

TECHNICAL SPECIFICATION FOR
DATA CENTRE
INFRASTRUCTURE

1. SCOPE:

- 1.1 This specification covers design, engineering, manufacture, assembly, testing at manufacturer's works, supply, delivery at site, unloading, handling, proper storage at site, erection, testing and commissioning at site of complete infrastructure for the proposed Data Centre to be installed by National Institute of Technology, Rourkela, as detailed in the specification, complete with all accessories required for efficient and trouble free operations.
- 1.2 The detail specifications of the different type of work to be carried out in the project shall be in adherence to (should it be TIER-2 guidelines of Uptime Institute). Thus shall be composed of multiple active power and cooling distribution paths, but only one path active. Shall have redundant components, and is concurrently maintainable providing 99.75% availability with less than 22 hours of downtime/year.
- 1.3 Farms are advice to visit the site before submitting proposal.
- 1.4 The Infrastructure essentially includes interalia redundant or backup power supplies, environmental controls (e.g., air conditioning, fire suppression), security devices etc. Critical systems like UPS and Precision Air-conditioning system will have N+1 topology.
- 1.5 The infrastructure shall be compatible for Data Centre with approximately 80m. Civil work will completed for 80sqm area. 40sqm will be developed in all respect to house IT infrastructure. Reaming 40sqm will reserved for future expansion. Data center infrastructure consisting of UPS, precision air conditioning system, power rail will be provided for 400sft (50% of data center space). The following rooms will be accommodated in the layout: -
 - Server Room
 - BMS Cum NOC Room
 - Store Room
 - Staging Area
 - Electrical and Mechanical Area (Gas Bank, Panel Room etc.)
 - UPS and Battery Room
- 1.6 While the scope excludes civil structural work for the concerned building, the associated minor civil work for installation of equipment shall be covered as defined in the bid document.
- 1.7 The Scope of Supply and Installation includes the following:
 - PART-A: Architectural and Interior work
 - i. Insulation System for floor & ceiling
 - ii. Pest Control

- iii. Raised floor arrangement for server & other areas and false flooring
- iv. Stringer System
- v. Suspended Ceiling
- vi. Internal Partition Work
- vii. Doors & Internal windows
- viii. Painting
- ix. Furniture & furnishing
- x. Other miscellaneous Civil work as per site requirement

PART-B: Electrical System

- i. DG set with AMF Panels as per required capacity of 200KVA
- ii. Main LT AC Panels
- iii. Power distribution Units for IT Racks.
- iv. Precision AC & Comfort AC Supply System
- v. AC Utility Panel
- vi. Complete Illumination System
- vii. Power Distribution Board Raw Power Sources
- viii. Distribution Board from auxiliary UPS system
- ix. Cabling System with Associated Cables & joint kits
- x. Earthing System

PART-C: HVAC System

- i. Precision Air-Conditioning System for Server room Rooms in N+1 configuration
- ii. Comfort Air-conditioning for others area with standby units for critical areas.
- iii. Accessories and Associated Cables & joint kits, interconnecting piping etc.

PART-D: Building Management System (BMS)

- i. Integrated Building Management System (**Optional**)
- ii. Fire Detection system for entire facility.
- iii. Environment friendly Gas Suppression system for Server room along with **VESDA** (very early warning aspirating smoke detection system). (**Optional**)
- iv. PA system.
- v. Access control system.
- vi. CCTV system.
- vii. Water leak detection and Rodent repellent system.
- viii. Fire proof cabinet for media storage.
- ix. Associated Cables & conduits.

1.8 While the list provides major installations of respective systems, Bidder shall be responsible to cover within offer all associated items which are not specifically mentioned to ensure very purpose and integration of the Data centre.

1.9 As the Data center is the Key-supporting element thus reliability, availability and Serviceability for the data center needs to be ensured. The bidder or qualified vendor should evaluate best solution with their expertise in designing, installing and commissioning of Data Center infrastructure, which is designed & featured with best individual system specification and integration features.

1.10 Any other item-system-work not specifically mentioned in the scope but required for successful installation and commissioning of the infrastructural support system to Data Centre as per Tier-II guidelines shall be provided by the bidder mentioning the same categorically.

1.11 While the following sections provides details of Technical Specifications for the equipment and system, the same shall be supplied as per approval of scheme/ drawings/technical particulars during detail engineering.

2. PROJECT LOCATION

Main building

National Institute of Technology, Rourkela-769008, Odisha

3. SITE DATA

The climatic conditions at site under which the equipment shall operate satisfactorily are as follows:

Latitude: 22.12 N

Longitude: 85.54 E

Altitude: 219 m from mean sea level

Average Annual Rain Fall:160-200 cm

Min & max Temperature: min 9 deg Celsius to 42 degree Celsius

Relative Humidity:65-85 %

4. STANDARD:

All infrastructure covered under this specification shall comply with the requirements of the ANSI/ CSA/ EIA/ TIA 942

Standards for Data Centers.

