

Northern Leader

Owner's Manual



WaterFurnace
Geothermal Heating • Cooling • Hot Water

Contents

GeoExchange System Benefits	3
How GeoExchange Systems Work	4
GeoExchange System Types	5
WaterFurnace Quality Commitment	6
Warranty	6
Thermostat Operating Procedures	7-11
Northern Leader Status Lights	12-14
System Maintenance	14-15
Resetting the Unit	15
Operation Service Hints	16
Quick Reference Card	17

Your WaterFurnace Northern Leader: the best in GeoExchange heating and cooling

Thank you for purchasing a WaterFurnace Northern Leader series GeoExchange heating and cooling system. You have joined hundreds of thousands of smart owners all over the world who have discovered that GeoExchange systems (also known as geothermal) are ideal for heating, air conditioning and domestic water heating. It's the only system that does it all in one unit!

GeoExchange technology is ideal because it delivers what you want and what our world needs:

- lowest operating cost of any heating and cooling system
- most energy efficient system available
- very comfortable with even temperature and humidity control
- quiet operation with no noisy outside equipment
- precise temperature control
- highly reliable with industry-proven components
- safe and clean with no flame, chimney or odors
- backed by the industry's best warranties
- low maintenance requirements
- improves the environment by not burning fossil fuels
- no carbon monoxide emissions

Energy Efficient

GeoExchange systems are extremely energy efficient since they only use electricity to power the pump, compressor and fan. These components transfer heat stored within the earth. As a result, GeoExchange systems use far less electricity than outdoor air-to-air heat pumps and conventional systems. In fact, they typically deliver about 3 to 4 times more energy than they consume.

Environmentally Beneficial

GeoExchange systems are also environmentally advantageous because they don't burn fossil fuels, thus eliminating "greenhouse gas" emissions into the air. They use far less refrigerant than air-to-air heat pumps or air conditioners, and are factory sealed to prevent leakage. They reduce the need for more coal-fired or nuclear power plants by placing less energy demand on our current capability to produce electricity.

You've made the ideal choice for everyone!

How does GeoExchange energy keep me warm in the winter and cool in the summer at savings of 30 to 60% over my current energy costs?

No matter where you live, the underground temperature stays relatively constant all year, even though outdoor temperatures vary greatly. GeoExchange systems harness the free, renewable, natural supply of energy stored underground... and use it for heating, air conditioning and hot water. One system keeps you comfortable in both winter and summer.

The basic principle of a GeoExchange system is to transfer heat produced by the sun and stored within the earth into the structure during winter, and to remove heat from indoors in summer and return it to the cooler earth. Water is used to carry this heat either by circulating through an underground closed loop piping system or by directly pumping ground water.

During the heating season

Water circulating through a "loop" of underground pipe absorbs heat from the earth and carries it to the Northern Leader unit which extracts the heat (compresses it to a higher temperature) and distributes it via a duct system.

During the cooling season

The Northern Leader unit extracts heat from the air and transfers it to the circulating water in the underground loop system where it is dissipated into the cooler earth.

Hot water options

Depending on the options you have chosen, your GeoExchange system can also provide some or all of your domestic hot water needs. If you have a unit with the hot water assist feature built in, whenever the unit is operating (except 3rd stage heat or emergency heat) it will provide a portion of your hot water needs. If your system incorporates a separate Premier Plus unit, it will provide all your hot water needs, even when your system is not heating or cooling.

Zone control

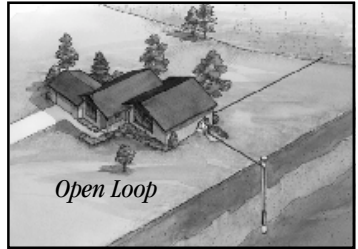
An optional IntelliZone system is available to provide the ultimate in comfort and efficiency to your system. This system electronically controls the operation of dampers in the duct system to provide different zones with just the right amount of conditioning.

Is there more than one way to install GeoExchange?

