MC Model Guide Specifications

General

Furnish and install where shown on plans, MC Model self-contained packaged air conditioning unit. Capacities, models and unit arrangement shall be as shown on the unit schedule and the contract drawings. All units shall conform to UL1995 standard and be certified to CAN/CSA C22.1 No 236 by Intertek-ETL. Unit shall be accepted for use in the City of New York by the Department of Buildings (MEA). Each unit shall be completely factory assembled, piped, wired and tested. Units shall be leak tested and charged with a full operating charge of Refrigerant 410A. Units shall then be disassembled into their individual modules for shipping and assembly on site. Installation and maintenance manuals and wiring diagrams shall be supplied with each unit. Factory test shall include, but not be limited to: complete run check of all electrical components and safeties, including proper control sequencing; pressure test of refrigerant coils and condensers; leak check of completed refrigerant circuits; leak check of completed water circuit; compressor run check.

Cabinet

VH CONFIGURATION: The unit shall be comprised of three distinct modules: 1) Main cooling/heating, 2) Filter/ waterside economizer, and 3) Fan section. The unit shall be designed for ease of assembly. The refrigeration circuit shall remain intact during disassembly/assembly. All modules shall be able to pass through a 36" steel framed door. The frame shall be fabricated of an angle iron framework. Unit exterior panels shall be 18 gauge G90 galvanized steel for corrosion protection. Each section shall incorporate removable access panels. The complete cabinet frame and access panels shall be insulated with ½", 1.5lb dual density fiberglass insulation. The main cooling/heating section and the filter/waterside economizer section shall contain a galvanized steel drain pan coated with archem type paint for corrosion resistance.

VL CONFIGURATION: The unit shall be comprised of two distinct modules: 1) Main cooling/heating section with blower(s) and motor(s) 2) Filter/ waterside economizer section. The unit shall be designed for ease of assembly. The refrigeration circuit shall remain intact during disassembly/ assembly. The frame shall be fabricated of an angle iron framework. Unit exterior panels shall be 18 gauge G90 galvanized steel for corrosion protection. Each section shall incorporate removable access panels. The complete cabinet frame and access panels shall be insulated with ½", 1.5lb dual density fiberglass insulation. The main cooling/heating section and the filter/waterside economizer section shall contain a galvanized steel drain pan coated with archem type paint for corrosion resistance.

Offered as an option, ½" thick, closed cell foam insulation shall promote the indoor air quality (IAQ) of commercial buildings by improving moisture management and sound control.

Evaporator

The direct expansion coil shall be a minimum of 3 rows and fabricated from ⅜" or ½" O.D. seamless copper tubing mechanically bonded to rippled and corrugated aluminum fins. Each individual evaporator coil shall be removable for replacement without disturbing the remaining refrigerant circuits. Each evaporator coil circuit shall be fed by an adjustable thermostatic expansion valve, with external equalizer, sized to provide efficient operation at full and at part load operating points in the cooling and heating modes.

Supply Fan

Supply fans shall be double width, double inlet forward curved type of Class II construction. All fans shall be statically and dynamically balanced. Fan shafts shall be mounted in heavy-duty 150,000 hour greaseable pillow block bearings. The fan motor shall be open drip proof three phase, NEMA T frame E high efficiency EPACT rated, 1800 rpm, with grease lubricated ball bearings. The drive shall include fixed pitch sheaves with multiple V belts sized for 115% of the fan brake horsepower.

Reverse Cycle Operation

Units shall be equipped with reversing valves to allow operation in the reverse cycle heating mode. Electric heaters shall not be allowed as a substitute.

Variable Air Volume (Optional)

Airflow modulation can be achieved by the use of a factory or field installed variable frequency drive (VFD). The VFD shall be controlled by a duct static pressure sensor. The pressure set point shall be adjustable and monitored by the unit mounted DDC. All of Bosch's products utilizing a VFD shall also have hot gas bypass to avoid freezing the air coil in reduced air flow situations. The duct static pressure must be installed and wired by the field contractor.

Refrigeration Circuit

Each unit shall contain multiple independent refrigeration circuits. Each circuit shall include a high efficiency heavy-duty scroll compressors. Each circuit shall have high and low pressure cutouts. Each circuit shall be factory sealed and fully charged with Refrigerant 410A. Suction and discharge schrader valves shall be provided for manifold gauge connections to facilitate servicing. Optional hot gas bypass shall be provided to allow unit operation under extended operating conditions avoiding coil freeze up. NOTE: HGBP is required with VAV operation.

Compressors

Each unit shall have multiple high efficiency scroll compressors with internal or external motor protection and a time delay to prevent short cycling and simultaneous starting of compressors following a power failure. Each compressor shall be on an independent refrigerant circuit. The compressors shall be mounted on rubber isolators.