ANSI American National Standards Institute

CSA Canadian Standards Association –

EIA Electronics Industries Alliance –

TIA Telecommunications Industry Association –

5. **Eligibility criteria for Bidders:**

Sr. No	Particulars
A.	DC Built Experience Qualifications
1.	Bidder should be an established system integrator who has an experience of installation & commissioning of Data Centers and should have been in the business for more than three years as on 31.03.2012.
2.	Should have executed at least two projects of data center integration (Tier II / Tier III or Tier IV). Of 40 sqm size floor area. Copy of work order (at least 2) for each of FY 2009-10, 2010-2011, 2011-2012 to be submitted.
3.	The bidder should have commissioned and installed as per above requirement on turnkey solution. The built Data Center primarily consisting of. Precision Air-conditioning, UPS System, Electrical Distribution, and Lighting. Fire Detection and suppression, Access control and CCTV, Building Management System, VESDA, Rodent repellent System, Structured cabling, Civil and Interiors, D.G Set etc and all the allied works required for successful installation, commissioning & completion of the Data Centre.
4	The bidder should have experience in providing onsite support & facility management services to data center created by them for last one year. Need to submit Work Completion certificate /Performance Certificate confirming year and area of activity.
5	The bidder must have on its roll as on bid opening date at least 5 technically qualified professionals in systems integration. Product installation/ commissioning & related services.
6	At-least 5 professionals should have certification as Data center professional as CDCP, CDCS, ITIL & PMP"s) in their payroll for at least for last 6 months. Photocopy of the certificates to be submitted. The combined nos. of these certificates should be equal to at least 3.

Pre Qualification requirement for Bidder		
1.	The bidder should be a Private/ Public Limited company registered under the Companies Act, 1956 or a registered firm. The company/firm should be in existence for more than 5 years.	Certificate of incorporation
2.	The bidder should have valid ISO 9001: 2000 certification	Copy of the Certification
3.	The firm should not be blacklisted by any central/any of the state Governments/ PSU or any Govt institution in India for last 3 years.	Self declaration by the authorized signatory.
4.	The bidder should submit valid letter from all the OEMs (whose products are being quoted) confirming the following: -Authorization for bidder -Confirm that the products/ technologies/ components/ services quoted because end of sale in next 2 years. Principal must support end of products for at least 3 years (End of life of products should be at least 3 years after end of sale).	Corresponding Letters/ MAF from all the OEMS
5.	Bidder should be an established system integrator who has an experience of installation & commissioning of Data Centres and should have been in the business for more than three years as on 31.03.2012 in datacenter business.	Need to submit Work Orders confirming year and area of activity with relevant documents in its support.
6.	The bidder should have built Data Center primarily consisting of, Precision Air-conditioning, UPS System, Electrical Distribution and Lighting, Fire Detection and suppression, Access control and CCTV, Building Management System, VESDA, Rodent repellent System, Structured cabling, Civil and Interiors, D.G Set etc and all the allied works required for successful installation, commissioning & completion of the Data Centre. (At least 2 in each preceding Fys. 2009-10 2010-11 2011-12).	Need to submit work order/ SOW

1. ERECTION, TESTING & COMMISSIONING: General Criteria

- a. All plant & equipment shall be issued to the contractor in disassembled condition for the purpose of erection as free issue item.
- b. The special tools supplied by the equipment manufacturer shall be handed over to the contractor. After the completion of the erection work, these special tools shall be returned to owner in good order and condition.
- c. Trays shall be supplied for laying of cables.
- d. The erection contractor shall arrange supervision of erection, testing & commissioning of plant and equipment under the scope of this contract by the manufacturer's engineer wherever necessary at his cost and responsibility.
- e. All skilled, unskilled and supervising personnel required for erection, testing & commissioning shall be deputed by the contractor at his cost and responsibility.
- f. Necessary watch & ward for protection and general safety of the equipment till handing over to the owner shall be the responsibility of the contractor.
- g. If any damage to the equipment is caused during the custody of the contractor, it will be to the account of the contractor NIT, Rourkela.
- h. The price quoted shall include all incidental charges, taxes, duties and other government levies whatsoever and shall remain firm till the completion of work. All these should be specifically mentioned.
- i. All tools, tackles, handling materials, consumables, oil filter machine etc. required shall be provided by the contractor without any extra charge to the owner.
- j. Transportation of plant, equipment and all other materials from Store upto the site of installation shall be arranged by the contractor without any extra charge to the owner.
- k. All erection works shall be done in compliance with the relevant clauses of IE Rules and other authoritative standards.
- l. Storage of equipment and materials at the erection site shall be the responsibility of the erection contractor. For specific criteria of erection etc, respective technical specifications may be seen.

Data Center Specifications: NIT Computer Centre

SI	Description	Specification	
	Total Data Center Area requirement	80sqm appx. (40sqm to be completed in all respect Civil, Electrical, Air-conditioning)	
	Racks/Floor Required	16 in total over 800sft. Current need 8 racks (Additional Telecom Racks in comfort zone)	
I. A	RACK BORD DIMENSIONS TO BE SUPPORTED	Racks not to be supplied	
	-Width (mm)	600	
	-Depth (mm)	1200	
	- Height (mm)	2400	
	- Weight (Kg)	500	
I. B	CIVIL		
	False flooring		
	-Floor tile (600mmx600mm)/ (600x800mm)	600x600	
	-Type (cement filled/ others)	Cement/Calcium Sulphate	
	- UDL Uniform distributed loading (Kg/Sq. Meter)	1200	
	- PL Point loading (Kg/ Sq. Meter)	450	
	- Minimum Raised floor height (mm)	450 mm- 600 mm	
2	False Ceiling	Optional	
3	Doors		
	Door width & height (mm) - Rack movement/passage	1300 mm(W), 2500mm (H)	Height max 2500 or the size of the opening which ever practically possible at site.
	Door width & height (mm) - Man movement	1000 mm(W), 2500mm (H)	
		1000 mm(W), 2500mm (H)	

