



# RESIDENTIAL PRODUCT GUIDE

**CLIMATEMASTER®** GEOTHERMAL HEATING & COOLING

DECLARE YOUR PERSONAL ENERGY INDEPENDENCE

## THE GEOTHERMAL ADVANTAGE



According to the U.S. Environmental Protection Agency (EPA) geothermal systems are, "the most energy-efficient, environmentally clean, and cost-effective space conditioning systems available today." Extremely high levels of efficiency are possible because a geothermal heat pump only uses electricity to move heat, not produce it. A geothermal unit typically supplies 4 kilowatts of heat for every kilowatt of electricity used. Three

of these kilowatts of heat come directly from the earth itself, and are clean, free and renewable. Geothermal heat pumps also take advantage of the mild ground temperature for extremely high efficiency cooling. Most systems also include a hot water generator, which diverts a portion of the supplied heat to the domestic water heater. This provides a substantial portion of a family's hot water needs at a very low cost. Overall, geothermal technology offers the highest cooling and heating efficiencies of any system available today.

Geothermal systems transfer heat from your home to the earth in the cooling mode, or from the earth to your home in the heating mode. Water is used as the heat transfer medium through a closed-loop piping system buried in the ground. By using this stable thermal source, geothermal heat pumps provide energy efficient comfort year round with a factory-tested and sealed packaged unit, without the need for a noisy outdoor fan, or a flue.

The environmental advantages of geothermal systems have caught the eye of governmental agencies such as the Environmental Protection Agency (EPA) and the Department of Energy (DOE). Because geothermal technology is lowest in CO<sub>2</sub> emissions, it provides a solution to global warming by primarily using the natural energy of the earth. EarthPure® (HFC-410A) zero ozone depletion refrigerant is available for ClimateMaster Geothermal Heat Pumps for an even friendlier system.



Tranquility® 30 Vertical Geothermal Heat Pump with EarthPure® Zero Ozone Depletion Refrigerant

There are two types of geothermal systems commonly installed in North America, closed-loop geothermal, and open-loop (well water systems) geothermal. Both types of systems work well and achieve very similar operating costs. An open-loop system is less expensive to install, but over time could require more maintenance. A closed-loop system is more expensive up front, but requires almost no maintenance.

Closed-loop systems use a network of buried high-density polyethylene (plastic) pipe, circulating a water/antifreeze solution from the ground to the heat pump. These systems are sealed and pressured, and thus recirculate the fluid, eliminating any water usage. Polyethylene pipe is always utilized to ensure long life and system reliability. Milk jugs are made from polyethylene. Polyethylene is a very tough plastic, especially when considering the wall thickness of a milk jug (pipe wall thickness is many times greater), but it is also extremely flexible, which allows the pipe to avoid damage even as the ground shifts. All connections are heat fused, which is a welding process, whereby the pipe and fitting are heated up to the melting point, around 500°F [260°C]. The two pieces are joined together while the plastic is still in its molten state. Once cooled, the joint is stronger than the pipe itself. Therefore, leak potential of the in-ground piping is nearly nonexistent. Properly installed, loop piping will last more than 50 years.

Closed-loop systems may be installed in a variety of configurations, depending upon the size of the yard and local excavation costs. A horizontal loop is typically installed with a trencher or backhoe. Trenches are normally four to six feet deep [1.2–1.8 meters]. One of the advantages of a horizontal loop system is being able to lay the trenches according to the shape of the land. As a rule of thumb, 125–300 feet of trench is required per ton of heat pump capacity [11–27 meters per kW of capacity], depending on geographic location. Anywhere from 1 to 6 pipes per trench may be used, depending upon the optimal design for the yard. More pipe per trench shortens the total amount of trench required.

For smaller yards, the loops can be installed vertically using a drill rig, much like a water well installation. Holes are bored to about 150–300 feet per ton of heat pump capacity [13–27 meters per kW of capacity]. U-shaped loops of pipe are inserted in the holes. The holes are then backfilled with a sealing solution (grouting material). Vertical and horizontal loops perform very similarly, and therefore are selected based upon the individual preference and yard layout.

Pond or lake loops are another type of closed-loop system, which is very cost effective, since excavation is limited to the trenching between the home and the pond/lake. Pond loops are still closed-loop systems. Polyethylene pipe is sunk at the bottom of the pond, and fluid is circulated through the pipe to exchange heat between the geothermal heat pump and the body of water. Using pond water directly is never recommended. A minimum of 8–10 feet [2.5–3 meters] in depth at its lowest level during the year is needed for a pond to be considered. Generally, a minimum of 1/2 acre [0.2 hectare] pond is required to provide adequate surface area for heat transfer.

The antifreeze solution in a closed-loop system will keep it from freezing down to about 15°F [-9°C]. In the U.S. and Canada, three types of antifreeze solution are acceptable: propylene glycol, methyl alcohol, and ethyl alcohol. Some states/provinces may require one type over another.

# THE GEOTHERMAL ADVANTAGE

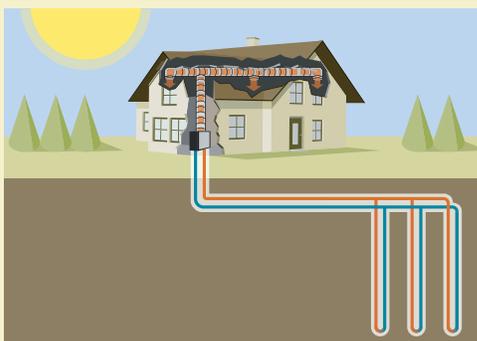
The term "Open-loop" is commonly used to describe a geothermal heat pump system that uses groundwater from a conventional well as a heat source in winter and a heat sink in summer. The groundwater is pumped through the heat pump where heat is extracted (in winter) or rejected (in summer), then the water is disposed of in an appropriate manner. Since groundwater is at a relatively constant temperature year-round, it is an excellent heat source/heat sink.

There are a number of ways to dispose of water after it has passed through the heat pump in an open-loop application. The open discharge method is the easiest and least expensive. Open discharge simply involves releasing the water into a stream, river, lake, pond, ditch, or drainage tile. Obviously, one of these alternatives must be readily available and must possess the capacity to accept the amount of water used by the heat pump before open discharge is feasible.

A second means of water discharge is the return well. A return well is a second well bore that returns the water to the ground aquifer. A return well must have enough capacity to dispose of the water passed through the heat pump. A new return well should be installed by a qualified well driller. Likewise, a professional should test the capacity of an existing well before it is used as a return.

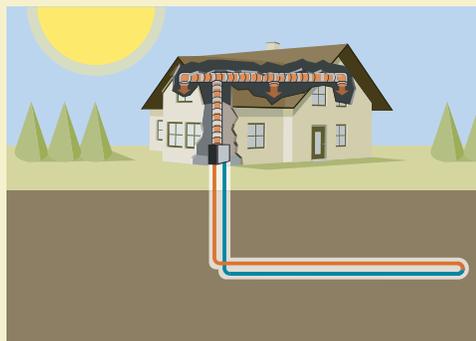
No matter which type of geothermal system is installed, homeowners benefit from the most comfortable system available, while saving money on operating costs and helping the environment. Today's geothermal systems are unmatched in comfort. State-of-the-art two-stage compressors, variable speed fans and microprocessor controls adjust the heating and cooling capacity based upon the current weather conditions. No matter what the temperature is outside, geothermal systems are always taking advantage of the mild ground temperature year round.

