description of the Item	Unit Rate (Rs.)	Amount (Rs.)
1.0	Lot	<p>Design, Supply, Installation, Commissioning &amp; Testing of DDC system complete as required. Necessary hardware/software for remote monitoring and controlling the complete A/C systems shall be supplied.</p> <p><b>Port configuration shall be</b>  <b>RS232 → Ethernet → output</b></p> <p><b><u>DDC system shall consist of following</u></b></p> <p><b>i) Monitoring and data acquisition function:</b>            Following data points shall be available.            a) RH and temperature of Computer room, Base band, SCC hall &amp; UPS Room.            b) ON/OFF status of the PAC unit.            c) Trip status/Alarm/Alarm history.            d) Running hours of Packaged A/C units.</p> <p><b>ii) Central control function:</b> It shall have following modes of switching commands.            a) PC Auto ON/Auto OFF            b) PC Manual ON/Manual OFF            c) Manual Mode(Local ON/OFF)</p> <p><b>iii) Graphs/Trends:</b> The graphic package shall be available in the system. Following parameters can be viewed as graphs and can be configurable at site.            RH &amp; temperature of Computer room, Base band, SCC hall &amp; UPS Room.</p> <p><b>iv) Data recording facility:</b></p> <p><b>v) Supply &amp; installation of data cables along with all accessories complete as required:</b>            Cabling shall be as per the following            a) The cable running from A/C unit location and remote console shall be OFC with suitable transmitter and receivers            b) Supply and laying of 19mm dia, 16 SWG MS conduit including bends and Junction boxes (shall consider a bend for each 20 mtrs. and junction box for each 40 mtrs of conduit) All joints and bends shall be threaded type. Surface run on walls/ceiling/cable trench /column with 6mm thick spacers at 600 mm intervals with saddles including supply and drawing of 14 SWG Copper wire as earth wire, painting of conduit, spacers, saddles with approved shade of enamel paint, supplying and fixing materials complete as required.            c) Laying of OFC in the 19mm conduit.</p> <p>Note: Approximate distance between A/C unit location and remote console location is 800 mtrs.</p>		

**Part- D: Electrical Control Panel**

SI.No	Qty	Description of the Item	Unit Rate Rs.	Amount Rs.
1.0	Lot	Electrical works comprising of supply, installation, testing and commissioning of complete power system and control system for the satisfactory operation of the Packaged A/C units, Humidifiers and Heaters. The electrical work shall consist of the following:		
2.0	1 No	Indoor floor mounted cubicle, dead front type, Main Motor control panel, dust and vermin proof, fully tropicalized construction with 14 SWG MS sheet with necessary anti corrosive treatment and powder coating of approved quality and color The panel shall be suitable for operation on 420 Volts +/-5%, 3 phase, 4 wire, 50 Hz AC supply complete with all inter connections and consisting of : Main incoming MCCB of suitable rating with 50 KA symmetrical breaking capacity, Earth leakage protection, shunt trip release and auxiliary contact block and having door interlocking facility. The MCCB shall have a leakage current tripping sensitivity of 100 milliamp. The incoming panel which accommodates the MCCB shall be provided with indicating lamps for ON and OFF positions of the circuit breaker. Digital Voltmeter and Ammeter with selector switch and CT of suitable range and accuracy Class I, KWH meter shall be provided as required for main incoming power supply.		
3.0	Lot	Instrumentation, consisting of digital ammeter with selector switch and CT's of suitable range and accuracy Class I, indication lamps, fuses and controls, for each packaged units.		
4.0	Lot	TPN aluminum bus bar of suitable capacity, mounted on non hygroscopic, glass fiber reinforced insulators.		
5.0	Lot	AC 23 duty switch fuse units of suitable capacity with HRC fuse links, suitable for satisfactory operation of package units, heaters, Pan humidifiers etc.		
6.0	02	Two Nos. of earthing strips on each side of the panel.		
7.0	Lot	Necessary armored cabling/ wiring in approved metallic enclosures for all power and control circuits in between all equipment and main panel. All power Cabling / control wiring shall be laid in cable trays. Incoming Power supply to the Electrical panel shall be provided by our Department. Further, cabling from the Electrical panel to the AC equipments shall be provided by the AC supplier.		