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	Door width & height (mm) - Service shafts		
4	Standard cage sizing (mm)	Optional	
5	Fire rated partitions		
	Fire rated partitions /doors - in white space	2hrs	
	Fire rated partitions /doors - Out side white space	2hrs	
6	Fire rated glass- in white space	2hrs	
	Fire rated glass - Out side white space in periphery	2hrs	
I.C	ELECTRICAL		
1	Electrical distribution		
	UPS to UPS output panel	Cu Cable	Rack Cable Length from Tap off till Rack should not be more than 3.5 Mt.
	UPS output panel to PDU	Cu Cable	
	PDU to rack	Cu Cable	
	Cable tray location	In Hot aisle only	
2	Panels		
	UPS O/P panel	Dual	
	AC panel	Single	
3	PDU's		
	- with isolation transformer if UPS does not have isolation transformer.	Required	Isolation transformer inrush current should be below 6 times the rated current.
	- two per row / shared	on demand as per business requirement	

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	Surge Suppressor	Required	Required
3	PDU s		
	with isolation transformer if UPS does not have isolation transformer.	Required	Isolation transformer inrush current should be below 6 times the rated current.
	- two per row / shared	on demand as per business requirement	
	Surge Suppressor	Required	Required
4	Lighting		
	Datacenter white space Lighting	2 x 36 CFL. 4 feet fixture	
	LUX level of lighting	500 lux at 3 feet level from FFL	
5	UPS Power	80KVA total load	
	0-5 KVA	50% racks	
	5-10KVA	25% racks	
	10-20 KVA	25% racks	
	- UPS Redundancy	N+1 (2+1)	
	- Battery backup per bank		
	- Power feed per rack		
	-Single		
	-Dual	Dual up to DCDB	
	- Dual with STS powered from two independent UPS		
	- Dual with STS powered from UPS as well as DGIRaw power		

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	- Power monitoring at PDU and rack level integrated with BMS	Required	
1.0	COOLING		
	- Precision / Comfort	Precision	
	-Type (chilled water / Dx)	Dx	
	- Operating temperature	22 +/- 2 Deg. C	
	-Operating temperature during Grid outage and power change over	28 +/- 2 Deg. C	
	- Operating humidity	50% +/- 5%	
	- Spot cooling for high density racks > 8KVA	Required	
	- Redundancy	N+1	
	- Floor grills CFM requirement	as per rack loading	
	- High density area	Not applicable	
I.E	Other Functional Space Requirement		
	Staging/ Shipping/ receiving room	Pl. provide details	
	BMS room centralized	3 to 5 persons	
	Storage room	For parts and equipment	
	NOC	Same with BMS	
	Electrical and Mechanical Room	To be made	
	Secondary Emergency Exit	To be provided	
	Structured Data Cabling Requirement	Cable Tray Network for Structured Cabling as per freezed Layout	
	UPS room	1 no	
	Common facilities	NA	
II	Common		

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II. A	Civil		
1	Building slab floor loading (Kg/Sq. Meter)	500	in NIT scope
3	- Hydraulic loading/ unloading deck with Civil Structure	Required to be provided	
4	Partition Work	Brick Work Partition complete in all respect for Electrical rooms, UPS Rooms and Other Support Areas	To be made as per requirement
5	Doors & Windows	2 Hr Fire Rated Doors for Data center Support Area	
6	Signages for Data Center and Support Area	As per Approved make and Specifications	
7	Entry for UPS	Separate Entry for UPS , Battery and Electrical Rooms	
8	Visitor Gallery	Fire Rated Glass Partition along the Data Center Periphery	
9	Raised Floor	raised floor only for data center area	
II.B	Electrical		
1	Electrical distribution		
	Transformer to Main LT Panel	By aluminium cable	NIT scope
	DG to DG panel	By aluminium cable	Supplier scope
	DG Panel to Main LT Panel	By aluminium cable	Supplier scope
	Main LT panel to UPS input panel	Copper Cable	Supplier scope
	UPS input panel to UPS	Copper Cable	Supplier scope
	UPS to UPS output panel	Copper Cable	Supplier scope
2	Lighting		

Expression of interest for building data center

	Common Area Lighting	2 x 36 CFL. Fixture Approved by Client	
	LUX level of lighting	500 lux at 3 feet level form FFL	
	Emergency Lighting	Emergency Lighting With Inverter system	
3	Utility Power		
	- Grid power (single source)	Single	
4	DG	Prime Rated at Continuous Running	DG supply from 500KVA institute generator is available is additional backup
	Configuration	One	
5	Diesel Storage		
	Tank	With DG	
	Storage Duration (Hrs)	12 (Minimum 8 Hrs) Diesel filling up shall be NIT responsibility	Capacity for running DC at full load all the DG at N configuration.
6	Earthing	Chemical Earthing Only	
		Separate Grid for Data Center	
		Separate Network for Utility Equipment	
		Recommended levels for equipment grounding conductors should have very low impedance level less than 0.25 ohm	
		Earthing Measurement System Installed in the UPS Room	

Detailed Specification of UPS System

The UPS will operate as an ON-LINE transfer system in the following modes:

Normal - The UPS inverter continuously supplies the critical AC load. The rectifier/ charger derives power from AC Input source and supplies DC power to the Inverter while simultaneously load charging power reserve battery.

