



GUIDE SPECIFICATIONS

CS Series

GENERAL

Units shall be performance certified to ISO standard 13256-1 for Water Loop Heat Pump, Ground Water Heat Pump and Ground Loop Heat Pump applications. Units shall be Underwriter Laboratories (UL and ULc) listed for safety on all models. The manufacturing company shall be ISO 9001:2000 certified. Each unit shall be run tested at the factory. Each unit shall be pallet mounted and stretch wrapped.

The units shall be warranted by the manufacturer against defects in materials and workmanship for a period of one year on all parts, and 5 years on the compressor. 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 (27°C) in heating as manufactured by FHP Manufacturing in Fort Lauderdale, Florida. **The units shall be manufactured in an ISO9001:2000 certified facility.**

CABINETWORK

Cabinetwork shall include two (2) separate integral assemblies to include: Cabinet and Sub-base. Cabinet shall be factory fabricated from heavy gauge "paint-grip" galvanized steel and finished with Polane T Plus polyurethane enamel paint finish. Cabinet dimensions are in accordance with drawings and are manufactured for left or right water discharge piping. Cabinet shall be single-piece construction. Removal of the cabinet shall give complete side and front access to unit for routine servicing. The cabinet is mounted onto the subbase and secured with two screws for security. A wall mounting bracket secured to the subbase shall be provided. Air flow is bottom intake-top discharge. Cabinets will be factory fabricated specifically for left hand or right hand connections as specified. Cabinet shall be slope top style, flat top cabinet is not acceptable.

SUB-BASE

Factory mounted 3-3/8" sub-base is constructed of heavy gauge painted steel. Cutouts are provided for floor connections and outside air. Includes integral filter mounts to support a bottom mount permanent, washable, aluminum mesh filter. Sub-base has a bracked that may be secured to the wall to provide stability.

CHASSIS

Chassis is of compact design and of the same dimensions for all model sizes. Dimensions must match details on drawings. Chassis mounts directly on support structures provided by the sub-base and shall be removable from the sub-base without dismantling the sub-base. Both compressor and coil compartments shall be thermally and acoustically insulated, and have removable steel cover plates giving double acoustical protection between the two compartments. Compressor is mounted to the bottom of chassis with a 2 piece base pan to reduce noise transmission and vibration. The compressor access panel shall have a closed cell foam insulation for extra quiet operation. Fiberglass insulation is not acceptable on compressor access panel. The condensate drain pan shall be stainless steel, IAQ with positive slope and be removable without disturbing the evaporator assembly for cleaning as needed.

REFRIGERANT CIRCUIT

All units shall contain sealed R-22 refrigerant circuit including a hermetic compressor, finned tube refrigerant to air heat exchanger, four-way solenoid activated reversing valve, expansion valve refrigerant metering device and coaxial tube-in-tube water to refrigerant heat exchanger. Compressor shall be high efficiency designed for heat pump duty and mounted on vibration isolators. Fin-tube refrigerant-to-air exchanger shall be aluminum fin plate and copper tube construction rated to withstand 450 PSI (3100 kPa) refrigerant working pressure. Coils shall be epoxy coated using an electro coating process for protection against most airborn chemicals. Water-to-refrigerant heat exchanger shall be constructed of a convoluted copper or cupro-nickel inner tube and steel outer tube with a designed refrigerant working pressure of 450 PSI (3100 kPa) and water side working pressure of no less than 400 PSI (2750 kPa). Four-way solenoid activated refrigerant reversing valve shall allow heating operation should the solenoid fail to function. All interconnecting tubing shall be copper. High and low pressure access shall be provided via schrader style ports.

FAN MOTOR ASSEMBLY

Unit blower is three-speed high efficiency PSC type. Motor is direct connected to two double width, double inlet forward curved oversized centrifugal blower

wheels that are selected for quiet operation, and balanced to minimize vibration. Blower wheel access is through removable blower housing covers. Motor and Blower assembly shall be removable without removing the chassis. Blower CFM is per scheduled data.

ELECTRICAL

Control circuit shall be 24 volt with direct sensing high and low pressure switches connected to a normally closed safety circuit. Line voltage control circuit and/or normally open safety switches are unacceptable. Compressor and blower motors shall be individually protected against current and/or heat overload. Standard control options shall be: a) Unit mounted CUC controller incorporating the following features: Tactile touchpad for temperature, fan and mode adjustment, Digital temperature display, LED display indicating unit operating mode as well as fan speed and fault indication, Adjustable temperature set point and differential, Options for manual or automatic changeover, hi or low fan speed and constant or cycling fan operation, b) Provisions for a remotely mounted thermostat or c) Provisions for master-slave connections to other units. The control box will additionally have a compressor contactor, fan relay, solid state lock-out device and class-2 transformer. The lock-out circuit shall include diagnostic LED's, anti short cycle time delay, random start time delay and low pressure bypass time delay. A low voltage terminal board is provided for NEC class-2 connection to units intended for remote thermostat or master/slave connection only.

POWER CONNECTION

Units shall be provided with a factory mounted 2 x 4 junction box with removable cover on the same side as the water connections (left or right) for direct wire connection. This cover may be supplied with a non-fused power disconnect switch for servicing the unit. The unit shall operate with specified voltages 115v, 208/230v or 265v, single phase, 60 Hz supply current. Supply power ampacity and maximum fuse size are per electrical specifications marked on each unit's data plate.

REMOTE THERMOSTAT

Remote thermostat equipped units shall be provided with a 24 volt anticipating type wall thermostat. a) The thermostat shall be a manual changeover type with an OFF, HEAT, COOL selector switch and a FAN, AUTO selector switch. b) The thermostat shall be an auto changeover type with an OFF, AUTO selector switch and a FAN, AUTO selector switch. A Hi/Lo fan switch shall be unit mounted for fan speed control.

MASTER-SLAVE

The master-slave operation shall be accomplished with a remote thermostat operating the master unit. Additional (slave) units shall be connected to the master unit with the operation of all dictated by the single wall mounted thermostat. A Hi/Lo fan switch shall be unit mounted for fan speed control. Each unit must have its own 24 volt transformer.

CABINET OPTIONS

The unit shall be chassis only, chassis on subbase, or chassis with subbase and cabinet.

