RG1 & RO1 Series

INSTALLATION INSTRUCTIONS

Downflow, Direct Vent (Sealed Combustion)
Forced Air Gas & Oil Furnaces

For installation in:
• Manufactured Homes
• Recreational Vehicles, Park Models, & Manufactured Buildings
• Modular Homes / Buildings

⚠️ WARNING / AVERTISSEMENT

FIRE OR EXPLOSION HAZARD
• Failure to follow safety warnings exactly could result in serious injury or property damage.
• Installation and service must be performed by a qualified installer, service agency or the gas supplier.
• 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.
• Leave the building immediately.
• Immediately call your gas supplier from a neighbors phone. Follow the gas suppliers instructions.
• If you cannot reach your gas supplier, call the fire department.

RISQUE D’INCENDIE OU D’EXPLOSION
• Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.
• L’installation et l’entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gaz (“installateur” qualifié, un organisme de service ou le fournisseur de gaz). Ne pas entreposer ni utiliser de l’essence ni d’autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

QUE FAIRE S’IL Y A UNE ODEUR DE GAZ
• Ne pas tenter d’allumer aucun appareil.
• Ne toucher à aucun interrupteur électrique; n’utiliser aucun téléphone dans le bâtiment.
• Évacuer l’immeuble immédiatement.
• Appeler immédiatement le fournisseur de gaz en employant le téléphone d’un voisin. Respecter à la lettre les instructions du fournisseur de gaz.
• Si personne ne répond, appeler le service des incendies.

DO NOT DESTROY. PLEASE READ CAREFULLY & KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPORTANT SAFETY INFORMATION</td>
<td>3</td>
</tr>
<tr>
<td>REQUIREMENTS &amp; CODES</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL INFORMATION</td>
<td>5</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>5</td>
</tr>
<tr>
<td>Minimum Clearances</td>
<td>5</td>
</tr>
<tr>
<td>Applications</td>
<td>5</td>
</tr>
<tr>
<td>Unit Location</td>
<td>5</td>
</tr>
<tr>
<td>CIRCULATING AIR REQUIREMENTS</td>
<td>7</td>
</tr>
<tr>
<td>Return Air Connections</td>
<td>7</td>
</tr>
<tr>
<td>Supply Air Connections</td>
<td>7</td>
</tr>
<tr>
<td>FURNACE INSTALLATION</td>
<td>8</td>
</tr>
<tr>
<td>General Information</td>
<td>8</td>
</tr>
<tr>
<td>Locating &amp; Cutting Duct Openings</td>
<td>8</td>
</tr>
<tr>
<td>Standard Duct Connector Installation</td>
<td>8</td>
</tr>
<tr>
<td>Alternate Attachment Method</td>
<td>9</td>
</tr>
<tr>
<td>Round Duct Connector Installation</td>
<td>10</td>
</tr>
<tr>
<td>Installing the Furnace</td>
<td>10</td>
</tr>
<tr>
<td>ROOF JACK INSTALLATION</td>
<td>11</td>
</tr>
<tr>
<td>Roof Jack Selection</td>
<td>11</td>
</tr>
<tr>
<td>Locating &amp; Cutting Roof/Ceiling Openings</td>
<td>12</td>
</tr>
<tr>
<td>Installing The Roof Jack</td>
<td>12</td>
</tr>
<tr>
<td>Installation of Transit-Mode Venting System</td>
<td>13</td>
</tr>
<tr>
<td>ELECTRICAL INFORMATION</td>
<td>14</td>
</tr>
<tr>
<td>Line Voltage Wiring</td>
<td>14</td>
</tr>
<tr>
<td>Connecting Power Supply Wires</td>
<td>14</td>
</tr>
<tr>
<td>Low Voltage Wiring</td>
<td>15</td>
</tr>
<tr>
<td>Connecting Thermostat Wires</td>
<td>15</td>
</tr>
<tr>
<td>Verifying Anticipator Setting</td>
<td>15</td>
</tr>
<tr>
<td>Grounding</td>
<td>15</td>
</tr>
<tr>
<td>FUEL SUPPLY &amp; PIPING</td>
<td>16</td>
</tr>
<tr>
<td>Leak Check</td>
<td>17</td>
</tr>
<tr>
<td>Oil Tank &amp; Piping Installation</td>
<td>17</td>
</tr>
<tr>
<td>One-Line System</td>
<td>18</td>
</tr>
<tr>
<td>Two-Line System</td>
<td>18</td>
</tr>
<tr>
<td>Fuel line Hook-Up</td>
<td>18</td>
</tr>
<tr>
<td>Fuel Line Bleeding</td>
<td>18</td>
</tr>
<tr>
<td>Priming furnaces equipped with Honeywell</td>
<td>19</td>
</tr>
<tr>
<td>R7184 primary control</td>
<td>19</td>
</tr>
<tr>
<td>Priming furnaces equipped with Beckett 7505</td>
<td>19</td>
</tr>
<tr>
<td>primary control</td>
<td>19</td>
</tr>
<tr>
<td>Fuel Oil Type</td>
<td>19</td>
</tr>
<tr>
<td>Conversion to Propane (LP) Gas</td>
<td>19</td>
</tr>
<tr>
<td>Atmospheric &amp; Direct Ignition Furnaces</td>
<td>19</td>
</tr>
<tr>
<td>High Altitude Conversion</td>
<td>19</td>
</tr>
<tr>
<td>Flue Gas Sampling</td>
<td>20</td>
</tr>
<tr>
<td>STARTUP &amp; ADJUSTMENTS</td>
<td>21</td>
</tr>
<tr>
<td>RG1 Operating Instructions</td>
<td>22</td>
</tr>
<tr>
<td>How to Shut Off Gas - Direct Ignition</td>
<td>22</td>
</tr>
<tr>
<td>RO1 Operating Instructions</td>
<td>22</td>
</tr>
<tr>
<td>How to Shut Off Gas - Oil &amp; Gas Gun</td>
<td>22</td>
</tr>
<tr>
<td>Verifying &amp; Adjusting Temperature Rise</td>
<td>23</td>
</tr>
<tr>
<td>Burner Adjustments</td>
<td>23</td>
</tr>
<tr>
<td>Gas Pressure</td>
<td>23</td>
</tr>
<tr>
<td>Combustion Air</td>
<td>23</td>
</tr>
<tr>
<td>Oil Gun Only (RO1 Models)</td>
<td>23</td>
</tr>
<tr>
<td>Electrode Setting (Oil Gun Only)</td>
<td>23</td>
</tr>
<tr>
<td>Switching Ignition Control between Interrupted and Intermittent Duty</td>
<td>23</td>
</tr>
<tr>
<td>OPERATING SEQUENCE</td>
<td>24</td>
</tr>
<tr>
<td>Direct Ignition Furnaces (RG1 Models)</td>
<td>24</td>
</tr>
<tr>
<td>Oil Gun Furnaces (RO1 Models)</td>
<td>24</td>
</tr>
<tr>
<td>FURNACE CONTROLS &amp; FUNCTIONS</td>
<td>24</td>
</tr>
<tr>
<td>TROUBLESHOOTING</td>
<td>25</td>
</tr>
<tr>
<td>Direct Ignition Furnaces (RG1 Models)</td>
<td>25</td>
</tr>
<tr>
<td>Oil Gun - Honeywell R7184 or Beckett 7505</td>
<td>26</td>
</tr>
<tr>
<td>Controls Only - RO1 Series</td>
<td>26</td>
</tr>
<tr>
<td>OPTIONAL ACCESSORIES</td>
<td>27</td>
</tr>
<tr>
<td>Optional Add-On Air Conditioning</td>
<td>28</td>
</tr>
<tr>
<td>MAINTENANCE</td>
<td>28</td>
</tr>
<tr>
<td>Homeowner Information</td>
<td>28</td>
</tr>
<tr>
<td>Installer Information</td>
<td>28</td>
</tr>
<tr>
<td>Additional Oil Furnace Maintenance</td>
<td>28</td>
</tr>
<tr>
<td>FIGURES &amp; TABLES</td>
<td>29</td>
</tr>
<tr>
<td>Table 10. RG1/RO1 Furnace Specifications - Factory Settings</td>
<td>29</td>
</tr>
<tr>
<td>Table 11. Equivalent Orifice Sizes for High Altitude Installations</td>
<td>30</td>
</tr>
<tr>
<td>Table 12. A/C Blower Speed Selection Chart</td>
<td>30</td>
</tr>
<tr>
<td>Gas Information</td>
<td>31</td>
</tr>
<tr>
<td>Table 13. Gas Flow Rates</td>
<td>31</td>
</tr>
<tr>
<td>Table 14. Gas Pipe Capacities</td>
<td>31</td>
</tr>
<tr>
<td>Electrical Information</td>
<td>32</td>
</tr>
<tr>
<td>Figure 38. Gas Direct Ignition Furnace, Heating &amp; A/C Ready - All RG1 Models</td>
<td>32</td>
</tr>
<tr>
<td>Figure 39. Gas and Oil Furnaces, A/C Ready - RO1 (066, 086) Models</td>
<td>33</td>
</tr>
<tr>
<td>INSTALLATION / PERFORMANCE CHECK LIST</td>
<td>36</td>
</tr>
</tbody>
</table>
IMPORTANT SAFETY INFORMATION

Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. WARNING indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. CAUTION indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

⚠️ WARNING:

The safety information listed below must be followed during the installation, service, and operation of this furnace. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

⚠️ WARNING:

FIRE AND EXPLOSION HAZARD

Can result in serious injury or death.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Storage of or use of gasoline or other flammable vapors or liquids in the vicinity of this or any appliance can result in serious injury or death.

⚠️ AVERTISSEMENT:

RISQUE D’INCENDIE ET D’EXPLOSION

Risque de blessures graves ou de mort.

Ne pas entreposer ni utiliser de l’essence ni d’autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil. Le fait d’entreposer ou d’utiliser de l’essence ou d’autres liquides ou vapeurs inflammables à proximité de cet appareil ou de tout autre appareil peut causer des blessures graves ou la mort.

⚠️ WARNING:

Do not use this appliance if any part has been submerged under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control that has been submerged underwater.

REQUIREMENTS & CODES

• This furnace must be installed in accordance with these instructions, all applicable local building codes and the current revision of the National Fuel Gas Code (NFPA54/ANSI Z223.1) or the Natural Gas and Propane Installation Code, CAN/CGA B149.1.


• Use only with type of gas approved for this furnace. Refer to the furnace rating plate.

• Install this furnace in accordance to the minimum clearances to combustible materials listed in Table 1, (page 6).

• Provide adequate combustion and ventilation air to the furnace space as specified on page 7 and page 23. Do not block or obstruct air openings on the furnace, air openings to the area where the furnace is installed, or the space around the furnace.

• Combustion products must be discharged outdoors. Connect this furnace to an approved vent system, as specified on pages 11 - 13.

