



# GTH2E

## NATURAL AND PROPANE GAS TWO STAGE HIGH EFFICIENCY (CONDENSING) WARM AIR FURNACE

### USER'S INFORMATION MANUAL

**WARNING:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
  
- WHAT TO DO IF YOU SMELL GAS
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
  
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.



An ISO 9001-2008 Certified Company

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## WARNINGS AND SAFETY SYMBOLS

PLEASE READ THIS MANUAL CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICE TECHNICIAN.

### General

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

#### WARNING

Fire, explosion, asphyxiation and electrical shock hazard. Improper maintenance and service could result in death or serious injury. Read this manual and understand all requirements, including use of qualified agency where directed.

Become familiar with symbols identifying potential hazards.



This is the safety alert symbol. Symbol alerts you to potential personal injury hazards. Obey all safety messages following this symbol to avoid possible injury or death.

#### ⚠ DANGER

Indicates a hazardous situation which, if not avoided, WILL result in death or serious injury

#### ⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

#### ⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

#### NOTICE

Used to address practices not related to personal injury.

#### ⚠ CAUTION

##### WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

#### ⚠ WARNING

**If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.**

- Improper installation, adjustment, alteration, service or maintenance could result in death or serious injury. Refer to this manual for proper instructions.
- Should overheating occur or gas burners fail to shut off, close manual gas valve for the furnace before shutting off electrical power to furnace. Failure to do so can cause an explosion or fire resulting in serious injury or death.
- Before restarting furnace, check all plastic vents and wires for damage
- Before operating smell all around appliance area for gas. Be sure to smell next to floor because some gas is heavier than air and will settle to the floor.
- **Use only your hand to turn the gas shutoff valve.** Never use tools. If valve will not turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in fire or explosion.
- Do not store or use gasoline or other flammable vapors and liquids, or other combustible materials in the vicinity of this or any other appliance.

**General Safety Issues**

- Most natural gas systems and all LP gas systems have a service regulator located near the point where gas piping enters the building.
- Propane tanks normally have additional first stage regulator located at tank outlet valve. These regulators located outdoors will have a vent. See Figure 1.

**⚠ WARNING**

Explosion, and fire hazard. Obstruction of the air vent on an LP (propane) cylinder or tank regulator could cause explosion or fire resulting in death or serious injury.

- Your gas supplier should periodically inspect and clean the air vent screen to prevent any obstruction.
- Keep protective regulator cover in place, as exposure to the elements can cause ice buildup and regulator failure.
- Do not store combustible materials against or around the furnace. Keep furnace area clear and free from all combustible materials. This applies to gasoline and other flammable vapors and liquids.
- Do not block or obstruct air openings on the furnace, or air openings supplying combustion or ventilation air to the area where the furnace is installed. There are many areas from which your furnace could be receiving combustion and ventilation air including from within the heated area (inside air), from outdoors, from an attic or crawl space.
- If renovations are done, verify the air supply openings are not inadvertently covered over with insulation, vapor barrier, or similar construction material.
- All doors and panels must be in place during normal furnace operation. Attempting to operate the furnace with missing doors or panels could lead to the creation of carbon monoxide gas.
- If the furnace is installed in a confined space or if you intend to build a furnace room where insulation is present, be aware that some insulating materials are combustible. Do not allow building insulating materials to come into contact with the furnace.
- Familiarize yourself with the location of the furnace gas manual shut-off valve and any electrical switches, fuse or circuit breaker associated with the furnace.
- If the furnace has been subjected to flood conditions, i.e., if any part of the furnace has been under water, call a qualified installer, service agency or gas supplier for a complete inspection. Electronic controls and gas train components may become unstable and unreliable. The furnace must not be used until the furnace has been checked, and any affected parts have been replaced.

**Figure 1 - Gas Regulator Vent**

REGULATOR VENT  
Keep free of ice, snow, and debris.



It is important for these vents to remain clear.

Do not allow moisture, which could freeze, to build up in the vent.

If you see moisture building up in the regulator vent, contact your gas supplier.

- Familiarize yourself with the location of your furnace filter or filters. A blocked air filter will reduce efficiency, increase fuel consumption, raise the furnace operating temperature, and shorten the life of furnace components.
- Do not cover return air grills and supply air registers with drapes, curtains, throw rugs, etc.
- Avoid shutting off supply air registers. The furnace requires a quantity of air passing over the heat exchanger to operate within design temperatures. Reducing the number of supply air registers available for air delivery may have the consequence of raising the furnace operating temperature, reducing furnace efficiency, and shortening the life of the furnace components.