PIPING OPTIONS

The unit shall be provided with factory installed supply and return water connection on right or left side. Supply and return water connections shall be a) 5/8" copper pipe for field connection of male or female pipe thread b) factory installed 1/2" FPT fitting for hose connection c) Factory supplied 1/2" FPT thread and field installed 1/2" x 12" stainless steel hose kit with an automatic flow control valve, ball valves with P/T ports, y-strainer with blow down valve.

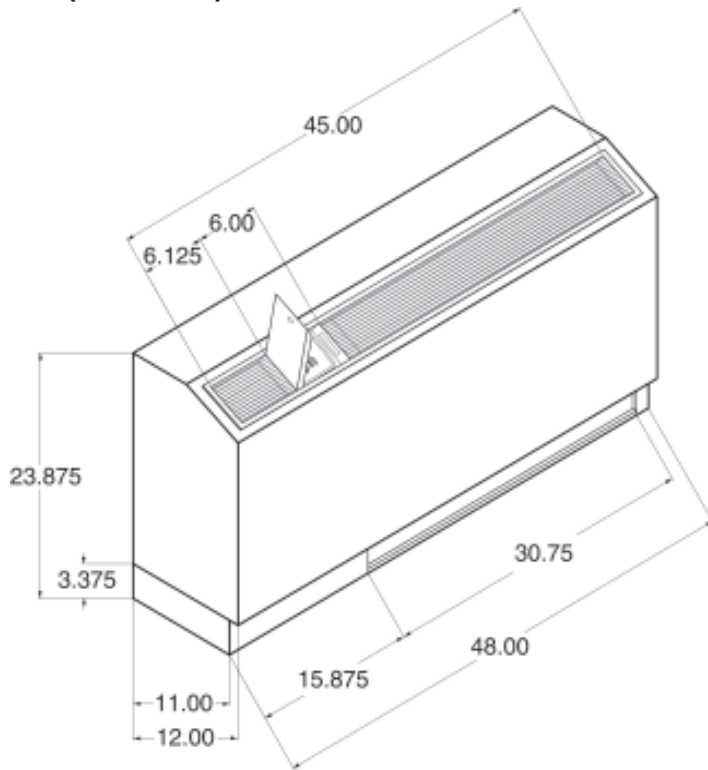
Continuing engineering research results in steady improvements. Therefore, these ratings and specifications are subject to change without notice.



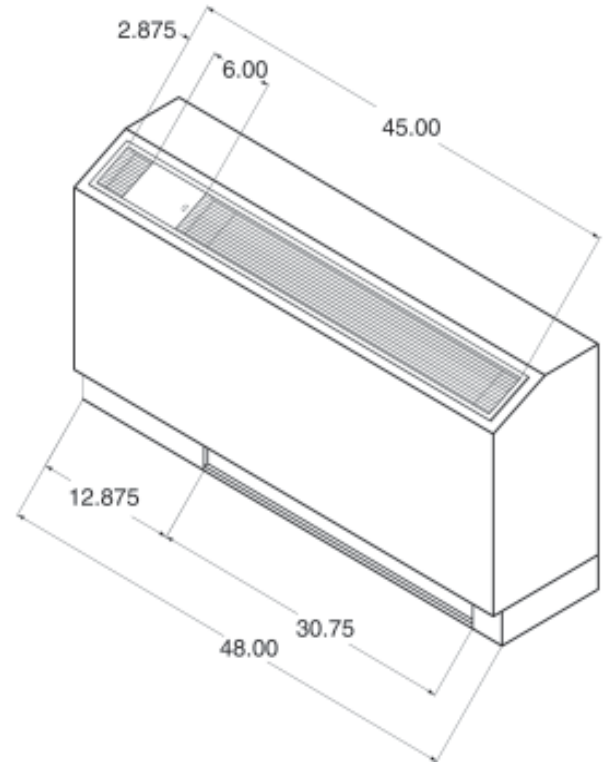
Console Dimensions

FHP Manufacturing Co.
601 N.W. 65th Court - Fort Lauderdale, FL 33309
Phone: (954) 776-5471 - Fax: (800) 776-5529
<http://www.fhp-mfg.com>

Left Hand Water Connections (Standard)



Right Hand Water Connections



Fresh Air Opening (In Sub-base Rear)

CAUTION! When installing unit in cold climates, an outside air damper must be provided to prevent possible condenser freeze-up.

NOTES: All dimensions within +/- 0.125".
Filter size: 7" x 30 1/4" x 3/8" Aluminum Mesh
Specifications subject to change without notice.

