

OUTSIDE AIR/RETURN AIR MIXING BOX INSTALLATION FOR GAS-FIRED INDOOR HEATER

OPTION GA1, GA2, GA3, GA4, GA5, GA6, GA7, GA8, OR GA9 FOR MODEL CAUA

NOTE: Installation should be done by a qualified agency in accordance with these instructions and in compliance with all codes and requirements of authorities having jurisdiction.

GENERAL INFORMATION

- The optional mixing box for the model CAUA heater is designed to provide the system with a supply air mixture of return air and outside air. Application with a mixed air temperature <35°F (<2°C) requires that the CAUA unit be ordered with option AD4.
- The mixing box is available in an assortment of configurations with a selection of actuators and controls for both heating and cooling (requires optional cased cooling coil) modes. The mixing box is factory-assembled for field-installation on the rear of the heater.
- All mixing box inlet air openings have duct flanges for connecting ductwork.
- Refer to the installation manual provided with the heater for important safety information and for instructions to install the heater. The heater should be in its final installation location before installing the mixing box.

Filters

If the box was ordered with filters (option AW9 or AW11), it is shipped with the filters installed. Removable door panels provide for filter access from either end of the cabinet. Replacement filters are listed in [Table 1](#).

Type	Unit Size			
	150, 200		250–400	
	Size	PN (Quantity)	Size	PN (Quantity)
Pleated disposable	2 × 16 × 16	104109 (2)	2 × 16 × 16	104109 (6)
	2 × 16 × 20	104110 (2)		
Pleated permanent (aluminum)	2 × 16 × 16	104103 (2)		104103 (6)
	2 × 16 × 20	101620 (2)		

Airflow Configurations

The mixing box is installed on the rear of the heater and is available in a variety of airflow configurations (refer to [Table 2](#)).

Option	Opening for Outside Air		Opening for Return Air	
	Location on Mixing Box	Dampers Included?	Location on Mixing Box	Dampers Included?
GA1	Top	Yes	Bottom or Rear	No
GA2	Rear	Yes	Top or Bottom	No
GA3	Bottom	Yes	Top or Rear	No
GA4	Bottom	Yes	Rear	Yes
GA5	Bottom	Yes	Top	Yes
GA6	Rear	Yes	Top	Yes
GA7	Rear	Yes	Bottom	Yes
GA8	Top	Yes	Rear	Yes
GA9	Top	Yes	Bottom	Yes

