

**PULSE21V™ SERIES
HORIZONTAL/DOWN-FLOW
GAS FURNACES – DIRECT VENT**

*92.0% to 94.6% A.F.U.E.

**80,000 and 100,000 Btuh (23.4 and 29.3 kW) Input
2 thru 5 Tons (7.0 thru 17.6 kW) Nominal Add-On Cooling**

*Isolated Combustion System Rating for Non-Weatherized Furnaces

Bulletin #210060

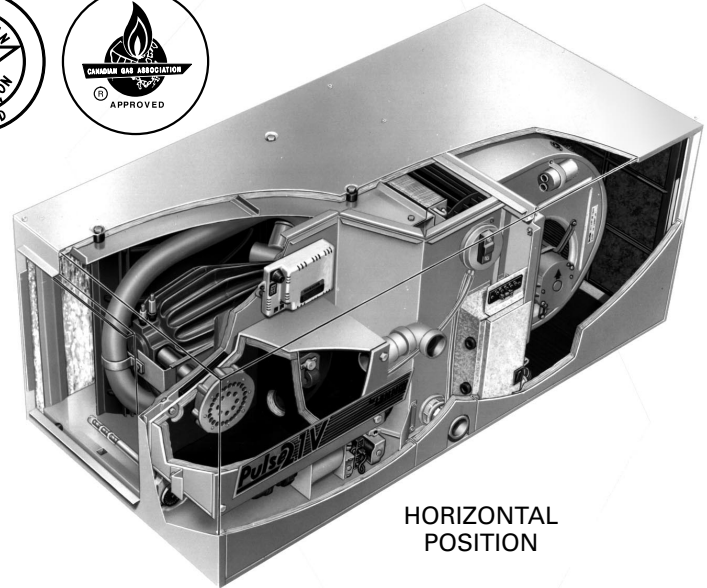
April 1997

Supersedes

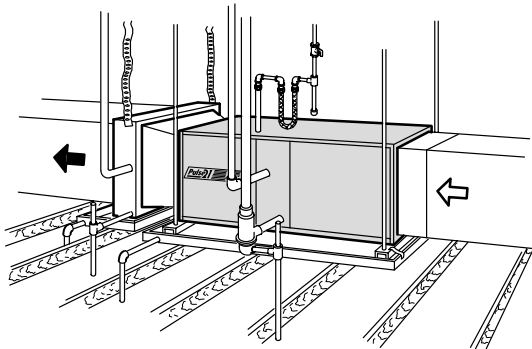
September 1994



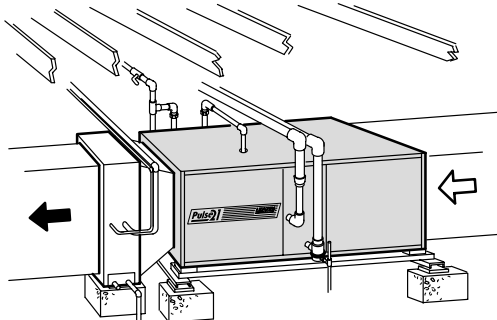
**DOWN-FLOW
POSITION**



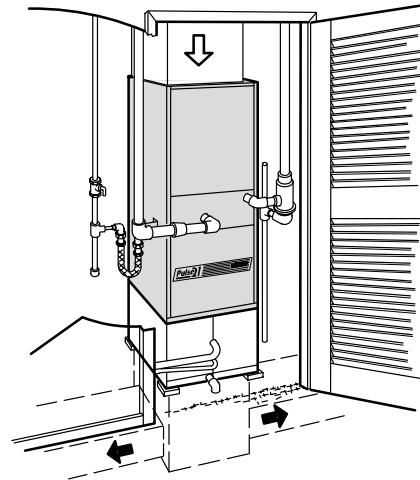
**HORIZONTAL
POSITION**



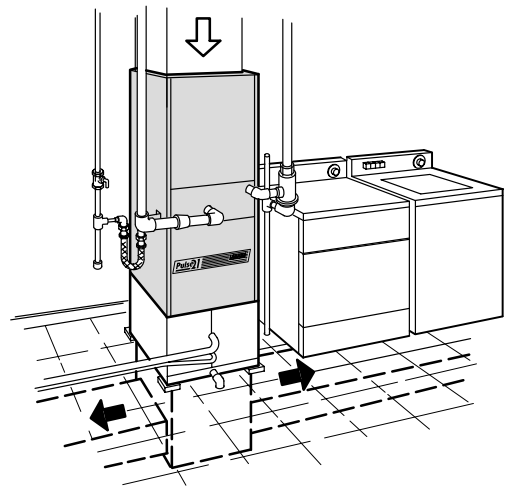
Horizontal Attic Installation



Horizontal Crawlspace Installation



Down-Flow Closet Installation



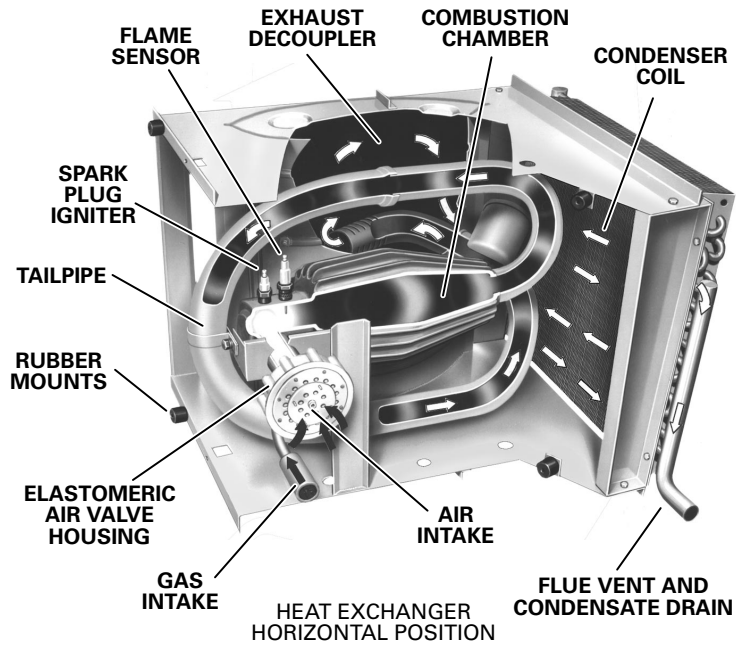
Down-Flow Utility Room Installation

☼ The maple leaf symbol in this bulletin denotes Canadian only usage where applicable

NOTE – Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice. ©1997 Lennox Industries Inc.

