

# Vertiv™ Liebert® DataMate Guide Specifications

## 1.0 GENERAL

### 1.1 Summary

These specifications describe requirements for a Thermal Management system. The system shall be designed to control temperature and humidity conditions in rooms containing electronic equipment, with good insulation and vapor barrier.

The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements of the room.

### 1.2 Design Requirements

The Thermal Management system shall be a Liebert® DataMate factory assembled unit. The refrigeration system shall be split, with the compressor located in a remote or close-coupled condensing unit. The evaporator section shall be specifically designed for floor or wall-mounted installation and serviceable from the front of the system. Condensing units shall be designed for outdoor or indoor mounting, below the raised floor, above-dropped-ceiling, or in room installation. Refer to Section 2.3 for condensing unit guide specifications.

Standard 60 Hz units shall be CSA-certified to the harmonized U.S. and Canadian product safety standard, “CSA C22.2 No 236/UL 1995 for Heating and Cooling Equipment” and are marked with the CSA c-us logo.

The system shall be AHRI Certified™, the trusted mark of performance assurance for heating, ventilation, air conditioning and commercial refrigeration equipment, using AHRI Standard 1360.

### 1.3 Submittals

Submittals shall be provided with the proposal and shall include: Single-Line Diagrams; Dimensional, Electrical, and Capacity data; Piping and Electrical Connection Drawings.

### 1.4 Quality Assurance

The specified system shall be factory tested before shipment. Testing shall include, but shall not be limited to: Quality Control Checks, “Hi-pot” Test (two times rated voltage plus 1000 volts, per NRTL agency requirements), and Metering Calibration Tests. The system shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

### 1.5 Acceptable Alternatives

Acceptable alternatives shall be permitted with engineer's prior approval only. Contractor to submit a detailed summary form listing all variations to include size deviations, electrical load differences, functional and component changes and savings to end user.

## 2.0 PRODUCT

### 2.1 Standard Features/All Systems

#### 2.1.1 Evaporator Cabinet and Frame Construction

The cabinet and chassis shall be constructed of heavy gauge, painted furniture steel. The cabinet shall be de-signed for easy installation and service access from the front only.

#### 2.1.2 Air Distribution

The air distribution system shall be constructed with a quiet, direct-drive fan assembly equipped with multiple double-inlet blowers, self-aligning sleeve bearings, and lifetime lubrication. Fan motor(s) shall be permanent-split capacitor, high efficiency type, equipped with two speeds for air flow modulation. Dehumidification shall utilize the lower fan speed.

Air filter shall be a cleanable polypropylene monofilament type over expanded aluminum with aluminum frame with a MERV4 rating based on ASHRAE 52.2 007. It shall be easily removable from the front of the system by means of quarter-turn fasteners and shall not require system shutdown for service.

#### 2.1.3 Microprocessor Control System

The control system shall be microprocessor-based, factory-wired into the system and tested prior to shipment. The wall-mounted control enclosure shall include a 2-line by 16-character LCD providing continuous display of operating status and alarm condition. An 8-key membrane keypad for setpoint/program control, fan speed selection and unit On/Off shall be located below the display. The control display shall be field-wired to the control board using 4-conductor field-supplied thermostat wire.

Temperature and humidity sensors shall be located in the wall box, which shall be capable of being located up to 300 ft (91.4m) from the evaporator unit.

##### Monitoring

The LCD shall provide On/Off indication, operating mode indication (cooling, heating, humidifying, dehumidifying), fan speed indication and current day, time, temperature and humidity (if applicable) indication. The monitoring system shall be capable of relaying unit operating parameters and alarms to the Vertiv™ Liebert® IS-UNITY-DP or the Vertiv™ Liebert® SiteScan™ monitoring systems.

##### Control Setpoint Parameters

- Temperature Setpoint: 65-85°F (18 to 29°C)
- Temperature Sensitivity: 1 to 9.9°F (1 to 5°C)
- Humidity Setpoint: 20-80% RH
- Humidity Sensitivity: 1 to 30% RH

The microprocessor can be set within these ranges; however, the unit may not be able to control to extreme combinations of temperature and humidity.

##### Unit Controls

#### 1. Compressor Short-Cycle Control

The control system shall prevent compressor short-cycling by a 3-minute timer from compressor stop to the next start.

## 2. Common Alarm and Remote On/Off

A common alarm relay shall provide a contact closure to a remote alarm device. Two (2) terminals shall also be provided for remote On/Off control. Individual alarms shall be “enabled” or “disabled” from reporting to the common alarm.

## 3. Setback Control

The control shall be user-configurable to use a manual setpoint control or a programmable, time-based set-back control. The setback control will be based on a 5 day/2 day programmed weekly schedule with capability of accepting 2 events per program day.