Condensers

All condensers shall be coaxial tube-in-tube for maximum heat transfer efficiency and performance. Inner water tubes shall be either copper or optional cupro-nickel with large internal diameters for reduced waterside pressure drops. Outer tubes shall be steel, painted for corrosion protection. All condensers shall be rated at 600 PSIG operating refrigerant pressures and 400 PSIG waterside pressures. Units shall be rated down to 50°F without the use of water regulating valves.

Waterside Economizer (Optional)

A complete waterside economizer package shall be provided, including coil, control valves and factory piping. The complete economizer package shall be rated for 400 PSIG waterside working pressure Economizer operation shall be controlled to maximize free cooling operation. Economizer shall be enabled by the field adjustable aquastat whenever the entering water temperature is less than set point. Water flow shall pass through the economizer coil and condenser in series while in the economizer operating mode and shall bypass the economizer coil while not calling for economizer operation. Mechanical cooling or heating shall be enabled during economizer operation.

Hot Water Preheat (Optional)

Hot water coils shall be 1 or 2 rows, fabricated from ½" O.D. seamless copper tubing mechanically bonded to rippled and corrugated aluminum fins. Coil shall be field mounted.

Hot Gas Reheat (Optional)

Provide a one row hot gas reheat coil to allow the unit to operate in the dehumidification mode without overheating the space. Control of the hot gas reheat shall be conducted by the unit mounted DDC or a unit controller with a humidity sensor that has a digital output to activate the reheat valve.

Filter Section

The unit shall be supplied with 4" deep pleated, 30% high efficiency filters. The filters shall have side access capability through an access panel.

Electrical

Each unit shall be wired and tested at the factory prior to shipment. Wiring shall comply with NEC requirements and shall conform with all applicable ETL standards. The units shall have a single point power connection. The control power shall be supplied through a factory installed, low voltage control circuit transformer with an integral resettable circuit breaker. The fan motor starter shall have at magnetic three line, ambient compensated overload protector with a manual reset. A terminal block shall be provided for the main power connection.

Each unit shall be provided with a Unit Protection Module (UPM) that controls compressor operation and monitors the safety controls that protect the unit.

Safety controls include the following:

High pressure switches located in the refrigerant discharge lines. One per refrigeration unit.

Low pressure switches for loss of charge protection located in the unit refrigerant suction lines. One per refrigeration unit.

A factory installed freeze sensor: If the temperature drops below or remains at the freeze limit trip for 30 seconds, the controller will shut the compressor down and enter into a soft lockout condition.

Condensate overflow protection sensor located in the drain pan(s) of the unit and wired to the UPM board.

The UPM includes the following features:

Anti-Short Cycle Timer: 5 minute delay on break timer to prevent compressor short cycling.

Random Start: Each controller has a unique random start delay ranging from 270 to 300 seconds.

Low Pressure Bypass Timer: The low pressure switch will be bypassed for 120 seconds after compressor start-up to prevent nuisance low pressure lockouts during cold start-up in the heating mode.

Brownout/Surge/Power Interruption Protection: A 20 millisecond window is to be monitored for the above condition. Should any of these conditions be detected, the 5-minute delay on break timer and the random start timer delay are initiated.

Malfunction Output: The controller shall have a set of wet contacts for remote fault indication.

LED Fault Indication: Two LED indicators are provided as follows:

- Green: Power LED indicates 18 – 30 VAC present at the board.
- Red: Fault indicator with blink codes as follows:
- One Blink: 1st Stage high pressure lockout
- Two Blinks: 1st Stage low pressure lockout
- Three Blinks: 2nd Stage high pressure lockout
- Four Blinks: 2nd Stage low pressure lockout
- Five Blinks: Freeze protection lockout
- Six Blinks: Condensate overflow lockout
- Seven Blinks: Brown Out

Intelligent Reset: If a fault condition is initiated, the 5 minute delay on break time period is initiated and the unit will restart after this delay expires. The UPM is configurable for either 2 or 4 fault occurrences before going into a hard lockout. The selection is made through a dip switch setting on the board. If the fault condition still exists or reoccurs twice or four times within one hour, the unit will go into a hard lockout and requires a manual lockout reset. A condensate overflow fault will, however, put the unit into a hard lockout immediately.

Lockout Reset: A hard lockout can be reset by turning the unit thermostat off and then back on or by shutting off unit power at the circuit breaker.

NOTE: The blower motor will remain active during a lockout condition.

Auxiliary Control Options (Optional)

A pressure differential type water flow switch shall be provided, factory installed, to verify water flow status at the unit. Compressor operation shall be disabled and an alarm signal provided if condenser water flow is lost. Unit operation will be restored when water flow has been reestablished.

DDC Controls: Unit shall be equipped with a factory installed DDC control capable of interfacing with BACnet™, Modbus, N2 or Lon works® (with optional card).

The controller shall be preprogrammed to control the unit and monitor the safety controls.

The unit shall be able to operate as a standalone or be integrated into the building management system.

A leaving water and leaving air sensor shall be installed in the unit.

Wall sensors shall be available for controlling zone temperature.