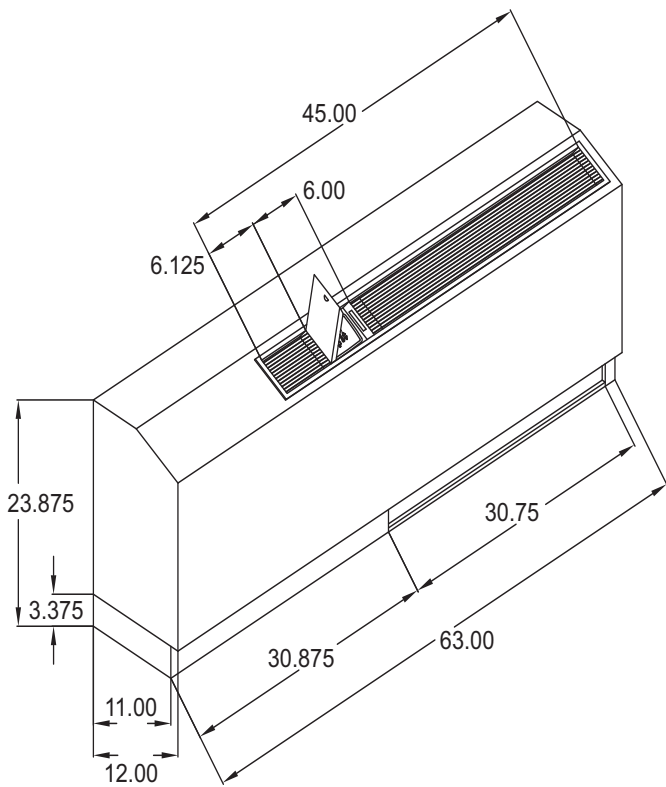


Console Dimensions

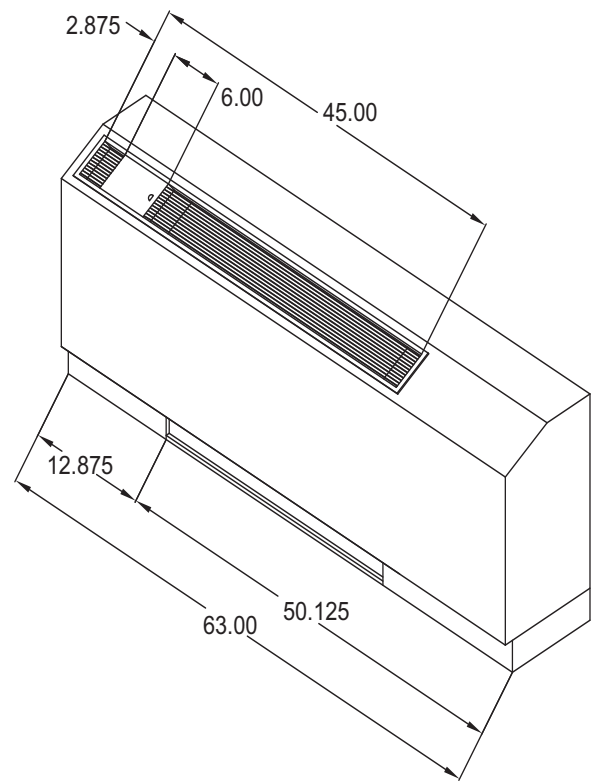
63" Extended Cabinet

FHP Manufacturing Co.
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Left Hand Water Connections



Right Hand Water Connections



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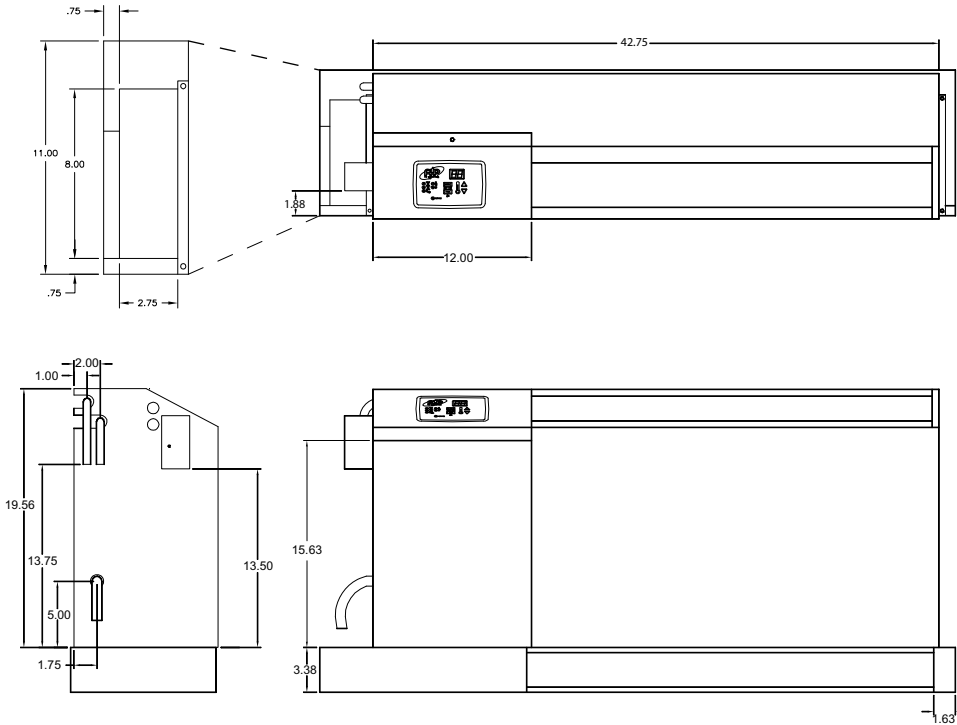
NOTES: All dimensions within +/- 0.125".
Filter size: 7" x 30 1/4" x 3/8" Aluminum Mesh
Specifications subject to change without notice.



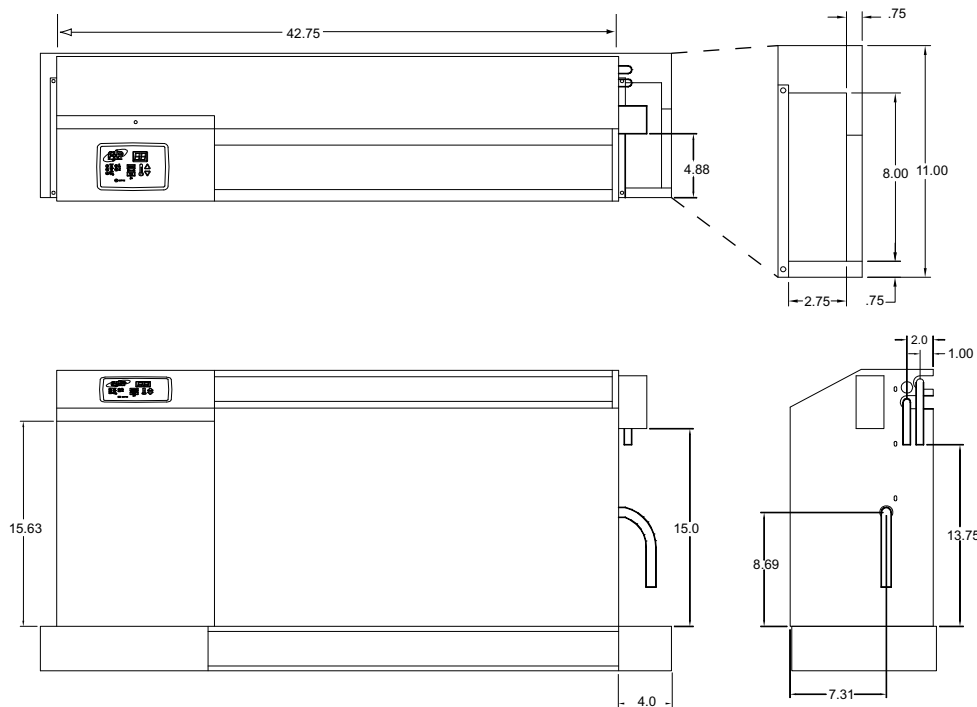
Chassis Dimensions

FHP Manufacturing Co.
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Phone: (954) 776-5471 - Fax: (800) 776-5529
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Left Hand Water



Right Hand Water



NOTES: All dimensions within +/- 0.125".

