

LM Split Systems Guide Specification

1.0 General

Units shall be performance certified to ISO standard 13256-1 for WaterLoop Heat Pump, Ground Water Heat Pump and Ground Loop Heat Pump applications. Units shall conform to UL 1995 standard and certified to CAN/CSA C22.1 No 236 by Intertek-ETL safety on all models. Each unit shall be run tested at the factory. Each unit shall be pallet mounted, stretch wrapped and covered with cardboard. The units shall be manufactured in an ISO9001:2000 certified facility. Refer to Bosch Thermotechnology Corp. limited product warranty for details on warranty coverage. The units shall be designed to operate with entering fluid temperatures between 50°F (10°C) and 110°F (43.3°C) in cooling and temperatures between 25°F (-3.9°C) and 80°F (26.6°C) in heating as manufactured by FHP Manufacturing in Fort Lauderdale, Florida.

Standard Construction

The LM Split condensing section cabinet is fabricated with 1mm white pre-painted steel with closed cell foam insulation as a standard feature. The LM Split air handler section is manufactured with G90 galvanized steel and fiberglass insulation as standard feature. The cabinet is specifically designed to aid in corrosion protection.

Air Handler: The interior shall be insulated with ½" (12.7mm) thick glass fiber. Two blower compartment access panels shall be removable with supply and return ductwork in place. A duct collar shall be provided on the supply air opening. A filter rack with a 2" (50.8 mm) thick disposable filters and a 1" (25.4mm) return air duct collar shall be provided with each unit. As an option, air filters shall be pleated, with a MERV-8 or MERV-13 rating. Units shall have a stainless steel condensate drain pans. Condensing Section: All unit installations shall allow sufficient service access to replace the compressor without unit removal. The compressor shall have a floating base pan to minimize noise transmissions. Each unit also comes standard with a heavy duty, multi-density compressor blanket for exceptional noise containment and as a thermal insulator for wires and components surrounding the compressor.

Refrigeration Circuits

All units shall contain a sealed refrigerant circuit including a two stage scroll compressor, two internal checking thermal expansion valve metering devices, one in the air handler and one in the condensing section, finned tube air-to-refrigerant heat exchanger, refrigerant reversing valve, refrigerant service shut off valves, and service ports. Compressor shall be high efficiency two stage scroll type, designed for heat pump duty, quiet operation and mounted on rubber vibration isolators. Compressor motors shall be equipped with overload protection. Refrigerant reversing valves shall be pilot operated sliding piston type with replaceable encapsulated magnetic coils energized only during the cooling cycle. The finned tube coil shall be constructed of lanced aluminum fins not exceeding fourteen fins per inch bonded to rifled copper tubes in a staggered pattern not less than three rows deep and have a 600 PSIG (4140 kPa) working pressure. Coils shall have standard uncoated and as an option the Tin-Plated Copper Tubing will aid in protecting the evaporator coil from many forms of corrosive elements in the airstream. The coaxial water-to-refrigerant heat exchanger shall be constructed of a convoluted copper (optional cupronickel) inner tube and steel outer tube with a designed refrigerant working pressure of 600

PSIG (4140 kPa) and a designed water side working pressure of no less than 400 PSIG (2750 kPa).

The water-to-refrigerant heat exchanger and all refrigerant piping shall be insulated with closed-cell polyvinyl chloride foam to prevent condensation at low fluid temperatures.

Fan and Motor Assembly

The fan shall be direct drive centrifugal forward curved type with a dynamically balanced wheel. The housing and wheel shall be designed for quiet low velocity operation. The blower fan housing is assembled with a removable inlet ring that allows for quick removal and servicing of fan motor without disconnecting the supply air duct work. The fan motor shall be a constant airflow (CFM) type ECM motor with internal programming factory set for the specific unit and featuring soft start/stop and a delay off feature for maximum efficiency and quiet operation. Air flow rates shall be varied according to the staging of the unit. There will further be provisions for adjusting the air delivery of the motor and blower by +/- 15% from rated air flow.