8.0	Lot	Necessary earthing work comprising of providing required two numbers of GI pipe earth stations and earthing of electrical equipments/motors including inter connection with suitable size of GI strips/wires. The length of the pipes shall be selected as 2.5 or 3.5 mtrs. depending upon the soil resistivity. The size of the strips/wires shall be decided in consultation with our Electrical Engineers.		
9.0	Lot	<p>The panel shall have necessary interfaces like 24 V DC/230 V AC relays, air break contactors etc. to trip the MCCB controlling the incoming supply on receiving signal from Supply air fire/smoke dampers, Return air fire/smoke detector system. Required number of NO/NC contacts with the LED shall be provided for visual (Actuation/OFF) indication of this trip signal along with a by pass key type actuator ( Lockable in two positions)</p> <p><b><u>Notes for Electrical panel:</u></b></p> <p>i) Cleaning and surface treatment of panel frame and all steel parts of the panel shall be carried out through seven tank process.</p> <p>ii)After rigorous surface treatment, panel shall be treated with powder coating process.</p> <p>iii)Fire retardant paint shall be applied inside switch chambers and bus bar chambers.</p> <p>iv) All panels shall have fire retarding DMC/SMC filling for the opening around the bus bar near to the sectional barriers, and door inter locking facility for all compartments.</p> <p>v) All terminations shall be made with proper lugs in the approved manner.</p> <p>vi)All components, panels, cables etc., shall confirm to relevant IS specifications and shall also be got approved by Head ACD.</p> <p>vii) Erection, testing and commissioning of the system and various components shall be done as per the relevant IS specifications.</p> <p>viii) All panels rated for more than 100 amps shall be provided with MCCB, for panels rated 63 amps or less MCB along with ELCB shall be provided.</p> <p>ix) All steel works used in construction of panel shall undergo seven tank metal treatment process.</p>		
			Total	

## PART- E : Installation, Commissioning & Testing

Sl.No	Qty	Description of the Item	Unit Rate (Rs.)	Amount (Rs.)
1.0	Lot	Plant Erection, System Integration, Commissioning & Testing –Labor charges		
			Total	

1. Installation, Commissioning and Acceptance of entire scope of work mentioned in the General and Technical specifications is at Master Control Facility, Hassan
2. Installation & Commissioning of the system and various components shall be done as per the relevant IS specifications
3. Acceptance test of the complete system shall be done as per the MCF requirement
4. Supplier shall carry out 24 hours pressure testing of the refrigeration circuit before commissioning the plant
5. Supplier shall carry out Min. 3 days round the clock test run of the packaged air conditioner after commissioning the plant. Also full load test of Min. 4 days after energizing the user equipment in the conditioned area.
6. After testing and evaluation of the system, the supplier shall provide following documents before the acceptance of the system.
  - i)PAC Operation & Maintenance manual-3 sets
  - ii)DDC Operation & Maintenance manual-3 sets
  - iii)Control & Power wiring diagram- 3 sets
  - iv)Duct lay out drawing- 3 sets
  - v)Test certificates of A/C equipment/ components/Electrical panel/ Fire dampers - 3 sets
  - vi)Test readings- 2 sets
  - vii) Inventory list-3 sets

**Part- F: Recommended Spares (Optional Item)**

Sl.No	Qty	Description of the Item	Unit Rate (Rs.)	Amount (Rs.)
<b>Components of the Packaged A/C Units supplied by the supplier</b>				
1.0	3Sets.	Condenser fan assembly including fan motor and blade.		
2.0	1 No.	Blower runner assembly including blower, blower housing and shaft		
3.0	1No.	Blower motor		
4.0	1Set	Microprocessor controller with all accessories including sensors and display unit.		