There are several different methods used to install a GeoExchange system. Your independent WaterFurnace dealer will assist you in choosing the right one for your space. Our dealers have been thoroughly trained on GeoExchange applications and are supported by the industry's best computer software to ensure that you receive the right system.

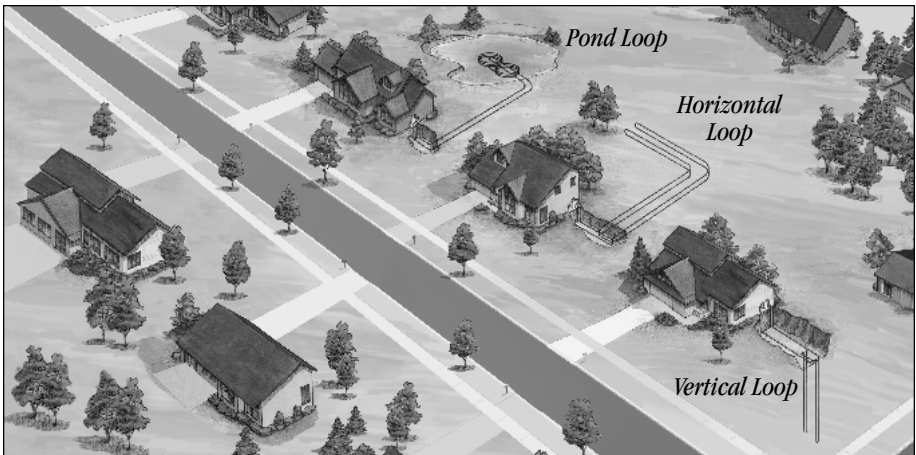
Open loop systems

A GeoExchange open loop system uses ground water as a direct energy source when good quality well water is available at a reasonable pumping depth. A good water discharge system is also required, such as a ditch, field tile, pond or stream. An open loop system may require periodic inspection/cleaning to prevent buildup of mineral deposits.



Closed loop systems

The GeoExchange closed loop system is an underground network of sealed, high-strength plastic pipe filled with a water/antifreeze solution. During cooling, heat is removed from the building and dissipated into the cooler earth. For heating, low-intensity heat energy is absorbed from the earth, intensified, and delivered into the structure. A closed loop system uses a small, low-wattage pump to circulate the liquid. Closed loops can be installed in the ground horizontally in a trench, vertically in drilled holes or submerged in a pond or lake. All three are sealed airtight and, when designed properly, produce similar efficiencies.



What about quality?

WaterFurnace... committed to total quality assurance

You can rest easy knowing that each Northern Leader unit is computer run-tested in all operating modes to ensure efficiency and reliability. Each unit carries an exclusive Quality Assurance emblem which is personally signed to verify our commitment to quality and to your comfort.

Your Northern Leader unit is also built with the industry's highest quality components and meets the quality standards of industry bodies, such as:



Air Conditioning and Refrigeration Institute



ETL Testing Laboratories

What about my warranty?

We've got you covered!

WaterFurnace International offers several options for warranty coverage to meet the varying needs of our customers. The standard Northern Leader warranty provides coverage for all parts and WFI supplied accessories plus a labor allowance for 10 years. Other warranty options include: 5 years parts and labor, 5 years parts only, and 1 year parts only. Refer to your warranty certificate or check with your WaterFurnace dealer to determine the extent of your warranty coverage.

Installations in commercial buildings carry different warranties.

Please read all warranty certificates carefully to familiarize yourself with the terms of the warranty so that you obtain full benefits and avoid misunderstandings. If you have any questions about warranty coverage, contact your WaterFurnace dealer.

Your Northern Leader warranty registration card must be returned to WaterFurnace International immediately after installation to receive full warranty benefits.

