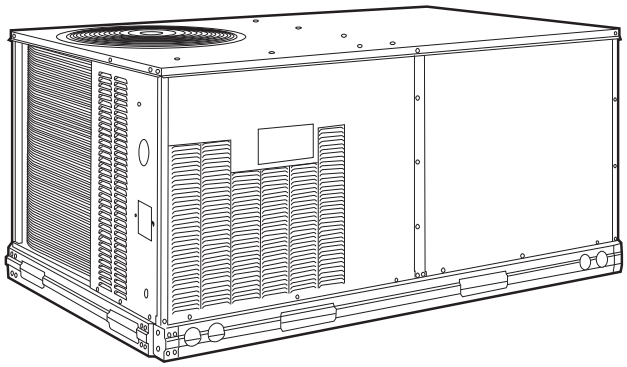
48TM−P06
Single−Package Rooftop Gas Heating/Electric Cooling Units with Puron® (R−410a) and Microchannel Heat Exchanger (MCHX)
Limited Production Unit
5 Tons

Carrier®
Turn to the Experts.™

Product Data

WEATHERMASTER®
WEATHERMAKER®



C06101

48TM−P units are single−packaged electric cooling with gas heating. Units are pre−wired and pre−charged with Puron (R−410a) refrigerant, and are factory tested in both heating and cooling modes.

PERFORMANCE FEATURES

- Puron (R−410A) HFC refrigerant
- Exclusive MCHX (Micro Channel Heat Exchanger) is a revolutionary, lightweight Aluminum condenser with superior, inherent corrosion resistance.
- 13.0 SEER
- Exceeds the ASHRAE 90.1 minimum efficiency requirements
- Exceeds Energy Star efficiency requirements
- Single compressor
- Convertible from vertical to horizontal airflow for slab mounting
- Copper tube, aluminum fin evaporator coils with corrosion resistant options
- Fully insulated cabinet
- Pre−painted exterior panels and primer coated interior panels
- Acutrol™ refrigerant metering system
- Exclusive non−corrosive composite condensate pan in accordance with ASHRAE 62 Standard, sloping design. Provides side or center drain
- Automatic changeover when used with auto−changeover thermostat
- Low outdoor temperature cooling operation: 25°F
- Maximum outdoor temperature cooling operation: 115°F
- Exclusive IGC solid−state control for on−board diagnostics with LED error code designation, burner control logic, energy saving indoor fan motor delay and induced draft combustion
- “Low NOx” models that meet California Air Quality Management NOx specs
- Redundant gas valves, with up to two stages of heating
- Rated in accordance with ARI Standards 210
- Designed in accordance with UL Standard 1995
- Listed by UL

MAINTENANCE FEATURES

- Two−inch disposable return air filters
- Tool−less filter access door
- Belt drive evaporator−fan motors with adjustable pulleys

INSTALLATION FEATURES

- Thru−the−bottom power entry capability standard
- Single point gas and electric connections
- Full perimeter base rail with built−in rigging adapters and fork truck slots

RELIABILITY FEATURES

- Scroll compressor with internal linebreak overload protection
- 24−volt control circuit protected with resettable circuit breaker
- Permanently lubricated evaporator fan motor
- Totally enclosed condenser motors with permanently lubricated bearings
- Loss of charge, freeze protection, and high−pressure switches
- Solid−state electronic direct spark ignition system
- Flame roll−out safety protector

OPTIONS AND ACCESSORIES

48TM-P06

ITEM	OPTION*	ACCESSORY†
100% Open Two-Position Damper		X
25% Open Two-Position Damper		X
Condenser Coil Grille		X
Condenser Coil Hail Guard Assembly		X
Convenience Outlet (Load Side)	X	
Copper Fins Indoor	X	
EconoMi$er IV with Corporate Controls	X	X
EconoMi$er2 (for use with PremierLink™ or Third Party Controls)	X	X
EconoMi$er2 Hinged Panel Kit		X
Electric Heat		X
Electronic Programmable Thermostat		X
Enthalpy or Differential Enthalpy Sensor		X
High-Static Motor and Drive	X	
Indoor Air Quality ($CO_{2)}$ Sensor		X
Manual Outdoor-Air Damper		X
Novar Control	X	
Outdoor Air Enthalpy Sensor		X
Outdoor Air/Return Air Temperature Sensor		X
Outdoor Coil Grille		X
Power Exhaust with Barometric Relief		X
PremierLink™ DDC Communicating Control	X	X
Return Air Enthalpy Sensor		X
Return Air Temperature Sensor		X
Roof Curbs		X
Thermostats and Subbases		X
Thru-the-Bottom Utility Connections		X
Time Guard II Control Circuit (Compressor Cycle Delay)		X
Unit-Mounted Non-Fused Disconnect	X	
Ultra–Violet Germicidal Lamp		X
Return Air CO_2 Sensor		X

*Factory-installed.
†Field-installed.
NOTES:
1. Refer to unit price pages or contact your local representative for accessory and option package information.
2. Some options may increase product lead times.

