# RESIDENTIAL PRODUCT GUIDE 2009 / 2010

## Reinventing Energy Efficiency

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# Bosch Group

The BOSCH ABS System is keeping U.S. roads safer for more than 30 years.

The Bosch Group is a leading global supplier of technology and services in the areas of Automotive, Industrial Technology, Consumer Goods and Building Technology. The company was founded in Stuttgart, Germany, in 1886 and presently has more than 300 subsidiaries and is represented in over 150 countries. This worldwide development, manufacturing, and sales network are the foundations for further growth.

With all its products and services, Bosch enhances the quality of life by providing solutions which are both innovative and beneficial.

For more than 30 years Bosch has developed active safety systems. For example the famous ABS and ESP systems have significantly contributed towards the reduction of accidents on U.S. roads.

One important concern of Bosch global research activity is the central question of how to make energy consumption more efficient. Bosch offers eco-friendly products in all its business sectors. In the area of sustainable mobility, these include technologies that help reducing the fuel consumption and CO2 emissions of vehicles. Energy efficiency and climate protection are also shaping the Industrial Technology and the Consumer Goods and Building Technology business sectors. Green technologies, such as photovoltaics, wind power, geothermal and alternative cooling and heating systems, all promise to be in even greater demand in the future, thereby becoming a key growth driver for the Bosch Group.

# Bosch Thermotechnology

Bosch Thermotechnik represents the Thermotechnology Division of the Bosch Group which is part of the business sector Consumer Goods and Building Technology. It can draw on many decades of experience as a manufacturer of heating and water heating systems – with an uncompromising priority on quality, customer benefits and innovation. The company has a number of powerful brands and is a leading worldwide supplier of high-quality heating and hot water systems. In particular, the company offers floor-standing and wall-hung boilers, water heaters, solar systems, heat pumps, control systems, tankless and heating accessories. Being a systems supplier, Bosch Thermotechnik can supply from a single source everything needed to produce the domestic hot water and indoor comfort solutions in an ultra efficient and environmentally friendly manner.

Bosch Thermotechnology has been active in the key growth market for renewable energy since 2005, when it acquired the largest manufacturer of electric heat pumps in Sweden in order to become a major player in the European markets. After that the company announced its intention of expanding the heat pump business on a global scale when it took over FHP Manufacturing Company in 2007.

Bosch Thermotechnology offers a complete range of ultra efficient solutions for domestic hot water production.

# FHP Manufacturing

FHP is a leading manufacturer of Water Source and Geothermal Heat Pumps in the U.S. The company was founded in 1970 in Pompano Beach, Florida. For almost 40 years it has been known for providing innovative solutions and the most energy efficient products in the industry.

FHP's engineering efforts have been focused on providing a greener world for future generations. We were the first company that offered a full line of products equipped with the environmental friendly refrigerant R-410A.

FHP headquarters include a state of the art facility with the latest manufacturing technology available. Each product is factory tested according to the Bosch quality standards in order to provide our customers the highest level of satisfaction and comfort. We carefully select our suppliers in order to equip our products with the best components available.

All FHP products are engineered and tested in our top class laboratory in order to ensure the most efficient and quiet technology available. FHP's heat pumps are independently tested and certified by the Air Conditioning, Heating and Refrigerant Institute (AHRI) and the Underwriters Laboratory (UL).

FHP works closely with industry associations such as the International Ground Source Heat pump Association (IGSHPA), the American Heating, Air Conditioning and Refrigerant Institute (AHRI) and the International Standards Organization (ISO). The company is also a participating member of the Geothermal Heat Pump Consortium (GeoExchange). This ensures meeting the required standards of the industry, the highest product efficiencies and engineering trends in the market.

Environmental stewardship is a core philosophy for FHP Manufacturing from design to production to the reduction in our customers' energy bills. At FHP, we are working on a better future every day.

# MILESTONES

**Bosch Group | FHP Manufacturing**

## 1800

**1897**
The de Dion Bouton three-wheeler was the first vehicle with the Magneto device invented by Robert Bosch.

**1887**
First low-voltage magneto ignition device applied to passenger vehicle engines for Gottlieb Daimler.

**1886**
Robert Bosch opens his first company doing installation work.

## 1900

**1906**
First American Bosch subsidiary was open in New York.

**1906**
100.000th magneto ignition device was manufactured.

**1903**
Bosch low voltage magneto installed in Camille Jenatzy's HP Mercedes helped him win the Gordon Bennett race in Ireland.

## 1910

**1914**
Bosch introduces the first electric starter.

**1910**
Bosch introduced a complete electrical system which includes a Magneto ignition device, spark plugs, headlights, a generator, a regulator switch, and an electrical starter.

**1910**
The first Bosch Magneto Co. factory built in Springfield, MA.

## 1920

**1927**
Bosch developed the first diesel injection pump and turned it into a standard.

**1922**
Bosch began producing batteries for motorcycles. Car batteries followed.


**1920**
Increasing motorization made it necessary to construct a customer service net. The Bosch Service-Stations were established.

## 1930

**1936**
Bosch became the first worldwide mass-producer of diesel injection systems, which was first applied in Mercedes-Benz cars.

**1933**
The first Bosch refrigerator was ready to be installed in a kitchen.

**1932**
Bosch acquired the gas appliances production of Junkers & Co., which manufactured continuous-flow water heaters in efficient assembly-line facilities.

## 1940

**1942**
The company's founder Robert Bosch past away at the age of eighty on March 12, 1942.

**1940**
Long since retiring from his daily business, Robert Bosch devoted himself to philanthropic and charitable causes, like the hospital named after him in Stuttgart, Germany.

## 1950

**1958**
The first Bosch washing machine went into serial production.

**1952**
The first Bosch food processor was introduced worldwide.


**1952**
The first Bosch fuel injection was introduced in the "Superior 600" car manufactured by the Gutbrod Company.

## 1960

**1967**
Bosch introduced a fuel injection system that lowered fuel consumptions and exhaust emission at the same time while increased driving performance.

**1964**
The first bosch automatic dishwasher was introduced.

**1964**
The Robert Bosch Foundation was founded in 1964. It holds more than 90% of the shares of the Robert Bosch Company. The seat of the foundation is located in the Robert Bosch House in Stuttgart.

## 1970

**1978**
The first ABS (Anti-lock Braking System) in passenger vehicles was introduced world-wide.

**1976**
The first lambda sensor developed by Bosch was installed in a vehicle.

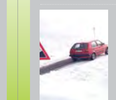
**1970**
Florida Heat Pump is founded in Pompano Beach, FL., by Cliff Young, Jr.

**1974**
Company name is changed to FHP Manufacturing to remove local image.

**1978**
The company is sold to Harrow Industries (G.L. Ohrstrom).

## 1980

**1989**
The Bosch subsidiary Blaupunkt introduced the navigation system called the TravelPilot, which became a standard feature in most vehicles.



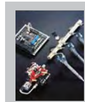
**1986**
The series production of traction control system (TCS) as well the electronic diesel control (EDC) were introduced into the market.

**1982**
FHP moves into its new facility in Fort Lauderdale, FL.

**1985**
FHP launches the **LT Series** as the first low temperature Heat Pump for Northern Markets.

**1989**
FHP celebrates its first export-sale to Canada.

## 1990



**1997**
Bosch introduced a new diesel system into the market. Its construction design makes diesel engines more economical, eco-friendlier and quieter.

**1995**
The Electronic Stability Program (ESP) was invented by Bosch. It controls the braking or accelerating of individual wheels in order to increase the control of the vehicle.

**1991**
Bosch set new lighting standards in 1991 by introducing the Litronic lighting system, a gaseous discharge lamp period. It is fitted into headlamps and ensures significantly more intense road illumination.

**1991**
FHP launches the **SE Series** as the first water source Heat Pump with scroll compressors in the US..

**1997**
FHP launches the **TAKE-APART Series** as the first large tonnage Heat Pump (30-60 Tons) for commercial applications.

**1998**
FHP is sold to Ingersoll-Rand.

**1999**
FHP is sold to G.L. Ohrstrom.

## 2000

**2005-2007**

In order to become a major player in the field of renewable energies Bosch acquired in 2005 the Swedish company IVT and in 2007 the American company FHP, two leading manufacturer of heat pumps.

**2003**
Bosch acquired the German company Buderus AG, a European leader in heating solutions.

Bosch is developing drive and control technology to exploit the energy in the oceans. This prototype is in operation off the English coast..

**2003**
FHP is the first water source Heat Pump manufacturer to introduce the environmentally friendly refrigerant R-410A.

**2004**
FHP receives ISO 9001:2000 certification.

**2007**
FHP is acquired by Bosch.

**2008**
FHP launches the **AP Series** as the most efficient series in the US Market.

**2009**
After renovations, FHP's new state-of-the-art facilities are opened in Fort Lauderdale, FL.

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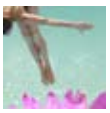


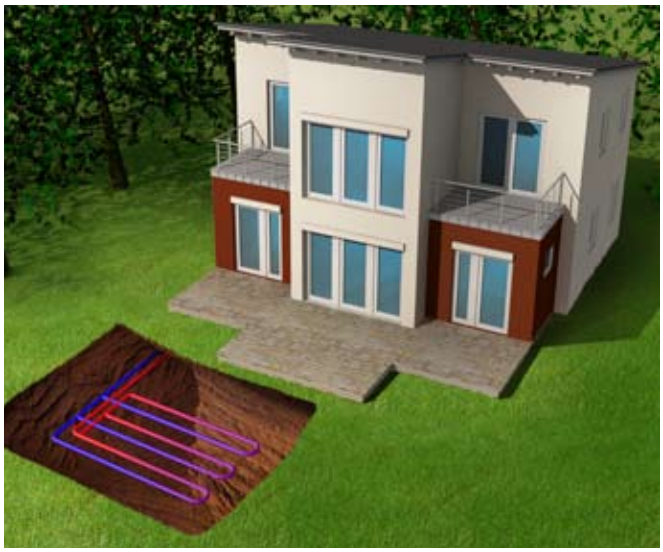
# GEOTHERMAL TECHNOLOGY

## Residential

# FHP's Geothermal Heat Pumps

Our Geothermal Heat Pump systems are the most energy and cost efficient systems on the market and therefore the greenest technology for heating and cooling. The technology uses the relatively constant temperature of the earth (thermal energy) to provide heating, air conditioning and hot water. Ground and water temperatures, 6 feet below the Earth's surface, stay relatively constant throughout the year. This allows the system to provide extremely efficient heating or cooling all year long in virtually any climate.

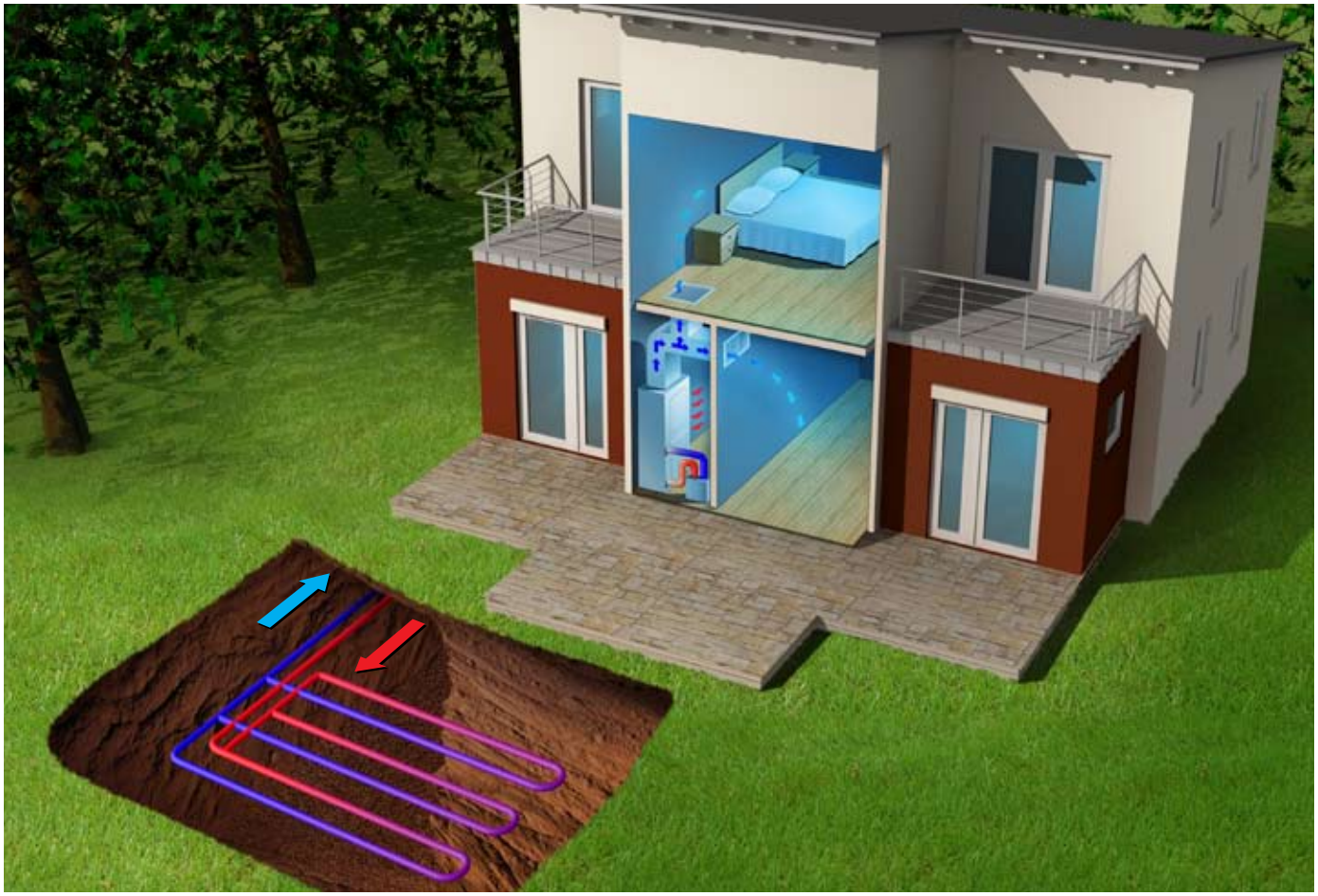
Sometimes the term "environmental comfort system" is used to describe a geothermal heat pump. This happens because a heat pump absorbs or rejects heat from the earth and has absolutely no impact on the environment.