PROCESS OF COMBUSTION

The process of combustion begins as gas and air are introduced into the sealed combustion chamber with the spark plug igniter. Spark from the plug ignites the gas/air mixture, which in turn causes a positive pressure buildup that closes the gas and air inlets. This pressure relieves itself by forcing the products of combustion out of the combustion chamber through the tailpipe into the heat exchanger exhaust decoupler and on into the heat exchanger coil. As the combustion chamber empties, its pressure becomes negative, drawing in air and gas for the next pulse of combustion. At the same instant, part of the pressure pulse is reflected back from the tailpipe at the top of the combustion chamber. The flame remnants of the previous pulse of combustion ignite the new gas/air mixture in the chamber, continuing the cycle. Once combustion is started, it feeds upon itself allowing the purge blower and spark plug igniter to be turned off. Each pulse of gas/air mixture is ignited at a rate of 60 to 70 times per second. Almost complete combustion occurs with each pulse. The force of these series of ignitions creates great turbulence which forces the products of combustion through the entire heat exchanger assembly resulting in maximum heat transfer.



FEATURES

Application — GSR21V series pulse furnaces are designed to be installed in either horizontal or down-flow positions. Horizontal air flow is left hand air flow only. Units provide heating efficiencies (AFUE) of up to 94.6%. Three models (natural gas or LPG/Propane) are available with input capacities of 80,000 and 100,000 Btuh (23.4 and 29.3 kW). Units operate on the pulse combustion principle and do not require a pilot burner, main burners, conventional flue or chimney. Units can be installed in a utility room, alcove, closet, crawlspace or attic. Lennox add-on evaporator coils, electronic air cleaners and power humidifiers can easily be added for a total comfort all-season system.

Electronically variable speed (VSM) blower motor maintains a specified air volume throughout the entire external static range. GSR21V furnaces also feature a variable heat output in direct proportion to amount of air delivered by the blower. Burner control is completely automatic. Units are also applicable to the Lennox Harmony II Zone Control System and the Lennox Efficiency Plus Humidity Control System.

High efficiency of the GSR21V series is achieved with a unique heat exchanger design which features: finned cast iron combustion chamber, temperature resistant steel tailpipe, aluminized steel exhaust decoupler section and a finned stainless steel tube condenser coil. Moisture, during the process of combustion, is condensed in the coil, extracting almost all usable heat out of the flue gas. Most of the combustion heat is utilized in the heat transfer from the coil, producing flue vent temperatures as low as 100°F to 130°F (38°C to 54°C) which allows the use of PVC (polyvinyl chloride) pipe for venting. Furnace can be vented through a side wall, roof or to the top of an existing chimney with up to 35 ft. (10.7 m) of PVC pipe and up to four 90 degree elbows. Condensate created in the coil (PH ranges from 4.0 to 6.0) is not harmful to standard household plumbing and can be drained into city sewers and septic tanks without damage.

The GSR21V furnace has no pilot light or burners. An automotive type spark plug is used for ignition on the initial cycle only, saving gas and electrical energy. In the pulse combustion process, the use of atmospheric burners is eliminated, with combustion confined to heat exchanger combustion chamber. Sealed combustion system virtually eliminates the loss of conditioned air due to combustion and stack dilution. Combustion air is piped to the furnace with same type PVC pipe as used for exhaust gases.

Furnace is equipped with a standard type redundant gas valve in series with a gas expansion tank and gas intake flapper valve. Also factory installed are an air intake flapper valve, purge blower, spark plug igniter, flame sensor with solid-state control, solid-state blower control, dual limit controls, high and low voltage terminal strip, 50VA transformer and cleanable air filter. Furnished for field installation are a flexible gas line connector, (4) isolation mounting pads, base insulation pad and condensate drip leg.

Optional equipment available are: flue vent/air intake line roof or wall termination installation kits, LPG/Propane conversion kits, down-flow additive base, horizontal support frame kit, external filter kit, heat cable kit, mufflers, ⚡ attenuators and thermostat.

GSR21V units are shipped completely factory assembled with all controls installed and wired. Units are test fired at the factory to insure proper operation.

Approvals — GSR21V series furnaces are certified by A.G.A. and C.G.A. Laboratories. Ratings are certified by GAMA. Units meet the California Nitrogen Oxides (NO_x) standards and California Seasonal Efficiency requirements. In addition, units have been rated and tested in the Lennox Research Laboratory according to U.S. Department of Energy (DOE) test procedures and Federal Trade Commission (FTC) labeling regulations. Blower data is from unit tests conducted in the Lennox Laboratory air test chamber.

Equipment Warranty — GSR21V "Pulse" heat exchangers have a limited lifetime warranty in residential applications and a limited twenty year warranty in non-residential applications. All other components have a limited warranty for five years in residential applications and one year in non-residential applications. Refer to Lennox Limited Equipment Warranty certificate included with the equipment for details.

Sequence of Operation — Room thermostat, on a demand for heat, will initiate purge blower operation for a pre-purge cycle (30 seconds) followed by energizing and opening of the gas valve. As ignition occurs, the flame sensor reacts to proof of ignition and de-energizes the spark plug igniter and purge blower after 8 seconds. Furnace blower operation is initiated 45 seconds after combustion ignition. When thermostat is satisfied, gas valve is closed and purge blower is re-energized for a post-purge cycle (34 seconds). Furnace blower will remain in operation until "fan off" factory setting of 270 seconds (adjustable from 90 to 330 seconds) is reached. Should loss of flame occur before thermostat is satisfied, flame sensor controls will initiate 5 attempts at re-ignition before locking out unit operation. Additionally, loss of either combustion intake air or flue exhaust will automatically terminate system operation. If unit becomes locked out, WatchGuard circuit on ignition control automatically resets ignition controls after one hour of continuous thermostat demand.

Cabinet — Constructed of heavy gauge cold rolled steel. Cabinet is subject to a five station metal wash process resulting in a perfect bonding surface for a paint finish of baked-on enamel. The paint solution and metal are given opposite electrical charges resulting in positive adhesion and even coverage of the paint to the metal surfaces. Heat exchanger section is completely lined with thick 1-1/2 lb./ft.³ (24 kg/m³) density foil faced fiberglass insulation. Blower compartment is completely lined with thick 1-1/2 lb./ft.³ (24 kg/m³) density black mat faced fiberglass insulation. This results in quiet and efficient operation due to the excellent acoustical and insulating properties of fiberglass. Complete service access is accomplished by removing heating section and blower access panels. Removable panel is provided in vestibule panel for access to the spark plug and flame sensor. Safety interlock switch automatically shuts power off to unit when blower access panel is removed. Electrical inlets, gas line inlets, intake air and exhaust air outlets are provided in the cabinet.

