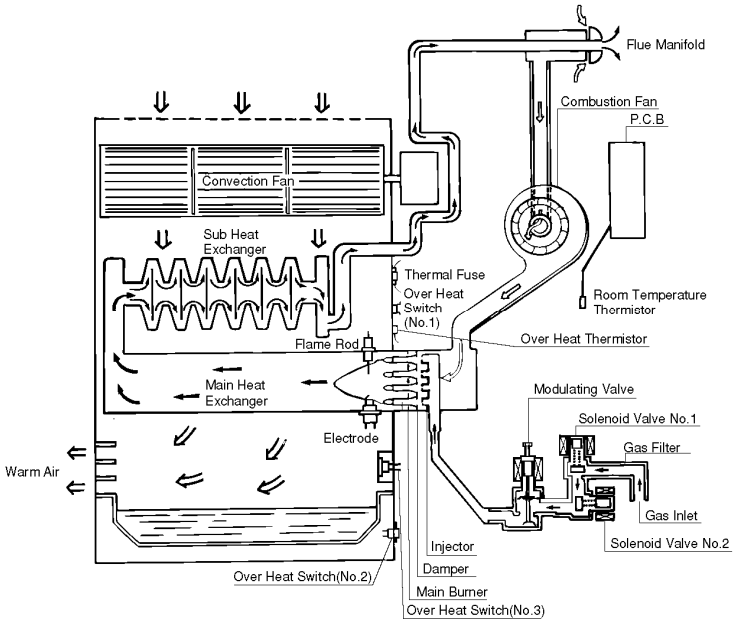
Ductless Heater 101

A complete training and sales guide for Rinnai's line of direct vent, ductless, heating systems.



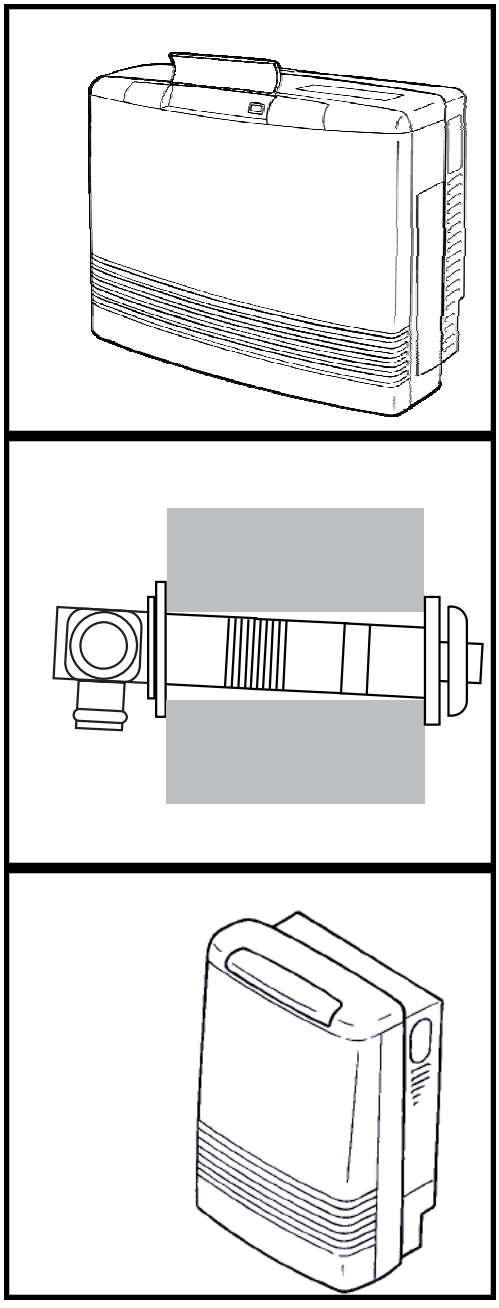


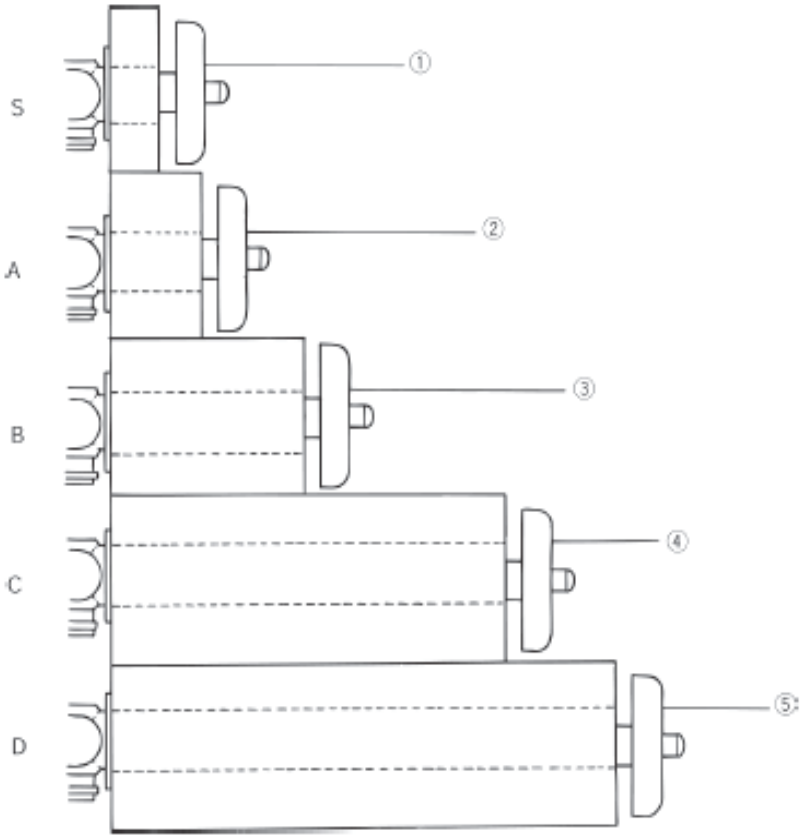
Table of Contents

The Rinnai Advantage

Unique Venting Installations - Termination

- Most termination flexibility in the industry
- Most adaptable for various wall thicknesses (3” to 31.5”)
  - Most competitors can only vent up to 17” through wall
- All units come with termination kit (4.5-9.5” standard thru the wall termination)

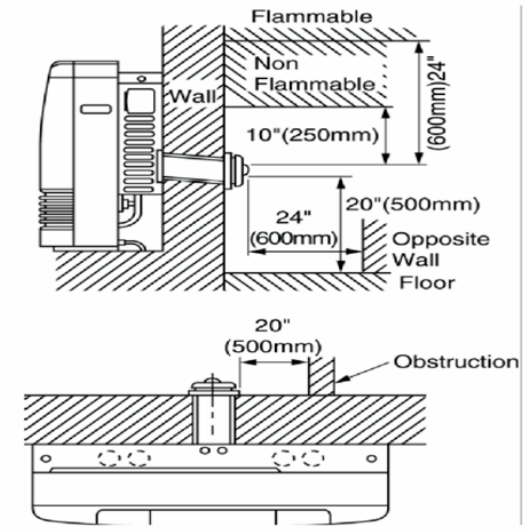
S	Vent suits walls	3” - 4 1/2 “ (75-115mm)
A	Vent suits walls	4 1/2” - 9 1/2” (115-240 mm)
B	Vent suits walls	9 1/2” - 15 3/4” (240-400 mm)
C	Vent suits walls	15 3/4” - 23 5/8” (400-600 mm)
D	Vent suits walls	23 5/8” - 31 1/2” (600-800 mm)



Unique Venting Installations - Termination

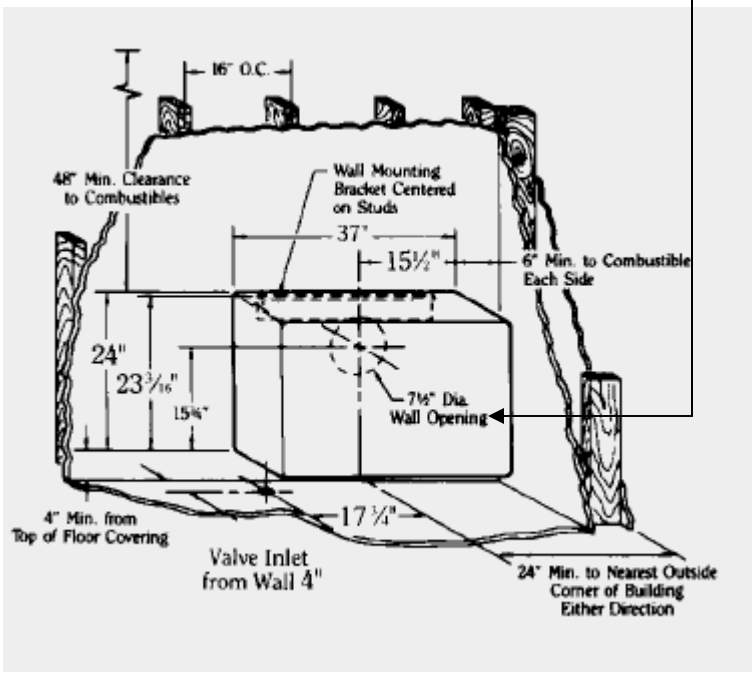
- Small and easy-to-cut termination hole size (3 1/8")
  - –Most competitors are 9" for 10,000-50,000 BTUs and 6" for <10,000 BTUs
- 9" external vent terminal clearance to any opening on external wall
- Zero clearance thru-wall termination
  - –No fire-stop necessary

Rinnai



CHECK WITH LOCAL CODE ENFOREMENT FOR ANY SPECIAL VARIANCE FROM THE ABOVE. THIS INFORMATION IS CONTAINED IN THE OWNER'S INSTALLATION MANUAL.

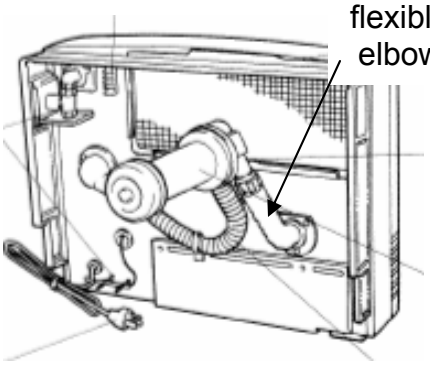
Empire Model DV 25/35

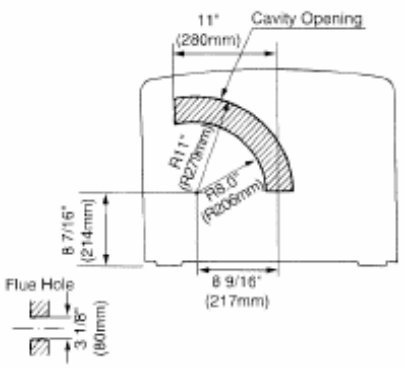


- Stainless steel termination cap (no rust)
- Sealed combustion ensures indoor air quality and safety
- Self-sealing termination gaskets
- Flexible elbow on unit for maximum placement flexibility
  - –Elbow can be rotated, but not bent
  - –Allows installer to easily avoid any wall obstructions without moving the heater

Rinnai's vent cap

Empire's vent cap





Placement Template

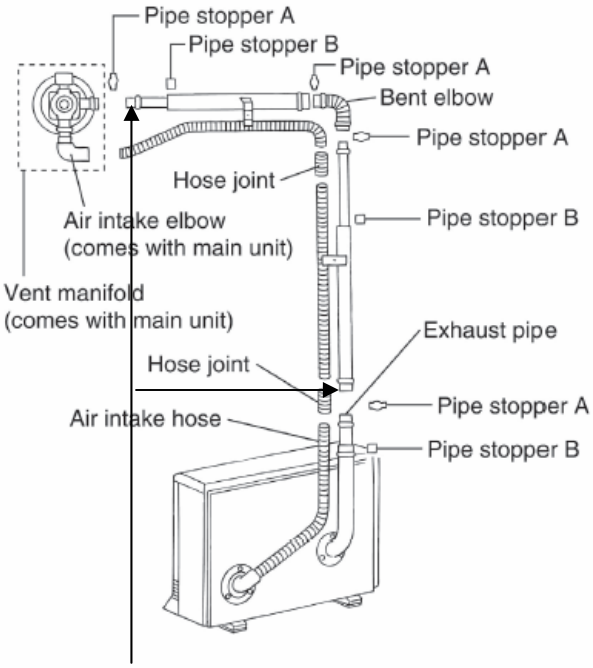
Unique Venting Installations - Termination Examples

Unique Venting Installations - Venting Extensions

- Flexible venting options = maximum flexibility for both heater and termination placement
- 13’ total length, 8’ vertical length maximum, with 2 elbows
- NOTE: Vent extensions are kitted (all supporting pieces are included)

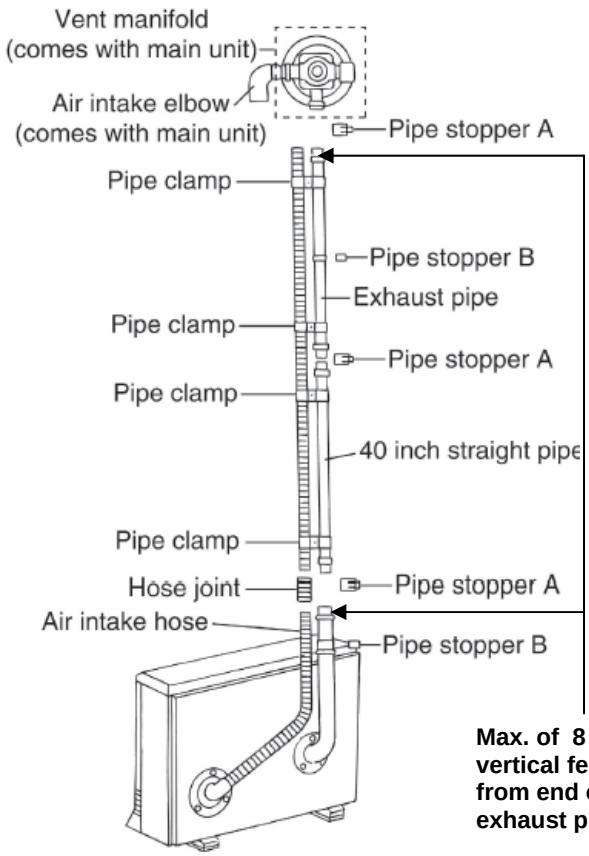
■ HOW TO INSTALL

Example:Using 2 sets of extension set and 1 bent set.