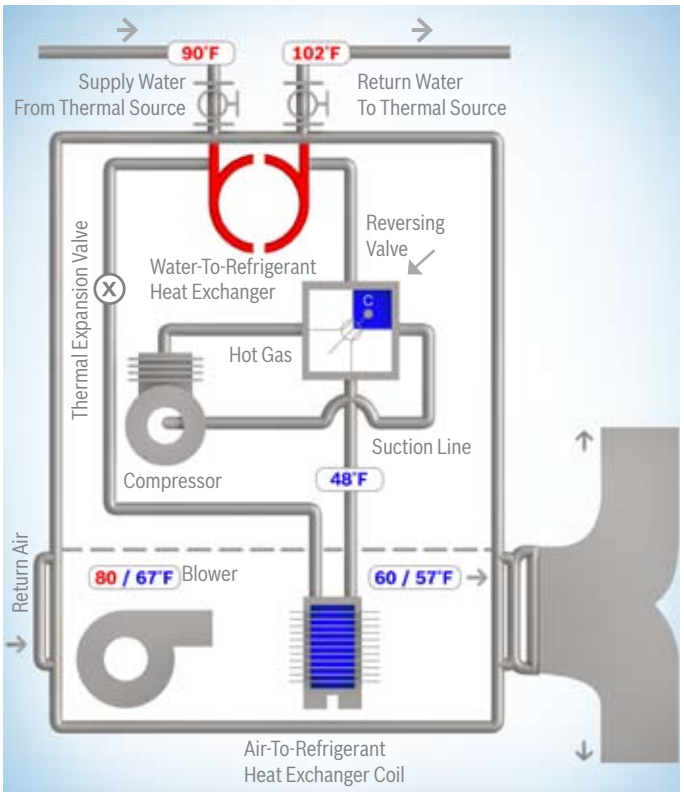


**Cooling Mode**

**Heating Mode**

# Operation Modes Of A Heat Pump

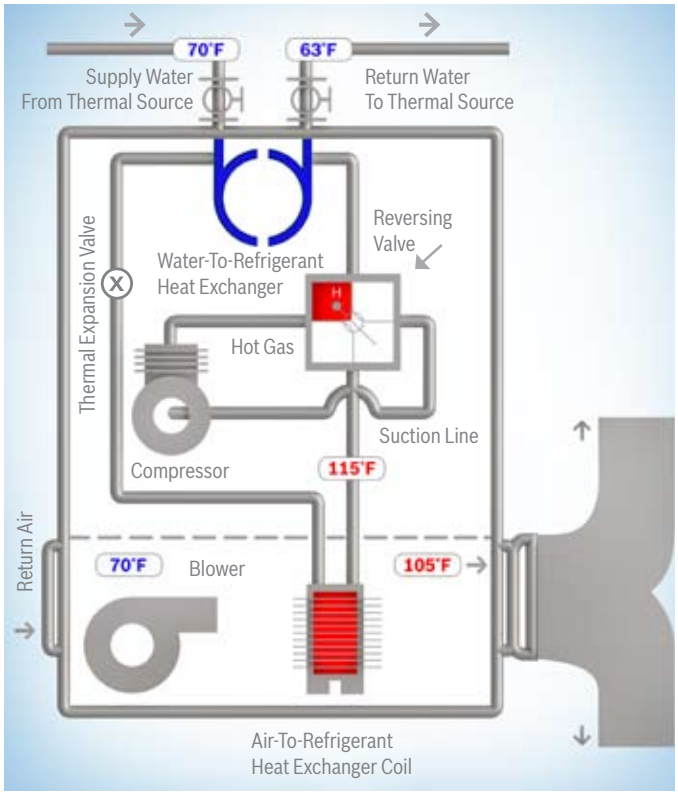





## Cooling Mode

In the COOLING mode, the refrigerant, a hot gas, is pumped from the compressor to the water-to-refrigerant heat exchanger via the reversing valve. Water, generally with an anti freeze, flowing through the water-to-refrigerant heat exchanger removes heat and the hot gas condenses into a liquid. This liquid then flows through a metering device to the air-to-refrigerant heat exchanger coil. In evaporating into a gas, the liquid absorbs heat and cools and dehumidifies the air that passes over the coil surface. The cooling cycle is completed when the refrigerant flows as a low pressure gas through the reversing valve and back to the suction side of the compressor.

The fluid from the water-to-refrigerant heat exchanger is pumped to the ground loop heat exchanger where it transfers the heat to the earth. The cooled fluid then flows back to the unit.




## Heating Mode

During the HEATING mode, the refrigerant, a hot gas, is pumped from the compressor to the air-to-refrigerant heat exchanger coil via the reversing valve. In the air-to-refrigerant heat exchanger coil, the heat is removed by the air that passes over the coil surface, and the hot gas condenses into a liquid. The air is circuited to the space and provides heating for the house. The refrigerant liquid then flows through a metering system to the water-to-refrigerant heat exchanger. When evaporating into a gas, the liquid absorbs heat and cools the water. The heating cycle is completed when the refrigerant flows as a low pressure gas through the reversing valve and back to the suction side of the compressor.

In the winter the fluid in the ground loop extracts heat from the ground, raising the fluid temperature and circulates back to the heat pump into the house.

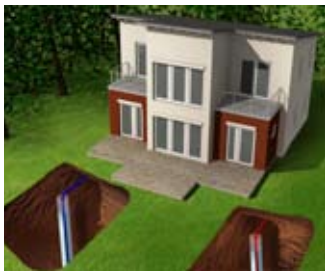
# Earth Coupling Options

Geothermal systems use the earth as a heat source and heat sink. In order to transfer heat to or from the house heat exchangers (ground loops) are installed in the ground. These consist of high density polyethylene plastic pipes. The loops are then connected to the heat pump and fluid circulated between them transferring the heat between the heat pump and the earth.

**Vertical Ground**
**Loop System**

**Horizontal Ground**
**Loop System**

**Pond/Lake**
**Loop System**



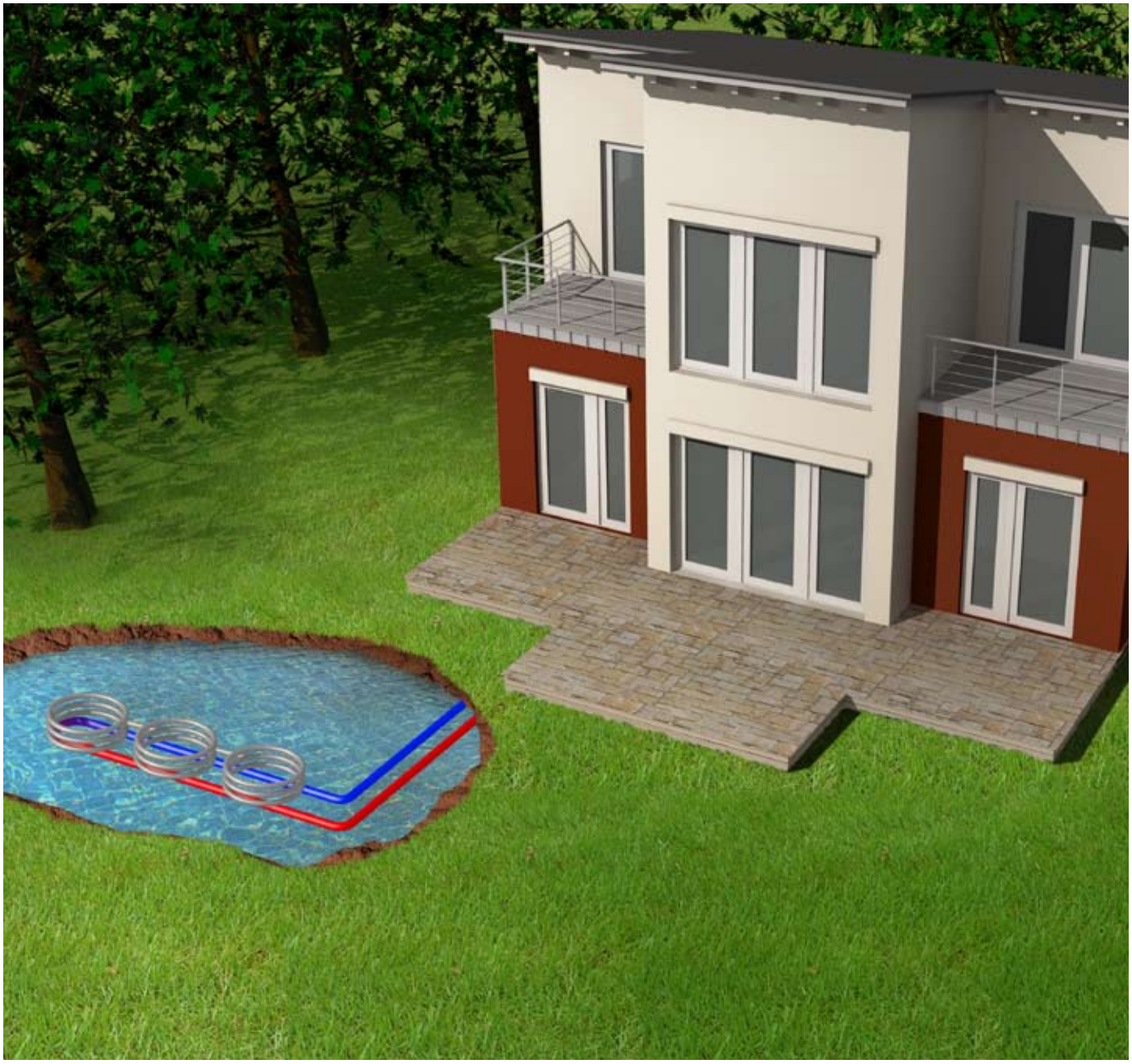
**Well Water**
**System**

## Vertical Ground Loop System

This type is used mainly in commercial buildings or where space is limited.
Vertical holes 100 to 400 feet deep are drilled in the ground, and a single loop of pipe with a U-tube at the bottom is installed. The borehole is then sealed with grout to ensure good contact with the soil. The vertical ground loops are then connected to a horizontal underground header pipe that carries fluid to the unit. The earth's temperature is more stable farther below the surface which is an advantage for the system. Vertical ground loop fields may be located under the house and garden lots. The life expectancy is in excess of 50 years.

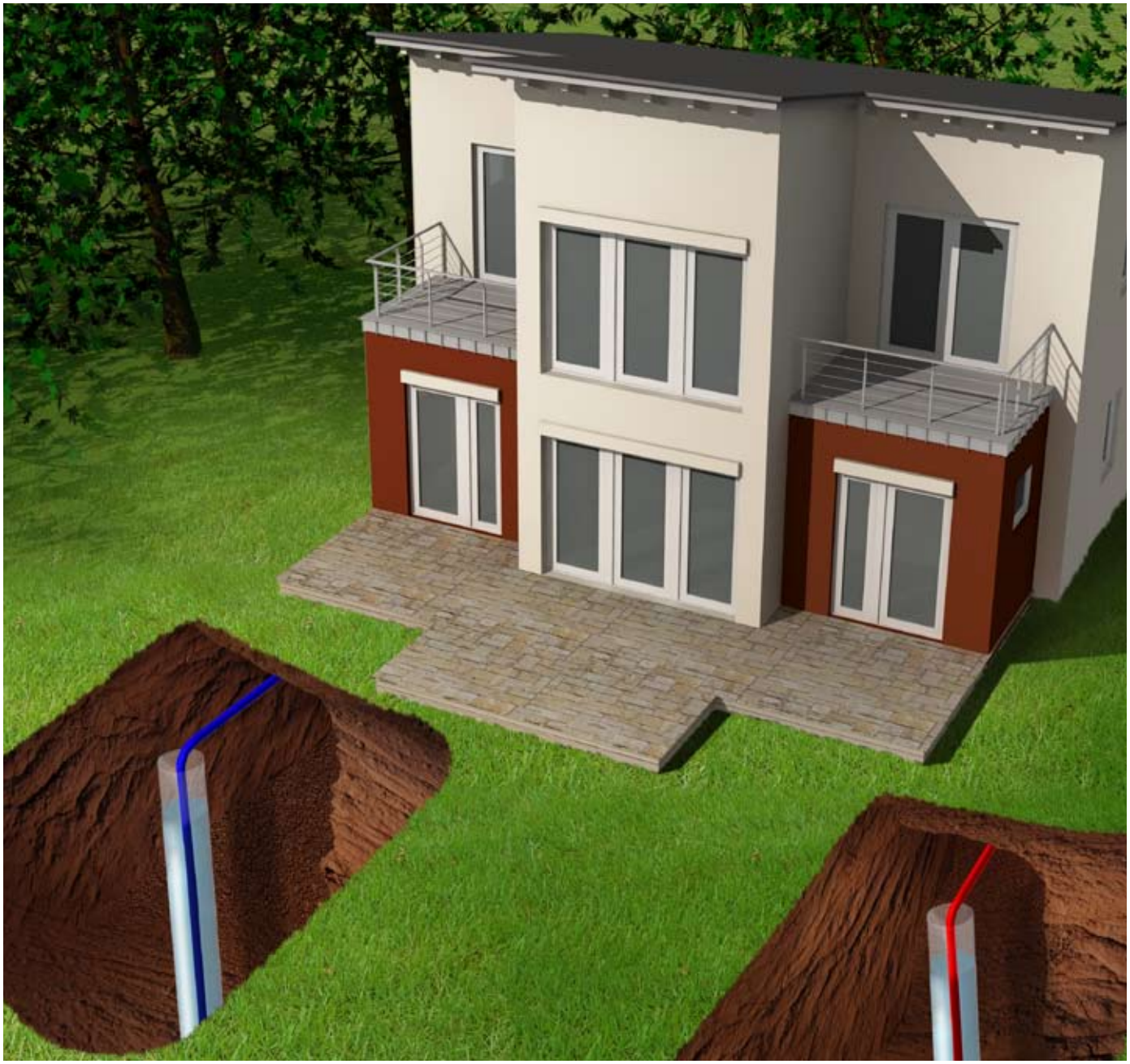
## Horizontal Ground Loop System

This type of design is cost effective on smaller projects or where there is sufficient space for the loop. Trenches, three to six feet deep are created and a series of parallel plastic pipes are laid inside them. These loops are manifolded and connected to the heat pump. The fluid is then circulated absorbing or rejecting heat to the earth depending on the mode of operation. A typical horizontal loop will be 400 to 600 feet long for each ton of heating and cooling but will vary according to the soil type and the layout of the piping.



## Pond/Lake Loop System

This type of design is economical when a project is located near a body of water. Fluid circulates through polyethylene piping in a closed system, just as it does through ground loops but in this case underwater. The pipes may be coiled in a slinky to fit more surfaces into a given amount of space. The lake needs to be a minimum size and depth depending on the load. Lake loops have no adverse impact on the aquatic system.



## Well Water System

This type of design is only possible if there is sufficient ground water available in a well, a lake or river in the area. The water must be of good quality. Local codes may limit the use of this system in certain areas.
The system is open which means that water is pumped directly into the geothermal unit and then discharged either into a return well or a body of water. The water quality remains unaffected.

# Advantages Of FHP's Geothermal Systems

## Environmentally Friendly

FHP's green technology is the most environmentally friendly way to cool and heat your home. The system has no carbon dioxide emissions or any other negative effects on the environment. FHP geothermal installations have the effect of reducing greenhouse gas emissions which are responsible for climate change. Saving energy also helps reducing the US dependence on foreign oil.

## Lower Operating Cost

FHP's technology helps to save up to 70 percent on your energy bills for heating, cooling and hot water because of the higher efficient operation compared to conventional systems. Simple payback could be as short as 5 to 7 years and you can experience costs savings from the beginning. For a new installation with the cost of the system included in mortgage payment you could have a positive cash flow from day one.

## Flexibility and Comfort

Depending on the season, our systems allow you to heat or cool your home. Experience a greater level of comfort without the hot spots from a conventional system. FHP units can be equipped with the ability to recover "waste" heat from the compressor to heat the water virtually for free and saving you extra dollars in your hot water bill.

## Reliability

Ground loop systems have a life expectancy in excess of 50 years. Your FHP unit is manufactured with rigorous standards ensuring trouble free operation over the life of the unit. Our residential warranty offer is among the best you will find in the market.

## Quiet operation

Customer satisfaction is our highest goal and therefore FHP units come equipped with a unique floating base pan and an optional compressor blanket that turn our units into the quietest ones available.

Environmental stewardship is a core philosophy for FHP Manufacturing from design to production to the reduction in our customers' energy bills. At FHP, we are working on a better future every day.