## Vertical (Drilled) Closed Loop



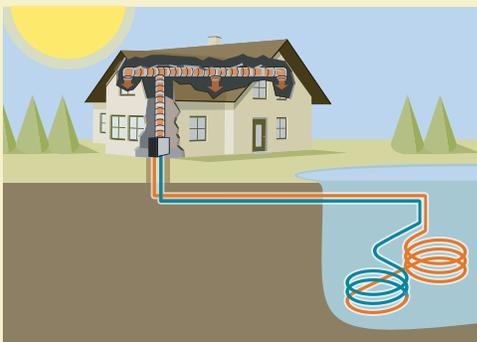
Vertical Loops are used extensively where land area is limited or soil conditions prohibit digging horizontal loops. A pair of pipes with a special U-Bend assembly at the bottom are inserted into a bore hole that averages between 150 to 300 feet deep per ton [13 to 27 meters per kW] of equipment. These holes are then backfilled with a special grout solution to ensure good contact with the earth.

## Horizontal (Trenched or Bored) Loop



Horizontal Loops are installed in areas where the soil conditions allow for economical excavation. Taking up more land area than any other loop type, they are used where space permits. Trenches are normally about 4 to 6 feet [1.2 to 1.8 meters] deep with multiple pipes placed in the trench at different depths. Normally, several hundred feet [over 100 meters] of trench is required, but where space permits these loops are considered desirable.

## Pond/Lake Loop



Pond Loops are usually very economical to install. If a pond or lake at least eight feet [2.5 meters] deep is available, pond loops can utilize the water (rather than soil) to transfer heat to and from the pond. A coiled pipe is placed in the water, which should cover about 1/2 acre [0.2 hectare]. An average home would require about 900 feet [27 meters] of pipe. Reduced installation costs and high performance are characteristic of this type of loop.

## Open Loop



Open-loop installations actually pump water from an underground aquifer through the geothermal unit and then discharge that water to a drainage ditch or pond. The geothermal unit processes the heat energy from the water just like a closed-loop installation. Discharging water to a "return" well is sometimes effective, but sending water to a pond or lake is considered more reliable.

## THE CLIMATEMASTER ADVANTAGE

### Who is ClimateMaster?

ClimateMaster emerged from the marriage of several water-source heat pump companies in a blending of strengths to form a focused organization. For over 50 years, we have been focused on enhancing business and home environments around the world. Our mission as the world's largest and most progressive leader in the water-source and geothermal heat pump industry reveals our commitment to excellence—not only in the design and manufacture of our products, but in our people and services.

### Made in the USA

All of ClimateMaster's 610,000 square feet in facilities operate in Oklahoma City, Oklahoma, which means ClimateMaster units are manufactured in the United States using American labor. While the trend nationally is to outsource labor outside the United States, ClimateMaster has made the commitment to remain proudly American made.

### ClimateMaster Design

From concept to product, ClimateMaster's Integrated Product Development Team brings a fusion of knowledge and creativity that is unmatched in the industry today. Drawing from every aspect of our business: Engineering, Sales, Marketing, and Manufacturing, our Development Team has created some of the most advanced, efficient, and versatile products available.

### Innovation, Concept, Needs

Great products are born from necessity. Whether it is a need to reduce sound, fit in a smaller space, make easier to service, achieve better efficiencies, or due to changing technologies, or new government regulations, ClimateMaster leads the industry in advancing the form, fit and function of water-source and geothermal heat pumps. Our design team continually strives for even the slightest improvement to our products. It is this continual drive for excellence that sets ClimateMaster apart from all other manufacturers.



### Start To Finish

At ClimateMaster, every product development project begins with a comprehensive set of specifications. These specifications are a culmination of input from the market, a specific need, or a number of other factors. From these detailed specifications, prototypes are constructed and testing begins. After a rigorous testing period in ClimateMaster's own state-of-the-art lab facility, the data is compared to the project specifications. Once the design team is satisfied that all of the specs are met, the unit is sent to the Production Department for pilot runs. After the pilot runs are completed, unit literature is finalized and the product is released to the marketplace.

### ClimateMaster Production

Innovative products demand innovative manufacturing processes. ClimateMaster's integrated production process combines every aspect of the manufacturing of our equipment into an organized, balanced, and controlled whole.

### Fabrication

Every sheet-metal component of a ClimateMaster unit is produced in our fabrication department. Panels are precisely constructed of galvanized or stainless steel using computerized cutting, punching, and forming equipment. This precise fabrication means a tighter fit that makes for a more solid unit and reduced vibration, which equals reduced noise. On certain series, a polyester powder coating is then applied to increase corrosion resistance and enhance the look of the unit. The final step is the addition of fiberglass insulation to the inside as an additional layer of sound deadening. This insulation meets stringent NFPA regulations, and includes antibacterial material.



### Assembly

ClimateMaster's 610,000 square foot facilities use the most stringent quality control standards in the industry. Each unit is assembled under the close supervision of our Integrated Process Control System or Procix. This multi-million dollar computer system watches each unit as it comes down the assembly line. In addition, our quality department is stationed on each line and performs random audits not only on the units, but also on component parts. All component parts must pass each and every quality checkpoint before a unit is packaged and shipped. These systems and processes are maximized due to the comprehensive and ongoing training every employee receives from the date they are hired.

### Component Parts

To produce a quality unit, you have to start with quality components. ClimateMaster's Purchasing Department is relentless in its search for the best components for our products - while securing these components at prices that keep costs low. Any new component must go through a grueling testing phase before it ever sees the production line. Working closely with vendors and their engineers, we continually find new ways to not only improve our units, but to ensure component quality as well. Sister companies like KOAX, who produce our coaxial heat exchangers, allow ClimateMaster to provide components specifically designed for our applications.



# THE CLIMATEMASTER ADVANTAGE

## ClimateMaster Awards

ClimateMaster leads the industry in product awards and certifications. From 100% Air-Conditioning, Heating and Refrigeration Institute (AHRI) performance ratings to industry awards for innovation, ClimateMaster applies cutting-edge technology to every product we design and manufacture.

ClimateMaster's Tranquility® Series has won multiple awards and ClimateMaster is widely accepted as a leader in the industry. You know you are doing great things when a lot of people tell you.



## Engineering Lab Facilities

ClimateMaster has one of the largest testing facilities of any water-source heat pump manufacturer, including the reverberant, ISO 3741 Compliant sound testing room in the industry. Innovation and product improvements are a mainstay of the ClimateMaster Engineering Lab. Our people are what make the difference in the development of superior products in a timely manner. Our certified facility has seven automated test cells capable of testing a wide variety of unit types under varying conditions. These cells are capable of producing data twenty four hours a day, seven days a week. The development time of equipment is significantly reduced allowing ClimateMaster Engineers and Lab Technicians to spend more time on the actual development process. This team effort has allowed us to maintain a high degree of competence in our industry. Our test cells and test equipment are calibrated and certified periodically, per recognized industry standards, to ensure the data is accurate and repeatable. In addition to testing new concept units, the lab continually audits production units throughout the year to ensure quality performance and reliability.