• Never test for gas leaks with an open flame. Use a commercially available soap solution to check all connections. See page 17.

• This furnace is designed to operate with a maximum external pressure rise of 0.5 inches of water column. Consult Table 12, (page 30) and the rating plate for the proper circulating air flow and temperature rise.

NOTE: It is important that the duct system be designed to handle the desired flow rate and external pressure rise. An improperly designed duct system can result in nuisance shutdowns, and comfort or noise issues.

• When supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air shall also be handled by duct(s) sealed to the furnace casing and terminating outside the space containing the furnace. See pages 8 - 10.

• This furnace may not be used for temporary heating of buildings or structures under construction.

• The information listed below is for reference purposes only and does not necessarily have jurisdiction over local or state codes. Always consult with local authorities before installing any gas appliance.
Additional information listed below is for reference purposes only and does not necessarily have jurisdiction over local or state codes. Always consult with local authorities before installing any gas appliance.

**Combustion & Ventilation Air**
- **US**: National Fuel Gas Code (NFGC), Air for Combustion and Ventilation
- **CANADA**: Natural Gas and Propane Installation Codes (NSCNGPIC), Venting Systems and Air Supply for Appliances

**Duct Systems**
- **US and CANADA**: Air Conditioning Contractors Association (ACCA) Manual D, Sheet Metal and Air Conditioning Contractors National Association (SMACNA), or American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Fundamentals Handbook

**Electrical Connections**
- **US**: National Electrical Code (NEC) ANSI/NFPA 70
- **CANADA**: Canadian Electrical Code CSA C22.1

**Gas Piping & Gas Pipe Pressure Testing**
- **US**: NFGC and National Plumbing Codes
- **CANADA**: NSCNGPIC

**General Installation**
- **US**: Current edition of the NFGC and the NFPA 90B. For copies, contact the National Fire Protection Association Inc., Batterymarch Park, Quincy, MA 02269; or American Gas Association, 400 N. Capitol, N.W., Washington DC 20001 or www.NFPA.org
- **CANADA**: NSCNGPIC. For a copy, contact Standard Sales, CSA International, 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, M9W 1R3 Canada

**Safety**
- **Federal Manufactured Home Constructions & Safety Standard (H.U.D. Title 24, Part 3280.707[a][2])**
- **The Standard for Manufactured Home Installations (Manufactured Home Sites, Communities, and Set-Ups) ANSI A225.1 and/or CAN/CSA-2240 MH Series).**
- **American National Standard (ANSI-119.2/NFPA-501C) for all recreational vehicle installations.**
- **CANADA**: CAN/CGA-B149.1 and .2–M00 National Standard of Canada. (NSCNGPIC)

- **The Commonwealth of Massachusetts requires compliance with regulation 248 CMR 4.00 and 5.00 for installation of through—the–wall vented gas appliances as follows:**

  1. **For direct-vent appliances, mechanical-vent heating appliances or domestic hot water equipment, where the bottom of the vent terminal and the air intake is installed below four feet above grade the following requirements must be satisfied:**
     
     a.) A carbon monoxide (CO) detector and alarm shall be placed on each floor level where there are bedrooms. The detector shall comply with NFPA 720 (2005 Edition) and be mounted in the living area outside the bedroom(s).
     
     b.) A (CO) detector shall be located in the room that houses the appliance or equipment and shall:
       
       - Be powered by the same electrical circuit as the appliance or equipment. Only one service switch shall power the appliance and the (CO) detector;
       - Have battery back-up power;
       - Meet ANSI/UL 2034 Standards and comply with NFPA 720 (2005 Edition); and Approved and listed by a Nationally Recognized Testing Laboratory as recognized under 527 CMR.
     
     c.) A Product-approved vent terminal must be used, and if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer’s instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.
     
     d.) A metal or plastic identification plate shall be mounted at the exterior of the building, 4 feet directly above the location of vent terminal. The plate shall be of sufficient size, easily read from a distance of eight feet away, and read “Gas Vent Directly Below”.

  2. **For direct-vent appliances, mechanical vent heating appliances or domestic hot water equipment where the bottom of the vent terminal and the air intake is installed above four feet above grade the following requirements must be satisfied:**

     a.) A (CO) detector and alarm shall be placed on each floor level where there are bedrooms. The detector shall comply with NFPA 720 (2005 Edition) and be mounted in the living area outside the bedroom(s).
     
     b.) A (CO) detector shall:
       
       - Be located in the room that houses the appliance or equipment;
       - Be hard-wired, battery powered or both.
     
     c.) A product-approved vent terminal must be used, and if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer’s instructions. A copy of the installation instructions shall remain with the appliance or equipment at the completion of the installation.
GENERAL INFORMATION

⚠️ CAUTION:

- Do Not alter or modify this furnace or any of its components.
- Never attempt to repair damaged or inoperable components. This may cause unsafe operation, explosion, fire and/or asphyxiation.
- If furnace malfunctions or does not operate properly, contact a qualified service agency or gas utility for assistance.

Manufacturer Warranty
(Owner's Responsibilities)

A warranty certificate with full details is included with these instructions. Carefully review these responsibilities with your manufactured housing dealer, service company or gas supplier. It is the sole responsibility of the homeowner to make certain the gas furnace has been correctly set up and converted to the proper fuel (L.P. gas or Natural gas) and adjusted to operate properly. All gas furnaces are manufactured for Natural gas and must be field converted when using L.P. gas.

The manufacturer will not be responsible for any costs found necessary to correct problems due to improper setup, improper installation, furnace adjustments, improper operating procedure on the part of the user, etc. Some specific examples of service calls which cannot be included in warranty payments are:

- Converting the furnace to use another type of gas.
- Repairing duct work in the home found to be faulty.
- Correcting wiring problems in the electrical circuit supplying the furnace.
- Resetting circuit breakers, blown fuses or other switches.
- Correcting problems due to improper gas supply pressure to the furnace.
- Providing instructional training on how to light and operate the furnace.
- Furnace problems caused by installation of an air conditioner, heat pump or other air comfort devices.
- Adding a Roof Jack extension because of unusual wind and/or snow conditions.
- Revising installation of the furnace flue assembly (Roof Jack).
- Adjusting or calibrating of thermostat.
- Any construction debris which falls into flue system.

Minimum Clearances

This heating appliance must be installed with clearances no less than the minimums listed in Table 1, (page 6). This furnace must be installed with ample clearance for easy access to the air filter, blower assembly, burner assembly, controls, and vent connections. See Figure 1, Figure 2, and Figure 3 (page 6). The dimensions of the room or alcove must be able to accommodate the overall size of the furnace and the installation clearances listed in Table 1 and in Figure 4 (page 6).

- Alcove installations: minimum 18" clearance at front of furnace shall be provided for future servicing. A removable access panel should be installed between top of the furnace door frame and the ceiling.
- Closet installations must use a louvered door having a minimum free area of 235 in² when located 6" from furnace or 390 in² for 5 ton ready RG1/RO1 furnaces. For special clearance between 1" - 6", requirements are a louvered door with a minimum of 250 in² free area, with the openings in the closet door in line with the louvered openings in the furnace door. A fully louvered closet door may be used. See Circulating Air Requirements on page 7.
- The furnace must be kept free and clear of insulating material. Examine the furnace area when the furnace is installed or when insulation is added. Insulating material may be combustible.

Applications

RG1 Series gas and RO1 Series oil furnaces are listed direct vent (sealed combustion), downflow appliances for manufactured (mobile) homes, recreational vehicles, and for use in residential/modular/commercial construction. The furnace must be located so that venting can be properly achieved.

Air conditioning may be added to structures with RG1/RO1 series furnaces using air conditioning or conventional units. This Installation Instruction manual includes special requirements for incorporation of air conditioning equipment to the RG1/RO1 series of furnaces. See Table 12, (page 30).

Multi-speed blower assemblies shown in Table 2, (page 6), have been certified for field installation in RG1/RO1 Series furnaces.

Unit Location

- The furnace shall be appropriately located to the supply and return air distribution system (page 7). Sides and back of the furnace may be enclosed by wall framing. See Minimum Clearances and Figure 1, Figure 2, and Figure 3 (page 6).
- The furnace installation is only intended for free air return through the furnace door louvers. DO NOT connect a ducted return air system directly to the furnace. Improper installation may create a hazard and damage equipment, as well as void all warranties.
- Furnace may be installed on combustible flooring when using manufacturer approved duct connectors. See pages 8-10.
- When installed in a residential garage, the furnace must be positioned so the burners and the source of the ignition are located no less than 18 inches above the floor and protected from physical damage by vehicles.
Figure 1. Alcove Installation

Figure 2. Closet Installation

Figure 3. Special 1" Clearance

Figure 4. Overall Dimensions

Table 1. Minimum Clearances

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<thead>
<tr>
<th>ALL MODELS</th>
<th>CLOSET</th>
<th>ALCOVE</th>
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</thead>
<tbody>
<tr>
<td>Front</td>
<td>6&quot;</td>
<td>18&quot;</td>
</tr>
<tr>
<td>Back</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>Sides</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>Roof Jack</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>Top</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Top and Sides of Duct</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>Bottom of Duct</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>B Cabinet</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>A Cabinet (w/ coil box)</td>
<td>0&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>A Cabinet (w/o coil box)</td>
<td>1/4&quot;</td>
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Table 2. Blower Assemblies

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<tr>
<td>903773</td>
<td>10 x 8</td>
<td>1/4</td>
</tr>
<tr>
<td>903413</td>
<td>11 x 8</td>
<td>1/2</td>
</tr>
<tr>
<td>903890</td>
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<td>3/4</td>
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<td></td>
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<td>2, 2½, 3 &amp; 4</td>
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<tr>
<td></td>
<td></td>
<td>2, 2½, 3, 4 &amp; 5</td>
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</table>
CIRCULATING AIR REQUIREMENTS

⚠️ WARNING:

Do not allow combustion products to enter the circulating air supply. Failure to prevent the circulation of combustion products into the living space can create potentially hazardous conditions including carbon monoxide poisoning that could result in personal injury or death.

All return ductwork must be secured to the furnace with sheet metal screws. For installations in confined spaces, all return ductwork must be adequately sealed. The joint between the furnace and the return air plenum must be air tight.

The surface that the furnace is mounted on must provide sound physical support of the furnace with no gaps, cracks or sagging between the furnace and the floor or platform.

Return air and circulating air ductwork must not be connected to any other heat producing device such as a fireplace insert, stove, etc. This may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.

Return Air Connections

U.S.A. home manufacturers shall comply with all of the following conditions to have acceptable return air systems for closet installed forced air heating appliances:

• The return air opening into the closet shall not be less than specified in the appliance’s listing.
• The cross-sectional area of the return duct system leading into the closet, when located in the floor or ceiling shall not be less than 235 in² (or 390 in² for 5 ton ready RG1/RO1 Furnaces).

