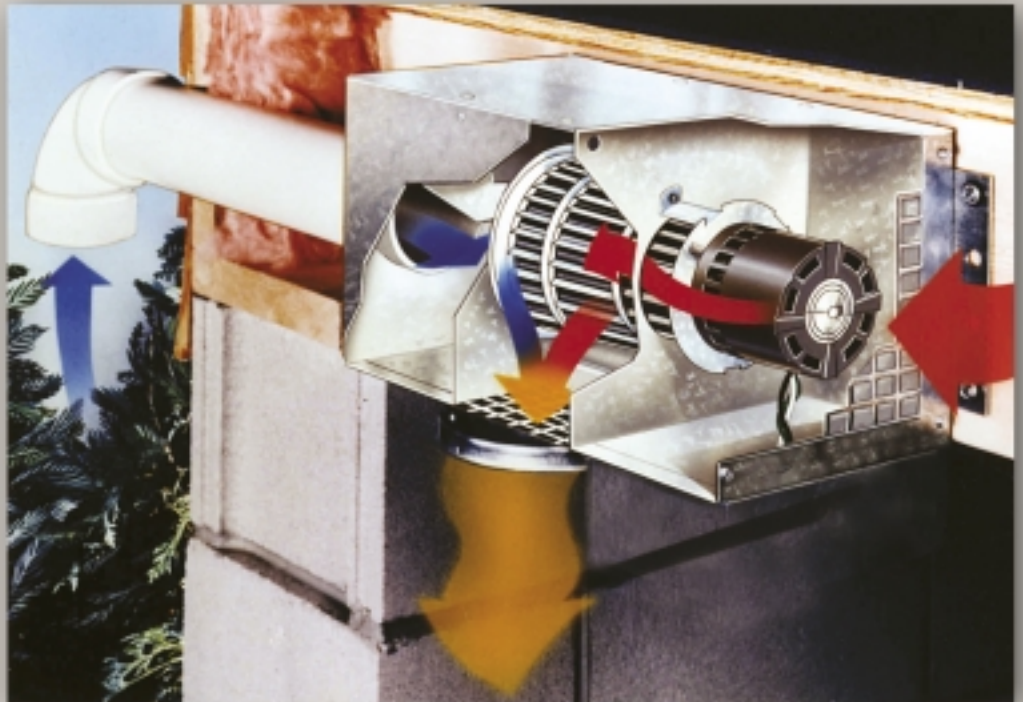


Combustion Air & Fresh Air **IN-FORCERS**™



The safe and cost-effective way to ensure adequate combustion air for gas and oil-fired heating equipment or to improve air quality problems caused by tight construction.

Features of all IN-FORCERS

- Installation is fast, simple and economical.
- Built-in damper closes during off cycles to prohibit cold air entry and warm air loss.
- Uses indoor air to temper outdoor air for increased comfort.
- Reduces negative pressure—a major cause of flue gas spillage, cold drafts and radon gas entry.
- Replaces air vented by exhaust fans, fireplaces, etc.



Combustion Air IN-FORCER

The Problem: Incomplete combustion or poor draft due to inadequate combustion air in too-tightly constructed buildings can result in carbon monoxide creation, poor equipment efficiency, reduced equipment life and nuisance service calls.

The Solution:

The IN-FORCER mechanically draws outside air indoors on demand to provide fresh air for safe and efficient operation of fuel burning equipment.



Combustion Air IN-FORCER features include:

- Automatic regulated control of fresh combustion air.
- Light indicates IN-FORCER is operating properly.
- Interlock shuts down burner if intake elbow is blocked or performance is significantly reduced.

Fresh Air IN-FORCER

The Problem: Energy-conserving building materials and techniques minimize fresh air intake... a major cause of illness, discomfort and structural damage from moisture.

The Solution:

The IN-FORCER mechanically draws outside air indoors to dilute pollutants and moisture, and replace stale air without sacrificing energy savings.