## Industry Affiliations and Associations

ClimateMaster works closely with the International Standards Organization (ISO), the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), and the Electrical Testing Laboratories (ETL), to ensure that our equipment not only meets the highest performance standards, but meets the highest industry standards as well. ClimateMaster has celebrated many consecutive years of 100% success rate in AHRI's performance certification program. An uncommon feat in the industry, this is a testament to the craftsmanship, design, and construction of every ClimateMaster unit.



Intertek



## Customer Service

ClimateMaster has gone to great lengths to meet our customers' business-to-business needs. ClimateMaster provides great products and our customer support is second to none. Our highly trained and experienced Customer Service Department is available to assist you. Visit our online Business Center or contact Tech Services for any information you may need.

## ClimateMaster.com

Our web site has become the central hub for all of our customers' information needs. Current literature, specifications, presentations, and other resources are readily available in an intuitive, easy-to-navigate format. At the click of a mouse, our new web site, [climatemaster.com](http://climatemaster.com), gives consumers, dealers and distributors a specific area to get the information they need when they need it.

## Literature

At ClimateMaster, innovation never sleeps. As new advances are made, and new products are released, the need for accurate literature becomes critical. Every piece of technical literature that ClimateMaster produces is printed in our state-of-the-art on-demand printing facility. What this means is that we print only the literature we need at the time we need it. This ensures that only the most current and accurate data is in the field.

## The Future of ClimateMaster

Our long history of innovation has paved the way for future endeavors with a solid platform of success. Growing markets in Europe and Asia demand a different way of not only manufacturing our products, but also successfully marketing them. Government regulations have phased out R-22 refrigerant at the beginning of 2010 paving the way for new HFC-410A, a much more environmentally friendly refrigerant. In looking ahead, we continually strive for better processes, better designs, and better innovations that will keep ClimateMaster as the global leader in water-source and geothermal heat pumps.

## TRILOGY® 45 Q-MODE® (QE) PACKAGED SYSTEMS

### Overview

Trilogy® 45 Q-Mode® is the next revolution in residential energy efficiency [and will set ClimateMaster dealers in a class of their own in the home heating and cooling market.] It is the first geothermal heat pump ever certified by AHRI to exceed 45 EER and is 47% more efficient than our two-stage geothermal heat pumps.

Trilogy® Q-Mode® far exceeds the capabilities of any other HVAC unit on the market today with the four significant differentiators:

1. Fully variable system exceeds 45 EER (highest in industry), driven by a variable speed compressor, variable speed blower fan and variable speed loop pump.
2. Q-Mode® technology, the only system that provides year-round full-time domestic water heating, along with space heating and cooling to further reduce operating costs.
3. The MOST INTELLIGENT system in the residential industry with Advanced Monitoring and Diagnostics. The communicating control monitors smart sensors across the unit to display operation, faults and possible causes in PLAIN ENGLISH on the thermostat, laptop software tool and on a web portal.
4. Web-enabled configuration and diagnostics not only provides dealers to web access the Trilogy®'s real-time operating data and fault information, but, also make changes to configuration of the unit from any web-enabled computer or tablet.

The Trilogy® Q-Mode® is a packaged water-to-air system that far exceeds ENERGY STAR® Tier 3 efficiency levels, allowing this unit to qualify for the uncapped 30% federal geothermal heat pump tax credit through 2016. Trilogy® is available in two models, with the capacity range of the first model between 9K–30K and the second model between 18k–60k BTUH.

### Features:

#### Ultra-High Efficiency

The revolutionary new Trilogy® utilizes variable speed technology matched with communicating controls and a micro-channel air coil to deliver the highest efficiency (44 EER+) in the industry. It also delivers an extremely wide range of heating and cooling capacities, with the ability to perfectly match loads to as low as 30% of maximum, thus delivering ultra-high efficiency and low operating costs. Due to the wide range of operation, it can also completely eliminate the use of auxiliary heat even in far Northern climates.

#### Ultimate in Comfort, Humidity Control and Low Sound Levels

In addition to efficiency, the Trilogy® Q-Mode® delivers unsurpassed comfort and humidity control by precisely matching capacity to the heating and cooling load while also operating at very low sound levels. It provides better humidity control compared to any system in the market by controlling the air coil temperature, modulating the variable speed fan, and running longer to increase moisture removal.

### Operating Cost Savings:

#### Q-Mode® (Patent pending):

#### Delivers comfort and efficiency in four modes

The industry's first, patent-pending Q-Mode® delivers four modes of operation to deliver the highest efficiencies across all AHRI rating points.

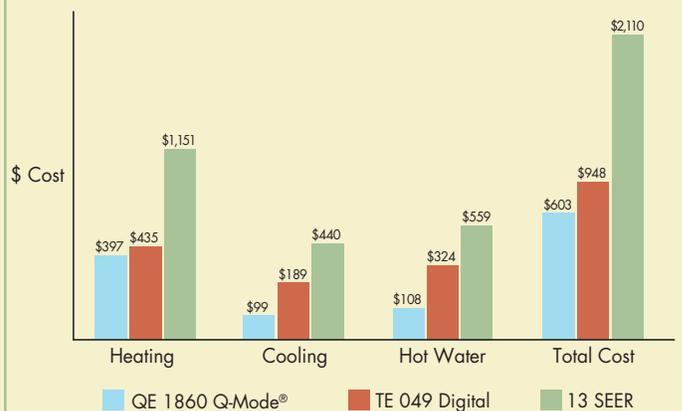
Q-Mode® operates in four modes:

1. Space Heating
2. Space Cooling
3. Hot Water while space cooling
4. Dedicated Hot Water when not in space cooling mode



Domestic hot water is a significant portion (18%) of a home's energy usage. Q-Mode® not only significantly reduces a home's heating and cooling energy costs, it also delivers year-round dedicated hot water to further reduce energy usage related to hot water generation by 80%.

### Operating Cost Savings



Source: St. Louis, MO, GeoDesigner

In addition to the savings on hot water generation, Trilogy® Q-Mode® delivers FREE space cooling when simultaneously heating hot water. The patent-pending technology moves heat between the home and the hot water tank, delivering more savings.

# TRILOGY® 45 Q-MODE® (QE) PACKAGED SYSTEMS

## Internet-Connected iGate® Communicating System

Trilogy® Q-Mode® has industry-exclusive two-way communicating controls, which allow for communication between smart components/sensors, the board, and the web-enabled thermostat. For installing and servicing contractors, this means unprecedented ease of setup and troubleshooting through the thermostat and through the dealer portal on the internet. The unit uses this technology to monitor every aspect of system operation to ensure peak performance. This unit is so advanced, it requires minimal configuration at start up and it easily tells the homeowner/contractor if something is wrong.