⚠️ CAUTION:

HAZARD OF ASPHYXIATION: Do not cover or restrict return air opening.

• Means shall be provided that prevent inadvertent closure of flat objects placed over the return air opening located in the floor of the closet (versus the vertical front or side wall).
• The total free area of openings in the floor or ceiling registers serving the return air duct system must be at least 235 in². At least one register should be located where it is not likely to be covered by carpeting, boxes and other objects.
• Materials located in the return duct system must have a flame spread classification of 200 or less. This includes a closet door if the furnace is in a closet.

• Noncombustible pans having 1” upturned flanges are located beneath openings in a floor duct system.
• Wiring materials located in the return duct system shall conform to Articles 300-22 of the National Electrical Code (ANSI C1/NFPA-70).
• Gas piping is not run in or through the return duct system.

⚠️ CAUTION:

HAZARD OF ASPHYXIATION: Negative pressure inside the closet, with closet door closed and the furnace blower operating on high speed, shall be no more negative than minus 0.05 inch water column.

• Test the negative pressure in the closet with the air-circulating fan operating at high speed and the closet closed. The negative pressure is to be no more negative than minus 0.05 inch water column.
• Air conditioning systems may require more duct register and open louver area to obtain necessary airflow.

Supply Air Connections

For proper air distribution, the supply duct system must be designed so that the static pressure measured external to the furnace does not exceed the listed static pressure rating shown on the furnace rating plate.

Location, size, and number of registers should be selected on the basis of best air distribution and floor plan of the home. The supply air must be delivered to the heated space by duct(s) secured to the furnace casing, running full size and without interruption. Three typical distribution systems are shown in Figure 5

Figure 5. Typical Supply Duct System
FURNACE INSTALLATION

NOTE: These Installation procedures are suggested for typical furnace installations. Since each installation is different, the sequence of instructions may differ from the actual installation. Only qualified HVAC technicians should install this furnace.

The installer must be familiar with and comply with all codes and regulations applicable to the installation of these heating appliances and related equipment. In the absence of local codes, the installation must be in accordance with the current provisions of one or more of the following standards.

• Federal Manufactured Home Constructions & Safety Standard (H.U.D. Title 24, Part 3280.707[a][2])
• American National Standard (ANSI-119.2/NFPA-501C) for all recreational vehicle installations.
• American National Standard (ANSI-Z223.1/NFPA-54) and/or CAN/CSA B149 for all gas-fired furnace models.
• American National Standard (ANSI-Z95.1/NFPA-31) and/or CSA B139 for all oil-fired furnace models.
• American National Standard (ANSI-C1/NFPA-70) and/or CSA 22.1 Canadian Electric Code Part 1 for all electrical field wiring.
• Units have been researched under standards UL 307A & B, UL727-1999, ANSI Z21.47b/CSA 2.3b-2008, and CSA B140.10.

General Information

• The furnace must be leveled at installation and attached to a properly installed duct system. Do not use the back of the furnace for return air. See page 7 for circulating requirements.
• The furnace must be installed so that all electrical components are protected from water.
• The dimensions of the room or alcove must be able to accommodate the overall size of the furnace and the installation clearances listed in Table 1, (page 6) and Figure 1 (page 6)
• The furnace must be installed upstream from a refrigeration system.
• The RG1 Series gas and RO1 Series oil furnace is certified for use on wood flooring or supports, but must be installed on top of a duct connector. This factory supplied accessory must be installed in the floor cavity and attached to the supply air duct before the furnace is installed.

Locating & Cutting Duct Openings

Floor cut-outs and fuel line holes must be carefully located to avoid misalignment of the furnace, and vent piping. To locate standard ducts see Figure 6 (page 9). For round ducts, see Figure 7.

1. Measure 10” from the rear wall or alcove and mark the centerline of the cut-out on the floor.
2. Using the centerline as a starting point, draw the rest of the duct cut-out to the dimensions shown in Figure 6 or Figure 7.
3. Cut out the floor opening 1/16” larger than the actual cutout drawn. This will allow some clearance when installing the duct connector.
4. Measure from the top of the floor down to the top of the supply air duct to obtain the depth of the floor cavity. NOTE: The depth of the floor cavity shown as “X” in Figure 9 (page 9) will determine the correct duct connector.
5. Determine which duct connector to use from Table 3 (page 9).
6. Measure and drill gas hole and cut out for cooling coil (if applicable). See Figure 6 or Figure 7.

Standard Duct Connector Installation

The standard duct connector is designed for use on ducts 12” in width. However ducts narrower than 12” may not allow sufficient clearances for this type of installation. For an alternate installation method, see page 9.

1. Center the duct connector in the floor opening with bottom tabs resting on top of the supply air duct.
2. Mark the cut-out area on the supply air duct by tracing around the connector tabs of the duct connector. See Figure 8 (page 9).
3. Remove the duct connector and cut out the marked area of the supply air duct 1/4” larger the actual cutout drawn.
4. Install the duct connector back in the floor opening with the bottom tabs extending into the supply air duct.
5. Install the mounting plate under the back side of the duct connector as shown in Figure 8. Align the screw holes in both components.
6. Secure the duct connector and the mounting plate to the wood floor with appropriate size screws.
7. Bend the connector tabs on the bottom of the duct connector upwards and as tight as possible against the supply air duct.
8. Bend both tabs up 90° on the mounting plate. See Figure 10 (page 10).
9. Seal all connections with industrial grade sealing tape or liquid sealant.

NOTE: Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.
Alternate Attachment Method

The standard duct connector is designed for use on ducts 12” in width. However, if there is insufficient clearance to bend the duct connector tabs, this alternate attachment method may be used.

1. Score and cut the top of the supply air duct as indicated in Option 1 or Option 2. See Figure 11 (page 10).

   **NOTE:** If Option 1 is selected, cut out the metal from the shaded area.

2. Fold the two flaps (Options 1 or 2) up to form the opening for the duct connector.

3. Install the duct connector with the bottom tabs extending into the supply air duct.

4. Bend the tabs on the bottom of the duct connector upwards and as tight as possible against the supply air duct. See Figure 12 (page 10).

5. Form the flaps (Options 1 or 2) up against the duct connector as tight as possible.

6. Secure the duct connector flaps to the supply air duct with staples (3 minimum) or if a 2x block/joist is not provided, use sheet metal screws (2 minimum).

   **NOTE:** The duct connector tabs may be attached to the air duct with sheet metal screws or other suitable fasteners as long as the duct connector and the air duct are securely attached.

7. Seal all connections with industrial grade sealing tape or liquid sealant.

   **NOTE:** Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.
Round Duct Connector Installation

1. Apply a bead of caulking, mastic, or other approved sealant around bottom side of connector.
2. Install and center the duct connector in the floor opening.
3. Install the mounting plate under the back side of the duct connector. See Figure 13. **NOTE:** Align the screw holes in both components.
4. Secure the duct connector and the mounting plate to the wood floor with appropriate size screws.
5. Connect the round supply duct to the underside of the duct connector and secure them with field supplied sheet metal screws.
6. Seal all connections with industrial grade sealing tape or liquid sealant.

**NOTE:** Requirements for sealing ductwork vary from region to region. Consult with local codes for requirements specific to your area.

Installing the Furnace

Sides and back of the furnace may be enclosed by wall framing such as in a closet or alcove. The dimensions of the room or alcove must be able to accommodate the overall size of the furnace shown in Figure 4 (page 6) and the installation clearances outlined on page 5. The furnace shall be appropriately connected to the supply and return air distribution system as shown in Figure 14 (page 10) & Figure 15 (page 11).

1. Remove furnace outer door(s) and bottom fuel line knockout.
2. Place furnace onto duct connector and center with floor opening.
3. Slide onto mounting plate. (Bottom rear slots on furnace should engage with mounting plate tabs.)
4. Secure front with one (1) fastener at each corner. See Figure 14 & Figure 15.

**NOTE:** Additional fasteners may be used at rear, sides or through door frame, as desired, to secure furnace to closet or alcove framing.
ROOF JACK INSTALLATION

Required ceiling and roof cut-out openings must be carefully located to avoid misalignment of the furnace and Roof Jack. **NOTE:** Install only Roof Jack Assemblies listed in Table 4 on this heating appliance.

**Roof Jack Selection**

1. Determine depth of ceiling cavity from center of roof opening to center of ceiling opening (Dimension A in Figure 16).
2. Determine ceiling height and subtract height of furnace (Dimension B in Figure 16).
3. Add dimensions A + B (and X from Table 5, (page 12) & Figure 6 if slant deck flashing is used). The total length of [A] + [B] + [X] must be within the minimum and maximum range of the Roof Jack listed in Table 4.

**Application Notes**

- SAW and SAWT series roof jacks with a 5” diameter inner vent pipe may be used with all models of RG1 Series gas and RO1 series oil furnaces.
  
  \[ S = \text{Slant Flashing: } 2.5/12 \text{ slope flexes from } 1/12 \text{ to } 4/12 \text{ roof slope, } 4/12 \text{ flexes from } 3/12 \text{ to } 5/12. \]
  
  See Figure 18 (page 12).

- Stainless steel roof jacks are available.
- RG/RO furnaces may be used with roof jacks as tall as 170” (except RG1 056 models, which are limited to 120”). An internal roof jack extension (p/n 901935 - 10”, p/n 903107 - 18”) can be used to increase roof jack height. All connections inside the home must be made below the ceiling.
- This furnace must never be connected to a chimney flue servicing a fireplace or other appliance designed to burn solid fuel.

**NOTE:** If the roof jack crown is covered or blocked with snow, the furnace will not operate properly. If the home is located in regions where snow accumulation exceeds 7” (HUD snowload zones) use an external roof jack extension (p/n 901937). Extensions are optional accessories and may be purchased through your distributor.

---

**Figure 15. “A” Cabinet Furnace on Coil Cabinet**

**Figure 16. Ceiling Cavity Depth**

**Table 4. Roof Jack Assemblies**

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>APPROX. LENGTH BELOW FLASHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAW(T)2135-(0,2,4)(A,S)</td>
<td>21” - 35”</td>
</tr>
<tr>
<td>SAW(T)2747-(0,2,4)(A,S)</td>
<td>27” - 47”</td>
</tr>
<tr>
<td>SAW(T)3563-(0,2,4)(A,S)</td>
<td>35” - 63”</td>
</tr>
<tr>
<td>SAW(T)5195-(0,2,4)(A,S)</td>
<td>51” - 95”</td>
</tr>
</tbody>
</table>

**Figure 17. Example of Flat Jack with Flashing**
Locating & Cutting Roof/Ceiling Openings

IMPORTANT NOTE:
Do not allow debris to fall into the furnace. This could cause unsafe operation and void the furnace warranty. Use the top cap that comes with the furnace packaging (or alternate protector) to prevent debris from falling into the furnace before the final roof jack connection is made.