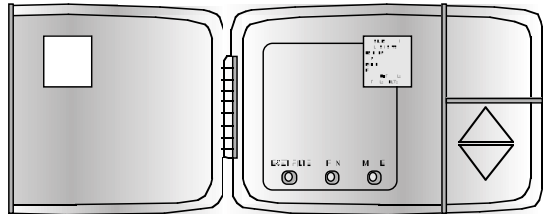
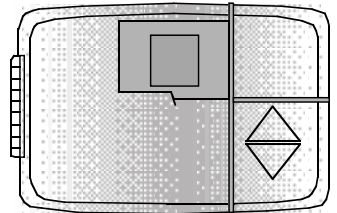
Operating Procedures

To enjoy all the benefits of your Northern Leader GeoExchange system, please review the following operating procedures, service tips and information. You'll find your system easy to operate and simple to maintain at its peak performance. However, if you have any questions or problems, contact your local WaterFurnace dealer.

What do I need to know about my thermostat?

Your digital thermostat has been designed to provide highly accurate control of room temperature. In addition, it will display information relating to your system's operation. The clearly marked buttons and informative display make it easy to understand and simple to use.

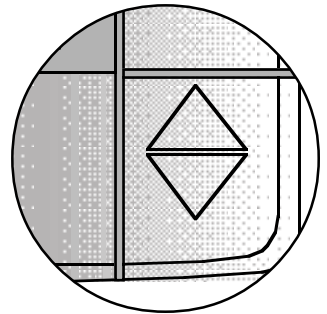
Note: *WaterFurnace offers several different thermostats that can be used with your Northern Leader system. The instructions that follow apply only to the type of thermostat pictured here. For operating instructions of other thermostats, contact your WaterFurnace dealer.*



General information

The thermostat normally displays room temperature, mode of operation selected and current system status. The five buttons on the front allow complete control of the system.

You may select different heating and cooling setpoints for the system to maintain; e.g. 70°F in heating and 75°F in cooling. Raising and lowering the setpoints in heating or cooling is as simple as pushing a button. In addition, your WaterFurnace dealer can configure the thermostat for either °F or °C on the display.



Important: Always allow the system at least five minutes to respond to any changes in settings. The thermostat has been programmed to start the heating or cooling cycle in stages.

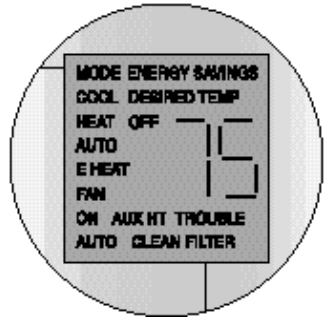
Note: The electronic thermostat cannot be set closer than 3° between heating and cooling.

How do I set my thermostat?

Mode button

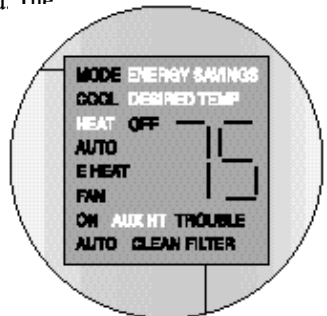
Push and release the **MODE** button to select the desired mode of operation. Each time the **MODE** button is pushed and released, the thermostat will select a different mode. The different modes are as follows (in sequence):

OFF	System will not operate
COOL	Cooling operation only
HEAT	Heating operation only
AUTO	Heating or cooling operation
E-HEAT	Heating with auxiliary heat only



Heat

Push and release the **MODE** button until the display reads **HEAT**. Your system is now in the heating mode. To review the heating setpoint, momentarily press either the \triangle or ∇ button and you will see your current setpoint displayed along with the words **DESIRED TEMP** illuminated on the display. The display will read **HEAT** and **ENERGY SAVINGS** when the system is operating in either the first or second stage heating mode. The heating cycle starts with the fan and compressor on a lower speed. This lower fan speed reduces the sound level and increases air temperature. Note: It is normal for the Northern Leader GeoExchange system to have extended run times in low speed. The Northern Leader two-speed is the most efficient in low speed operation. Should the thermostat require maximum heat, the fan and compressor will switch to a higher speed. During extreme cold weather additional heating capacity may be required. At such times, the thermostat will automatically request auxiliary heating assistance, and display the words **AUX HT**. The **ENERGY SAVINGS** on the display is not illuminated when auxiliary heat is being used.