### Digital Communicating Control Features:

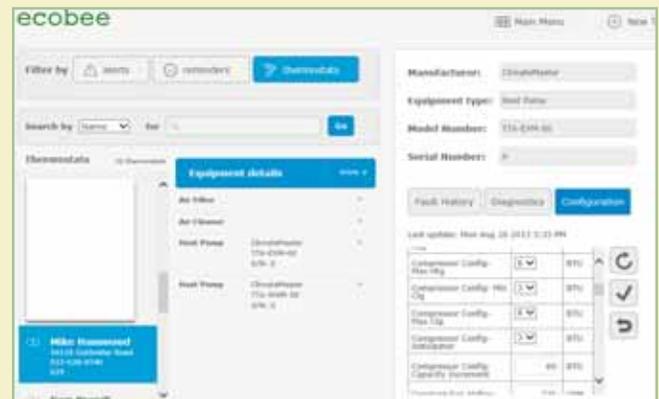
- Communicating interface to compressor, web-enabled thermostat, fan motor and geo source pump
- Comprehensive setup and diagnostics via system thermostat, PC service tool, and the internet
- High pressure, loss of charge, freeze and condensate overflow protection
- Intelligent fault retry with history retention
- Service tool port for optional setup and diagnostics at unit
- Auxiliary relay outputs for accessory connections

This plain English communication is now extended from the unit and thermostat to the internet! The NEW iGate® Connect thermostat connects the iGate® communicating system to the internet through Wi-Fi. This allows monitoring, configuration and diagnosis of the system through:

- iGate® Connect digital thermostat
- PC service tool connected to the unit
- Dealer portal on the internet



What is truly revolutionary about the iGate® Connect system is that dealers (from their office, home or vacation) can now monitor unit operation (47 data points), faults (including details and conditions at fault) and change settings (15 settings) from an internet-connected computer or mobile device.

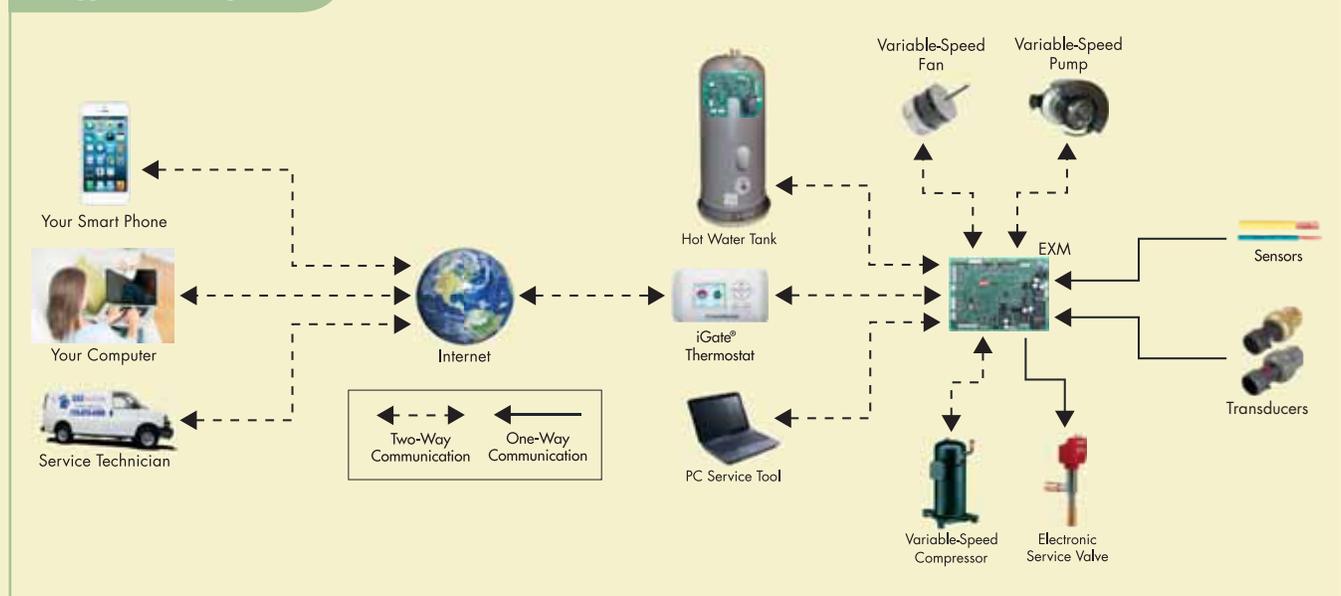


## iGate® Smart Tank

iGate® Smart Tank is the first communicating smart water tank in the industry and communicates directly with the Trilogy® 45 Q-Mode® to produce full-time domestic hot water at over 500% (5.0 COP) efficiency. The iGate® Smart Tank's polyurethane construction with super insulation delivers additional savings by not losing heat and unlike steel water tanks, is not prone to rust.



## Trilogy® iGate® System



## TRILOGY<sup>®</sup> 45 Q-MODE<sup>®</sup> (QE) PACKAGED SYSTEMS

### vFlow<sup>®</sup> Internal Variable Water Flow

Industry-first, built-in vFlow<sup>®</sup> replaces a traditionally inefficient, external component of the geothermal system (water circulation) with an ultra-high-efficient, variable speed, internal water flow system. This saves homeowners 70–80% on operating water circulator vs traditional single speed pump systems. It saves installers time and labor by avoiding installing bulky external flow centers or flow regulators. Multi-unit installations are also much simpler with vFlow<sup>®</sup> systems, as the units automatically adjust water flow across the system.

vFlow<sup>®</sup> is enabled by iGate<sup>®</sup>, which facilitates intelligent communication between the thermostat, DXM2 control, sensors and internal water pump to make true variable water flow a reality.

### vFlow<sup>®</sup> Internal Variable Water Flow

1. Closed loop – individual unit pumping: vFlow<sup>®</sup> Internal Flow Controller model ("2" in Position 11 of the unit model number) would be used. This includes variable speed pump, flushing ports, 3-way flushing valves and expansion tank. Copper water coil is standard with this option.
2. Closed loop – multi unit / central pumping: vFlow<sup>®</sup> Internal Low Pressure Drop (high Cv) Motorized Modulating Valve ("5" in Position 11 of the unit model number) would be used. Copper water coil is standard with this option.

### vFlow<sup>®</sup> delivers three main benefits:

1. Easier and quicker unit installation as the flow control is built in to the unit.
2. Superior reliability by varying the water flow to deliver more stable operation.
3. Higher cost savings by varying the flow (and pump watt consumption) to match the unit's mode of operation.

### Variable flow

vFlow<sup>®</sup> technology enables variable water flow through the unit, with the DXM2 control adjusting the pump speed to maintain an installer-set loop  $\Delta T$ . By controlling the water flow, the system is able to operate at its optimal capacity and efficiency. vFlow<sup>®</sup> provides a lower flow rate for part load where units typically operate 80% of the time and a higher, more normal flow rate for full load operation.

### Energy Savings with water circulation control

Units with vFlow<sup>®</sup> deliver higher operating cost savings by varying the water flow to match the unit's operation (ex: lower water flow when unit is in part load operation). Lowering the flow results in lower energy consumption by the water pump (=higher cost savings) in vFlow<sup>®</sup> units (whether internal or external pump).