NOTE: Refer to the installation instructions provided with optional air conditioning packages when installing furnaces with optional cooling coil cabinet or with optional C* series indoor coils.

1. Locate center of roof jack opening, measure 13 1/2" from the rear wall of closet or alcove along the center line of furnace and floor opening. See Figure 19.
2. Cut ceiling and roof holes:
   - Ceiling = 8 3/4" (222 mm) diameter
   - Roof = 9 3/8" (238 mm) diameter

Installing The Roof Jack

1. Apply caulking compound on underside of roof flashing to form a continuous strip at least 3/8" wide around the underside of the perimeter of the flashing. See Figure 20 or Figure 21 (page 13).
2. Connect roof jack assembly to the furnace. Insert telescoping roof jack Assembly through the opening cut on the roof.
3. Connect flue pipe to flue collar of furnace. See Figure 22 (page 13).
4. Connect combustion air pipe to furnace collar with sheet metal screw. See Figure 22.

NOTES:
- It is recommended that the connection of the combustion air pipe to the furnace be made before the flashing is secured to the roof to maintain alignment of roof jack and furnace connections.
- For replacement furnaces, be sure the inner flue pipe connects over the furnace vent collar. **DO NOT use a smaller diameter inner flue pipe which could slide inside the furnace vent collar and restrict the flow of furnace flue products.**

5. Attach roof flashing. If necessary, shift roof flashing slightly in the roof opening so that assembly is in alignment with furnace.

NOTE: If flashing is mounted on 12 degree angle, it may be necessary to adjust the angle to match the roof pitch; (1/12 - 4/12 maximum).

6. Press down firmly on roof flashing (over caulking) to make the seal with roof water tight.
7. Secure flashing with appropriate fasteners. **NOTE:** For added protection against leaks, coat the flashing plate and fasteners with approved roofing compound.
Secure lower roof jack section with no. 10 S.M. screws
Caulk under roof flashing to prevent water leakage

Optional 2-piece ceiling ring #902521

Figure 20. Flat Roof

Upper Roof Jack Section
Secure roof jack with appropriate fasteners after connecting to furnace

Figure 21. Pitched Roof

Caulk under roof flashing to prevent water leakage

Figure 22. Combustion Air Pipe Connection

Secure flashings with appropriate fasteners

Figure 23. Roof Jack Crown

Installation of Transit-Mode Venting System (Manufactured Home Factory)

1. Furnace must be installed in accordance to furnace installation manual.
2. Select appropriate roof jack from Table 4, (page 11)
3. Roof Jack (less upper roof jack crown), with weather cap to be installed as described under Install Roof Jack.
   **NOTE:** Upper roof jack crown to be stored in a prominent location inside manufactured home until on-site installation.
4. The four warning tags supplied must be installed as follows:
   - To weather cap
   - To fuel line connection point (Gas) or furnace burner (Oil)
   - To furnace flame observation door (Gas or Oil)
   - To furnace wall thermostat
5. Transit-mode weather cap to be removed and upper roof jack crown installed. See Figure 23. Do Not Discard screws.
6. Place upper roof jack (crown) on the flue pipe assembly.
   **NOTE:** Make sure inside flue pipe attaches over inner flue pipe and outer roof jack pipe fits over outer pipe.
7. Secure in place using three, #10, 1/2” sheet metal screws removed in step 5. Do not use the same holes which secured the rain cap in place.
8. Remove and discard venting system warning tags.

---

**WARNING:**

Failure to properly secure the flue pipe to the furnace may result in fire, explosion or asphyxiation when operating the furnace.
**Line Voltage Wiring**

⚠️ **WARNING:**

To avoid electric shock, personal injury, or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections.

- Electrical connections must be in compliance with all applicable local codes with the current revision of the National Electric Code (ANSI/NFPA 70).
- For Canadian installations the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

It is recommended that 115VAC line voltage be supplied to the furnace from a dedicated branch circuit containing the correct fuse or circuit breaker for the furnace as listed in Table 6, (page 15).

**IMPORTANT NOTE:**

Refer to the wiring diagram inside the control box cover or Figure 38 (page 32) & Figure 39 (page 33) for the wiring of your particular unit. Any other wiring methods must be acceptable to authority having jurisdiction.

⚠️ **CAUTION:**

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

**IMPORTANT NOTE:**
Proper line voltage polarity must be maintained in order for the control system to operate correctly. Verify the incoming neutral line is connected to the white wire and the incoming “hot” line is connected to the black wire. The furnace will not operate unless the polarity and ground are properly connected as shown in Figure 25 (page 15).

Route all electrical wiring to the left side of the furnace. See Figure 24. For installation of A-size cabinet furnaces, allow sufficient slack in the wiring if an optional cooling coil cabinet is added at a later time. **Use of copper conductors is recommended.**

**Connecting Power Supply Wires**
1. Remove the furnace control panel cover.
2. Route wires (115 VAC) through the strain relief on the left side of the furnace control box (Figure 24).
3. Connect the **hot** wire to the **black** pigtail lead, and the **neutral** wire to the **white** pigtail lead. Secure all connections with suitable wire nuts.
4. Connect the **ground** wire to the grounding screw.
5. Reinstall the control panel cover and secure with the original mounting screws.
Low Voltage Wiring

- The furnace is designed to be controlled by a 24 VAC thermostat. The thermostat's wiring must comply with the current provisions of the NEC (ANSI/NFPA 70) and with applicable local codes having jurisdiction.
- The thermostat must be installed according to the instructions supplied by the thermostat manufacturer. Low voltage connections (24 VAC) from the thermostat are wired to the terminal strip on the integrated control in the furnace.
- The thermostat should be mounted about 5 feet above the floor on an inside wall. DO NOT install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting information.
- The nominal anticipator setting is 0.4. Refer to the thermostat literature for additional information.
- Five-conductor thermostat wire is recommended for 24 volt low-voltage circuit (2-wire is required for furnace only; 5-wire for heating and optional cooling systems). Refer to Table 6 for thermostat wire information.

Connecting Thermostat Wires

1. Insert 24 volt wires through the plastic grommet just above the control panel.
2. Connect the thermostat wires to the furnace low voltage pigtails. See Figure 25.
3. Connect low-voltage circuit to the wall thermostat.
4. A hole may be made in the furnace cabinet to ease thermostat wiring. Make sure that the wiring is protected from the sharp edge of the added hole.

Verifying Anticipator Setting

After the furnace is installed, check the thermostat anticipator against the nominal setting of 0.4.
1. Connect the milliamp meter in series with one of the gas valve’s low voltage terminals.
2. Energize the gas valve.
3. Read the value of the milliamps.
4. Adjust the heat anticipator of the thermostat to the value on the milliamp meter. If the heat anticipator is set too high, the furnace may delay turning on. If set too low, the furnace may cycle frequently and not provide comfort to the homeowner.

Grounding

![WARNING:](image)

To minimize personal injury, the furnace cabinet must have an uninterrupted or unbroken electrical ground. The controls used in this furnace require an earth ground to operate properly. Acceptable methods include electrical wire or conduit approved for ground service. Do not use gas piping as an electrical ground!

Table 6. Thermostat Wire Gauge (24V)

<table>
<thead>
<tr>
<th>THERMOSTAT WIRE GAUGE</th>
<th>2 - WIRE - HEATING</th>
<th>4 OR 5 WIRE - COOLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>55 ft.</td>
<td>25 ft.</td>
</tr>
<tr>
<td>22</td>
<td>90 ft.</td>
<td>45 ft.</td>
</tr>
<tr>
<td>20</td>
<td>140 ft.</td>
<td>70 ft.</td>
</tr>
<tr>
<td>18</td>
<td>225 ft.</td>
<td>110 ft.</td>
</tr>
</tbody>
</table>

* Time-delay fuses or circuit breakers are required.
FUEL SUPPLY & PIPING

⚠️ WARNING:

FIRE OR EXPLOSION HAZARD
• Failure to follow safety warnings exactly could result in serious injury or property damage.
• Installation and service must be performed by a qualified installer, service agency or the gas supplier.
• 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.
• Leave the building immediately.
• 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:

All piping must conform with local building codes, or in the absence of local codes, with the most recent edition of the National Fuel Gas Code ANSI Z223.1 or (CAN/CGA B149.1 or .2). Failure to follow all safety warnings could result in serious injury, death or property damage.

This furnace may be installed with left, right, or bottom gas entry. When connecting the gas supply, provide clearance between the gas supply line and the entry hole in the furnace casing to avoid unwanted noise and/or damage to the furnace. Typical gas service hookup for this furnace is shown in Figure 26 (page 17).

Table 14, (page 31) lists gas flow capacities for standard pipe sizes as a function of length in typical applications based on nominal pressure drop in the line.

IMPORTANT NOTES:
• Some local regulations require the installation of a manual main shut-off valve and ground joint union external to the furnace. See Figure 27 (page 18). The shut-off valve should be readily accessible for service and/or emergency use. Consult the local utility or gas supplier for additional requirements regarding placement of the manual main gas shut-off.
• Gas piping must never run in or through air ducts, chimneys, gas vents, or elevator shafts.
• Compounds used on threaded joints of gas piping must be resistant to the actions of -liquefied petroleum gases.
• The main gas valve and main power disconnect to the furnace must be properly labeled by the installer in case emergency shutdown is required.
• Flexible gas connectors are not recommended for this furnace but may be used if allowed by local jurisdiction. Only new flexible connectors may be used. DO NOT reuse old flexible gas connectors.
• A drip leg is recommended for a vertical run to the unit.
• All piping shall be black iron pipe, or equivalently sized steel tubing. Internally tinned copper tubing may be used for gas supply systems.
• Fuel line installations other than typical installations shown in Figure 26 (page 17) & Figure 27 (page 18) must comply with the fuel piping provisions stated in the Federal Manufactured Home Standard (H.U.D. TITLE 24, PART 280) and the National Fuel Gas Code (ANSI-Z223.1/NFPA-54).
• Shut-off valve must be designed and listed for use with liquid petroleum (L.P. gas).
• A 1/8” NPT plugged tappings for test gauge connection are present on the gas valve. See Figure 28 (page 20) for locations.

⚠️ WARNING:

RISQUE D’INCENDIE OU D’EXPLOSION
• Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.
• L’installation et l’entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gaz, service agency or the gas supplier.
• Ne pas entreposer ni utiliser de l’essence ni d’autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

QUE FAIRE S’IL Y A UNE ODEUR DE GAZ
• Ne pas tenter d’allumer aucun appareil.
• Ne toucher à aucun interrupteur électrique; n’utiliser aucun téléphone dans le bâtiment.
• Évacuer l’immeuble immédiatement.
• Appeler immédiatement le fournisseur de gaz en employant le téléphone d’un voisin. Respecter à la lettre les instructions du fournisseur de gaz.
• Si personne ne répond, appeler le service des incendies.