Max. of 13 linear feet (start measurement at end of exhaust pipe on back of unit)

Example:Using 80 inches slide pipe set.

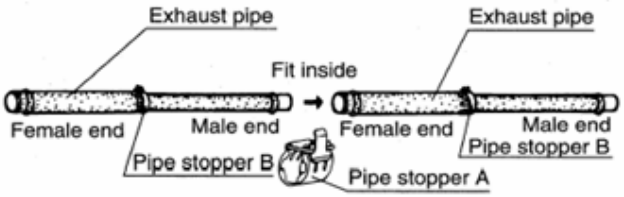


Max. of 8 vertical feet from end of exhaust pipe

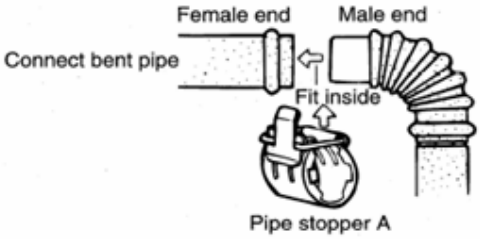
Unique Venting Installations - Venting Extensions

- Rinnai venting solutions = maximized profits
  - Easy installation and venting system design saves time on installations.
  - Flexibility allows placement of heater on both conditioned and non-conditioned walls and in places not possible for our competitors.

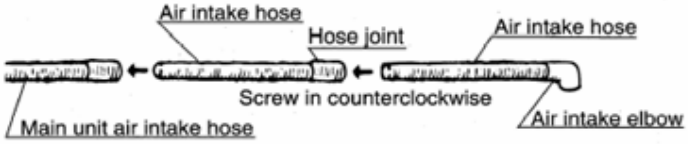
1. How to connect exhaust pipes



To connect the exhaust pipes, fit the male end into the female end and clamp with pipe stopper A to prevent slipping. The exhaust pipe can be telescoped to the required length; do not cut it.



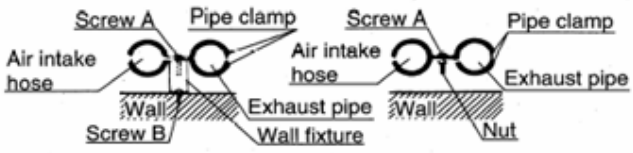
2. How to connect air intake hose



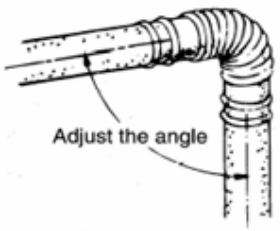
Screw hose joint half of its length onto the air intake hose, then screw another air intake hose into the joint. The hose can be cut to the required length.

IMPORTANT: The PVC air line is longer than the exhaust line and may need to be cut to size. Be sure, however, to thoroughly deburr all rough edges.

3. Affixing the air intake hose and exhaust pipe



4. How to use the bent pipe



Unique Venting Installations - Vent Extension Part Numbers

Vent Kits for the RHFE 263, 431, 556, and 1004 Series

FOT-150	S	3” - 4 1/2 “ (75-115mm) wall thickness
FOT-151	A	4 1/2” - 9 1/2” (115-240 mm) wall thickness
FOT-152	B	9 1/2” - 15 3/4” (240-400 mm) wall thickness
FOT-153	C	15 3/4” - 23 5/8” (400-600 mm) wall thickness
FOT-154	D	23 5/8” - 31 1/2” (600-800 mm) wall thickness

Part number 1004F-530X01 is shipped with every 1004 unit and must be installed on vent termination end every time, even when using extension sets. It is called an exhaust adaptor B assembly. This allows the use of the same vent termination kit on all models produced in 1999.

Vent Extensions for the RHFE 263, 431, and 556 Series

FOT-155	Extension set - 20 inches
FOT-156	Extension set - 40 inches
FOT-157	Extension set - 80 inches
FOT-158	Elbow set - 90 degrees
FOT-190	Elbow set - 90 degrees (long)

Vent Extensions for the RHFE 1001 and 1004 Series

FOT-102	Extension set - 20 inches
FOT-103	Extension set - 40 inches
FOT-114	Extension set - 80 inches
FOT-115	Elbow set - 90 degrees

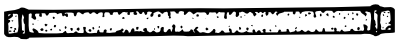
Unique Venting Installations - Vent Extension Part Numbers

RHFE-431FAIII / 556FAIII / FTRAIII / 263FA / ALL WTA

EXTENSION SET PARTS AND INSTALLATION GUIDE

FOT-155	20” (0.5 m) Extension Set
FOT-156	40” (1 m) Extension Set
FOT-157	80” (2 m) Extension Set
FOT-158	Bent Elbow Set
FOT-190	Long Bent Elbow Set

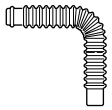
① EXHAUST PIPE (ADJUSTABLE)



② EXHAUST PIPE (NON ADJUSTABLE)

③ AIR INTAKE HOSE

④ BENT ELBOW



⑤ LONG BENT ELBOW

⑥ HOSE JOINT

⑦ PIPE STOPPER A

⑧ PIPE STOPPER B

⑨ PIPE CLAMP

⑩ WALL-FIXTURE

⑪ NUT

⑫ SCREW A

⑬ SCREW B

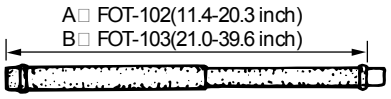
Item	Description	FOT-155	FOT-156	FOT-157	FOT-158	FOT-190
1	Exhaust Pipe (adjustable) 11.4-20.3 in (290-515 mm)	1				
1	Exhaust Pipe (adjustable) 21.0-39.6 in (533-1005 mm)		1	1		
2	Exhaust Pipe - 40 in (1016 mm)			1		
3	Air Intake Hose - 29.5 in (750 mm)	1				
3	Air Intake Hose - 49.2 in (1.25 m)		1			
3	Air Intake Hose - 90.6 in (2.3 m)			1		
4	Bent Elbow				1	
5	Long Bent Elbow					1
6	Hose Joint	1	1	1		
7	Pipe Stopper A	1	1	2	1	1
8	Pipe Stopper B	1	1	1		
9	Pipe Clamp	2 sets	3 sets	4 sets		
10	Wall Fixture	2	3	4		
11	Nut	2	3	4		
12	Screw A	2	3	4		
13	Screw B	4	6	8		

Unique Venting Installations - Vent Extension Part Numbers

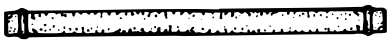
RHFE-1001 SERIES AND RHFE-1004 SERIES

EXTENSION SET PARTS AND INSTALLATION GUIDE

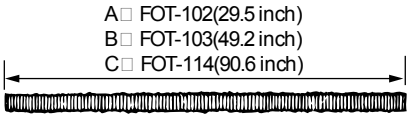
FOT-102	20” (0.5 m) Extension Set
FOT-103	40” (1 m) Extension Set
FOT-114	80” (2 m) Extension Set
FOT-115	Bent Elbow Set



①EXHAUST PIPE



②EXHAUST PIPE(STRAIGHT) 40 inch



③AIR INTAKE HOSE

④BENT ELBOW

⑤HOSE JOINT

⑥PIPE STOPPER A

⑦PIPE STOPPER B

⑧TOP STOPPER

⑨PIPE CLAMP

⑩WALL-FIXTURE

⑪NUT

⑫SCREW A

⑬SCREW B

⑭O RING

Item	Description	FOT-102	FOT-103	FOT-114	FOT-115
1	Exhaust Pipe (adjustable) 11.4-20.3 in (290-515 mm)	1			
1	Exhaust Pipe (adjustable) 21.0-39.6 in (533-1005 mm)		1	1	
2	Exhaust Pipe - 40 in (1016 mm)			1	
3	Air Intake Hose - 29.5 in (750 mm)	1			
3	Air Intake Hose - 49.2 in (1.25 m)		1		
3	Air Intake Hose - 90.6 in (2.3 m)			1	
4	Bent Elbow				1
5	Hose Joint	1	1	1	
6	Pipe Stopper A	1	1	2	2
7	Pipe Stopper B	1	1	1	
8	Top Stopper	1	1	1	
9	Pipe Clamp	2 sets	3 sets	4 sets	
10	Wall Fixture	2	3	4	
11	Nut	2	3	4	
12	Screw A	2	3	4	
13	Screw B	4	6	8	
14	O-Ring				1

Vent Extension Examples

Basement Installation

Sunroom Installation

Venting Extensions used to vent through wall to other room for a heater in the Living Room

Heater is on other side of wall

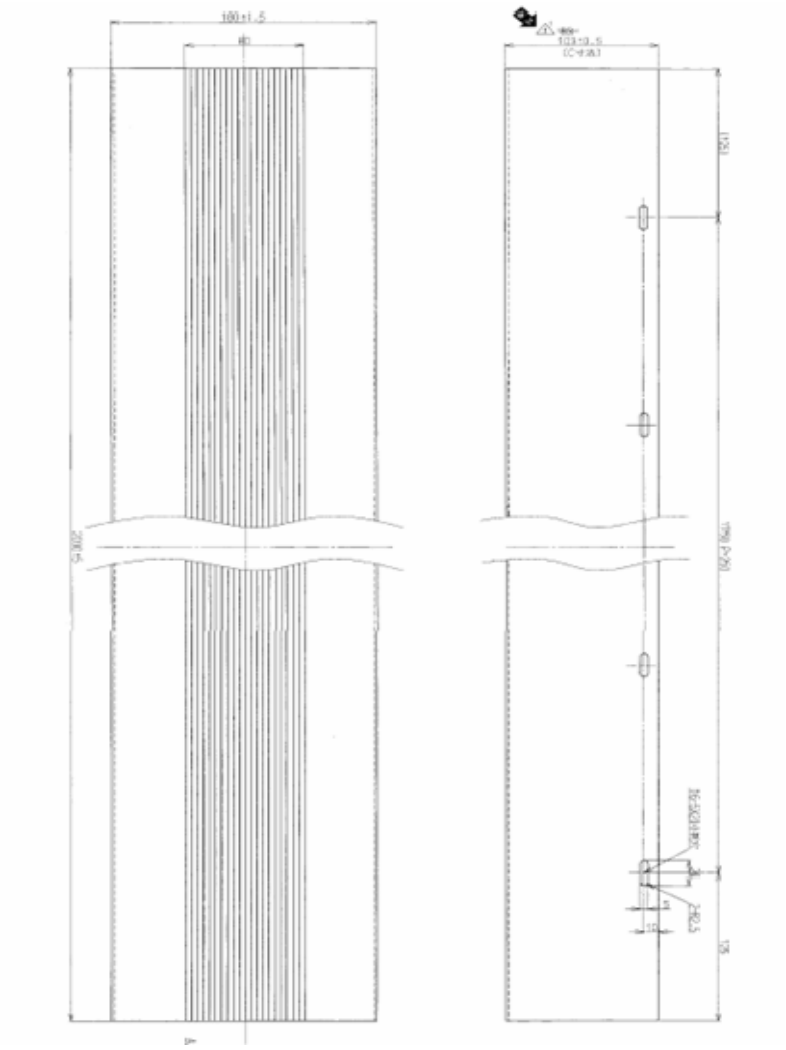
Classroom Installation

Home Installation

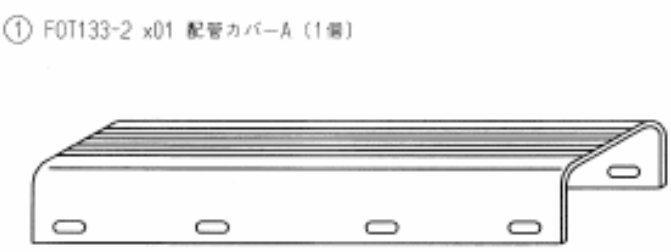
Unique Venting Installations - Vent Covers

Vent Covers: the simple design provides easy and attractive way to cover the venting.