List of Items to be supplied by the supplier (BOQ)

Sl. No	Description of the Items	Qty	Ref. No of Annexure - II
1	Packaged A/C units of cooling capacity 22 TR	03Nos.	Part- A- Sl. No 1
2	HARD DRAWN GRADE- L' Copper piping for refrigerant lines between Indoor & Out door unit Hot gas line –(15 RMT x 2circuits) x 3 units  Liquid line- (15 RMT x 2circuits) x 3 units	90RMT (approx) 90RMT (approx)	Part- A- Sl. No 2
3	Electrical cabling between Indoor unit, Out door unit, Pan humidifiers, heaters etc	01 Lot	Part- A- Sl. No 3
4	PAC unit motorized damper	03Nos.	Part- A- Sl. No 4
5	PAC unit condensate water line -32 mm(1¼”) dia PVC pipe	15RMT (approx)	Part- A- Sl. No 5
6	GSS Supply air duct 1.00 mm thick	100Sq Mtr (approx)	Part- B- Sl. No 1
7	Motorized fire & smoke dampers with actuators for SA duct Fire/smoke detector system in RA path	01No. 01Set	Part- B- Sl. No 2
8	Heater kit- 18 KW	01Set	Part- B- Sl. No 3
9	Pan humidifier kit	01Set	Part- B- Sl. No 4
10	Fresh air intake louvers	01No.	Part- B- Sl. No 5
11	5 Micron filters	01Set	Part- B- Sl. No 6
12	Paints/primer etc.,	01Set	Part- B- Sl. No 7
13	MS trays/clamps/ bolt nuts/ screws etc.,	01Set	Part- B- Sl. No 8
14	Stickers for Numbering of equipments	01Set	Part- B- Sl. No 9
15	DDC system Hardware & software (for Remote monitoring & Controlling)	1 Lot	Part- C
16	Electrical panel	1 Lot	Part -D

**Recommended spares(Optional Items)**

Sl.No	Description of the Item	Qty	Ref. No of Annexure - II
<b>Components of the 22 TR Packaged A/C Units supplied by the supplier</b>			
1.0	Condenser fan assembly	03sets	Part F-SI.No. 1
2.0	Blower runner assembly	01 No.	Part F-SI.No.2
3.0	Blower motor	01No.	Part F-SI.No.3
4.0	Microprocessor controller	01Set	Part F-SI.No.4

**Technical Specifications for SCC- B Plant**

**Part- A: Microprocessor based fully automatic packaged air conditioning units:**

<b>Sl. No</b>	<b>Qty</b>	<b>Description of the Item</b>	<b>Unit Rate (Rs.)</b>	<b>Amount (Rs.)</b>
1.0	03 Nos.	<p>Design, Supply, Installation, Commissioning and Testing of fully automatic, Microprocessor based, Air cooled condenser, multiple refrigeration circuit, packaged air conditioning units of 16.5TR/each complete with all accessories, safety cut outs such as HP/LP switch, overload relays, single phasing protection, Thermostat etc. suitable to operate on round the clock basis.</p> <p>a) Conditioned air quantity to be delivered by evaporator blower of each unit: Not less than 11,000 CMH</p> <p>b) Type of Compressor: Hermetically sealed Scroll</p> <p>c) Type of Condenser: Air cooled (Note: Distance of the outdoor unit location from the indoor unit is 12 RMT approximate)</p> <p>d) No. of refrigeration circuits in each unit: 3 Independent refrigeration circuits(i.e. 5.5TR x 3)</p> <p>e) Inside environmental conditions to be met with two unit operation: Temperature:21+/-2°C Relative humidity :55+/-5%</p> <p>f) A/C units shall be provided with latest Micro processor controller which operates the A/C unit automatically for maintaining the required inside conditions. Auto-start with necessary time delay after power interruption shall be in built feature of the Microprocessor system. In addition to this A/C units need to be Controlled and Monitored remotely. Hence, the Packaged units offered shall be compatible for the same. Necessary Software/Hardware for remote monitoring and controlling of complete AC system shall be supplied by the vendors. Approximate distance between A/C unit location and Remote console is 800 mtrs.</p> <p>g) <u>EXTERNAL</u> overload relay of suitable range, for all compressors shall be provided in addition to inbuilt Internal thermal protector.</p> <p>h) Separate hand operated selector switch, out side microprocessor controller circuit in separate panel for</p>		

