Liebert® CRV300mm DX

**GUIDE SPECIFICATIONS**

# GENERAL

## Summary

These specifications describe requirements for an environmental control system. The system shall be designed to maintain temperature and relative humidity conditions within the row(s) of racks.

## Design Requirements

The environmental control system shall be a Liebert CRV factory assembled unit.It shall be floor mounted, optimized for maximum cooling capacity in a minimum footprint.

It shall be specifically designed for service from the front and rear of the unit. The system shall be designed to ensure even air distribution to the entire face area of the coil. Thanks to optional adjustable air supply diffusers, the unit shall be capable to be mounted between the racks or at the end of row. The unit shall modulate cooling capacity and airflow based on requirements.

CR025 (DX version)

Each system shall be capable of handling up to 5033CMH with a horizontal airflow pattern and shall be rated at 4000 CMH. It shall have a net sensible cooling capacity rated no less than \_\_\_\_ kW, based on the entering air condition of \_\_\_°C dry bulb, \_\_\_% Relative Humidity and \_\_\_°C ambienttemperature. These units shall be supplied with 380-415Volt, 3 phase, 50 Hz power supply. The humidifier shall have a capacity of 1.5kg/h. Reheat shall have a capacity of 3kW.

## Submittals

Submittals shall be provided with the proposal and shall include: Dimensional/installation, refrigerant – hydraulic and electrical connections data, and circuit drawings.

## Warranty

The system shall be provided with a warranty against defects in material and workmanship.

## Quality Assurance

The specified system shall be factory-tested before shipment and designed to meet CE requirements. The system shall be designed and manufactured according to world-class quality standards. The manufacturer shall be ISO 9001 certified.

# PRODUCT

## COOLING CIRCUITS

There shall be one refrigeration circuit, incorporating a high efficiency, Inverter driven DC Scroll compressor with crankcase heater, safety valve, filter drier, moisture indicating sight glass, liquid line solenoid valve and an electronic expansion valve.

The compressor shall be an R410A DC inverter driven scroll type with variable capacity operation from 30-100%, The compressor should have a suction gas cooled motor, vibration isolators, internal thermal overloads, manual reset high pressure switch, low pressure and high pressure transducer, crankcase heater, and an operating speed varying between 1200RPM to 4500RPM @ 50Hz.

The evaporator coil shall bemanufactured from copper tubes and hydrophilic painted aluminium fins, with a condensate drain pan. The evaporator coil shall have0.79m2 face area and 2 or 3 rows. The hydrophilic coating provides superior water carryover resistance.

The electronic expansion valve (EEV)shall be designed for modulating controlof refrigerant circuits with high speed and high precision. It should be suitable for use as expansion devicein refrigerant circuits with DC Inverter Scroll compressor, with green refrigerants (i.e. R410A).Electronic expansion valve provides a better control of superheating at the outlet of the evaporator, ensuring at the same that compressor will never be filled by liquid.

## Fan section

 The unit shall be equipped with four DC fans.The fan speed shall be variable and automatically regulated by the highly intelligentcontrol through all modes ofoperation. Each fan should have a dedicated motor which provides a level of redundancy. The fans pull airthrough the coil and should be located on the front side of the unit.

## Cabinet and Frame

 The exterior steel panels shall be custom powder coated to protect against corrosion. The wall constructed side panels separate the 15mm, 1.75 lb/ft3insulation from the airstream. The unitshould be provided with levelling feet. The perforated inlet andoutlet panels shall have 75% open area.

## Air Filtration

 The unit shall be equipped with two air filters rated G4following EU4, located within the cabinet,and accessible from the rear of the unit. A filter clog alarm should be available as an option.

## Refrigerant

Unit shall besuitable for operation with R410A refrigerant.

## Unit Controls

## Microprocessor Controller

Liebert CRV models shall be controlled by intelligentcontrolboard. The controlboard should be microprocessor based.

The controller should allow setting and monitoring of the room parameters. Unit utilises multiple temperature sensors placed at the rack inlet, to ensure management and control of temperature by rack.Each unit canbe connected up to 10 remote Temperature Sensors.

The controller allows setting and monitoring of the following space parameters:

* Air inlet Temperature
* Air supply Temperature (remote sensors at rack inlet)
* Return Temperature set-point
* Supply Temperature set-point
* Humidity (inlet)
* Humidity set-point

The example of available warnings / alarms:

* High supply temperature
* Low supply temperature
* High return humidity
* Low return humidity
* Loss of airflow
* Compressor Low Pressure
* Compressor High Pressure
* Electrical heater high temperature (When applicable)
* Clogged filter
* Supply sensor failure
* Humidifier problem
* Rack sensor failure
* etc

Following features shall be incorporated in the controller:

* Status Report of the latest 200 alarm history of the unit.
* Input for remote on-off and volt-free contacts for simple remote monitoring of low and high priority alarms: high/low temperature, high/low refrigerant pressure, fan/control failure, compressor/control failure and others shall be available
* Automatic restart shall be provided after a power failure.