FEATURES (continued)

Heat Exchanger Assembly — Lennox developed heat exchanger assembly consists of combustion chamber, tailpipe, exhaust decoupler section and condenser coil. Combustion chamber contains the spark plug igniter, flame sensor and combustion air and gas intake manifolds. Cast iron construction provides excellent radiation of heat over entire surface area. Finned “teardrop” shape design permits total air coverage of all surfaces with low resistance. Tailpipe connects the combustion chamber to the exhaust decoupler section. Precisely sized and shaped tailpipe is constructed of combination stainless and aluminized steel for superior resistance to high temperatures. Aluminized steel resonator on tailpipe minimizes combustion sound. Heavy gauge aluminized steel exhaust decoupler section has large surface area for maximum heat transfer. Air foil shape design results in complete air coverage with minimum air resistance. Condenser coil intake header connects to bottom of exhaust decoupler section. Large face area and circuiting of coil provides high heat transfer, minimum air resistance and proper moisture drainage. Coil is constructed of exactly spaced ripple-edged aluminum fins fitted to stainless steel tubes. Flared collars on fins grip tubes for maximum contact area. Flared tubing connections and high temperature brazing provide tight, leakproof joints. Combined flue vent and condensate drain outlet is located on the coil. Coil is factory tested for leaks. All components are mounted in a heavy gauge steel frame and installed in the furnace cabinet on resilient rubber mounts assuring quiet, vibration free operation. Heat exchanger has been laboratory life cycle tested.

Blower — Units are equipped with quiet multi-speed direct drive blowers. Each blower assembly is statically and dynamically balanced. Change in blower speed is easily accomplished by simple jumper change on VSP2-1 blower control.

Variable Speed (VSM) Blower Motor — Variable speed motor (VSM) is resiliently mounted. When units are used with Harmony II Zone Control System, blower motor operates between low and high speed settings depending on number of zones operating.

VSP2-1 Blower Control — Blower control interfaces the VSM motor with the thermostat and optional CCB1 humidity control. Contains blower timed-on control (45 seconds fixed) and blower timed-off control (90 to 330 seconds adjustable). Blower operation is automatic if limit is tripped. Control board has four diagnostic indicator lights (ON/OFF - HEAT - HI/LOW - CFM) to assist in servicing. Control is factory installed in the unit blower section. The three blower speeds — heating, high speed cooling and low speed (cooling, low heat or continuous fan), timed off blower control and single or two stage heating operation are made by simple jumper pins on the board.

Ignition Control — Solid-state control provides power for spark plug igniter. Also controls pre-purge and post-purge cycles and re-ignition sequence if loss of flame occurs. Also features Watchguard circuit. Solid-state control provides automatic reset of ignition controls after 1 hour of continuous thermostat demand after unit lockout. Ignition control is factory installed on the vestibule panel.

Automatic Gas Valve, Expansion Tank and Gas Intake Flapper Valve — 24 volt redundant dual gas control valve combines gas pressure regulation and manual main shutoff valve into one compact combination control. Dual valve design provides double assurance of 100% close off of gas on each heating cycle. Expansion tank is located downstream from the gas valve and absorbs any pressure pulsations. Gas intake flapper valve is installed in the combustion chamber intake manifold between the orifice and expansion tank. Valve is opened by entering gas pressure and closed by back pressure from combustion pulse during the heating cycle.

Combustion Air Intake Box — Contains the purge blower and air intake flapper valve. Box is located on vestibule panel. Purge blower is equipped with a permanently lubricated motor. Blower operates only during pre-purge, post-purge and ignition cycles. Air is drawn through the blower during the combustion cycle by negative pressure in the combustion chamber. Pressure switches terminate unit operation in case of air intake or flue exhaust blockage. Flapper valve air housing is constructed of an elastomeric non-metallic polymer which reduces operating sound levels. Flapper valve section of the box is completely lined with 1 inch (25 mm) thick 6 lb./ft.³ (96 kg/m³) density duct liner board, black neoprene coated fiberglass. Valve opening and closing is actuated by back pressure and negative pressure in combustion chamber during the heating cycle.

Wiring Junction Box — Power supply and thermostat connections are made at the wiring junction box located on the vestibule panel. Box contains 50 VA transformer, high and low voltage terminal strips and accessory relay. Accessory relay terminals provide connections for power humidifiers or electronic air cleaners. Low voltage terminal strip has a fuse to protect the transformer. Terminal strip permits easy connections for optional power humidifiers and electronic air cleaners.

Dual Limit/Modulation Controls — Factory installed and accurately located upstream and downstream of the heat exchanger. Primary and secondary limit controls provide protection from abnormal operating conditions. Primary limit is automatic reset. Secondary limit is manual reset when internal filter is used and automatic when external filter is used. Modulation control allows combustion process to cycle on and off to maintain even supply air temperature.

Cleanable Air Filters (U.S. Only) — Washable or vacuum cleanable frame type filter is furnished as standard. Polyurethane media is coated with oil for maximum efficiency. Filter is readily accessible in unit for quick and easy removal for servicing.

✦ **Air Filters** — Air filters are not furnished with the unit. Optional field installed external filter rack kit is available and must be ordered extra. See optional accessories section.

Installation Recommendations — Lennox recommends the following installation installation procedures to minimize any vibration transmitted from furnace during operation. Place (4) neoprene rubber isolation mounting pads (furnished) and/or base insulation pad (furnished), 1 inch (25 mm) thick, 1-1/2 lb./ft.³ (96 kg/m³) density fiberglass, under the unit. Install flexible duct connectors in the supply air plenum and return air plenum or duct connection. Insulate 1 inch (25 mm) thick, 1-1/2 to 3 lb./ft.³ (96 kg/m³) density, mat faced fiberglass supply and return air plenums through take-off or duct elbow. Use flexible gas connector (furnished) in gas supply piping where allowed by local codes. Insulate (refrigerant piping insulation or equivalent) all straps and hangers used in suspending ducts, electrical conduit, gas piping, combustion air intake piping and flue exhaust piping. In addition, use plastic pipe or tubing for drain line from the condensate coil drip leg (furnished) to the drain, do not use copper tubing.

OPTIONAL ACCESSORIES (Must Be Ordered Extra)

External Filter Rack Kit (Optional) — Filter Rack Kit LB-83252CA (67H04) field installs external to the unit in the return air duct. Kit contains assembled filter rack, frame type filter with cleanable foam media and automatic reset secondary limit. See specifications table and optional accessory dimension drawing.

Thermostat (Optional) — See Thermostats bulletin in Accessories Section and Lennox Price Book. For non-zoned applications, a two-stage heating thermostat may be used for dual air volume control. For all-season applications, heating-cooling thermostat is available with the condensing unit.

LPG/Propane Conversion Kits (Optional) — 100,000 Btuh (29.3 kW) input model requires a LPG/Propane conversion kit LB-83176CM (73H60) for field changeover from natural gas. 80,000 Btuh (17.6 kW) input models are shipped with convertible gas valve and with the LPG/Propane orifice furnished as standard for field conversion. See specifications table.