		<p>Manual and Auto mode selection shall be provided.(This facility shall give the free option to run the unit either in Auto mode or in Manual mode at will by passing the Microprocessor controller)</p> <p>i) Packaged A/C units shall be of Environment friendly Refrigerant gas.</p> <p>j)The noise level of indoor and outdoor units shall not exceed 70 db within 1 meter of the units</p>		
2.0	108RMT (approx) 108RMT (approx)	<p>Supply, Installation &amp; Commissioning of HARD DRAWN GRADE 'L' Copper piping for refrigerant lines, between Indoor and out door units.</p> <p>i)Hot gas line-(12x3RMT)x3units</p> <p>ii) Liquid line-(12x3RMT)x3 units</p>		
3.0	Lot	<p>Supply, Installation &amp; Commissioning of electrical cables between indoor and outdoor unit, pan humidifier, heaters etc.,</p> <p>Cables shall be Aluminum power cables confirming IS 7098 PT-1 with following specifications.</p> <p>Core color: Red, Yellow, Blue and Black</p> <p>Grade:1.1KV</p> <p>Aluminum conductor: stranded</p> <p>Inner sheath of PVC tape</p> <p>Insulation XLLPE</p> <p>Overall FRLS PVC outer sheathed</p> <p>Galvanized steel flat strip/round wire armoured</p> <p>(approximate distance between indoor unit to outdoor unit is 12 Mtrs)</p>		
4.0	03Nos.	<p>Design, Supply, Installation, Testing and Commissioning of factory fabricated motorized damper on the supply air outlet of each packaged air conditioner and complete as required. Damper motors shall be electrically interlocked with the package unit so that damper motor gets ON at least 60-90 seconds <u>before</u> the blower fan gets ON. Similarly while switching OFF Damper motor gets OFF at least 60-90seconds <u>after</u> the blower motor gets OFF</p>		
5.0	12RMT (approx)	<p>Providing condensate water drain piping with 32 mm dia PVC pipe with necessary bends/ fittings complete as required</p>		



		connected in equal capacity across each phase. Heaters shall be installed in the Supply air duct at suitable location in packaged unit room with necessary MS frame work/insulators & earthing. Heaters shall be electrically interlocked with the package unit to prevent from energizing unless air flow has been established.		
4.0	01Set	Supply, Installation, Testing and Commissioning of: Pan humidifiers kit of adequate capacity and suitable for wall mounting for seasonal operation comprising immersion heater, float valve assembly, inlet make up and drain water connections, cabling and earthing etc. and complete as required with controls such as humidistat, geysersstat etc		
5.0	1 No	Supply & Installation of Fresh air intake louvers made of extruded aluminum with bird/ insect screen with intake louvers. The lowest louvers of the assembly shall extend out slightly to facilitate disposal of rain water without falling on the wall on which it is mounted and complete with all aluminum construction, volume control dampers. Size: 0.65 x 0.45 meters-1 No.		
6.0	01 Set	Providing 5 micron filters, in the supply air duct(Necessary MS frame work/ supports shall be provided to install the filters)		
7.0	Lot	Providing suitable MS frame for outdoor units including clamping of pipes/cables and providing anti vibration rubber pads. MS angles shall not be less than 50mmx50mm and 5mm thickness in size.		
8.0	Lot	Painting of all equipments and all the accessories indicated in this work with one coat of primer and two coats of Anti rust/ Rust guard paint of approved quality and color and as directed by Head AC Division.		
9.0	Lot	All piping and cabling between Indoor and Out door units shall be routed through the MS trays with necessary supports / proper clamping and anti vibration rubber pads.		
10.0	Lot	Numbering for in door / out door units of the packaged A/C.		
11.0	Lot	Minor civil works like cutting away and making good of openings in walls, ceilings for passage of pipes, ducts, cables etc., complete as required, including arranging scaffolding if necessary.		