## Displays versions:

The graphic screen display shallbe a128 x 64dot LCD screen with white backlight.It shall provide three-level password protection to prevent unauthorized operation effectively. The operation time of components should beavailable through the menu. The expert-level fault diagnosis system can automatically display the current fault information, facilitating maintenance. It provides tracked records of the temperature and humidity.A buzzer provides audible indication in case of the ‘Warning’ or ‘Alarm’ event.

## Rack Temperature sensors

Each sensor shall consists of a vented case with atemperature probe. Upto 10 housings (10temperature probes) can be connected to a Liebert CRV. One housing andsensor probe should be attached to a rack the cooling unit is conditioning. The sensors providereal-time, direct feedback to the cooling unit to optimize the amount of cooling and airflow required;increasing energy efficiency and ensuring proper rack inlet air temperatures. The sensor data canalso be reported to remote BMS and monitoring systems. The sensor network consists of one CANwire leaving the cooling unit and connecting to a T sensor. Each remaining T sensor shall be connectedto the previous sensor; often referred to as a daisy-chain configuration.

## Remote Shutdown Terminal

The remote shutdown terminal shall provide the customer with a location to remotely shut downthe unit.

## Common Alarm Contact

Provides the customer with a set of normally open (n/o) contacts forremote indication of unit alarms.

## Monitoring

The control board should provide an RS485 port, and the standard protocol shall be MODBUS. For monitoring by serial port, the RDU-SIC monitoring card shall be used, and it provides an RJ45 port and a USB port. Up to two SIC cards can be installed per unit. Features of the SIC card include:

* Using the Web browser to monitor intelligent equipment and the environment through the Web server function
* Using the network management system (NMS) to monitor intelligent equipment and the environmentthrough the SNMP agent function
* Using the machine room management software (RDU-Manager) to monitor intelligent equipment and the environment through the TCP/IP port
* Using the centralized management software (Nform) to monitor intelligent equipment through the Velocity Server function

## Condenser

 The condenser should be with fan speed controller designed & set for usages of R410A refrigerant. Condenser should be worked -20 deg C to 46 deg C ambient temperature. The condenser frame shall be made up of a sturdy aluminium structure. The electrical control box shall be IP55. The entire unit shall be IP20type of protection.

## Optional Features

### ELECTRIC RE-HEATING

 Class 1 electrical heating:Positive Temperature Coefficient (PTC) ceramic type electric heater shall be used. The rated heating capacity shall be 3kW.

### HUMIDIFIER

 CAREL electrode humidifier shall be factory installed in the cooling unit. The CAREL humidifier shall include humidifying cylinder kit and humidifying control board. The humidifying control board receives humidifying command from the maincontrol board, controls operation of the humidifying cylinder automatically, and feedbacks alarm information of thehumidifier to the main control board.The conductive rate of water shall be required to be within the rangeof 125 ~ 1250us/cm for electrode humidifying.

### CONDENSATE PUMP

 The unit shall be equipped with a factory installed condensate pump. It shall have acapacity of up to 10 l/h orup to 6±1 m head.

### AIR DISCHARGE BAFFLES

The unit should be equipped with user adjustable air diffusors on the outlet from the unit. The baffles should be able to adjust the supply the air to the LEFT to the RIGHT or to BOTH sides. Thanks to adjustable air supply diffusers, the unit shall provide ideal air distribution in all layouts (layouts with unit installed at the end of the row as well as in the middle of the row).

### WATER LEAKAGE DETECTION KIT

The kit shall be used to detect water under floor, and send alarm signal to the control board.