GENERAL INFORMATION—CONTINUED

Dimensions

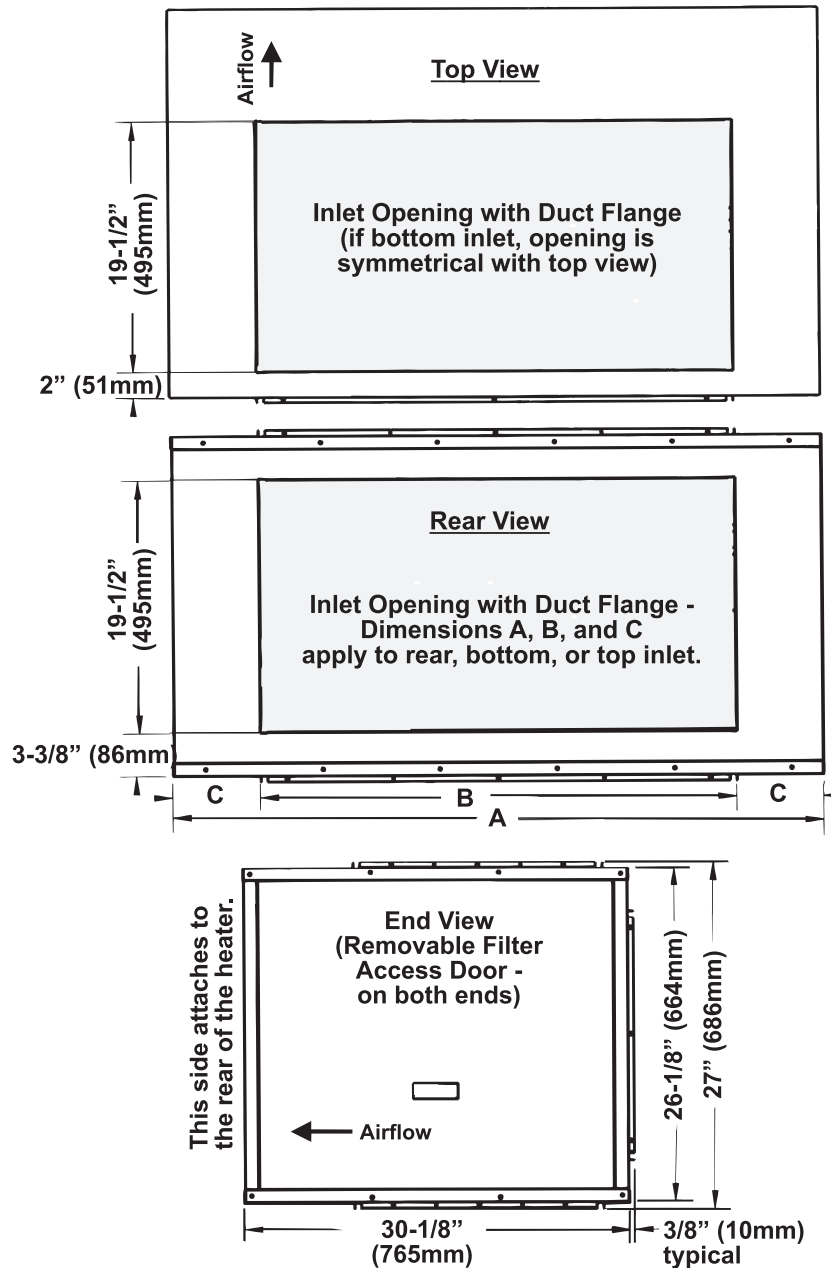


Figure 1. Mixing Box Dimensions (Refer to [Table 3](#))

Table 3. Mixing Box Dimensions			
Unit Size	Dimension (See Figure 1)		
	A	B	C
	Inches (mm)		
150, 200	38 (965)	22 (578)	7-5/8 (194)
250-400	50 (1270)	36-1/2 (927)	6-3/4 (171)

NOTE: Dimensions are applicable for an inlet location on top, bottom, or rear of mixing box.

Control Options

NOTES:

- **IMPORTANT:** The standard model CAUA heater is designed for a maximum temperature rise of 75°F. At an outside air temperature >35°F (>2°C), any percentage of outside air is permitted.
- For optimum operation and to prevent condensation, the mixed air temperature going to the heat exchanger must not be <35°F (<2°C). This inlet air temperature restriction does not apply to a unit ordered with makeup air option AD4, which includes stainless steel components and a flue wrapper condensate drain to permit an inlet air temperature <35°F (<2°C).
- In all cases when the unit shuts down, the outside air damper closes.

Table 4. Control Options

Damper Motor		Operating Mode	Damper Control Option**	Action
Option*	Description			
GB2	Two-position actuator	Heating or heating and cooling	—	While unit is operating, outside air damper is open
		Cooling	GC3C	When sensor detects low enthalpy in outside air, control opens outside air damper to minimize cooling energy consumption and equipment cycling When sensor detects high enthalpy in outside air, control closes outside air damper
			GC3C and GC4	In addition to above GC3C actions, control delays opening of outside air damper based on return air temperature to provide faster cool down of supply air
GB3	Modulating actuator	Heating or heating and cooling	GC1A or GC1B	Outside air damper controls mixture of inlet air (requires manual setting of potentiometer to desired minimum position)
			GC1A or GC1B with GC3A	In addition to above GC1A or GC1B action, dampers are modulated based on mixed inlet air temperature in heating mode
			GC1A or GC1B with GC4	In addition to above GC1A or GC1B action, opening of outside air damper is delayed based on return air temperature to provide faster cool-down (cooling mode) or warm-up (heating mode) of supply air
			GC1A or GC1B with GC3A and GC4	Includes all above GC1A, GC1B, GC3A, and GC4 actions
		Heating	GC3A	Control modulates dampers based on mixed inlet air temperature
			GC3A and GC4	In addition to above GC3A action, control delays opening of outside air damper to provide faster warm-up of supply air
GB4	Modulating actuator with proportional enthalpy control	Cooling and heating	GC3B	In cooling mode, one sensor detects enthalpy of outside air and another sensor detects enthalpy of return air to modulate dampers to maintain most economic mix of inlet air (normally set to maintain between 50–56°F) In heating mode, sensor detects mixed air temperature to modulate damper
			GC3B and GC4	In addition to above GC3B action, control delays opening of outside air damper based on return air temperature to provide faster cool-down (cooling mode) or warm-up (heating mode) of supply air

*Damper motor option GB2 is used on all mixing box options. GB3 and GB4 are used only on mixing box options GA4, GA5, GA6, GA7, GA8, and GA9.