Emergency (Failure of AC Input) – Upon failure of AC Input power, the critical AC load will be supplied by the Inverter, which without any switching obtains power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the AC input source.

Recharge – Upon AC power restoration the rectifier / charger shall automatically restart and assume the inverter and battery recharge loads.

The power factor of the UPS system will be 0.9 and THD <10%.The battery circuit breaker MCCB shall have O/L and U/V protection. The UPS shall have built in isolation transformer at the output.

Battery Bank is designed to provide 30 minutes back up at full load for Server Farm Area. Batteries are sealed and maintenance free type. The UPS Module will have the battery circuit breaker mounted near to the batteries. When this breaker is opened no battery voltage will be present in the enclosure. The UPS module will be automatically disconnected when the battery reaches to minimum discharge voltage level or when signaled by other control functions. Remote tripping of Battery circuit breaker facility will be also incorporated. The batteries will be housed in suitable Racks inside the UPS/ Electrical room.

Operational Features of UPS

- Input Standard Voltage, 380 /400 / 415 V 3 Phase, 3 or 4 wire, +10 %,-15% Input Frequency, 50 Hz, +5% or -5%
- Output Steady State Voltage, 380 / 400 / 415 V +1% or -1% Output Frequency, 50 Hz, +0.25Hz to 0.5Hz
- Output Transient Voltage Stability, < 5% or –5% for a load change from 0% to 100%
- Overload – 125% for 10 minutes and 150% for 60 seconds
- Efficiency at full rated load, Not less than 90%
- Total Harmonic Content – With < 2% of Linear Load and < 5% for Nonlinear Load
- Crest factor should be 3:1
- Input Harmonic Filter (for <10% Input current distortion) Acoustic Noise 70-75 dBA
- DC ripple (with & without Battery connected) < 1%
- Automatic shutdown of component for longer power outages Monitoring and logging the status of the power supply Physical Protection IP 20
- Relative Humidity up to 95%
- Displaying the voltage/current draw of the component Automatic restarting of component following a power outage Displaying the current voltage on the line

- Providing alarms on some error connections Providing protection against short circuits Operating Temperature range - 0 to 40 Celsius. Design compliance with IEC and ISO

Software that must be installed and integrated suitable operating system

- Supplies True Online UPS Power
- Non-Linear load compatible
- Capability to handle high Crest Factor load Ventilation- Air cooling with Integral Fans Built in Reliability & High Efficiency
- Low Audible Noise
- Compact Footprint
- Front Access for easy Maintenance
- The power factor of the UPS system should not be less than 0.9 at all load conditions
- Input Current Harmonics < 10%
- The battery circuit breaker MCCB shall have O/L and U/V protection.

N+1 Redundancy:

This configuration consists of two feed lines each consisting of a static battery charger, and inverter. Both the feed lines will have one battery PROJECT per feed line with 100% battery capacity as specified in data sheet.

Under Normal Conditions, the load will be fed from the inverter by way of the static switch and the battery charger will supply the power output necessary to the inverter and at the same time, maintain the batteries in their charged condition.

When the mains supply is not available, or the battery charger is out of service, the batteries shall supply sufficient power to the inverter, at the DC Voltage anticipated, so that the inverter can supply the maximum power for the period specified.

When the mains voltage is recovered, the battery charger must recharge the batteries to the required voltage within the time limit specified and simultaneously supply the entire power necessary for the inverter automatically synchronized condition

Details Specification of Precision AC

Precision Air Conditioning (PAC)

EQUIPMENT SPECIFICATIONS

Precision Air conditioner units (All components from single standard manufacturer)

The Precision Air conditioner shall be High sensible cooling capacity and high SHR (i.e. the sensible to total cooling capacity ratio). Low running costs, achieved by means of sophisticated design and co-design methods, combined with an accurate selection of the components. The whole range of units shall be "environment friendly" because it uses materials that can be recycled, particularly for the plastics and the thermal insulation.

Cabinet Construction

The unit construction shall be enables to access all the main components of the machine from the front for installation purposes and routine servicing. With this feature, the machines can be installed side by side, or in between cabinets for other technical applications (racks). Outside panels shall be coated with grey epoxy-polyester paint, which guarantees the long-term durability of their original features. The front panels are attached to the framework by means of rapid-coupling "fasteners". The standard panels are lined on the inside with heat- and sound-proofing insulation to class 1.

Fans

Aluminium single-inlet centrifugal fans with backward curved blades with a low moment of inertia and innovative vane profile shall be provided. The directly coupled electric motor is of the three-phase (or single-phase in outside-rotor type protection grade IP10, offering the opportunity for speed adjustment by means of an auto-transformer and complete with thermal protection (klixon) inside the electric motor winding. Using this type of fan with a highly-reactive fan wheel instead of the one with forward curved blades enables you to reach higher useful static pressures (up to 350 Pa) AS A STANDARD FEATURE. Standard forward curved blower with traditional Belt driven motor arrangement not acceptable.