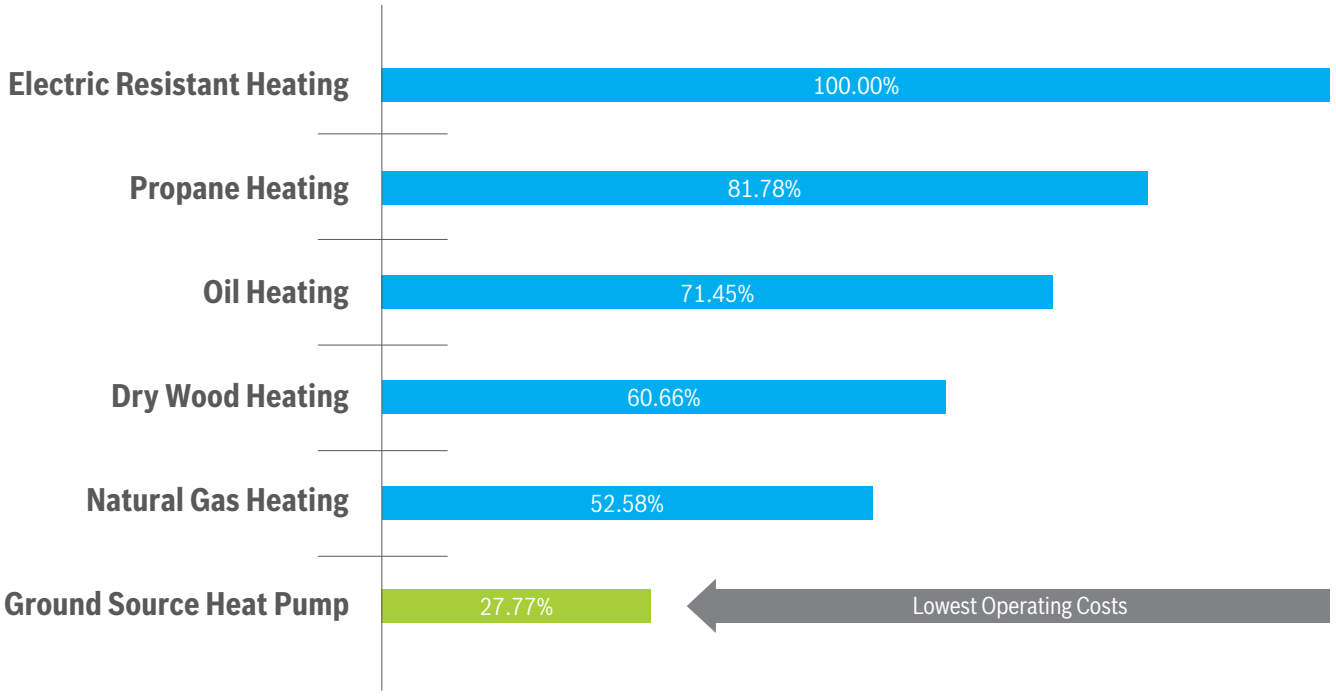
# Cost And Payback

Geothermal heat pumps not only provide dependable, natural heat—they also provide you with more financial independence through the money the heat pumps can save.

- Geothermal heat pumps have the lowest life cycle cost today — 25% to 50% less than a conventional system
- Savings up to 70% in your energy bill depend on location and which GSHPS you use
- Will normally cost more than a conventional system, but will pay back that cost difference in a short period of time
- Local and federal Tax Credits & Rebates decrease your installation cost, which decreases payback period
- Extra money to invest on your family quality time
- Considered the technology of choice by the Department of Energy and the Environmental Protection Agency

# Heating Operating Cost Estimate

Estimated heating costs of operation for a building with 54,000 Btu/hr Design Heat Loss at -3 F.
Estimates based on the following energy costs:
Electricity - 9.5 cents per kilowatt hour; Natural Gas - $1.20 per therm; Propane - $1.75 per gallon; Oil - $2.25 per gallon; Dry Wood - $230 per full cord.
Source: Phoenix Energy Supply; FHP Manufacturing



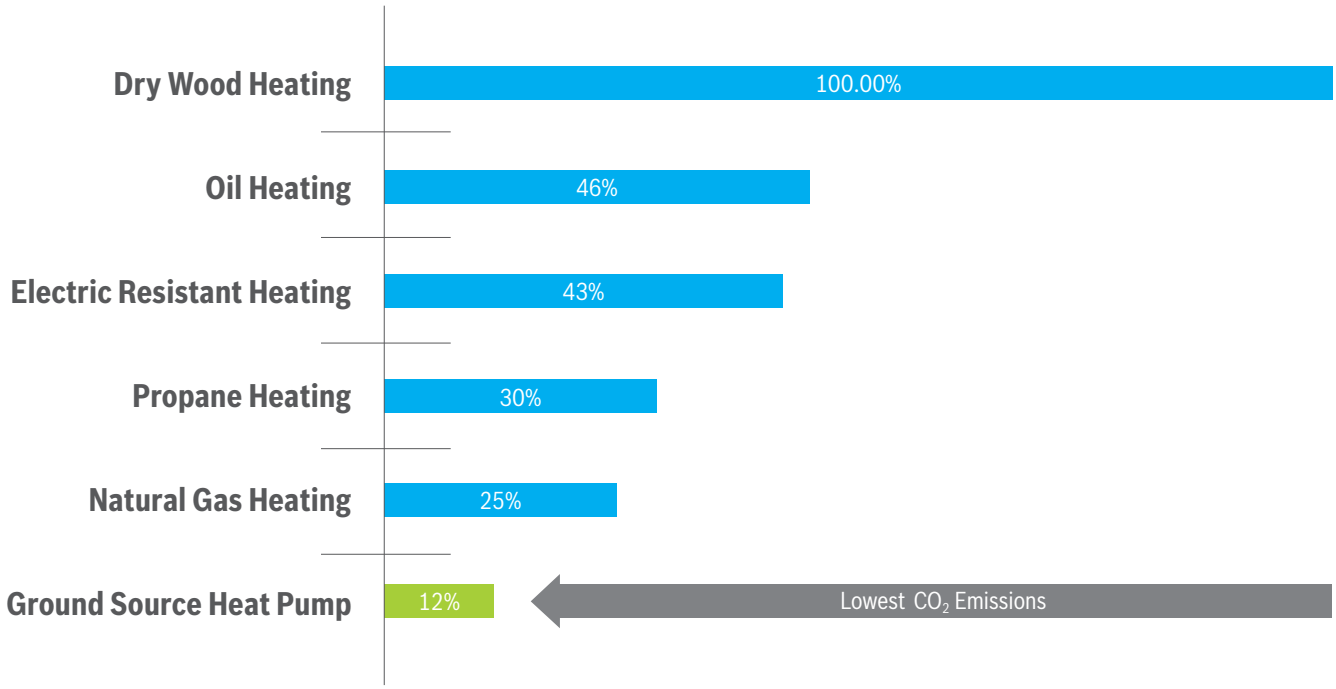
# $CO_2$ Emissions Estimate

Estimated $CO_2$ emissions for a building with 54,000 Btu/hr Design Heat Loss at -3 F.

Estimates based on the following $CO_2$ emission rates:

Electricity - 0.76 $CO_2$/KWH; Natural Gas - 110 lb $CO_2$/MBTU; Propane – 126.7 lb $CO_2$/MBTU; Oil – 188.6 lb $CO_2$/MBTU; Dry Wood – 323.8 lb $CO_2$/MBTU.

Source: Phoenix Energy Supply; FHP Manufacturing



# GO GREEN

**With Residential Geothermal Heating And Cooling Incentives**

The Stimulus Bill signed in 2009 by President Obama improves the tax credit and removes any cap from the incentive. A homeowner is no longer limited, and may collect the full 30% of the installed system cost as a tax credit for systems that are installed between January 1, 2009 and December 31, 2016—an immense cost savings that can be combined with state and local incentives.

**WWW.BOSCHTAXCREDIT.COM**

## About Geothermal Heat Pump Opportunities

Recent Congressional legislation has improved the tax credit for the installation of residential geothermal heat pumps. With the new laws, a residential customer who installs a geothermal heat pump may be eligible for a tax credit of 30% of the installed cost of the system, with no limit in place. Geothermal heat pumps are a cost-effective solution to reducing a home's reliance on fossil fuels by harnessing the natural power of the earth to both heat and cool one's home all year long. The government strongly encourages homeowners to invest in renewable energy technology, and these incentives make owning your own heat pump system more affordable than ever.

## Available Government Incentives

As part of the economic rescue bill (H.R. 1424) passed in October 2008, a residential system installed and placed in service between January 1, 2008 and December 31, 2016 was previously eligible for a tax credit equal to 30% of the installed cost of the system up to a cap of $2,000 for a single residence. The Stimulus Bill signed in 2009 by President Obama improves that tax credit and removes any cap from the incentive. A homeowner is no longer limited, and may collect the full 30% of the installed system cost as a tax credit for systems that are installed after January 1, 2009. In addition, if a homeowner is not able to use the entire tax credit in the year the system is installed, they may carry the unused portion of the credit into the next year.

# Additional State, County And Local Incentives

Federal incentives can also be combined with grants and other rebates from state, county and local governments that encourage the use of renewable energy.

For example, if the installed cost of your heat pump is $15,000 and you live in Northwest Florida, you would be eligible for a $1,200 rebate from your utility company and exempt from sales tax and property tax for the equipment and increased value of your home. You would be eligible for $4,140 in federal tax credits after other rebates were considered, making your total cost just under $10,000.*

With so many incentives in place, it has never been easier or more affordable to put geothermal technology to work in your home, lowering your energy bills and saving you money every day of the week. Talk to your FHP-Bosch Group representative today to discuss geothermal heating and cooling for your home.

# Residential Credit Provisions

1. The system must meet ENERGY STAR requirements in effect at the time the system is completed. Energy Star requires that your system meets specific efficiency standards and produces some or all of your domestic hot water.
2. The system must be in the taxpayer's residence (not limited to primary residence).
3. There are no specific requirements for the invoice. However, it will be helpful if the invoice states "Geothermal Heat Pump" and that it "exceeds requirements of ENERGY STAR program currently in effect."
4. The taxpayer has to file IRS Form 5695 to receive the credit.

# Incentives For Condo Owners

In a typical condo, the owners contribute to the upkeep by paying money to a condominium management association. If the association puts in qualifying equipment, each member of the association can claim the residential tax credits on his or her taxes for his or her share of the spending. Though the language is not definitive, it does state that the condo has to be "substantially used as residences." In most cases, a condo association is not a taxable entity, making individual unit owners the ones to benefit from a tax credit.

**For information and support,** please contact your FHP-Bosch Group representative. Information about specific incentive programs is available on the Database of State Incentives for Renewable Energy (DSIRE) at www.dsireusa.org and it's updated frequently. FHP-Bosch Group recommends the following references: IRS Title 26, Section 48(a); IRS Form 3468 and IRS Publication 946.

*We strongly recommend consulting a tax professional for information on specific benefits for your home. These numbers are for illustrative purposes only.

# TAX CREDIT CERTIFICATE

Bosch Group

## RESIDENTIAL

As part of the American Recovery and Reinvestment Act of 2009 (ARRA), the United States Tax Code was revised to expand the existing tax credit available to consumers related to the installation of geothermal heat pumps. As a result, consumers purchasing qualified systems now can take a one-time tax credit equal to 30% of the investment in the geothermal system, including installation costs, without a cap.

## A qualified system must meet the following requirements:

- Installed after January 1, 2009 and before December 31, 2016[1].
- Meet federal Energy Star Program requirements in effect at the time the installation is completed. Energy Star requires that the system meet specific efficiency requirements and that some or all of domestic hot water is provided through the use of a desuperheater, integrated demand water heating or a separately installed compressor that provides demand water heating.
- Installed in residence (not limited to primary residence).

Please complete the information below, and keep this certificate for your records. We advise prior consulting with your tax advisor for further information.

### Installing Contractor Information

Name: _____

Address: _____

_____

Phone: _____

Installation Date: _____

### Geothermal Closed Loop System

**14.1 EER and 3.3 COP or greater***

Model Number: _____

### Geothermal Open Loop System

**16.2 EER and 3.6 COP or greater***

Model Number: _____

ARI Reference #: _____

*Consult efficiencies, ARI reference and Energy Star ratings by model number, starting on page 2.

[1] Products installed between January 1, 2008 and December 31, 2008 are eligible for a 30% tax credit but such credit would be capped at $2000.00.
[2] Energy Star currently requires that a geothermal heat pump must provide some or all of the domestic water heating. This product can be purchased without the domestic water heating option but would not meet Energy Star's current requirements.


# Thank You For Buying FHP.

The environment would like to thank you also.

# FHP WARRANTY PROGRAMS

**Providing You Comfort And Peace Of Mind.**

# Proud To Offer
## An Industry-Leading Warranty

"I am proud to state that I have been an FHP distributor–Rep since 1976. Warranty issues, while minimal, have been handled promptly and professionally. The FHP products have performed exactly as advertised. Our customers have told us repeatedly how much they have enjoyed having an FHP unit in their homes."

Charles E. Elks, Jr.
President, Mechanical Equipment Sales

FHP is proud to offer an industry-leading warranty on our products, ensuring peace of mind that your state-of-the-art geothermal heat pump system will perform to it's highest standard for years to come. FHP also has the ultimate in customer support and a network of expertly trained representatives all over the country to meet your needs.

Most importantly, at FHP, we know quality. We have been building the most advanced and reliable equipment for the last 40 years, and that is why we back our exclusive heat pumps with one of the best warranties in the business. This warranty covers all units from a half-ton to 6 tons of capacity with 110 or 208/230 single phase voltage.* We also include the WW122 series in our excellent coverage plan.

We stand by our products to ensure you get the most from your investment in clean, renewable energy. Should you ever have a problem, we are here to make sure you are satisfied and your system exceeds your expectations.

For more information about FHP's industry-leading warranty program, or about any of our products, contact your knowledgeable local representative or visit our website at www.fhp-mfg.com.

### FHP's Limited Warranty Includes The Following Components:

- **Compressor: 10 years**
- **Refrigerant Circuit: 10 years**
- **All Other Parts: 5 years**
- **Extended Service Agreements****

### FHP's Limited Warranty Is Available For The Following Product Types:

- **Sizes from a half-ton to 6 tons with 110 or 208/230 single phase voltage**
- **The WW122 Series Unit**

* Purchased through a Residential Distributor
** Ask your contractor about our additional five and ten year Extended Service Agreements


BUILT2SATISFY

# PRODUCT FEATURES

**FHP I Bosch Group I Heat Pumps I Residential**

## Cabinet And Configurations

All units are constructed with corrosion resistant galvalume + sheet metal. Our premium units such as the AP and WT series are constructed with galvanized sheet metal covered with black vinyl material for an appealing appearance. FHP units are designed to fit our customer's needs and are available in vertical, horizontal, counter-flow, and split system configurations.

All units provide three easy removable access panels to allow for convenient access to the compressor, refrigerant circuit, and the electrical box. Removable panels in the evaporator section allow easy access and serviceability to the fan motor. A wide range of supply air and return air configurations are available on FHP's residential water-to-air units.

## Geothermal

All of FHP's units excepting the EC Series come ready for geothermal applications. A geothermal extended range option is available for the EC series consisting of a TXV metering device and a wrapped condenser coil.