**Refer to [Table 5](#).

Table 5. Damper Control Descriptions

Damper Control Option	Description
GC1A	Manually-adjustable (range = 0–100°F, factory setpoint = 35°F) potentiometer mounted in mixing box
GC1B	Manually-adjustable (range = 0–100°F, factory setpoint = 35°F) potentiometer mounted remotely
GC3A	Mixed air temperature controller (heating only)
GC3B	Dual setpoint modulating enthalpy control for heating and cooling (used only with GB4 damper motor)*
GC3C	Two-position enthalpy control (factory setpoint = 75°F/40% humidity) used with two-position damper motor (cooling only)
GC4	Senses return air temperature to delay opening of outside air damper and provide warm-up or cool-down time

*With two enthalpy setpoints, damper operation can be interlocked with a time clock or other device to provide a different mix depending on occupancy or other determining factor.

INSTALLATION

1. Cut inlet air opening and drill mounting holes (see [Figure 2](#)):



Cut edges of metal cabinets are sharp.

- a. Locate four embosses in metal panel on rear of heater where mixing box is to connect to heater. Embosses are corner indicators for inlet air opening.
- b. Carefully cut straight lines between embosses to create inlet opening using tin snips or aviation shears.
- c. Mark and drill six 1/8-inch (3-mm) mounting holes as shown.