Evaporator Coil

Heat exchanger (evaporator coil) shall be designed with an ample front surface area in order to ensure a low air flow velocity through the exchanger so as to prevent the entrainment of droplets of condensation, reduce the air's load losses and ensure a more efficient heat exchange during both the cooling and the dehumidifying processes. The exchanger is composed of copper tubes mechanically expanded on aluminium fins, complete with a hydrophilic treatment to reduce the surface tension between the water and the metal surface, thus favoring film-wise condensation. The exchanger is situated upstream from the fans to ensure unhindered air distribution and is complete with a stainless steel condensate tray with

a flexible conduit for its drainage and an incorporated trap. Coils should be fully accessible from front and V or A shape type of coil not acceptable.

Filtration

Air filters of box type, made of self-extinguishing, artificial-fiber cellular material. The frame containing the filter material is made of metal. Low airflow and clogged filter alarm sensors consisting of two pressure switches for controlling the operating conditions of the fans and the buildup of dirt on the air filters inside the unit. Dry media disposable G4 type filters or equivalent is also acceptable.

Copland

Latest-generation hermetic scroll compressors (air and water-cooled DX versions), characterized by a high COP (coefficient of performance) and consequently also a high energy efficiency.

Refrigerating circuits (air-cooled DX versions)

Each circuit is composed of as standard, a fluid intake complete with a rotalock on-off cock and safety valve, a dehydrating filter and flow sensor. The former enables the refrigerating circuit to be kept free of humidity (thus increasing the life of all the circuit's components), while the latter enables a rapid check on whether the system is charged with refrigerant correctly and whether it contains any humidity.

Electronic Expansion Valve (EEV) controlled by the microprocessor with special software created and tested by the manufacture shall be provided. This enables to adjust the flow of refrigerant fluid through the evaporator, controlling the real evaporator superheating in relation to variations in the ambient conditions in the room being air-conditioned. Improving in this way precision of cooling and the energy efficiency of the cooling cycle. Traditional Thermostatic expansion valve is not accepted. Liquid receiver with safety plug installed inside the unit (in the air-cooled DX versions).

Remote air-cooled condenser (for air-cooled DX version).

These condensers are characterized by a single- or dual-circuit exchanger with aluminium finned copper tubes, complete with low-speed axial-flow fans to reduce the sound pressure level. The frame is made of embossed aluminium with excellent weather-resistant characteristics. The remote condenser is complete with an electric power and control board, fully wired and tested at the factory. Condensers shall be suitable for 24 hours operation and be capable of providing vertical or horizontal discharge

Humidifier (Optional)

Immersed-electrode humidifier for modulating sterile steam production with the automatic regulation of the concentration of salts in the boiler to allow for the use of untreated water. Proportional control of the humidifier's operation (achieved by controlling the electric current allowed to pass through the cylinder's electrodes) and the periodic flushing cycle (controlled by continuously monitoring the water's conductivity) guarantee a perfect efficiency of the system, a low energy consumption

and a greater durability of the components.

Switch Board

Switchboard shall be situated in a compartment separated from the air flow and made in compliance with the directive 73/23/EEC and related standards. The main characteristics are 24Vac low-voltage secondary circuit with isolation transformer, plastic insulating screen for protection from live components, general isolator with mechanical interlock, thermo magnetic circuit-breakers for protection, terminal board for no-voltage signal and control contacts. All the units must undergo a safety test cycle to check the continuity of the protection circuit and the insulation resistance, and a voltage (dielectric strength) test.

Microprocessor control system

The microprocessor controller manages the unit operations autonomously. In direct expansion unit the algorithms permits integral management of the Electronic expansion valve (EEV) with consequent optimization of energy saving, constant air flow during dehumidification and absolute operating stability. Units have been designed and developed to interact with all the most widely used Building Management Systems, exchanging data via the most common communication protocols through serial connections.

The Uniguard UG40 user terminal is fitted with a backlit 1 1x15 pixel LCD display and 6 backlit keys to move between and change parameters. It can be situated on board the machine or, on request, with a kit for wall mounting for the remote control of the unit. By means of the user terminal, you can set the air-conditioner's operating parameters, monitor the trend of the main working parameters and read any alarm messages.

By means of the user terminal, you can set the air-conditioner's operating parameters, monitor the trend of the main working parameters and read any alarm messages.

Modes of operation (cooling, heating, humidification, de-humidification.

Displays of actual temperature and actual Relative Humidity.

Date, time and unit identification display.

System component Auto / Manual status display on the controller screen.

Alarm

Visual system alarm indication (along with mutable audio alarm as well).

Alarm display menu (incorporating various system alarms like temperature high / low, humidity high / low, Compressor HP/LP, Wet floor and loss of air flow conditions).

The unit should show the settings & operating parameters of the other units

Programmable services interval indication display / alarm.

Displays the units are switched off by supervision system, thru timer, by

inversion cycle, switched off by fire/smoke, switched off by flooding
Safety Protections

The unit shall also incorporate the following protections:

- High pressure trip- Manual reset for each compressor
- Low pressure trip- Manual reset for each compressor.
- Single phasing preventers.
- Reverse phasing
- Phase imbalancing
- Phase failure
- Overload tripping (MPCB) of all components
- Safety Interlocks
- Operation of heaters & humidifiers shall be possible only when blower fan is in operation.