Console units must be installed with a cabinet and sub-base.

Filter size: 7" x 30 - 1/8" x 3/8" Aluminum Mesh.

Unit controller shown, other control options may have a different control panel configuration.

Specifications subject to change without notice.



CONSOLE UNITS SPECIFICATION DATA SHEET

FHP MANUFACTURING HIGH-EFFICIENCY WATER SOURCE HEAT PUMPS

CS009

ENERGY-MISER CONSOLE

ELECTRICAL SPECIFICATIONS

| Electrical Characteristics | Elect. Symbol | Compressor | | Blower | | Loop Pump | | Min. Circuit Amps | Max. Fuse/Breaker |
|----------------------------|---------------|------------|------|--------|------|-----------|----|-------------------|-------------------|
| | | RLA | LRA | FLA | HP | FLA | HP | | |
| 115-1-60 | -0 | 5.8 | 40.0 | 1.8 | 1/10 | - | - | 9.1 | 15 |
| 208/230-1-60 | -1 | 2.9 | 19.0 | 0.5 | 1/10 | - | - | 4.1 | 15 |
| 265-1-60 | -2 | 2.5 | 16.0 | 0.8 | 1/10 | - | - | 3.9 | 15 |

MECHANICAL SPECIFICATIONS

| Refrigerant: R-22 | | | |
|-------------------|-------------|-----------|-----------|
| Air Coil | | | |
| Square Feet | Rows Deep | Tube O.D. | Fins/Inch |
| 2.00 | 2 | 3/8 | 14 |
| Water Coil | | | |
| Type | Work Press | | |
| Coaxial | 450 psig | | |
| Blower Size | Compr Type | | |
| 5.25x8 DD (x2) | Rotary | | |
| Net Weight | Ship Weight | | |
| 131 lbs | 151 lbs | | |

BLOWER PERFORMANCE

| | |
|------|-----|
| High | 350 |
| Low | 320 |



ISO 13256-1 CERTIFIED PERFORMANCE DATA Rated at 350 CFM and 2.0 GPM

| Water Loop | | | | Ground Water | | | | Ground Loop | | | |
|------------|------|----------|-----|--------------|------|----------|-----|-------------|------|----------|-----|
| Cooling | | Heating | | Cooling | | Heating | | Cooling | | Heating | |
| Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP |
| 8,200 | 14.7 | 8,500 | 5.2 | 9,100 | 21.4 | 6,900 | 4.2 | 8,400 | 16.6 | 5,200 | 3.1 |

FLUID PRESSURE DROP

| Fluid Flow (GPM) | Pressure Drop | |
|------------------|---------------|--------|
| | (FOH) | (PSIG) |
| 1.3 | 2.16 | 0.94 |
| 1.5 | 2.80 | 1.21 |
| 2 | 4.70 | 2.03 |
| 2.5 | 7.02 | 3.04 |
| 3 | 9.75 | 4.22 |

CAPACITY DATA All performance at 350 CFM and 2.0 GPM

COOLING

EFT Range (Standard)
45°F to 110°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (kW) | Heat of Reject (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|------------------------|------|
| 50° | 70°db 61°wb | 8.08 | 5.38 | 0.67 | 0.37 | 9.34 | 21.9 |
| 60° | | 7.80 | 5.24 | 0.67 | 0.42 | 9.22 | 18.7 |
| 70° | | 7.52 | 5.11 | 0.68 | 0.46 | 9.11 | 16.2 |
| 85° | | 7.10 | 4.95 | 0.70 | 0.54 | 8.93 | 13.2 |
| 100° | | 6.67 | 4.82 | 0.72 | 0.61 | 8.75 | 11.0 |
| 50° | 75°db 63°wb | 8.65 | 6.41 | 0.74 | 0.37 | 9.92 | 23.3 |
| 60° | | 8.35 | 6.24 | 0.75 | 0.42 | 9.78 | 19.9 |
| 70° | | 8.05 | 6.09 | 0.76 | 0.47 | 9.64 | 17.2 |
| 85° | | 7.60 | 5.90 | 0.78 | 0.54 | 9.44 | 14.1 |
| 100° | | 7.14 | 5.74 | 0.80 | 0.61 | 9.23 | 11.7 |
| 50° | 80°db 67°wb | 9.49 | 7.06 | 0.74 | 0.37 | 10.76 | 25.3 |
| 60° | | 9.15 | 6.87 | 0.75 | 0.42 | 10.60 | 21.7 |
| 70° | | 8.82 | 6.71 | 0.76 | 0.47 | 10.43 | 18.7 |
| 85° | | 8.33 | 6.50 | 0.78 | 0.54 | 10.19 | 15.3 |
| 100° | | 7.83 | 6.32 | 0.81 | 0.62 | 9.94 | 12.7 |
| 50° | 85°db 71°wb | 10.32 | 7.72 | 0.75 | 0.38 | 11.61 | 27.3 |
| 60° | | 9.96 | 7.52 | 0.75 | 0.43 | 11.41 | 23.4 |
| 70° | | 9.60 | 7.34 | 0.76 | 0.48 | 11.22 | 20.2 |
| 85° | | 9.06 | 7.11 | 0.78 | 0.55 | 10.93 | 16.5 |
| 100° | | 8.52 | 6.91 | 0.81 | 0.62 | 10.64 | 13.7 |