**Part- C: Remote Monitoring & Controlling of complete A/C system, Hardware / Software**

Sl. No	Qty	Description of the Item	Unit Rate (Rs.)	Amount (Rs.)
1.0	Lot	<p>Design, Supply, Installation, Commissioning and Testing of DDC system complete as required. Necessary hardware/software for remote monitoring and controlling of the A/C systems shall be supplied.</p> <p><b>Port configuration shall be</b>  <b>RS232 → Ethernet → output</b></p> <p><b><u>DDC system shall consist of following</u></b></p> <p><b>i) Monitoring and data acquisition function:</b> Following data points shall be available.</p> <p>a) RH and Temperature of VHRR, Conference Hall and Video conference Room.</p> <p>b) ON/OFF status of the PAC unit.</p> <p>c) Trip status/Alarm/Alarm history.</p> <p>d) Running hours.</p> <p><b>ii) Central control function:</b> It shall have following modes of switching commands.</p> <p>a) PC Auto ON/Auto OFF</p> <p>b) PC Manual ON/Manual OFF</p> <p>c) Manual Mode(Local ON/OFF)</p> <p><b>iii) Graphs/Trends:</b> The graphic package shall be available in the system. Following parameters can be viewed as graphs and can be configurable at site. RH &amp; Temperature of VHRR, Conference Hall &amp; Video conference Hall</p> <p><b>iv) Data recording facility</b></p> <p><b>v) Supply &amp; installation of data cables along with all accessories complete as required:</b> Cabling shall be as per the following</p> <p>a) The cable running from A/C unit location and remote console shall be OFC with suitable transmitter and receivers</p> <p>b) Supply and laying of 19mm dia, 16 SWG MS conduit including bends and junction boxes (shall consider a bend for each 20 mtrs. and junction box for each 40 mtrs of conduit) All joints and bends shall be threaded type. Surface run on walls/ceiling/cable trench /column with 6mm thick spacers at 600 mm interval with saddles including supply and drawing of 14 SWG Copper wire as earth wire, painting of conduit, spacers, saddles with approved shade of enamel paint, supplying and fixing materials complete as required.</p> <p>c) Laying of OFC in the 19mm conduit.</p> <p>Note: Approximate distance between A/C unit location and remote console location is 800 mtrs.</p>		

## Part- D: Electrical Control Panel

Sl. No	Qty	Description of the Item	Unit Rate (Rs.)	Amount (Rs.)
1.0	Lot	Electrical works comprising of Supply, Installation, commissioning and Testing of complete power system and control system for the satisfactory operation of the Packaged A/C units, Humidifiers and Heaters. The electrical work shall consist of the following:		
2.0	01 No	Indoor floor mounted cubicle, dead front type, Main Motor control panel, dust and vermin proof, fully tropicalised construction with 14 SWG MS sheet with necessary anti corrosive treatment and powder coating of approved quality and color. The panel shall be suitable for operation on 420Volts +/-5%, 3 phase, 4 wire, 50 Hz AC supply complete with all inter connections and consisting of : Main incoming MCCB of suitable rating with 50 KA symmetrical breaking capacity, Earth leakage protection, shunt trip release and auxiliary contact block and having door interlocking facility. The MCCB shall have a leakage current tripping sensitivity of 100 milliamp. The incoming panel which accommodates the MCCB shall be provided with indicating lamps for ON and OFF positions of the circuit breaker. Digital Voltmeter and Ammeter with selector switch and CT of suitable range and accuracy Class I, KWH meter shall be provided as required for main incoming power supply.		
3.0		Instrumentation, consisting of digital ammeter with selector switch and CT's of suitable range and accuracy Class I, indication lamps, fuses and controls, for each packaged units.		
4.0		TPN aluminum bus bar of suitable capacity, mounted on non hygroscopic, glass fiber reinforced insulators.		
5.0		AC 23 duty switch fuse units of suitable capacity with HRC fuse links, suitable for satisfactory operation of package units, heaters, Pan humidifiers etc.		
6.0		Two Nos. of earthing strips on each side of the panel.		
7.0		Necessary armored cabling/ wiring in approved metallic enclosures for all power and control circuits in between all equipment and main panel. All power Cabling / control wiring shall be laid in cable trays. Incoming Power supply to the Electrical panel shall be provided by our Department. Further, cabling from the Electrical panel to the AC equipments shall be provided by the AC supplier.		