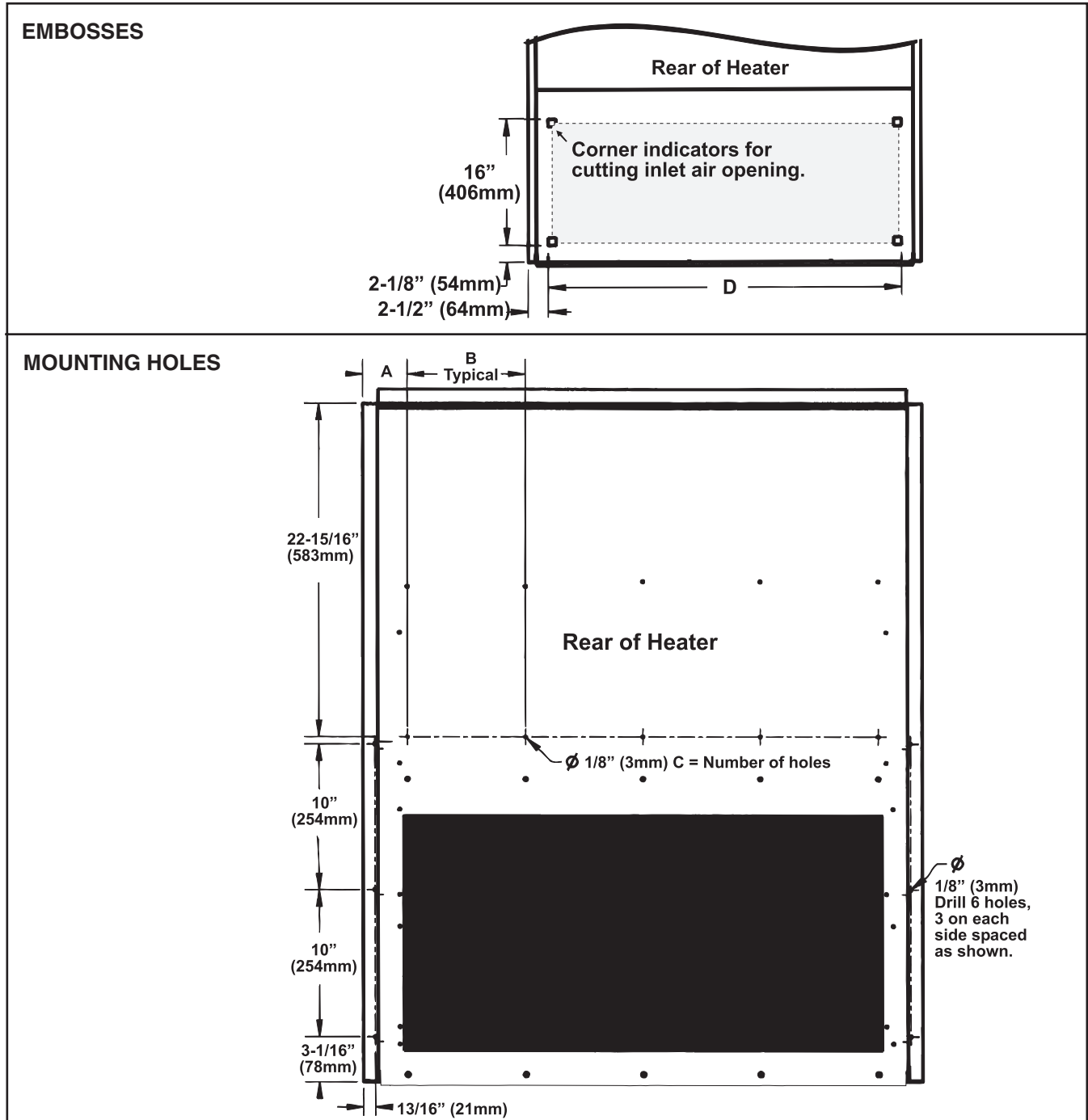


Figure 2. Embosses and Mounting Holes (Refer to [Table 6](#))

Table 6. Inlet Air Opening and Mounting Hole Dimensions				
Unit Size	Dimension (See Figure 2)			
	A	B	C (No. of Holes)	D
	Inches (mm)			
150, 200	3 (76)	8 (203)	5	33 (838)
250-400	2-1/2 (64)	9 (229)	6	45 (1143)

2. For option GA1, GA2, or GA3, select return air location:

NOTE: The mixing box was manufactured with an outside air opening with dampers in either the top, rear, or bottom. There are two openings for return air allowing for a choice of location. When the mixing box is shipped, one return air opening is left open and the other is covered. Depending on the installation, the cover may be in the correct position or it may need to be moved.

- a. Determine whether or not cover needs to be moved.

NOTE: Depending on which return air opening is being covered, the cover may be re-installed after the mixing box is connected in step 3.

- b. If cover requires moving, remove existing screws that secure cover, position cover over return air opening that will not be used, and install cover using existing screws.

3. Connect mixing box:

- a. On rear of heater, remove row of existing screws along bottom (save screws).
- b. Position mixing box against rear of heater. If installing mixing box with one damper, reach through return air opening or remove end panel(s). If installing mixing box with two dampers, remove one or both access panels on ends of box.
- c. Reaching inside mixing box, install existing screws to secure bottom edge of mixing box to heater.
- d. Install sheet metal screws provided with mixing box in holes drilled in step 1c to secure both sides and across top.

4. For option GA4, GA5, GA6, GA7, GA8, or GA9, adjust damper linkage:

NOTE: Both dampers are closed for shipping. The linkage for the return air damper must be adjusted prior to use.

- a. Remove access panel on end of mixing box where damper controls are located.
- b. Loosen setscrew on return air damper rod at damper arm.
- c. Manually open return air dampers to automatically move damper rod and arm to its correct position.
- d. Tighten setscrew on return air damper rod at damper arm.
- e. Replace access panel on end of mixing box.

5. Connect damper motor wires:

NOTE: Wiring depends on the damper motor and control options selected (refer to [Table 4](#)).

- a. Remove door panel on front of heater.
- b. Run wires from damper motor into heater cabinet, up past side of burner box (same side as blower motor wires), and into control compartment.
- c. Connect wires to terminals in accordance with wiring diagram provided with heater.
- d. Replace door panel on front of heater.

INSTALLATION—CONTINUED

6. Refer to installation manual provided with heater to complete installation of heater.

NOTE: To reduce noise transmission, use of a flexible duct boot to connect ductwork is recommended.

CAUTION

Ductwork must be supported—do not rely on the mixing box to support the ductwork.

7. Connect outside air ductwork to duct flange on outside air inlet of mixing box.
8. If system includes return air ductwork, connect it to duct flange on return air inlet.
9. When heater and ductwork installation is complete, turn ON electric power and gas, start up heater, and check for proper operation of damper motor and controls.

NOTES

