

**Model:** MPU

**Description:** A Modular Packaged Heating, Cooling and ventilating unit(s), as indicated on the drawings shall be furnished. Direct Fired Gas Unit(s) shall be tested in accordance with ANSI Standard Z83.8-2006/CSA 2.6-2006, and shall bear the ETL label. Orientation shall be horizontal, down or side discharge. Unit(s) shall be factory assembled, tested and shipped as a complete packaged assembly, for outdoor mounting, consisting of the following:

1. Gas burner or Electric Heat
2. Centrifugal blower (forward-curved double width/double inlet)
3. Motor starter with thermal overload protection
4. Motor and drive assembly
5. Fuel burning and safety equipment
6. Temperature control system
7. Gas piping
8. Pre-piped and charged condenser(s)

**Construction:**

**Housing**

Unit housing shall be constructed of 20 gauge G-90 galvanized steel. The wall panels and roof panels shall be fabricated by forming double-standing, self-locking seams that require no additional support. The floor and wall panels shall be caulked air tight with a silicone caulk. All casing panels shall be attached with sheet metal screws or rivets, which can be removed to field service large components. The unit base shall be suitable for curb or flat mount. Housing construction should be suitable for outdoor installation.

An observation port shall be located on the exterior of the unit for observation of the main flame and pilot flame. All controls, gas valves, modulating controls and electrical components shall be mounted within the burner vestibule. The burner vestibule shall be an integral part of the unit and not extend outside the exterior casing of the unit and not exposed to the main air stream. The vestibule full-size door shall provide easy access to controls and gas-train components. Blower door shall provide easy access to blower, motor and drives. Access doors shall be provided on both front and backside of unit providing full access to every part of the unit.

Internal ridged board 1" x 1.5" foil face installation shall be installed on roof, walls and base of casing.

**Base**

The base shall be constructed of galvanized steel for improved rigidity. Base shall be structurally reinforced to accommodate the blower assembly and burner.

**Blower**

Blower(s) shall be forward-curved, centrifugal, Class I or II (depending on application requirements), double width, double inlet, constructed G-90 galvanized steel. Unit shall have a heavy-duty, solid-steel shaft. Wheels shall be balanced in two planes and done in accordance with AMCA standard 204-96, Balance Quality and Vibration Levels for Fans. The wheel blades shall be aerodynamically designed to minimize turbulence, increase efficiency and reduce noise. The wheel blades shall be securely attached to the wheel inlet ring. The wheel shall be firmly attached to the fan shaft with setscrews and keys. The blower assembly shall be isolated from the fan structure with vibration isolators.

Blower capacity shall be \_\_\_\_\_ CFM at 70 degrees F standard air, \_\_\_\_\_ external static pressure.

External Static is the sum of duct loss plus duct component static pressure. All blowers shall be tested and set at rated speed after being installed in the factory-assembled unit.

**Motor & Motor Compartment**

Motors shall be heavy-duty ball bearing type and furnished at the specified voltage, phase and enclosure. Motor mounting plate shall be constructed of heavy gauge galvanized steel and shall be designed to provide easy adjustment of the belt tension. Blower motor shall be suitable for operation on \_\_\_\_\_ volts, \_\_\_\_\_ cycle, \_\_\_\_\_ phase power. Blower motor shall be a \_\_\_\_\_ HP motor, Open Drip Proof.

**Shaft & Bearings**

Shafts shall be precision ground and polished. Heavy duty, pre-lubricated bearings shall be selected for a minimum (L50) life in excess of 200,000 hours of operation at maximum cataloged operating speed. They shall be designed for, and individually tested, specifically for use in air handling applications.

**Belts & Drives**

Belts shall be oil and heat resistant, non-static, grip-notch type. Drives shall be cast type, precision machined and keyed, and secured attached to the fan and motor shafts. Fan operating speed shall be factory set using adjustable pitch motor pulleys. All drives shall be a minimum of 2 grooves above 2 HP.

**Burner**

The gas burner shall be direct-fired, draw-through type, sized to provide an output of \_\_\_\_\_ BTU/hr using natural or propane gas at an inlet-supply pressure to the unit of \_\_\_\_\_ inches water column (7" w.c. minimum).

