



HIGH EFFICIENCY ROOFTOP UNITS

DWY – WATER LOOP HEAT PUMP

DWC – WATER LOOP COOLING ONLY

DGY – GROUND LOOP HEAT PUMP

FHP packaged down-flow rooftop units are adaptable to a wide variety of applications including offices, schools, hotels, shopping centers and retirement communities.

The units are available in three configurations, water loop, geothermal and cooling only to meet your requirements.

- High efficiency in the cooling and heating modes
- Factory supplied roof curbs allow positioning on the roof above the conditioned space minimizing duct work
- All units are fully charged and run tested in both cooling and heating modes for trouble free startup
- Units designed to conform to appropriate UL/ANSI Standards by ETL or other nationally recognized testing laboratory.



Unit Performance

Model	DWY & DWC – Water Loop				DGY – Ground Loop			
	Btuh Cooling	EER	Btuh Heating	COP	Btuh Cooling	EER	Btuh Heating	COP
036	34,500	14.1	42,900	4.4	35,800	14.9	24,100	3.5
048	49,600	13.0	59,600	4.5	52,000	14.9	35,000	3.5
060	60,600	12.8	73,000	4.6	60,200	14.1	47,000	3.2
072	75,200	12.8	83,300	4.6	76,300	15.9	55,400	3.7
096	95,000	12.5	113,000	4.2	96,000	13.5	71,400	3.2
120	119,000	12.0	140,000	4.0	120,000	13.4	93,100	3.2
150	150,700	12.5	185,000	4.3	154,000	13.6	120,500	3.2
180	171,900	13.9	208,000	4.6	178,200	15.7	133,600	3.5
240	229,800	12.5	287,100	4.3	236,900	14.5	180,600	3.4
300	276,400	13.6	343,100	4.6	285,000	14.8	230,000	3.6
360	376,500	12.4	459,100	4.2	383,100	14.0	304,100	3.2
420	426,700	12.1	550,000	4.2	440,000	13.4	369,600	3.2

Rating in accordance with ISO Standard 13256-1

Application Range

DWY heat pumps and DWC cooling only units are designed to operate on a cooling tower/boiler system with loop entering fluid temperatures between 55 °F and 95 °F.

DGY ground loop units are designed to operate with ground loop fluid temperatures between 30 °F and 100 °F.

ROOFTOP PACKAGE UNITS
DWY/DWC/DGY SERIES

WATER SOURCE HEAT PUMPS

Standard Design Features

Heavy Duty Cabinet. All models are constructed of G-90 galvanized steel. Bases are 16-gauge, corner posts 18-gauge, access panels are 20-gauge and top panels are 18-gauge. The interior of the entire unit is thermally insulated with 1" thick fiberglass with an R-value of 4.2. Insulation exposed to the air stream is finished with acrylic coating that is resistant to air erosion. The cabinet is mounted on two steel rails to facilitate installation. The design of the cabinet allows access to the electrical panel without impairing the unit operation.

Non-Rust Sound Attenuating Base Pan. Unit base pans are fabricated from 16 gauge G-90 galvanized steel and filled with a viscous petroleum distillate to a uniform 1/4" wet depth, air dried, and cured into a solid protective layer to eliminate corrosive oxidation. Air handling sections have an additional layer of 24-gauge aluminum that covers and encapsulates the corrosion protection. A layer of 3/8" thick closed cell insulation is applied to the bottom of the base providing thermal insulation, sound attenuation and curb perimeter seal.

Paint Finish. Unit are constructed of hot dipped galvanized G90 steel that is chemically treated with zinc phosphate, coated with 0.2 to 0.3 MIL polyurethane primer then finished with .7 to .8 MIL polyester top coat, making these units suitable for a variety of applications. Finish meets or exceeds 1,000 hour Salt Spray Test per ASTM B117 97.

Non-Corroding Hardware. Exterior nuts, bolts and washers are stainless steel. Exterior screws are coated with Magnigard Silver 17, an epoxy finish containing aluminum flake pigment that meets or exceeds 10,000 hour Salt Spray Test per ASTM B117 97.

Compressor. Models 036 and 048 have high efficiency reciprocating compressors. All other models shall be equipped with scroll compressors selected for their reliability and high efficiency. Compressor mountings are designed to reduce vibration transmission to the unit and minimize piping stress.

Compressor Protection. All compressors have crankcase heaters and internal overheat-overload protection.

Compressor Control Module. Units are equipped with control modules having the following sequence: Three second start delay, ninety-second bypass of low-pressure cutout switch at start-up to avoid nuisance trips and five minute anti-short-cycle time delay. Compressor operation is locked out upon opening of high-pressure or low-pressure cutout (after 90 second start-up delay expires). Reset remotely at thermostat or by removing and reapplying power to the unit. Switched 24-vac output for remote fault indication (field installed).