In closed loop applications, using vFlow<sup>®</sup> with an internal variable-speed (ECM) flow controller, the ECM pump uses fewer watts than a fixed speed (PSC) pump, even at full load (see chart). The ECM pump excels in energy savings in part load, saving 70–80% watts compared to fixed speed pumps (see chart). The ECM pump can operate with independent flow rates for heating and cooling, further saving even more energy.

### vFlow<sup>®</sup> Eliminates External Pumps

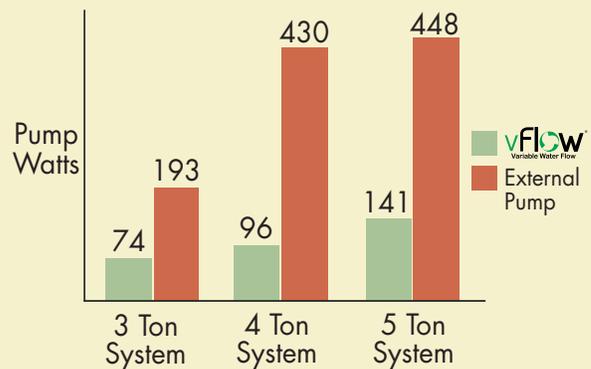


### Variable Water Flow



Variable speed pump delivers variable water-flow, controlled by EXM control, based on loop water  $\Delta T$ .

### vFlow<sup>®</sup> Operating Cost Savings



# TRILOGY® 45 Q-MODE® (QE) PACKAGED SYSTEMS

## TRILOGY® 45 Q-MODE® VARIABLE SPEED SERIES (QE)

Trilogy® 45 Q-Mode® represents a breakthrough in efficiency in geothermal heating and cooling systems. It is the first geothermal pump ever certified by AHRI to exceed 45 EER. The Trilogy® 45 Q-Mode® utilizes variable speed technology providing an extremely wide range of heating and cooling capacities with the ability to perfectly match loads to as low as 30% of maximum.

In addition to outstanding efficiency, the Trilogy® 45 Q-Mode® is the only geothermal heating and cooling system with Q-Mode®, a patent-pending technology providing year-round hot water on demand even when space conditioning is not required.

Trilogy® 45 Q-Mode® far exceeds the capabilities of any other HVAC unit on the market today with the four significant differentiators:

- The fully variable system exceeds 45 EER (highest in industry), driven by a variable speed compressor, fan and pump (the Trilogy®)
- Q-Mode® technology, the only system that provides year-round full-time domestic water heating, along with space heating and cooling to further reduce operating costs
- The MOST INTELLIGENT system in the residential industry with Advanced Monitoring and Diagnostics. The communicating control monitors smart sensors across the unit to display operation, faults and possible causes in PLAIN ENGLISH on the thermostat, laptop software tool and on a web portal
- Web-enabled configuration and diagnostics provides access to the Trilogy®'s real-time operating data and fault information and make changes to the configuration settings from any web-enabled computer or tablet



The Trilogy® Q-Mode® is a packaged water-to-air system that exceeds ENERGY STAR® Tier 3 efficiency levels, allowing this unit to qualify for the uncapped 30% federal geothermal heat pump tax credit through 2016

\* Rated at Ground Loop Conditions ISO 13256-1

\*\* Rated at Ground Water Conditions ISO 13256-1

### Standard Features

- Two capacities; 0930 and 1860
- 45 EER/5.1 COP
- Variable-stage upflow, downflow, and horizontal right or left return
- Q-Mode®, patent-pending technology with four modes of operation; dedicated full-time domestic water heating, space heating and cooling and free space cooling while generating hot water
- vFlow® variable water flow with variable speed pump for managing water flow required for peak performance.
- iGate® Internet-connected Communicating Control system to configure, control, monitor and diagnose the unit on the thermostat, in plain English
- Exceeds federal requirements for 30% tax credit on installation costs
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional Warranty to extend labor allowance from the standard 5 years to 10 years

### Accessories

- iGate® Smart Tank, communicating water storage tank in three capacities, 50, 85 and 105 gal.
- iGate® Connect, internet-connected, communicating programmable thermostat.

## TRANQUILITY® DIGITAL TECHNOLOGY

ClimateMaster has applied decades of experience and invested years of research to create two innovative technologies that maximize energy savings, reliability and comfort... and they can only be found in the new Tranquility® Digital systems.

### iGate® Communicating Controls

iGate® technology represents the next generation in intelligent controls by using 2-way communication to provide a gateway into your system. The iGate® control system allows you and your dealer to monitor the performance of your unit, custom tailor its operation, and diagnose any issues, all from your thermostat.

The iGate® communications hub is the new DXM2 intelligent controller, which analyzes the status of sensors and smart components (also 2-way communicating) to determine how best to operate your system for optimal comfort, efficiency and long-term reliability. All of this information is passed to the iGate® thermostat (or dealer diagnostic tool), where it can be displayed in plain English. And since communication is both ways, the iGate® thermostat can also be used to configure and tailor your system without touching your unit. Future accessories will enable iGate® communication over the internet, allowing you (and your dealer if you so choose) to access your system from a PC or smart phone.

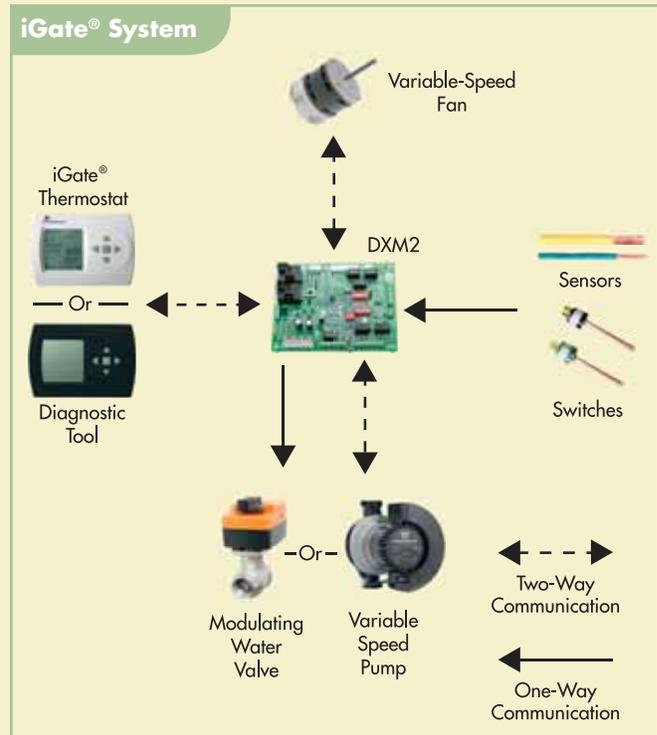
### vFlow® Variable Water Flow

vFlow® variable water flow technology is a major advance in geothermal system performance made possible through the iGate® system. vFlow® not only builds the major water circulation components into the unit for a clean installation, it also intelligently varies the water flow to minimize pump energy consumption and improve the reliability of your system.