CCB1 EfficiencyPlus™ Humidity Control (Optional) — The CCB1 humidity control (35H00) is an electronic control which installs next to the room thermostat and allows the selection of the desired indoor humidity level in the cooling mode. During the heating season the control is inoperable. The CCB1 controls the indoor humidity by altering the indoor blower speed and the compressor speed. Humidity level desired may be accomplished by adjusting a vertical slide to a set point on a scale of 40% thru 60% with 50% recommended as the initial set point. Five indicator lights (MIN — MAX) in a bar graph configuration indicate the difference in the actual relative humidity and the set point. This indicates the demand imposed on the system equipment, the more lights on, the longer the equipment will operate to obtain the desired humidity level. If no lights are on, the humidity is at or below the set point.



OPTIONAL ACCESSORIES (Must Be Ordered Extra)

Concentric Vent/Intake Air Roof/Wall Termination Kit (Optional) — Facilitates installation of combustion air intake pipe and flue exhaust pipe. Kit LB-49107CE (**60G77**) contains concentric termination assembly, mounting clamp, roof flashing, reducer bushing and 45 degree elbow. Kit requires single hole penetration of roof or wall for installation. 2 inch (51 mm) kit is A.G.A./C.G.A. certified. See Specifications table and optional accessory dimension drawings. Not available for -100 size models.

Vent/Intake Air Wall Termination Kits (Optional) — Facilitates installation of combustion air intake pipe and flue exhaust pipe. Kit must be ordered extra. Refer to venting tables in this bulletin to determine pipe size needed and proper termination kit required.

- **Ring Kit (15F74)** 2 inch (51 mm) contains 2 stainless steel outside seal caps, 2 galvanized steel inside seal caps, 4 seal rings for the caps and 18 inch (457 mm) insulation sleeve for sealing and isolating intake and exhaust piping penetration of wall. Maintain a maximum of 6 inches (152 mm) between the inlet and outlet openings in the installation of the pipes. See optional accessory dimension drawings.
- **WTK Close Couple Kits (30G28)** 2 inch (51 mm) or (**81J20**) 3 inch (76 mm) contains one insulated faceplate, one insulated exhaust pipe, elbow and fittings. See optional accessory dimension drawings.
- **Close Couple Kits (22G44)** 2 inch (51 mm) or (**44J40**) 3 inch (76 mm) consists of close-couple side-by-side PVC (polyvinyl chloride) piping with galvanized steel wall cover plate for sealing and isolating piping penetration of the wall. Piping spacing and length is sized for proper wall installations. A.G.A./C.G.A. certified. See optional accessory dimension drawings.
- **WTKX Close Couple Kit With Extension Riser (30G79)** 2 inch (51 mm) is used where extended grade line clearance is required. Kit includes 3 ft. (1.0m) extension riser containing both vent lines (exhaust vent insulated) and wall securing bracket. See optional accessory dimension drawings.

Vent/Intake Air Roof Termination Kit (Optional) — Facilitates installation of combustion air intake pipe and flue exhaust pipe. Kit contains two neoprene rubber roof flashings. Kit also contains two 18 inch (457mm) insulation sleeves for sealing and isolating intake and exhaust piping penetration in roof. See Specifications table and optional accessory dimension drawings. Refer to venting tables in this bulletin to determine pipe size needed and proper termination kit required.

For 2 inch (51 mm) Venting — LB-49107CC (**15F75**)

For 3 inch (76 mm) Venting — LB-65678A (**44J41**)

In-Line Mufflers (Optional) — Two mufflers LB-52057CA (**67F81**) are optional and must be ordered extra. Mufflers field install, vertical or horizontal, one in the intake line and one in the exhaust line. See dimension drawings. Two mufflers are required on -80 & -100 units.

♠ **In-Line Attenuators (Optional)** — Two attenuators field install, vertical or horizontal, one in the intake line and one in the exhaust line. GPA-3030 (**12H76**) contains two 30 in. (762 mm) long attenuators. GPA-3019 (**12H77**) contains one 30 in. (762 mm) attenuator and one 19 in. (483 mm) attenuator for reduced clearances. See optional accessory dimension drawings.

Condensate Drain Heat Cable Kits (Optional) — Self-limiting wattage heat cable prevents condensate drain from freezing in unconditioned areas. Kit LB-88643C (**26K70**) has 50 ft. (15.2 m) of heat cable. Kit LB-88643B (**26K69**) contains 24 ft. (7.3 m) of heat cable. Kit LB-88643A (**26K68**) contains 6 ft. (1.8 m) of heat cable. Also available:

- Heat Cable Tape 66 ft. (20 m) length, 1/2 in. (13 mm) wide fiberglass (**39G04**) or 60 ft. (18 m) length, 2 in. (51 mm) wide aluminum foil (**39G03**).

SPECIFICATIONS

Model No.	GSR21V3-80	GSR21V5-80	GSR21V5-100
Input — Btuh (kW)	80,000 (23.4)	80,000 (23.4)	100,000 (29.3)
Output — Btuh (kW)	76,000 (22.3)	76,000 (22.3)	92,000 (27.0)
☆A.F.U.E.	94.5%	94.6%	92.0%
California Seasonal Efficiency	92.5%	92.1%	89.7%
Temperature rise range — °F (°C)	40 — 70 (22 — 39)	30 — 60 (17 — 33)	45 — 75 (25 — 41)
High static certified by A.G.A. / C.G.A. — in wg. (Pa)	.80 (200)		
Gas Piping Size I.P.S. — in. (mm) Natural or LPG/Propane	1/2 (13)		
Vent/Intake air pipe size connection — in. (mm)	2 (51)		
Condensate drain connection — in. (mm) SDR11	1/2 (13)		
Blower wheel nominal diameter x width — in. (mm)	10 x 10 (254 x 254)	11-1/2 x 9 (279 x 229)	
Blower motor hp (W)	1/2 (373)	1 (746)	
Blower motor minimum circuit ampacity	12.0	17.4	
Maximum fuse or circuit breaker size (amps)	15.0	20.0	
‡Number and size of filters — in. (mm)	(1) 20 x 25 x 1 (508 x 635 x 25)		
Nominal cooling that can be added — Tons (kW)	2 — 3 (7.0 — 10.6)	3-1/2 — 5 (12.3 — 17.6)	
Shipping weight — lbs. (kg) 1 package	317 (144)	329 (149)	335 (152)
Electrical characteristics	120 volts — 60 hertz — 1 phase All models		
↔Optional Accessories (Must Be Ordered Extra)↔			
LPG/Propane kit	♦Furnished		73H60
In-line Mufflers (♠Attenuators) — 2 required	67F81 (qty. 2) or ♠GPA-3030 (12H76) and ♠GPA3019 (12H77) — 19 lbs. (9 kg)		
Concentric Vent/Intake Air Roof Termination Kit	60G77 — 2 inch (51 mm) — 12 lbs. (5 kg)		
Vent/Intake Air Roof Termination Kit	2 inch (51 mm)	15F75 — 3 lbs. (1 kg)	
	3 inch (76 mm)	44J41 — 3 lbs. (1 kg)	
Vent/Intake Air Wall Termination Kit	2 inch (51 mm)	Ring Kit (15F74), Close-Couple Kit (22G44), WTKX Close-Couple w/ 3 ft. (1 m) Extension Riser (30G79), WTK Close-Couple Kit (30G28)	
	3 inch (76 mm)	Close-Couple Kit (44J40), WTK Close-Couple Kit (81J20)	
Down-Flow Combustible Floor Base	68387 — 6 lbs. (3 kg)		
External Filter Kit — No. and size of filter	67H04 — (1) 20 x 25 x 1 in. (508 x 635 x 25 mm)		
Horizontal Support Frame Kit	56J18 — 18 lbs. (8 kg)		
Condensate Drain Heat Cable	26K68 6 ft. (1.8 m) — 26K69 24 ft. (7.3 m) — 26K70 50 ft. (15.2 m)		
Heat Cable Tape	39G04 — 66 ft. (20 m) x 1/2 in. (38 mm) fiberglass or 39G03 — 60 ft. (18 m) x 2 in. (25 mm) aluminum foil (1 roll)		