AVERTISSEMENT:
NOTE: Optional fuel inlet lines are available for all gas furnace models to permit the addition of a 1/2" F.P.T. shut-off valve above the floor.

The gas supply to your home will either be Natural Gas or L.P. (bottle gas). Your furnace is factory equipped to operate on Natural Gas. If your gas supply is L.P. (bottle gas), you must contact a qualified serviceman or gas supplier to convert the furnace. Instructions for conversion to propane are shown on page 19. Factory installed orifice sizes are listed in Table 10, (page 29).

For natural gas operation, the furnace is designed for 7” W.C. inlet pressure. Pressure is reduced to 3 1/2” W.C. by the pressure regulator in the gas valve. The maximum inlet pressure for the valve is 7” W.C and the minimum inlet pressure is 4.5” W.C.

For L.P. gas, pressure to the gas valve must be more than 11” W.C but not more than 13” W.C. Pressure is reduced to 10” W.C by the pressure regulator in the gas valve.

Leak Check

![WARNING:]

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

AVERTISSEMENT:

RISQUE D’INDÉNIE OU D’EXPLOSION

Le non-respect des avertissements de sécurité pourrait d’entrainer des blessures graves, la mort ou des dommages matériels.

Ne jamais utiliser une flamme nue pour vérifier la présence des fuites de gaz. Pour la vérification de tous les joints, utiliser plutôt une solution savonneuse commerciale fabriquée spécifiquement pour la détection des fuites de gaz. Un incendie ou une explosion peut entraîner des dommages matériels, des blessures ou la mort.

After the gas piping to the furnace is complete, all connections must be tested for gas leaks. This includes pipe connections at the main gas valve, emergency shutoff valve and flexible gas connectors (if applicable). The soap and water solution can be applied on each joint or union using a small paintbrush. If any bubbling is observed, the connection is not sealed adequately and must be retightened. Repeat the tightening and soap check process until bubbling ceases.

IMPORTANT NOTE:

When pressure testing gas supply lines at pressures greater than 1/2 psig (14 inch W.C.), the gas supply piping system must be disconnected from the furnace to prevent damage to the gas control valve. If the test pressure is less than or equal to 1/2 psig (14 inch W.C.), close the manual shut-off valve.

Oil Tank & Piping Installation

The following procedures are recommended as good practice. However, requirements of local codes and ordinances, H.U.D. Manufactured Home and Safety Standards or National Fire Protection Association must be satisfied, where they apply, for an approved installation.

- Use a tank capacity suitable for the application with a weatherproof, capped fill opening and a shielded vent to let in air as fuel is used.
• The inside of the tank must be clean before filling. All water, rust, sediment, and debris must be flushed out.
• A fuel or tank gauge is recommended for easy checking of the fuel level. Check the gauge reading with a dipstick. See Figure 27.
• Locate the storage tank conveniently near the home. If the fuel tank is installed above ground, the tank may rest 3 to 4 inches off the ground. Fuel tanks may also be buried if properly coated to resist corrosion. The vertical dimension from the bottom of the fuel tank to the fuel pump must not exceed 10 feet.
• Keep the tank filled, especially in the summer to reduce the accumulation of condensation.

One-Line System
The One-Line System is highly recommended where vertical lift, from bottom of tank to pump, is less than 8 feet (Figure 27). A single line hookup has the advantage of lower cost and quieter operation.

Two-Line System
If a Two-Line system is used or if oil is taken from the bottom of the tank, a filter is recommended. A Two-Line system should only be used if vertical lift exceeds 8 feet.
1. Install the oil feed line as outlined in steps 1 - 6 below.
2. Install the oil pump bypass plug in the bottom return port.
3. Route the return line up through the furnace base to the return port of the pump. Route the other end of the line to the tank, using 3/8" O.D. copper tubing or 1/4" pipe with the ends capped.
4. Insert the return line through the second opening in the duplex bushing. If the bottom of the tank is lower than the pump intake, the tube should be inserted three or four inches from the tank bottom. If the bottom of the tank is higher than the pump intake, the return line should extend not more than 8" inside the tank.

Fuel Line Hook-Up
1. Use a 3/8" O.D. copper tubing for the fuel line. NOTE: Cap the end with tape to keep out dirt while the line is being routed.
2. Install duplex bushing for two 3/8" lines in the top fitting of the tank. See Figure 27.
3. Insert one end of the tubing through the duplex bushing until it is three to five inches from the bottom drain. Tighten the bushing.
4. Route the line where it will not incur any damage. Make bends gradual and avoid kinks which might restrict oil flow.
5. Open the furnace door and connect the oil line to the intake port on the pump. Tighten other port plugs on the pump. NOTE: Verify the oil line is airtight! Air leaks can cause the pump to lose prime and will create other problems such as nozzle failure, odors, rumbling noise, and false safety shutdown.
6. Insert the short length of the copper tube level with the bottom of the duplex bushing. Form the tube into an inverted “U” to serve as a vent.

Fuel Line Bleeding
To eliminate problems caused by air in the oil line, all connections in the oil supply line and all plugs, nuts, and fittings on the pump must be airtight. NOTE: This includes the nut that covers the pressure adjustment. It is important that the hook-up be done carefully and with a good flaring tool.
Prepare the burner for priming by attaching a clear plastic hose over the bleed port fitting and fully opening the pump bleed port. Use a suitable container to collect purged oil.
To ensure continuous operation, use a wire to jump terminals T-T (or F-F) on the primary control while burner is running.
Priming furnaces equipped with Honeywell R7184 primary control:
1. While the ignition is on, press for 1/2 second (or less), and release the reset button. The lockout time will be extended to 4 minutes.
2. If prime is not established within the 4 minutes, the control will lock out. Press the reset button to reset the control.
3. Repeat steps 1 & 2 (if needed) until the oil pump is fully primed.

Priming furnaces equipped with Beckett 7505 primary control
1. After the burner starts, press and hold the reset button until the yellow LED turns on (15 seconds). This indicates that the button has been held long enough.
2. Release the reset button. The yellow LED will turn off and the burner will start up again.
3. At burner start up, click the reset button while the igniter is still on. This transitions the control to a dedicated pump prime mode, during which the motor, igniter and valve are powered for 4 minutes. The yellow LED will be on. **NOTE:** If prime is not established during the four minute pump prime mode, repeat step 3 until the oil pump is fully primed.
4. When oil flow is clear and free of air bubbles, close air-bleed valve and tighten. **NOTE:** Air bleed out time will varies depending on length of oil line, number of bends, etc.

Fuel Oil Type

⚠️ **WARNING:**
Do not use gasoline, crankcase oil, or any oil containing gasoline. Failure to keep supply of oil clean by various procedures described above may cause failure of certain components such as the fuel pump gears, check valve, shaft seal, or burner nozzle which may result in a burner fire.

Do not use fuel oil heavier than Grade No. 2. In areas where the oil supply is subject to low temperatures, Grade No. 1 may be used.

Conversion to Propane (LP) Gas

⚠️ **CAUTION:**
Furnace conversion must be performed by a qualified technician. Improper conversion can cause unsafe operation, explosion, fire and/or asphyxiation.

This gas fired heating appliance was shipped from the factory for use with natural gas. However, the appliance can be converted for use with LP gas. Use the following procedure for gas conversion of the burner.

Atmospheric & Direct Ignition Furnaces
1. Follow the instructions “How to Shut Off Gas” (page 22).
2. Disconnect the gas pipe union and the electrical wires connected to the gas valve.
3. Remove the gas valve assembly:
   a. Remove screw(s) from gas valve bracket. Gas valve and spud may be removed. Orifice is located at the end of the spud (RG1 Models)
5. Replace the main orifice with the L.P. gas orifice supplied in the envelope located by the gas valve. Verify the orifice size matches the nameplate or Table 10, (page 29).
6. For Honeywell gas valves with the regulator converter:
   a. Unscrew the pressure regulator cap and check for the letters NAT or LP. See Figure 28 (page 20).
   b. Invert the cap and tighten until snug.
7. For Robertshaw gas valves with the regulator converter:
   a. Remove the black cover and unscrew the converter located on top of the gas valve. See Figure 29 (page 20).
   b. Invert the converter. For LP, the red ring will be located at the bottom and the LP stamping on the converter will appear right side up.
   c. Screw converter back into the regulator, hand tight plus 1/8 turn. Replace the black cover on the converter top to protect the threads.
8. Reassemble the burner assembly into the furnace.
9. Reconnect the gas piping and electrical wires to the gas valve.
10. Open the manual shut-off valve and follow the Lighting and Operating instructions on page 22.

High Altitude Conversion

⚠️ **WARNING:**
The reduction of input rating necessary for high altitude installation may only be accomplished with factory supplied orifices. Do not attempt to drill out orifices in the field. Improperly drilled orifices may cause fire, explosion, carbon monoxide poisoning, personal injury or death.

High altitude conversion with this furnace depends on the installation altitude and the heating value of the gas. The installation of this furnace at altitudes above 2,000 feet must meet the requirements of the National Fuel Gas Code or local jurisdiction. In Canada, the requirements for high altitude are different and governed by CGA B149.1. Please consult your local code authority.

The installer must indicate the furnace has been converted to high altitude. This may be accomplished by marking the rating plate with a permanent marker.

This furnace is shipped from the factory with orifices and gas regulator settings for natural gas operation at sea
level altitudes. At 2000 feet, the NFGC requires that this appliance be derated 4% for each 1000 feet of altitude. For example, the input needs to be reduced 8% at 2,000 feet, 12% at 3,000 feet and etc. This deration is in reference to the input rate and gas heating value at sea level. See Table 11, (page 30).

Flue Gas Sampling
It may be necessary to take flue gas sampling from oil and gas furnaces (RO1 Models) in order to check the performance after furnace installation. A flue gas sample may be taken from the heat exchanger, which is located behind the hole of the top-front of blower compartment.

1. Turn off all electric power to the appliance.
2. Remove the black plastic cap located above the blower. Do not discard cap.
3. Drill a hole through the top of the blower compartment. **NOTE:** Hole diameter should be same size as sampling tube.
4. Insert sampling tube through the drilled hole and into the heat exchanger.
5. After a complete check and adjustment of furnace performance, seal the drilled hole with a screw larger than the hole. **NOTE:** Seal the screw threads with silicon sealant - rated at least 500° F.
6. Plug the outside hole with the plastic cap removed in step 3.
**WARNING:**

**FIRE OR EXPLOSION HAZARD**
- Failure to follow safety warnings exactly could result in serious injury or property damage.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- 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.
- Leave the building immediately.
- 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:**

Before placing the furnace in service, it must be checked to ensure it is equipped for the type of gas being used. The burner flame must be observed and adjusted if necessary. Failure to observe this caution may result in unsafe operation, explosion and/or fire, or asphyxiation. See the Gas Supply and Combustion Air sections.