Electrical

Controls and safety devices will be factory wired and mounted within the unit. Controls shall include optional comfort alert module, compressor contactor, 24V transformer, reversing valve coil and solid state lock-out controller unit protection module (UPM). The UPM board shall include the following features: diagnostic LED's, low pressure bypass time delay (to prevent nuisance low pressure lock-outs during operation with low fluid temperatures), anti-short cycle time delay, random start time delay and one time intelligent reset. When the safety controls are activated the lock-out circuit shall reset itself the first time. If the safety controls are subsequently activated 2 or 4 times (field configurable) within one hour, then the lock-out circuit shall disable the compressor until it is reset at the thermostat or main circuit breaker to prevent compressor operation during fault conditions. A lock-out indicating terminal shall be provided in the low voltage circuit. Safety devices include a low pressure cutout set a 40 PSIG (280 kPa) for loss of charge protection (freezestat and/or high discharge gas temperature sensor is not acceptable) and a high pressure cutout control set at 600 PSIG (4140 Kpa).

The ECM motor interface board shall provide a screw type terminal block for thermostat connection, LED's to indicate thermostat status and air delivery. It shall also provide a means of changing the motor program to any of up to four pre-programmed options. Direct wiring of the motor control harness to the thermostat is not acceptable.

A terminal block with screw terminals shall be provided for control wiring. An optional energy management relay to allow unit control by an external source can be factory installed.

Piping

The supply and return water connections are located on the front of the unit. Supply, return water and condensate drain connections shall be brass female pipe thread fittings and mounted flush to cabinet exterior.

Internal Electric Heat (Optional)

208/230-1-60 volt units shall be equipped with optional factory installed internal electric resistance heat for auxiliary and emergency heat. Electric heater must be Intertek (ETL) approved for safety when installed in the unit. External heater packages or heater packages not specifically listed for use with the unit are unacceptable. Electric heater packages shall include a heater collar mounted to the blower outlet, individual thermal overload protected heater elements no greater than 5kW each and magnetic contactors. An empty heater collar is standard in all units. Heating elements are available as an after sale product and can be added at any time if purchased without this option.

Factory Installed Options

A comfort alert module shall be installed in the unit to assist in service diagnostics (sizes 024-070 only).

Smart Start Control: A factory installed start assist device that reduces inrush current on start up and extends compressor longevity.

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 pre-programmed 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.

Flow Proving Switch: Prevents unit operation if there is no fluid flow. This factory installed, internally mounted device shall be rated at 600 psi and disable the compressor if a lack of water-flow occurs.

Additional Factory Options

All units shall be connected by hoses and have a maximum working pressure 400 PSI for sizes ½" – 1" and 300 PSI for sizes 1¼ – 2". A variety of hose kits are available depending on the job requirement. Kits 2 through 6 include supply and return ported ball shut-off valves with P/T ports. Hose kit options are available in the accessories section of the BST selection software.

Kit 1 – Hose kit either 24" or 36" long.

Kit 2 – Hose kit with ball valves on the supply and return hoses. Valves shall have P/T ports to facilitate pressure and temperature readings.

Kit 3 – Hose kit with automatic flow control valve. The design flow rate is preset at the factory per the specified design conditions and shall automatically limit the flow to this value. This shall facilitate balancing of the fluid loop and allow each unit the required flow.

Kit 4 – Hose kit with an automatic flow control valve and a Y-strainer and blow down valve on the supply side. The filter screen is 20 mesh, 304 stainless steel.

This shall prevent dirt and debris from entering the water coil.

Kit 5 – Hose kit with an automatic flow control valve and a 24V, 2-position solenoid valve on the return. This shall be used to shut off flow to the unit when there is not a call for heating or cooling. (Typically used with a VFD pumping.)

Kit 6 – Hose kit with an automatic flow control valve, Y-strainer/BD valve on the return. 24V, automatic flow valve, blow down valve and two position solenoid valve.

Thermostats

The unit control may be as simple as a single stage thermostat or the unit may have a DDC controller integrated into the building management system. All external low voltage control wiring is made to the thermostat terminal located in the unit electrical box. Thermostats may be manual change over, auto change over, programmable or non-programmable depending on the requirements of the project. A full line of thermostats are available from Bosch Thermotechnology Corp. as an accessory.