

Tender Part-II
Special Conditions of Contract

1. GENERAL

- 1.1 The subject tender is called for replacement for 4 Nos. Precision Air-Conditioning units installed in Main Data Centre at CRIS office complex, Chanakyapuri, New Delhi-21. This may be noted that the proposed work is to be carried out in a very critical Data Centre of Indian Railways which cannot be shut and will remain operational even during execution of this work.
- 1.2 Tenderers are advised to inspect the site before participating in the tender to assess the scope of work / existing setup and make sure that proposed Precision Air-Conditioning units can be installed in existing available space.
- 1.3 Any other details required by the bidder may be obtained from the office of Deputy Manager/Electrical on any working day between 10 AM to 5 PM.
- 1.4 The bidder shall submit an authorization letter from the Original Equipment Manufacturer (OEM) of confirming the availability of genuine spare parts and maintenance services for the offered Comprehensive Annual Maintenance Contract. The format for the same is available at Annexure- 8 in SBD Part-I.
- 1.5 As per CRIS I&S policy Non-Disclosure Agreement (NDA) for confidentiality has to be signed by the successful bidder or OEM before execution of any work with CRIS, format of NDA is enclosed at Annexure-14 in SBD Part-I.
- 1.6 Relaxation for MSEs & Start-ups is as per Clause 12.2 & 12.3 of the Standard Bid Document Part-I respectively.
- 1.7 Compliance to MAKE-IN-INDIA Policy: As per Standard Bid Document Part-I
- 1.8 Safety and Industrial Law/ Labour Law: As per Standard Bid Document Part-I
- 1.9 Evaluation and Consideration of bids: The evaluation and acceptance of bids shall be carried out in accordance with the procedure specified in Standard Bid Document Part-I.
- 1.10 Electronic Reverse Auction (eRA) is not applicable in this tender.
- 1.11 JV and Consortium are not allowed to bid in this tender.
- 1.12 **Security Deposit/ Bank Guarantee:** The successful bidder shall submit a Performance Bank Guarantee (PBG) equivalent to 5% of the total awarded value of the Work Order (i.e., Schedule 'A' and Schedule 'B'), within twenty-one (21) days from the date of issue of the Letter of Acceptance (LOA). All other terms and conditions related to the Performance Bank Guarantee shall be as per the provisions specified in Standard Bidding Document Part-I. The validity of PBG should be 3 months beyond the last date of post warranty annual maintenance contract from the date of completion and handing over.
- 1.13 **Payment Terms:** Payment terms for SITC (i.e. Schedule 'A') shall be applicable as per Clause 20.2 and for post-warranty annual maintenance (i.e. Schedule 'B') as per Clause 20.3 of the Standard Bid Document Part-1.

- 1.14 **Dispute Resolution:** If any dispute arises during the term of the contract, it shall be resolved in accordance with Clause 41 of Standard Bid Document Part-I.
- 2. PERIOD OF COMPLETION**
- 2.1 The completion period for the work of supply, installation, testing and commissioning of Precision Air Conditioning units is six (06) months from the date of issue of the work order. Time is the essence of this contract. The contractor will be required to maintain steady and regular progress to the satisfaction of the Engineer to ensure that the work is complete in all respects within the stipulated time.
- 2.2 The currency of contract for comprehensive (with spares) on site annual maintenance shall be for a period of five years after the warranty period of one year from the installation, commissioning and satisfactory handing over of Precision Air Conditioning units. However, it may be extended further for a period of two years (one year at a time) by adopting due procedure. The rate for extended period (i.e. sixth & seventh year) would be same as that of fifth year after warranty period.
- 3. COMPLETENESS OF WORK**
- 3.1 The bidder should be a total solution provider and shall cover the total scope of the Contract. The bidder shall ensure availability of all technical expertise, manpower resources, availability of spare parts, logistics support etc. and all the expenses incurred for the same will be borne by the bidder.
- 3.2 Completeness of the EQUIPMENT/SERVICES shall also be the responsibility of the bidder. Any equipment, fittings and accessories which may not be specifically mentioned in the specifications, but which are usual or necessary for the satisfactory functioning of the equipment (successful operation and functioning of the EQUIPMENT being bidder's responsibility) shall be provided by bidder without any extra cost.
- 3.3 Bidder must identify a senior level Manager for entire project execution, management and regular liaison / discussions with CRIS.
- 4. QUALITY OF MATERIALS AND ERECTION**
- 4.1 All materials used in the work shall be as per the OEM's recommendations, good quality & of reputed make confirming to relevant standards for the purpose specified.
- 4.2 All work carried out shall also be of the best workmanship and offered for inspection to the CRIS representative, who shall have the power to reject any material or order for removal of any work done which in his opinion is faulty or insecure and the successful bidder shall replace the same to the satisfaction of CRIS.
- 5. INSPECTION AND FINAL ACCEPTANCE**
- 5.1 The successful bidder will be required to furnish such facilities as will be necessary for inspection of equipment's before dispatch at his or his associate works/godown/warehouse required for acceptance. The successful bidder will give sufficient notice regarding the date proposed for inspection by the inspecting officer of CRIS.
- 5.2 When the successful bidder completes the work, bidder will offer material/equipment for CRIS inspection and testing of the material / equipment. Test results shall be recorded and installation