PERFORMANCE DATA

Cooling Capacities

48TM–P													
Temp (F) Air Ent Condenser (Edb)		Air Entering Evaporator – CFM/BF											
		1500/0.12			1750/0.14			2000/0.16			2500/0.21		
		Air Entering Evaporator – Ewb (F)											
		76	67	62	76	67	62	76	67	62	76	67	62
75	TC	72.7	66.8	61.2	74.7	68.7	63.2	76.4	70.2	64.7	78.8	72.6	67.3
	SHC	36.2	43.9	51.8	38.1	46.9	56.0	40.0	49.8	59.7	43.3	55.1	65.5
	kW	3.49	3.43	3.36	3.52	3.45	3.38	3.54	3.47	3.40	3.58	3.50	3.43
85	TC	70.1	64.2	58.4	72.0	66.0	60.3	73.4	67.4	61.9	75.7	69.6	65.0
	SHC	35.3	43.1	50.7	37.3	46.2	55.0	39.1	49.1	58.8	42.5	54.5	63.7
	kW	4.00	3.92	3.86	4.03	3.95	3.88	4.06	3.97	3.89	4.09	4.00	3.93
95	TC	67.1	60.9	54.9	68.8	62.7	56.8	70.2	64.1	58.5	72.2	66.1	62.3
	SHC	34.3	41.9	49.2	36.3	45.1	53.4	38.1	48.1	57.1	41.6	53.7	60.8
	kW	4.56	4.47	4.40	4.59	4.50	4.42	4.62	4.52	4.44	4.66	4.55	4.49
105	TC	63.5	57.1	48.9	65.2	58.8	52.0	66.4	60.1	55.1	68.3	62.0	58.5
	SHC	33.0	40.4	46.3	35.0	43.7	50.9	36.9	46.8	54.1	40.5	52.5	58.5
	kW	5.17	5.07	4.95	5.20	5.10	5.00	5.23	5.12	5.04	5.27	5.16	5.09
115	TC	59.3	51.5	43.5	60.8	53.7	47.2	62.0	55.5	50.0	63.7	57.3	54.8
	SHC	31.5	38.1	42.7	33.5	41.7	46.1	35.5	45.1	50.0	39.2	50.9	54.8
	kW	5.83	5.69	5.56	5.86	5.74	5.62	5.89	5.77	5.67	5.93	5.81	5.76
125	TC	54.5	44.9	39.0	55.9	46.6	42.2	57.0	48.2	45.0	58.5	50.8	49.6
	SHC	29.7	35.6	39.0	31.8	39.1	42.2	33.8	42.2	45.0	37.5	48.2	49.6
	kW	6.54	6.35	6.23	6.57	6.39	6.30	6.60	6.42	6.35	6.64	6.48	6.45

Standard Ratings

BF – Bypass Factor
Edb – Entering Dry Bulb
Ewb – Entering Wet Bulb
kW – Compressor Motor Power Input
SHC – Sensible Heat Capacity (1000 Btu/h) Gross
TC – Total Capacity (1000 Btu/h) Gross

GUIDE SPECIFICATIONS

Packaged Rooftop Electric Cooling Unit — Constant Volume Application

HVAC Guide Specifications

Size: **5 Tons, Nominal (Cooling)**
(Accessory Electric Heating)

Carrier Model Number: **48TM-P**

General

A. SYSTEM DESCRIPTION

Outdoor rooftop-mounted electrically controlled heating and cooling unit utilizing a hermetic compressor(s) for cooling duty. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.

B. QUALITY ASSURANCE

1. Unit shall comply with ASHRAE 90.1-2001 Minimum Efficiency Energy Standards.
2. Unit shall be rated in accordance with ARI Standards 210. Designed in accordance with UL Standard 1995.
3. Unit shall be designed to conform to ASHRAE 15, latest revision.
4. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
5. Roof curb shall be designed to conform to NRCA Standards.
6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
7. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
8. Unit shall be designed in accordance with ISO 9001:2000, and shall be manufactured in a facility registered to ISO 9001:2000.
9. Each unit shall be subjected to a completely automated run testing on the assembly line. Units contain a factory-supplied printout indicating tested pressures, amperages, data, and inspectors; providing certification of the unit status at the time of manufacture.