Top View



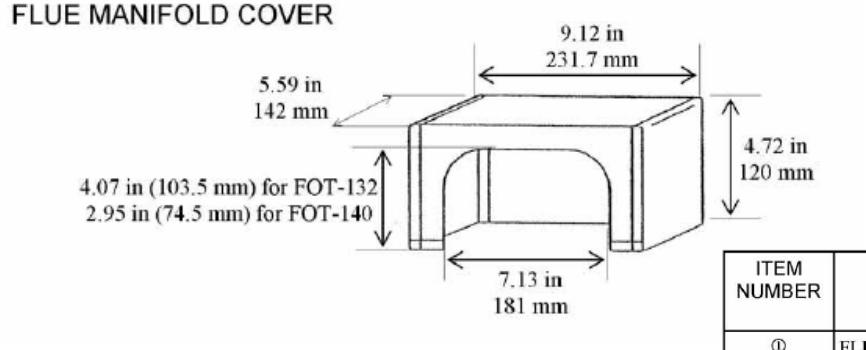
Side View



Mounting Bracket

Unique Venting Installations - Vent Cover Part Numbers

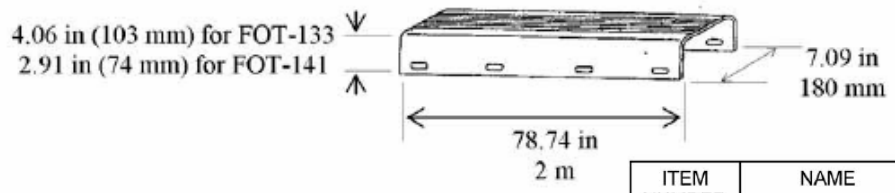
FLUE MANIFOLD COVER



ITEM NUMBER	NAME	FOT-132 MANIFOLD COVER KIT A	FOT-140 MANIFOLD COVER KIT B
①	FLUE MANIFOLD COVER	1	1
②	BASE PLATE	1	1
③	TEMPLATE	1	1
④	WALL SCREW	4	4
⑤	COVER SCREW	4	4

FOT-132: for RHFE-1004 Series
FOT-140: for RHFE-263 Series, RHFE-431 Series, RHFE-556 Series

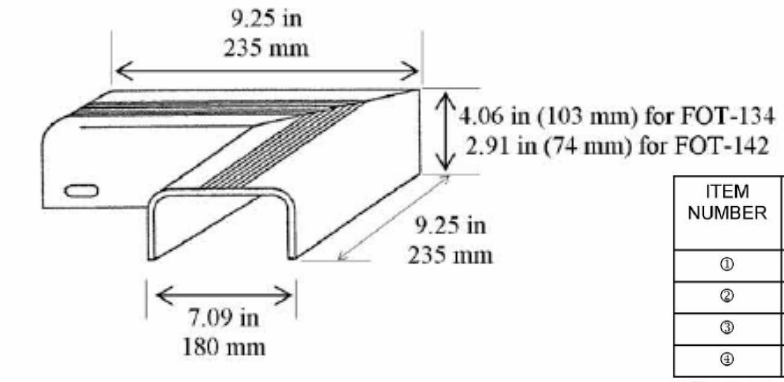
VENT COVER



ITEM NUMBER	NAME	FOT-133 STRAIGHT COVER KIT A	FOT-141 STRAIGHT COVER KIT B
①	COVER	1	1
②	WALL BRACKET	8	8
③	TEMPLATE	1	1
④	WALL SCREW	16	16
⑤	COVER SCREW	16	16

FOT-133: for RHFE-1004 Series
FOT-141: for RHFE-263 Series, RHFE-431 Series, RHFE-556 Series

VENT COVER ELBOW



ITEM NUMBER	NAME	FOT-134 ELBOW COVER KIT A	FOT-142 ELBOW COVER KIT B
①	COVER	1	1
②	WALL BRACKET	2	2
③	WALL SCREW	4	4
④	COVER SCREW	4	4

FOT-134: for RHFE-1004 Series
FOT-142: for RHFE-263 Series, RHFE-431 Series, RHFE-556 Series

Unique Venting Installations - Vent Cover Examples

Vent Cover with Elbow

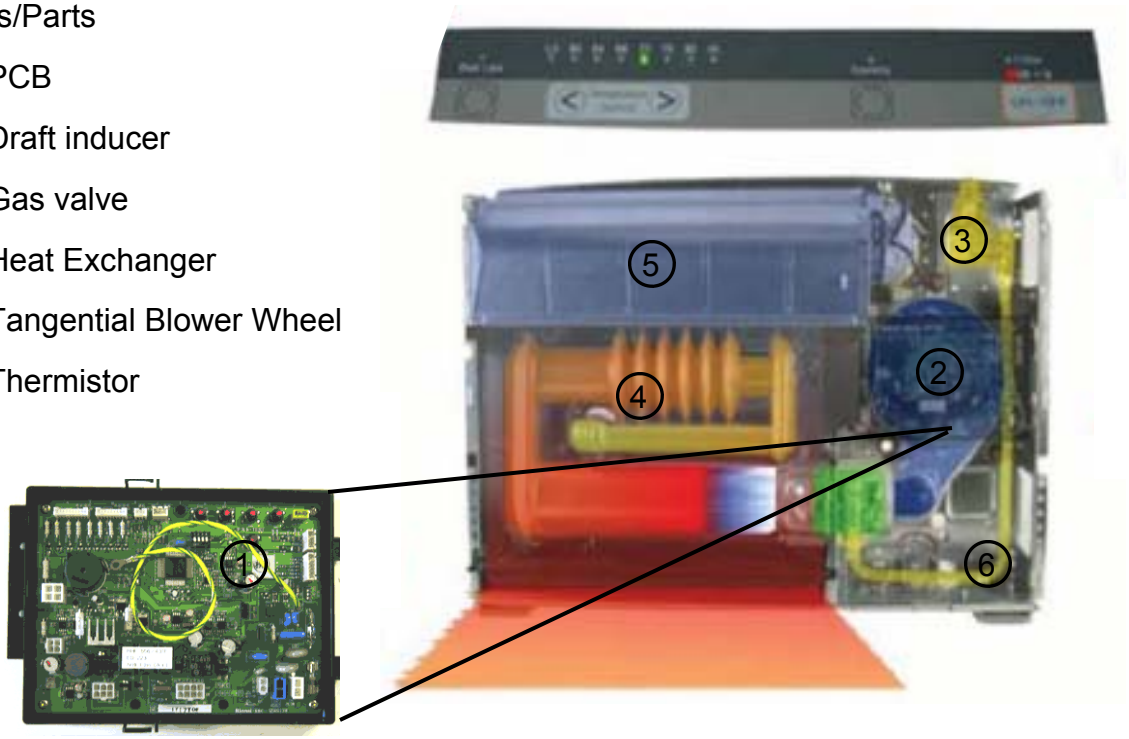
Painted Vent Cover/Basement Installation

Vent Cover and Termination Cover

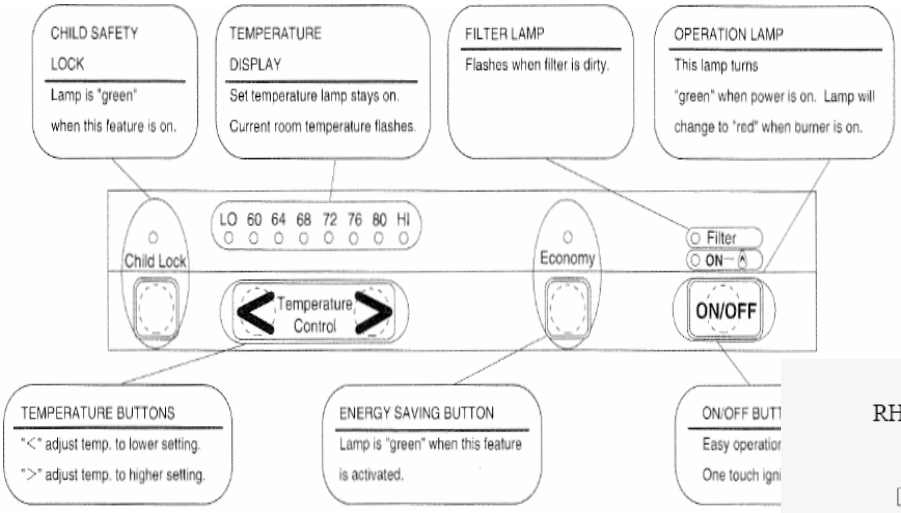
Smart Technology

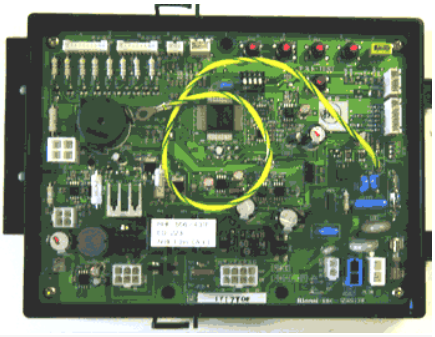
Components/Parts

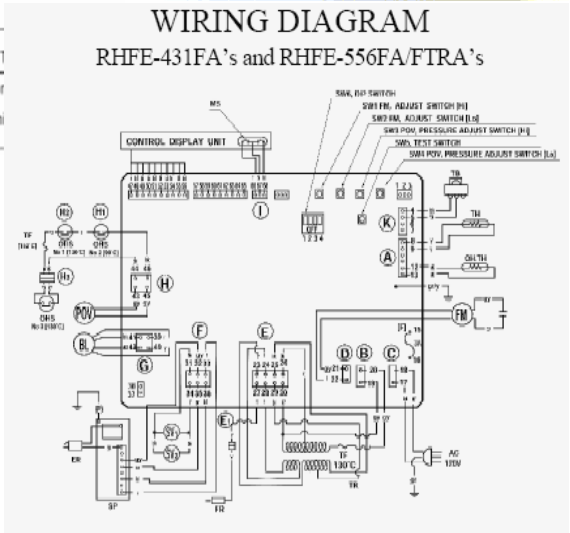
1. PCB
2. Draft inducer
3. Gas valve
4. Heat Exchanger
5. Tangential Blower Wheel
6. Thermistor



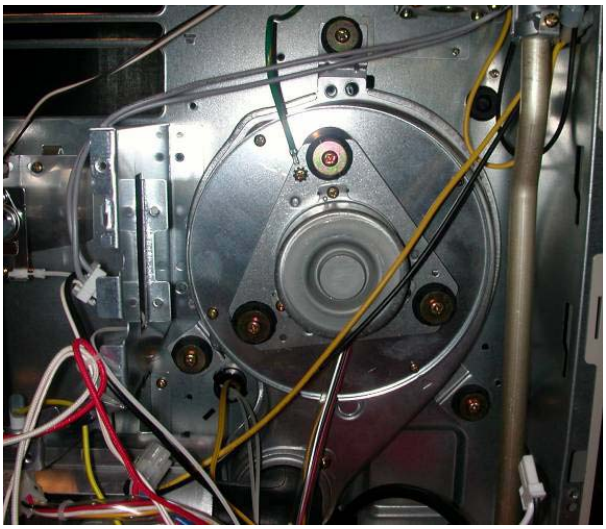
Control Panel → PC Board







Variable Speed Draft Inducer

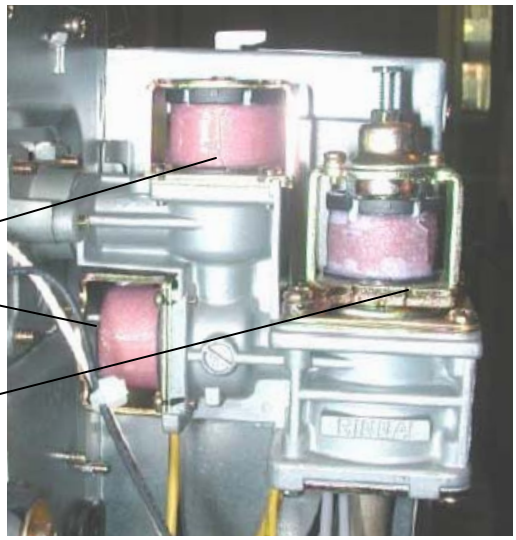


- Controls the intake air to allow the Rinnai to adjust its firing rate by increments as low as 1,000 BTU.
- It does this by a small computer board mounted on the back of the motor communicating with the PCB 100 times per second.
- In case of a high gust of wind, the unit will automatically shut down, go into a post purge cycle, wait two minutes, and then pre-purge and re-ignite.*
  - This eliminates any pilot outages that are common with the traditional direct vent style unit.

*This function is unlimited for the 201/263 model, but is limited to 5 instances with the 431/556/1004 models. The reason is the 201/263 model is smaller and more susceptible to wind gusts and so more likely to experience this issue, whereas the larger 431/556/1004 units are more resistant to wind gust impacts.

Rinnai's Gas Valve Technology

- Microcomputer controlled.
- Rinnai employs both fully modulating and 7-stage gas valve technology* to achieve superior performance and temperature control. The gas valve allows the heater to attack a small degree change with a small amount of BTU's on a continuous basis, thus not overheating the space.
- The two left-hand solenoids act as on/off solenoids. There are two to provide redundancy and greater safety.
- The third solenoid, which sits on top of the regulator, controls the firing rate. It is a proportional operative valve (POV) that uses electricity to modulate the firing rate.
- It accomplishes this by applying more or less electricity to the solenoid, which puts more or less pressure on the diaphragm of the regulator. This results in increasing or decreasing the firing rate.
- This type of valve eliminates any over-sizing and overheating in the main area common with full-on/full-off firing systems.



*431/556 units are equipped with the modulating gas valve; the 201/263/1004 units have the 7-stage gas valve

DC Coils

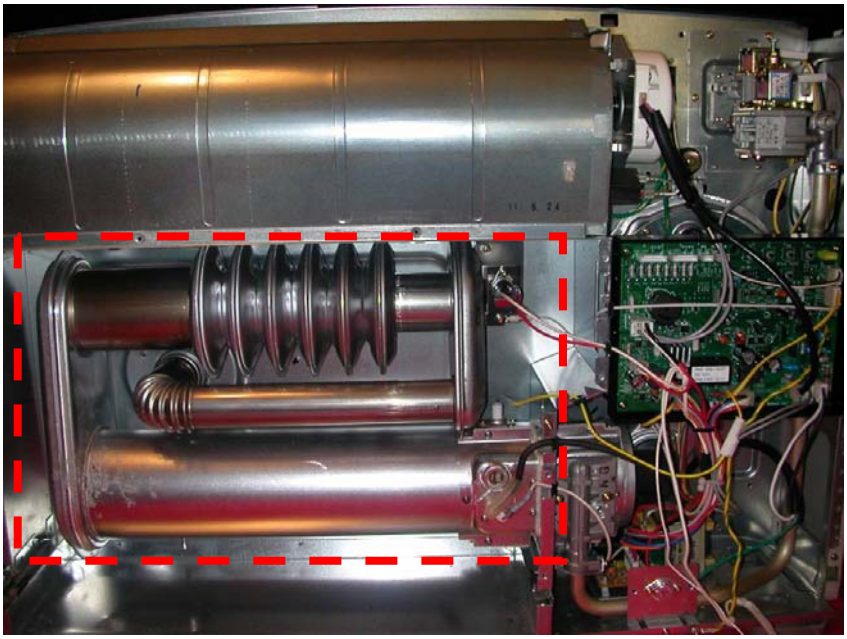
The modulating gas valve utilizes DC coils because it results in:

- Less wear and tear
- Quiet, no chatter operation
- Less heat retention (which helps durability)
- Modulation of the proportional operation valve.

The POV (proportional operating valve) is a DC coil exhibiting all the dependability functions stated above but also results in the ability to apply varying DC voltages to modulate the opening degree of the gas valve input. Most all other companies gas valves are AC driven and will not have the longevity or capability to perform as the Rinnai gas valves perform.