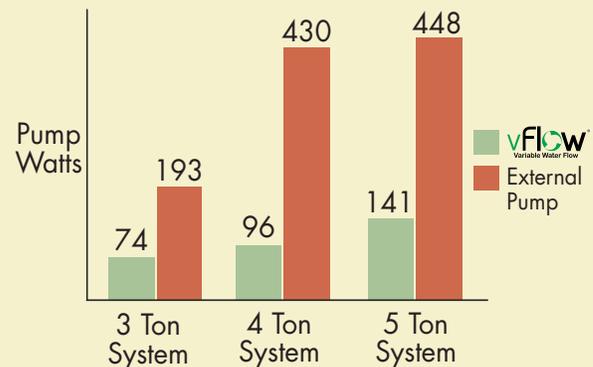
The heart of vFlow® is either a variable-speed pump (for ground loops) or modulating water valve (for ground water) directly linked into the iGate® system. Water flow is automatically varied based on changes in unit capacity level (stage) and source water temperature to maintain optimum system performance.

vFlow® systems reduce water pumping power by 60–80% compared to traditional external pumping modules, which can save over \$100 per year in an average 2,000 square foot home. In addition, vFlow® protects the unit against extreme operating conditions, extending the life of the compressor and air coil. Since vFlow® is built inside the unit, it also saves on installation time and makes for a very clean and compact installation.

**There's no need for bulky external pumping modules any more.**



### vFlow® Operating Cost Savings



### vFlow® Eliminates External Pumps



# TRANQUILITY® DIGITAL PACKAGED SYSTEMS

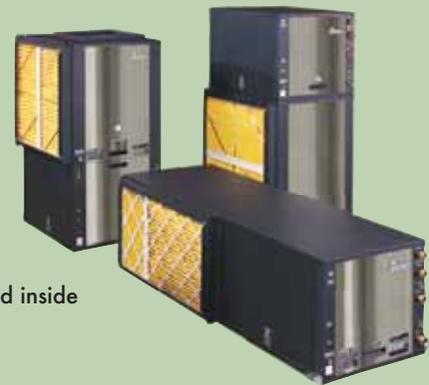
## TRANQUILITY® 30 DIGITAL TWO-STAGE SERIES (TE)

The Tranquility® 30 Digital offers vFlow® variable water flow and iGate® information gateway with a two-stage compressor and variable speed fan to deliver higher efficiency from 29.6 EER\* and the lowest operating cost of any home heating and cooling system. These systems are so sophisticated that they automatically adjust to provide the optimum and consistent indoor air temperatures and humidity regardless of the weather extremes. Designed for both new construction and retrofit applications, the narrow cabinet design allows for easy movement through doorways, crawl spaces, and attic access.

\* Rated at Ground Loop Conditions ISO 13256-1

### Standard Features

- Five Capacities 026, 038, 049, 064, & 072
- 29.6 EER/5.0 COP
- Two-Stage upflow, downflow, and horizontal right or left return
- iGate® information gateway to configure, control, monitor and diagnose the unit on the thermostat, in plain English
- Noise reduction features include: dual level compressor isolation; insulated compressor compartment; interior cabinet insulation using 1/2" coated glass fiber and variable speed fan
- Extended range operation (20-120°F EWT) and flow rates automatically controlled inside the unit
- EarthPure® HFC-410A zero ozone depletion refrigerant
- Exceeds federal requirements for 30% tax credit on installation costs
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional Warranty to extend labor allowance from the standard 5 years to 10 years



### Options

- Hot water generator with internally mounted pump
- vFlow® Built-in Variable Water Flow for 60-80% lower pumping cost, easier/quicker "plug & play" installation and is available for Closed loop, Open loop and Closed loop—central pumping
- Communicating Programmable thermostat (ATC32) / Communicating Configuration / Diagnostic Tool (ACD)
- Secure Start™ can expand the life of your unit by reducing start up current and protecting the compressor from low-voltage sags
- Service Disconnect Switch located on the front panel for easy service access

## TRANQUILITY® 22 DIGITAL TWO-STAGE SERIES (TZ)

The Tranquility® 22 Digital offers vFlow® variable water flow and iGate® information gateway with a two-stage compressor and variable speed fan to deliver high comfort in a compact, affordable package for home heating, cooling and hot water. These systems are so sophisticated that they automatically adjust to provide the optimum and consistent indoor air temperatures and humidity and the highest reliability. Designed for both new construction and retrofit applications, the compact cabinet design allows for installation in tight areas.

### Standard Features

- Six Capacities 024, 030, 036, 042, 048 & 060
- 22 EER/4.1 COP
- Two-Stage upflow, and horizontal right or left return
- iGate® information gateway to configure, control, monitor and diagnose the unit on the thermostat, in plain English.
- Noise reduction features include: dual level compressor isolation; insulated compressor compartment; interior cabinet insulation using 1/2" coated glass fiber and variable speed fan
- Extended range operation (20-120°F EWT) and flow rates automatically controlled inside the unit
- EarthPure® HFC-410A zero ozone depletion refrigerant
- Exceeds federal requirements for 30% tax credit on installation costs
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional Warranty to extend labor allowance from the standard 5 years to 10 years.



### Options

- Hot water generator with internally mounted pump
- vFlow® Built-in Variable Water Flow for 60-80% lower pumping cost, easier/quicker "plug & play" installation and is available for Closed loop, Open loop and Closed loop—central pumping
- Communicating Programmable thermostat (ATC32) / Communicating Configuration / Diagnostic Tool (ACD)

## TRANQUILITY® PACKAGED SYSTEMS

### TRANQUILITY® 20 SINGLE-STAGE SERIES (TS)

The Tranquility® 20 Series utilizes EarthPure® HFC-410A refrigerant along with advanced scroll compressor technology and microprocessor controls allow the Tranquility® 20 to operate at the most efficient level for all weather conditions. The Tranquility® 20 Series was designed for both new construction and retrofit applications. The narrow cabinet design for easy movement through doorways, crawl spaces and attic access. At 21.9 EER, the Tranquility® 20 has some of the industry's highest single stage efficiency ratings.\*

\* Rated at Ground Loop Conditions ISO 13256-1

#### Standard Features

- Eight Capacities 018, 024, 030, 036, 042, 048, 060 & 070
- 21.9 EER/4.3 COP
- Single-Stage upflow, downflow, and horizontal right or left return
- Extended range operation (20-120°F EWT) and flow rates as low as 1.5 gpm per ton
- EarthPure® HFC-410A zero ozone depletion refrigerant
- Noise reduction features include: dual level compressor isolation; insulated compressor compartment; interior cabinet insulation using 1/2" coated glass fiber and optional variable speed fan
- Exceeds federal requirements for 30% tax credit on installation costs
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- Hot water generator with internally mounted pump
- Cupro-Nickel coaxial heat exchanger
- Extended 5-year limited labor allowance
- Electronic auto-changeover thermostat with 3-stage heat, 2-stage cool and indicator LED's



## TRANQUILITY® WATER-TO-WATER SYSTEMS

### TRANQUILITY® BRAZED PLATE WATER-TO-WATER SERIES (TBW)

The TBW Series offers a wide range of units for most any installation with an extended range refrigerant circuit, capable of ground loop (geothermal) applications. As ClimateMaster's most adaptable EarthPure® HFC-410A refrigerant units, the TBW Series can be used for radiant floor heating, snow/ice melt, chilled water for fan coils, hot/chilled water for make-up air, and many other types of HVAC applications.