## FURNACE OPERATION INFORMATION

During heating season, furnace operation is fully automatic.

### To Start The Furnace:

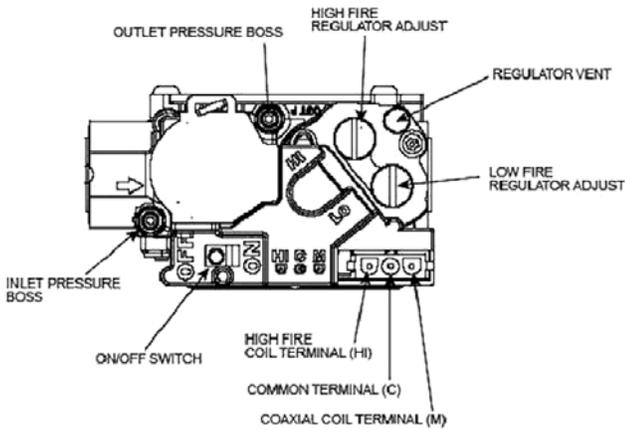
1. Read these instructions and safety notices thoroughly.
2. Set thermostat to lowest setting.
3. Verify all supply air registers and return air grilles are open.

If this is the first time the furnace has undergone a trial ignition since installation, or if there has been work done on the gas lines, furnace might not light because of air trapped in gas supply line.

Turn thermostat down to its lowest setting, wait 5 minutes, adjust thermostat to desired setting.

If the problem persists, proceed to "Furnace Shut-Down Procedure" and call your Installer, service agency or gas supplier.

Figure 2 - White Rodgers 36G54 Gas Valve



### Furnace Shut-Down Procedure:

1. Set thermostat to its lowest setting.
2. Shut off electric power to furnace.
3. Turn appliance manual shut-off valve to "OFF" position.
4. Remove burner access door, turn manual gas control switch to "OFF" position, re-install burner access door.

If you intend to be away from home for lengthy periods of time during non-heating season, it is advisable to follow furnace shut down procedure

4. Turn off electric power to the furnace.
5. Remove burner access door.
6. Verify the appliance manual shut-off valve is in "ON" position. Valve handle is normally in-line with gas pipe and valve body when it is in "ON" position; perpendicular to the gas piping and valve body when it is in "OFF" position.
7. Turn manual gas control switch to "OFF" position. See Figure 2.
8. Wait 5 minutes to clear out any gas. If, after this time you smell gas, STOP. Turn appliance manual shut-off valve to "OFF" position. If burning propane or other LP gas, smell for gas near the floor since propane and butane are both heavier than air. If after this time you do not smell gas, continue to next step.
9. Turn manual gas control switch to "ON" position.
10. Replace burner access door, verify it is properly in place.
11. Restore electric power to furnace.
12. Adjust thermostat to desired setting. If thermostat also controls air conditioning system, verify the thermostat system switch is in "HEAT" or "AUTO" mode.

**Air Filter**

- Do not operate your furnace or air conditioner for extended periods of time without an air filter.
- Portion of the dust entrained in the air may temporarily lodge in air duct runs and supply registers. Any recirculated dust particles will be heated and charred by coming into contact with heat exchanger. This residue will soil ceilings, walls, drapes, carpets, furniture, and other household articles.

**⚠ WARNING**

Electrical shock hazard. Turn OFF electrical power supply at service panel before attempting maintenance. Failure to do so could result in death or serious injury.

- Follow air filter manufacturer’s instructions for removing and cleaning the filter.
- Allow the filter to dry thoroughly before reinstallation. Never operate the blower fan with a wet filter.
- Consult your installation contractor or service technician if you have any questions on filters.
- If cleaning the filter, verify filter is re-installed with airflow direction identical to its previous use. Reversing the filter will cause dust trapped within filter to break free and recirculate within the duct system.