- The first lighting of the furnace after any home setup must be performed by a qualified service technician.
- **BEFORE LIGHTING:** Smell all around the furnace for gas and next to the floor. Some gas is heavier than air and may settle on the floor.
- Use only your hand to push in the gas control lever. Never use tools. If the lever will not push in by hand, don’t try to repair it. Force or attempted repair may result in a fire or explosion. Call a qualified service technician.
- Do not use this furnace if any part has been under water. Immediately call a service technician to inspect the furnace and to replace any part of the gas valve or control system which has been under water.

---

**AVERTISSEMENT:**

**RISQUE D’INCENDIE OU D’EXPLOSION**
- Le non-respect des avertissements de sécurité pourrait entraîner des blessures graves, la mort ou des dommages matériels.
- L’installation et l’entretien doivent être effectués par un installateur qualifié, un organisme de service ou le fournisseur de gaz, service agency or the gas supplier.
- Ne pas entreposer ni utiliser de l’essence ni d’autres vapeurs ou liquides inflammables dans le voisinage de cet appareil, ni de tout autre appareil.

**QUE FAIRE S’IL Y A UNE ODEUR DE GAZ**
- Ne pas tenter d’allumer aucun appareil.
- Ne toucher à aucun interrupteur électrique; n’utiliser aucun téléphone dans le bâtiment.
- Évacuer l’immeuble immédiatement.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone d’un voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

---

**WARNING:**

Close the hinged fire door. If door is left open or spring is broken it may allow products of combustion into the living space by the furnace blower, resulting in possible asphyxiation.

---

**WARNING:**

Should overheating occur, or the gas supply fails to shut off, shut off the manual gas valve to the furnace before shutting off the electrical supply.

---

**AVERTISSEMENT:**

En cas de température excessive, ou sail est impossible de cooper l’alimentation en gaz, fermer le robinet manuel d’alimentation en gaz du générateur d’air chaud avant de cooper l’alimentation électrique.
RG1 Operating Instructions
(Direct Ignition Furnaces)
Direct ignition furnaces do not have a pilot. Ignition is accomplished by a silicon carbide hot surface ignitor. A control module takes care of all timing functions. After lighting, the control module uses the ignitor as a flame sensor, shutting off gas should the flame go out. There are no external relays or timing devices. Do not try to light this furnace by hand. The control module is not field serviceable.

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance.
3. Remove the furnace door and turn off the gas valve:
   - Honeywell: push in and turn the gas control knob clockwise to OFF. See Figure 30.
   - Robertshaw: push the gas control lever (Do not force!) to the OFF position. See Figure 31.
4. Wait ten (10) minutes to clear out any gas. If you smell gas, STOP! and follow the Safety Information on page 21. If you do not smell gas, proceed to next step 5.
5. Set the thermostat MODE the On position.
6. Turn the gas valve ON:
   - Honeywell: push in and turn gas control knob counterclockwise to On (Figure 30).
   - Robertshaw: push the gas control lever to the On position (Figure 31). Do not force!
7. Replace the furnace door.
8. Turn on all electric power to the appliance.
9. Change the thermostat mode to HEAT and the temperature selector to a desired temperature level. The igniter should light in approximately 75 seconds. If the appliance will not operate, see How to Shut Off Gas - Direct Ignition and call your service technician or gas supplier.

NOTE: In the event of any flashback or explosion, immediately shut off the furnace and call your service technician.

How to Shut Off Gas - Direct Ignition
1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance before servicing unit.
3. Set the furnace On-Off Switch to OFF.
   - Honeywell (Figure 30): Turn gas control knob clockwise to OFF, Robertshaw (Figure 31): Push the gas control lever to OFF.
   - For oil, shut off all valves.
4. Replace the furnace door.

RO1 Operating Instructions
(Oil Gun Furnaces)
If your furnace model number begins with RO1*, the furnace is equipped with an ignition device which automatically lights the burner. Do not try to light this furnace manually.

1. Open all valves in the oil line.
2. Verify the fire door is closed.
3. Set the furnace On-Off switch to ON.
4. Set the thermostat to the desired setting.

NOTE: RO1 oil gun furnaces may be converted to gas gun in the field by using the proper conversion kit listed in the Replacement Parts List.

How to Shut Off Gas - Oil & Gas Gun
1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance at the breaker or fuse box.
3. Set the thermostat MODE switch to OFF.
4. Turn the gas valve OFF:
   - Honeywell: push in and turn the gas control knob clockwise to the OFF position (Figure 30).
   - Robertshaw: push the gas control lever to the OFF position (Figure 31).
5. Replace the furnace door.
Verifying & Adjusting Temperature Rise
Confirm the temperature rise through the furnace is within the limits specified on the furnace rating plate. Any temperature rise outside the specified limits could result in premature failure of the heat exchanger.
1. Place thermometers in the return and supply air stream as close to the furnace as possible. To avoid false readings, the thermometer on the supply air side must be shielded from direct radiation from the heat exchanger.
2. Adjust all registers and duct dampers to the desired position and run the furnace for 10 to 15 minutes in high fire before taking any temperature readings. The temperature rise is the difference between the supply and return air temperatures.

For typical duct systems, the temperature rise will fall within the limits specified on the rating plate with the blower speed at the factory recommended setting. If the measured temperature rise is outside the specified limits, it may be necessary to change the speed of the blower. NOTE: Lowering the blower speed increases the temperature rise and a higher blower speed will decrease the temperature rise.

The furnace is equipped with a multi-speed motor. Refer to the furnace wiring diagram, Figure 38 (page 32) & Figure 39 (page 33) for blower speed selection.

Burner Adjustments
Burner settings are made at the factory. However, these settings may change during shipping, handling, and installation. The following items should be checked and readjusted if necessary.

Gas Pressure
The gas pressure can be checked with a manometer at the pressure tap (Figure 28 (page 20)) located on the top of the gas valve. The gas valve pressure regulator can be adjusted by removing the regulator selector stack and turning the slotted insert located directly under the selector stack. The regulator selector stack must be secured in place before each pressure reading is taken. Natural gas manifold pressure should be 3.5" W.C. and L.P. gas manifold pressure should be 10" W.C. Replace the gas pressure tap plug on the gas valve.

Combustion Air

⚠️ CAUTION:
- Combustion air adjustment must be made only by a qualified technician. Improper air adjustment may cause unsafe operation, explosion and/or fire asphyxiation.
- If the input to the furnace is too great because of excessive gas pressure, wrong size nozzle or orifice, high altitude, etc., the burner flame will be sooty and can produce carbon monoxide, which could result in unsafe operation, explosion and/or fire or asphyxiation.

Oil Gun Only (RO1 Models)
It is recommended that the CO₂ and Smoke levels be measured for maximum performance. CO₂ readings should be 10 - 11% for 66,000 BTUH furnaces and 12 - 13% for 86,000 BTUH furnaces. The Smoke should be N0. 0 on the Bacharach Scale, and 0 to 0.02 negative draft over fire.

Electrode Setting (Oil Gun Only)
Poor ignition of the oil spray may result if the electrodes are not adjusted as shown in Figure 32. Do not permit any electrodes to be grounded to any surface.

Switching Ignition Control between Interrupted and Intermittent Duty
(Oil Gun Only)
Honeywell and Beckett oil primary controls can be switched between interrupted and intermittent ignition control. To switch from interrupted duty (Factory set) to intermittent duty, remove the blue wire from the quick-connect terminal. Attach the burner motor and igniter wire to the burner motor (orange) control terminal by splicing or adding tab adapters. Seal and isolate any bare wires.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>NAT. GAS</th>
<th>LP GAS</th>
<th>OIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>66,000</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>86,000</td>
<td>5.3</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 7. Factory Combustion Air Settings

![Figure 32. Oil Gun electrode Position](image)
OPERATING SEQUENCE

Direct Ignition Furnaces (RG1 Models)
1. On a call for heat, the thermostat contacts close, supplying 24 VAC between terminals C and W of the control module.
2. When the inducer starts, the air pressure switch closes at -0.20 W.C. differential pressure and energizes the gas valve.
3. After a 45 second purge, the ignitor is energized for a 30 second warm-up period. After warm up, the gas valve opens. NOTE: The time for ignition is approximately 6 seconds, after which the gas valve either remains open if flame is sensed, or closes if flame is not sensed.
5. If flame is not sensed, the sequence repeats four more times before a lockout occurs. To reset, wait 30 seconds and then interrupt the 24 VAC power by turning the room thermostat below room temperature, then returning it to the original set point.
6. If flame does not establish on the 5th attempt (initial fire + 4 re-tries), the control de-energizes the gas valve, the red LED flashes 4 times, and the furnace locks out heat operation for 1 hour. See Table 9, (page 27).
7. If a flame is present, the control energizes the main blower on heat speed 30 seconds after the gas valve opens.
8. When call for heat is satisfied the thermostat contacts open, the gas valve shuts off gas flow and the combustion blower remains on for a 30 second post-purge period.
9. The main blower is de-energized after a 120 second blower off delay.

Oil Gun Furnaces (RO1 Models)
With Honeywell R7184 / Beckett 7505 Control
1. When a call for heat is initiated, there is a 2 to 6 second delay while the control performs a safe start check.
2. The ignition and motor are turned on and a flame should establish within a 15-second lockout time. NOTE: Burner will prepurge for 15 seconds if equipped with Honeywell R7184B or Beckett 7505B Control.
3. If flame is not sensed within the 15-second lockout time, the control shuts down on safety lockout and must be manually reset by pushing the reset button on the control. If control locks over three times in a row, the control enters restricted lockout. To reset Honeywell R7184: Hold down the reset button for 45 seconds until the LED flashes once. Beckett 7505: Hold down reset button for 15 seconds until the red LED turns off and the yellow LED turns on.

If furnace still doesn’t light, turn the furnace off as described above and call your technician. In the event of flashback or explosion, immediately shut off furnace and call your service technician.

WARNING:
4. After flame is established, the ignition remains on for 10 seconds to ensure flame stability. It then turns off.
5. The circulating air blower will energize after the temperature fan switch closes.
6. The furnace runs until the call for heat is satisfied.
7. The circulating air blower will de-energize when the temperature fan switch opens.

FURNACE CONTROLS & FUNCTIONS

Furnace On / Off Switch: This switch turns electrical power to the furnace on and off. The switch must be set in the ON position for the furnace to operate. If blower operation is not desired, the furnace On-Off switch may be set in the Off position to cut the electrical power to the furnace. See Figure 33.

Limit Control: This furnace is protected by two high temperature safety limit switches. The auxiliary (upper) limit switch and the high temperature (lower) limit switch are automatic reset types. If either limit trips, the burner will shut off. If either limit switch trips off again soon after resetting, set the furnace furnace On-Off switch to the Off position and call your authorized serviceman. See Figure 33.