Microprocessor Controls

Following information shall be available on the display on the units:

- Room temperature and humidity.
- Supply fan working status.
- Compressor working status.
- Electric heaters working status.
- Manual / Auto unit status.
- Temperature set point.
- Humidity set point.

- Working hours of main component i.e. Compressor, fan, heater, humidifier.
- Unit working hours.
- Current date and time.
- Type of alarm (with automatic reset or block)
- The last 100 intervened alarms.

The Microprocessor shall be able to perform following functions:

- Testing of the working of display system.
- Password for unit calibration values modification.
- Automatic reset of program.
- Cooling capacity control.
- Compressor starting timer.
- Humidifier capacity limitation.
- Date & time of last intervened alarm.
- Wrong password alarm.
- Start / Stop status storage

Following alarms shall be displayed on screen of microprocessor unit:

- Airflow loss.

Compressor low pressure.
Compressor high pressure.
High / low room temperature.
High / low room humidity.
Filter Clog alarm

Sequencing:

The units should have sequencing as an inbuilt feature. The units shall be designed to work for equal no of run hours also incase of fault the stand by unit should Start. The units should have weekly programmer.

The microprocessor control system can be supplied with the following optional cards:
RS485 serial adapter for data transfer to a central supervisor system with
STD protocol or MODBUS protocol;

- WATER LEAK DETECTOR comprising a control module installed on the electric switchboard and an external sensor.

LIST OF PREFERRED MAKES
(FOR ARCHITECTURAL & INTERIOR WORK)

Sl. NO.	Item Name	Preferred Makes
1.	Laminate (1.5 mm)	MERINO/GREENLAM
2.	Hardware fittings	EBCO/HAFELE
3.	Cylindrical locks/Mortice Lock	GODREJ
4.	Door Closer	DORMA
5.	Floor Spring	DORMA
6.	Aluminium Sections	INDAL/JINDALIHINDALCO
7.	Float Glass (Toughened)	SAINT GOBAIN/INDO- ASAHI/MODIFLOAT
8.	Partition Board	NUWUD/UNIWUD/GYPSUM
9.	Veneer	JACKSONS
10.	Melamine	MRF/ASIAN
11.	Water proof plywood paint	KITPLY/UNIPLY/ARCHIDPLY
12.	Plastic Emulsion/ Texture paint	ASINPAINTS/BERGER/DULUX/ U NITILE/ HERITAGE
13.	Enamel Paint	ASIAN PAINTS/BERGER/DULUX
14.	Weather coat paint	ASIAN PAINTS/BERGER/DULUX
15.	Vinyl Flooring Antistatic/plain)	ARMSTRONG.ISI,RI KVIN
16.	Mirror	SAINT GOBAIN/MODIFLOAT/INDO- ASAHI
17.	Carpet tiles	SHWA- ISI/ MILKEN
18.	Raised Access flooring	UNITED INSULATIONS/MICROTAC
19.	Under deck Insulation	ARMADUCT /ARMAFLEX
20.	Vitrified Ceramic tiles	NITCO/ JOHNSON/BELL/ASIAN
21.	Venetian Blinds	VISTA LEVLOR/ MAC
22.	Fire Rated door	SHAKTHI MET DOOR/ GODREJ
23.	Steel door	SHAKTHI MET DOOR/ GODREJ
24.	Fire Rated Glass	PROMAT
25.	Grid False Ceiling (Grid)	AMSTRONG/ USG

Expression of interest for building data center

26.	Metal False Ceiling(Grid)	AMSTRONG/ USG
27.	Aluminium Composite Panel	ALUSTRONG/ ALUCOBOND/ ALUCOPLA/ ALSTONE

LIST OF PREFERRED MAKES (FOR ELECTRICAL WORK)

Sr. No.	Item name	Preferred makes
HT Switchgear		
1.	RMU	Siemens / ABB / Schneider
2.	HT Breakers (VCBISF6)	Siemens / ABB / Schneider
3.	Transformer	Crompton Greaves / Voltamp /EMCO
4.	Instrument Transformer	Kappa / Pragathi /Instrans/ Gilbertt & Maxwell / Matrix
LT Swithgear		
1.	On Load change over switch	HPL
2.	ACB/ MCCB I Contactor/ Release	Siemens I ABB / Schneider (Imported)
3.	Automatic transfer Switch (ATS)	ASCO/ Cummins
4.	TVSS	ASCO or other equivalent make
5.	Change Over Switch	Siemens / ABB / Schneider
6.	Digital Meters	Conzerv / Rishab / Secure
7.	KWH / DLM I MDC Meters	Conzerv / Rishab / Secure
8.	Dual Source KWH Meter	Conzerv / Rishab / Secure
9.	MCB, ELMCB ELCB	Siemens / ABB / Schneider / Hagger
10.	Protection Relay	ABB / Areva/ L&T / AVK SEGC
11.	HRC Fuses and fuse fitting	Siemens / ABB / Schneider
12.	CT's & PT's	AE / Kappa
13.	Capacitor	Siemens / Neptune / Ducati / Matrix
14.	Capacitor Control Relay	Siemens / Neptune / Ducati / Matrix
15.	DG Synchronisinc & AMF Relay	Woodward / Siemens/ Allen Bradly