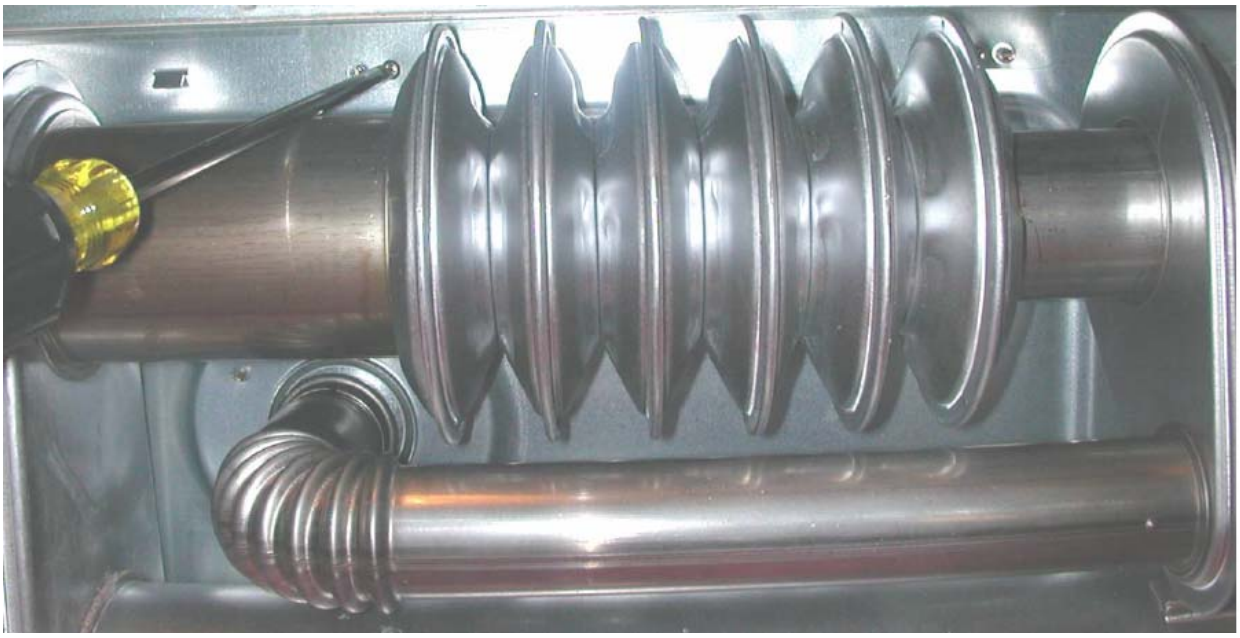
Heat Exchanger

- Rinnai uses a stainless steel and aluminized steel heat exchanger, just like high efficiency heaters.
- Our competition typically uses a clam shell design, which is an obsolete technology in high efficiency heaters.
- The clam shell design often will “oil can” or pop when the heat exchanger expands.
- Built into the Rinnai heat exchanger is a *concertina* section, designed as an expansion chamber to eliminate the expansion and contraction noises common with clam shell exchangers.



The Concertina

- Built into each concertina, which acts as a secondary heat exchanger, is a baffle to slow down the flue gases through the heat exchanger. This enhances heat transfer into the room and increases efficiency.



Tangential Designed Blower Wheel

- These fans have the ability to modulate up and down with the firing rate of the heater, thus making the Rinnai Wall Heater truly variable speed.
- The tangential design pitches the blades forward and at a 37.5 degree angle, allowing the blades to slice through the air instead of slapping the air. This also results in less air noise.

Quiet Operation

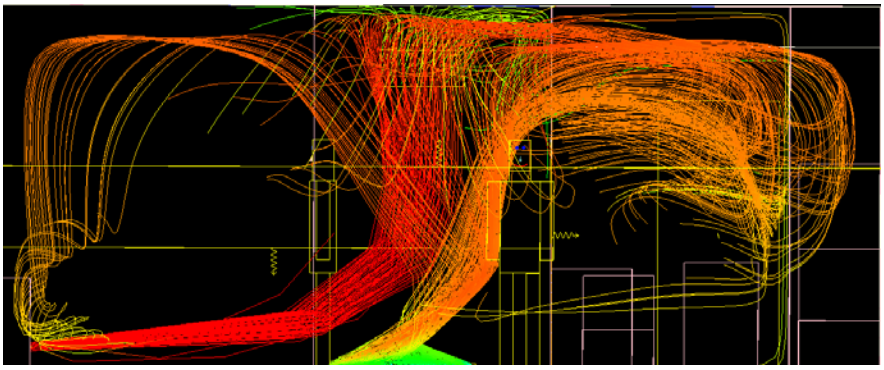
Model	Decibels
RHFE 263/201FA	High = 38dB Low = 31dB
RHFE 431	High = 38dB Low = 32dB
RHFE 556	High = 41dB Low = 32dB
RHFE 1004	High = 47dB Low = 37dB

Compare to:

Sound Type	Decibels
Whisper	20
Average Residence	40
Conversation	60
Standard Heater	68
Refrigerator	70
Lawn Mower	100

*Rinnai Air Flow Dynamics **

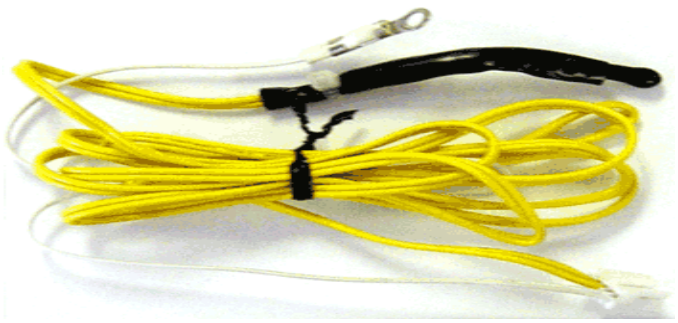
- A traditional heater unit emits hot air at about 30” off the floor and then rises up, leaving a large segment of cold air below.
- A Rinnai spreads its heat out across the floor, pulling the cold air up into its heat plume and thus blending and mixing the cold air. The warm air then mushrooms out at the ceiling. That blended air is drawn down and mixed again with either newly heated air coming from the heater or drawn back to the heater to be re-heated. The result is a very even, comfortable, and stable temperature in the area that is to be heated.
- Because the Rinnai utilizes variable speed, it runs on a longer cycle at lower temperatures, maximizing air mixture and air circulation.



*Def. of Dynamics: An interactive system or process, especially one involving competing or conflicting forces (like heat and cold!)

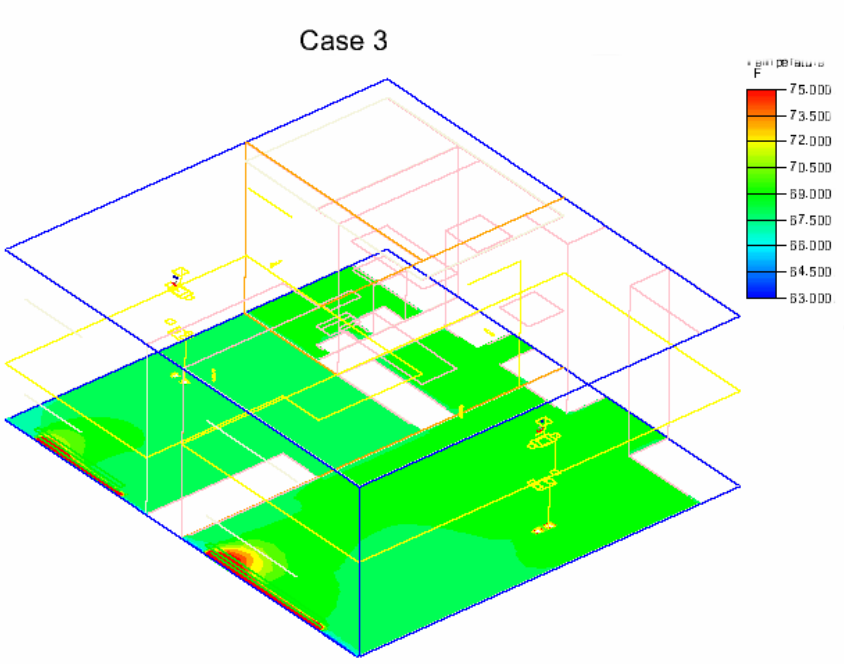
Negative Coefficient Thermistor

- Senses temperature changes of 2/10 of a degree.
- When the thermistor senses a 5/10 degree change in the air 2” above the floor, it triggers the unit to initiate firing.
  - 201/263/1004 models initiates combustion at stage 5 and then modulates firing rate after determining heating need.
  - 431/556 models initiates combustion at target level and then modulates.



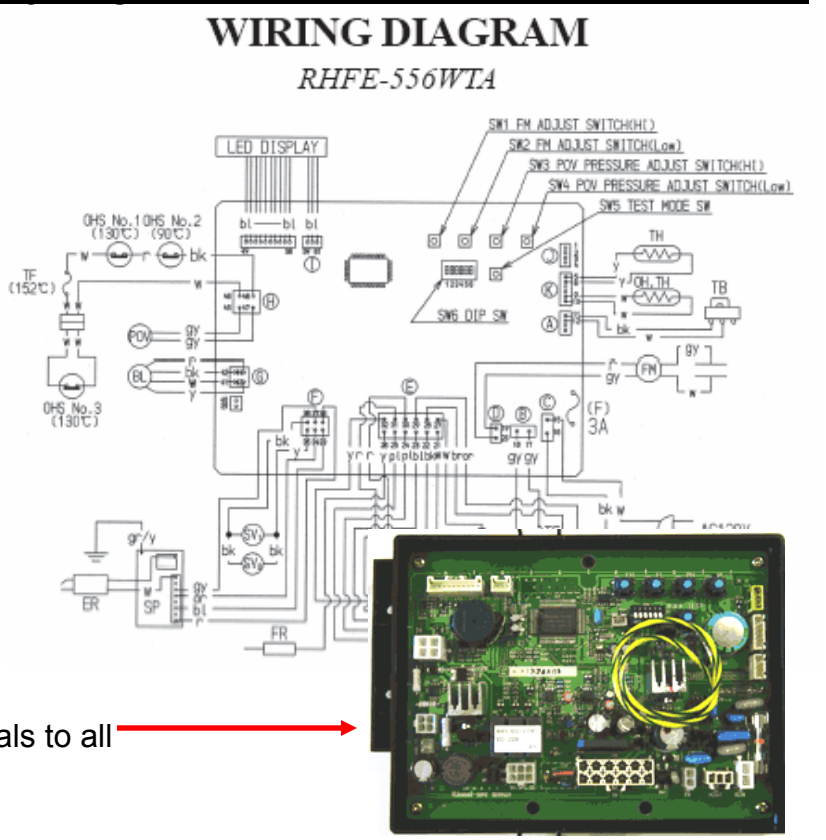
Thermistor Location

- In order to immediately detect a temperature decrease, the Rinnai thermistor is located 2” off the floor. The coldest air in a room gathers in a 2” layer on the floor. This is therefore the optimal position to detect an influx of cold air.
- Once the thermistor detects the cold air, it triggers the heater to fire and attack the cold with a precise amount of BTUs.
- This process prevents the large build up of cold air that occurs when the thermostat is located 5’ up the wall.



Comfortable Heat and Fuzzy Logic

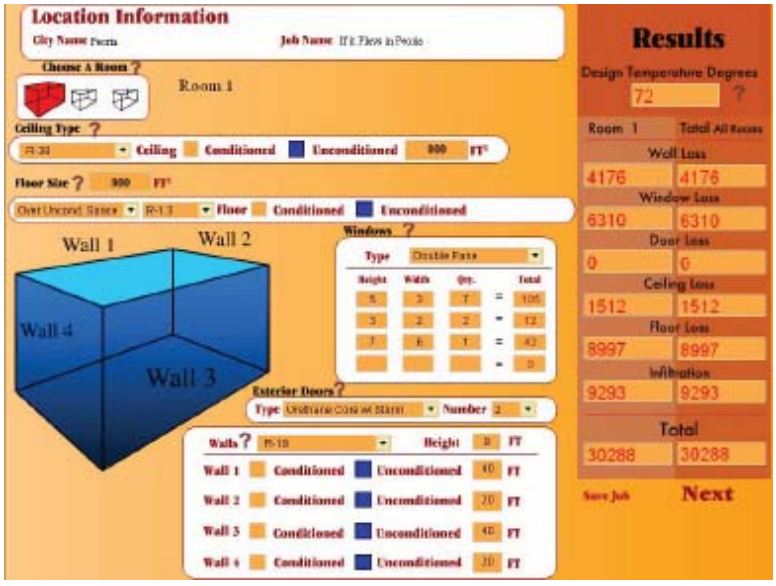
- Comfortable Heat is a product of Rinnai's expertise in gas modulation and is unique in the world.
- The Fuzzy Logic built into our PCB board allows the unit respond to a 5/10ths degree drop below the set temperature and gently maintain that temperature within 3 degrees.
- Fuzzy Logic is the unit's ability to learn how quickly the area heats up and cools down based on the given firing rate. The unit learns how we live and adapts itself.
- The PCB board is the Rinnai traffic cop, sending electrical signals to all parts of the unit at the same time.