Blower Off Delay: When the blower fan operates under cooling mode, there is a 40 second delay after the call for cooling (from the thermostat) is satisfied before the blower turns off.

Gas Valve: The gas valves for the gas furnaces are a 100% shut-off type and will fail safe, if for some reason
the gas is turned off. The valve is a “slow-open” for RG1 models which means it opens to a low-fire position, and after a few seconds, “steps-open” to high-fire.

Oil Burner Primary Control: The primary control for oil gun furnaces starts the burner, monitors a safe operating cycle, and shuts the burner off at the end of a heating cycle. The control uses a light sensing transducer to determine if fuel ignition has been successfully attained. If ignition is not attained by the end of the safety ignition timing period, the control shuts the burner off and enters “lock-out.” See Figure 33.

Summer Cooling - (B, C, & D Series): Your furnace is A/C ready, equipped with A/C relay and transformer. The unit is equipped to use a 4-wire thermostat. When using a 5-wire thermostat, RC and RH should be jumped (see instructions included with thermostat).

TROUBLESHOOTING

Direct Ignition Furnaces (RG1 Models)

High Gas Bills
a. Verify the proper orifice is being used.
b. Check the return air system. Is it clear and free of blockage?
c. Check the furnace filter. Is it clean or need replacing?
d. Verify the home is insulated, windows and doors fit tightly, and there are no leaks in the heating duct system.
e. Check the room thermostat. Is the setting higher than necessary? Low humidity requires higher temperatures for the same level of comfort. Check for proper humidity level in the home.

Burner Motor won’t Run - T-stat Calls for Heat
1. Check the electrical supply to the furnace.
2. Verify the furnace furnace On-Off switch is in the ON position.
3. Defective thermostat circuit - white and red thermostat low voltage leads (RG1/RO1M, RG1/RO1B models). If the burner motor or combustion fan runs, check:
   • Thermostat connections
   • Thermostat
4. No voltage to control module - determine if 24 volts (or 120 volts) is available to the control module. If voltage is not available check for:
   • Blown fuse, defective transformer, circuit breaker, no electrical supply.
   • Limit switch open.
   • Loose connections.

Combustion Blower Runs - No Flame
1. Defective pressure switch (RG1 - 077 & 090 Models) - check air tube and electrical connections.
2. Burner in purge mode - allow 75 seconds for flame establishing period.
3. Check for proper electrical connections at purge timer, control box, or gas valve.
4. Check for gas supply - gas line valve on, control lever on.

120 VAC Is Available At AMP Plug - Ignitor Does Not Heat Up
1. Disconnect power to the furnace.
2. Disconnect AMP plug to the ignitor, and check ignitor resistance with an ohm meter. Set on RX1 scale.
   • Normal reading should be 40 - 75 ohms.
   • If above or below this rating at room temperature change ignitor.
3. Check for continuity from ignitor receptacle to burner.

Control Module is Powered - Ignitor won’t Heat Up
1. Disconnect ignitor leads at AMP receptacle and check for 120 volts at the plug during ignition sequence.
2. Replace ignition control if 120 volts is not available at AMP plug during ignition sequence.

Main Flame Ignores - Burner Locks Out
• Ignition control is not properly grounded.
• Defective ignition control.
• Improper polarity of 120 volt power supply.
• Ignitor has hairline crack.
• Improper gas pressure or burner air adjustment is not allowing flame to contact ignitor tip for flame rectification.
• Misaligned ignitor does not allow flame to contact ignitor tip for flame rectification.

Burner Short Cycling - Thermostat Calls for Heat, Limit Switches Closed
• Check for polarity.
• Check ground.
• Check flue.
• Check combustion air.
• Check gas pressure.
• Check orifice.
• Check the position of ignitor, a normal reading should be 40-75 ohms.

24 Volts Supplied To Gas Valve During Ignition - No Main Gas Flow
• Gas valve may be defective. Replace if necessary.
• Gas piping may be plugged. Check for adequate gas supply to gas valve at union.

Burner Operates - Insufficient Heat
• Check thermostat for proper setting and location. Thermostat should not be located where it will be affected by another heat source.
• Check for clean filter and proper air flow.
• Check burner for proper gas firing rate.
• Be sure unit is not undersized for its thermal load.
• Check thermostat anticipator. The nominal setting is 0.4.

Burner Flame Without Motor Running
• Gas valve stuck open, check gas valve for proper operation (replace if necessary) and inspect heat exchanger.
• Check for 115 volts to the combustion blower motor; replace if necessary.
If no power to combustion blower then check wiring and control module; replace if necessary.

_Circulation Air Blower Will Not Operate Even Though The Burner Does Operate_
- Check thermostat connection.
- Check wiring to motor.
- Check for a defective motor.

_Oil Gun - Honeywell R7184 or Beckett 7505 Controls Only - RO1 Series._

_Burner does not start with a call for heat_
- Check the electrical supply to furnace.
- Verify the furnace door switch is in the ON position.
- Check for line voltage (115 VAC) at the oil primary control.
- Check indicator LED with burner off, no call for heat (no flame). See Table 9, (page 27).
  - If green LED indicator is on, the cad cell is seeing stray light or the cad cell of controller is defective.
  - If green LED indicator is off, go immediately to step 5.
  - If LED indicator is flashing (red or green on Beckett 7505 control), refer to the next step 1 below - Reset primary control.
- Jumper T to T terminals on primary control.
  - If burner starts, check thermostat or limit wiring connections.
  - If burner does not start, turn off power. Check all wiring connections.
  - If burner does not start, replace primary control.

_Burner starts & then locks out on safety with Honeywell R7184 LED indicator flashing ½ second on, ½ second off. For Beckett 7505 control, the red LED will flash_

1. Reset primary control: To reset the control from (soft) lockout, the button needs only to be pressed and released. If the R7184 control is in restricted mode, press and hold the button for 45 seconds - until the LED flashes once. If the 7505 control is in restricted mode, press and hold the button in for 15 seconds until the red turns off and the yellow LED turns on.

_NOTE:_ Restricted Lockout: If the control locks out three times in a row without a complete heat cycle between attempts, the lockout becomes a restricted (hard) lockout.

2. If the LED indicator stops flashing and the ignition remains off, the primary control could be defective. If line voltage is present at the igniter terminals, and there is no ignition, the igniter is likely defective and needs to be replaced.

3. If the LED indicator stops flashing, burner turns on, but the control locks out again, check the cad cell. If the cad cell is operational, replace the primary control.

4. If the LED continues to flash at the interval listed above, verify that the control is not in restricted mode. If in restricted mode, reset it. If not in restricted mode, replace the control.

5. If the (LED indicator for R7184 control; green LED for 7505 control) stays off while the flame is on, check the cad cell sighting for view of the flame.

6. If the burner locks out, check the cad cell resistance. See Table 8.

7. If the burner stays running, the system is operational.

8. If the (LED indicator for R7184 control; green LED for 7505 control) is off, check the cad cell assembly after disconnecting the line voltage.

_Burner will not start and the LED indicator is flashing at 2 seconds on, 2 seconds off for R7184 (or green LED is flashing for 7505)_

- Hold the reset button down for 1 - 2 seconds. If LED indicator continues to flash, wait for 60 - 70 seconds. If it still continues to flash, replace the primary control.
- _Honeywell R7184 control:_ To check cad cell resistance, press and release the button during the run mode, with the igniter off. The LED will flash to indicate the cad cell resistance. For proper burner operation, it is important that the cad cell resistance is under 1600 Ohms. For cad cell resistance, see Table 8.
- _Beckett 7505 control:_ To check cad cell resistance, unplug the cad cell leads (yellow wires) from the control. Measure the resistance with a meter in the conventional way (when a flame is present). For proper burner operation, it is important that the cad cell resistance is under 1,600 Ohms.

<table>
<thead>
<tr>
<th>LED FLASHES (OHMS)</th>
<th>CAD CELL RESISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-400</td>
</tr>
<tr>
<td>2</td>
<td>400-800</td>
</tr>
<tr>
<td>3</td>
<td>800-1600</td>
</tr>
<tr>
<td>4</td>
<td>&gt;1600</td>
</tr>
</tbody>
</table>

/Table 8. Cad Cell Resistance when sensing flame/
OPTIONAL ACCESSORIES

Necessary when the furnace is used with some central air conditioners

If an air conditioner is installed that does not use the furnace blower for air distribution and operates independently of the furnace, the thermostat system must have an interlock to prevent the furnace and air conditioner from operating at the same time. This interlock system usually contains either a “Heat-Cool” switch which must be turned to one of the positions to activate heat or cool operation, or a positive “OFF” switch on the cooling thermostat.

The furnace must also be equipped with an automatic damper to prevent cold air from being discharged up around the heat exchanger. See Figure 34 or Figure 35. Cold air may cause condensation inside the heat exchanger which can rust and lead to early failure.

Flame Status - A Yellow LED labeled “Flame” is provided to indicate flame status. When flame is sensed, the flame LED is lit. If flame sense is weak, yellow LED will flash.

<table>
<thead>
<tr>
<th>RED LED INDICATOR</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady ON</td>
<td>Control OK</td>
</tr>
<tr>
<td>Steady OFF</td>
<td>No power</td>
</tr>
<tr>
<td>Rapid flash</td>
<td>False flame or internal control fault</td>
</tr>
<tr>
<td>One flash</td>
<td>Limit switch is open</td>
</tr>
<tr>
<td>Two flashes</td>
<td>Pressure switch is open</td>
</tr>
<tr>
<td>Three flashes</td>
<td>Pressure switch is stuck closed</td>
</tr>
<tr>
<td>Four flashes</td>
<td>Lockout due to failed ignition</td>
</tr>
<tr>
<td>Five flashes</td>
<td>L1 neutral reversed or L1 voltage not present on L1</td>
</tr>
</tbody>
</table>

Table 9. Control Module Status Indicators

**Figure 34. Coil Cavity Damper**

**Figure 35. Damper without Coil Cavity**
MAINTENANCE

Homeowner Information

- On some closet installations, the return air opening to the furnace may be on the floor, in the door, in the side wall of the closet, or any combination of these. The upper grille on the front of the furnace admits return air to the blower. Return air must be provided back to the circulating blower in order to provide air distribution. See Figure 36.
- Filters - At least twice each season (more often in dusty areas) remove and clean the air filters with a vacuum or with warm water and soap. Reinstall when dry. Also clean dust and lint around furnace and in the furnace vestibule.
- During extremely cold weather, ice may form on the furnace roof jack (Figure 37). Small amounts of ice forming on the roof jack will present no problems to proper furnace operation. Excessive ice formation could restrict the combustion air supply to the burner, causing inefficient burner operation. If excessive ice has formed on the air inlet or exhaust portions of the roof jack, it must be carefully removed.