16.	PLC	Siemens/ AlleriBradely/Schneider/ Siemens/ABB
17.	Push Buttons & Indication Lamps	Siemens / ABB / Schneider
18.	Indication Lamps (LED)	Siemens / Vaishno
19.	Selector Switch	Siemens/ Sulzer/ Keycee
20.	K-Rated Isolation Transformer	Datsons/ SGB / MGM /Emerson
21.	LT Panel Builder	Advence / Tricolite / Adelec
Bus Trunking System		
	Bus Trunking System (Indoor & Outdoor)	Siemens / Schneider / BBI
Cable and accessories		
1.	HT Cable (With CCV Line)	Polycab / KEI / UniversalGloster
2.	LT Cables	Polycab / Universal / Gloster/ Nicco
3.	HT Cable Termination	Raychem / M-Seal
4.	Cable Trav	Indiana / Profab / Storack
5.	Raceways	Indiana / Slotco
6.	Glands	Comet! Jainsons
7.	Lugs	Dowels / Jainsons
8.	HT Cable Termination	Raychem / M- Seal
Wiring accessory		
1.	MS Conduits & Accessories	AKG / Supreme / Bharath/ GB / Precision
2.	PVC Conduit and Accessories	Avon/ Precision / VIP
3.	PVC- FRLS insulated Copper Wires	KEI / Finolex / L & T
4.	FRLS Copier flexible cable	KEI / Finolex / L & T.
5.	PVC Insulation Tape	Steel Grip

6.	Switches & Sockets outlets	Anchor Roma / Seizer/ Clipsal / MK Ivory
7.	Distribution Boards	Siemens / ABB / Schneider/ Hager
8.	Industrial Sockets outlets	Neptune /Schneider / C&S
9.	Nuts & Bolts	GKW / Avon
10.	Metal Clad Industrial Sockets	BCH / MG / Hanger
	Telephone Wire	Finolex / Skyline / RR Cable
1.	Terminal Box	Elemex
2.	Toggle Switches	Kaycee
Lighting		
1.	Lighting Fixture	Philips / Wipro / GE
2.	External Decorative light Fixture	Philips / Wipro / Keselec schreder,
Others		
1.	Variable Speed drives	Danfoss- HVAC Series/ ABB/ Siemens/ Schneider
2.	Single phase inverter	Siemens /Minilec
3.	Lightning Streamer	Erica
4.	Lightning Arrestor	Indelec /Erica / Duval Messien / Lightning protection International
5.	Maintenance Free Earthing	Emerson / Erica / Lightning protection International
6.	Battery Charger	Voltstat /Stalcom
7.	Batteries	EXIDE / Standard Furukawa / Amar Raja
8.	Inverter	Luminous / Microtek / Su-Kam / Amar Raja
9.	Electrical Motors	Siemens / ABB / Crompton
UPS & Batteries		

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1.	UPS	Emerson / MGE / Socomec / Eaton/Reillo- Pci
2.	2V Batteries	EXIDE / Standard Furukawa 1 Amar Raja/ Rocket
3.	12V Batteries	Rocket / Fiamm
DG Set		
1.	Engine	Cummins / Caterpillar / Mitsubishi
2.	Alternator	Leroy Summer / Equivalent

LIST OF PREFERRED MAKES (FOR HVAC WORK)

Sr. No	Item Description	Preferred Make
1.	Equipment	
2.	Water cooled Scroll Type Chillers	Trane / York /Hitachi / Carrier/ Mc-Quay / Blue star
3.	Air cooled Scroll Type Chillers	Trane / York / Hitachi/ Carrier / Mc-Quay / Blue star
4.	VRF	Daikin / Toshiba
5.	Hot Water Generator	Rapid cool / KEPL
6.	Secondary Pumps	Grundfoss / ITT / Armstrong
7.	Primary Pumps	Kirloskar / Beacon / Mather & Platt
8.	Cooling Tower	Paharpu / Mihir
9.	Air Handling Units-Casing	Caryaire / Zeco
10.	High Density Cooling	APC inrow Cooling Solution / Uniflair Floor Solution / Emerson/Stulz
11.	Precision Air Handling Unit	Stulz / Uniflair / Emerson
12.	Fan Coil Units	Zeco / caryaire
13.	VAV	Johnson Control / Honeywell / Trane
14.	Heat recovery wheel	BryAir / ABB (Sweden)
15.	Cooling / Heating coils	Caryaire / Zeco
16.	Centrifugal fans for AHUs	Nicotra / Comefri / Krugger
17.	Inline Fans	Caryaire / Krugger
18.	Axial Fans	Flaktwood (ABB) / Krugger / GEC
19.	Propeller Fan	Alstom (Marathon) / Crompton
20.	Electric Motors (Energy efficient)	Siemens / ABB / Crompton