## 4. Temperature Calibration

The control shall include the capabilities to calibrate the temperature and humidity sensors and adjust the sensor response delay time from 10 to 90 seconds. The control shall be capable of displaying temperature values in °F or °C.

## 5. System Auto Restart

For startup after power failure, the system shall provide automatic restart with a programmable (up to 9.9 minutes in 6-second increments) time delay. Programming can be performed either at the wall-mounted controller or from the central, site-monitoring system.

## 2.1.4 Alarms

### 1. Unit Alarms

The control system shall monitor unit operation and activate an audible and visual alarm in the event of the following factory preset alarm conditions.

- High Temperature (max 90°F, 32.2°C)
- Low Temperature (min 35°F, 1.7°C)
- High Humidity (max 85% RH)
- Low Humidity (min 15% RH)
- High Water Alarm - Lockout Unit Operation
- High Head Pressure
- Loss of Power
- Compressor Short Cycle

### 2. Custom Alarms (2x)

- Humidifier Problem
- Water Detected
- Custom Alarm (1)
- Custom Alarm (2)

User-customized text can be entered for the two (2) custom alarms

### 3. Alarm Controls

Each alarm (unit and custom) shall be individually enabled or disabled (except for high head pressure and high water in condensate pan) and can be programmed for a time delay of 0 to 255 seconds of continuous alarm condition to be recognized as an alarm. Each alarm shall also be enabled or disabled to activate the common alarm (except high head pressure and high water in condensate pan).

#### 4. Audible Alarm

The audible alarm shall annunciate at the LCD wall box any alarm that is enabled by the operator.

#### 5. Common Alarm

A programmable common alarm shall be provided to interface user selected alarms with a remote alarm de-vice.

#### 6. Remote Monitoring - Vertiv™ Liebert® SiteScan™

All alarms shall be communicated to the Liebert site-monitoring system with the following information: date and time of occurrence, unit number and present temperature and humidity.

### 2.2 Chilled Water System Components

#### 2.2.1 Chilled Water Control

The water circuit shall include a 2-way valve with an On/Off actuator. Design pressure shall be 300psi (2068kPa) with a maximum close-off pressure of 60psi (414kPa).

#### 2.2.2 Chilled Water Coil

The cooling coil shall have a minimum of 2.6 ft.2 (.24m2) face area, 3 rows deep. It shall be constructed of copper tubes and aluminum fins and be mounted in a galvanized condensate drain pan. The coil shall be designed for a maximum face velocity of \_\_\_\_ FPM (m/s) at \_\_\_ CFM (CMH). The water circuit shall be designed to dis-tribute water into the entire coil face area. The coil shall be supplied with \_\_\_ °F (°C) entering water temperature, with a \_\_\_ °F (°C) temperature rise. The coil shall be supplied with \_\_\_ GPM (l/s) of chilled water and the pressure drop shall not exceed \_\_\_\_\_ psi (kPa).

### 2.3 Direct Expansion System Components

#### 2.3.1 Direct Expansion Coil

The evaporator section shall include an evaporator coil, thermostatic expansion valve and filter-drier.

The evaporator coil shall have \_\_\_ ft.2 (m2) face area, \_\_\_ rows deep. It shall be constructed of copper tubes and aluminum fins and have a maximum face velocity of \_\_\_ FPM (m/s) at \_\_\_\_\_ CFM (CMH). An externally equalized thermostatic expansion valve shall control refrigerant flow. The coil shall be provided with a galvanized steel drain pan. The evaporator refrigerant piping shall be spun-closed and filled with a nitrogen holding charge. Field relief of the Schrader valves shall indicate a leak-free system. The evaporator unit can be coupled directly with a water/glycol condensing unit or mounted remote to the indoor or outdoor condensing unit. Evaporator and condensing unit shall be field piped using copper lines, brazed, evacuated and field charged with R-407C refrigerant.

#### 2.4 Indoor Air-Cooled Centrifugal Fan Condensing Unit

Condensing unit components shall include condenser coil, scroll compressor, high-pressure switch, Vertiv™ Liebert® Lee-Temp refrigerant receiver, head pressure control valve, hot gas bypass system and liquid line solenoid valve. The hot gas bypass circuit shall be provided to reduce compressor cycling and improve operation under low-load conditions. Units available for [(2-ton)(3-ton)] systems.

All components shall be factory-assembled. The condensing unit refrigerant piping shall be spun-closed and filled with a nitrogen holding charge. Field relief of the Schrader valves shall indicate a leak-free system. Evap-orator and condensing unit shall be field piped using copper lines, brazed, evacuated and field charged with R-407C refrigerant. Condensing unit shall be designed for 95°F (35°C) ambient and be capable of operation to -30°F (-34°C). The condensing unit shall be mounted remote to the evaporator.