Separate Refrigeration Circuits. Units have multiple refrigeration circuits on sizes 096 through 420. Multi-compressor models provide the added benefit of partial standby. They also provide two-stage operation with one compressor being activated from the first stage of the (optional) two-stage space thermostat in the cooling cycle. In the heating cycle, all compressors are activated by the first stage of the space thermostat.

Indoor Air Coil. Unit sizes 036, 048 and 060 have aluminum plate lance fins with seamless rifled copper tubes. All other models shall have sine waved shaped aluminum fins formed on multiple rows of seamless copper tubing arranged in a staggered tube configuration for maximum heat transfer. The copper tubes are mechanically expanded, firmly bonding the tube to the collar of each fin.

Multiple compressor models have face split coils for maximum dehumidification at part load conditions.

Coaxial Counterflow Water Coil. The coaxial counterflow water coil consists of an enhanced surface inner copper tube for the fluid with the outer steel tube containing the refrigerant (tube-in-tube).

Fluid connections are stubbed off inside the cabinet. Field piped return and supply fluid lines will enter through individual sleeves in the compressor base pan section after passing through the roof curb. Units are shipped with water pressure taps and upper elbows for easy connections to the fluid source.

DGY models are equipped with fully insulated refrigerant and water lines and polyurethane foam encased coaxial coil.

Evaporator Blower and Motor. A forward-curved, statically and dynamically balanced DIDW centrifugal blower(s) is used for the supply air. Blower wheels are fabricated of galvanized steel. Blower housings are fabricated of galvanized or epoxy coated steel. The blower wheel(s) are mounted on a solid steel shaft supported by sealed ball bearings. The shaft is belt driven with adjustable drive sheaves connected to a nominal 1725-rpm motor with sealed ball bearings. The sealed bearings on both the blower shaft and motor are permanently lubricated. Motors up to 3 horsepower are internally protected (auto-reset) and motors 5 horsepower and larger are externally protected (manual reset).

Refrigerant Circuit. Each refrigerant circuit has a reversing valve (except DWC), high-pressure safety control, low pressure safety control/loss of charge protection, dual gauge connections for high and low pressure readings and bi-flow thermo-expansion valve. The expansion valve has adjustable superheat and distributors to meter the refrigerant evenly to the evaporator refrigerant circuits. The 24 v reversing valve is energized in the cooling mode making the unit fail safe to the heating mode.

Factory installed service ports in the compressor suction, discharge and liquid lines shall provide ease in servicing. A common refrigerant line connection is also provided for use with water regulating valves.

Electric Controls. Internally wired controls includes the compressor control module, reversing valve relay and blower and compressor contactors or starters in a sheet metal control panel. The isolated 24-v control circuit includes a transformer and low voltage terminal board for external thermostat hookup.

Terminal Boards Connections 24-volt terminal boards shall be furnished for loop pump interlock on DGY models and 24-volt thermostat connections on all models.

Low Pressure Controls DGY units are to be furnished with a 15 psig control for use on ground loop systems.

DWY & DWC units are furnished with a 30-psig control for use on an open loop or high temperature closed loop systems.

Filters. All models are shipped with 2 -inch thick disposable glass fiber media filters mounted in the factory installed filter rack on the return air opening.

Sloped Stainless Steel Condensate Drain Pans The condensate drain pan are sloped to comply with ASHRAE Standard 62-1089R and fabricated from

stainless steel. The bottom is insulated with 5/8" closed cell neoprene insulation. Condensate may be drained from either side of the unit from MPT drain fittings positioned at the exterior of each side of the cabinet (unit sizes 036, 048, 060 and 072 are equipped for one side drain only).

Power Entry Power through the curb sleeves is standard on all models.

Factory Options

Corrosion Protection Options:

- Mill & Chemical Service
- Seacoast Construction

Indoor Air Coils Coatings:

- Baked phenolic
- Thermoguard

Specialty Coils:

- Copper tube, copper fin DX evaporator coil
- Cupronickel Coaxial Coil

Refrigerant Circuit Components

- Hot gas reheat
- Hot gas bypass (single compressor units or lead compressor only on dual compressor units)

Motors:

- High Efficiency Blower Motor
- Totally Enclosed Blower Motor

Cabinet:

- Foil faced fiberglass insulation
- Closed cell foam insulation
- Closed cell foam insulation with aluminum inner walls
- Steel pillow block blower bearings
- Quick release handles on service panels

Filters:

- 2-Inch aluminum metal media filters
- 2 Inch extended surface pleated filters (30% efficient)

Electrical Options:

- Clogged filter indicator
- Firestat, return air mounted manual reset limit control
- 115 volt GFCI convenience outlet
- Exhaust fan interlock relay (to start remote exhaust fan)
- Non-fused disconnect NEMA3R enclosure
- Phase/voltage monitor