☆Annual Fuel Utilization Efficiency. Isolated combustion system rating for non-weatherized furnaces.

♦LPG/Propane orifice furnished standard with unit for field changeover. Convertible gas valve requires simple adjustment without adding any parts. See installation instructions.

‡Not furnished in Canada.

BLOWER DATA

GSR21V3-80 BLOWER PERFORMANCE 0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range VSP2-1 Blower Control — Factory Settings

Low Speed — 1
High Speed — 4
Heat Speed — 2

"ADJUST" Jumper Setting	BDC2 Jumper Speed Positions																							
	"LOW" Speed (Cool Or Continuous Fan)								"HIGH" Speed (Cool)								"HEAT" Speed							
	1		2		3		4		1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	520	245	670	315	800	380	960	455	1110	525	1220	575	1340	630	1420	670	1110	525	1210	570	1310	620	1420	670
NORM	480	225	600	285	740	350	880	415	1070	505	1160	545	1270	600	1300	615	1000	470	1100	520	1200	565	1280	605
—	420	200	550	260	650	305	770	365	950	450	1040	490	1150	545	1170	550	900	425	1000	470	1100	520	1160	545

NOTE — The effect of static pressure and filter resistance is included in the air volumes listed.

GSR21V5-80 AND GSR21V5-100 BLOWER PERFORMANCE 0 through 0.80 in. w.g. (0 Through 200 Pa) External Static Pressure Range VSP2-1 Blower Control — Factory Settings

Low Speed — 1
High Speed — 4
Heat Speed — 1

"ADJUST" Jumper Setting	BDC2 Jumper Speed Positions																							
	"LOW" Speed (Cool Or Continuous Fan)								"HIGH" Speed (Cool)								"HEAT" Speed							
	1		2		3		4		1		2		3		4		1		2		3		4	
	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s	cfm	L/s
+	860	405	1100	520	1460	690	1740	820	1800	850	2090	985	*2100	*990	*2100	*990	1930	910	*2100	*990	*2100	*990	*2100	*990
NORM	770	365	1020	480	1390	655	1580	745	1720	810	1990	940	*2100	*990	*2100	*990	1800	850	2000	*945	*2100	*990	*2100	*990
—	680	320	900	425	1180	555	1400	660	1450	685	1690	800	1940	915	2040	965	1580	745	1780	840	1920	905	2010	950

NOTE — The effect of static pressure and filter resistance is included in the air volumes listed.

* 2200 cfm (1040 L/s) at 0.2 in. w.g. (50 Pa).

2100 cfm (990 L/s) at 0.5 in. w.g. (125 Pa).

2000 cfm (990 L/s) at 0.8 in. w.g. (200 Pa).

INSTALLATION CLEARANCES

DOWN -FLOW POSITION

Sides	1 inch (25 mm)
Rear	1 inch (25 mm)
Top	1 inch (25 mm)
Front	6 inch (152 mm)
Front (service)	36 inches (914 mm)
*Floor	*Combustible
Flue Pipe	0 inches (0 mm)

* Clearance for installation on combustible floor if optional additive base is installed between furnace and combustible floor. Not required in add-on cooling coil applications if installed in accordance with local codes or U.S. National Fuel Gas Code ANSI-Z223.1.

HORIZONTAL POSITION

Ends	3 inch (76 mm)
Rear	3 inch (76 mm)
*Top	*3 inch (76 mm)
Front	6 inch (152 mm)
Front (service)	36 inches (914 mm)
Floor	Combustible
Flue Pipe	0 inches (0 mm)

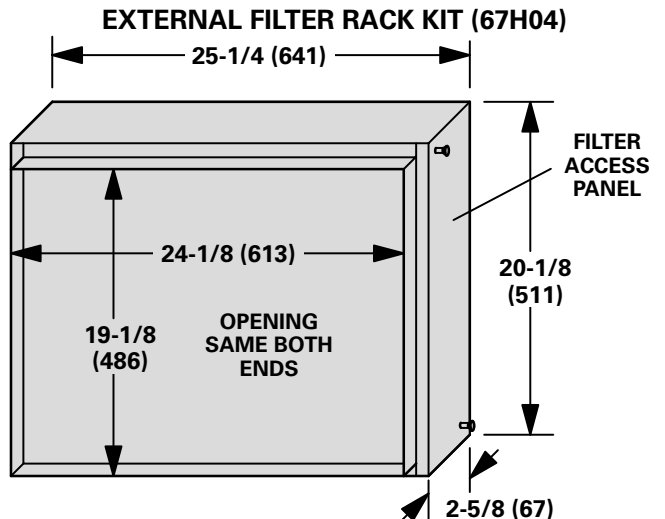
*Line contact installation permissible between jacket top or sides and building joists.

VENTING REQUIREMENTS

Vent Pipe Maximum Equivalent Length – ft. (m)	Minimum Vent Pipe Diameter Required – in. (mm)
5 – 50 (1.5 – 15.2)	2 (51)
51 – 90 (15.5 – 27.4)	2-1/2 (64)
91 – 130 (27.7 – 39.6)	3 (76)

NOTE— One 90° elbow is equivalent to 5 feet (1.5m) of straight vent pipe
One 45° elbow is equivalent to 2.5 feet (.75 m) of straight vent pipe.
Intake and exhaust pipes MUST be the same diameter.
All pipe runs must terminate with 1-1/2" (38 mm) pipe.