HEATING

EFT Range (Standard)
25°F to 80°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Power Input (kW) | Heat of Abs. (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------|----------------------|------|
| 50° | 60° | 7.21 | 0.47 | 5.61 | 4.5 |
| 60° | | 8.14 | 0.47 | 6.55 | 5.1 |
| 70° | | 9.07 | 0.46 | 7.49 | 5.7 |
| 80° | | 10.00 | 0.46 | 8.43 | 6.4 |
| 50° | | 70° | 6.82 | 0.48 | 5.18 |
| 60° | 7.69 | | 0.48 | 6.07 | 4.7 |
| 70° | 8.57 | | 0.47 | 6.95 | 5.3 |
| 80° | 9.45 | | 0.47 | 7.84 | 5.9 |
| 50° | 80° | | 6.35 | 0.49 | 4.67 |
| 60° | | 7.16 | 0.49 | 5.50 | 4.3 |
| 70° | | 7.98 | 0.48 | 6.33 | 4.8 |
| 80° | | 8.80 | 0.48 | 7.16 | 5.4 |

LOW TEMP HEATING

Antifreeze Required

| | | | | | |
|-----|-----|------|------|------|-----|
| 25° | 60° | 4.80 | 0.48 | 3.16 | 2.9 |
| 30° | | 5.25 | 0.48 | 3.62 | 3.2 |
| 40° | | 6.16 | 0.47 | 4.54 | 3.8 |
| 25° | 70° | 4.53 | 0.49 | 2.87 | 2.7 |
| 30° | | 4.96 | 0.49 | 3.30 | 3.0 |
| 40° | | 5.82 | 0.48 | 4.17 | 3.5 |
| 25° | 80° | 4.22 | 0.50 | 2.51 | 2.5 |
| 30° | | 4.62 | 0.50 | 2.92 | 2.7 |
| 40° | | 5.42 | 0.49 | 3.73 | 3.2 |

Units are complete packages containing a compressor, reversing valve, expansion valve metering device, and heat exchangers. Also included are safety controls: Overload protection for motors, high and low refrigerant pressure switches and a solid state lock-out circuit. Console units available with unit mounted digital controls including ACO/MCO selection and LED temperature readout or remote mounted control capability.

Performance based on ARI/ISO rated air flow, fluid flow and voltage. For conditions other than rated, consult the FHP EAD selection software. Due to variations in installation actual performance may vary marginally from tabulated values.

As a result of continuing research and development, specifications are subject to change without notice.
CS009ip6 mod2 Rev: 5-06

FHP MANUFACTURING COMPANY

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CONSOLE UNITS SPECIFICATION DATA SHEET

FHP MANUFACTURING HIGH-EFFICIENCY WATER SOURCE HEAT PUMPS

CS012

ENERGY-MISER CONSOLE

ELECTRICAL SPECIFICATIONS

| Electrical Characteristics | Elect. Symbol | Compressor | | Blower | | Loop Pump | | Min. Circuit Amps | Max. Fuse/Breaker |
|----------------------------|---------------|------------|------|--------|------|-----------|----|-------------------|-------------------|
| | | RLA | LRA | FLA | HP | FLA | HP | | |
| 115-1-60 | -0 | 8.3 | 49.0 | 1.8 | 1/10 | - | - | 12.2 | 20 |
| 208/230-1-60 | -1 | 4.5 | 26.0 | 0.5 | 1/10 | - | - | 6.1 | 15 |
| 265-1-60 | -2 | 3.3 | 23.0 | 0.8 | 1/10 | - | - | 5.1 | 15 |

MECHANICAL SPECIFICATIONS

| Refrigerant: R-22 | | | |
|-------------------|-------------|-----------|-----------|
| Air Coil | | | |
| Square Feet | Rows Deep | Tube O.D. | Fins/Inch |
| 2.00 | 2 | 3/8 | 14 |
| Water Coil | | | |
| Type | Work Press | | |
| Coaxial | 450 psig | | |
| Blower Size | Compr Type | | |
| 5.25x8 DD (x2) | Rotary | | |
| Net Weight | Ship Weight | | |
| 138 lbs | 158 lbs | | |

BLOWER PERFORMANCE

| | |
|------|-----|
| High | 400 |
| Low | 365 |



ISO 13256-1 CERTIFIED PERFORMANCE DATA Rated at 400 CFM and 2.5 GPM

| Water Loop | | | | Ground Water | | | | Ground Loop | | | |
|------------|------|----------|-----|--------------|------|----------|-----|-------------|------|----------|-----|
| Cooling | | Heating | | Cooling | | Heating | | Cooling | | Heating | |
| Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP |
| 10,400 | 14.2 | 11,300 | 4.3 | 11,600 | 20.0 | 9,700 | 3.9 | 10,500 | 15.4 | 7,400 | 3.1 |

FLUID PRESSURE DROP

| Fluid Flow (GPM) | Pressure Drop | |
|------------------|---------------|--------|
| | (FOH) | (PSIG) |
| 1.5 | 2.91 | 1.26 |
| 2 | 4.89 | 2.11 |
| 2.5 | 7.30 | 3.16 |
| 3 | 10.14 | 4.39 |
| 4 | 17.01 | 7.36 |

CAPACITY DATA All performance at 400 CFM and 2.5 GPM

COOLING

EFT Range (Standard)
45°F to 110°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (kW) | Heat of Reject (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|------------------------|------|
| 50° | 70°db 61°wb | 10.30 | 6.85 | 0.67 | 0.51 | 12.04 | 20.2 |
| 60° | | 9.91 | 6.65 | 0.67 | 0.57 | 11.84 | 17.5 |
| 70° | | 9.52 | 6.47 | 0.68 | 0.62 | 11.64 | 15.3 |
| 85° | | 8.94 | 6.24 | 0.70 | 0.71 | 11.35 | 12.7 |
| 100° | | 8.36 | 6.03 | 0.72 | 0.79 | 11.05 | 10.6 |
| 50° | 75°db 63°wb | 11.02 | 8.17 | 0.74 | 0.51 | 12.77 | 21.5 |
| 60° | | 10.61 | 7.92 | 0.75 | 0.57 | 12.55 | 18.6 |
| 70° | | 10.19 | 7.71 | 0.76 | 0.63 | 12.33 | 16.3 |
| 85° | | 9.57 | 7.43 | 0.78 | 0.71 | 11.99 | 13.5 |
| 100° | | 8.95 | 7.18 | 0.80 | 0.79 | 11.65 | 11.3 |
| 50° | 80°db 67°wb | 12.08 | 9.00 | 0.74 | 0.52 | 13.85 | 23.3 |
| 60° | | 11.63 | 8.73 | 0.75 | 0.57 | 13.59 | 20.3 |
| 70° | | 11.17 | 8.50 | 0.76 | 0.63 | 13.33 | 17.7 |
| 85° | | 10.49 | 8.19 | 0.78 | 0.72 | 12.93 | 14.7 |
| 100° | | 9.81 | 7.92 | 0.81 | 0.80 | 12.54 | 12.3 |
| 50° | 85°db 71°wb | 13.14 | 9.84 | 0.75 | 0.52 | 14.93 | 25.2 |
| 60° | | 12.65 | 9.55 | 0.75 | 0.58 | 14.63 | 21.8 |
| 70° | | 12.15 | 9.29 | 0.76 | 0.64 | 14.32 | 19.1 |
| 85° | | 11.41 | 8.95 | 0.78 | 0.72 | 13.87 | 15.8 |
| 100° | | 10.67 | 8.66 | 0.81 | 0.81 | 13.42 | 13.2 |