accepted only after CRIS is satisfied about its compliance with the requirements of the technical specifications.

6. TOOLS AND SPARES

The successful bidder shall make his own arrangements for necessary tools, equipment under this contract for carrying out fault attendance / repair or preventive maintenance. However, electricity needed for installation, testing and commissioning of equipment and water for scheduled preventive maintenance will be provided by the CRIS and no extra charges will be levied.

7. DEVIATION

Deviations from any clauses of the tender papers shall be clearly brought out by the bidder at the time of submission in his tender offer. Clauses not so commented upon shall be deemed to have the acceptance of the bidder and shall therefore, be binding on him.

8. ENHANCEMENT OR REDUCTION OF QUANTITIES/WORK

The Engineer on behalf of the CRIS shall be entitled by order in writing to enlarge or diminish or reduce the work or make any alteration in their design, character position, site, quantities, dimensions or in the method of their execution or in the combination and use of material for the execution thereof or order any additional works to be done or any work not be done and the successful bidder will not be entitled to any compensation for any increase / reduction in the quantities of works but will be paid for the actual amount of work done and for approved materials supplied against a specific order.

9. EMERGENCY WORKS

In the event of any accident or failure occurring during the CAMC period in connection with the maintenance of equipment (covered in this AMC), which in the opinion of the Engineer require immediate attention the CRIS may deploy its own workmen or other agency to execute or partly execute the necessary work or carryout repairs, if the Engineer considers that the successful bidder is not in a position or is not responding timely to do so. The cost of any such work carried out shall be determined by CRIS and the same will be deducted from his dues.

10. NIGHT WORK

10.1 If the Engineer is satisfied that the work is not likely to be completed in time except by resorting to night work, he may order the successful bidder to carry out the works even at night without conferring any right on the successful bidder for claiming any extra payment for the same.

10.2 No claim for idle labour and or idle machinery etc., on any account will be entertained. Similarly, no claim shall be entertained for business or any loss.

11. REPAIRS

Any damages to walls, doors, equipment, painting or any other items belonging to CRIS during handling, installation and execution of maintenance services under this contract shall be set right or repaired to the satisfaction of the CRIS. All structural frameworks for support of various items of equipment shall be given the final coat of approved make and colour after the work is completed.

12. DISPOSAL OF SURPLUS EXCAVATED MATERIALS

- 12.1 The successful bidder shall at all times keep the site free from all surplus earths, surplus materials and all rubbish, which shall arise from the works and should dispose of the surplus excavated materials as ordered by the Engineer, failing which it will be done at the cost of the successful bidder and cost will be deducted from his dues.
- 12.2 The successful bidder shall leave the site in a clean and tidy condition.
- 12.3 The successful bidder shall be entirely responsible for all works executed by him until it is finally taken over by CRIS and he will be liable to make good any damages or loss which may occur to such work by inclemency of weather, floods etc. or due to any other act of God until the work is taken over.

13. WARRANTY

13.1 Warranty Period

The successful bidder shall guarantee the work and the materials offered for satisfactory performance for a period of **12 months** from the date of handing over after successful commissioning & issuance of acceptance against all defects arising out of faulty design, poor workmanship and, or supply of defective or substandard materials. The successful bidder should make good all defects free of cost during the guarantee period and replace in accordance with the maintenance instructions and schedules the defective equipment and parts of such equipment promptly and satisfactorily.

13.2 Warranty Terms

Warranty terms shall be applicable as per Clause 22 of the Standard Bid Document Part-1.