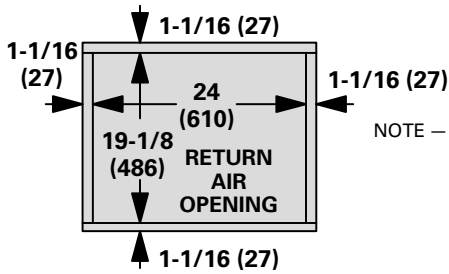
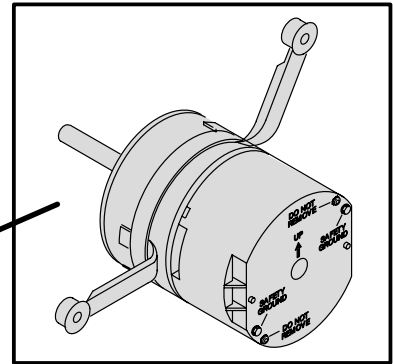
OPTIONAL ACCESSORY DIMENSIONS – in (mm)



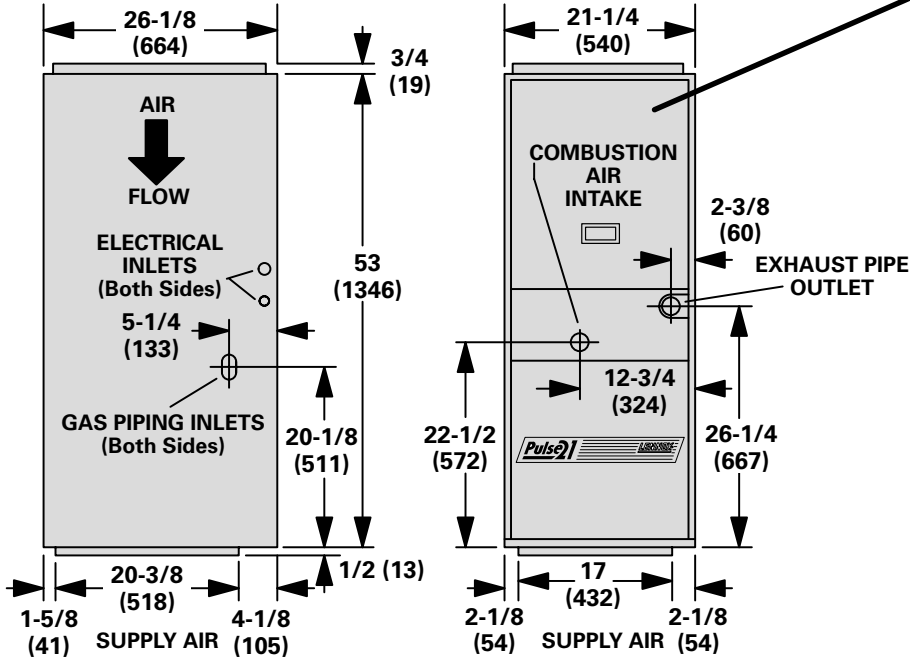
UNIT DIMENSIONS – inches (mm)

DOWN-FLOW POSITION

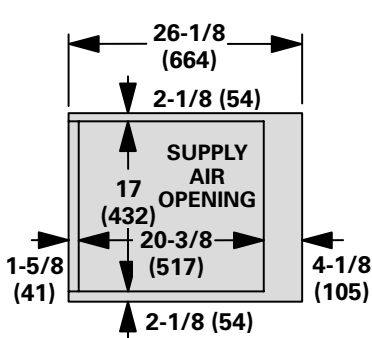
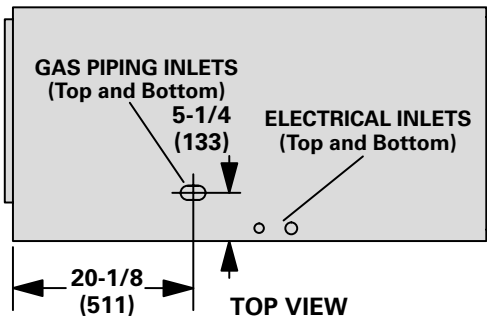
ELECTRONICALLY VARIABLE SPEED (VSM) MOTOR



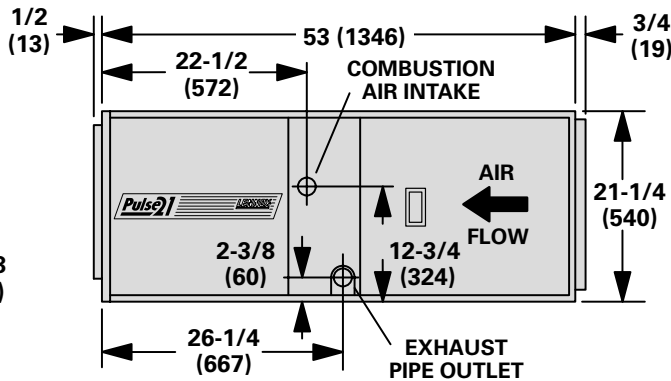
NOTE – When heating only unit is installed on a combustible floor, an additive base is required. This is optional equipment and must be ordered extra. When using additive base, make opening in floor 2-5/8 inches (67mm) larger (front to rear and side to side) than furnace supply air opening.



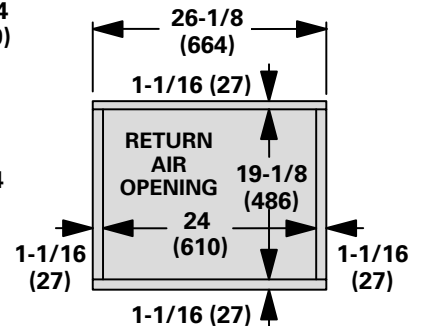
HORIZONTAL POSITION



DISCHARGE END



FRONT VIEW

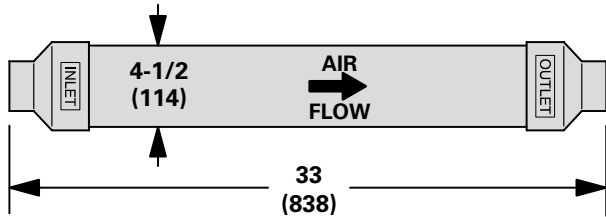


INLET END

OPTIONAL ACCESSORY DIMENSIONS – inches (mm)

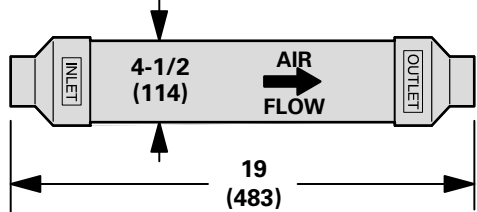
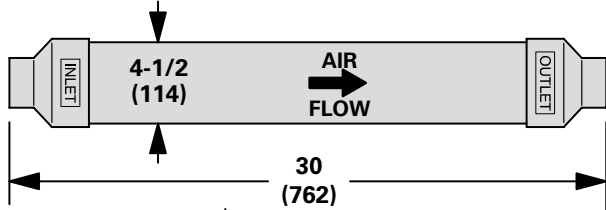
**IN-LINE MUFFLERS
67F81**

NOTE – Two mufflers are furnished per order.