Comfortable Heat: The First Step

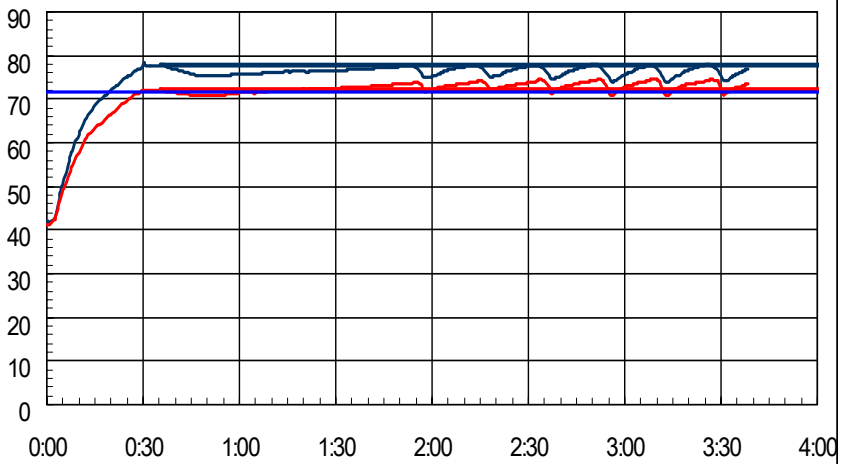
- The first step is to perform a heat loss calculation to determine the size and quantity of units for the given space.
- Typically, central heating systems are oversized due to inaccurate heat loss calculations or over-estimations of needed heating capacity.
- With typical single stage gas valve technology, over-sizing does not allow for maximum efficiency or run times and creates discomfort and stresses on the heating equipment.
- Rinnai's advanced gas valve technology has the advantage of providing the ability to adjust the BTU input to match the need that is required at any given point in time.

Example of Heat Loss Calculation



Comfortable Heat: How It Works

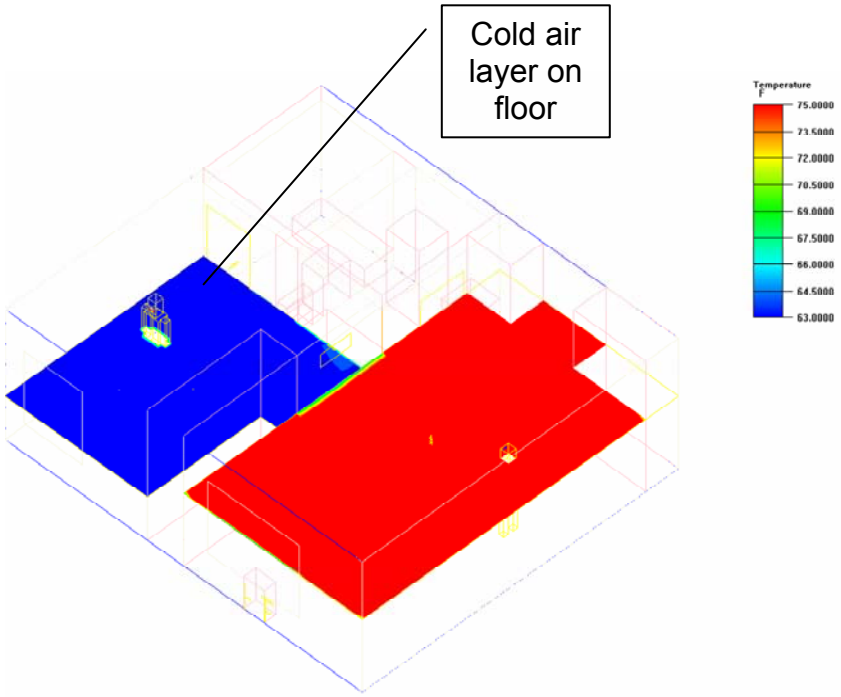
- Once the heater has been sized for a space, the unit(s) are installed.
- Once turned on and set to the desired temperature, the unit receives a call for heat and begins the heating process.
- As the unit emits heat into the room, it also reads the return air temperature. As the temperature approaches set point, the unit will start reducing its firing rate to increase its run time and keep air circulating.
- The Rinnai avoids over shooting the set temperature and instead bumps up against it.



Graph illustrates 40ºF and a set temperature desired of 78ºF. As the heater approaches the set temperature desired, the Rinnai with modulation ability neither over shoots the Comfort level or allows cycle losses found in the competitor's units because of the continuous run modulation thus maintaining efficiency and COMFORT.

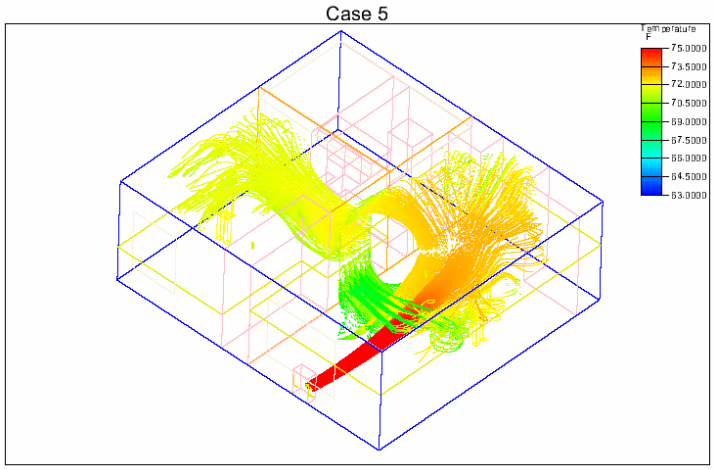
How It Works: Temperature Detection

- After reaching set temperature, the unit will preserve a stable temperature by reacting to a ½ degree change in temperature 2" off the floor.
- The coldest air in a room forms a 2" layer on the floor. By having its thermistor at the 2" level, the Rinnai unit can immediately detect and respond to temperature decreases and keep the room comfortable.
- A traditional heating system's thermostat is mounted 5' off the floor, which allows cold air to build up and necessitates a greater BTU output to re-warm the air.



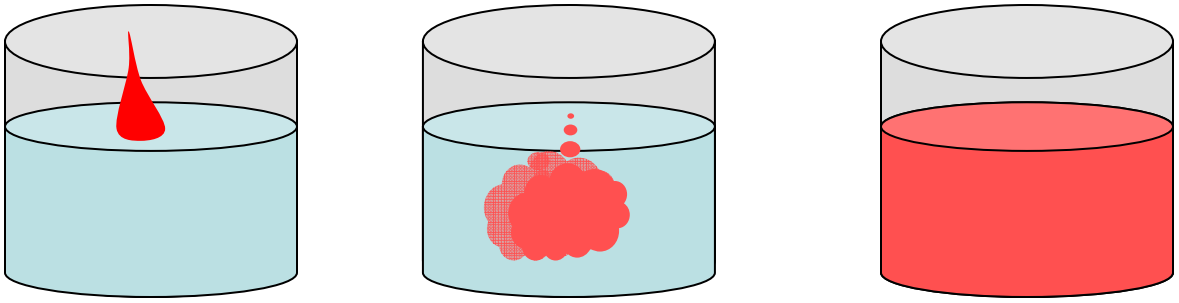
Comfortable Heat: How It Works

- How can a Rinnai wall heater heat an 800ft² space from one spot on the living room wall?
- It is based on 2 main principles:
  - The first is the 2nd law of thermodynamics, which states that heat will seek cold.
  - The second principle is variable speed technology, which is the ability to detect a small temperature change and then attack it with a small amount of BTUs on a continuous basis.



- The 2nd law of thermodynamics (heat seeks cold) takes effect once the main room is to temperature. Although the unit is on standby, heat moves from the main room to other rooms through the doorways, seeking cold. The doorways act as duct work. And for every BTU of heat that leaves a space, an equal and opposite amount of cold air replaces it. The cold air comes from the other rooms into the main room and falls to the floor, where it works its way back to the heater. This cold air is detected by the thermistor mounted 2" off the floor and triggers the unit to fire.
- Variable speed technology has 4 components: electronics, sensing system, the gas valve, and the blower fan.
  - The electronics consists of the PCB and Fuzzy Logic, which enable the various system components to work together seamlessly and respond to real time environmental changes.
  - The sensing system consists of the thermistor working together with the electronics to sense temperature changes and adapt the unit's performance to the specific heat loss characteristics of the living space as well as responding to instant changes in the environment, such as a door opening.
  - The gas valve allows for a modulated response to temperature changes, injecting just the right amount of BTUs to respond to the specific call for heat on an instantaneous basis.
  - The modulating blower fan works with the gas valve to to heat gradually without creating strong drafts associated with single stage systems.

Nature Seeks Equilibrium



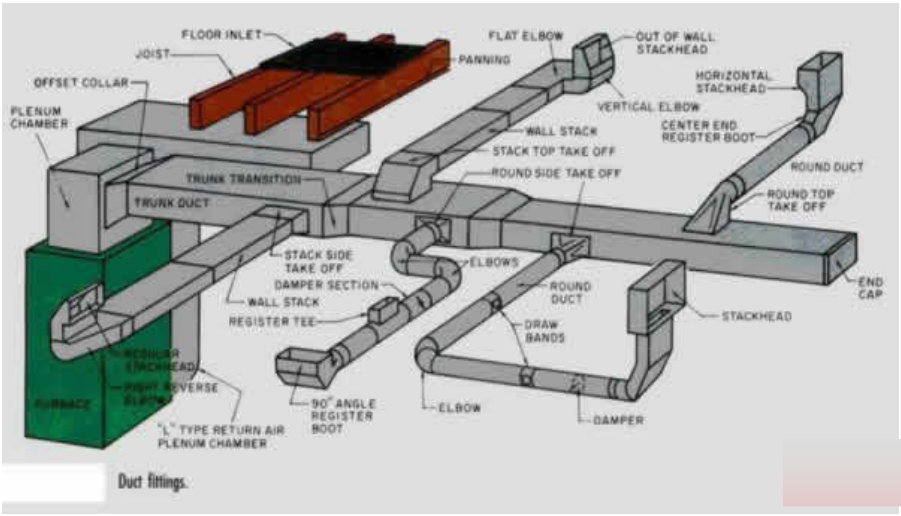
One drop of red dye in a cup of water will, without assistance, gradually diffuse throughout the water and achieve a perfectly balance equilibrium. Heat and cold work the same way in a room!

Total Heating or Zone Heating

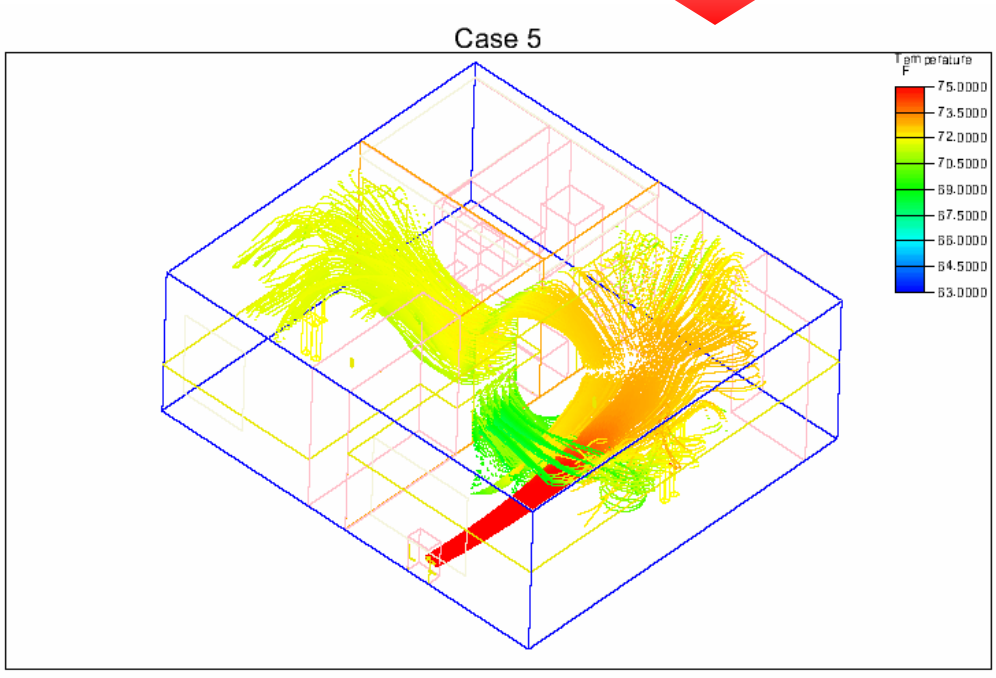
- Rinnai's Direct Vent Heaters have 2 primary applications:
  - Total Heating Solution (as a ductless heater)
  - Zone Heating Solution (as a ZONE heat source)
- Total Heating Solution, "Ductless Heater":
  - Uses "Comfortable Heat" to heat entire home
  - Ductless
  - Either with no A/C system or "Mini-Split" ductless A/C System
- Zone Heating Solution, "Direct Vent Heat":
  - Used for:
    - Small spaces
    - Hard-to-heat spaces
    - Eliminating cold spots
    - Supplementing conventional ducted system
    - Supplementing "heat pump systems"

Whole Heating

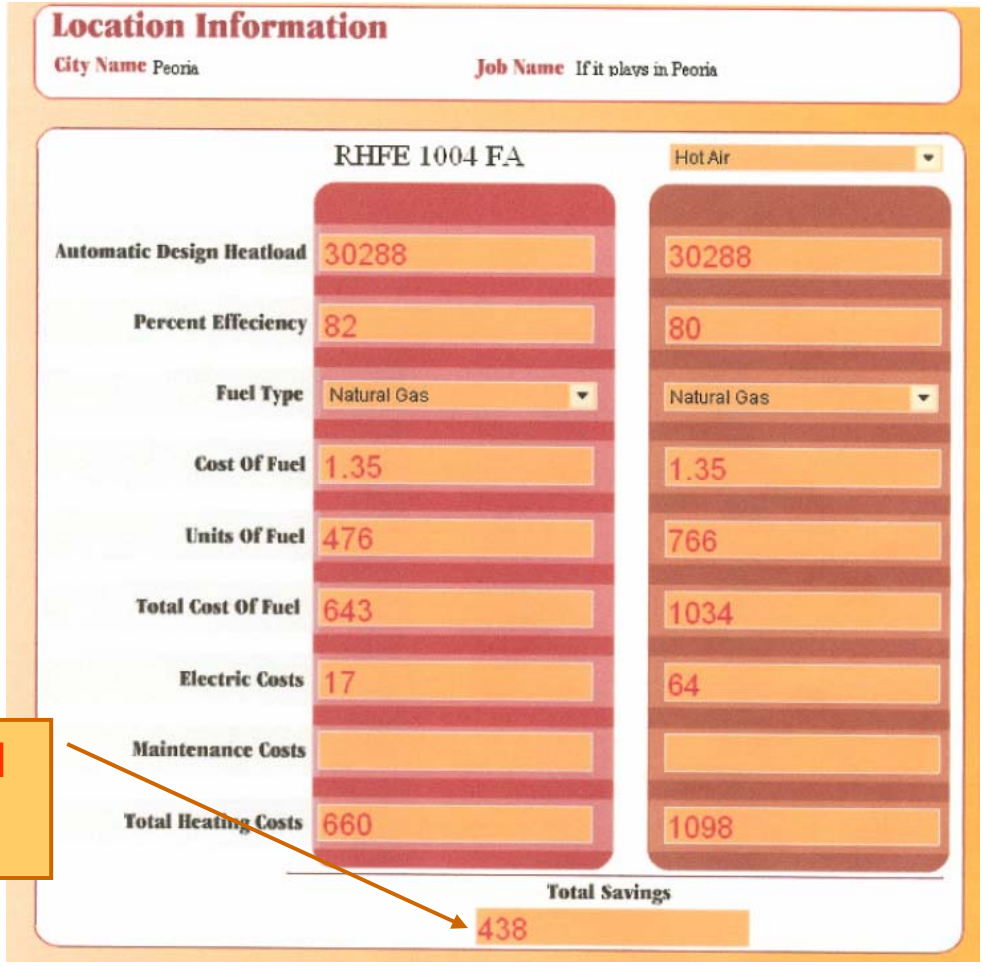
From this…



to this



Ductless Heater vs. Forced Air System



40% total savings!