14. TERMINATION OF CONTRACT

The termination of the contract shall be as per Clause 34 of the Standard Bid Document Part-I. If the performance of the successful bidder is found unsatisfactory by CRIS, the contract can be terminated by giving one month's notice.

- 15. All other terms and conditions specifically not mentioned above shall be governed by Standard Bid Document Part-I.

Tender Part-II
TECHNICAL REQUIREMENTS

1. INTRODUCTION

- 1.1 The subject tender is being called for the replacement of 4 Nos. Precision Air-Conditioning (PAC) units (i.e., two units of Emerson make, Model Pex 130 CEMS-100 and two units of Stulz make, Model SEC 351A) installed in the Main Data Centre at the CRIS office complex, Chanakyapuri, New Delhi-21. It may be noted that the proposed work is to be carried out in a highly critical Data Centre of Indian Railways, which cannot be shut down and will remain operational even during the execution of the work.
- 1.2 The successful bidder shall ensure that the existing cooling parameters inside the Data Centre are maintained during the execution of the work and no interruption in Data Centre operations shall be permitted.
- 1.3 At present, two Precision Air-Conditioning units of Emerson make, Model Pex 130 CEMS-100 and two PAC of Stulz Make, Model SEC 351A, are provided to meet the cooling requirements of deferent areas of the Main Data Centre at CRIS office complex, Chanakyapuri, New Delhi. These PAC units are working as N+1 configuration i.e. one unit remains in standby mode for a period of 4 hours through inbuilt sequence-controller.
- 1.4 It may be noted that the replacement of existing PAC units with new PAC units is to be carried out without affecting the services running in the Data Centre.
- 1.5 Operation and monitoring (O&M) of the installed PAC units in the CRIS Data Centre shall be carried out by existing O&M staff deployed through an outsources agency.

2. SCOPE OF WORK

- 2.1 In this scope of work, four numbers PAC units currently installed in Main Data Centre are to be replaced with new Precision Air-Conditioning units the indoor and outdoor units shall be installed at same location or adjacent location of existing indoor and outdoor unit as per the feasibility. These new Precision Air-Conditioning units will work in N+1 configuration in synchronism mode asper the cooling demand.
- 2.2 The Indoor units shall be installed on adjustable MS Stand. MS Stand for Indoor unit will be installed duly painted with anti-corrosive / galvanizing paint along with vibration pads and all required accessories.
- 2.3 The Outdoor units shall be installed at rooftop of first floor on MS Structure including railing. The MS Structure will be installed duly painted with anti-corrosive / galvanizing paint along with vibration pads and all required accessories as per the site requirement and approved drawing. This also includes Civil work for fixing the MS Structure.
- 2.4 The successful bidder shall submit the detailed scheme for carrying out the work of installation, commissioning activities without affecting the running services of CRIS Data Centre preferably within 1 month of the issue of the letter of acceptance.
- 2.5 The work also includes dismantling of existing two numbers Precision Air-Condition unit of Emerson make, capacity 8 Ton each, Model No. Pex 130 CEMS-100 and two units of Stulz Make, Model SEC 351A as mentioned at Sr. 8 in Schedule 'A'.

2.6 Providing all services including all spares, etc. during warranty and post warranty annual maintenance for a period of five years.

2.7 Maintenance:

The work comprises comprehensive (with spares) on-site maintenance of Precision Air Conditioning units installed in CRIS Complex. This includes repair, overhaul, checking, and replacement of defective parts including supply & refilling of gas etc. during warranty and post warranty annual maintenance.

- Preventive maintenance of the entire equipment bimonthly.
- Breakdown maintenance in the event of malfunction of the equipment, which prevents its operation, whenever it is required (unlimited calls).

2.7.1 Preventive Maintenance

Preventive maintenance includes functional checking, necessary adjustments, cleaning etc. It is to be carried out during Sunday and Holiday at times planned in advance. Any maintenance that can be carried out while the power is “ON” and without affecting the operation of equipment can be carried out during normal working hours. The periodical maintenance shall include complete check-up, overhauling, servicing, testing of Precision AC units. The successful bidder shall maintain a log sheet for periodical bimonthly maintenance visit. The log sheet shall have details of PAC unit, date & time of service and details of work done. The service report / log sheet shall be duly signed by representatives of CRIS & successful bidder and one copy shall be submitted to CRIS. Any person visiting the premises for attending any complaint or to carryout certain inspection, must possess proper identification card so as to facilitate for any identification by CRIS representative.