#### Standard Features

- Three Capacities 036 [8.7 kW], 060 [13.5 kW], & 120 [26.9 kW]
- Extended range (20 to 120°F, -6.7 to 48.9°C) operation
- Compressor "run" and "fault" lights on the front of the cabinet
- EarthPure® HFC-410A zero ozone depletion refrigerant
- Up to 130°F entering water temperature (load)
- Installing TBW on open loop system will void warranty and unit will not be eligible for federal tax credit.
- Brazed Plate heat exchangers on both the load and source side
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- Hot water generator with internal pump
- Extended 5-year limited labor allowance



### TRANQUILITY® COAXIAL WATER-TO-WATER SERIES (TCW)

The TCW Series offers a wide range of units for most any installation with an extended range refrigerant circuit, capable of open loop (ground water) applications. As ClimateMaster's most adaptable EarthPure® HFC-410A refrigerant units, the TCW Series can be used for radiant floor heating, snow/ice melt, chilled water for fan coils, hot/chilled water for make-up air, and many other types of HVAC applications.

#### Standard Features

- Three Capacities 036 [8.7 kW], 060 [13.5 kW], & 120 [26.9 kW]
- Extended range (20 to 120°F, -6.7 to 48.9°C) operation
- Compressor "run" and "fault" lights on the front of the cabinet
- EarthPure® HFC-410A zero ozone depletion refrigerant
- Up to 130°F entering water temperature (load)
- Coaxial cupro-nickel heat exchanger on source side
- Coaxial copper heat exchanger standard on the load side.
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- Hot water generator with internal pump
- Cupro-nickel heat exchanger for load side
- Extended 5-year limited labor allowance



## TRANQUILITY® DIGITAL SPLIT SYSTEMS

### TRANQUILITY® DIGITAL INDOOR SPLIT SERIES (TES)

The Tranquility® Digital Indoor Split Series delivers the ultimate in efficiency, comfort, reliability and serviceability—intelligently driven by the iGate®, the industry's first two-way communicating control, two-stage compressor, and industry-first vFlow® internal variable water flow components. The Tranquility® Splits also deliver reliable operation, lower operating costs and compact installation. The Tranquility® Digital Indoor Split Series easily connects to new or existing fossil fuel and electric furnaces. Ideal for remote applications with a 2nd floor or crawl spaces.

#### Standard Features

- Four Capacities 026, 038, 049, & 064
- 25.6 EER/4.3 COP
- Two-Stage operation for ultra high efficiencies
- iGate® information gateway to configure, control, monitor and diagnose the unit on the thermostat, in plain English.
- Extended range operation (20–120°F EWT)
- AHRI matched and rated with TAC and TAH cased coils and air handlers.
- EarthPure® HFC-410A zero ozone depletion refrigerant
- Noise reduction features include dual level compressor isolation
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- Hot water generator
- Cupro-Nickel coaxial heat exchanger
- Extended 5-year limited labor allowance
- vFlow® Built-in Variable Water Flow for 60–80% lower pumping cost, easier/quicker “plug & play” installation



### TRANQUILITY® DIGITAL OUTDOOR SPLIT SERIES (TEP)

The Tranquility® Digital Outdoor Split Series delivers the ultimate in efficiency, comfort, reliability and serviceability—intelligently driven by the iGate®, the industry's first two-way communicating control, two-stage compressor, and industry-first vFlow® internal variable water flow components. The Tranquility® Splits also deliver reliable operation, lower operating costs and compact installation. The Tranquility® Digital Outdoor Split Series easily connects to new or existing fossil fuel and electric furnaces. Designed for the replacement market, quiet outdoor installations with weather and sound insulated cabinets make it the perfect fit. Includes built-in earth loop circulating pump, flushing valves, expansion tank and hose kit for easy ground loop connection.

#### Standard Features

- Four Capacities 026, 038, 049, & 064
- 25.6EER/4.3 COP
- Two-Stage operation for ultra high efficiencies
- vFlow® Built-in Variable Water Flow for 60–80% lower pumping cost, easier/quicker “plug & play” installation
- iGate® information gateway to configure, control, monitor and diagnose the unit on the thermostat, in plain English.
- Extended range operation (20–120°F EWT)
- AHRI matched and rated with TAC and TAH cased coils and air handlers.
- Noise reduction features include dual level compressor isolation
- Built-in earth loop circulating pump, flushing valves, hose kit and loop expansion tank for easy loop connection
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- External hot water generator with internally mounted pump
- Extended 5-year limited labor allowance



## TRANQUILITY® DIGITAL SPLIT SYSTEMS

### TRANQUILITY® DIGITAL AIR HANDLER SERIES (TAH)

The Tranquility® Digital Air Handler Series has among the highest efficiency ratings of any geothermal split system in the industry when matched with ClimateMaster Tranquility® Indoor and Outdoor units. Tranquility® Digital Air Handlers are specifically designed and matched for use with Tranquility® Indoor and Outdoor geothermal split units. Tranquility® Digital Air Handlers are available in vertical upflow or downflow, and horizontal left or horizontal right airflow. Designed for new or retrofit geothermal installations/applications, ideal for remote applications like a 2nd floor, crawl spaces, and attics.

#### Standard Features

- Four Capacities 026, 038, 049, & 064
- Fully convertible vertical upflow, downflow, horizontal left and horizontal right airflow
- Variable speed ECM fan motor adapts to various duct systems
- EarthPure® HFC-410A zero ozone depletion refrigerant
- AHRI matched and rated with TEP/ TES products
- 230v and 115v compatible
- Condensate overflow protection
- Corrosive resistant aluminum air coil
- Exceeds federal requirements for 30% tax credit on installation costs\*
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- Internal electric heat for easy field installation
- Dehumidification mode for high latent cooling (when matched with ATP32UO4 thermostat)
- Extended 5-year limited labor allowance
- Electronic auto-changeover thermostat with 3-stage heat, 2-stage cool and indicator LED's

\*When matched with ClimateMaster Tranquility® Digital or Non-Digital Split compressor section



## TRANQUILITY® SPLIT SYSTEMS

### TRANQUILITY® CASED AIR COIL SERIES (TAC)

The Tranquility® Cased Coil Series has among the highest efficiency ratings of any geothermal split system in the industry when matched with ClimateMaster Tranquility® Indoor or Outdoor units. Tranquility® Cased Coils are specifically designed and matched for use with Tranquility® Indoor and Outdoor geothermal split units. This series is available in vertical upflow or downflow, and horizontal left or horizontal right airflow. Designed for retrofit geothermal installations, the Tranquility® Cased Coil Series is ideal for dual fuel geothermal add-on applications.