Energy Conservation - Other Items

- Avoid Cycle Loss

  Energy lost through constant start up and shut down process of a typical single-stage heater

- Avoid Duct Loss

  "Due to extreme winter and summer temperatures in these spaces, 10 percent to 30 percent of the energy used to heat and cool the air is lost through the duct surfaces." (http://www.energystar.gov/ia/home_improvement/home_sealing/DuctInsulationFS_2005.pdf)

- Modulation = Energy Conservation

  Rinnai's modulating gas valve technology allows the ductless heater to use only the energy necessary to maintain temperature without overheating. This saves on overall heating costs.

- Adding a Rinnai can convert a central heating system into a zone-based system

  Only heat the space you're occupying/living in.

Safety

1. **Multiple Overheat Switches**

   Insures occupant SAFETY and prevents unit from overheating.

2. **Flue Block Function**

   Automatically shuts off unit if flue is obstructed.

3. **Cool-to-touch cabinet**
4. **Minimum clearances**

   2" side; 10" top; 40" front

   Competitors are typically >12" on top

5. **CSA approved**
6. **Self diagnostic**

Self Diagnostic Codes

- All Rinnai Ductless Heaters retain error codes in the memory to assist in repair and to monitor quality control history. It is stored in the E2PROM of the PCB forever.
- To recall the error code history, combustion time, combustion frequency, and power failure occurrences, place the unit in the OFF position, then push the "Economy button", the "▲" and "▼"button and hold all 3 for 2.5 seconds and release them.
- Error codes will be displayed in the LED numbers in sequence with the most recent fault code being displayed as the first number or numbers to be displayed.
- All heaters having analog displays with temperature lights will display as below:

LO 64 68 72 76 80 HI (RECORD GROUP OF NUMBERS AS THEY APPEAR

EXAMPLE = 60 64 68 = ABNORMAL COMBUSTION FAN MOTOR RPMS

- All heaters having digital displays with temperature lights will display as:

SET	ROOM
1	53
2	14

01 = FIRST CODE MOST RECENT AND 53 = ABNORMAL SPARK SENSED

02 = SECOND CODE 2ND MOST RECENT AND 14 = OVERHEAT SAFETY

Error Coded Messages

Analog Indicator Light	Digital LED Display	Probable Cause	Comments
LO - HI	PF, --:--	Power Failure	Check power supply
60	11	Missed ignition	Flame current does not reach 1.0 microamp within the given time after solenoid opens
LO	12	Flame Failure	Flame rod current remains below 1.0 microamp for 3 seconds during initial combustion
68	14	Overheat safety device	High limit temperature thermistor or thermal fuse has activated
HI	16	Over temperature cut off	Room temperature is sensed as being above 104ºF for longer than 10 minutes
72 * 76	31	Room temperature thermistor disconnection	Room temperature thermistor open circuit
76 * 80	32	Room temperature thermistor short circuit	Room temperature thermistor wire trapped, touching bare metal
64 * 68 * 72	33	High limit thermistor disconnections	High limit thermistor open circuit
68 * 72 * 76	34	High limit thermistor short circuit	High limit thermistor wire trapped touching bare metal
LO * 60 * 64	53	Abnormal spark sensed	Sparker not OFF within 20 seconds at time of ignition; 1st spark sensed not within 2 seconds; 2nd spark sensed spark not continuous for 1 second after solenoid valve opens
60 * 64 * 68	61	Abnormal combustion fan motor rpm	Speed is not achieved within time or goes over speed level
64 * 68	70	ON/OFF switch failure	ON/OFF switch connects continuously for more than 15 seconds
LO * 60	71	Solenoid valve check	Solenoid valve(s), SV1 & SV2, signal and response signal are different
80	72	Flame rod failure	Flame rod output does not cease within 20 seconds
72 * 76 * 80 * HI	73	Communication failure	Data transfer between CPU and E2PROM fails
NA	49	Pressure sensor disconnect or breakdown	Check sensor connections to PCB and hoses to blower motor housing in rear
NA	99	Flue block or venting disconnected. Vent must be connected	Check intake and exhaust inside and outside for blockage or freezing.

NOTE: If a fault code occurs it will be necessary to turn the unit off and back on to clear the code. It will go into memory for future reference for the technician. If the unit operates and heats without the error code occurring again a service call may not be necessary.

UNDERSTANDING SELF-DIAGNOSTIC CODES: Fault codes are used to assist the technician in identifying probable causes to shorten diagnostic time.

Multiple Applications - Sunroom

Multiple Applications - Basement

Multiple Applications - Home / Living Room

Multiple Applications - Bonus Room

Niagara Mohawk

Electric-to-Gas Conversion Expected to Save Big $$$

When your heating bills use up about a third of your rental income, you have a big problem. And that's exactly what prompted the conversion of heating units at Kennedy Plaza in Utica from electricity to natural gas.

Now under way, the conversion is projected to save the owner about $117,000 a year in energy costs — a one-third reduction, reports Bill Stickles, Niagara Mohawk's regional marketing specialist in Utica.

The 27-year-old complex is government-subsidized housing, under the Federal Housing Authority 230 Loan Program, with a total of 303 units.

Two five-story buildings have 88 two-bedroom units. Each apartment is getting two Rinnai "Energy Saver" direct-vent gas furnaces. They have built-in thermostats and humidifiers, centrifugal blower fans and electronic ignitions, Stickles notes. Their efficiency is rated at 82 percent.

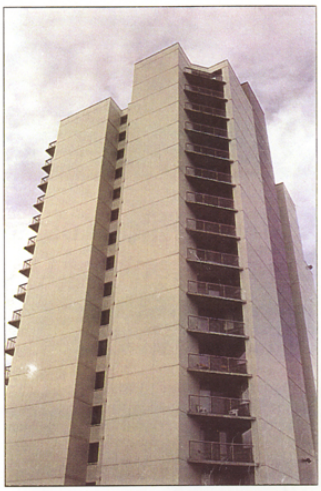
An adjacent 17-story building holds 153 one-bedroom apartments and 62 studio apartments, most of which are getting one Rinnai unit.

Gas Has the Advantage

Stickles says the primary reason for the conversion at Kennedy Plaza was the $117,000-a-year cost reduction switching to natural gas produced.

"Electric heating may have been the right decision when Kennedy was built in 1970, but it isn't now," Stickles asserts.

"The initial cost for equipment and installation will be more than it would have been for possible alternative solutions, but the much lower operating cost of natural gas makes it the obvious choice," he adds.



Kennedy Plaza's Tower

Scharf Plumbing & Heating, Inc., is the installing contractor, while Bob Almy & Associates Consulting Engineers did the engineering work. Both are located in Utica.

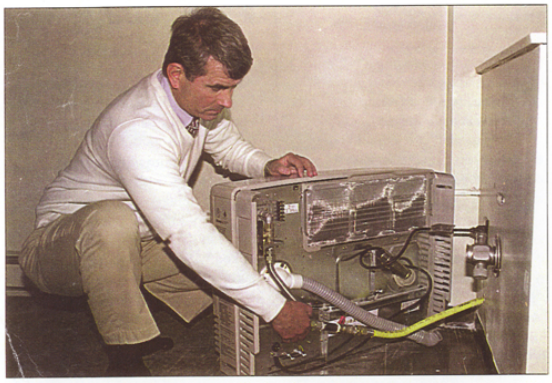
Safety a Factor

"Important factors in selecting the Rinnai heating units were safety and durability," Stickles says.

State codes require that exhaust flues terminating on outside walls operate safely in 40 mph winds. That is sometimes a problem for equipment manufacturers. Rinnai solved it by using a tachometer and microcomputer to vary the sensitivity of the lockout device.

"This system can tell the difference between a temporary gust and a blocked flue, but the more common pressure-sensitive switches sometimes can't," Stickles explains.

The conversion is expected to be completed in early this year. B&E



Bill Stickles, regional marketing specialist for Niagara Mohawk, checks out a Rinnai gas furnace in one of Kennedy Plaza's 303 apartments. The conversion from electricity to natural gas is projected to save $117,000 a year in heating costs.

PAGE 2

Product Specifications

General Specifications

Direct Vent MODELS	CFMS	AMPERAGE	DECIBELS	BTU HIGH	BTU LOW	DIMENSIONS
RHFE 263 FA	128.5 High 96.4 Low	47 Watts High Fire	High=38dBA Low=31dBa	11,000 NG 11,000 LP	5,500 NG 5,700 LP	H 26 5/8” W 16 3/4” D 9 13/16”
RHFE 201FA	70.6 High 48.3 Low	42 Watts High Fire	High=34dB Low=27dB	8,000 NG 8,000 LP	3,000 NG 3,000 LP	H 26 5/8” W 16 3/4” D 9 13/16”
RHFE 431 FAIII & WTA	141.3 High 110.5 Low	40 Watts High Fire	High=38dBA Low=32dBA	16,700 NG 16,700 LP	8,200 NG 8,200 LP	H 21 13/16” W 29 1/2” D 9 13/16”
RHFE 556 FAIII & WTA	162.7 High 110.5 Low	55 Watts High Fire	High=41dBA Low=32dBA	21,500 NG 20,700 LP	8,200 NG 8,200 LP	H 21 13/16” W 29 1/2” D 9 13/16”
RHFE 1004 FA	360.6 High 203.4 Low	121 Watts High Fire	High=47dBA Low=37dBA	38,400 NG 36,500 LP	10,500 NG 10,500 LP	H 26 3/8” W 36 5/8” D 13”

263
201

1004

431

556

Rinnai

263FAII

Type of Appliance	Direct vent wall furnace suitable for homes including mobile and manufactured homes; forced combustion, forced convection	
Rinnai Model Number	RHFE-263FAII-N (Natural gas)	RHFE263FAII-P (Propane)
Gas Rate Input (BTU/hour)	Low - 5,500 High - 11,000	Low - 5,700 High - 11,000
Gas Rate Output (BTU/hour)	Low - 4,450 High - 8,800	Low - 4,600 High - 8,800
AFUE Rating	80%	80%
Minimum Gas Supply Pressure	3.5 in (89 mm) W.C.	8 in (203 mm) W.C.
Maximum Gas Supply Pressure	10.5 in (267 mm) W.C	13 in (330 mm) W.C.
Electrical Connection	AC 120V, 60 Hz, 47 watts	
Gas Connection	1/2 inch FNPT	
Combustion System	Stainless steel inshot burners	
Ignition System	Direct spark	
Fan CFM Output	Low - 96.4	High - 128.5
Temperature Settings	Low (LO): minimum combustion 60° - 80° F in 2° increments High (HI): maximum combustion	(16° - 26° C in 1° increments)
Temperature Control	Electronic thermostat	
Humidifier Tray	Enameled tray with capacity of 1.5 pints (0.7 liters)	
Weight	Approximately 37 lbs (17 kg)	
Clearance from Combustibles	Side: 2 inches (50 mm) Front: 40 inches (1 m)	Top: 0 inches (0 mm)
Noise Level	31 - 38 dB(A)	
Warm Air Outlet	Bottom front louvers	

FEATURES

Seven-stage modulating gas valve:	provides precise gas flow by operating from one to seven stages
Negative coefficient thermistor:	detects temperature change in 1/2 of a degree
Variable speed inducer motor with pressure switch:	monitors and controls combustion fan and allows the appliance to overcome winds of up to 40 mph
Quiet operation:	reduces noise through use of swept blades in convection fan; and through the design of the combustion chamber and heat exchanger which silently expand or contract due to temperature changes
Self diagnostic electronics:	continually monitors functions; provides auto shutdown codes; indicates when air filter needs cleaning

Rinnai

263FAII

Safety Devices

- Flame rod detects flame failure; results in auto shutdown to prevent escape of gas
- Bi-metal switch, thermal fuse, and thermistor detect overheat condition; results in auto shutdown
- 3 amp fuse protects against power surge; results in auto shutdown
- Abnormal spark at time of ignition results in auto shutdown
- Combustion fan purges any gas from the combustion chamber before ignition
- Convection fan continues to run after burner shutdown to cool internal parts
- Function lock prevents inadvertent operation
- Appliance shuts down if room reaches 104° F (40° C)

Venting

concentric; 3 1/8 inch (80 mm) wall hole

Maximum Vent Length

13 feet (4 m) with a maximum of 2 bends; maximum 8 feet vertically

Wall Thickness and Flue Manifold Kits
(the "A" vent kit is included with the appliance)

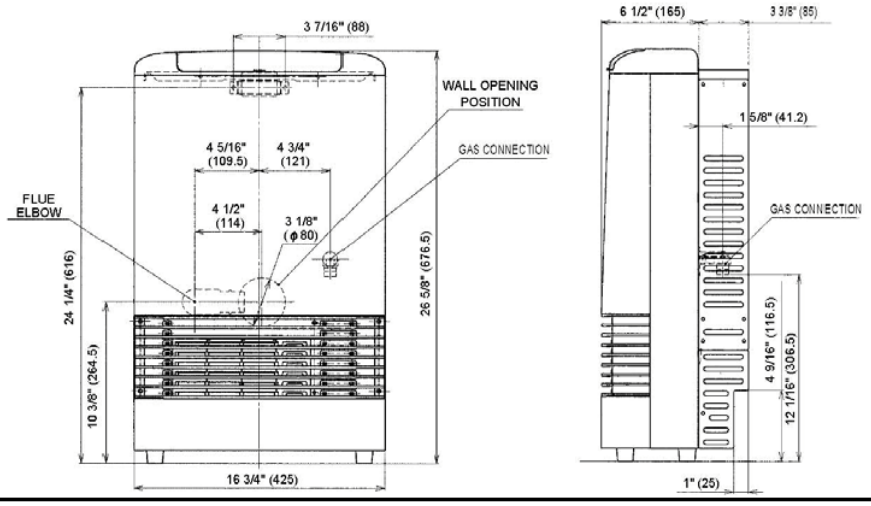
Name	Kit No.	fits walls
S Vent Kit	FOT-150	3 - 4 1/2 in (75 - 115 mm)
A Vent Kit	FOT-151	4 1/2 - 9 1/2 in (115 - 240 mm)
B Vent Kit	FOT-152	9 1/2 - 15 3/4 in (240 - 400mm)
C Vent Kit	FOT-153	15 3/4 - 23 5/8 in (400 - 600 mm)
D Vent Kit	FOT-154	23 5/8 - 31 1/2 in (600 - 800 mm)

Warranty

Labor: 2 years; Parts: 5 years; Heat Exchanger: 10 years with years 6-10 prorated

Rinnai is continually updating and improving products; therefore, specifications are subject to change without prior notice. Local, state, provincial and federal codes must be adhered to prior to installation.