2.7.2 Breakdown Maintenance

This is to be carried out in the event of malfunction, which prevents the operation of the equipment. Breakdown maintenance includes faultfinding, repairs or replacement of defective parts with new or as new parts, functional checking and rectifying the equipment. Such repairs will be attended and rectified at the earliest but in any case, within 24 hours of its reporting including night hours and holidays, as mentioned at SLR in Para-3.

2.8 JE/Electrical will look after day-to-day operation of the equipment. The bidder shall contact JE/Electrical for inspection, fault attendance and further directions as the case may be.

2.9 Spares and Materials

2.9.1 Defective parts discovered during maintenance will be replaced by new parts.

2.9.2 Spares will be supplied free of cost by the bidder as a part of Service Contract. The bidder will keep the stock of spares.

2.10 Tools/Instruments

The bidder would provide all the required tools and instruments to their service engineer for the purpose of servicing and testing the equipment covered by this Contract.

3. **SERVICE LEVEL REQUIREMENTS (SLR)**

The CRIS remains open and is working on Saturdays, Sundays and Holidays i.e. 24x7 basis.

3.1 RESPONSE TIME–

Response Time is the total time taken by the Successful bidder between registering the complaint at Help Desk or through telephone / e-mail. Successful bidder shall be in positioned to reach the site within 4 hours on receipt of the call

3.2 RESOLUTION TIME

Resolution Time is the total time taken by the Successful bidder between registering the complaint at Help Desk or through telephone / e-mail and rectifying the fault. This time includes time taken to reach the site, diagnose, repair / replace the faulty components / module / device etc. **The complaint shall be rectified within 24 hours after receipt of call.**

3.3 PENALTY

Penalty will be calculated as: -

Sr.	Description	Unit	Rate
a.	Response time beyond 4 hrs. on receipt of the breakdown call.	Per Hour	0.02% of Total Cost
b.	Rectification time beyond 24 hrs. on receipt of the breakdown call.	Per Hour	0.05% of Total Cost

3.3.1 The penalty will be imposed for delay in rectification / non performance of equipment. The rate of penalty will be as mentioned above. The total cost for the purpose of penalty calculation will be “Total Cost” of Schedule-‘A’ during warranty period of one year and “Total Cost” of Schedule-'B' during post warranty AMC period.

3.3.2 The penalty will be imposed subject to a maximum of 10% of the total cost as mentioned above in Para-3.3.1.

3.3.3 In case of major work i.e. replacement of Compressor / motor / gas charging penalty for rectification shall be levied after 48 hours from receipt of the breakdown call.

4. The equipment shall be strictly conforming to the Tender specifications. Enclosed with the tender paper and relevant I.S. Specification and other code of practices as applicable (i.e. BEE, etc.).

5. EQUIPMENT SPECIFICATIONS

This specification deals with general information and criteria for supply, installation, commissioning & testing of Precision Air Conditioning in Main Data Centre at CRIS Office Complex, Chanakyapuri, New Delhi-21.

5.1 PRECISION AIR CONDITIONING UNITS

The room air-conditioning system shall be a floor discharge unit designed specifically for high sensible heat ratio applications such as Server and Computer rooms. Each unit shall be capable of providing sensible cooling capacities at rated ambient temperatures with adequate airflow. Inside Conditions: 21±1 Degree Celsius and relative humidity is 50±5% RH. The system shall contain Scroll compressor, Evaporator, Humidifier, Condenser and an Externally Equalized Thermostatic expansion valve / Electronic expansion valve all of which shall be contained within the cabinet of the unit. Each PAC unit shall have a minimum net sensible cooling capacity corresponding to 8.0 TR or higher at the specified design conditions.

5.2 CABINET CONSTRUCTION

The frame shall be constructed of corrosion resistance steel & shall be double skin type side panels, shall be fitted with glass fibre / nitrile rubber insulation, fire rated. The cabinet shall be powder coated and have a textured finish.

5.3 FILTRATION

The filter chamber shall be an integral part of the system and withdraw able from the PAC unit. The filter should be of 5-micron filtration Capacity & efficiency level should be 95% or above. Filter should be washable type.