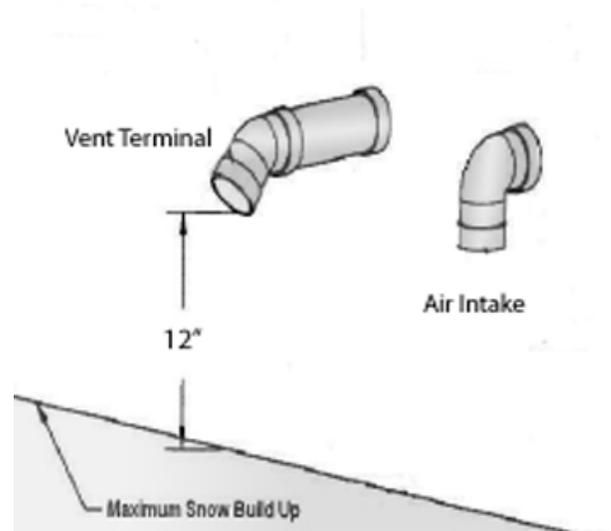
**Lubrication**

Circulating air blower, and induced blower assembly motors have sealed bearings. Bearings contain permanent special purpose lubricants. Attempting to force common oil into circulating and induced blower motor bearings will deteriorate the original lubricant and shorten bearing life.

**Routine Examination**

- Recommend your furnace and vents be checked by qualified service technician once a year.
- Do not allow snow, ice or debris to accumulate around outdoor furnace exhaust and combustion air intake terminals. Blockage of exhaust or combustion intake terminals can result in inadequate performance or nuisance shut-downs. Homeowner should inspect the vent terminal and air intake regularly to ensure they are free and clear of snow.
- Maintain at least one foot of clearance between snow build-up and vent/combustion air intake openings at all times. Clear away excess snow to maintain this clearance.

**Figure 3 - Vent Terminal Clearance**



It is good practice to give a quick inspection of your furnace each time you inspect or clean the air filter.

- Check furnace for obvious signs of deterioration.
- Check venting and combustion air piping to ensure it is still fastened to the furnace. It should not sag, and should have a ¼" to the foot slope upwards to the outside wall or termination.
- There should be no water marks on floor under venting. Water marks may indicate leaking pipe joint.
- All ductwork should be secured to furnace, and all ductwork should be solidly supported throughout heating system.
- Water should flow easily through condensate drain line. Excess debris in drain line may indicate a problem which should be referred to your service contractor.
- Gas burner should be observed during heating season to verify flames are clean and blue. A bit of orange color in flame is not likely to be a problem and is probably dust particles burning. If you observe lazy yellow flames, call your heating or service contractor immediately. Yellow flames may lead to soot-ups.

## ROUTINE MAINTENANCE BY HOMEOWNER

Your furnace should be cleaned and inspected annually by trained and qualified service technician. Your service technician has the knowledge and test equipment to determine the condition of your furnace

### Furnace Appearance

- Furnace exterior finish is a durable automotive like coating. It may be washed with mild soap if necessary.
- Galvanized metal surfaces require no maintenance.
- Keep dust buildup on warm surfaces to a minimum, since dust can be combustible.
- Dust build-up in circulating fan can impair blower performance.
- Recovery coil is located immediately above blower assembly. It may become coated with dust.

To clean recovery coil:

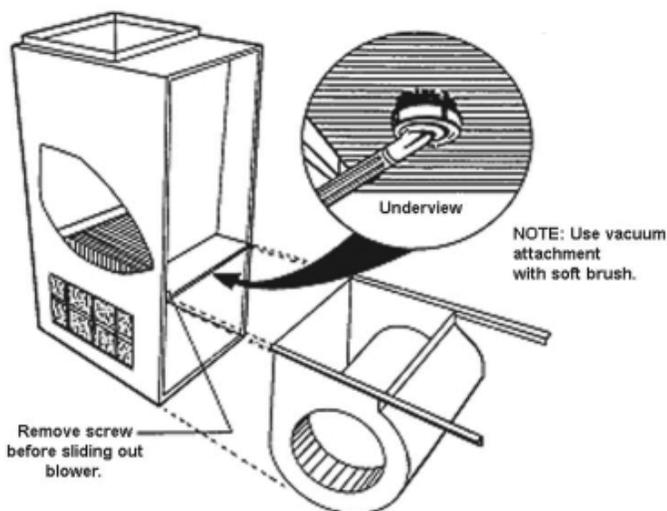
1. Disconnect electrical power to furnace.
2. Remove blower access door
3. Remove screws fastening blower assembly to blower division panel.