Installer Information

All furnaces need periodic service at the beginning of each heating season. Call your qualified service contractor for these items:

- Remove the air circulator and clean all dust and lint from the unit with a stiff bristle brush.
- Inspect the combustion chamber blower compartment, flue collar and Roof Jack.
- Check the gas valve (if applicable) and fuel line connections for leaks.
- Make any adjustments necessary for good operation.

⚠️ WARNING:

Use of furnace or air conditioning components that are not included in the certification of this appliance may create a hazard, invalidate the certification, and in many states, make installations illegal. Listed NORDYNE air conditioning components are specified on the furnace label.

Additional Oil Furnace Maintenance

In addition to the preceding, the following should be performed by a qualified service contractor at least once each season for oil-fired furnaces:

- Replace the oil nozzle with the type nozzle specified for your furnace.
- Clean, adjust and replace if necessary the spark electrodes.
- Reset the nozzle/drawer assembly to factory specifications.
- Clean the inside of the furnace heat exchanger and replace the combustion liner if necessary.
- Clean or replace the oil filter element at the oil tank.
- Adjust the burner for top efficiency and check to make sure all fittings are leak-tight.

Figure 36. Periodic Cleaning

Figure 37. Roof Jack
### FIGURES & TABLES

<table>
<thead>
<tr>
<th>FURNACE MODEL #</th>
<th>INPUT MBTU/H</th>
<th>OUTPUT MBTU/H</th>
<th>ORIFICE NO</th>
<th>E.S.P. IN WC</th>
<th>OIL NOZZLE</th>
<th>IGNITOR DIRECT</th>
<th>COMB. BLOWER</th>
<th>MOTOR HP</th>
<th>A/C READY TONS</th>
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<td>RG1B 056</td>
<td>56</td>
<td>46</td>
<td>29 45</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>RG1C 056</td>
<td>56</td>
<td>46</td>
<td>29 45</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RG1B 070</td>
<td>70</td>
<td>57</td>
<td>24 42</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>RG1C 070</td>
<td>70</td>
<td>57</td>
<td>24 42</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RG1B 077</td>
<td>77</td>
<td>62</td>
<td>21 40</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>RG1C 077</td>
<td>77</td>
<td>62</td>
<td>21 40</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RG1B 090</td>
<td>90</td>
<td>72</td>
<td>17 36</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>RG1C 090</td>
<td>90</td>
<td>72</td>
<td>17 36</td>
<td>0.3</td>
<td>x</td>
<td>x</td>
<td>1/2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>RO1B 066</td>
<td>66</td>
<td>56</td>
<td></td>
<td>0.3</td>
<td>.50 Gph</td>
<td>x</td>
<td>Burner Model: AF-10</td>
<td>1/4</td>
<td>3</td>
</tr>
<tr>
<td>RO1B 086</td>
<td>86</td>
<td>73</td>
<td></td>
<td>0.3</td>
<td>.65 Gph</td>
<td>x</td>
<td>Spray Angle: 80° A</td>
<td>1/4</td>
<td>3</td>
</tr>
</tbody>
</table>

**NOTES:**
- Electrical Supply - 120 volts, 60HZ, 1 Ph. Fuse or Breaker - 15 amps
- Temperature Rise - 45° F to 75° F
- High Altitude - See Table 11, (page 30). For Canadian Altitudes (2,000’ to 4,500’), reduce the gas manifold pressure to 3.0” W.C. for natural gas and to 8” W.C. for LP gas.
- Thermostat Circuit - 24 volts, 60HZ, 30 vac
- Normal Anticipator Setting - 0.4
- Manifold Pressure - Natural Gas: 3.5” w.c. LP Gas: 10” w.c.

**Table 10. RG1/RO1 Furnace Specifications - Factory Settings**
### Table 11. Equivalent Orifice Sizes for High Altitude Installations

<table>
<thead>
<tr>
<th>FURNACE MODELS</th>
<th>ORIFICE SIZE &amp; OUTPUT CAPACITY</th>
<th>ALTITUDE - FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SEA LEVEL</td>
</tr>
<tr>
<td>RG1 - 056</td>
<td>Orifice Size - Nat. Gas</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Orifice Size - LP</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Output - MBTUH</td>
<td>45.4</td>
</tr>
<tr>
<td>RG1 - 070</td>
<td>Orifice Size - Nat. Gas</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Orifice Size - LP</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Output - MBTUH</td>
<td>56.7</td>
</tr>
<tr>
<td>RG1 - 077</td>
<td>Orifice Size - Nat. Gas</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Orifice Size - LP</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Output - MBTUH</td>
<td>61.7</td>
</tr>
<tr>
<td>RG1 - 090</td>
<td>Orifice Size - Nat. Gas</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Orifice Size - LP</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Output - MBTUH</td>
<td>71.7</td>
</tr>
</tbody>
</table>

**NOTES:** For Canadian high altitude (2,000 - 4,500'), reduce gas manifold pressure to 3.0" W.C. for natural gas and 9" W.C. for LP gas. (Includes 4% Input Reduction for Each 1,000 Feet). These specs do not apply to oil furnace installations. Reference Sources: ANSI Z233.1 & NFPA 54, National Fuel Gas Code.

### Table 12. A/C Blower Speed Selection Chart
## Gas Flow Rates

### Table 13

<table>
<thead>
<tr>
<th>TIME FOR ONE REVOLUTION (SECONDS)</th>
<th>CUBIC FEET PER REVOLUTION OF GAS METER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>360</td>
</tr>
<tr>
<td>12</td>
<td>300</td>
</tr>
<tr>
<td>14</td>
<td>257</td>
</tr>
<tr>
<td>16</td>
<td>225</td>
</tr>
<tr>
<td>18</td>
<td>200</td>
</tr>
<tr>
<td>20</td>
<td>180</td>
</tr>
<tr>
<td>22</td>
<td>164</td>
</tr>
<tr>
<td>24</td>
<td>150</td>
</tr>
<tr>
<td>26</td>
<td>138</td>
</tr>
<tr>
<td>28</td>
<td>129</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
<tr>
<td>32</td>
<td>113</td>
</tr>
<tr>
<td>34</td>
<td>106</td>
</tr>
<tr>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>38</td>
<td>95</td>
</tr>
<tr>
<td>40</td>
<td>90</td>
</tr>
<tr>
<td>42</td>
<td>86</td>
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<tr>
<td>44</td>
<td>82</td>
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<tr>
<td>46</td>
<td>78</td>
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<tr>
<td>48</td>
<td>75</td>
</tr>
<tr>
<td>50</td>
<td>72</td>
</tr>
<tr>
<td>52</td>
<td>69</td>
</tr>
<tr>
<td>54</td>
<td>67</td>
</tr>
<tr>
<td>56</td>
<td>64</td>
</tr>
<tr>
<td>58</td>
<td>62</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>62</td>
<td>58</td>
</tr>
<tr>
<td>64</td>
<td>56</td>
</tr>
</tbody>
</table>

### Table 14

<table>
<thead>
<tr>
<th>NOMINAL PIPE DIAMETER (IN.)</th>
<th>LENGTH OF PIPE RUN (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td>1/2</td>
<td>130</td>
</tr>
<tr>
<td>3/4</td>
<td>280</td>
</tr>
<tr>
<td>1</td>
<td>520</td>
</tr>
<tr>
<td>1 1/4</td>
<td>1,050</td>
</tr>
<tr>
<td>1 1/2</td>
<td>1,600</td>
</tr>
</tbody>
</table>

Cubic Feet Per Hour Required = \( \frac{\text{Input To Furnace (Btu/hr)}}{\text{Heating Value of Gas (Btu/Cu. Ft.)}} \)

**NOTE:** The cubic feet per hour listed in the table above must be greater than the cubic feet per hour of gas flow required by the furnace. To determine the cubic feet per hour of gas flow required by the furnace, divide the input rate of the furnace by the heating value (from gas supplier) of the gas.

---

**Table 14. Gas Pipe Capacities**
Electrical Information

WIRING DIAGRAM

Gas Direct Ignition Furnace, Heating & A/C Ready, RG1 Models.

NOTES
1. Incoming power must be polarized. Observe color coding. (See furnace data label for electrical information.)
2. If any of the original wires (as supplied with the appliance) must be replaced, use 105˚C Thermoplastic type wire or its equivalent.

Jumper must be removed if converting to a multipurpose blower. Jumper is required for RG1D90N3, RG1D90N4, AND RG1D77N4

A/C & Heating Speeds: Refer to Table 12, A/C Blower Selection in the manual

LEGENDS
115V: FIELD 115V: 24V: FIELD 24V:

CONTROL LIGHT STATUS
RED
Steady On: No power
Steady Off: Lockout due to failed ignition
Rapid Flash: Normal
1 Flash: Lockout due to failed ignition
2 Flashes: Pressure switch is open with inducer on
3 Flashes: Pressure switch is open with inducer off
4 Flashes: Pressure switch is closed with inducer on
5 Flashes: 115 vac & neutral reversed or no ground

YELLOW
Steady On: Blinking
Good Flame Signal
Steady Off: No Flame Signal

WIRING DIAGRAM

Figure 38. Gas Direct Ignition Furnace, Heating & A/C Ready - All RG1 Models
Figure 39. Gas and Oil Furnaces, A/C Ready - RO1 (066, 086) Models
ATTENTION INSTALLERS:

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the furnace or failure to follow safety warnings could result in serious injury, death, or property damage.

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Please read all instructions carefully before starting the installation. Return these instructions to the customer’s package for future reference.

PROPOSITION 65 WARNING:

WARNING: This product contains chemicals known to the state of California to cause cancer.

WARNING: This product contains chemicals known to the state of California to cause birth defects or other reproductive harm.

ELECTRICAL SYSTEM

<table>
<thead>
<tr>
<th>Electrical connections tight?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line voltage polarity correct?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Supply Voltage: ______________ VOLTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the thermostat been calibrated?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Is the thermostat level?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Is the heat anticipator setting correct?</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

GAS SYSTEM

<table>
<thead>
<tr>
<th>Gas Type: (circle one)</th>
<th>Natural Gas</th>
<th>Propane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas pipe connections leak-tested?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Gas Line Pressure: ........................................................ (in - W.C.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation Altitude: ........................................................... (FT.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deration Percentage: ............................................................ (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furnace Input: ................................................................. (Btu/h)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Air Temperature: ...................................................... (° F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Air Temperature: ...................................................... (° F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Rise: ............................................................... (° F)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMBUSTION AIR & VENTING SYSTEM

<table>
<thead>
<tr>
<th>Is there adequate fresh air supply for combustion &amp; ventilation?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vent free from restrictions?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Filter(s) secured in place?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Filter(s) clean?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Flue connections tight?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Is there proper draft?</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>