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| **SCHEDULE OF PRECISION AIR CONDITIONING SYSTEM** **TECHNICAL DATA** |
| **Item** | **Technical Specification** | **Tender Specification** | **Data of Equipment as Offered** |
|   |   |   |   |   |
| 1 | Brand and Model |   | Liebert, CR025RA |
| 2 | Manufacturer |   | Emerson Network Power |
| 3 | Manufacturer compliance to ISO9001 | YES | Yes |
| 4 | Local Agent | Tenderer to specify |   |
| 5 | Air Cooled System | YES | Yes |
| 6 | Gross Cooling Capacity at 35oC 26%RH | Not less than 21 kW | 21.6 KW |
| 7 | Net Sensible Capacity at 35oC 26%RH | Not less than 20.2 kW | 20.6 KW |
| 8 | Product Performance Selection Sheet | Must Submit | Yes |
| 9 | Sensible Heat Ratio | >0.90 | 0.95 |
| 10 | a | Compressor Type | Modulating type Scroll Compressor (Hot gas bypass not accepted) | Inverter driven Scroll |
|   | b | No of refrigerant circuit per unit | One | One |
|   | c | Type of Refrigerant | R410A | R410A |
|   | Full load NSEER at 35oC 26%RH | not less than 3.6 | 3.66 |
|   | Partial load(70%)NSEER at 35oC 26%RH | not less than 4.25 | 4.3 |
| 11 | Cabinet Access | Front and Back Only | Front and Back Only |
| 12 | Noise level measured at 2m | Tenderer to specify | 75.5 dBA |
| 13 | Dimension W,D,H (mm) | Tenderer to specify(Depth <1100mm) | 1100 X 300 X 2000 mm |
| 14 | Weight (kg) | Tenderer to specify | 260 kg |
| 15 | a | Reheat Type | Positive Temperature Coefficient(PTC) Type | PTC with overheat protection |
|   | b | Reheat Capacity | 3 kW | 3 kW |
| 16 | a | Fan Type | EC fan | EC fan |
|   | b | Number of Fan | Tenderer to specify | 4 |
|   | c | Air Flow Rate (rated) | not less than 4000 CMH | 4000 CMH |
|   | d | Air Flow Rate (max) | should be more than 4800 CMH | 5033 CMH |
|   | e | Fan Motor | Tenderer to specify | 1.08 kW |
| 17 | a | Evaporator Coil Type | Copper Tube Blue Fin Coating Aluminium Fins | Copper Tube Blue Fin Coating Aluminium Fins |
|   | b | Evaporator Coil Configuration | V-Frame | Frame V |
|   | c | Face Area | Tenderer to specify | 0.79 sqm |
|   | d | Face Velocity | < 1.4 m/s | 1.38 m/s |
|   | e | Expansion Valve | EEV (Electronic Expansion Valve) | EEV |
| 18 | a | Control Panel Type | Microprocessor Based LCD Display | Liebert custom |
|   | b | Visual & Audible Alarm | YES | Yes |
|   | c | Temperature Sensitivity | ±1 oC (10 oC - 40 oC) | Yes |
|   | d | Humidity Sensitivity | ±5% | Yes |
|   | e | Capable of Monitoring:- Room temperature- Room Humidity- Set Point Temperature- Set Point Humidity- Time of Fault | Tenderer to specify | Yes |
| **Item** | **Technical Specification** | **Tender Specification** | **Data of Equipment as Offered** |
|  |  |  |  |  |
| 19 | a | Condenser Model | Tenderer to specify | LSF-32 R3 |
|   | b | Country of Origin | Tenderer to specify | China |
|   | c | Dimension W,D,H (mm) | Tenderer to specify | 1384 X 990 X 689 mm |
|   | d | Weight (kg) | Tenderer to specify | 110 kg |
|  | e | Total Heat Rejection | Tenderer to specify | 26.82 kW |
|  | f | Ambient Temperature | 35 oC | 35oC |
|   | g | Air Flow Rate | Tenderer to specify | 12600 CMH |
|   | h | FLA | Tenderer to specify | 1.75 Amp |
|  | i | Max equivalent piping length (m) | Tenderer to specify | 50m |
|  | j | Max vertical distance for outdoor unit higher than indoor unit (m) | Tenderer to specify | +30m |
|  | k | Max vertical distance for outdoor unit lower than indoor unit (m) | Tenderer to specify | -8m |
| 20 | Deviation From Specification |   |   |
| 21 |   | Other Details |   |   |
|   | a | Humidifier type | Inbuilt (Electrode type) | Yes |
|   | b | Humidifier capacity | 1.5 kg/hr | 1.5 kg/hr |
|   | c | Rack Temp sensor | Inbuilt | Yes |
|   | d | Monitoring card | Inbuilt (Modbus RS485 or SNMP) | Yes |
|   | e | Condensate Pump | Inbuilt | Yes |
|   | f | Wind leading grille | min 4 | 4 |
|   |   |   |   |   |
|   |   |   |   |   |
|   | The tenderer shall state here any deviation from the specifications in his offer in this tender. |
|   | All items not stated here are deemed to comply fully with the specification. (If the space provided here is not sufficient, an additional slip shall be attached) |