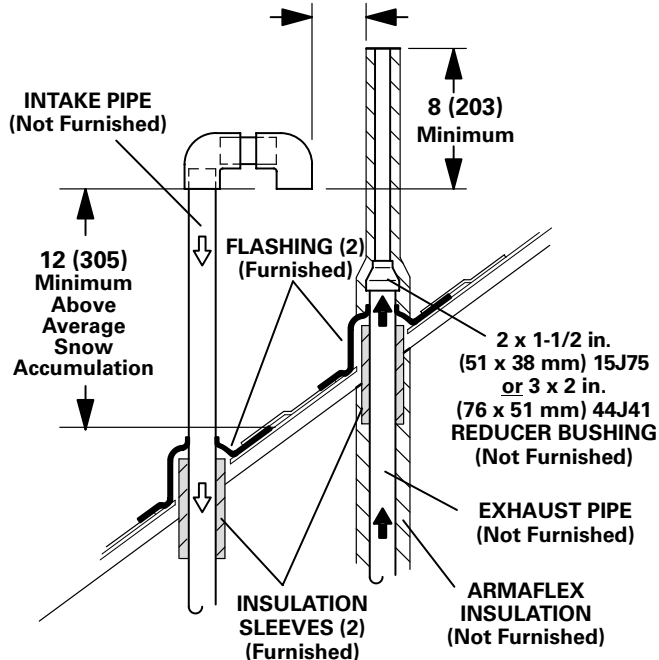
**IN-LINE ATTENUATORS
GPA-3030 & GPA-3019**

NOTE – GPA-3030 (12H76) contains two 30 in. (762mm) Attenuators. GPA-3019 (12H77) contains one 30 in. (762mm) Attenuator and one 19 in. (483mm) Attenuator.



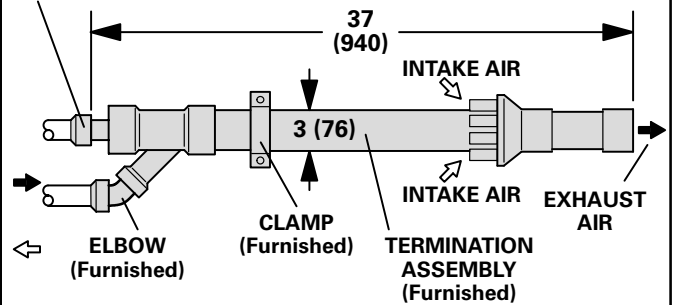
**ROOF TERMINATION KITS
15F75 for 2 inch (51 mm) Venting
44J41 for 3 inch (76 mm) Venting**

3 in. MAX.
(76 mm)

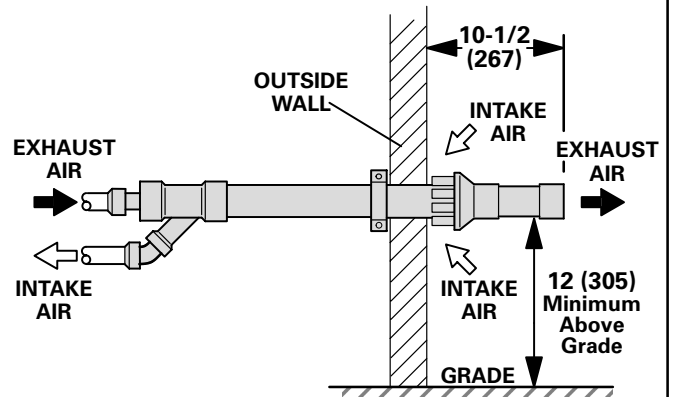


**CONCENTRIC ROOF/WALL
TERMINATION KIT
60G77 for 2 inch (51 mm) Venting**

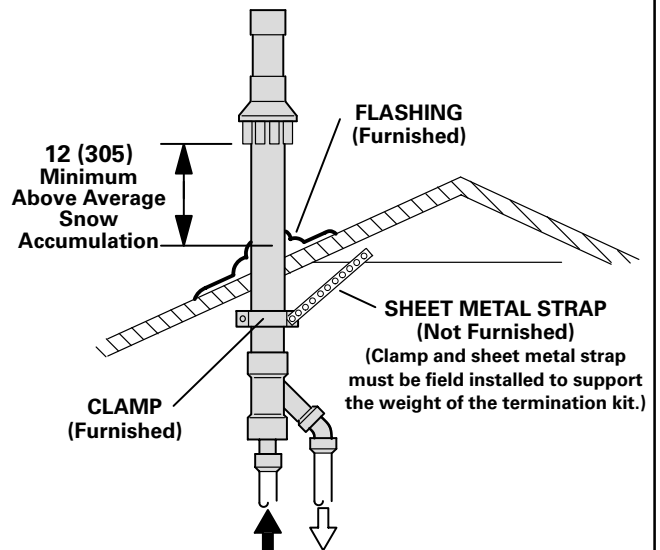
2 x 1-1/2 in. (51 x 38 mm)
REDUCER BUSHING
(Furnished)