Note: If your system is not equipped with auxiliary heat, the thermostat may still indicate a request for auxiliary heat.

At the end of the heating cycle, the fan will remain on for approximately 30 seconds, unless "Continuous Fan" has been selected.

Cool

Push and release the **MODE** button until the display reads **COOL**. Your system is now in the cooling mode.

To review the cooling setpoint, momentarily press either the \triangle or ∇ button and you will see the current setpoint and **DESIRED TEMP** on the display.

To adjust the setpoint, press and hold either the \triangle or ∇ button until the desired temperature is displayed.

Note: As the cooling setpoint is adjusted, the words **DE-
SIRED TEMP** will be displayed.

The words **COOL** and **ENERGY SAVINGS** will be displayed when the system is operating in the cooling mode.

At the end of the cooling cycle, the fan will remain on for approximately 30 seconds, unless "Continuous Fan" has been selected.

Auto

Push and release the **MODE** button until the display reads **AUTO**. Your system is now in the automatic mode, with either heating or cooling operation available.

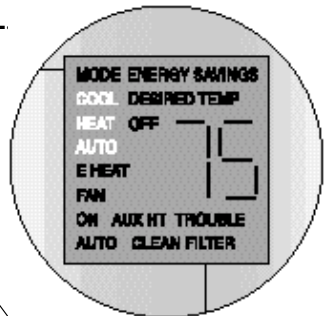
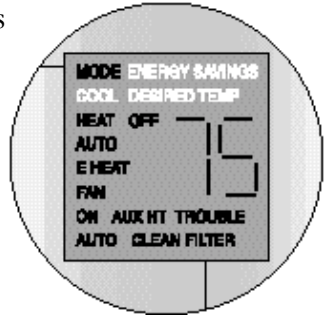
To review the heating and cooling setpoints, momentarily press either the \triangle or ∇ button. The thermostat will then either display the current heating setpoint and the word **HEAT** or the cooling setpoint and the word **COOL**. If the heating setpoint and the word **HEAT** is displayed, pressing the **MODE** button within five seconds will display the cooling setpoint and the word **COOL**.

If the cooling setpoint and the word **COOL** is displayed, pressing the **MODE** button within five seconds will display the heating setpoint and the word **HEAT**.

To adjust the heating setpoint, press and hold either the \triangle or ∇ button while reviewing the heating setpoint.

Note: As the heating setpoint is adjusted, the words **DESIRED TEMP** will be displayed.

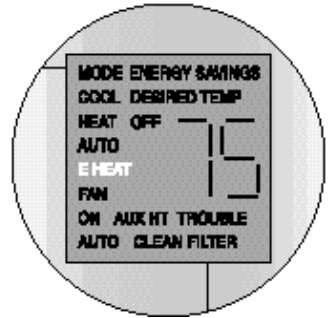
To adjust the cooling setpoint, press and hold either the \triangle or ∇ button while reviewing the cooling setpoint. Note: As the cooling setpoint is adjusted, the words **DESIRED TEMP** will be displayed.



Emergency Heat

Push and release the **MODE** button until the word **E-HEAT** is displayed. Your system is now in the emergency heat mode. Emergency heat mode uses only the auxiliary heat to maintain comfort. This should only be used if your Northern Leader unit is inoperable.

Note: If your system is not equipped with auxiliary heat, do not select the emergency heat mode.



Off

Push and release the **MODE** button until the display reads **OFF**. When the word **OFF** is displayed, the system will not provide heating or cooling.