## Coated Air Coils

All FHP Evaporator coils are baked enamel coated with a corrosion resistant material. This coating protects against most airborne chemicals that can lead to accelerated corrosion and premature failure of the coil. All coatings are factory applied for total coil coverage and must pass the equivalent of a 1000-hour salt spray test. Baked Coating provides superior protection against corrosion due to acids, solvents and salt found in a typical environment and which could lead to premature failure of the coil. Application of baked coating has a negligible effect on the coil performance.

## Four Sided Filter Rack

FHP units include either a 1" or 2" air filter. Four sided filter racks minimize unfiltered air from entering the unit. Filter doors allow for easy routine maintenance and changing of the air filter. MERV 11 high efficiency filters are available on most units.

## Metering Device

FHP's EC series uses capillary tubes as a metering device on units of 5 tons or less (60,000 BTU/h). All other units utilize a high quality thermal expansion valves (TXV). Units with capillary tubes have an extended range option available for geothermal applications that includes a TXV in lieu of capillary tubes. A TXV allows for greater flexibility in operation over a wider range of conditions allowing them to closely match the demand of the unit and run at optimal efficiency. The TXV is installed in the compressor section for easy access and servicing.

## Stainless Steel Drain Pan

All FHP units utilize stainless steel drain pans. A stainless steel drain pan prevents corrosion and allows for easier cleaning. It will not deteriorate over the life of the unit.

## Filter Drier

A filter drier absorbs moisture that may be contained within the refrigerant system. Moisture is detrimental and can possibly damage the compressor when it mixes with the refrigerant.

## Electrical Heater

An electric heater option is available for most water-to-air FHP units. Electric heaters are available from 5 through to 20 kW. Ask your FHP dealer about which sizes and combinations are available for your unit.

## Foil Faced Insulation

Foil faced fiberglass insulation is standard on AP units and as an option on the other series. This material allows for wipe down with a damp cloth for improved IAQ (indoor air quality). Other units are standard with ½" thick, multi density, coated, glass fiber insulation.

## Floating Base

The floating base pan is a feature that isolates the compressor from the surrounding cabinet. Even under normal operating conditions vibration may be transmitted to the building and introduced in to the space as noise. The floating base pan isolates the compressor from the cabinet and absorbs the vibration energy so that it does not get transmitted to the space. This feature, unique only to FHP is standard in all of our units to ensure quite operation.

## Service Connections

In order to measure pressures, reclaim or recharge the refrigerant system, two Schrader service ports are provided in every unit. One is located on the suction side and the other on the high-pressure side. Water and electrical connections are located in the front of each unit for easy access and serviceability. An optional disconnect switch is available on all units as an added safety feature.

## R410-A Refrigerant

FHP's entire product line features the environmentally friendly R-410A refrigerant. R-410A is a non-ozone depleting refrigerant since it does not contain any chlorine. R-410A is classified as an HFC (Hydrofluorocarbon) refrigerant as it only contains Hydrogen, Fluorine and Carbon. This refrigerant is the industries replacement for refrigerant R-22.

## Blower Motors

Most of FHP's units utilize a low rpm direct drive blower motor featuring a 3 speed permanently split capacitor (PSC) motor. The speed of the PSC motors can be changed by switching the wires. FHP's premium units such as the AP and ES series offer as standard variable speed GE/Regal-Beloit 2.3 ECM blower motor. This programmable motor has 80% mechanical efficiency and will maintain constant airflow even if there are changes in the air distribution system.

## Coaxial Heat Exchanger



Oversized coaxial refrigerant to water heat exchangers are standard in all units. The customer can choose between Cupronickel or Copper coils. These coils are designed to allow optimal heat transfer while offering extremely low-pressure drop. This unique low-pressure flow design reduces the amount of pumping power necessary to achieve optimum water flow in order to maintain the efficiency of the unit. Coaxial heat exchangers are not as susceptible to clogging and freezing as are plate heat exchangers. All geothermal units come standard with a wrapped insulated coaxial heat exchanger. The insulation wrap prevents condensation from forming in low temperature operations.

## Controls and interface options

Designed to enhance the unit operation with more flexibility, accurate control and operating modes the FHP controllers and interface options provide an increased level of comfort in the conditioned space together with solid state reliability and ease of operation.

## Unit Protection Module UPM1

The Unit Protection Module UPM 1 is standard on all FHP units and was developed to enhance their operation. The UPM 1 is designed for single compressor models.

The (optional) freeze protection will prevent unit operation below 35°F (1.7°C) leaving fluid temperature. The condensate overflow option prevents unit operation in the event the drain pan clogs and there is a potential for condensate overflow. Each controller has a random start feature programmed into its microprocessor ranging from 270 - 300 seconds preventing the simultaneous starting of multiple units. An anti-short cycle timer allows 5 minute delay on break timer to prevent compressor short cycling. A low pressure bypass timer switch prevents nuisance lockouts during cold start up. The high pressure switch delay of one (1) second provides switch stabilization on start up to prevent nuisance lockouts.

**The Unit Protection Modules monitor the operating condition of the unit by providing:**

- A Brownout/ Surge/ Power Interruption Protection - This allows for the water pumps to restart and establish water flow to prevent nuisance lockouts during brief power interruptions.
- Malfunction Output - The controller has a set of 24 volt contacts for remote fault indication.
- Test/ Service pin - A jumper is provided to reduce all time delay settings to 6 seconds during troubleshooting or operation verification.
- L.E.D. Indicators
- Intelligent Reset

## Comfort Alert Diagnostics Module

The Alert Diagnostics module is installed in the electrical box of our units. It is an available option on almost all FHP units. The tool monitors data from the thermostat and compressor and records any malfunction of the system. LED lights provide the alert code and lead the service technician to the cause of the malfunction. The Alert Diagnostics module can significantly reduce maintenance by improving system technician by up to 75% over systems without this feature.

## Motor Control Interface (MCI)

To obtain the optimum performance from your FHP unit the Motor Control Interface board was designed to translate inputs from the thermostat to the unit.
The start/stop ramp up/down and the speed of the blower under different operating conditions are determined by the settings MCI board which may be customized to meet specific job site conditions.

## Solid State Console Unit Controller (CUC)

CUC controllers are standard on all FHP Console Units except for remote and master/slave options. The CUC controllers provide the ultimate flexibility in operation with several selectable modes of operation - manual/automatic changeover, high or low fan speed as well as fan operation constant fan or cycling with compressor

In addition to the different operating options the CUC controller monitors the operating condition of the unit by providing a 5 minute anti short cycling delay, rrandom start and brownout protection. A 90 second low pressure bypass timer prevents nuisance lockouts during cold winter start up. An intelligent reset allows the unit to automatically restart after 5 minutes if a fault is no longer active.

**Features of the controllers include:**

- Tactile Touchpad for temperature, fan and mode adjustment.
- Digital Display of temperature in either degrees Fahrenheit or Celsius.
- L.E.D. Display to provide indication for unit operating mode as well as fan speed and fault indication for high or low pressure lockout.
- Adjustable Temperature Set Point from 60° F through 80° F (15.5° C through 26.7° C).
- Adjustable Temperature Differential between 1° F and 6° F (0.6° C and 3.3° C).

## Solid State Water to Water Unit Control (WUC)

FHP's water to water heat pump controller offers a low cost, simple solution to the control of a water to water heat pump unit. The control is configurable to provide cooling only, heating only or auto change over control strategies based on the application of the unit in a given system. Intelligent auto reset of a fault condition avoids nuisance hard lockouts

**Features of the controller include:**

- Adjustable temperature differential for heating and cooling set point.
- Adjustable auto changeover set point with adjustable dead band setting.
- LED display of control temperature and set points.
- ˚F or ˚C Display.
- Pump operation configurable for continuous or cycling operation with the compressor.
- Compressor lead-lag operation on units with dual compressors.
- Malfunction output and service LED can be set to steady or pulsing to indicate fault condition.
- Color LED's indication of mode of operation.
- Set points retention in non volatile memory in the event of a power failure.
- Five minute delay on break or power interruption for compressor short cycling protection.
- Brown out low voltage protection

## DDC Controls

The FHP factory mounted DDC Controller is preprogrammed and installed in the unit to be job site ready to run. The Unit will operate in a 100% stand-alone control mode or connect to a Building Automation System (BAS) using open protocols BACnet, Modbus, N2 or LonWorks.

Zone temperatures, leaving air temperatures and water temperatures can be monitored from the central control computer and unit fault indication displayed. An attractive wall sensor is available in three configurations. A Back view hand held diagnostic tool is available to allow local access to display and modify user defined properties without any computer software.

## Compressor Blanket

A high density compressor blanket is standard on all AP, WT and WW units through 6 tons. It is also available on other units as an option. This together with the unique floating base pan can reduce sound levels by up to 60 percent.

## 4-Way Reversing Valve

The reversing valve allows the heat pump to either heat or cool depending on the demand of the thermostat. All residential and commercial FHP units feature a pilot operated refrigerant reversing valve constructed of high quality brass.

## Blower Housing

All blower housings are constructed of high quality galvanized metal. There are different options available to meet the custom needs. All motors are securely fastened to the blower housing utilizing vibration absorbers to reduce vibration transmission. Horizontal units are field convertible, offering end or side discharge arrangements.

## Compressors

FHP's water source heat pumps employ the industry's most reliable and efficient compressors on the market. High efficiency rotary, reciprocating or scroll compressors are used in our units. Scroll compressors are available in single and two stage operation.

## Hot Gas Bypass

The hot gas bypass (HGB) option is designed to allow for applications where there can be a wide variation in the load. As the entering air temperature decreases, so does the temperature and pressure of the refrigerant. It is possible that, as the evaporating temperature falls ice can form on the coil. The build up of ice can lead to the eventual failure of the compressor. Hot gas by pass routes some of the hot discharge gas from the compressor directly to the evaporator, by-passing the condenser. This helps in preventing excessive compressor cycling and allows the unit to more closely matches the system capacity.

## Hot Gas Reheat - Dehumidification

Hot gas reheat (HGR) is an available option on all ES/EC/EV and 2 stage ES units. This option allows the user to not only control space temperature, but also space humidity levels. An excess of moisture in the space can allow mold growth, lending to damage to the structure or interior surfaces, as well as reducing the air quality and creating an unhealthy environment. A unit is normally controlled only by a thermostat. The thermostat may be satisfied at 70ºF, however, the humidity may be at an unacceptability high level. Based on temperature alone, the unit will not run because the thermostat has reached the set point. In order to reduce the humidity levels, the heat pump must continue to operate in the cooling mode to remove humidity from the air; this may result in producing colder air than is desired, lending to uncomfortable space temperatures. By utilizing a humidistat the unit is able to monitor the humidity levels in the space. The HGR option allows cooling and dehumidification to satisfy both the thermostat and humidistat. Once the thermostat reaches set point and the humidity is above set point the unit will cool and dehumidify the air then be reheated by hot refrigerant gas and delivered to the space at around room temperature. The unit is operating as a dehumidifier. This option offers significant energy savings over the traditional means of reheating air with electric heating coils.

## Electrical Box

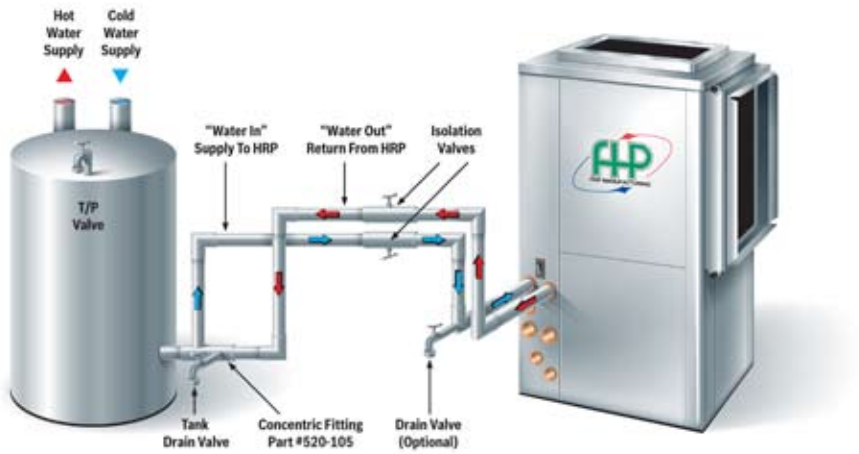
All of FHP's units provide access to the electrical boxes from the front panel for easy serviceability. The electrical box houses the unit's high and low voltage power connections. Most units come with a 50 VA transformer with a 75VA transformer available as an option. Separate knockouts in the electrical post allow for easy and safe routing of high and low voltage lines to the inside of the cabinet.

## Water Connections

All FHP units are provided with high quality bronze FPT water connection fittings. The pipe fittings are attached securely to the corner post, reducing the stress on the pipe joints during installation.

## Desuperheater

A desuperheater or HRP (Hot Water Heat Recovery Package) is a feature that takes advantage of waste heat of the compressor and uses it to heat domestic water. Heating your water with FREE waste heat will reduce the use of your inefficient water storage tank heating elements. Hot water is produced by using a double wall coaxial heat exchanger coil: the hot refrigerant gas flows in the outer tubing while the domestic water flows in the inner pipe being heated by the hot refrigerant. The HRP heats water with superheated gas that is being produced by the compressor as you heat or cool your space, thus saving you money in your hot water production.




**Typical Connection Diagram For EV, ES, & AP Series with Internal HRP**

| MODEL | NOMINAL UNIT TONS | HR CAPACITY (BTU/HR.) | GHR GPM FLOW RATE | POTENTIAL SAVINGS PER HOUR EQUIV. - Kwh |
|---|---|---|---|---|
| HR000 | 1.0 | 1,430 | .50 | .4 |
| | 1.5 | 2,140 | .75 | .7 |
| HR001 | 1.0 | 2,858 | .50 | .8 |
| | 1.5 | 4,287 | .75 | 1.3 |
| HR002 | 2.0 | 5,716 | 1.00 | 1.7 |
| | 2.5 | 7,146 | 1.25 | 2.1 |
| | 3.0 | 8,575 | 1.50 | 2.5 |
| HR003 | 3.5 | 10,004 | 1.75 | 2.9 |
| | 4.0 | 11,433 | 2.00 | 3.4 |
| | 4.5 | 12,862 | 2.25 | 3.8 |
| | 5.0 | 14,292 | 2.50 | 4.2 |

* Capacity based on entering domestic water temperature of 80°F, entering superheated discharge gas temperature 180°F, and leaving saturated vapor temperature 105°F. R-22 refrigerant shown. Use: .950 multiplier for R410A.