C. DELIVERY, STORAGE, AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

PRODUCTS

A. EQUIPMENT (STANDARD)

1. General:
   Factory assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-410a), and special features required prior to field start-up.
2. Unit Cabinet:
   a. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
   b. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum $^1/_2$-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side.
   c. Cabinet panels shall be easily removable for servicing.
   d. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
   e. Unit shall have a factory-installed, sloped condensate drain pan made of a non-corrosive material, providing a minimum $^3/_4$-in-14 NPT connection with both vertical and horizontal drains, and shall comply with ASHRAE Standard 62.
   f. Unit shall have a factory-installed filter access panel to provide filter access with tool-less removal.
   g. Unit shall have standard thru-the-bottom power connection capability (accessory kit is required).
3. Fans:
   a. Evaporator Fan:
      (1.) Fan shall be belt driven. Belt drive shall include an adjustable-pitch motor pulley.
      (2.) Fan wheel shall be double-inlet type with forward-curved blades.
      (3.) Bearings shall be sealed, permanently lubricated ball-bearing type for longer life and lower maintenance.
   b. Evaporator fan shall be made from steel with a corrosion-resistant finish and shall be dynamically balanced.
   c. Outdoor fan shall be of the direct-driven (with totally enclosed motors) propeller type and shall discharge air vertically.
   d. Condenser fan shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
   e. Induced-draft blower shall be of the directdriven, single inlet, forward-curved centrifugal type, made from steel with a corrosion-resistant finish and shall be dynamically balanced.
4. Compressor(s):
   a. Fully hermetic type, internally protected scroll-type.
   b. Factory mounted on rubber grommets and internally spring mounted for vibration isolation.
5. Coils:
   a. Standard evaporator coil has aluminum double wavy plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
   b. Al/Al condenser coil.
   c. Testing:
      (1.) Evaporator and condenser coils shall be qualified to UL 1995 burst test at 2,100 psi.
      (2.) Evaporator and condenser coils shall be leak tested to 236 psig. Evaporator coil is pressure tested to 645 psig and condenser coil is pressure tested to 660 psig.
6. Refrigerant Components:
   These components shall include:
   a. Fixed orifice metering system (Acutrol™ device).
   b. Refrigerant filter drier.
   c. Service gauge connections on suction and discharge lines.