HEATING

EFT Range (Standard)
25°F to 80°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Power Input (kW) | Heat of Abs. (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------|----------------------|------|
| 50° | 60° | 9.95 | 0.71 | 7.52 | 4.1 |
| 60° | | 11.04 | 0.73 | 8.55 | 4.4 |
| 70° | | 12.13 | 0.75 | 9.57 | 4.7 |
| 80° | | 13.22 | 0.77 | 10.60 | 5.0 |
| 50° | | 70° | 9.40 | 0.72 | 6.93 |
| 60° | 10.43 | | 0.74 | 7.89 | 4.1 |
| 70° | 11.46 | | 0.76 | 8.85 | 4.4 |
| 80° | 12.49 | | 0.78 | 9.82 | 4.7 |
| 50° | 80° | | 8.75 | 0.74 | 6.23 |
| 60° | | 9.71 | 0.76 | 7.12 | 3.7 |
| 70° | | 10.67 | 0.78 | 8.01 | 4.0 |
| 80° | | 11.63 | 0.80 | 8.90 | 4.3 |

LOW TEMP HEATING

Antifreeze Required

| | | | | | |
|-----|-----|------|------|------|-----|
| 25° | 60° | 7.08 | 0.66 | 4.82 | 3.1 |
| 30° | | 7.62 | 0.67 | 5.32 | 3.3 |
| 40° | | 8.68 | 0.69 | 6.33 | 3.7 |
| 25° | 70° | 6.69 | 0.67 | 4.39 | 2.9 |
| 30° | | 7.20 | 0.68 | 4.86 | 3.1 |
| 40° | | 8.20 | 0.70 | 5.80 | 3.4 |
| 25° | 80° | 6.23 | 0.69 | 3.88 | 2.6 |
| 30° | | 6.70 | 0.70 | 4.31 | 2.8 |
| 40° | | 7.64 | 0.72 | 5.18 | 3.1 |

Units are complete packages containing a compressor, reversing valve, expansion valve metering device, and heat exchangers. Also included are safety controls: Overload protection for motors, high and low refrigerant pressure switches and a solid state lock-out circuit. Console units available with unit mounted digital controls including ACO/MCO selection and LED temperature readout or remote mounted control capability.

Performance based on ARI/ISO rated air flow, fluid flow and voltage. For conditions other than rated, consult the FHP EAD selection software. Due to variations in installation actual performance may vary marginally from tabulated values.

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CONSOLE UNITS SPECIFICATION DATA SHEET

FHP MANUFACTURING HIGH-EFFICIENCY WATER SOURCE HEAT PUMPS

CS015

ENERGY-MISER CONSOLE

ELECTRICAL SPECIFICATIONS

| Electrical Characteristics | Elect. Symbol | Compressor | | Blower | | Loop Pump | | Min. Circuit Amps | Max. Fuse/Breaker |
|----------------------------|---------------|------------|------|--------|-----|-----------|----|-------------------|-------------------|
| | | RLA | LRA | FLA | HP | FLA | HP | | |
| 115-1-60 | -0 | 11.3 | 67.0 | 1.3 | 1/4 | - | - | 15.4 | 25 |
| 208/230-1-60 | -1 | 5.9 | 33.0 | 0.8 | 1/4 | - | - | 8.2 | 15 |
| 265-1-60 | -2 | 5.4 | 27.0 | 0.8 | 1/4 | - | - | 7.6 | 15 |

MECHANICAL SPECIFICATIONS

| Refrigerant: R-22 | | | |
|-------------------|-------------|-----------|-----------|
| Air Coil | | | |
| Square Feet | Rows Deep | Tube O.D. | Fins/Inch |
| 2.00 | 3 | 3/8 | 14 |
| Water Coil | | | |
| Type | Work Press | | |
| Coaxial | 450 psig | | |
| Blower Size | Compr Type | | |
| 5.25x8 DD (x2) | Rotary | | |
| Net Weight | Ship Weight | | |
| 144 lbs | 164 lbs | | |

BLOWER PERFORMANCE

| | |
|------|-----|
| High | 550 |
| Low | 500 |



ISO 13256-1 CERTIFIED PERFORMANCE DATA Rated at 550 CFM and 3.5 GPM

| Water Loop | | | | Ground Water | | | | Ground Loop | | | |
|------------|------|----------|-----|--------------|------|----------|-----|-------------|------|----------|-----|
| Cooling | | Heating | | Cooling | | Heating | | Cooling | | Heating | |
| Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP |
| 14,300 | 13.9 | 14,000 | 4.3 | 16,000 | 20.5 | 10,600 | 3.5 | 15,000 | 15.4 | 8,800 | 3.0 |

FLUID PRESSURE DROP

| Fluid Flow (GPM) | Pressure Drop | |
|------------------|---------------|--------|
| | (FOH) | (PSIG) |
| 2.5 | 2.51 | 1.09 |
| 3 | 3.49 | 1.51 |
| 3.5 | 4.60 | 1.99 |
| 4 | 5.85 | 2.53 |
| 5 | 8.74 | 3.78 |

