


# Geothermal Heat Pumps with R-454B Refrigerant

## Owner's Manual

**NOTE:** Read the entire instruction manual before starting the installation.

### A NOTE ABOUT SAFETY

Any time you see this symbol  in manuals, instructions and on the unit, be aware of the potential for personal injury. There are three levels of precaution:

**DANGER** identifies the most serious hazards which will result in severe personal injury or death.

**WARNING** signifies hazards that could result in personal injury or death.

**CAUTION** is used to identify unsafe practices which would result in minor personal injury or product and property damage.

**NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.



### WARNING

#### PERSONAL INJURY, DEATH AND / OR PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in personal injury, death or property damage.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or service agency must use factory-authorized kits or accessories when modifying this product.

Read and follow all instructions and warnings, including labels shipped with or attached to unit before operating your new geothermal heat pump.

### Your new system

Congratulations on the purchase of your new geothermal system.

Please take a few moments to read this document to familiarize yourself with the unit operation.

Use this document to:

- Record model information of your unit for future reference
- Record the earth loop location (see page 3)
- Record service history (see page 4)

### REGISTER YOUR SYSTEM

To obtain the longer warranty periods as shown on the Warranty Certificate table under original owner, for the original purchaser, the product must be properly registered at [www.cac-bdp-all.com/www.ICPUSA.com](http://www.cac-bdp-all.com/www.ICPUSA.com) within ninety (90) days of original installation. In jurisdictions where warranty terms conditioned on registration are prohibited by law, registration is not required and the longer warranty period shown will apply.

MODEL NUMBER: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

INSTALLATION DATE: \_\_\_\_\_

INSTALLING DEALER: \_\_\_\_\_

DEALER PHONE NUMBER: \_\_\_\_\_

### HEATING AND COOLING YOUR HOME

Your geothermal system operation is controlled by the thermostat which is generally mounted in a central location in the home.

A wide variety of thermostats can be used with your geothermal unit. You can set the desired heating and cooling “set-points” on your thermostat. The thermostat senses indoor temperatures and sends a signal to the geothermal unit to heat, cool, turn off, or change stages.

For enhanced comfort, consider setting your thermostat in “continuous fan” mode. This mode keeps the fan/blower operating continuously which can provide more consistent temperatures throughout the home, eliminating hot spots and cold spots.

Using the “auto change-over” mode on your thermostat will enable the unit to automatically switch from heating to cooling (and vice-versa) when necessary. This mode is beneficial, for example, during the spring or fall when heating may be needed at night and cooling may be needed during the day.

### THERMOSTATS

A wide variety of thermostats can be used with your geothermal unit. For thermostat operation instructions, refer to the thermostat Owner's Guide.

### PROGRAMMABLE THERMOSTATS

If your thermostat is programmable, using the set-back feature can provide additional energy savings. However, energy savings may not be maximized if the heating set-back temperature is substantially different from the normal temperature. For example, if you want the “occupied” temperature to be 72°F (22°C), and you program the thermostat for a set-back temperature of 60°F (15°C), then the geothermal unit will likely engage the auxiliary back-up heat when it is time for the normal temperature setting to be achieved, in order to attain the programmed higher temperature in a short period of time. The energy savings gained during the set-back period may be lost if the unit has to operate with auxiliary electric to bring the temperature back up to the normal setting. Therefore, it is recommended to limit the difference between the normal temperature setting and the set-back temperature during heating to minimize the use of auxiliary electric.

## ACCESSORIES

Other accessories, like zoning systems, humidifiers, high efficiency air cleaners etc., can also be used with your geothermal system to provide additional comfort, energy savings and improved indoor air quality.

For instructions on operating these accessories, refer to the Owner's Guides.

## VARIABLE SPEED OPERATION

If your geothermal unit is equipped with a two-stage compressor and variable speed blower, you may notice your system runs for longer periods of time. This system is designed to meet cooling or heating needs of the home at a wide range of conditions. During days when the outdoor temperature is moderate, operation in low speed or low stage is common. When the outdoor temperature is extreme, the unit will generally operate on high speed/high stage. Longer "run times" on the unit result in indoor temperature that is more consistent with fewer drafts, better humidity control, enhanced comfort and enhanced energy efficiency.

## HEATING MODE

During heating, your geothermal unit absorbs heat energy from the ground using the earth loop (or well water). This low intensity heat is transferred to refrigerant, intensified by the unit's compressor, and then transferred to the air through the indoor air coil. (When a "water-to-water" style geothermal unit is used, the unit heats water, not air, and delivers warm water to the home's hydronic heating system.)