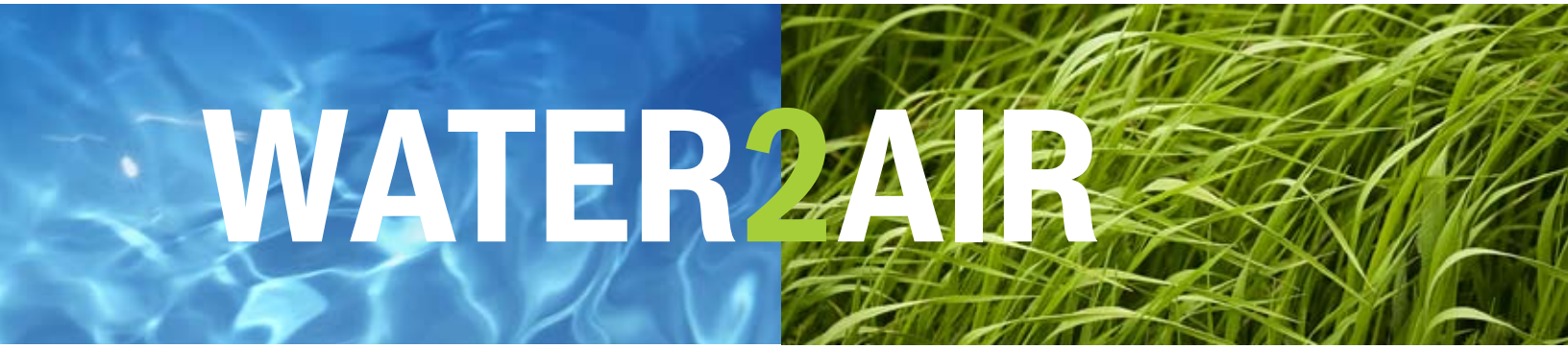


| Series | AP | ES | ES 2 Stage | EV | EC | WW | WT |
|---|---|---|---|---|---|---|---|
| Water to Air | ✓ | ✓ | ✓ | ✓ | ✓ | × | × |
| Water to Water | × | × | × | × | × | ✓ | ✓ |
| Size Range | AP025 - AP071 | ES018 - ES070 | ES025 - ES071 | EV018 - EV070 | EC007 - EC070 | WW024 - WW072 | WT025 - WT071 |
| Sizes Available (Tons) | 2, 3, 4, 5, 6 | 1.5, 2, 2.5, 3, 3.5, 4, 5, 6 | 2, 3, 4, 5, 6 | 1.5, 2, 2.5, 3, 3.5, 4, 5, 6 | 0.5, 0.75, 1, 1.25, 1.5, 2, 2.5, 3, 3.3, 3.5, 4, 4.25, 5, 6 | 2, 3, 4, 5, 6 | 2, 3, 4, 5, 6 |
| Efficiency (GLHP) | EER: 18.0 - 28.5 COP: 4.1 - 4.8 | EER: 15.6 - 19.6 COP: 3.3 - 3.5 | EER: 15.5 - 24.5 COP: 3.6 - 4.0 | EER: 15.0 - 18.5 COP: 3.3 - 3.4 | EER: 14.1 - 15.8 COP: 3.1 - 3.6 | AHRI has no rating for WW Units according to (ARI / ISO 13256-1) | AHRI has no rating for WW Units according to (ARI / ISO 13256-1) |
| Efficiency (WLHP) | EER: 16.0 - 20.0 COP: 5.1 - 6.5 | EER: 13.6 - 16.0 COP: 4.3 - 5.6 | EER: 13.5 - 17.5 COP: 4.4 - 5.4 | EER: 13.0 - 15.5 COP: 4.2 - 5.4 | EER: 12.5 - 14.0 COP: 4.2 - 5.1 | | |
| Stages | 2 Stage | 1 Stage | 2 Stage | 1 Stage | 1 Stage | 1 Stage | 2 Stage |
| Configuration | V, H, C, S | V, H, C, S | V, H, C, S | V, H, C, S | V, H, C, S | Water to Water | Water to Water |
| Refrigerant R-410A | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Compressor | Ultra Tech Scroll | Scroll | Ultra Tech Scroll | Scroll | Rotary EC007 - EC015<br>Recip EC018 - EC042<br>Scroll EC048 - EC070 | Scroll | Ultra Tech Scroll |
| ECM Motor | ✓ | ✓ | ✓ | × | × | N/A | × |
| Electric Heater | Optional | Optional | Optional | Optional | × | N/A | × |
| Hot Gas Reheat | × | Optional | Optional | Optional | Optional | N/A | × |
| Hot Gas Bypass | × | Optional | Optional | Optional | Optional | × | × |
| Coated Evaporator Coil | ✓ | ✓ | ✓ | ✓ | ✓ | N/A | × |
| Desuperheater | Optional | Optional | Optional | Optional | Optional | Optional | Optional |
| Floating Base | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Stainless Steel Drain Pan | ✓ | ✓ | ✓ | ✓ | ✓ | N/A | × |
| Filter Rack; Filter | 4 sided rack; 2 inch (MERV11) | 4 sided rack; 1 Inch/optional 2 Inch | 4 sided rack; 1 Inch/optional 2 Inch | 4 sided rack; 1 Inch/optional 2 Inch | 2 sided rack, 1 Inch/optional 2 Inch 4 sided | N/A | N/A |
| Insulation | ½" thick foil faced glass fiber | ½" thick, multi density, coated, glass fiber | ½" thick, multi density, coated, glass fiber | ½" thick, multi density, coated, glass fiber | ½" thick, multi density, coated, glass fiber | ½" thick foil faced glass fiber | ½" thick foil faced glass fiber |
| Energy Star Rated | all rated | all rated | all rated | all rated | EC: 015, 018, 024, 030, 036, 042, 048, 051, 060, 061, 070 | N/A | N/A |
| Warranty Residential | 5 year parts, 10 year refrigerant circuit, 10 year compressor | 5 year parts, 10 year refrigerant circuit, 10 year compressor | 5 year parts, 10 year refrigerant circuit, 10 year compressor | 5 year parts, 10 year refrigerant circuit, 10 year compressor | 5 year parts, 10 year refrigerant circuit, 10 year compressor | 5 year parts, 10 year refrigerant circuit, 10 year compressor | 5 year parts, 10 year refrigerant circuit, 10 year compressor |

✓ Standard × Not available

# FHP | BOSCH GROUP | HEAT PUMPS | RESIDENTIAL

## Reinventing Energy Efficiency


WATER2AIR

AP SERIES

# WATER2AIR

**Extreme Efficiency I 2 Stage**

LUXURIOUS

- Horizontal
- Vertical
- Split Systems
- Counter-Flow


# AP SERIES

## Efficiency

Rated as the most efficient product on the market today, the AP Series unit features a state of the art two-stage unloading scroll compressor. When controlled by a multistage thermostat, this compressor matches the demand for heating and cooling. This can mean up to a staggering 70% savings in your energy bill, while improving humidity control and the overall comfort throughout your home.

## Quiet Operation

The unique floating compressor base pan and compressor blanket keep sound levels to an absolute minimum. While the ECM (Electronically Commutated Motor) motors are whisper quiet, they can be adjusted to provide proper airflow to ensure your highest level of comfort.

## Environmentally Friendly

We are proud to have been the first company ever to offer a full line of products with the non-ozone depleting refrigerant R-410A. This helps preserve the Earth's ozone layer making all of our Geothermal systems the most environmentally friendly way to heat and cool your home.

## Quality

The AP Series features coated evaporator coils, stainless steel drain pans and a black vinyl coated cabinet as standard equipment to ensure their long and trouble-free life. Rigorous factory testing virtually guarantees no hassle from the start while FHP's thirty years of experience in designing heat pumps is your assurance of the highest quality product. FHP's ISO 9001:2000 certified facilities provide consistent quality in every unit we build.


# Key Features

For complete description of features please refer to page 31

## Standard

- Coated Air Coils
- Four Sided Filter Rack
- Stainless Steel Drain Pan
- Filter Drier
- Foil Faced Insulation
- Floating Base
- TXV Valve
- R410-A Refrigerant
- ECM Motor
- Coaxial Heat Exchanger Copper
- Geothermal
- Compressor Blanket
- Scroll Compressor 2 Stage
- Unit Protection Module 1
- Motor Control Interface
- Comfort Alert Diagnostics Module

## Optional

- Electrical Heater
- Coaxial Heat Exchanger Cupronickel
- Desuperheater

# AP SERIES Technical Specifications


| MODEL | Horz. ( W x L x H ) | Vert. ( D x W x H ) |
|---|---|---|
| AP025 | 26.00x54.50x22.00 | 26.00x21.50x47.25 |
| AP035 | 30.00x68.00x22.00 | 33.25x24.00x47.25 |
| AP049 | 30.00x68.00x22.00 | 33.25x26.00x58.00 |
| AP061 | 30.00x89.00x22.00 | 33.25x26.00x66.25 |
| AP071 | 30.00x89.00x22.00 | 33.25x26.00x66.25 |

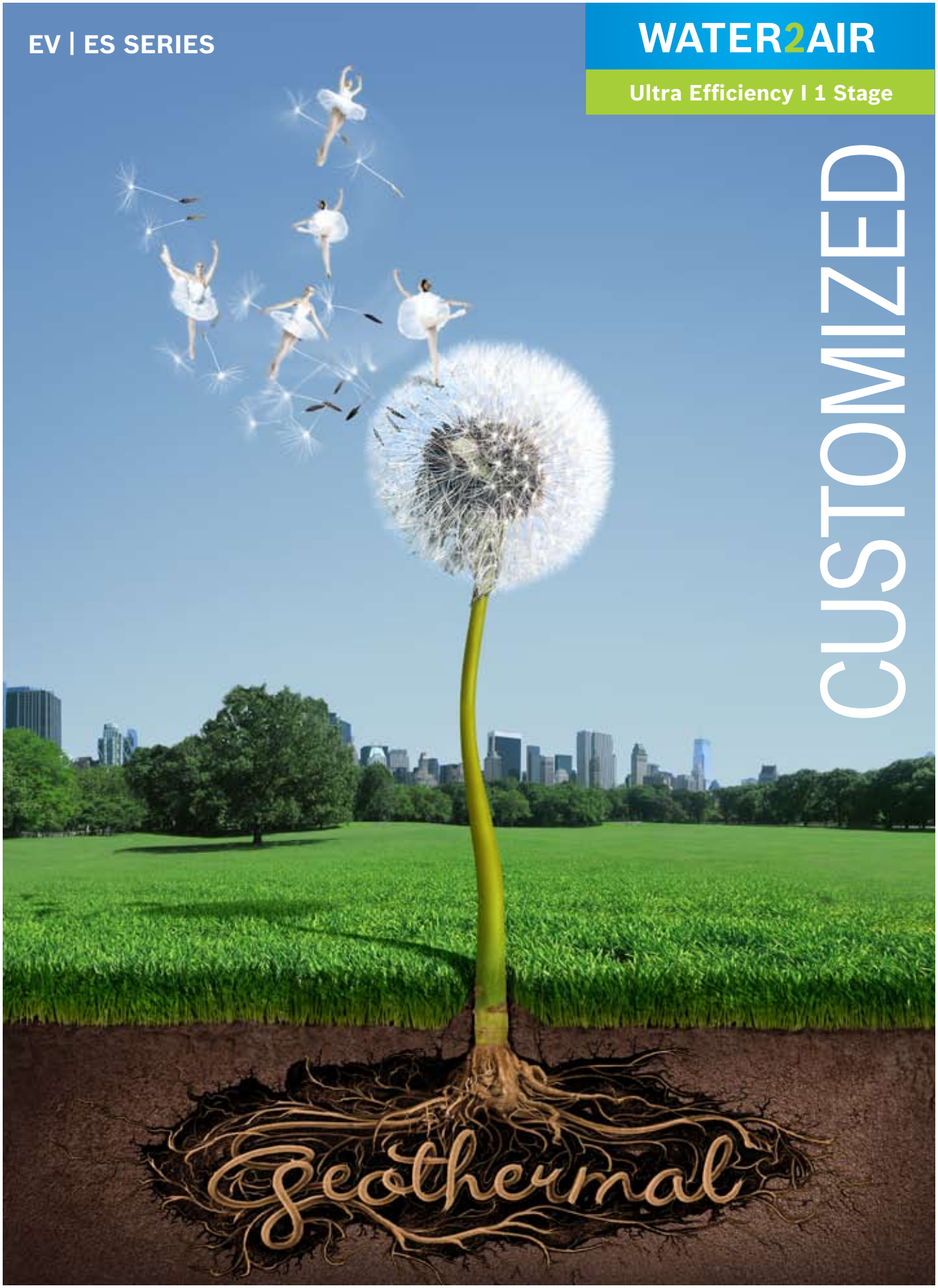
| MODEL | ARI / ISO 13256-1 PERFORMANCE DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ENTERING WATER TEMPERATURES | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| **AP025** | | | | | | | | | | | | |
| Part Load | 20,000 | 19.3 | 23,000 | 6.5 | 22,500 | 32.5 | 19,500 | 5.5 | 22,000 | 27.8 | 16,600 | 4.7 |
| Full Load | 27,000 | 16.2 | 32,500 | 5.3 | 31,000 | 25.1 | 26,500 | 4.8 | 28,500 | 19.2 | 20,400 | 4.1 |
| **AP035** | | | | | | | | | | | | |
| Part Load | 25,700 | 19.8 | 29,500 | 6.3 | 29,500 | 34.0 | 24,300 | 5.3 | 28,200 | 28.5 | 22,000 | 4.8 |
| Full Load | 36,600 | 16.0 | 43,000 | 5.1 | 41,200 | 23.5 | 36,200 | 4.7 | 38,200 | 18.4 | 28,200 | 4.1 |
| **AP049** | | | | | | | | | | | | |
| Part Load | 37,000 | 20.0 | 38,500 | 5.9 | 41,200 | 32.5 | 31,500 | 5.0 | 40,200 | 28.0 | 28,000 | 4.6 |
| Full Load | 50,000 | 16.9 | 53,000 | 5.2 | 56,000 | 24.0 | 45,500 | 4.8 | 52,000 | 19.0 | 38,000 | 4.1 |
| **AP061** | | | | | | | | | | | | |
| Part Load | 47,000 | 19.0 | 56,500 | 6.2 | 53,000 | 33.0 | 45,000 | 5.2 | 51,000 | 27.7 | 39,000 | 4.6 |
| Full Load | 64,000 | 16.2 | 78,500 | 5.4 | 71,000 | 23.8 | 65,000 | 5.0 | 67,000 | 18.5 | 49,000 | 4.1 |
| **AP071** | | | | | | | | | | | | |
| Part Load | 53,000 | 18.2 | 65,800 | 5.2 | 59,000 | 28.8 | 53,700 | 4.6 | 57,500 | 25.2 | 47,000 | 4.1 |
| Full Load | 72,000 | 16.0 | 89,000 | 5.2 | 78,000 | 21.8 | 73,000 | 4.7 | 74,000 | 18.0 | 58,000 | 4.1 |

EV | ES SERIES

# WATER2AIR

**Ultra Efficiency I 1 Stage**

CUSTOMIZED



- Horizontal
- Vertical
- Split Systems
- Counter-Flow

# EV SERIES

## Efficiency

Now you can help preserve the future of the planet as well as your economic future with this cost-effective choice. Our single-stage, ultra-efficient EV Series comes with a variety of options making it suitable for virtually any application.

## Quiet Operation

The EV Series has been designed for quiet operation with FHP's standard floating compressor base pan to keep sound to an absolute minimum.

## Environmentally Friendly

As a company, FHP strives to be as environmentally conscious as possible. Depletion of the ozone layer and global warming are both addressed by FHP's ultra-efficient products that will save you money on energy bills while reducing $CO_2$ emissions in the atmosphere.

## Quality

EV Series units feature coated evaporator coils and stainless steel drain pans as standard to ensure their long and trouble-free life. Rigorous factory testing virtually guarantees no hassle from the start while FHP's thirty years of experience in designing heat pumps is your assurance of a state of the art quality product. FHP's ISO 9001:2000 certified facilities provide consistent quality in every unit we build.