### NOTICE

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify operation after servicing.

4. Unplug harness from blower division, junction box and remove thermostat wires.
5. Pull blower assembly out.
6. Once blower assembly has been removed, coils may be vacuumed with soft brush attachment. See Figure 4.

**Figure 4 - Recovery Coil Access**



7. Match up the blower rails with hangers on underside of blower division panel, slide blower assembly back into position.
8. Be careful not to bend the fins when cleaning. You may wish to leave this maintenance procedure to your service technician.
9. Replace screws fastening blower assembly to blower division panel.
10. Secure harnesses to blower division and junction box. Connect thermostat wiring to control board.
11. Replace blower access door.
12. Restore electrical power to furnace.

### WARNING

Fire, explosion hazard. Do not clean burner area while burners are operating. Failure follow these instructions could result in death or serious injury.

### WARNING

Electrical shock hazard. Disconnect electrical supply to furnace before removing burner compartment access door. Failure to follow these instructions could result in death or serious injury.

- Have cleaning of interior of recovery coil done by trained qualified service technician. Evidence cleaning is necessary may include large amounts of dirt or debris building up in condensate drain line.
- Inspect and clean burner area periodically. Take care when cleaning around burner area. Hot surface igniter is fragile and will break easily. Do not touch hot surface igniter or flame rod.
- Furnace gas train is designed to operate as sealed unit. Verify burner compartment access door is properly in place before attempting to restart furnace.

Condensation must be properly disposed into sump or drainage system. Condensate lines must remain clear and free flowing. Do not allow plastic drain lines to become pinched or kinked. Blocked drain line may cause furnace to operate erratically, or not at all.

**Sequence of Operation**

1. Room temperature drops causing room thermostat call for first stage heat by connecting "W1" to "R". The control verifies the limit switch is closed and both the low and high pressure switches are open. The control energizes the induce draft motor on high speed and waits for the low pressure switch to close. The inducer remains on high speed and begins a 15 second pre-purge period. The high pressure switch is ignored. If the low pressure switch does not close within 60 seconds, the control will flash "2" on the Status LED, and de-energize the inducer for 60 minutes.
2. When the 15 second pre-purge time has elapsed, the control energizes the \*HSI output for a 5 second warm-up period (10 seconds on retries). The control energizes the low main gas valve. 4 seconds after the gas is energized, the control de-energized the \*HSI output and leaves the gas energized another 1 second for flame proving. If flame is present at the end of the trial for ignition time, the control leaves the gas valve energized, inducer on high speed, and begins heat blower on delay. The control always ignites on high inducer/low gas and ignores second stage call for heat until low heat is established for 15 seconds. (\*HSI= Hot Surface Ignition)
3. Blower on delay time begins when the gas 5 - HOMEOWNER'S REFERENCE valve is energized. The control provides the ECM (Electronically Commutated Motor) low heat speed signal when flame is proven, and starts a 30 second soft start (slowly ramp up) blower delay before full capacity blower level.
4. When there is a demand for 2nd stage heat from Thermostat W2 or automatic staging , the control changes the inducer from low to high speed. When high pressure switch closes, the control changes indoor blower speed from Low heat to High heat and energizes high gas output. If the High pressure switch is open the Green LED will flash. If the High pressure switch is closed the Green LED will be on. High gas valve drops out while high pressure switch is open because it is directly in series with the high pressure switch.
5. When the thermostat W2 call ends and W1 remains (two stage thermostat), the control de-energizes the high gas output and immediately changes inducer speed from high to low. With the thermostat heating contacts open (single stage thermostat), the flames extinguish immediately and the induced blower stops after a 5 second post purge time.
6. Blower off delay is handled by the ECM (Electronically Commutated Motor). The control de-energizes the ECM heat signal when the gas valve de-energizes, and starts a programmed soft stop (slowly ramp down) delay period.

**Variations**

If your system includes air conditioning, your thermostat (installer supplied) will likely have two switches.

- First switch is system switch. Switch settings include HEAT, COOL, and OFF.
- Some thermostats have system switches which include HEAT, COOL, AUTO, and OFF.
- System switch must be in HEAT or AUTO position for furnace to run.

Second switch is fan switch. It usually has settings of ON and AUTO. Fan switch may be in either position when using furnace. If fan switch is set to ON, main blower will run continuously.



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