DIMENSIONS



Rinnai

431FAIII

Type of Appliance	Direct vent wall furnace suitable for homes including mobile and manufactured homes; forced combustion, forced convection	
Rinnai Model Number	RHFE-431FAIII-N (Natural gas)	RHFE-431FAIII-P (Propane)
Gas Rate Input (BTU/hour)	Low - 8,200 High - 16,700	Low - 8,200 High - 16,700
Gas Rate Output (BTU/hour)	Low - 6,640 High - 13,400	Low - 6,640 High - 13,400
AFUE Rating	80.8%	81.0%
Minimum Gas Supply Pressure	3.5 in (89 mm) W.C.	8 in (203 mm) W.C.
Maximum Gas Supply Pressure	10.5 in (267 mm) W.C	13 in (330 mm) W.C.
Electrical Connection	AC 120V, 60 Hz, 40 watts	
Gas Connection	1/2 inch FNPT	
Combustion System	Stainless steel inshot burners	
Ignition System	Direct spark	
Fan CFM Output:	Low: 110.5	High: 141.3
Temperature Settings	Low (LO): minimum combustion 60° - 80° F in 4° increments High (HI): maximum combustion	
Temperature Control	Electronic thermostat	
Humidifier Tray	Enameled tray with capacity of 3 pints (1.3 liters)	
Weight	Approximately 51 lbs (23 kg)	
Clearance from Combustibles	Side: 2 inches (50 mm) Front: 40 inches (1 m)	Top: 10 inches (250 mm)
Noise Level	32 - 38 dB(A)	
Warm Air Outlet	Bottom front louvers	

FEATURES

Linear function modulation:	provides precise gas flow
Negative coefficient thermistor:	detects temperature change in 1/2 of a degree
Variable speed inducer motor :	monitors and controls combustion fan
Quiet operation:	reduces noise through use of swept blades in convection fan; and through the design of the combustion chamber and heat exchanger which silently expand or contract due to temperature changes
Self diagnostic electronics:	continually monitors functions; provides auto shutdown codes; indicates when air filter needs cleaning

Rinnai

431FAIII

Safety Devices

- Flame rod detects flame failure; results in auto shutdown to prevent escape of gas
- Bi-metal switch, thermal fuse, and thermistor detect overheat condition; results in auto shutdown
- 3 amp fuse protects against power surge; results in auto shutdown
- Abnormal spark at time of ignition results in auto shutdown
- Combustion fan purges any gas from the combustion chamber before ignition
- Convection fan continues to run after burner shutdown to cool internal parts
- Function lock prevents inadvertent operation
- Appliance shuts down if room reaches 104° F (40° C)

Venting

concentric; 3 1/8 inch (80 mm) wall hole

Maximum Vent Length

13 feet (4 m) with a maximum of 2 bends; maximum 8 feet (2.4 m) vertically

Wall Thickness and Flue Manifold Kits
(the "A" vent kit is included with the appliance)

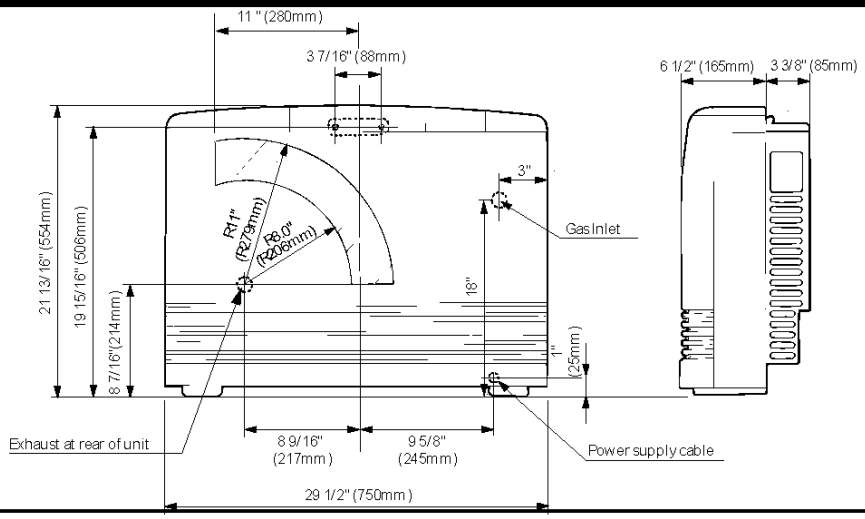
Name	Kit No.	fits walls
S Vent Kit	FOT-150	3 - 4 1/2 in (75 - 115 mm)
A Vent Kit	FOT-151	4 1/2 - 9 1/2 in (115 - 240 mm)
B Vent Kit	FOT-152	9 1/2 - 15 3/4 in (240 - 400mm)
C Vent Kit	FOT-153	15 3/4 - 23 5/8 in (400 - 600 mm)
D Vent Kit	FOT-154	23 5/8 - 31 1/2 in (600 - 800 mm)

Warranty

Labor: 2 years; Parts: 5 years; Heat Exchanger: 10 years with years 6-10 prorated

Rinnai is continually updating and improving products; therefore, specifications are subject to change without prior notice. Local, state, provincial and federal codes must be adhered to prior to installation.

DIMENSIONS



Rinnai

556FAIII

Type of Appliance	Direct vent wall furnace suitable for homes including mobile and manufactured homes; forced combustion, forced convection	
Rinnai Model Number	RHFE-556FA-N (Natural gas)	RHFE-556FA-P (Propane)
Gas Rate Input (BTU/hour)	Low - 8,200 High - 21,500	Low - 8,200 High - 20,700
Gas Rate Output (BTU/hour)	Low - 6,640 High - 17,420	Low - 6,640 High - 16,770
AFUE Rating	80.6%	81.0%
Minimum Gas Supply Pressure	5 in (127 mm) W.C.	11 in (279 mm) W.C.
Maximum Gas Supply Pressure	10.5 in (267 mm) W.C	13 in (330 mm) W.C.
Electrical Connection	AC 120V, 60 Hz, 52 watts	
Gas Connection	1/2 inch FNPT	
Combustion System	Stainless steel inshot burners	
Ignition System	Direct spark	
Fan CFM Output:	Low: 110.5	High: 162.7
Temperature Settings	Low (LO): minimum combustion 60° - 80° F in 4° increments High (HI): maximum combustion	
Temperature Control	Electronic thermostat	
Humidifier Tray	Enameled tray with capacity of 3 pints (1.3 liters)	
Weight	Approximately 51 lbs (23 kg)	
Clearance from Combustibles	Side: 2 inches (50 mm) Front: 40 inches (1 m)	Top: 10 inches (250 mm)
Noise Level	32 - 41 dB(A)	
Warm Air Outlet	Bottom front louvers	

FEATURES

Linear function modulation:	provides precise gas flow
Negative coefficient thermistor:	detects temperature change in 1/2 of a degree
Variable speed inducer motor:	monitors and controls combustion fan
Quiet operation:	reduces noise through use of swept blades in convection fan; and through the design of the combustion chamber and heat exchanger which silently expand or contract due to temperature changes
Self diagnostic electronics:	continually monitors functions; provides auto shutdown codes; indicates when air filter needs cleaning

Rinnai

556FAIII

Safety Devices

- Flame rod detects flame failure; results in auto shutdown to prevent escape of gas
- Bi-metal switch, thermal fuse, and thermistor detect overheat condition; results in auto shutdown
- 3 amp fuse protects against power surge; results in auto shutdown
- Abnormal spark at time of ignition results in auto shutdown
- Combustion fan purges any gas from the combustion chamber before ignition
- Convection fan continues to run after burner shutdown to cool internal parts
- Function lock prevents inadvertent operation
- Appliance shuts down if room reaches 104° F (40° C)

Venting

concentric; 3 1/8 inch (80 mm) wall hole

Maximum Vent Length

13 feet (4 m) with a maximum of 2 bends; maximum 8 feet (2.4 m) vertically

Wall Thickness and Flue Manifold Kits
(the "A" vent kit is included with the appliance)

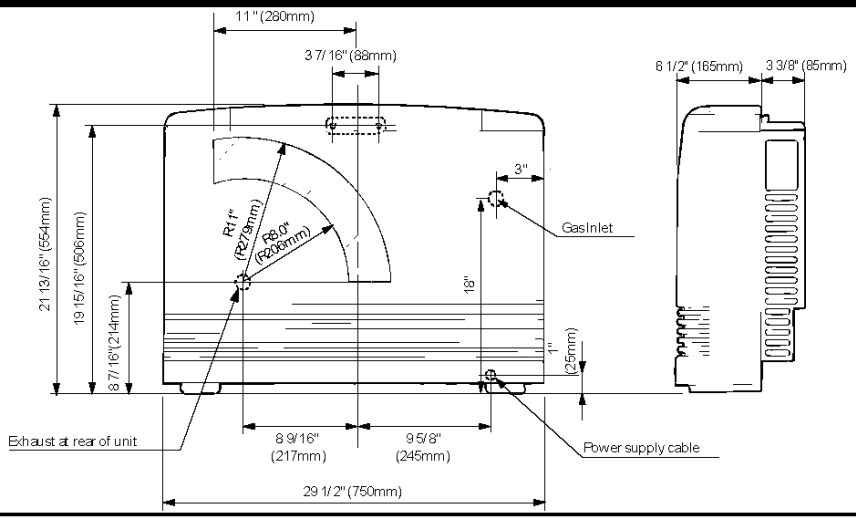
Name	Kit No.	fits walls
S Vent Kit	FOT-150	3 - 4 1/2 in (75 - 115 mm)
A Vent Kit	FOT-151	4 1/2 - 9 1/2 in (115 - 240 mm)
B Vent Kit	FOT-152	9 1/2 - 15 3/4 in (240 - 400mm)
C Vent Kit	FOT-153	15 3/4 - 23 5/8 in (400 - 600 mm)
D Vent Kit	FOT-154	23 5/8 - 31 1/2 in (600 - 800 mm)

Warranty

Labor: 2 years; Parts: 5 years; Heat Exchanger: 10 years with years 6-10 prorated

Rinnai is continually updating and improving products; therefore, specifications are subject to change without prior notice. Local, state, provincial and federal codes must be adhered to prior to installation.

