# Engineering Specifications

**Project:**

**Location:**

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## Heat Pump Specifications: Vitocal 100-AW, AM2V-051078

### 1.0 General

The air-to-water heat pump package shall include an outdoor air-to-water heat pump (outdoor unit) and an indoor hydronic distribution module with digital interface for system control (indoor unit). The outdoor and indoor units shall communicate using Modbus protocol for transfer of operating conditions, setpoints and faults; all information shall be available on the indoor unit.

The outdoor unit shall be constructed and assembled as a completely packaged unit, factory tested and certified by ETL. The outdoor unit shall be ready for field connections to a sealed hydronic fully pumped heating and cooling system. The outdoor unit shall be complete with a heavy gauge steel jacket with a matt black baked enamel finish with molded plastic top panel.

The indoor unit shall be constructed and assembled as a completely packaged unit, factory tested. The indoor unit shall be ready for field connections to a sealed hydronic fully pumped hot water heating system. The indoor unit shall be complete with a heavy gauge steel jacket with a white baked enamel finish. The indoor unit shall incorporate three individual resistive immersion-type heating elements.

The digital control system shall maintain optimized performance for cooling, heating and DHW production. Cooling is achieved through fixed setpoint temperature control. Heating is achieved using fixed setpoint temperature control or integrated outdoor reset logic. DHW production shall be achieved through a direct connection between the indoor unit and an indirect-fired DHW storage tank.

### 1.1 Outdoor Unit Performance Criteria

Each outdoor unit shall be designed for operating at:

| | |
|---|---|
| Total heating capacity | 17 kW (58,000 Btu/h) |
| Total cooling capacity – low | 14.7 kW (4.2 Tons) |
| Total cooling capacity – high | 15.1 kW (4.3 Tons) |
| Power supply | 208/230 VAC / 1 Phase / 60 Hz |
| Rated current | 35.1 Amps |

Maximum allowable working pressure: 30 psig.

Maximum temperature of heating medium: 149°F (65°C).

### 1.2 Indoor Unit Performance Criteria

Each indoor unit shall be designed for operating at:

| | |
|---|---|
| Total heating capacity | 9 kW (30,700 Btu/h) |
| Power supply | 230 VAC / 1 Phase / 60 Hz |
| Rated current (FLA) | 43 Amps |

Maximum allowable working pressure: 30 psig.

| | |
|---|---|
| Maximum system temperature: | 140°F (60°C). |
| Maximum DHW temperature: | 167°F (75°C). |

**2.0 Construction**

The outdoor unit shall be equipped with a brazed plate heat exchanger for transferring energy from the refrigeration cycle to system water. The outdoor unit shall be equipped with a brazed plate heat exchanger for enhanced vapour injection. The outdoor unit shall be equipped with two variable speed air coil fans.

Wire and cable entry to the outdoor unit shall be facilitated by strain reliefs to protect electrical wires. All controls, relays, transformers, and wiring shall be installed within the enclosure.

Standard equipment for the outdoor unit shall also include the following items:
- Scroll compressor
- Air coil
- System water brazed plate heat exchanger
- Brazed plate heat exchanger for enhanced vapour injection operation

The indoor unit shall be equipped with a monochrome digital control unit interface, with rotary push button selectors and a 3 inch screen. The indoor unit shall be capable of operating using space and system temperature sensors. The indoor unit shall be capable of controlling up to two heating circuits, one mixed circuit and one non-mixed circuit. The indoor unit shall be able to operate on a supply setpoint temperature and shall facilitate the connection of an outdoor temperature sensor for operation with the indoor unit controls' integrated outdoor reset logic. The indoor unit shall be capable of DHW heating using the integrated 3-way diverting valve for DHW heating.

Wire and cable entry to the indoor unit shall be facilitated by strain reliefs to protect electrical wires. All controls, relays, transformers, and wiring shall be installed within the enclosure.

Standard equipment for the indoor unit shall also include the following items:
- Automatic reset high limit
- Manual reset fixed high limit
- Monochrome digital user interface with system operation display
- Pre-charged system expansion tank with 3.2 USG (12 L) capacity
- 3-way diverting valve for DHW heating

**3.0 Certifications**

All individual components shall be accepted as part of the system under the governing body having jurisdiction. Field approval shall not be required for any component.

The outdoor unit shall have the following approvals and listings, or be in compliance with: ETL, AHRI

## Buffer Tank Specifications: Vitocell 100-E, MSCA-20

**1.0 Performance Criteria**

The system buffer tank shall have a storage capacity of no less than 20 USG (75 L).

The buffer tank shall be suitable for chilled system water or heated system water.

The buffer tank shall be designed for use on heating systems with the following operating conditions:

- Maximum operating pressure: 45 psig
- Minimum operating temperature: 45°F (7°C)

- Maximum operating temperature:  230°F (110°C)

**2.0 Construction**

Each system buffer tank shall be of steel construction. Buffer tank enclosure panels shall encase the tank with a foamed-in-place PUR foam (HCFC-free). The buffer tank shall be equipped with NPT threaded connections capable of supporting a direct system connection, a direct connection to a primary heat/cool generator, and a direct connection to a back-up heat generator, without the use of adaptors. The buffer tank shall be equipped with two sensor wells.