

Vertiv™ VRC

3.5kW Rack Mounted Cooling Unit

Guide Specification

1.0 GENERAL

1.1 Summary

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

1.2 Design Requirements

The environmental control system shall be a Vertiv™ VRC factory assembled unit. It shall be rack mounted, optimized for maximum cooling capacity in a minimum space. The unit shall be CE and UL certified.

The system shall be designed to ensure even air distribution to the entire face area of the coil. The unit shall be able to mount at the bottom of the rack. The unit shall modulate cooling capacity and airflow based on requirements.

VRC10X (Self Contained Version)

Each system shall be capable of handling up to 750 CMH with a vertical airflow pattern. It shall have a net sensible cooling capacity rated no less than 3.3 kW, based on the entering air condition of 35°C (95°F) dry bulb, 20.6°C (69.08°F) wet bulb, and 35°C (95°F) condensing temperature. These units are to be supplied with 120 Volt, 1 phase, 60 Hz power supply (UL); 208/230 Volt, 1 phase, 60Hz power supply (UL), 230 Volt, 1 phase, 50Hz power supply (CE).

VRC20X (Split Version Indoor unit)

Each system shall be capable of handling up to 750 CMH with a horizontal airflow pattern. It shall have a net sensible cooling capacity rated no less than 3.5 kW, based on the entering air condition of 35°C (95°F) dry bulb, 20.6°C (69.08°F) wet bulb, and 35°C (95°F) condensing temperature. These units are to be supplied with 120 Volt, 1 phase, 60 Hz power supply (UL), 208/230 Volt, 1 phase, 60Hz power supply (UL), 230 Volt, 1 phase, 50Hz power supply (CE).

VRC3XX (Split Version Condensing Unit)

Two versions of condensing units for VRC Split system are available. The standard version (VRC30X) can work from -15°C (5°F) to 45°C (113°F), the low ambient version (VRC35X) can work from -34°C (-29.2°F) to 45°C (113°F). These units are to be supplied with 208/230 Volt, 1 phase, 60Hz for compressor and 120 Volt for condensing fan (UL); 208/230 Volt, 1 phase, 60Hz for compressor and 208/230 Volt for condensing fan (UL); 230 Volt, 1 phase, 50Hz power supply (CE).

1.3 Submittals

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

1.4 Warranty

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

1.5 Quality Assurance

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

2.0 PRODUCT

2.1 Cooling Circuits

The unit shall be equipped with one refrigeration circuit, incorporating an inverter rotary compressor, condenser, electronic expansion valve, and evaporator.

The compressor is an R410A DC inverter driven rotary type with variable capacity operation from 25% - 100%. The compressor has a suction gas cooled motor, manual reset high pressure switch, low pressure, and high pressure transducer.

The evaporator coil is manufactured from copper tubes and hydrophilic painted aluminum fins, with an outdoor powder spraying condensate drain pan. The evaporator coil has 0.080m² (self-contained version) and 0.092m² (split version) face area and three rows. The hydrophilic coating provides superior water carryover resistance.

The electronic expansion valve (EEV) is designed for modulating control of refrigerant circuits with high speed and high precision. It is suitable for use as an expansion device in refrigerant circuits with DC inverter compressor with organic safety refrigerants (i.e., R410A). The electronic expansion valve provides a better control of superheating at the outlet of the evaporator, ensuring that the compressor will never be filled by liquid.

2.2 Fan Section

The unit is equipped with either one axial fan (for split system) or one centrifugal fan (self-contained system). These fans are commonly referred to as EC fans. The fan speed is variable and automatically regulated by the controller through all modes of operation. The fans pull air through the coil and are located on the front side of the unit.

2.3 Frame

The exterior 1.0mm - 5mm thick galvanized steel panels are custom powder coated to protect against corrosion. The side panels are equipped with 6mm - 19mm thick insulation. The perforated inlet and outlet panels have 75% open area.

2.4 Air Filtration

The unit is equipped with air filters with polypropylene materials located within the unit and accessible from the return air side of the unit. A filter clog alarm is available as an option.

2.5 Refrigerant

The unit is suitable for operation with R410A refrigerant.

2.6 Supply Air Baffle System (Only Split Version)

A modular supply air baffle system shall be located in the discharge air stream on the front of the indoor unit to direct air toward the IT gear equipment and balance airflow requirements within the row. By focusing the cold air where it is needed, and meeting the servers' requirement, the need for excessive air flow and energy consumption is eliminated.

2.7 Serviceability

The self-contained version units shall be designed, so almost all components are easily accessible for service and maintenance from the front and rear side of the rack. The split version units can be taken out easily after disconnecting the refrigerant pipes.

2.8 Unit Controls

2.8.1 Microprocessor Controller

Vertiv™ VRC models are controlled by the Vertiv™ Liebert® iCOM™ controller. The controller board is microprocessor based. It can be programmed to control the function of every device within the unit via I/O.

The controller allows setting and monitoring of the air parameters of the rack. The unit utilizes temperature sensors placed at the air inlet and outlet to ensure management and control of temperature by the rack.

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

- Return Air temperature
- Air Supply temperature
- Return temperature set point
- Supply temperature set point
- Return temperature band
- Supply temperature band
- Rack Average temperature

The example of available warnings / alarms:

- High supply temperature
- Low supply temperature
- High return temperature
- High discharge temperature
- High pressure abnormality
- High pressure alarm
- Low pressure alarm
- Filters maintain

The following features are incorporated in the controller:

- 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, compressor/control failure, and others available
- Automatic restart is provided after a power failure

2.8.2 Display

The unit shall also include an LCD Display, which is 128 × 64 pixel screen with white backlight, symbolic representation of unit functions, diagnostics feature. A buzzer provides an audible indication in the case of “Warning” or “Alarm” event.

2.9 Monitoring

The unit shall also include a monitoring card, and it is compatible with RJ45 port and a USB port.

A web browser can be used to monitor your intelligent equipment and the environment through the web server function provided by the monitoring card.

A network management system (NMS) can be used to monitor your intelligent equipment and the environment through the SNMP agent function provided by the Monitoring card.

Machine room management software (RDU Manager) to monitor your intelligent equipment and the environment through the TCP/IP port provided by the monitoring card.

2.10 Condenser (Split Version Only)

The condenser should be constructed from sturdy galvanized steel structure body, copper tube and aluminium fins heat exchanger, axial fan, and fan speed controller designed & set for use with R410A refrigerant. The standard condenser (Vertiv™ VRC30x) should work from -15°C to +45°C (from 5°F to 113°F) ambient temperature. The low ambient version of the condenser (Vertiv™ VRC35x) should work from -34°C to +45°C (from -29.2°F to 113°F). The entire unit shall be IPX4 type of protection. The electric box shall be IP54, protection class B.