The burner shall be capable of heating the entire air supply from \_\_\_\_\_ F° to \_\_\_\_\_ F° ( \_\_\_\_\_ degrees F temperature rise). The burner shall burn over its entire length at all times when the system is in operation.

The burner shall have non-clogging, 4302B stainless-steel combustion baffles attached to a ductile aluminum gas-supply section with no moving parts to wear out or fail. The burner shall be capable of 92% combustion efficiency with a maximum turndown ratio of up to 30 to 1.

The gas burner shall be furnished with a pilot package arranged so that the pilot flame lights the burner with instantaneous ignition. Pilot assembly includes a flame rod, spark rod and pilot, which is automatically ignited by ignition transformer. A flame-rod rectification system shall be used to prove pilot and main flame.

Rear access doors will provide complete access to burner and pilot assembly.

Burner profile plates shall be self-adjusting to operate across the complete CFM range of each model heater. Every unit shall be designed for Variable Air Volume capabilities.

**COOLING EQUIPMENT**

**Standard**

All cooling equipment should conform to local code requirements. All gas manifold components shall be piped and wired at the factory.

Components Include:

- 14 SEER minimum condenser
- Thermal Expansion Valve

- Filter/Dryer
- Hard Start Kit for Condenser
- Insulated Suction Lines
- Multiple Stages where required
- Pre Charged System
- R-410A Refrigerant

## **GAS EQUIPMENT**

### **Standard**

All gas equipment should conform to local code requirements. All gas manifold components shall be piped and wired at the factory.

Components Include:

- Pilot-gas shut-off valve
- Pilot-gas regulator
- Pilot-gas valve
- Main-gas shut-off valve
- Main-gas regulator
- Two solenoid valves
- Modulating-gas valve
- Burner

### **Optional**

High-gas pressure regulator

## **SAFETY CONTROLS**

### **Standard**

- Motor starter with adjustable overloads
- Air-flow safety switch
- Electronic flame-safety relay
- High-temperature limit switch
- Main-gas regulator
- Two safety shutoff valves
- Modulating-gas valve
- Burner
- Adjustable burner ON/OFF inlet air duct-stat to shut off burner when inlet air is sufficiently warm to maintain space temperature
- Non-Fused Disconnect
- Casing insulation shall be 1" x 1.5" density with a foil face

### **Optional**

- High gas-pressure switches to open circuit to electronic flame-safety relay, if gas pressure is too high.
- Low gas-pressure switch to open circuit to electronic flame safety rely, if gas pressure is too low.
- Adjustable low temperature blower-safety control with bypass timer to shut down unit, if discharge temperature drops below setting.
- Proof-of-closure switch to energize the main-burner circuit only if the motorized gas valve is in a closed position.

## **ACCESSORIES**

- **Inlet Dampers:** Manufacturer shall provide and install on unit, when possible, a two-position, motor-operated damper with internal end switch to energize the blower-starter circuit, when damper is 80% open. Blades shall be a maximum of 6" wide 16-gauge G-90 galvanized steel and shall be made to guarantee the absence of noticeable vibration at design air velocities. Damper blades are to be mounted on friction-free synthetic bearings. Damper edges shall have PVC coated polyester fabric mechanically locked into blade edge. Jamb seals used are flexible metal, compression type.
- **Filters:** The filters shall be (2") thick, aluminum mesh coated with super-filter adhesive, aluminum mesh with polyester foam or pleated throw away. Aluminum-mesh filters shall have aluminum frames with media to be layers of split and expanded aluminum, varying in pattern to obtain maximum depth loading. Washable 2" filters shall be enclosed in two-piece, die-cut frame with diagonal supports. Frame shall be constructed of heavy-duty beverage board. Filter media is supported on the air leaving side by a metal grid.
- **Filter Section:** Shall be either insulated or non-insulated constructed of G-90 galvanized steel with filters supported by internal slides and with removable access panels.
- **Fresh-Air Inlet Hood:** Shall be constructed of G-90 galvanized steel with bird screen.
- **Fresh-Air Inlet Hood/Filter Combination:** Shall be constructed of G-90 galvanized steel with bird screen and (2") cleanable filters supported by internal slides mounted in the inlet face of the hood.
- **Discharge Diffusers:** Shall be constructed of G-90 galvanized steel with horizontal and vertical blades capable of four-way diffusion.
- **Curb:** 20" curb shall be constructed of 18-gauge aluminized steel as a completed welded assembly.
- **Cooling Coil Section:** Cooling coil section shall be field bolted directly to discharge of blower section. Coil section to be designed to fit onto common curb with main unit. Base of coil section to be constructed with double pitch stainless steel drain pan for coil, same as main unit. Casing and roof to be 20-gauge G-90 galvanized construction. Inside of section to be fully insulated with foil back insulation. DX or chilled water coil to meet scheduled requirements.