7. Filter Section:
   a. Standard filter section shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
   b. Filter face velocity shall not exceed 320 fpm at nominal airflows.
   c. Filter section should use only one size filter.
   d. Filters shall be accessible through an access panel with "no-tool" removal.
8. Controls and Safeties:
   a. Unit Controls:
      Unit shall be complete with self-contained low-voltage control circuit, protected by a fuse on the 24-v transformer side.
   b. Safeties:
      (1.) Unit shall incorporate the following standard safety devices.
      -Compressor overtemperature, overcurrent.
      -Loss-of-charge/low-pressure switch.
      -Freeze-protection thermostat, evaporator coil.
      -High-pressure switch.
      -Automatic reset motor thermal overload protector.
9. Operating Characteristics:
   a. Unit shall be capable of starting and running at 115°F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 at ± 10% voltage.
   b. Compressor with standard controls shall be capable of operation down to 25°F ambient outdoor temperature.
10. Electrical Requirements:
    All unit power wiring shall enter unit cabinet at a single factory-predrilled location.
11. Motors:
    a. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have line break thermal and current overload protection.
    b. Evaporator-fan motor shall have permanently lubricated bearings and inherent automatic-reset thermal overload protection. Evaporator motors are designed specifically for Carrier and do not have conventional horsepower (hp) ratings listed on the motor nameplate. Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a "maximum continuous bhp" rating that is the maximum application bhp rating for the motor; no "safety factors" above that rating may be applied.
    c. Totally enclosed outdoor-fan motor shall have permanently lubricated bearings, and inherent automatic-reset thermal overload protection.
12. Special Features:
    Certain features are not applicable when the features designated * are specified. For assistance in amending the specifications, contact your local Carrier Sales Office.
    a. Carrier PremierLink™ Controls*:
       (1.) Shall be available as a factory-installed or as a field-installed accessory.
       (2.) Shall work with Carrier Comfort Network® (CCN) and ComfortVIEW™ software.
       (3.) Shall be compatible with *Comfort*Link™ controllers.
       (4.) Shall be ASHRAE 62-2001 compliant.
       (5.) Shall accept a CO_2 sensor in the conditioned space — Demand Control Ventilation (DCV) ready.
       (6.) Shall have baud communication rate of 38.4K or faster.
       (7.) Shall be Internet ready.
       (8.) Shall include an integrated economizer controller.
       (9.) If an EconoMi$er2 with the 4 to 20 mA actuator is specified, then no control is required.
    b. Roof Curbs:
       (1.) Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
       (2.) Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
    c. Integrated Economizers:
       (1.) Integrated integral modulating type capable of simultaneous economizer and compressor operation. During economizer operation, up to two compressors will operate.
       (2.) Available as a factory-installed option in vertical supply/return configuration only. (Available as a field-installed accessory for dedicated horizontal and/or vertical supply return configurations.)
       (3.) Includes all hardware and controls to provide cooling with outdoor air.
       (4.) Equipped with low-leakage dampers, not to exceed 2% leakage at 1-in. wg pressure differential.
       (5.) Capable of introducing up to 100% outdoor air.
       (6.) EconoMi$er IV and EconoMi$er2 shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
       (7.) Designed to close damper(s) during loss-of-power situations with spring return built into motor.
       (8.) Dry bulb outdoor-air temperature sensor shall be provided as standard. Outdoor air sensor set point is adjustable and shall range from 40° to 100°F. For the EconoMi$er IV, the return air sensor, indoor enthalpy sensor, and outdoor enthalpy sensor shall be provided as field-installed accessories to provide enthalpy control, differential enthalpy control, and differential dry bulb temperature control. For the EconoMi$er2, the enthalpy, differential temperature (adjustable), and differential enthalpy control shall be provided as field-installed accessories.
       (9.) The EconoMi$er IV and EconoMi$er2 shall have a gear-driven parallel blade design.
       (10.) EconoMi$er IV control shall provide control of internal building pressure through its accessory power exhaust function. Factory set at 100%, with a range of 0% to 100%.
       (11.) EconoMi$er2 shall be capable of control from a 4 to 20 mA signal through optional 4 to 20 mA design without control (required for PremierLink™ or third party control interface).
       (12.) EconoMi$er IV Occupied Minimum Damper Position Setting maintains the minimum airflow into the building during occupied period providing design ventilation rate for full occupancy (damper position during heating). A remote potentiometer may be used to override the set point.
       (13.) EconoMi$er IV Unoccupied Minimum Damper Position Setting — The EconoMi$er IV dampers are completely closed when the unit is in the occupied mode.

(14.) EconoMi$er IV IAQ/DCV Maximum Damper Position Setting — Setting the maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space. This position is intended to satisfy the base minimum ventilation rate.

(15.) EconoMi$er IV IAQ/DCV control — modulates the outdoor-air damper to provide ventilation based on the optional 2 to 10 vdc CO_2 sensor input.

(16.) Actuator shall be direct coupled to economizer gear, eliminating linkage arms and rods.

(17.) Control LEDs:
-When the outdoor-air damper is capable of providing free cooling, the "Free Cool" LED shall illuminate.
-The IAQ LED indicates when the module is on the DCV mode.
-The EXH LED indicates when the exhaust fan contact is closed.

(18.) Remote Minimum Position Control — A field-installed accessory remote potentiometer shall allow the outdoor-air damper to be opened or closed beyond the minimum position in the occupied mode for modified ventilation.

d. Manual Outdoor-Air Damper:
Manual damper package shall consist of damper, birdscreen, and rainhood which can be preset to admit up to 50% outdoor air for year round ventilation.

e. *100% Two-Position Damper:

(1.) Two-position damper package shall include single blade damper and motor. Admits up to 100% outdoor air.

(2.) Damper shall close upon indoor (evaporator) fan shutoff.

(3.) Designed to close damper during loss of power situations.

(4.) Equipped with 15% barometric relief damper.

f. *25% Two-Position Damper:

(1.) Two-position damper package shall include single blade damper and motor. Admits up to 25% outdoor air.

(2.) Damper shall close upon indoor (evaporator) fan shutoff.

g. Electric Resistance Heaters and Single Point Kits:

(1.) Open wire nichrome elements with all necessary safety operating controls.

(2.) UL listed and indicated on basic unit informative plate.