8.0		<p>Necessary earthing work comprising of providing required two numbers of GI pipe earth stations and earthing of electrical equipments/motors including inter connection with suitable size of GI strips/wires. The length of the pipes shall be selected as 2.5 or 3.5 mtr depending upon the soil resistivity. The size of the strips/wires shall be decided in consultation with our Electrical Engineers.</p>		
9.0		<p>The panel shall have necessary interfaces like 24 V DC/230 V AC relays, air break contactors etc. to trip the MCCB controlling the incoming supply on receiving signal from Supply air fire/smoke dampers, Return air fire/smoke detector system. Required number of NO / NC contacts with the LED shall be provided for visual (Actuation/ OFF) indication of this trip signal along with a by pass key type actuator (Lockable in two positions)</p> <p><b><u>Notes for Electrical panel:</u></b></p> <p>i) Cleaning and surface treatment of panel frame and all steel parts of the panel shall be carried out through seven tank process.</p> <p>ii)After rigorous surface treatment, panel shall be treated with powder coating process.</p> <p>iii)Fire retardant paint shall be applied inside switch chambers and bus bar chambers.</p> <p>iv) All panels shall have fire retarding DMC/SMC filling for the opening around the bus bar near to the sectional barriers, and door inter locking facility for all compartments.</p> <p>v) All terminations shall be made with proper lugs in the approved manner.</p> <p>vi)All components, panels, cables etc., shall confirm to relevant IS specifications and shall also be got approved by Head ACD.</p> <p>vii) Erection, testing and commissioning of the system and various components shall be done as per the relevant IS specifications.</p> <p>viii) All panels rated for more than 100 amps shall be provided with MCCB, for panels rated 63 amps or less MCB along with ELCB shall be provided.</p> <p>ix) All steel works used in construction of panel shall undergo seven tank metal treatment process.</p>		
<b>Total</b>				

**Part- E: Installation, Commissioning & Testing**

<b>Sl.No</b>	<b>Qty</b>	<b>Description of the Item</b>	<b>Unit Rate (Rs.)</b>	<b>Amount (Rs.)</b>
1.0	Lot	Plant Erection, System Integration, Commissioning & Testing –Labor charges		
			Total	

1. Installation, Commissioning and Acceptance of entire scope of work mentioned in the General and Technical specifications is at Master Control Facility, Hassan
2. Installation & Commissioning of the system and various components shall be done as per the relevant IS specifications.
3. Acceptance test of the complete system shall be done as per the MCF requirement.
4. Supplier shall carry out 24 hours pressure testing of the refrigeration circuit before commissioning the plant
5. Supplier shall carry out Min. 3 days round the clock test run of the packaged air conditioner after commissioning the plant. Also full load test of Min. 4 days after energizing the user equipment in the conditioned area.
6. After testing and evaluation of the system, the supplier shall provide following documents before the acceptance of the system.
  - i) PAC Operation & Maintenance manual-3 sets
  - ii) DDC Operation & Maintenance manual-3 sets
  - iii) Control & Power wiring diagram- 3 sets
  - iv) Duct lay out drawing- 3 sets
  - v) Test certificates of A/C equipment/ components/Electrical panel/ Fire dampers etc., - 3 sets
  - vi) Test readings- 2 sets
  - vii) Inventory list-3 sets