5.4 FANS

The fan section shall be designed for an external static pressure of 20 Pa. or better. The centrifugal type fan shall be located downstream of the evaporator coil and be of the backward curved blades with EC motor, double width, double inlet and statically and dynamically balanced. Each fan shall be separately driven by a high efficiency electric motor with an IP54 enclosure rating. The fan speed must be controlled based on the room return air temperature and also must have automatic speed control without manual intervention.

5.5 HUMIDIFICATION

a. Electrode Type Humidifier

Humidity shall be achieved by using Immersed-electrode type humidifier by which steam shall be produced. The steam shall be distributed evenly into the bypass air-streams of the environment control system to ensure full integration of the water vapor into the supply air without condensation. The humidifier shall be fitted with an auto flush cycle activated on demand from the microprocessor control system. The humidifier shall be fully serviceable with replacement electrodes. Wastewater shall be flushed from the humidifier by the initiation of the water supply solenoid water valve overflow system.

Or

b. Infrared Type Humidifier

The humidifier shall be of the infrared type consisting of high intensity quartz lamps mounted above and out of the water supply. Bypass air shall be used to enable moisture to be absorbed into the air stream without condensation. The humidifier pan shall be stainless steel and arranged to be removable without disconnecting high voltage electrical connections. The complete humidifier section shall be pre-piped, ready for field connection to water supply. The humidifier shall have max. steam generating capacity of no less than 4.5 Kg/Hrs. and equipped with an automatic water supply system and shall have an adjustable water-overfeed to prevent mineral precipitation. A high-water detector shall shut down the humidifier to prevent overflowing. Full capacity operation shall be achieved within 10 sec from cold start. Waste water should be flushed from the humidifier by the initiation of the water supply solenoid water valve via a U-pipe overflow system. Drain solenoid valves will not be used.

5.6 ELECTRICAL HEATING

The heating circuit shall include dual safety protection through loss of air and manual reset high temperature controls.

5.7 COMPRESSORISED SYSTEMS

Scroll Compressor

The compressor shall be of the high efficiency compliant scroll design with an E.E.R. (Energy Efficiency Ratio) of not less than 11 at AHRI condition. The compressor shall be charged with mineral oil and designed for operation on R410a. Each compressor shall have internal motor protection and be mounted on vibration isolators.

5.8 REFRIGERATION CIRCUIT

The refrigeration system shall be of the direct expansion type and incorporate one or more hermetic scroll compressors. The system shall include a manual reset high pressure control, auto reset low temperature switch, externally equalized thermal expansion valve / Electronic expansion valve, high sensitivity refrigerant sight glass, large capacity filter drier and charging/access ports in each circuit. Each refrigeration circuit shall include rigidly mounted isolation valves in the discharge and liquid lines to aid servicing and installation (air cooled units only).

5.9 COPPER PIPING

All connections of Refrigerant Piping shall be in high grade Copper and copper pipes should not be lower than 18 Gauge (Size:- 5/8" & 7/8" or as per manufacture guidelines for offered PAC). All connections, Tees, Reducers, etc. shall be of proper quality. For all outdoor piping shall be painted with 2 coats of weather proof paint to withstand ambient conditions.

5.10 EVAPORATOR COIL

The coil shall be constructed of rifled bore copper tubes and louvered aluminum fins, with the frame and drip tray fabricated from heavy gauge aluminum. All metal parts in contacts with condensate shall be the same material to prevent electrolytic corrosion. The drip trays shall ensure the collection of condensate and be accessible for cleaning.

5.11 DEHUMIDIFICATION

Evaporator fan should be operated at lower speed to reduce face velocity across evaporator coil during Dehumidification cycle. By doing so energy consumption can be reduced for fan and also possibility of condensate carryover will be reduced.

5.12 REMOTE AIR COOLED CONDENSER

The air-cooled condenser shall be the low profile, weatherproof type incorporating high efficiency, direct drive, external rotor motors. The condenser shall be constructed from heavy-duty aluminums and corrosion resistant components. Heavy duty mounting legs and all assembly hardware shall be included. Condensers shall be suitable for 24-hour operation.

5.13 SPEED CONTROLLED CONDENSER FAN

The condenser fans shall be directly driven by electric motors with an IP54 enclosure rating and class F insulation. The motors shall be equipped with permanently sealed bearings. The motors shall be speed controlled to ensure stable operating conditions from -5 Degree Celsius to 45 Degree Celsius ambient by a factory fitted; direct acting pressure actuated electronic fan speed controller. The control system shall be complete with input isolation switch, transducers and electrical wiring. A circuit breaker shall be factory fitted per refrigeration circuit for field connection/isolation of power to each remote air-cooled condenser.