The condensing coil shall be constructed of copper tubes and aluminum fins. The condenser fan shall be centrifugal type, double inlet, direct drive and shall operate at 1050 rpm (890 rpm @ 50 Hz). The fan and motor shall be mounted on vibration isolators. The condenser fan shall be designed for \_\_\_CFM (CMH) at \_\_\_\_\_" (mm) w.g. external static pressure.

## 2.5 Outdoor Air-Cooled Prop Fan Condensing Unit

Condensing unit components shall include a condenser coil, a direct-drive propeller-type fan, a scroll compressor, high-pressure switch, Liebert® Lee-Temp receiver and head pressure control valve, hot gas bypass system and liquid line solenoid valve. A hot gas bypass system shall be provided to reduce compressor cycling and improve operation under low load conditions.

All components shall be factory-assembled. The condensing unit refrigerant piping shall be spun-closed and filled with a nitrogen holding charge. Field relief of the Schrader valves shall indicate a leak-free system. Evaporator and condensing unit shall be field piped using copper lines, brazed, evacuated and field charged with R-407C refrigerant. Condensing unit shall be designed for 95°F (35°C) ambient and be capable of operation to -30°F (-34.4°C).

The condenser coil shall be constructed of copper tubes and aluminum fins.

(Option) The 2- or 3-ton condensing unit shall be designed to operate at a sound level less than 58dBA.

(Option) The 2- or 3-ton condensing unit shall be designed for design ambient operation of 105°F (40.6°C).

(Option) The coil shall be epoxy-coated for extended coil life in corrosive environments, such as coastal areas. Factory-applied E-coat using immersion and baking process shall provide a flexible epoxy-coating to all coil sur-faces. Coil color shall be black and shall be protected from solar UV ray degradation with a factory-applied UV topcoat.

## 2.6 Indoor Close-Coupled Water/Glycol Condensing Unit

The water/glycol-cooled condensing unit shall include a scroll compressor and a water/glycol cooled condenser, and shall be capable of being close-coupled to the evaporator module. The water/glycol cooled condenser shall be designed to balance the heat rejection at \_\_\_\_\_ °F (°C) entering water/glycol temperature with a flow rate of \_\_\_ GPM (l/s) and have a total system pressure drop of \_\_\_\_\_ ft of water (kPa). An adjustable two-way water regulating valve shall be included. The condenser water/glycol circuit shall be designed for a static operating pressure of 150psi (1034kPa).

All components shall be factory-assembled. The condensing unit refrigerant piping shall be spun-closed and filled with a nitrogen holding charge. Field relief of the Schrader valves shall indicate a leak-free system. Evap-orator and condensing unit shall be field piped using copper lines, brazed, evacuated and field charged with R-407C refrigerant. An integral wiring harness for single point power connection shall be provided for field wiring of evaporator and condensing unit together.

## 2.7 Indoor Remote Water/Glycol-Cooled Condensing Unit

The water/glycol condensing unit shall include a scroll compressor, high-pressure switch, coaxial condenser, water-regulating valve, hot gas bypass system and liquid line solenoid valve. A hot gas bypass circuit shall be provided to reduce compressor cycling and improve operation under low-load conditions. The condensing unit refrigerant piping shall be spun-closed and filled with a nitrogen holding charge. Field relief of the Schrader valves shall indicate a leak-free system. Evaporator and condensing unit shall be field piped using copper lines, brazed, evacuated and field charged with R-407C refrigerant. Units available for [(2-ton)(3-ton)] systems.

The water/glycol condensing unit shall be equipped with a coaxial condenser having a total system pressure drop of \_\_\_\_\_ ft. of water (kPa) and a flow rate of \_\_\_\_\_ GPM (l/s) with \_\_\_\_\_ °F (°C) entering water/glycol temperature.

The condenser circuit shall be pre-piped with a [(2-way) (3-way)] regulating valve which is head-pressure actuated.

The condenser water/glycol circuit shall be designed for a static operating pressure of [(150psi (1034kPa)) (350 PSI (2413 kPa))].

## 2.8 Factory-Installed Options

### 2.8.1 Electric Reheat

The electric reheat shall be low-watt density, tubular element and shall include agency approved safety switch to protect the system from overheating. The capacity of the reheat coil shall be

\_\_\_\_\_ BTU/HR, \_\_\_\_ kW, controlled in 1 stage.

### 2.8.2 Steam Generating Humidifier

The environmental control system shall be equipped with a steam generating humidifier that is controlled by the microprocessor control system. It shall be complete with disposable canister, all supply and drain valves, 1" (25.4mm) air gap on fill line, inlet strainer, steam distributor, and electronic controls. The need to change canister shall be annunciated on the microprocessor wall-box control panel. The humidifier shall have a capacity of 3 lb./hr. (1.4kg/h). An LED light on the humidifier assembly shall indicate cylinder full, overcurrent detection, fill system fault, and end of cylinder life conditions.