Heat Recovery:

- Lead Compressor Waste Heat Recovery Water Heater

Supplemental Heat Options:

- Electric Heat

Controls:

- Manual 25% Outside Air Damper, with termination for 24V control
- Motorized proportional outside air damper with termination for 24V control
- ASHRAE type 3 economizer

Field Installed Accessories

- Full Perimeter Curb
- Full Perimeter Curb with Burglar Bars
- Insulated Curb
- Sloped Roof Kit
- Tie Down Kit
- Room Thermostats
 - Electromechanical
 - Electronic
 - Electronic programmable
 - Firestat, duct mounted manual reset limit control

Engineering Guide Specifications

General

Furnish and install FHP Manufacturing Model DWY/DGY/*DWC Series A water source heat pump where indicated in the plans and specifications.

Performance ratings shall be per ARI Standard ISO 13256-1 with capacity and energy efficiency not less than scheduled. Unit shall be provided with factory installed options listed as detailed below.

Approvals

Unit shall be design certified to conform to appropriate UL/ANSI Standards by ETL or other nationally recognized testing laboratory.

Cabinet

Cabinet shall be constructed of G-90 galvanized steel with minimum gauge thickness as follows: Bases - 16-gauge; Corner Posts and Tops - 18-gauge; Access Panels - 20-gauge. The interior of the indoor airside is to be thermally insulated with 1-inch thick – 1½-pound density glass fiber insulation. A closed cell neoprene liner is to be installed on the underside of the base pan for noise reduction and weather seal to the roof curb. The cabinet is to be mounted on two steel rails to facilitate installation. The design of the cabinet shall allow access to the compressor and electrical panel without impairing unit operation.

Non-Rust Base.

Unit base pan shall be coated with a viscous petroleum distillate to a uniform ¼" wet depth, air-dried and cured to form a solid protective layer to eliminate corrosive oxidation.

Sloped Stainless Steel Drain Pan

The condensate drain pan shall be sloped to comply with ASHRAE Standard 62-1089R and fabricated from stainless steel. The bottom shall be insulated with 5/8" closed cell neoprene insulation. Condensation may be drained from either side of the unit (model sizes 096 through 420) from MPT drain fittings positioned at the exterior of each side of the cabinet.

Paint Finish.

Hot dipped galvanized G90 steel shall be chemically treated with zinc phosphate, coated with 0.2 to 0.3 MIL polyurethane primer then finished with .7 to .8 MIL polyester top coat. Finish shall meet or exceeds 1,000 hour Salt Spray Test per ASTM B117 97.

Non-Corroding Hardware.

All exterior nuts, bolts and washers shall be stainless steel type 304. All exterior screws shall be steel coated with Magnigard Silver 17.

Assembly and Test

The unit shall be completely factory assembled, wired, leak and safety control tested. After assembly, each unit is to be charged and run tested in both the heating and cooling cycles (DWC models cooling only).

Refrigerant System

The refrigerant system shall include a reciprocating compressor (model sizes 036 and 048) or scroll compressors (models 060 and larger) with a crankcase heater and thermal overload protection. The compressor shall rest on external rubber isolators. The compressor is to have an optional 5-year limited warranty by the unit manufacturer from date of installation.

Each system shall include a reversing valve (except DWC), accumulator, dual gauge connections for high and low pressure readings, bi-flow thermo-expansion valve with adjustable superheat, coaxial counterflow water coil with inner copper tube and outer steel tube and copper tube aluminum plate-finned indoor air coil. Multiple compressor models shall have face split coils for maximum dehumidification at part load conditions.

Safety controls shall include low-pressure safety control/loss of charge protection and high-pressure safety control (manual-reset). Unit shall include a compressor logic control module with a circuit to lock the compressor off in the event one of the safety controls have been activated. Unit shall include a circuit to bypass the 30/15 psig low-pressure cutout at start-up for 90 seconds. Unit shall not be restarted until the room thermostat has been turned off and then on again or electric power to the unit has been interrupted.

Electrical Controls

Internally wired controls are to include the compressor control module(s) and the blower and compressor motor contactors or starters. The 24-volt control circuit shall include a transformer and low voltage terminal board for external thermostat control hookup. Loop pump 24-volt interlock shall be furnished for DGY models.

Fan Section

A forward curved, statically and dynamically balanced DWDI centrifugal blower(s) shall used. Blower(s) and housing(s) shall be fabricated of galvanized steel. The blower wheel(s) shall be mounted on a solid steel shaft supported by sealed ball bearings. The shaft shall be driven by adjustable belt drive sheaves connected to a nominal 1725-rpm motor with sealed ball bearings. The sealed bearings on both the blower shaft and motor shall be permanently lubricated.

Filters.

2-inch thick disposable glass fiber media filters shall to be mounted in the factory installed flat filter rack on the return air opening.