# Key Features

For complete description of features please refer to page 31

## Standard

- Coated Air Coils
- Four Sided Filter Rack
- Stainless Steel Drain Pan
- Filter Drier
- Floating Base
- TXV Valve
- PSC Motor
- Coaxial Heat Exchanger Copper
- Geothermal
- Scroll Compressor
- Unit Protection Module 1
- R410-A Refrigerant

## Optional

- Electrical Heater
- Coaxial Heat Exchanger Cupronickel
- Desuperheater
- DDC Controls
- Comfort Alert Diagnostics Module

# EV SERIES Technical Specifications


| MODEL | Horz. ( W x L x H ) | Vert. ( D x W x H ) |
|---|---|---|
| EV018 | 25.50x43.00x21.75 | 21.50x21.50x40.25 |
| EV024 | 25.50x43.00x21.75 | 21.50x21.50x40.25 |
| EV030 | 26.00x54.50x21.75 | 26.00x21.50x47.25 |
| EV036 | 26.00x54.50x21.75 | 26.00x21.50x47.25 |
| EV042 | 30.00x68.00x21.75 | 32.75x24.00x47.25 |
| EV048 | 30.00x68.00x21.75 | 32.75x24.00x47.25 |
| EV060 | 30.00x68.00x21.75 | 33.25x26.00x51.25 |
| EV070 | 30.00x78.00x21.75 | 33.25x26.00x58.25 |

| MODEL | ARI / ISO 13256-1 PERFORMANCE DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ENTERING WATER TEMPERATURES | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| EV018 | 18,500 | 14.5 | 24,000 | 5.4 | 22,000 | 25.4 | 19,000 | 4.3 | 19,500 | 18.5 | 14,500 | 3.4 |
| EV024 | 25,000 | 14.1 | 32,500 | 4.2 | 29,500 | 20.3 | 26,500 | 3.6 | 27,000 | 15.0 | 20,500 | 3.3 |
| EV030 | 30,000 | 15.5 | 33,500 | 4.7 | 34,500 | 24 | 27,500 | 4.1 | 31,000 | 18.0 | 22,000 | 3.4 |
| EV036 | 33,000 | 14.8 | 39,000 | 5.0 | 38,500 | 22.6 | 31,500 | 4.3 | 34,000 | 17.4 | 24,000 | 3.4 |
| EV042 | 43,000 | 13.5 | 47,000 | 4.6 | 47,000 | 20 | 39,000 | 4.0 | 44,500 | 15.3 | 30,500 | 3.3 |
| EV048 | 48,500 | 13.6 | 58,000 | 4.8 | 55,000 | 20.6 | 47,000 | 4.2 | 49,000 | 16.4 | 37,500 | 3.4 |
| EV060 | 57,500 | 13.0 | 66,000 | 4.3 | 68,000 | 19.2 | 56,000 | 3.8 | 60,000 | 15.0 | 45,000 | 3.3 |
| EV070 | 68,000 | 13.5 | 80,000 | 4.5 | 76,000 | 19.8 | 68,000 | 4.0 | 70,000 | 15.2 | 53,000 | 3.3 |

- Horizontal
- Vertical
- Split Systems
- Counter-Flow

# ES SERIES

## Efficiency

Plenty of options are available for the highly-customized ES Series allowing you to get the heat pump that best fits your needs at a cost-effective price. The ES Series comes with an ECM (Electronically Commutated Motor) fan that will provide additional energy savings and greater level of comfort in your living space. If airflow becomes restricted, the ECM will automatically adjust to restore full airflow ensuring peak performance of the unit and no loss of comfort.

## Quiet Operation

Both the Scroll Compressor and ECM have been engineered for sound reduction, making it one of the quietest units on the market today. With the standard FHP sound package, the compressor is mounted on a floating base pan that keeps sound levels to an absolute minimum.

## Environmentally Friendly

We are the industry's leader in developing environmentally friendly technology products. With the ES Series, you not only save money on energy bills but also help reduce global warming, as $CO_2$ emissions are minimal.

## Quality

Coated evaporator coils and stainless steel drain pans are standard for a long and trouble-free life. Rigorous factory testing virtually guarantees no hassle from the start while FHP's thirty years of experience in designing heat pumps is your assurance of a state of the art quality product. FHP's ISO 9001:2000 certified facilities provide consistent quality in every unit we build.


# Key Features

For complete description of features please refer to page 31

## Standard

- Coated Air Coils
- Four Sided Filter Rack
- Stainless Steel Drain Pan
- Filter Drier
- Floating Base
- TXV Valve
- R410-A Refrigerant
- ECM Motor
- Coaxial Heat Exchanger Copper
- Geothermal
- Scroll Compressor
- Unit Protection Module 1
- Motor Control Interface

## Optional

- Electrical Heater
- Coaxial Heat Exchanger Cupronickel
- Desuperheater
- DDC Controls
- Comfort Alert Diagnostics Module

# ES SERIES Technical Specifications


| MODEL | Horz. ( W x L x H ) | Vert. ( D x W x H ) |
|---|---|---|
| ES018 | 25.50x43.00x21.75 | 21.50x21.50x40.25 |
| ES024 | 25.50x43.00x21.75 | 21.50x21.50x40.25 |
| ES030 | 26.00x54.50x21.75 | 26.00x21.50x47.25 |
| ES036 | 26.00x54.50x21.75 | 26.00x21.50x47.25 |
| ES042 | 30.00x68.00x21.75 | 32.75x24.00x47.25 |
| ES048 | 30.00x68.00x21.75 | 32.75x24.00x47.25 |
| ES060 | 30.00x68.00x21.75 | 33.25x26.00x51.25 |
| ES070 | 30.00x78.00x21.75 | 33.25x26.00x58.25 |

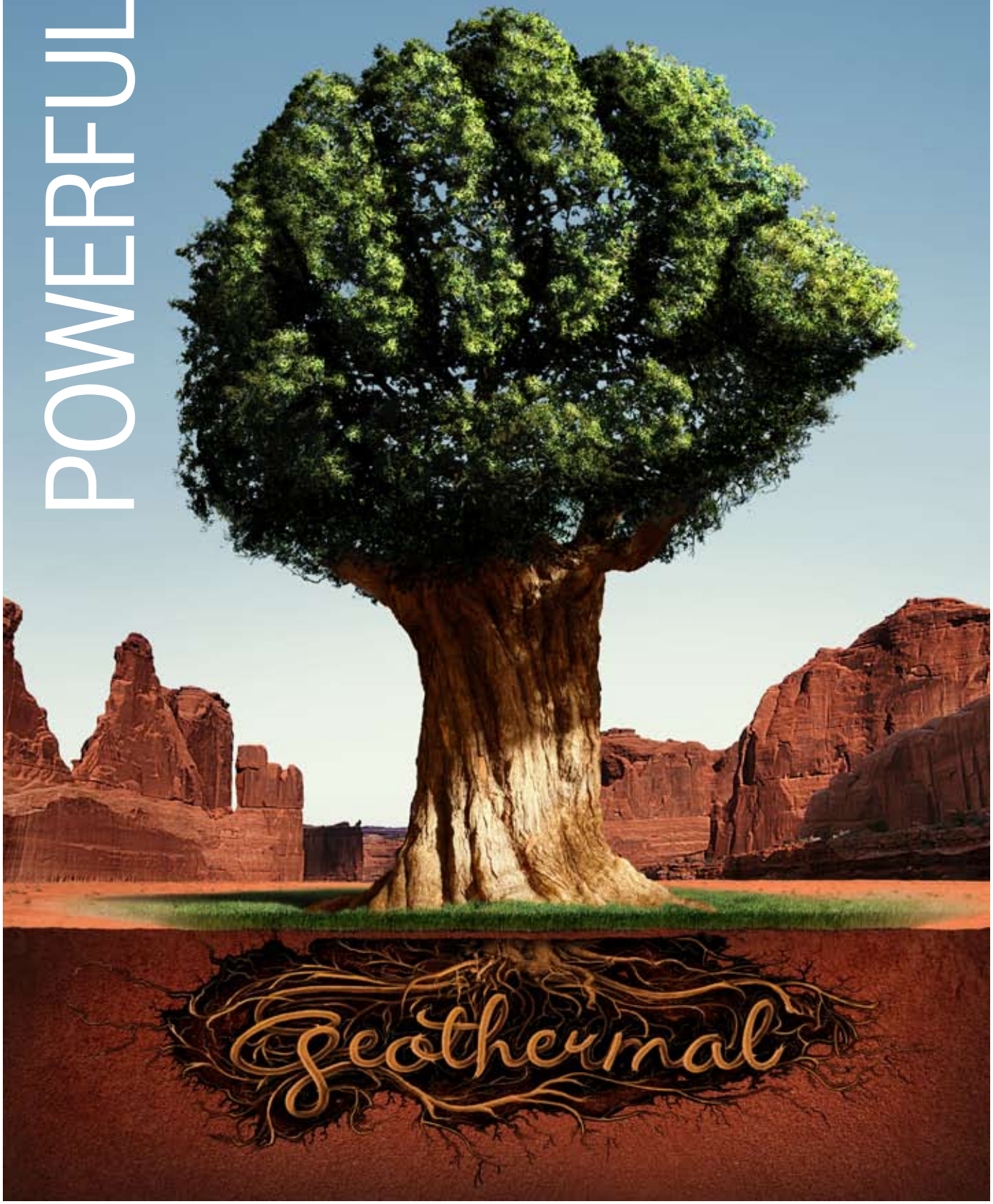
| MODEL | ARI / ISO 13256-1 PERFORMANCE DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ENTERING WATER TEMPERATURES | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| ES018 | 18,500 | 15.2 | 24,000 | 5.6 | 22,000 | 27.4 | 19,000 | 4.4 | 19,500 | 19.6 | 14,500 | 3.5 |
| ES024 | 25,000 | 14.2 | 32,500 | 4.3 | 29,500 | 21.9 | 26,500 | 3.7 | 27,000 | 15.9 | 20,500 | 3.4 |
| ES030 | 30,000 | 16.0 | 33,500 | 4.8 | 34,500 | 25 | 27,500 | 4.2 | 31,000 | 19.0 | 22,000 | 3.5 |
| ES036 | 33,000 | 15.6 | 39,000 | 5.2 | 38,500 | 23.9 | 31,500 | 4.4 | 34,000 | 19.0 | 24,000 | 3.5 |
| ES042 | 43,000 | 14.3 | 47,000 | 4.7 | 47,000 | 21.6 | 39,000 | 4.1 | 44,500 | 16.5 | 30,500 | 3.3 |
| ES048 | 48,500 | 14.3 | 58,000 | 4.9 | 55,000 | 21.6 | 47,000 | 4.3 | 49,000 | 17.2 | 37,500 | 3.5 |
| ES060 | 57,500 | 13.6 | 66,000 | 4.4 | 68,000 | 20.1 | 56,000 | 3.9 | 60,000 | 15.6 | 45,000 | 3.3 |
| ES070 | 68,000 | 14.0 | 80,000 | 4.6 | 76,000 | 20.3 | 68,000 | 4.1 | 70,000 | 15.6 | 53,000 | 3.3 |

# WATER2AIR

**Ultra Efficiency I 2 Stage**

**ES 2 STAGE SERIES**

POWERFUL



- Horizontal
- Vertical
- Split Systems
- Counter-Flow

# ES SERIES 2 STAGE

## Efficiency

Considered one of the industry's most ultra-efficient units, the ES 2 Stage Series provides you with powerful performance. In addition to the UltraTech™ Scroll Compressor, it comes equipped with an ECM (Electronically Commutated Motor) fan. The ECM is factory programmed to vary the airflow based on the stages of compressor operation resulting in additional energy savings up to 60% and a greater level of comfort in the living space.

## Quiet Operation

Both the UltraTech™ Scroll Compressor and ECM have been engineered for sound reduction making the ES 2 Stage Series one of the quietest ever. With the standard FHP sound package, the compressor is mounted on a floating base pan that reduces sound to an absolute minimum.

## Environmentally Friendly

We are the industry leader in the development of the environmentally friendly technology that is used in the design of the ES 2 Stage Series. This gives you protection from potentially skyrocketing maintenance costs associated with less environmentally friendly refrigerants used in other company's products.

## Quality

The ES 2 Stage Series units feature coated evaporator coils and stainless steel drain pans as standard to ensure a long and trouble-free life. Rigorous factory testing virtually guarantees no hassle from the start while FHP's thirty years of experience in designing heat pumps is your assurance of a state of the art quality product. FHP's ISO 9001:2000 certified facilities provide consistent quality in every unit we build.


# Key Features

For complete description of features please refer to page 31

## Standard

- Coated Air Coils
- Four Sided Filter Rack
- Stainless Steel Drain Pan
- Filter Drier
- Floating Base
- TXV Valve
- R410-A Refrigerant
- Coaxial Heat Exchanger Copper
- Geothermal
- Scroll Compressor 2 Stage
- Unit Protection Module 1
- Motor Control Interface
- ECM Motor

## Optional

- Electrical Heater
- Coaxial Heat Exchanger Cupronickel
- Desuperheater
- DDC Controls
- Comfort Alert Diagnostics Module

# ES SERIES 2 STAGE Technical Specifications


| MODEL | Horz. ( W x L x H ) | Vert. ( D x W x H ) |
|---|---|---|
| ES025 | 26.00x54.50x21.75 | 26.00x21.50x47.25 |
| ES035 | 26.00x54.50x21.75 | 26.00x21.50x47.25 |
| ES049 | 30.00x68.00x21.75 | 32.75x24.00x47.25 |
| ES061 | 30.00x68.00x21.75 | 33.25x26.00x51.25 |
| ES071 | 30.00x78.00x21.75 | 33.25x26.00x58.25 |