Unless you live in a climate that doesn't get very cold, your geothermal unit will likely have a back-up source of heat. This is done either with an auxiliary heat accessory or a fossil-fuel furnace. During extreme conditions, the geothermal unit may use the back-up electric resistance heater to supplement the output.

If the geothermal unit is connected to a gas furnace, the geothermal system will turn off and allow the fossil-fuel furnace to operate during very cold temperatures.

The outdoor temperature at which the auxiliary electric or fossil furnace is used is dependent upon how the geothermal unit was sized which determines its output capacity. The back-up source of heat (either auxiliary electric or fossil fuel furnace) is also activated in the unlikely event of a compressor failure in order to maintain heating comfort. (When a "water-to-water" style geothermal unit is installed, back-up heat, if used, is usually done with a boiler.)

## COOLING MODE

During cooling, your geothermal unit removes heat from the air in your home (just like an air conditioner). Unlike an ordinary air conditioner, the geothermal unit sends the unwanted heat into the ground. Heat is transferred from the indoor air, to the refrigerant, to the ground loop fluid (or well water), and into the ground. Because the ground temperatures are cooler than the outdoor air temperatures, a geothermal unit operates more efficiently than an ordinary air conditioner.

## HOT WATER

If your geothermal unit is equipped with the device that provides supplemental water heating, it will be connected to your water heater. During heating and cooling operation, your geothermal unit will move excess heat to a water line into the water heater by using a small pump. This water heating function is only operational during heating and cooling. The amount of hot water made by the geothermal unit varies based on several conditions, and is usually not sufficient to be the sole source of hot water. Your water heater will still be connected to electricity or fossil fuel so that you will have full capacity, regardless of the contribution by the geothermal unit.

## GEOHERMAL EARTH LOOP

Your geothermal earth loop is the key to energy efficiency and performance. The pipe is made using high-density polyethylene with a formulation and specification to maximize the performance when buried in the ground or submerged in a pond. All outside/buried connections are made with heat fusion so there are no clamps or glues that can deteriorate over time. The pipe and connections don't rust, rot or corrode and should last for decades. Once the loop is installed, service is limited to ensuring that proper levels of pressure are maintained and the circulating pump(s) are operational to deliver the proper flow rate to the unit. The fluid in the loop may include anti-freeze to prevent the liquid from freezing.

## WELL WATER / OPEN LOOP SYSTEM

If your geothermal unit is connected to your water well rather than an earth loop, it is important to ensure that the proper water quality and flow rate is maintained. Some maintenance is usually required for these applications in order to keep the heat exchanger inside the geothermal unit free of any mineral build-up. Periodic cleaning is highly recommended. The frequency of this maintenance or cleaning is dependent upon the quality of water. Poor water quality will lead to reduced efficiency and capacity, along with the potential for premature failure or corrosion of the heat exchanger. Contact your dealer for recommendations on the service interval.

## FILTERS

One of the most important things you can do for your geothermal system is to keep the filter clean. A dirty filter causes excessive restriction of air flow, leading to operational conditions in the unit that could lead to high energy costs, poor comfort, excessive wear and tear, noise, and premature failure. Your geothermal dealer will be able to provide appropriate replacement filters.

## OPERATION DURING CONSTRUCTION

Your geothermal heat pump contains components that can be damaged by operation during the construction process. Contaminants like drywall dust, sawdust, and chemicals can cause damage and premature failure of your system. Although using an extremely high efficiency filter may seem like the right solution, the filter will "load up" quickly and may cause excessive pressures and operational stress on the components. Using a standard, lower efficiency filter will not provide adequate protection to the unit. Units that fail due to operation during construction will not be covered under the warranty. See your Warranty Certificate for details.