5.14 UNIT CONTROLLER

The unit controller shall be microprocessor based and include a large LCD backlit graphic display and/or touch screen display for clear visibility of text, graphics, alarms and operating parameters. The display and control buttons/touch screen shall be accessible from the unit front without removing any external panels. The controller shall feature ISP (In-system-Programming) technology to support program upload via a PC. Control strategies shall be P-I-D with dew point compensation for accurate temperature and humidity control. A selection of return or supply air control shall be provided to suit the application. The controller shall incorporate password-protected access levels to prevent unauthorized modification of operating parameters. In normal operating mode, the display shall indicate unit number, date, time, temperature and relative humidity set points, actual temperature and humidity values, operating status, alarm conditions, trends/graphs and system operating mode through dynamic icons. The controller shall be capable of storing and displaying a minimum of one hundred (100) most recent alarms/events with date and time stamps in non-volatile memory. All parameters, settings, logs and event data shall be protected against power failure and retained in memory. The controller shall support automatic lead-lag operation, duty rotation, standby management and sequencing of multiple Precision Air Conditioning units for optimized operation and redundancy. The controller shall provide monitoring and alarm indication for all critical operating parameters including temperature, humidity, compressor status, fan status, filter status, sensor faults, communication faults and water leak detection sensors. The PAC unit shall be provided with provision for connection and monitoring of water leak detection sensor(s) with alarm annunciation through the controller. The controller shall support integration with BMS, DCIM and Network Management Systems through industry-standard protocols such as Modbus RTU/TCP/SNMP.

5.15 CONTROL

Each Precision Air-Conditioning (PAC) unit shall be provided with a factory-installed microprocessor-based controller capable of monitoring, controlling and protecting the unit operation.

5.15.1 Programmable Conditions

The control system shall support field-programmable set-points for the following parameters:

- a) Temperature Set Point
- b) Humidity Set Point
- c) High Temperature Alarm Threshold
- d) Low Temperature Alarm Threshold
- e) High Humidity Alarm Threshold
- f) Low Humidity Alarm Threshold

5.15.2 Configurable Control Features

The control system shall include, as a minimum, the following user-configurable features:

- a) Unit Identification Number
- b) Programmable Start-up Delay, Cold Start Delay and Fan Run-On Timers
- c) Sensor Calibration Adjustment
- d) Remote Shutdown Enablement and General Alarm Management
- e) Return-Air Temperature Control
- f) Selection of Available Modulating Output Types

5.16 ALARMS

5.16.1 Audible, Visual and General Alarm Activation

The microprocessor controller shall initiate audible, visual and general alarm signals upon occurrence of any of the following conditions:

- a) High Temperature
- b) Low Temperature
- c) High Humidity
- d) Low Humidity
- e) Loss of Airflow
- f) High Refrigerant Pressure
- g) Low Refrigerant Pressure
- h) Humidifier Low Water Condition
- i) Water Detected Under Floor

Each listed alarm shall have selectable control action modes: Enabled / Disabled / Off.

5.16.2 Visual Alarm Activation

The microprocessor shall activate a visual alarm in the event of any of the following conditions:-

- a) Service Intervals (Cooling Coil, Filter and Humidifier)
- b) Loss of Power (History Record)
- c) Unit Off (History Record)

All alarm events shall be time and date stamped.

5.16.3 Safety and Electrical Protection

Each unit shall incorporate, as a minimum, the following protections:

- a) Single-Phasing Protection
- b) Phase Reversal Protection
- c) Phase Unbalance Protection
- d) Phase Failure Protection
- e) Overload Protection through MPCB for Compressors and MCB Protection for All Other Components

5.16.4 Data Logging

The control system shall maintain cumulative operating hour records for each operating mode, including cooling, heating, humidification, de-humidification and fan operation. The controller shall retain in non-volatile memory the 100 most recent alarm events, with date and time stamping.

5.16.5 OPEN COMMUNICATION NETWORK INTERFACE CARD (NIC)

The Open Comms NIC (Network Interface card) shall transform the controls into manageable nodes within a Network, NMS and BMS system. This interface card shall be connected to the existing Ethernet LAN and provide browser-based access. SNMP alerts should be available for NMS connectivity.