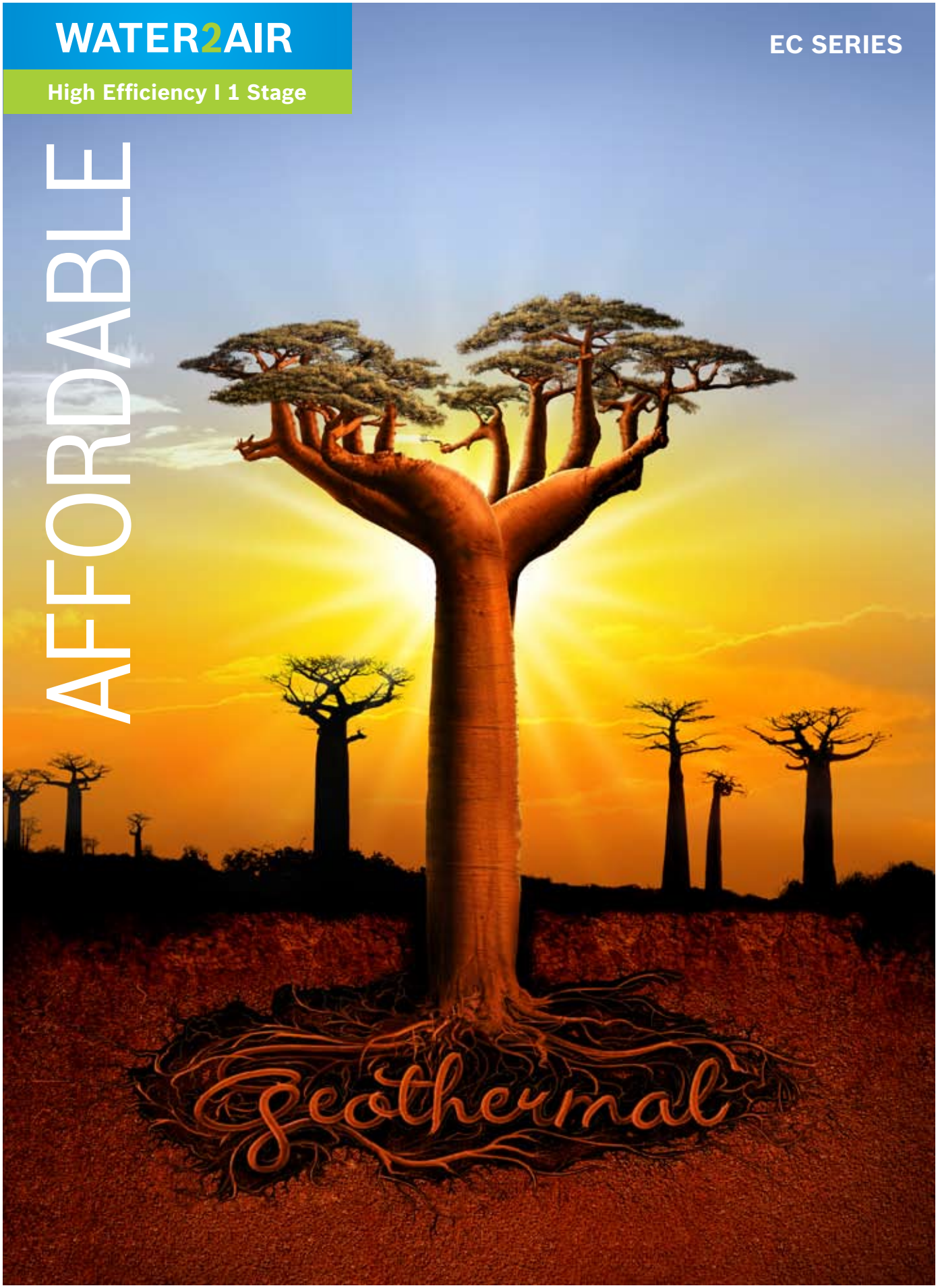
| MODEL | ARI / ISO 13256-1 PERFORMANCE DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ENTERING WATER TEMPERATURES | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| **ES025** | | | | | | | | | | | | |
| Part Load | 18,800 | 17.5 | 20,500 | 5.1 | 21,000 | 30.0 | 18,000 | 4.6 | 20,000 | 24.5 | 15,500 | 4.0 |
| Full Load | 26,000 | 16.0 | 30,000 | 5.0 | 29,000 | 24.0 | 25,000 | 4.6 | 27,500 | 18.7 | 19,000 | 3.8 |
| **ES035** | | | | | | | | | | | | |
| Part Load | 24,000 | 17.0 | 27,000 | 5.3 | 27,000 | 28.0 | 22,500 | 4.5 | 27,000 | 24.5 | 20,500 | 4.0 |
| Full Load | 36,000 | 14.6 | 43,000 | 4.8 | 42,000 | 21.6 | 36,000 | 4.2 | 38,000 | 17.2 | 28,000 | 3.8 |
| **ES049** | | | | | | | | | | | | |
| Part Load | 34,000 | 16.0 | 39,000 | 5.4 | 38,000 | 24.0 | 32,000 | 4.6 | 36,000 | 21.8 | 28,500 | 4.0 |
| Full Load | 48,000 | 13.5 | 58,000 | 4.8 | 54,000 | 19.0 | 48,000 | 4.2 | 49,000 | 15.5 | 38,000 | 3.6 |
| **ES061** | | | | | | | | | | | | |
| Part Load | 42,000 | 17.0 | 48,000 | 5.4 | 48,000 | 26.0 | 40,000 | 4.6 | 45,000 | 23.5 | 36,500 | 4.0 |
| Full Load | 60,000 | 14.0 | 72,000 | 4.7 | 68,000 | 19.7 | 61,000 | 4.3 | 62,000 | 15.7 | 49,000 | 3.6 |
| **ES071** | | | | | | | | | | | | |
| Part Load | 51,000 | 15.8 | 55,000 | 4.4 | 57,000 | 25.2 | 47,000 | 4.0 | 56,000 | 21.8 | 42,000 | 3.6 |
| Full Load | 72,000 | 14.5 | 80,000 | 4.5 | 77,000 | 19.6 | 68,000 | 4.2 | 74,000 | 16.3 | 53,000 | 3.7 |

# WATER2AIR

**High Efficiency I 1 Stage**

**EC SERIES**

AFFORDABLE



- Horizontal
- Vertical
- Split Systems
- Counter-Flow

# EC SERIES

## Efficiency

The Single stage EC series with high efficiency makes water source technology affordable for your home. Available from 1/2 to 6 tons in various configurations, there is a unit to meet your every need. When equipped with the “Extended Range Option”, the unit is suitable for geothermal applications.

## Quiet Operation

The EC Series comes with FHP’s unique sound package, the floating compressor base pan and to keep sound to an absolute minimum.

## Environmentally Friendly

These highly efficient units, equipped with the geothermal option not only will reduce your operating costs but play their part in reducing $CO_2$ emissions, a leading cause of global warming.

## Quality

Rigorous factory testing virtually guarantees no hassle from the start while FHP’s thirty years of experience in designing heat pumps is your assurance of a state of the art quality product. FHP’s ISO 9001:2000 certified facilities provide consistent quality in every unit we build.


# Key Features

For complete description of features please refer to page 31

## Standard

- Coated Air Coils
- Stainless Steel Drain Pan
- Filter Drier
- Floating Base
- PSC Motor
- Coaxial Heat Exchanger Copper
- Unit Protection Module 1
- R410-A Refrigerant

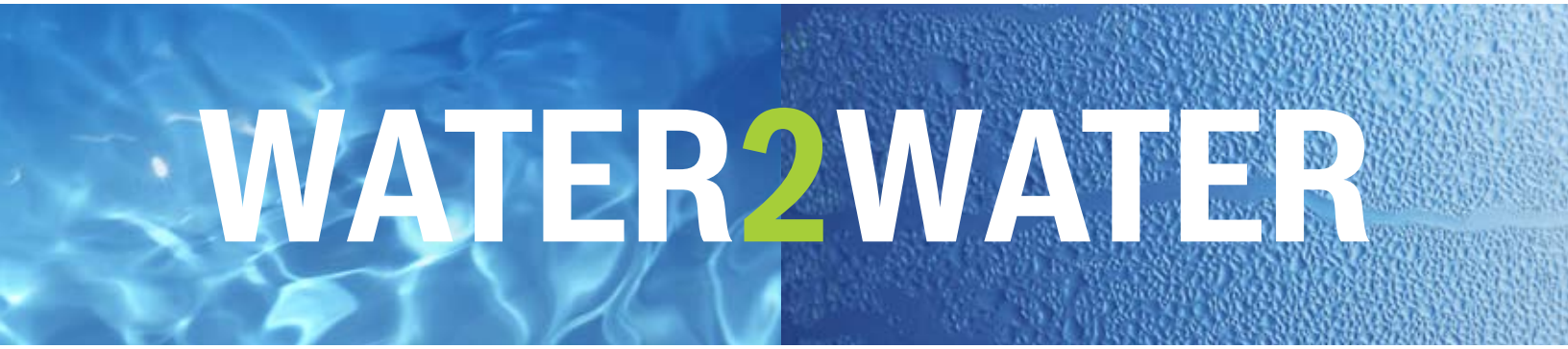
## Optional

- Hot Gas Bypass
- Hot Gas Reheat
- TXV Valve
- Coaxial Heat Exchanger Cupronickel
- Desuperheater
- DDC Controls
- Geothermal
- Comfort Alert Diagnostics Module

# EC SERIES Technical Specifications

| MODEL | Horz. (W x L x H) | Vert. (D x W x H) |
|---|---|---|
| EC007 | 19.00x31.00x13.25 | 19.00x19.00x24.25 |
| EC009 | 19.00x31.00x13.25 | 19.00x19.00x24.25 |
| EC012 | 19.00x31.00x13.25 | 19.00x19.00x24.25 |
| EC015 | 21.50x43.00x17.00 | 21.50x21.50x32.25 |
| EC018 | 21.50x43.00x17.00 | 21.50x21.50x32.25 |
| EC024 | 21.50x43.00x19.00 | 21.50x21.50x36.25 |
| EC030 | 22.00x45.00x19.00 | 21.50x21.50x39.25 |
| EC036 | 22.00x54.50x19.00 | 26.00x21.50x43.25 |
| EC041 | 21.50x43.00x22.00 | 21.50x21.50x39.25 |
| EC042 | 22.00x54.50x19.00 | 26.00x21.50x43.25 |
| EC048 | 36.00x43.00x21.00 | 32.50x24.00x45.25 |
| EC051 | N/A | 26.00x26.00x43.25 |
| EC060 | 36.00x43.00x21.00 | 32.50x24.00x45.25 |
| EC061 | N/A | 26.00x26.00x43.25 |
| EC070 | 26.00x78.00x21.75 | 33.25x26.00x58.25 |


| MODEL | ARI / ISO 13256-1 PERFORMANCE DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ENTERING WATER TEMPERATURES | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| EC007 | 6,200 | 12.5 | 8,000 | 5.1 | 7,200 | 20.0 | 6,000 | 4.0 | 6,500 | 15.0 | 4,500 | 3.2 |
| EC009 | 7,800 | 13.7 | 11,400 | 4.7 | 9,000 | 20.0 | 8,600 | 3.8 | 8,100 | 14.8 | 6,400 | 3.2 |
| EC012 | 11,000 | 13.0 | 14,500 | 4.5 | 12,400 | 19.0 | 11,500 | 3.6 | 11,500 | 14.5 | 8,700 | 3.1 |
| EC015 | 14,000 | 13.0 | 18,000 | 4.6 | 15,800 | 19.0 | 13,500 | 3.8 | 14,500 | 15.0 | 10,100 | 3.3 |
| EC018 | 18,500 | 13.0 | 24,000 | 4.4 | 21,400 | 19.0 | 18,000 | 3.8 | 19,800 | 14.1 | 13,400 | 3.3 |
| EC024 | 25,000 | 13.8 | 30,000 | 4.5 | 28,200 | 20.6 | 23,800 | 3.8 | 26 ,500 | 15.2 | 17,900 | 3.3 |
| EC030 | 29,000 | 13.0 | 35,000 | 4.3 | 33,000 | 18.6 | 28,400 | 3.8 | 31,000 | 14.4 | 21,000 | 3.3 |
| EC036 | 36,000 | 13.8 | 46,000 | 4.5 | 40,200 | 19.5 | 36,200 | 4.0 | 37,800 | 15.5 | 27,400 | 3.3 |
| EC041 | 38,000 | 12.5 | 49,000 | 4.2 | 40,400 | 16.1 | 39,000 | 3.7 | 39,200 | 14.1 | 28,500 | 3.1 |
| EC042 | 42,000 | 13.0 | 53,000 | 4.2 | 44,500 | 18.5 | 42,000 | 3.8 | 43,800 | 14.2 | 32,200 | 3.3 |
| EC048 | 48,000 | 14.0 | 58,000 | 4.8 | 58,000 | 20.6 | 46,600 | 4.2 | 52,000 | 15.4 | 36,800 | 3.5 |
| EC051 | 47,500 | 13.8 | 53,500 | 4.7 | 58,000 | 20.6 | 46,600 | 4.2 | 51,000 | 15.5 | 37,800 | 3.6 |
| EC060 | 62,000 | 13.2 | 79,000 | 4.4 | 67,000 | 18.3 | 61,500 | 3.9 | 63,600 | 14.7 | 50,000 | 3.3 |
| EC061 | 59,000 | 13.9 | 68,000 | 4.6 | 63,000 | 19.7 | 55,400 | 4.1 | 61,000 | 15.8 | 44,600 | 3.5 |
| EC070 | 68,000 | 13.5 | 80,000 | 4.5 | 76,000 | 19.8 | 68,000 | 4.0 | 70,000 | 15.2 | 53,000 | 3.3 |

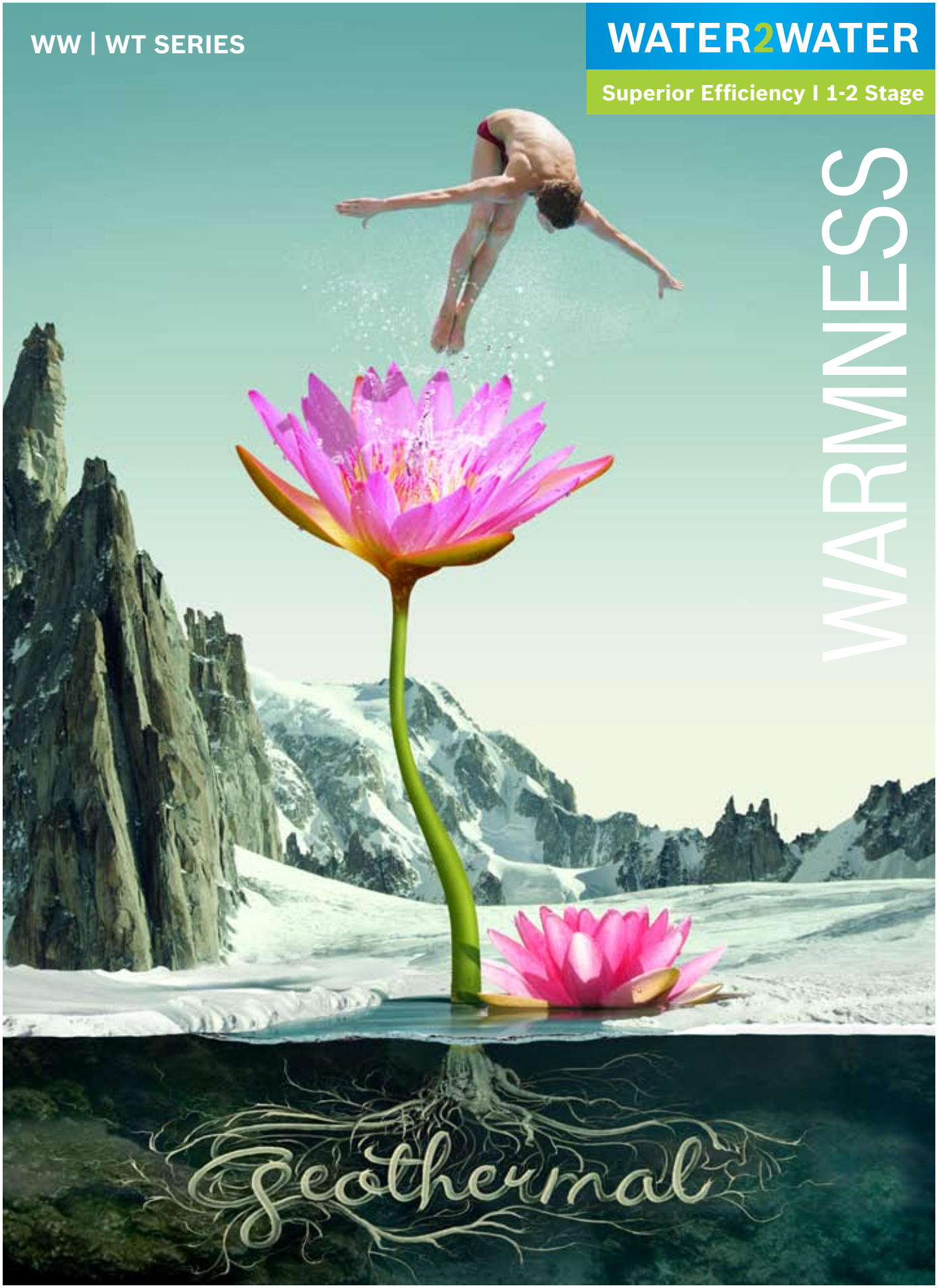

WATER2WATER

WW | WT SERIES

# WATER2WATER

**Superior Efficiency I 1-2 Stage**

WARMNESS




# WW SERIES

## Efficiency

Our single-stage WW Series water-cooled modular reverse cycle chillers are designed to meet all of your requirements. The WW Series can be utilized for hydronic heating, make-up air applications or swimming pool heating just to mention a few of the potential heating applications. The modular design gives you the flexibility to install units individually or in any combination to match the exact load requirement.