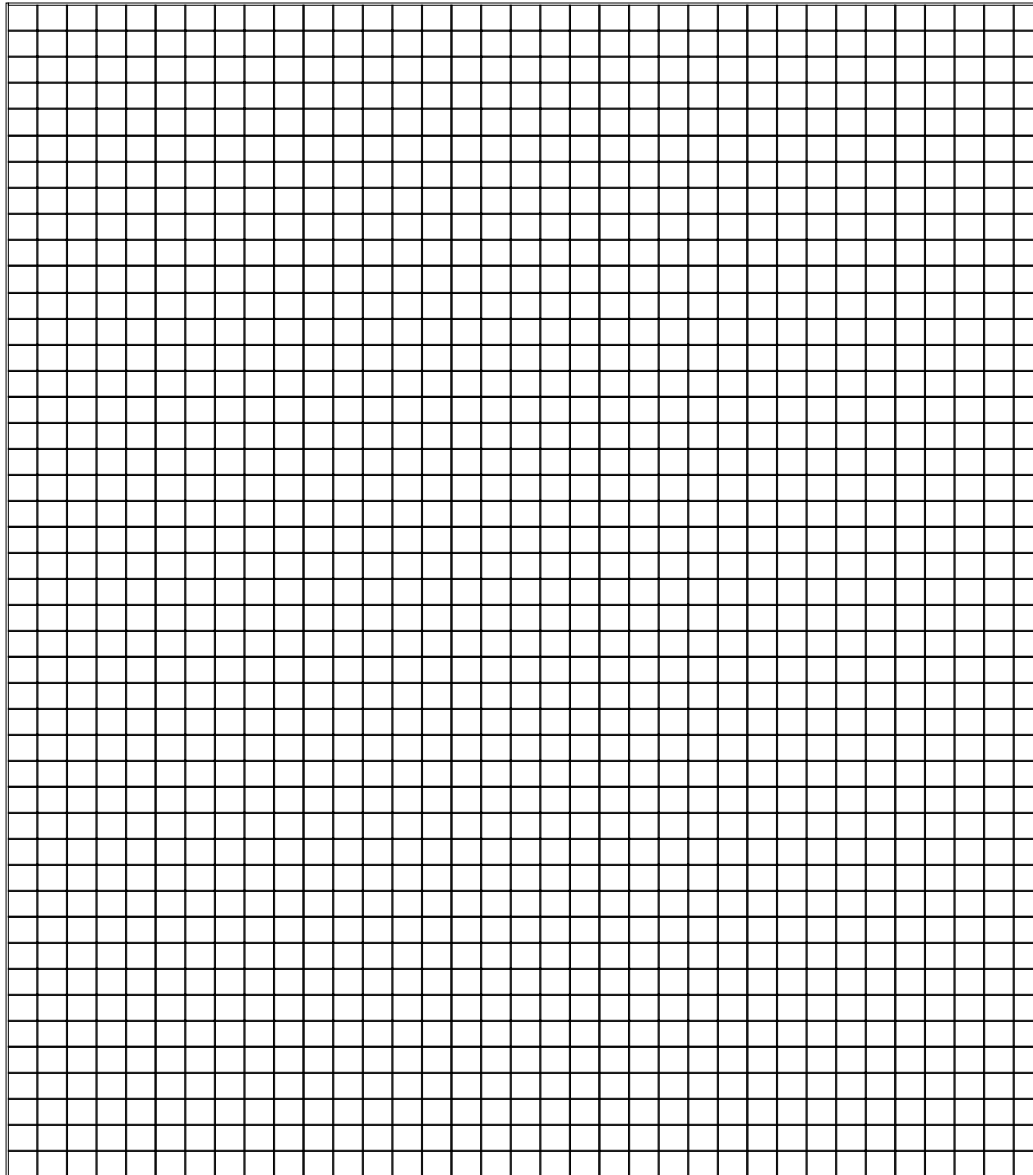
## Record your loop location

Once the grass has been re-established over your earth loop, it's going to be "invisible".

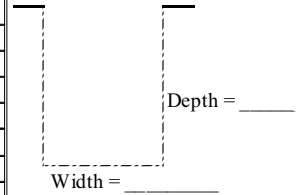
In order to prevent damage in the future, it is strongly recommend that you record its location.

Using the grid below, draw a bird's eye view of your home, property lines, and loop location (showing each trench and borehole).

You may also want to show water well location and underground utilities.



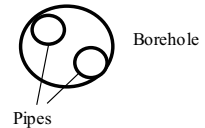
### Horizontal Loop: Trench Side View



Show location  
of pipes in trench

### Vertical Loop:

Top View



Borehole Depth = \_\_\_\_\_

### Pond Loop:

Depth of pond where  
coils are located = \_\_\_\_\_

Number of coils = \_\_\_\_\_

### For Well Water / Open Loop

#### Geothermal Installations:

Depth of well = \_\_\_\_\_  
(Mark location of well on drawing.)

List the Companies that provided the following services:

Scale: 1  = \_\_\_\_ feet (or meters)

Loop designed by: \_\_\_\_\_

Anti-freeze Type: \_\_\_\_\_

Loop backhoe / trenching work done by: \_\_\_\_\_

Loop vertical drilling done by: \_\_\_\_\_

Pipe fusion performed by: \_\_\_\_\_

Loop flushing performed by: \_\_\_\_\_

## Preventive Maintenance or service record

In order to keep your geothermal system operating at peak performance, it is recommended that you have your installing dealer check out the unit on a regular basis (annually or semi-annually).

Your dealer will offer a maintenance program that provides multi-point inspections.

[illegible]