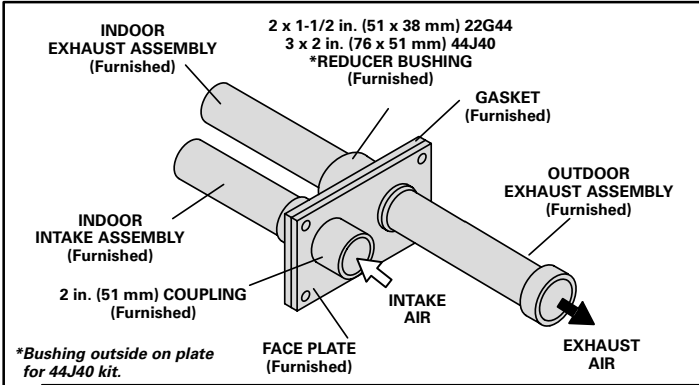


**CONCENTRIC WALL
TERMINATION APPLICATIONS**



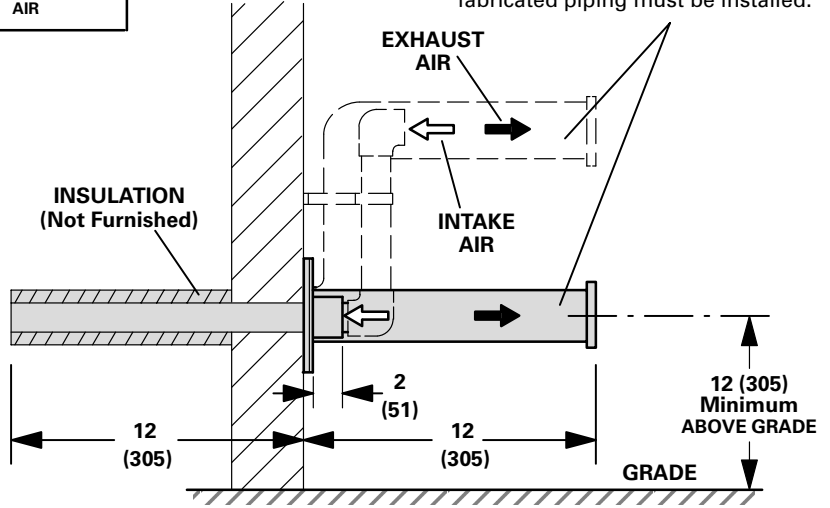
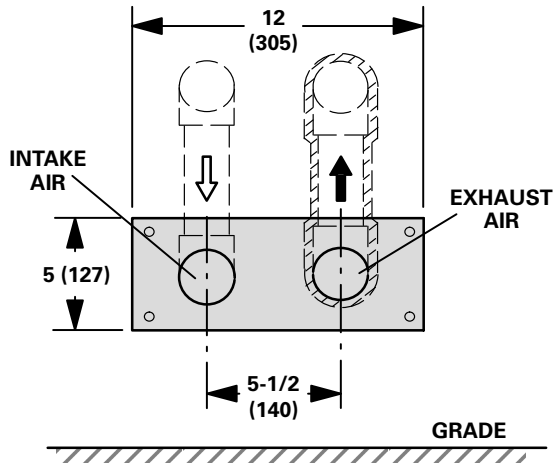
**CONCENTRIC ROOF
TERMINATION APPLICATIONS**





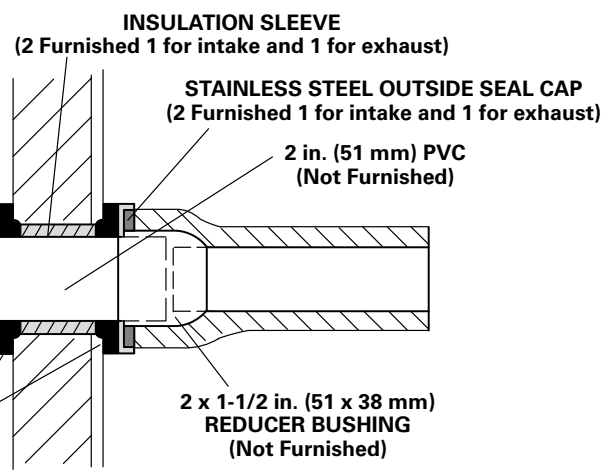
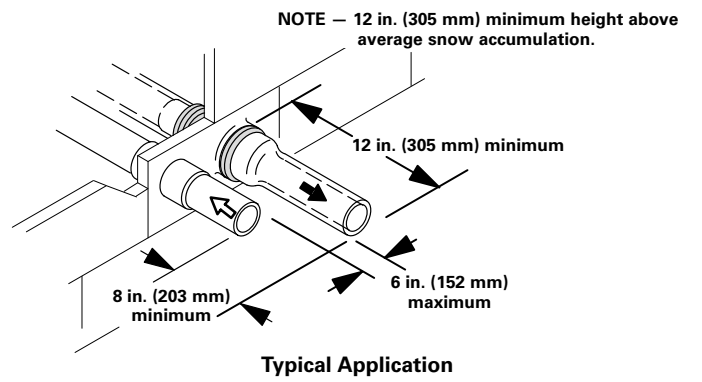
WALL TERMINATION KITS (CLOSE-COUPLE)
 22G44 – for 2 inch (51 mm) Venting
 44J40 – for 3 inch (76 mm) Venting

If Intake and Exhaust Pipe is less than 12 in. (305 mm) above snow accumulation or other obstructions, field fabricated piping must be installed.



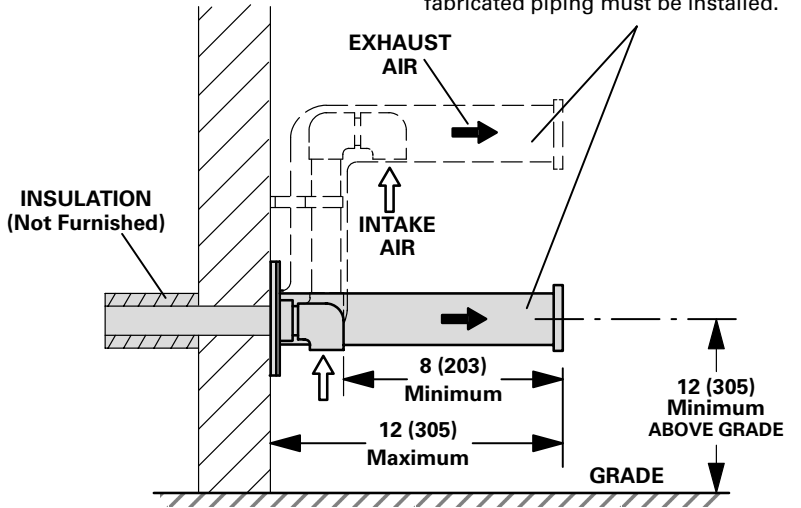
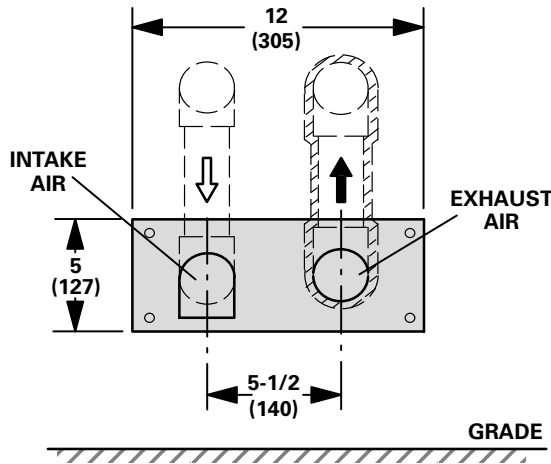
WALL TERMINATION KIT (RING KIT)
 15F74 – for 2 inch (51 mm) Venting
 NOTE – Not for use with 3 inch (76 mm) Venting

NOTE – EXHAUST PIPE SHOWN



**WTK WALL TERMINATION KIT
WITH FIELD FABRICATION ABOVE
GRADE EXTENDED CLEARANCE**
30G28 – For 2 inch (51 mm) Venting
81J20 – For 3 inch (76 mm) Venting

If Intake and Exhaust Pipe is less than 12 in. (305 mm) above snow accumulation or other obstructions, field fabricated piping must be installed.



WTKX EXTENSION RISER TERMINATION KIT
30G79 – For 2 inch (51 mm) Venting
NOTE – Not for 3 inch (76 mm) Venting