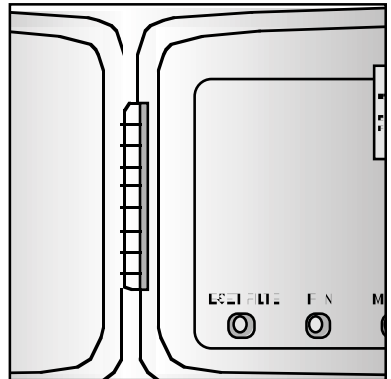
The display still shows room temperature and the fan is operable. Avoid using the **OFF** mode during extremely cold weather to prevent damage to your home from freezing.

How do I set the fan?

Fan button

To select continuous fan operation, press and release the **FAN** button and the display will show the words **FAN ON**. Continuous fan operation uses low speed to quietly circulate the air in your home or building.

Continuous fan operation is useful when using an air cleaner for continuous air filtering or to help maintain even air temperatures throughout a multi-level or large home or building. The fan will come on automatically whenever the system is operating, but there will be no indication of this on the thermostat display.



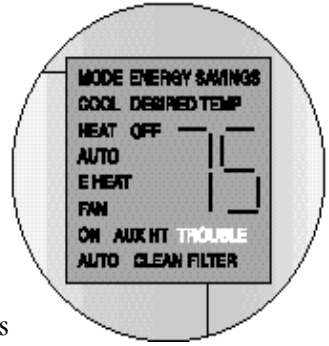
What if the word **TROUBLE** is displayed on the thermostat?

The **TROUBLE** display is used to indicate the following problems:

Continuously on **TROUBLE** with backlight for LCD flashing—the system has shut down due to a protective device (see resetting the unit section, page 15). The auxiliary heat, if installed, will automatically come on if necessary to keep the home or building comfortable.

Slow flashing **TROUBLE** (about 1 flash/second) with backlight for LCD flashing—the unit is not receiving valid thermostat signals. Your unit will operate normally during this time, if possible. Call your WaterFurnace dealer.

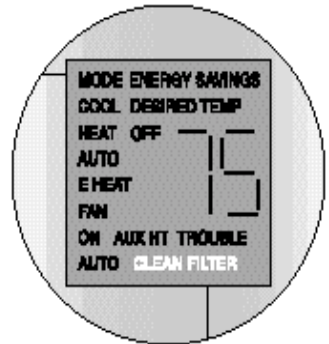
Fast flashing **TROUBLE** (about 3 flashes/second)—the unit is locked-out due to insufficient airflow. Reset the unit (see page 15). If unit still does not operate or the **TROUBLE** display is still on, call your WaterFurnace dealer.



What if the words **CLEAN FILTER** are displayed on the thermostat?

This indicates that it is time to replace or clean the air filter in the system.

After a new (or clean) filter is in place, press the **RESET FILTER** button to reset the timer.



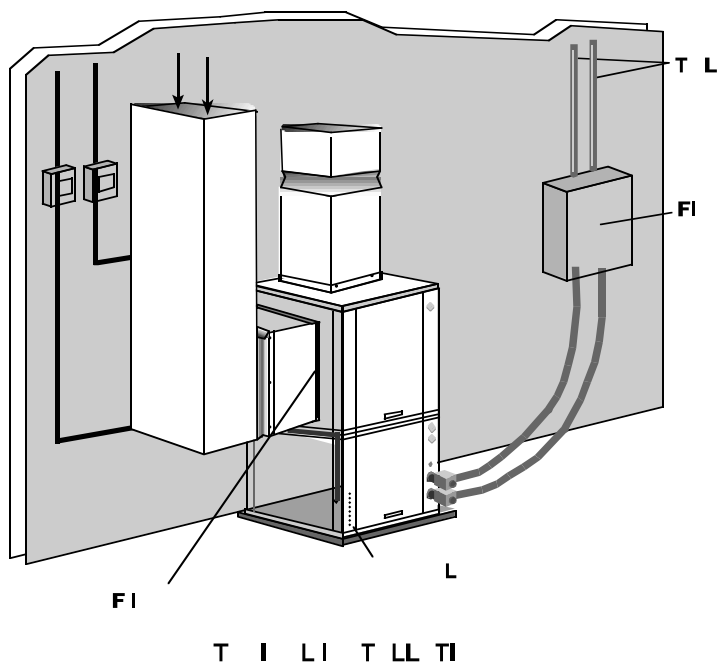
What do I do in case of a power failure?