CAPACITY DATA All performance at 550 CFM and 3.5 GPM

COOLING

EFT Range (Standard)
45°F to 110°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (kW) | Heat of Reject (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|------------------------|------|
| 50° | 70°db 61°wb | 14.28 | 9.51 | 0.67 | 0.68 | 16.61 | 21.0 |
| 60° | | 13.77 | 9.24 | 0.67 | 0.77 | 16.42 | 17.8 |
| 70° | | 13.26 | 9.01 | 0.68 | 0.87 | 16.22 | 15.3 |
| 85° | | 12.49 | 8.71 | 0.70 | 1.01 | 15.93 | 12.4 |
| 100° | | 11.73 | 8.46 | 0.72 | 1.15 | 15.64 | 10.2 |
| 50° | 75°db 63°wb | 15.29 | 11.33 | 0.74 | 0.69 | 17.63 | 22.3 |
| 60° | | 14.74 | 11.01 | 0.75 | 0.78 | 17.40 | 18.9 |
| 70° | | 14.20 | 10.74 | 0.76 | 0.87 | 17.17 | 16.3 |
| 85° | | 13.37 | 10.38 | 0.78 | 1.01 | 16.83 | 13.2 |
| 100° | | 12.55 | 10.08 | 0.80 | 1.15 | 16.49 | 10.9 |
| 50° | 80°db 67°wb | 16.76 | 12.48 | 0.74 | 0.69 | 19.12 | 24.2 |
| 60° | | 16.16 | 12.14 | 0.75 | 0.79 | 18.84 | 20.6 |
| 70° | | 15.56 | 11.83 | 0.76 | 0.88 | 18.56 | 17.7 |
| 85° | | 14.66 | 11.44 | 0.78 | 1.02 | 18.15 | 14.4 |
| 100° | | 13.76 | 11.11 | 0.81 | 1.16 | 17.73 | 11.8 |
| 50° | 85°db 71°wb | 18.23 | 13.65 | 0.75 | 0.70 | 20.61 | 26.1 |
| 60° | | 17.58 | 13.27 | 0.75 | 0.79 | 20.28 | 22.2 |
| 70° | | 16.93 | 12.94 | 0.76 | 0.89 | 19.96 | 19.1 |
| 85° | | 15.95 | 12.51 | 0.78 | 1.03 | 19.46 | 15.5 |
| 100° | | 14.97 | 12.15 | 0.81 | 1.17 | 18.97 | 12.8 |

HEATING

EFT Range (Standard)
25°F to 80°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Power Input (kW) | Heat of Abs. (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------|----------------------|------|
| 50° | 60° | 11.70 | 0.88 | 8.71 | 3.9 |
| 60° | | 13.16 | 0.90 | 10.08 | 4.3 |
| 70° | | 14.62 | 0.93 | 11.45 | 4.6 |
| 80° | | 16.08 | 0.95 | 12.82 | 4.9 |
| 50° | | 70° | 11.05 | 0.89 | 8.00 |
| 60° | 12.43 | | 0.92 | 9.29 | 4.0 |
| 70° | 13.81 | | 0.95 | 10.58 | 4.3 |
| 80° | 15.19 | | 0.97 | 11.87 | 4.6 |
| 50° | 80° | | 10.29 | 0.91 | 7.17 |
| 60° | | 11.58 | 0.94 | 8.37 | 3.6 |
| 70° | | 12.86 | 0.97 | 9.56 | 3.9 |
| 80° | | 14.14 | 1.00 | 10.75 | 4.2 |

LOW TEMP HEATING

Antifreeze Required

| | | | | | |
|-----|-----|-------|------|------|-----|
| 25° | 60° | 7.89 | 0.81 | 5.12 | 2.8 |
| 30° | | 8.61 | 0.83 | 5.79 | 3.1 |
| 40° | | 10.04 | 0.85 | 7.14 | 3.5 |
| 25° | 70° | 7.46 | 0.83 | 4.63 | 2.6 |
| 30° | | 8.13 | 0.84 | 5.26 | 2.8 |
| 40° | | 9.49 | 0.87 | 6.53 | 3.2 |
| 25° | 80° | 6.95 | 0.85 | 4.06 | 2.4 |
| 30° | | 7.58 | 0.86 | 4.64 | 2.6 |
| 40° | | 8.83 | 0.89 | 5.81 | 2.9 |

Units are complete packages containing a compressor, reversing valve, expansion valve metering device, and heat exchangers. Also included are safety controls: Overload protection for motors, high and low refrigerant pressure switches and a solid state lock-out circuit. Console units available with unit mounted digital controls including ACO/MCO selection and LED temperature readout or remote mounted control capability.

Performance based on ARI/ISO rated air flow, fluid flow and voltage. For conditions other than rated, consult the FHP EAD selection software. Due to variations in installation actual performance may vary marginally from tabulated values.

As a result of continuing research and development, specifications are subject to change without notice.
CS015ip6 mod2 Rev: 5-06

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CONSOLE UNITS SPECIFICATION DATA SHEET

FHP MANUFACTURING HIGH-EFFICIENCY WATER SOURCE HEAT PUMPS

CS018

ENERGY-MISER CONSOLE

ELECTRICAL SPECIFICATIONS

| Electrical Characteristics | Elect. Symbol | Compressor | | Blower | | Loop Pump | | Min. Circuit Amps | Max. Fuse/Breaker |
|----------------------------|---------------|------------|------|--------|-----|-----------|----|-------------------|-------------------|
| | | RLA | LRA | FLA | HP | FLA | HP | | |
| 208/230-1-60 | -1 | 7.1 | 38.0 | 0.8 | 1/4 | - | - | 9.7 | 15 |
| 265-1-60 | -2 | 5.5 | 32.0 | 0.8 | 1/4 | - | - | 7.7 | 15 |

MECHANICAL SPECIFICATIONS

| Refrigerant: R-22 | | | |
|-------------------|-------------|-----------|-----------|
| Air Coil | | | |
| Square Feet | Rows Deep | Tube O.D. | Fins/Inch |
| 2.00 | 3 | 3/8 | 14 |
| Water Coil | | | |
| Type | Work Press | | |
| Coaxial | 450 psig | | |
| Blower Size | Compr Type | | |
| 5.25x8 DD (x2) | Rotary | | |
| Net Weight | Ship Weight | | |
| 152 lbs | 172 lbs | | |