## 2.9 Ship-Loose Accessories

### 2.9.1 Remote Sensors

The unit shall be supplied with remote temperature and humidity sensors. The sensors shall be connected to the unit by a 30 ft. (9m) shielded cable.

### 2.9.2 Condensate Pump

The condensate pump shall have the capacity of \_\_\_\_\_ GPH (\_\_\_ l/h) at \_\_\_ ft. head (\_\_\_ kPa). It shall be complete with integral float switch, discharge check valve, pump, motor assembly and reservoir. A secondary float switch shall be provided to permit field wiring to the unit control to shut down the evaporator upon a high water level condition.

### 2.9.3 Step-Down Transformer

A step-down transformer shall be provided for [(Indoor Evaporator) (Close-Coupled Water/Glycol Condensing Unit) (Outdoor Air-Cooled Condensing Unit)] needing 277V input power voltage. The transformer shall be coated with epoxy and contained in an enclosed, non-ventilated electrical box with adaptable mounting brackets, suitable for [(indoor) (outdoor)] mounting.

### 2.9.4 Liebert Local Monitoring Systems, Auto-changeover and Leak Detection

Provide indicated quantities of the following:

\_\_\_\_\_ Leak Detection System(s) Model \_\_\_\_\_

\_\_\_\_\_ Remote Monitor(s) Model \_\_\_\_\_

\_\_\_\_\_ Auto-changeover Control(s) Model \_\_\_\_\_

### 2.9.5 Remote Monitoring and Control—IS-UNITY-DP and BMS

The Vertiv™ Liebert® IS-UNITY-DP BMS Monitoring Solution shall provide SNMP v1/v2c/v3, BACnet IP, BACnet MSTP, Modbus TCP/IP, and Modbus RTU monitoring capability to the Vertiv™ Liebert® DataMate system. Card shall employ Ethernet and RS-485 networks to monitor and manage a wide range of operating parameters pertaining to the cooling system. The Unity card shall provide access to the Liebert® DataMate remotely via a web interface and shall support Vertiv™ Liebert® Nform connectivity. The wall-mount kit for field-installation shall include the IS-UNITY-DP card, power/communication interface card, painted enclosure, 120V wall outlet transformer with 6ft (2m) low voltage power wire, and full instructions. Field-supplied wiring for communication to the Liebert® DataMate and to other systems shall be required to access features.

### 2.9.6 Vertiv™ Liebert® SiteScan™ Site Monitoring System

A Liebert® SiteScan™ Site Monitoring System Model \_\_\_\_\_ shall be provided for remote monitoring of the Liebert® DataMate unit and monitoring of other Liebert support equipment. The Liebert® SiteScan™ shall have the capability to monitor and change (at the user direction) the temperature and humidity setpoints and sensitivities of each unit. The printer shall provide the user with chronological alarm information. It shall also be capable of being programmed to print out environmental conditions or operating modes at each unit.

### 2.9.7 Drycooler

The Liebert drycooler shall be a low-profile, direct-drive propeller fan-type air-cooled unit. The drycooler shall be constructed with an aluminum cabinet and a copper-tube aluminum fin coil, and one or more direct drive fans. All electrical connections and controls shall be enclosed in an integral, NEMA 3R rated electrical panel section of the drycooler. The drycooler shall be quiet and corrosion resistant.

The drycooler shall be designed for \_\_\_\_ °F (°C) ambient.

### 2.9.8 Glycol Pump Package

The system shall include a centrifugal pump mounted in a weatherproof and vented enclosure. The pump shall be rated for \_\_\_\_ gpm (l/s) at \_\_\_\_ ft. (kPa) of head, and operate on \_\_\_\_ volt, \_\_\_\_ phase, \_\_\_\_\_ Hz.

## 3.0 EXECUTION

### 3.1 Installation of Air Conditioning Units

#### 3.1.1 General

Install air conditioning units in accordance with manufacturer's installation instructions. Install unit plumb and level, firmly anchored in locations indicated and maintain manufacturer's recommended clearances.

#### 3.1.2 Electrical Wiring

Install and connect electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's electrical connection diagram submittal to electrical contractor.

#### 3.1.3 Piping Connections

Install and connect devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's piping connection diagram submittal to piping contractor.

#### 3.1.4 Supply and Drain Water Piping

Connect water supply and drains to air conditioning unit. Provide pitch and trap as manufacturer's instructions and local codes require.

#### 3.1.5 Field Quality Control

Startup air conditioning units in accordance with manufacturer's start up instructions. Test controls and demonstrate compliance with requirements.