## Part- F: Recommended Spares(Optional)

Sl.No	Qty	Description of the Item	Unit Rate (Rs.)	Amount (Rs.)
<b>Components of the 16.5 TR Packaged A/C Units supplied by the supplier</b>				
1.0	3Sets.	Condenser fan assembly including fan motor and blade.		
2.0	1 No.	Blower runner assembly including blower, blower housing and shaft		
3.0	1No.	Blower motor		
4.0	1Set.	Microprocessor controller with all accessories including sensors and display unit.		

### List of Items to be supplied by the supplier (BOQ)

Sl. No	Description of the Items	Qty	Ref. No of Annexure -III
1	Packaged A/C units of cooling capacity 16.5 TR	03 Nos	Part- A- Sl. No 1
2	HARD DRAWN GRADE- L' Copper piping for refrigerant lines between Indoor & Out door unit Hot gas line –(12 RMT x 3circuits) x 3 units Liquid line- (12 RMT x 3circuits) x 3 units	108RMT (approx) 108RMT (approx)	Part- A- Sl. No 2
3	Electrical cabling between Indoor unit, Out door unit, Pan humidifiers, heaters etc	01 Lot	Part- A- Sl. No 3
4	PAC unit motorized damper	03 Nos	Part- A- Sl. No 4
5	PAC unit condensate water line -32 mm(1¼") dia PVC pipe	12RMT (approx)	Part- A- Sl. No 5
6	GSS Supply air duct - 0.63 mm thick GSS Supply air duct-1.25 mm thick	65SqMtr (approx) 25SqMtr (approx)	Part- B- Sl. No 1
7	Motorized fire & smoke dampers with actuators for SA duct Fire/smoke detector system in RA path	02 Nos 01 Set	Part- B- Sl. No 2
8	Heater kit- 18 kw	01Set	Part- B- Sl. No 3
9	Pan humidifier kit	01Set	Part- B- Sl. No 4
10	Fresh air intake louvers	01 No	Part- B- Sl. No 5
11	5 Micron filters	01Set	Part- B- Sl. No 6
12	MS frame for outdoor units	01Lot	Part-B- Sl.No. 7
13	Paints/primer etc.,	01Lot	Part- B- Sl. No 8
14	MS trays/clamps/ bolt nuts/ screws etc/	01Lot	Part- B- Sl. No 9
15	Stickers for Numbering of equipments	01Lot	Part- B- Sl. No 10
16	DDC system Hardware & software (for Remote monitoring & Controlling)	01Lot	Part- C- Sl. No 1
17	Electrical panel	01 No	Part -D

## Optional Items ( Recommended spares)

Sl.No	Description of the Item	Qty	Ref. No of Annexure -III
<b>Components of the 16.5 TR Packaged A/C Units supplied by the supplier</b>			
1.0	Condenser fan assembly	03sets	Part F-SI.No. 1
2.0	Blower runner assembly	01 No.	Part F-SI.No.2
3.0	Blower motor	01No.	Part F-SI.No.3
4.0	Microprocessor controller	01Set.	Part F-SI.No.4