Don't worry. Your Northern Leader thermostat employs the latest developments in solid-state electronic technology. One of its unique features is the elimination of a battery required to maintain your selected set points in the event of a power loss. The thermostat memory is unaffected by power failures of any duration. When power is restored, the thermostat will continue operating as if the power had never been interrupted. However, there will be no heating or cooling during the outage.

What if my unit stops working?

Your Northern Leader unit has been equipped with a number of self-protection devices and controls. Should you suspect that heating or cooling operation has ceased, look at the thermostat to see if the word **TROUBLE** is displayed.

- If it is on continuously or flashing rapidly, see resetting the unit section, page 15.
- If it is flashing slowly, operation may seem normal but there is a problem. Call your WaterFurnace dealer for assistance.



What do I need to know about the unit itself?

Your Northern Leader unit is equipped with a variety of information and warning lights known as **STATUS** lights. These lights are mounted in plain view on the front left corner of your unit. They will help you properly identify any problems and what might be required to correct the situation.

These lights will:

- help determine whether your system is operating correctly
- help identify any problems

- help determine if you can fix the problem yourself and avoid a service call
- save you time and expense when you need to call an independent WaterFurnace dealer by helping them identify the problem before they come out

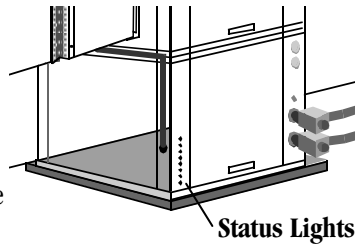
Status light descriptions and service tips

Drain

When this light comes on, it indicates that the condensate drain pan within the unit has reached the overflow level. This may be caused by foreign matter blocking the drain pan opening.

Water Flow

A sensor protects your unit against internal freeze up caused by a water flow loss in the heating mode. When the **WATER FLOW** light is on, this signals that internal freezing conditions have occurred. This may be caused by a pump failure, low antifreeze level or air pockets in the loop piping (see resetting the unit section, page 15).



Low Pressure

When this light is on it indicates a loss in refrigerant pressure in the system or failure of compressor components. This may be caused by a refrigerant leak (see resetting the unit section, page 15). This could also be a signal of low pressure in cooling, due to a dirty filter or low water/antifreeze flow in heating.

High Pressure

When this light is on it indicates high refrigerant pressure. This may be caused by a loss of water flow in the cooling mode or low airflow in the heating mode which could be due to a dirty filter.

Airflow

When this light is on it indicates an airflow problem. Contact your WaterFurnace dealer.

Status

A blinking **STATUS** light indicates that the microprocessor control, which is the “brain” of the unit, is operating properly. If the light doesn't flash, but remains continuously on or off, the control is inoperative. Turn off all power to the unit, including auxiliary heat, and then turn it back on. If the light remains continuously on or off, call your WaterFurnace dealer.

DHW Limit

A sensor monitors the temperature of your hot water tank. The light will come on if the temperature is above 130°F (54°C). At this time your unit's hot water system will be de-energized to prevent excessive temperatures. Don't worry; hot water operation will resume when the tank cools off. This is not a fault condition and the unit does not require resetting.

DHW Pump Switch

When the pump switch is off, your unit's hot water system is disabled, and the **DHW OFF** status light will be lit. This switch may be used when the water heater is being serviced or replaced. This switch must be turned off when water flow from the water heater to the Northern Leader unit is turned off or disconnected. Damage to the pump may otherwise occur.

What kind of safety controls does my unit have?

Your WaterFurnace Northern Leader unit is equipped with safety controls which are designed to protect the unit in case of improper airflow, water flow or refrigerant charge. These safety controls should not be bypassed by anyone. Doing so may void the warranty.

How do I maintain my system?