DIMENSIONS



Rinnai

1004FA

Type of Appliance	Direct vent wall furnace suitable for homes including mobile and manufactured homes; forced combustion, forced convection	
Rinnai Model Number	RHFE-1004FA-N (Natural gas)	RHFE-1004FA-P (Propane)
Gas Rate Input (BTU/hour)	Low - 10,500 High - 38,400	Low - 10,500 High - 36,500
Gas Rate Output (BTU/hour)	Low - 8,400 High - 30,900	Low - 8,400 High - 29,200
AFUE Rating	80.6%	82.0%
Minimum Gas Supply Pressure	5 in (127 mm) W.C.	11 in (279 mm) W.C.
Maximum Gas Supply Pressure	10.5 in (267 mm) W.C	13 in (330 mm) W.C.
Electrical Connection	AC 120V, 60 Hz, 121 watts	
Gas Connection	1/2 inch FNPT	
Combustion System	Stainless steel inshot burners	
Ignition System	Direct spark	
Temperature Settings	Low (LO): minimum combustion 60° - 80° F in 2° increments High (HI): maximum combustion	
Temperature Control	Electronic thermostat	
Humidifier Tray	Enameled tray with capacity of 7 pints (3 liters)	
Weight	Approximately 90 lbs (41 kg)	
Clearance from Combustibles	Side: 2 inches (50 mm) Front: 40 inches (1 m)	Top: 10 inches (250 mm)
Noise Level	37 - 47 dB(A)	
Warm Air Outlet	Bottom front louvers	

FEATURES

Seven-stage modulating gas valve:	provides precise gas flow by operating from one to seven stages
Negative coefficient thermistor:	detects temperature change in 1/2 of a degree
Variable speed inducer motor with pressure switch:	monitors and controls combustion fan and allows the appliance to overcome winds of up to 40 mph
Quiet operation:	reduces noise through use of swept blades in convection fan; and through the design of the combustion chamber and heat exchanger which silently expand or contract due to temperature changes
Self diagnostic electronics:	continually monitors functions; provides auto shutdown codes; indicates when air filter needs cleaning

Rinnai

1004FA

Safety Devices

- Flame rod detects flame failure; results in auto shutdown to prevent escape of gas
- Bi-metal switch, thermal fuse, and thermistor detect overheat condition; results in auto shutdown
- 5 amp fuse protects against power surge; results in auto shutdown
- Abnormal spark at time of ignition results in auto shutdown
- Combustion fan purges any gas from the combustion chamber before ignition
- Convection fan continues to run after burner shutdown to cool internal parts
- Function lock prevents inadvertent operation
- Appliance shuts down if room reaches 104° F (40° C)

Venting

concentric; 3 1/8 inch (80 mm) wall hole

Maximum Vent Length

13 feet (4 m) with a maximum of 2 bends; maximum 8 feet (2.4 m) vertically

Wall Thickness and Flue Manifold Kits
(the "A" vent kit is included with the appliance)

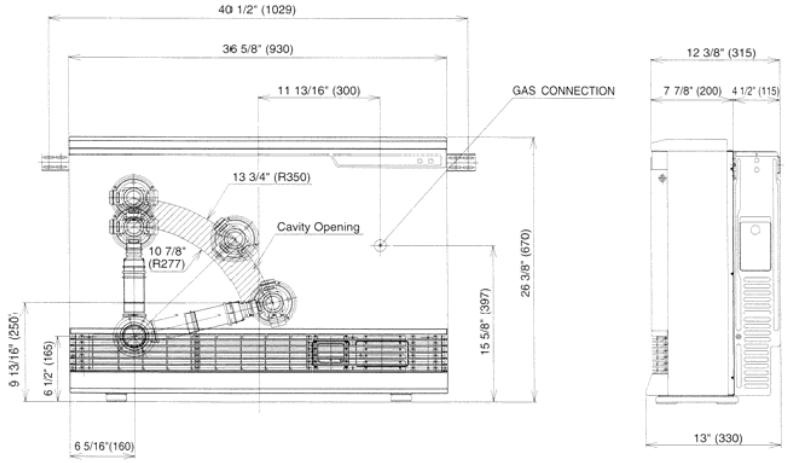
Name	Kit No.	fits walls
S Vent Kit	FOT-150	3 - 4 1/2 in (75 - 115 mm)
A Vent Kit	FOT-151	4 1/2 - 9 1/2 in (115 - 240 mm)
B Vent Kit	FOT-152	9 1/2 - 15 3/4 in (240 - 400mm)
C Vent Kit	FOT-153	15 3/4 - 23 5/8 in (400 - 600 mm)
D Vent Kit	FOT-154	23 5/8 - 31 1/2 in (600 - 800 mm)

Warranty

Labor: 2 years; Parts: 5 years; Heat Exchanger: 10 years with years 6-10 prorated

Rinnai is continually updating and improving products; therefore, specifications are subject to change without prior notice. Local, state, provincial and federal codes must be adhered to prior to installation.

DIMENSIONS



Certification for All Models

All models are certified by CSA.

CSA INTERNATIONAL

Certificate of Compliance

EXAMPLE

Certificate: 1257662 (113206) Master Contract: 189893
Project: 1673991 Date Issued: 2005/06/03
Issued to: Rinnai America Corporation
103 International Dr
Peachtree City, GA 30269
USA
Attention: Donald N. Emen

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US'

C US

Issued by: Michael Sharkey

Authorized by: Richard Fort, Manager of Certification Services

PRODUCTS
CLASS 1512 81 - FURNACES (GAS) - WALL - Direct Vent - Certified to U.S. Standards
CLASS 1512 01 - FURNACES (GAS) - WALL - Direct Vent

1512-01 Direct Vent Wall Furnace

MODEL NUMBER

For Use With Natural Gas Trade Name: Rinnai

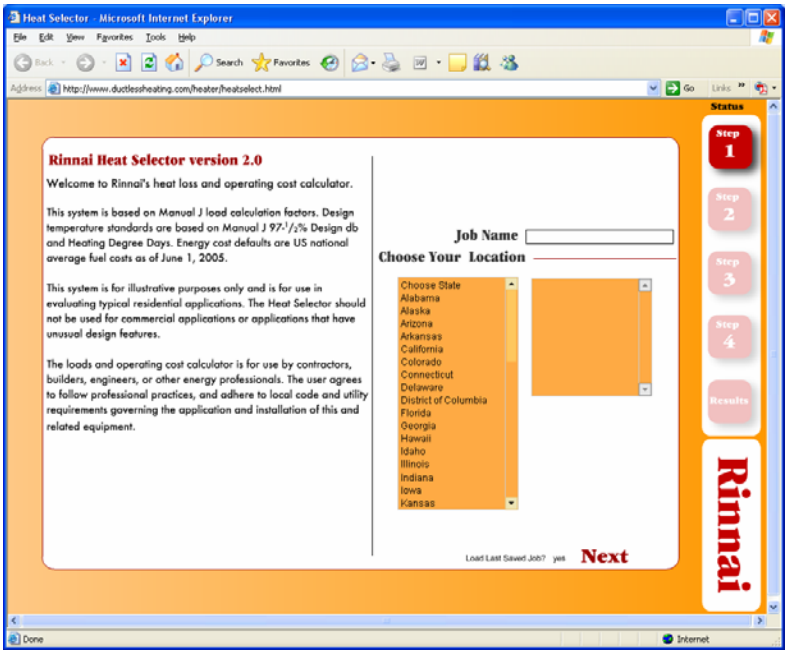
RHFE-1004FA-N

The 'C' and 'US' indicators adjacent to the CSA Mark signify that the product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the U.S., respectively. This 'US' indicator includes products eligible to bear the 'NRTL' indicator. NRTL, i.e. Nationally Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognized to perform certification to U.S. Standards.

DOD 507 Rev. 2004-06-30

Sizing

- Use the Manual J worksheet (“Heat Selector”) at http://www.ductlessheating.com
- This must be done before selecting the right model heater
- 90% of all homes are oversized



Frequently Asked Questions (FAQ)

- Can the DF heat more than the room in which its located?
  Yes, the appliance is designed to spread the heat through the house.
- Is it a space heater?
  No, the appliance is designed to be the primary heat source.
- What type of gas can you use?
  Natural gas or liquid propane gas (LP)
- Does it require electricity?
  Yes, the appliance requires AC 120V, 60 Hz and depending on the model 40 - 121 watts.
- Does it have to be mounted on an outside wall?
  No, the appliance is free standing.
- Is the DF fuel convertible for the end-user?
  Yes, in case the other gas type becomes available for the consumer, the appliance can be converted by the gas agency, supplier, or installer. Conversions are not permitted for the purpose of inventory adjustment.
- How long will my DF last?
  The appliance is designed with an MTBF (Mean Time Before Failure) design criteria of 20 years.
- How many are installed in North America?
  Over 200,000. These appliances have been sold in North America since 1993.
- Can these units be sold in Canada?
  Yes, these appliances have been certified by CSA and are approved for sale in the United States and Canada.

Support

- Warranty
  - 10 years heat exchanger (pro-rated), 5 years parts, 2 years reasonable labor.
- Service & Support
  - 24/7 tech service support
  - 800-621-9419
  - Training & Registration Programs
- Submittals
  - Available upon request
- Contact info
  - www.rinnai.us
  - www.ductlessheating.com

Sales Resources

- Trade Show Leads
- Local contacts
- Association names
- Builders
- Custom Builders
- Remodelers
- HUD
- Assisted Living

Marketing Resources

- Heater Display POP
- Literature: ads (local dealer), slicks
- Spec Sheets
- Counter mats
- Technician Hats
- Product clings
- Submittals

Testing

RINNAI ENERGY SAVER REVIEW POINTS

1. Why do you need to know the wall thickness at the termination point of a Rinnai direct vent installation? _____
   a. To know how much gas line is to be installed.
   b. To select the correct vent termination size.
   c. To know the correct hole saw size.
   d. None of the above.
2. Select the current measurements available for extension sets for the Rinnai direct vent heaters. _____
   a. 4.5 inches to 9.5 inches, 12 inches to 25 inches, 24 inches to 36 inches
   b. 20 inches, 40 inches, 80 inches
   c. 6 feet, 12 feet, 15 feet, 35 feet
   d. 3 inches, 6 inches, 9 inches, 12 inches
3. The termination kit shipped with each direct vent heater will fit a wall thickness of what size? _____
   a. 3.5 inches to 9 inches thick.
   b. 4.5 inches to 9.5 inches thick.
   c. 31.75 inches to 42.5 inches thick
   d. 12 inches to 39 inches thick.
4. The maximum vertical length of a direct vent extension is what length? _____
   a. 6 feet
   b. 8 feet
   c. 15 feet
   d. 18 feet
5. How many ? elbows may be used with extension sets? _____
   a. Three
   b. Two
   c. Four
   d. None of the above
6. The maximum extension set length is 13 feet total with 8 feet vertical maximum with two 90-degree elbows not counting the elbow on the unit. _____
   a. True
   b. False

Testing

7. What does heat do? _____
    a. Rises
    b. Seeks cold
    c. Snows
    d. Causes moisture
8. What does hot air do? _____
    a. Rises
    b. Seeks cold
    c. Snows
    d. Causes moisture
9. Where is the coldest place in a structure? _____
    a. Ceiling
    b. Walls
    c. Floors
    d. Furniture
10. Where does a Rinnai Heater displace its warm air? _____
    a. Top
    b. Bottom
    c. Center
    d. Side
11. Comfort heating is affected by: _____
    a. Stratification
    b. Humidity
    c. Infiltration
    d. Stagnation
    e. All of the above
12. A modulation gas control valve on the Rinnai Heater allows Rinnai: _____
    a. To match the heat loss with the BTU input.
    b. To attack a small degree change with a small amount of BTU input.
    c. To provide the best comfort available in the market today.
    d. To increase efficiency and reduce cost of operations.
    e. All of the above.

Testing

13. A negative co-efficient thermistor is accurate within 0.1 degree. When heat is applied, resistance readings: _____
    a. Increases
    b. Remains the same
    c. Decreases
    d. Beeps
14. Rinnai uses DC coils on its gas control valve for what reason? _____
    a. Less wear and tear, longer lasting.
    b. Quiet no chatter operation.
    c. Less heat retention, longer lasting.
    d. Modulation of the proportional operational valve.
    e. All of the above.
15. Installation of Rinnai Heater requires the following: _____
    a. Proper gas pressure and supply at the unit.
    b. Properly GROUNDED and polarized electrical supply.
    c. 3-inch hole for termination vent kit.
    d. All of the above.
16. What information is on the rating plate of a Rinnai Heater? _____
    a. Model and serial number.
    b. Clearances to unit.
    c. Type gas, BTU input, Supply pressure.
    d. All of the above
17. Check all features found on a Rinnai Heater.

- ☐ Filter indicator
- ☐ Child or function lock
- ☐ LED controls
- ☐ Self-diagnostics
- ☐ Modulating Gas Control
- ☐ Modulating Blower
- ☐ Economy Function
- ☐ Cool to the Touch Cabinets
- ☐ 5 year parts warranty
- ☐ 10 year heat exchanger warranty
- ☐ 2 years unprecedented Labor warranty
- ☐ Thermostat operation
- ☐ Humidifier tray

Testing

18. Self-Diagnostic Error Codes are retained in memory to help the technician Trouble-shoot the Rinnai Heater. How many Codes does the Rinnai keep in memory? _____
    a. 4
    b. 6
    c. 8
    d. 10
19. All of Rinnai's Direct Vent Heaters are convertible from one gas type to the other.
    a. True
    b. False
20. Rinnai ductless Heaters eliminates the following: _____
    a. Duct Loss
    b. Cycle Loss
    c. Satisfaction
    d. All of the above
    e. None of the above
21. Application opportunities for the Rinnai Heater are: _____
    a. Residential Homes, Cabins, Resorts, Basements
    b. Modular Homes, Apartments, Condos, Rentals
    c. Light Commercial, Florida Rooms, Sun Rooms
    d. Churches, Schools, Nurseries, Offices, Others
    e. All of the above plus more

Rinnai DV 101 Class Evaluation

Please take a few minutes to evaluate this training class. All comments are welcomed to help us better serve the needs of the technician and salesmen. Your comments are appreciated.

Was the subject matter relevant to your job?

Was the subject matter presented in an effective manner?

Was the length of the class too long or too short to cover the material?

Was the instructor clear and knowledgeable about the subject matter?

Did you receive correct answers to your questions?

Do you have any suggestions to improve this class for future purpose?

Was the hands-on training helpful or boring to you?

Would you attend another class representing this product?

Will you use any of the information presented to assist you in your job?

Please enter your comments and suggestions below. You do not have to sign the comment sheet.

Notes

Notes

Notes

Testing Answers

1. b
2. b
3. b
4. b
5. b
6. a
7. b
8. a
9. c
10. b
11. e
12. e
13. c
14. e
15. d
16. d
17. all are features found on a Rinnai heater
18. d
19. a
20. a
21. e

Ask about Rinnai®

Rinnai's other fine products

Tankless Water Heaters

- Residential and Commercial Applications
- Continuous Hot Water
- Up to 8.5 GPM
- High Energy Efficiency
- Propane or Natural Gas
- Internal or External Installation
- Digital Temperature Control
- Small, Compact Design

Vent-Free Zone Heaters

- Programmable Thermostat
- Energy Efficient, Vent-free
- No Visible Flame
- Oxygen Depletion Sensor
- Secondary Heat Source
- "Cool-to-the-Touch" Cabinet

Direct-Vent Fireplace, RHFE-750ETR

- Energy Efficient Source of Zone Heating
- Accurate Temperature Control
- Bottom Air Discharge
- Full-function Remote
- Unique Interchangeable Fronts
- Digital Dual Timer Function

Infrared Heaters

- Wall-mountable or Free-standing
- Works in Power Outages
- Energy Efficient
- Natural or Propane Gas
- ODS Safety Sensor
- Ideal for Emergency Heating

Rinnai America Corporation
103 International Drive
Peachtree City, GA 30269
TOLL FREE: 1-800-621-9419
www.rinnai.us

R-TRHT-E-01
Rev A
8/2007