21.	Condensing units/ air cooled split units	Carrier/ Hitachi
19	Air Washer (Wetting Pads)	Roots Air/ Ambassador / Humidin / Zeco
20	Kitchen Scrubber (Nozzle Type)	Zeco / CaryAir
HVAC Controls & Accessories		
1.	Two Way/Three Way Valves	Honeywell / Siemens / Danfoss / Johnson
2.	Pressure independent Valve	Honeywell / Siemens / Danfoss
3.	Motorized Actuator	Siemens / Honeywell / Belimo
4.	Butterfly Valves(Water Duty)	Siemens / Danfoss
5.	Check Valves(Water Duty)	Advance / Intervolve
6.	Gate Valves(Water Duty)	Leader / Sant / Audco / Advance
7.	Balancing Valves(Water Duty)	Advance / C & R
8.	Ball Valves (with & without strainer)	Rapid cool / Emerald
9.	Prefilters	Thermadyne / Anfilco
10.	Pot Strainers	Emerald / Flowel / Sant
11.	Y- Strainers	Emerald / Flowel / Sant
12.	Pressure Gauges	H.Guru / Emerald / Feibig
13.	Thermometers	Emerald / H.Guru / Japsin
14.	Water Flow Switch	Rapidcool / Danfoss
15.	Modulating Motor / proportional thermostat/Snap acting thermostat	Honeywell / Siemens / Anargy / Siemens
16.	Pan Humidifier	Rapidcontrol 1 Emerald 1 Khokar
	Air Distribution & Piping	
	Insulation	
1.	Expanded Polystyrene Insulation	Beardsell /Styrene Packings / Indian Packaging Services

2.	Biased cell polyethylene Insulation	Trocellan / Paramount
3.	Nitrile Rubber – FM Global standard	Armaflex / K Flex
4.	Under deck Insulation	UP Twiga / Ownes corning
5.	Fibreglass insulation	UP Twigs /Owens Corning
6.	Pre Moulded PUF section for Pipe support	Lloyd / Malanpur
7.	Vibrators Isolators	Resistoflex 1 Flexionics (USA) /Dunlop
8.	RPTissue	UP Twiga /Ownes corning
9.	Polyurethane foam	Malanpur / Lloyd
10.	Sealing Material for False floor Gaps	Koldlok / Emerson /Eqvt
11.	False Floor	Uniflair / United Insulation
	Other	
1.	Red Oxide, Zinc Chromate Primer	ICI /Berger/Asian
2.	CPRX	Shalimar
3.	Dash Fasteners	Hilti /Fischer
4.	Canvas connection fire proof for FCUs	Navair
	IT Equipments	
1.	LAN Products	Tyco / R&M / Paduit / Systimax
2.	Racks	APW / Netrack / Rittal

LIST OF PREFERRED MAKES (FOR BMS WORK)

Sl. No.	Item Description	Preferred Makes
ACCESS CONTROL		
1.	Database server to be supported	HP/IBM/Dell
2.	Operating system to be supported	As per OEM
3.	Access Control System - Server Software & Visitor Management System	Honeywell, KABA, Siemens,GE
4.	Access Control Hub	Honeywell, KABA, Siemens, GE
5.	Intelligent Door Manager	Honeywell, KABA, Siemens, GE
6.	Card Readers	HID, IDESCO, KABA
7.	Biometric Verification	BIOSCRYPT, HID, KABA, IDESCO
8.	Smart card	HID Mifare DESFire LEGIC
9.	Retractable pedestrian Flap barriers and Tripods	Magnetic Auto Control, Gunnebo, KABA
10.	Boom Barriers	FAAC/ Magnetic Auto Controls/ Benenka
11.	Under Vehicle Scanner System	Zenscan, Comport, Loucum
12.	Standard Long Range, Active Vehicle Tag	Nedap, balogh, IDESCO
13.	Electro Magnetic Lock & Magnetic Contact	Faraday, Insyn, Trimec, Bell
14.	Emergency Break Glass	KAC, Sentrol ,Europlex, Honeywell
15.	Card Printer	Fargo, Datacard, Zebra
16.	Door Contact	Ademco, Sentrol, Bell
17.	CCTVSYSTEM	
18.	Integrated IP Camera, Camera, Video Streamer & Software	Pelco Bosch ,GE, Eurotech Honeywell ,Indigo Vision
19.	LCD Television (CCTV)	Samsung, Phillips, Hitachi, Sony

20.	PUBLIC ADDRESS SYSTEM	
21.	Ceiling, Wall Mount, Column Mount and External Horn Speakers	Bosch, Ahuja, Onkyo
22.	DVD Player	Phillips, Sony, Panasonic
23.	Speech Processor (Voice Recorder)	Visionic ,Bosch, Ahuja
24.	Emergency Voice Communication System	Bosch, HEI ,Ahuja
25.	FIRE ALARM SYSTEM	
26.	Fire Alarm System (UL Listed Products)	Notifier ,Edwards ,Siemens, Honeywell
UTILITY MONITORING SYSTEM		
1.	Software, DDC Controllers	Honeywell, Siemens, Sauter Johnson Controls
2.	<i>Ultrasonic Level Sensor</i>	<i>Sontay, Endruss & Hauser</i>
3.	Personal Computer	Dell, Hewlett Packard, IBM
4.	Printer	Epson, HP, TVSE
5.	MS Conduit	Bharath / Gupta / Vimco
6.	Copper Conductor cable/ Communication cable /	Finecore, Belden, Varsha, AMP, Finolex
	Signal cable	
7.	Power Supply Unit	Siemens, Honeywell, Sauter, Race
8.	Modular Sockets and Switches	MK India/ Mosaic/ Clipsal/ Crabtree/ LK
9.	LHS Cable	Sontay, GE-Ziton , Protecto wir

NOTE: Only those items covered under Price Schedule shall be applicable for respective MAKES.

Services

Data Centre FMS service for 3 years including supplying of manpower for 24x7 operation of Generator, UPS and Infrastructure Management.