(3.) Available in multiples to match heating requirements.

(4.) Single point kits available for each heater when required.

h. *Electronic Programmable Thermostat:
Unit shall be capable of using deluxe full-featured electronic thermostat. Thermostat shall use built-in compressor cycle delay control for both heating and cooling duty. Thermostat shall be capable of working with Carrier direct digital controls.

i. *Thermostat and Subbase:
Thermostat and subbase shall provide staged cooling and heating automatic (or manual) changeover, fan control, and indicator light.

j. *Condenser Coil Hail Guard Assembly:
Hail guard shall protect against damage from hail and flying debris.

k. Unit-Mounted, Non-Fused Disconnect Switch:
Switch shall be factory-installed, internally mounted. NEC and UL approved non-fused switch shall provide unit power shutoff. Switch shall be accessible from outside the unit and shall provide power off lockout capability.

l. Convenience Outlet:
Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Switch shall include 15 amp GFI receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Outlet shall be accessible from outside the unit.

m. High Static Indoor Fan Motor and Drives:
High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.

n. Condenser Coil Grille:
The grille protects the condenser coil from damage by large objects without increasing unit clearances.

o. Compressor Cycle Delay:
Unit shall be prevented from restarting for minimum of 5 minutes after shutdown.

p. Thru-the-Bottom Utility Connectors:
Kit shall provide connectors to permit electrical connections to be brought to the unit through the basepan

q. Indoor Air Quality (CO_2) Room Sensor (EconoMi$er IV):
Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be wall mounted with an LED display in parts per million. The set point shall have adjustment capability.

r. Return Air CO_2 Sensor (EconoMi$er IV):
Sensor shall have the ability to provide demand ventilation control through the EconoMi$er IV. The IAQ sensor shall be duct mounted. The set point shall have adjustment capability.

s. Power Exhaust Accessory for EconoMi$er IV or EconoMi$er2:
Power exhaust shall be used in conjunction with EconoMi$er2 to provide system exhaust of up to 100% of return air (vertical only). The power exhaust is a field-installed accessory (separate vertical and horizontal design).
NOTE: Horizontal power exhaust is intended to mount in return ductwork.
As the outdoor-air damper opens and closes, *both* propeller fans are energized and de-energized through the EconoMi$er IV controller. The set point is factory set at 100% of outdoor-air, and is adjustable 0 to 100% to meet specific job requirements. Available in 208/230-1-60 v or 460-3-60 v. An LED light on the controller indicates when the power exhaust is operating.
For the EconoMi$er2, the power exhaust shall be controlled by the PremierLink™ or third party controls.

t. Outdoor Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):
The outdoor air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit control will provide differential enthalpy control. The sensor allows the unit control to determine if outside air is suitable for free cooling.

u. Return Air Enthalpy Sensor (EconoMi$er IV or EconoMi$er2):
The return air enthalpy sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with an outdoor air enthalpy sensor, the unit will provide differential enthalpy control.

v. Return Air Temperature Sensor (EconoMi$er IV or EconoMi$er2):
The return air temperature sensor shall be used with the EconoMi$er IV or EconoMi$er2 device. When used in conjunction with the standard outdoor air temperature sensor, the unit device will provide differential temperature control.

w. Outdoor Air/Return Air Temperature Sensor (adjustable) (EconoMi$er2):
Optional sensor uses the PremierLink control to control outdoor air damper and compressor operation.

x. Indoor Air Quality (CO_2) Sensor (EconoMi$er2):
   (1.) Shall have the ability to provide demand ventilation indoor air quality (IAQ) control through the EconoMi$er2 with an IAQ sensor.
   (2.) The IAQ sensor shall be available in duct mount, wall mount, and wall mount with LED display. The set point shall have adjustment capability.
   (3.) Requires EconoMi$er2, PremierLink or Apollo control options.

y. Ultra-Violet Germicidal Lamps:
Ultra-violet germicidal lamps are designed to eliminate odor-causing mold and fungus that may develop in the wet area of the evaporator section of the unit. The high output, low temperature germicidal lamps are field installed in the evaporator section of the unit, aimed at the evaporator coil and condensate pan. The short wavelength ultra-violet light inhibits and kills mold, fungus and microbial growth. The lamps have an output rating at 45°F in 400 fpm airflow of 120 microwatts/cm^2 at 1 meter.

 Printed in U.S.A. Edition Date: 8/07 **Catalog No:48TM–P–1PD**

 Replaces: NEW