BLOWER PERFORMANCE

| | |
|------|-----|
| High | 650 |
| Low | 600 |



FLUID PRESSURE DROP

| Fluid Flow (GPM) | Pressure Drop | |
|------------------|---------------|--------|
| | (FOH) | (PSIG) |
| 2.5 | 2.57 | 1.11 |
| 3 | 3.57 | 1.55 |
| 4 | 6.00 | 2.60 |
| 5 | 8.97 | 3.88 |
| 6 | 12.45 | 5.39 |

ISO 13256-1 CERTIFIED PERFORMANCE DATA Rated at 650 CFM and 4.0 GPM

| Water Loop | | | | Ground Water | | | | Ground Loop | | | |
|------------|------|----------|-----|--------------|------|----------|-----|-------------|------|----------|-----|
| Cooling | | Heating | | Cooling | | Heating | | Cooling | | Heating | |
| Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP | Capacity | EER | Capacity | COP |
| 16,200 | 13.2 | 17,000 | 4.3 | 17,800 | 19.9 | 14,200 | 3.7 | 16,500 | 15.0 | 11,500 | 3.2 |



CAPACITY DATA All performance at 650 CFM and 4.0 GPM

COOLING

EFT Range (Standard)
45°F to 110°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Sensible Capacity (MBtuH) | Sensible to Total Ratio | Power Input (kW) | Heat of Reject (MBtuH) | EER |
|---------------------------|-------------------------|------------------------|---------------------------|-------------------------|------------------|------------------------|------|
| 50° | 70°db 61°wb | 15.76 | 10.49 | 0.67 | 0.76 | 18.34 | 20.9 |
| 60° | | 15.26 | 10.24 | 0.67 | 0.88 | 18.25 | 17.4 |
| 70° | | 14.76 | 10.03 | 0.68 | 1.00 | 18.15 | 14.8 |
| 85° | | 14.00 | 9.77 | 0.70 | 1.18 | 18.02 | 11.9 |
| 100° | | 13.25 | 9.56 | 0.72 | 1.36 | 17.88 | 9.8 |
| 50° | 75°db 63°wb | 16.87 | 12.50 | 0.74 | 0.76 | 19.46 | 22.2 |
| 60° | | 16.33 | 12.20 | 0.75 | 0.88 | 19.34 | 18.5 |
| 70° | | 15.79 | 11.95 | 0.76 | 1.00 | 19.21 | 15.8 |
| 85° | | 14.99 | 11.63 | 0.78 | 1.18 | 19.03 | 12.7 |
| 100° | | 14.18 | 11.39 | 0.80 | 1.36 | 18.84 | 10.4 |
| 50° | 80°db 67°wb | 18.49 | 13.77 | 0.74 | 0.77 | 21.11 | 24.1 |
| 60° | | 17.90 | 13.45 | 0.75 | 0.89 | 20.94 | 20.2 |
| 70° | | 17.31 | 13.17 | 0.76 | 1.01 | 20.76 | 17.1 |
| 85° | | 16.43 | 12.82 | 0.78 | 1.19 | 20.50 | 13.8 |
| 100° | | 15.55 | 12.55 | 0.81 | 1.38 | 20.24 | 11.3 |
| 50° | 85°db 71°wb | 20.12 | 15.06 | 0.75 | 0.77 | 22.75 | 26.0 |
| 60° | | 19.48 | 14.70 | 0.75 | 0.90 | 22.53 | 21.7 |
| 70° | | 18.84 | 14.40 | 0.76 | 1.02 | 22.31 | 18.5 |
| 85° | | 17.87 | 14.02 | 0.78 | 1.20 | 21.98 | 14.9 |
| 100° | | 16.91 | 13.72 | 0.81 | 1.39 | 21.65 | 12.2 |

HEATING

EFT Range (Standard)
25°F to 80°F

| Entering Fluid Temp. (°F) | Entering Air Temp. (°F) | Total Capacity (MBtuH) | Power Input (kW) | Heat of Abs. (MBtuH) | COP |
|---------------------------|-------------------------|------------------------|------------------|----------------------|-------|
| 50° | 60° | 14.96 | 1.08 | 11.27 | 4.1 |
| 60° | | 16.49 | 1.11 | 12.70 | 4.4 |
| 70° | | 18.02 | 1.14 | 14.14 | 4.6 |
| 80° | | 19.55 | 1.17 | 15.57 | 4.9 |
| 50° | | 70° | 14.13 | 1.10 | 10.38 |
| 60° | 15.58 | | 1.13 | 11.72 | 4.0 |
| 70° | 17.02 | | 1.16 | 13.07 | 4.3 |
| 80° | 18.47 | | 1.19 | 14.41 | 4.6 |
| 50° | 80° | | 13.16 | 1.13 | 9.32 |
| 60° | | 14.51 | 1.16 | 10.56 | 3.7 |
| 70° | | 15.85 | 1.19 | 11.80 | 3.9 |
| 80° | | 17.20 | 1.22 | 13.05 | 4.1 |

LOW TEMP HEATING

Antifreeze Required

| | | | | | |
|-----|-----|-------|------|------|-----|
| 25° | 60° | 10.92 | 1.01 | 7.47 | 3.2 |
| 30° | | 11.67 | 1.02 | 8.18 | 3.3 |
| 40° | | 13.17 | 1.05 | 9.58 | 3.7 |
| 25° | 70° | 10.31 | 1.03 | 6.80 | 2.9 |
| 30° | | 11.02 | 1.04 | 7.46 | 3.1 |
| 40° | | 12.44 | 1.07 | 8.78 | 3.4 |
| 25° | 80° | 9.60 | 1.05 | 6.01 | 2.7 |
| 30° | | 10.26 | 1.07 | 6.62 | 2.8 |
| 40° | | 11.58 | 1.10 | 7.84 | 3.1 |

Units are complete packages containing a compressor, reversing valve, expansion valve metering device, and heat exchangers. Also included are safety controls: Overload protection for motors, high and low refrigerant pressure switches and a solid state lock-out circuit. Console units available with unit mounted digital controls including ACO/MCO selection and LED temperature readout or remote mounted control capability.

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