## **TEMPERATURE CONTROL SYSTEMS**

**Discharge Temperature Control:** Use for building exhaust-air replacement to maintain a constant discharge temperature of supply air. The burner flame modulates to compensate for outdoor temperatures. The optional manual SUMMER-OFF/WINTER selector switch and exhaust system interlock controls the heater-blower operation. Supplied with optional remote-control panel with temperature selector dial and SUMMER-OFF/WINTER selector.

**Discharge Temperature Control with room override:** For building-exhaust air replacement and auxiliary-space heating to maintain a constant supply-air discharge temperature. A room override thermostat raises discharge set point for more heat to maintain room temperature. Discharge temperature probe and room-override thermostat modulate burner flame. Optional SUMMER- OFF/WINTER selector switch and exhaust-system interlock control heater-blower operation. Supplied with optional remote-control panel with temperature-selection dial, SUMMER-OFF/WINTER selector switch and room-override thermostat.

**Space Temperature Control:** For building exhaust-air replacement with modulated space- temperature control. A modulating space thermostat adjusts burner flame to maintain discharge-air temperature to compensate for changing building heat losses or gains. High- and low-discharge air sensor probes limit maximum and minimum discharge-air temperatures. The optional SUMMER- OFF/WINTER selector switch and exhaust-system interlocks control heater-blower operation. Supplied with optional remote-control panel with SUMMER-OFF/WINTER selector switch and a modulating-room thermostat.

**VAV OPTIONS:**

- **VAV (Static Pressure Control):** A factory-supplied field wired VFD is provided which varies the speed of the blower wheel. A field wired Static Pressure Controller, which measures building pressure and closes and opens contacts on the VFD to accelerate or decelerate the blower speed to maintain the building pressure set on the Static Pressure Controller, controls the VFD. Factory supplied automatic profiles maintain the burner profile pressure drop as the blower speed is varied.
- **VAV (Manual Speed Control):** A factory-supplied field wired VFD is provided which varies the speed of the blower wheel. The VFD is controlled manually to set the speed of the blower. Factory supplied automatic profiles maintain the burner profile pressure drop as the blower speed is varied.
- **VAV (Speed Switch):** A factory-supplied field wired VFD is provided which varies the speed of the blower wheel. The VFD is controlled by a field wired speed switch, which manually switches the VFD between pre-set blower speeds. Factory supplied automatic profiles maintain the burner profile pressure drop as the blower speed is varied.

**WIRING AND ELECTRICAL**

A single point electrical connection shall be supplied. The control circuit voltage shall be 115 volts. A control transformer shall be provided, when required. Wiring in control enclosures shall be in accordance with the National Electrical Code and the local code, as it may affect the installation. Motor starter shall be provided. Starter shall be line voltage, definite purpose type.

Unit(s) shall be complete with all items such as relays, starters, switches, safety controls, conduit and wire as previously mentioned, and as required for proper operation. All factory-mounted controls shall be factory pre-wired to the unit control panel. A safety disconnect switch shall be standard on all units and shall be sized according to the unit.

**FACTORY TESTED**

Unit(s) shall be operated, tested and set at the factory using job-site conditions for electrical and gas input. All operating and safety controls shall be tested and set at the factory. Adjustable or fixed sheaves shall be set for proper RPM at specified conditions. Gas-pressure regulator shall be set for specified burning rate at specified inlet pressure.

**SERVICE AND PARTS**

The supplier shall furnish as built wiring connection and control-circuit diagrams, dimension sheets and a full description of the unit(s). Service manuals, showing service and maintenance requirements, shall be provided with each unit.