Caution: Before you perform any maintenance to your system, turn off all electrical power to the unit. There may be separate supplies— one for the unit and one or two for the auxiliary heat.

Filters

- Check your filters every 60 days. A dirty filter will cause your unit to work harder than necessary, waste energy and may cause premature component failure.
- To achieve optimum performance and economical operation, change your “replaceable type” filter if you see a buildup of dust or dirt.
- If you have opted for a permanent electrostatic filter, wash it with a garden hose at least every 60 days. When placing the filter back in the slot, be sure that the arrow on the filter frame points toward the Northern Leader unit.
- After a new or clean filter is in place, press the **RESET FILTER** key on the thermostat.
- Never operate the unit without a filter; this will void the warranty.

Water Supply for Well Water Systems

An adequate water supply to the unit is very important. Do not let anyone disrupt the water supply by re-routing the supply line or tapping into it without first checking with your WaterFurnace dealer. If the well pumping system requires service or is inoperable, your unit should be turned off until an adequate water supply is restored.

Water Supply For Closed Loop Systems

No regular maintenance is required. However, if you notice air noise within the piping or your loop is ever damaged by excavation, contact your WaterFurnace dealer.

What about regular service?

It is suggested that you have the unit inspected by an independent authorized WaterFurnace dealer on an annual basis. They will check the unit's performance and make sure that your Northern Leader unit is heating and cooling at its peak performance level. If your unit is using a well as its water supply, your unit may need periodic cleaning to remove mineral deposits.

If my unit shuts off, how do I reset it?

To reset the unit, repeatedly push the **MODE** button on the thermostat until the display reads **OFF**.

- If **FAN ON** is displayed, it must also be turned off by pushing the **FAN** button.
- The **TROUBLE** signal will continue flashing or remain on for up to 60 seconds after turning the system and fan off.
- After the **TROUBLE** signal goes out, turn the system back on to the desired window or phase.
- Unit operation should resume within five minutes if heating or cooling is required.
- The appropriate status light on the Northern Leader unit will continue indicating the fault. This serves as a diagnostic aid for your dealer.
- If the unit shuts down again, call your WaterFurnace dealer as soon as possible. Do not repeatedly reset your unit.

What if my unit does not operate properly?

Before you call your WaterFurnace dealer for service, check these service hints:

- Check air filters. Depending upon filter type, clean or replace if necessary. (See Filters, page 14.)
- Make sure the thermostat is set properly.
- Check to make sure the electrical disconnect switches are in the **ON** position. Both the unit and auxiliary heat (if present) must be powered for proper operation.
- Check for a tripped circuit breaker or a blown fuse in your home or building's main power box. Reset breaker or replace fuse.
- If the circuit breaker continues to go off after you reset it, call your WaterFurnace dealer immediately to prevent damage to your unit.
- Check the thermostat indicator lights to ensure proper operation of the system.
- Check the unit status lights on the corner of the unit to ensure the unit is operating properly.
- If you can't determine the problem, call your WaterFurnace dealer promptly.

For quick reference, write your WaterFurnace dealer's name and telephone number below.

Dealer: _____

Telephone Number: _____

Date of Purchase: _____

Type of System: Closed Loop Open Loop
 Well Water Pond Loop

Auxiliary Heat: Yes No If yes, what kW? _____

Loop Length: _____

Unit Model #: _____ Serial #: _____

Options: _____

Once again, thank you for purchasing a WaterFurnace GeoExchange heating and cooling system... you've made the best choice for yourself and the environment.

WaterFurnace

9000 Conservation Way
Fort Wayne, IN 46809-9794

Phone: 1-219-478-5667 or
1-800-934-5667
FAX: 1-800-783-5667
<http://www.waterfurnace.com>

Northern Leader Owner's Manual

P/N 96P648A01 009

WaterFurnace is a registered trademark of WaterFurnace, Inc. and
its subsidiaries. Northern Leader is a registered trademark of
Northern Leader. ©2001 WaterFurnace, Inc.