### List of preferred Makes

Packaged A/C units: Bluestar/Voltas/Carrier/Emmerson/ETA/ LG  
 DDC controller: Presvi  
 Temperature Sensors: Johnson/.Honeywell/IRA/Presevi  
 Humidity Sensor: Johnson/Honeywell/IRA/Presevi  
 Electric Motors: ABB / Siemens/ Crompton greaves/ Kirloskar (IS Marked)  
 Starters : Siemens/L&T/ Schneider/GE power controls/Tecnic  
 MCBs: MDS legrand/Havells/Versatrip/GE power controls/Siemens/Indo-kopp/Safeline/Indo  
 Asian/S&S/Datar/H.H.Elcon/Schneider/Hager(L&T)/Alstom/ABB  
 ELCBs:GEC-Alstom/MDS Legrand/Guts/Prok-DVS/Siemenns/Havells/GE power controls/Indo-Kopp/Datar/HH Elcon/Schneider  
 MCCBs: L&T/Siemens/English Electric/Alstom/HH Elecon/GE power controls/ABB/MDS Legrand/Schneider/C&S  
 Overload relays: L&T/Siemens/GE power controls/Abb/ Schneider Electric  
 Switches: Siemens/ L&T/ ABM / MG  
 Push buttons/ /Lamps: Siemens/Tecnic  
 Control Instruments: Thermostats –Honeywell/Ranco/Johnson/Siemens  
 Humidistat –Honeywell/Ranco/Johnson/Siemens  
 HP/LP pressure switches- Danfoss/Ranco  
 Damper motors: Honeywell/ Belimo  
 GSS ducting sheets: SAIL/TISCO/ Jindal/Ispat  
 Fire Dampers: Caryaire/George Rao & CO./ Air master/Ravistar/  
 Actuators for fire dampers: Joventa/Belimo  
 Fresh air grilles:Caryaire/Ravistar/Airmaster  
 Pan humidifier:Rapid cool  
 Safety thermostat:Anergy controls  
 Damper motors:Honeywell/Belimo  
 5 Micron filters: Aerosol/KlenzaidPurair/Kirloskar/M.N.Rama rao&co/ Chempharm Industries/ John Fowler(India) Ltd

\*Note: List of preferred makes is for guidance only. If better makes are offered, evaluation on case to case basis will be made by MCF, if required.

# **SPECIAL INSTRUCTIONS FOR 2 PART TENDER**

We invite your offer in 2 part as follows:

- a PART – I TECHNICAL & COMMERCIAL TERMS OTHER THAN PRICE
- b PART - II PRICES ONLY.

## **PART – I: TECHNICAL & COMMERCIAL**

- 1) Our Tender Enquiry contains technical requirements and specification. The detailed technical specification of your offer should be covered in this part. This part should not contain prices. This is to be prepared and duly signed and sent in a sealed cover duly superscribing.

**Quotation against Tender No.  
Due on:  
FOR THE SUPPLY OF  
  
PART - I TECHNICAL & COMMERCIAL)  
The cover should indicate “from” address**

- 2) The Commercial Terms to be covered in this Part are Delivery Terms as per ( INCOTERMS), Delivery Period, Payment Terms (without mentioning the price or amount), acceptance of Bank Charges payable outside India, Whether item needs Export Licence, Validity of the Offer, Warranty/Guarantee, Performance Guarantee, Liquidated Damages (for delayed supplies) etc.

## **PART – II: PRICE ALONE**

- 1) The Currency and Prices for the items should be indicated item wise with Break-up in this part. Options where quoted, should indicate quantity, unit rate separately. The Prices are to be mentioned both in figures as well as in words and each page is to be signed by your Authorized Signatory. This part VIZ PART - II should also be duly signed and sent in a separate cover superscribing as follows:

**“ Quotation against Tender No.  
Due on:  
FOR THE SUPPLY OF  
  
PART-II (PRICE BID)  
The cover should indicate “from” address**

All these two covers prepared as above should be kept in another envelope sealed superscribed as mentioned below:

**QUOTATION AGAINST TENDER NO.  
DUE ON:**

ADDRESS TO:

**PURCHASE & STORES OFFICER  
MASTER CONTROL FACILITY  
GOVERNMENT OF INDIA  
DEPARTMENT OF SPACE  
PB # 66, HASSAN-573 201  
KARNATAKA**

**Telephone: +91 08172-273594  
Fax : +91 08172-239035**

- 2) Normally we do not open PART- II. If PART - I does not meet with our technical specification requirements. Your offer prepared as above should reach us on or before the due date and time. The offers received after the due date and time will be treated as in-valid.

\* \* \*