#### Standard Features

- Four Capacities 026, 038, 049, & 064
- Fully convertible vertical upflow or downflow, and horizontal left or horizontal right airflow
- AHRI matched and rated with TEP/TTS products
- Easily connects to a new or existing fossil fuel furnace
- Corrosive resistant aluminum air coil
- Exceeds federal requirements for 30% tax credit on installation costs\*
- Large removable access panel provides an open service-friendly cabinet
- Standard 10-year limited warranty on all parts with 5 year labor allowance; Optional extended 5-year limited labor allowance available

#### Options

- Extended 5-year limited labor allowance
- Electronic auto-changeover thermostat with 3-stage heat, 2-stage cool and indicator LED's

\*When matched with ClimateMaster Tranquility® Digital or Non-Digital Split compressor section



# TRILOGY® & TRANQUILITY® PACKAGED SYSTEM COMPARISON

		<b>Packaged Series</b>				
		● Standard	○ Optional	Trilogy® 45 Q-Mode® (QE)	Tranquility® 30 Digital (TE)	Tranquility® 22 Digital (TZ)
Efficiency	Cooling		45 EER	29.6 EER	23.7 EER	21.9 EER
	Heating		5.1 COP	5.0 COP	4.1 COP	4.3 COP
ENERGY STAR® Designation		Most Efficient				Tier 3
30% Federal Tax Credit Eligible		Yes	Yes	Yes	Yes	Yes
Compressor		Variable	Two Stage	Two Stage	Two Stage	One Stage
Q-Mode®—Free Cooling		●				
Communicating System						
Advanced Monitoring and Diagnostics		●				
Wi-Fi Communicating Thermostat		●				
Non-Communicating Electronic Controls						○
Hot Water Generation		Dedicated Full Time	Part Time	Part Time	Part Time	Part Time
Front Panels		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Air Filter		2" MERV 11	2" MERV 11	1" MERV 8	2" MERV 11	2" MERV 11
vFlow® Internal Variable Water Flow		●	○	○		
Indoor Fan	Variable Speed	●	●	●		○
	Single Speed					●
Configuration	Vertical Upflow	○	○	○		○
	Horizontal	○	○	○		○
	Vertical Downflow	○	○			○
Air Coil		Micro-channel	Tin Plated*	Tin Plated	Tin Plated	Tin Plated**
Warranty—10-Year Parts; 5-Year Labor Allowance		●	●	●	●	●
Warranty—10-Year Parts; 10-Year Labor Allowance		○	○	○	○	○

\*TE026-049 uses Micro-channel aluminum coil

\*\* TS024-048 uses Micro-channel aluminum coil

## TRANQUILITY® SPLIT SYSTEM COMPARISON

Split Series ● Standard ○ Optional		Tranquility® Digital (TES)	Tranquility® Digital (TEP)	Tranquility® Digital (TAH)	Tranquility® (TAC)
		Tranquility® Compressor Section		Indoor Split	Outdoor Split
Efficiency*	Cooling	25.6	25.6		
	Heating	4.3	4.3		
ENERGY STAR® Designation		Most Efficient	Most Efficient		
30% Federal Tax Credit Eligible		Yes	Yes		
Compressor		Two Stage	Two Stage		
Front panel		Stainless Steel	Painted		
vFLOW Internal Variable Water Flow		○	●		
Communicating System		iGate	iGate	iGate	
Multi-Positional				●	●
Hot Water Generator	Built-in	○			
	Accessory		○		
Variable Speed Indoor Fan				●	
Corrosive Resistant Aluminum Air Coil				●	●
Warranty—10-Year Parts; 5-Year Labor Allowance		●	●	●	●
Warranty—10-Year Parts; 10-Year Labor Allowance		○	○	○	●

\* When matched With Tranquility® Air Handler

## TRANQUILITY® BRAZED PLATE WATER-TO-WATER FEATURES

<b>Water-to-Water Series</b> ● Standard ○ Optional		Tranquility® Brazed Plate (TBW*)	Tranquility® Coaxial (TCW**)
		Efficiency	Cooling 16.4
	Heating 3.1	4	
ENERGY STAR® Designation		*Tier 3	**Tier 3
30% Federal Tax Credit Eligible		Yes	Yes
Generates Load Hot Water up to 130°F EWT		●	●
Generates Load Chilled Water		●	●
Single-Stage Compressor		Yes	Yes
Source Heat Exchanger		Stainless Steel Brazed Plate	Cupro Nickel
Load Heat Exchanger		Stainless Steel Brazed Plate	Copper or Cupro Nickel
Thermal Expansion Valve (TXV)		●	●
Dual-Level Compressor Isolation		●	●
Stainless Steel Front Panels		●	●
Non-Communicating Electronic Controls		●	●
Internal Hot Water Generator Coil and Pump		○	○
External Fixed-Speed Flow Controller		○	○
Warranty—10-Year Parts; 5-Year Labor Allowance		●	●
Warranty—10-Year Parts; 10-Year Labor Allowance		○	○

\*TBW units are intended for closed loop (geothermal) applications only

\*\*TCW units are intended for open loop (ground water) applications only

NOTES:

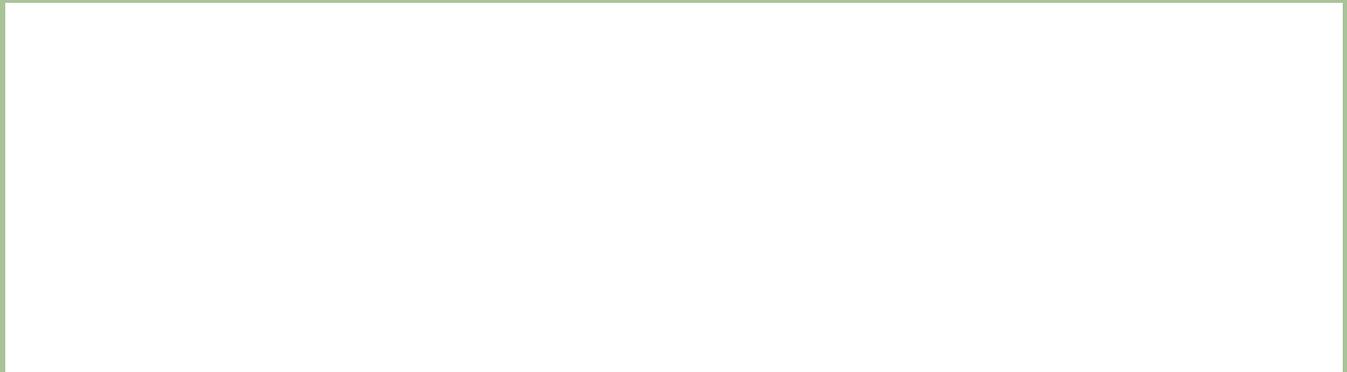
24-hour information:

877-436-6263

**climatemaster.com**

7300 S.W. 44th Street  
Oklahoma City, OK 73179  
405-745-6000

An LSB Industries, Inc. Company (NYSE: LXU)



ClimateMaster works continually to improve its products. As a result, the design and specifications of each product at the time for order may be changed without notice and may not be as described herein. Please contact ClimateMaster's Customer Service Department at 405-745-6000 for specific information on the current design and specifications. Savings vary due to weather conditions, local conditions, user preferences, and utility rates. Statements and other information contained herein are not warranties and do not form the basis of any bargain between the parties, but are merely ClimateMaster's opinion or commendation of its products.