## Quiet Operation

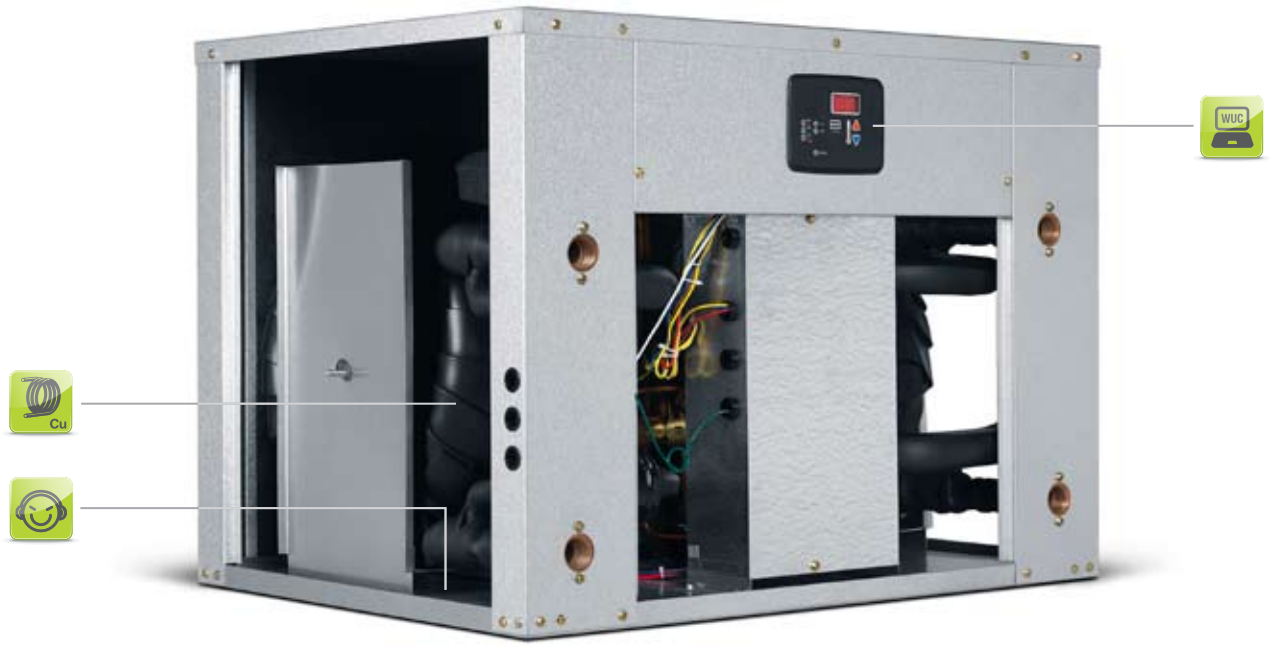
Our chillers have a fraction of the refrigerant charge of central station chillers and operate at a significantly reduced sound level. Its floating compressor base pan reduces sound to a minimum.

## Environmentally Friendly

These highly efficient units not only will reduce your operating costs but play their part in reducing carbon dioxide emissions, a leading cause of global warming.

## Quality

Rigorous factory testing virtually guarantees no hassle from the start while FHP's thirty years of experience in designing heat pumps is your assurance of a state of the art quality product. FHP's ISO 9001:2000 certified facilities provide consistent quality in every unit we build.




# Key Features

For complete description of features please refer to page 31

## Standard

- Geothermal
- Scroll Compressor
- R410-A Refrigerant
- Coaxial Heat Exchanger Copper
- Floating Base
- Comfort Alert Diagnostics Module
- Unit Protection Module 1

## Optional

- Coaxial Heat Exchanger Cupronickel
- Solid State Water to Water Unit Control
- Desuperheater

# WW SERIES Technical Specifications


| MODEL | (WxLxH) |
|---|---|
| WW024 | 32.50x24.00x24.25 |
| WW036 | 32.50x24.00x24.25 |
| WW048 | 32.50x24.00x24.25 |
| WW060 | 32.50x24.00x24.25 |
| WW072 | 32.50x24.00x24.25 |
| WW122 | 28.00x46.00x32.00 |

| MODEL | ALL UNITS RATED IN ACCORDANCE WITH AHRI/ISO/ASHRAE/ANSI 13256-2 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOAD TEMPERATURE | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 53.6°F | | 104°F | | 53.6°F | | 104°F | | 53.6°F | | 104°F | |
| | SOURCE TEMPERATURE | | | | | | | | | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| WW024 | 23,900 | 12.8 | 35,000 | 4.3 | 26,500 | 20.0 | 29,000 | 3.6 | 25,000 | 14.9 | 23,500 | 3.0 |
| WW036 | 25,500 | 13.3 | 37,000 | 4.4 | 28,500 | 20.9 | 30,000 | 3.7 | 26,500 | 15.5 | 24,500 | 3.0 |
| WW048 | 39,300 | 12.8 | 57,000 | 4.3 | 44,000 | 19.9 | 47,000 | 3.6 | 41,000 | 14.8 | 38,500 | 2.9 |
| WW060 | 51,300 | 12.7 | 75,500 | 4.4 | 56,000 | 19.2 | 62,000 | 3.6 | 53,000 | 14.6 | 50,500 | 3.0 |
| WW072 | 55,100 | 13.2 | 80,000 | 4.4 | 61,000 | 20.4 | 65,000 | 3.6 | 57,500 | 15.3 | 52,000 | 2.9 |
| WW122 | 114,600 | 13.3 | 168,000 | 4.5 | 127,000 | 20.5 | 135,500 | 3.6 | 119,500 | 15.5 | 108,000 | 2.9 |


# WT SERIES

## Efficiency

The WT Series water to water heat pump is the industry first two-stage reverse cycle chiller water heater designed specially to meet the cooling and heating needs of today's high end hydronic systems. While the WT Series boasts industry leading efficiency at full load heating and cooling, it is even more efficient at part load. Unless peak capacity is required, it can run at roughly 2/3 capacity but at significantly higher efficiencies to maintain maximum comfort with minimum energy use.

## Quiet Operation

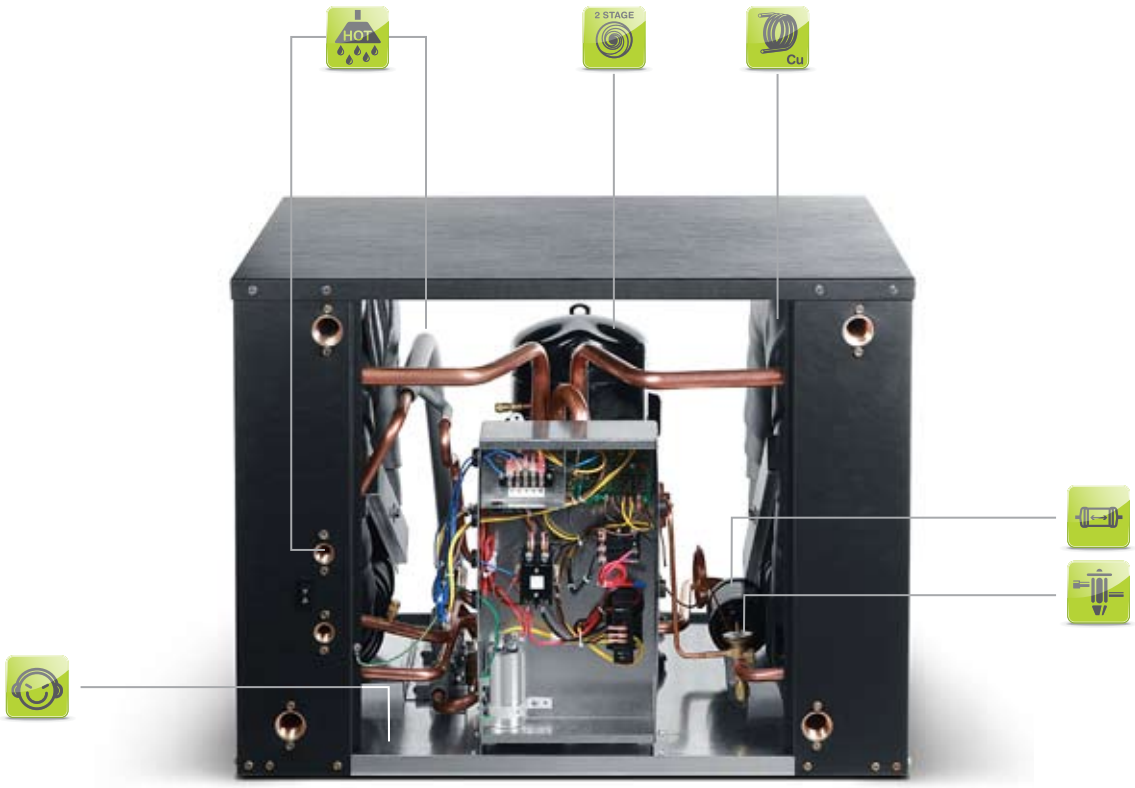
The WT Series employs a number of features to insure that it will provide comfort quietly. The entire refrigerant system is supported by a heavy gauge base that floats on a unique high density visco-elastic sound barrier. The compressor is covered in a multi density sound blanket and the heavy gauge steel cabinet is fully insulated. When employed as the heat source for radiant floor systems, this unit becomes the heart of the quietest system available.

## Environmentally Friendly

We are committed to environmentally friendly technologies and the WT Series is just the latest example of this philosophy and passion; not only reducing greenhouse gasses through efficient operation but also employing the ozone friendly refrigerant, R-410a. Furthermore, we do not use any paints, glues or solvents that can harm the environment.

## Quality

The WT Series features a multi density sound blanket, a heavy gauge base with floating base pan and a black vinyl coated cabinet as standard to ensure a long trouble free life of the unit. Rigorous factory testing virtually guarantees no hassle from the start while FHP's thirty years of experience in designing heat pumps is your assurance of a state of the art quality product. FHP's ISO 9001:2000 certified facilities provide consistent quality in every unit we build.




# Key Features

For complete description of features please refer to page 31

## Standard

- Geothermal
- Scroll Compressor 2 Stage
- R410-A Refrigerant
- Coaxial Heat Exchanger Copper
- Floating Base
- TXV Valve
- Unit Protection Module 1
- Comfort Alert Diagnostics Module
- Filter Drier

## Optional

- Coaxial Heat Exchanger Cupronickel
- Solid State Water to Water Unit Control
- Desuperheater

# WT SERIES Technical Specifications

| MODEL | (W x L x H) |
|---|---|
| WT025 | 32.50 x 24.00 x 24.00 |
| WT035 | 32.50 x 24.00 x 24.00 |
| WT049 | 32.50 x 24.00 x 24.00 |
| WT061 | 32.50 x 24.00 x 24.00 |
| WT071 | 32.50 x 24.00 x 24.00 |


| MODEL | ALL UNITS RATED IN ACCORDANCE WITH AHRI/ISO/ASHRAE/ANSI 13256-2 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOAD TEMPERATURE | | | | | | | | | | | |
| | Water Loop (WLHP) | | | | Ground Water (GWHP) | | | | Ground Loop (GLHP) | | | |
| | 53.6°F | | 104°F | | 53.6°F | | 104°F | | 53.6°F | | 104°F | |
| | SOURCE TEMPERATURE | | | | | | | | | | | |
| | 86°F | | 68°F | | 59°F | | 50°F | | 77°F | | 32°F | |
| | CAPACITY AND EFFICIENCY DATA | | | | | | | | | | | |
| | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP | COOLING CAPACITY | EER | HEATING CAPACITY | COP |
| **WT025** | | | | | | | | | | | | |
| **Part Load** | 15,500 | 14.7 | 22,000 | 4.6 | 18,500 | 25.7 | 17,000 | 3.7 | 18,000 | 22.1 | 15,500 | 3.1 |
| **Full Load** | 21,000 | 13.4 | 31,000 | 4.4 | 24,500 | 21.2 | 25,000 | 3.6 | 22,500 | 15.9 | 19,500 | 2.8 |
| **WT035** | | | | | | | | | | | | |
| **Part Load** | 22,500 | 14.5 | 31,000 | 4.7 | 25,500 | 24.5 | 25,000 | 3.6 | 24,000 | 20.6 | 22,000 | 3.1 |
| **Full Load** | 29,000 | 12.6 | 43,000 | 4.3 | 34,000 | 20.2 | 34,000 | 3.5 | 30,000 | 14.5 | 27,000 | 2.8 |
| **WT049** | | | | | | | | | | | | |
| **Part Load** | 29,000 | 13.8 | 42,000 | 4.5 | 33,500 | 23.5 | 34,500 | 3.8 | 32,500 | 20.1 | 30,500 | 3.2 |
| **Full Load** | 39,000 | 12.8 | 58,000 | 4.1 | 45,000 | 19.7 | 47,000 | 3.6 | 41,000 | 14.9 | 37,500 | 2.9 |
| **WT061** | | | | | | | | | | | | |
| **Part Load** | 37,000 | 14.2 | 55,000 | 4.7 | 42,500 | 23.3 | 41,500 | 3.6 | 41,000 | 19.8 | 36,500 | 3.0 |
| **Full Load** | 49,000 | 12.9 | 74,500 | 4.2 | 56,000 | 19.9 | 59,000 | 3.4 | 51,000 | 14.8 | 44,500 | 2.7 |
| **WT071** | | | | | | | | | | | | |
| **Part Load** | 43,500 | 13.5 | 65,500 | 4.4 | 50,500 | 21.8 | 52,000 | 3.5 | 48,500 | 18.7 | 45,000 | 3.1 |
| **Full Load** | 57,500 | 12.4 | 86,500 | 4.1 | 64,000 | 18.8 | 70,000 | 3.4 | 60,000 | 14.8 | 53,000 | 2.9 |

# BOSCH GREEN HOUSE

## Reinventing Energy Efficiency

### Buderus Controls

We supply a wide selection of advanced controls to ensure that your heating and domestic hot water system delivers high efficiency and reliable heating year after year. Buderus controls are designed to allow the heating engineer quick and easy access to all functions of the boiler and the heating system.

### Solar Bosch Systems

Bosch solar hot water solutions take the first class technology, innovation, reliability, quality, and environmental consciousness Bosch is known world-wide for to the next level. They are designed for great energy efficiency, especially when combined with a Bosch high-efficiency tankless water heater as back-up. There is no better choice for your home than a solar thermal system from Bosch to reduce your energy expenses and your carbon footprint.

### Bosch Tankless Water Heater

If you are building your new dream home- or simply remodeling your current home, there's a BOSCH tankless water heater ideal for your needs. Every unit deliveries the highest efficiency in the market and it's built it the top quality BOSCH standards. With a BOSCH tankless water heater you will get an endless supply of hot water and can save about half the cost of your current water heating bill.

### FHP Heat Pumps

Our high efficient water source heat pumps systems provide the most flexible and lowest installation costs of virtually any HVAC system. These systems are the most energy and cost efficient systems on the market and therefore the greenest technology and the smartest investment for commercial heating and cooling applications.

### Buderus Boilers

Our extensive boiler range includes energy efficient cast iron boilers, stainless steel boilers, as well as the very latest aluminum condensing boilers and multiple-boiler cascade systems for maximum energy efficiency.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