Fresh Air IN-FORCER features include:

- Automatic clock/timer accommodates various air change requirements and lifestyles.
- Replaces air vented by exhaust fans, fireplaces, etc.
- Reduces moisture, mold and mildew buildup.
- Increases security—fresh air is brought in while windows and doors are locked.

Installation is Simple and Fast

- 1 Install standard 3" PVC pipe through wall at desired locations. (Screened intake and PVC coupler supplied.)



- 2 Mount IN-FORCER almost anywhere, including between joists, using built-in hanging bracket.



(OPTIONAL STEP)
Attach 6" flex or metal fresh air outlet duct and route to desired location.



- 3 **(COMBUSTION AIR MODELS)**

24 VAC CONTROLLED MODELS—Connect color-coded low voltage control cable to burner circuit. Plug cord into outlet.



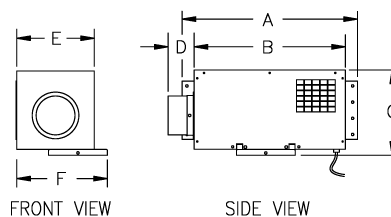
115 VAC CONTROLLED MODELS—Wire in series with 115 VAC burner controls.

(FRESH AIR MODELS)

Plug cord into electrical outlet and program timer to desired sequence.



IN-FORCER Dimensions



A	B	C	D	E	F
17 3/4"	15 5/8"	8 7/8"	2 5/8"	8"	9 3/8"

Motor Specifications

115/1/60 1600 RPM 80 WATTS 1.0 FLA

Steps to Selecting the Right Combustion Air IN-FORCER

- PAI-1G & PAI-2G for 24 VAC Control Circuits
- PAI-1O & PAI-2O for 115 VAC Control Circuits

Step 1: Determine the required CFM from **Table A** based on equipment type and BTU/hr input of the heater(s).

Step 2: Calculate the equivalent length of 3" PVC inlet pipe and 6" outlet duct (if used) from **Table B**.

Step 3: Referencing **Table C** and your calculated equivalent length, verify that CFM performance listed in **Table C** is equal to or greater than that determined in **Table A**. Select Model PAI-1 or PAI-2 Series based on CFM necessary and control circuit voltage.

Required CFM Based on Equipment Type and BTU/HR Input Table A

BTU/HR INPUT	GAS		OIL FLAME RETENTION
	ATMOSPHERIC	INDUCED COMBUSTION	
40,000	21	11	12
50,000	26	14	15
60,000	32	17	18
70,000	37	19	21
80,000	42	22	24
90,000	47	25	27
100,000	53	28	30
110,000	58	30	33
120,000	63	33	37
130,000	68	36	40
140,000	74	39	43
150,000	79	41	46
160,000	-	44	49

BTU/HR INPUT	GAS		OIL FLAME RETENTION
	ATMOSPHERIC	INDUCED COMBUSTION	
170,000	-	47	52
180,000	-	50	55
190,000	-	52	58
200,000	-	55	61
210,000	-	58	64
220,000	-	61	67
230,000	-	63	70
240,000	-	66	73
250,000	-	69	76
260,000	-	72	79
270,000	-	74	-
280,000	-	77	-
290,000	-	80	-

Calculate Equivalent Length Table B

The performance shown is based on equivalent feet. To determine the equivalent feet of an installation, add the length of the 3" PVC inlet pipe plus the equivalent length of any elbows. Do not include intake elbow or gooseneck equivalent loss, they have already been factored into the performance data. Use the same method to determine the equivalent feet if a 6" outlet duct is installed.

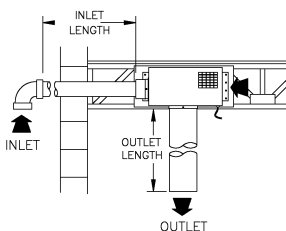
EQUIVALENT LENGTH OF ELBOWS

ELBOW DIAMETER	90°	45°
3" PVC	5'	2.5'
6"	10'	5'

In-Forcer CFM Performance Data Table C

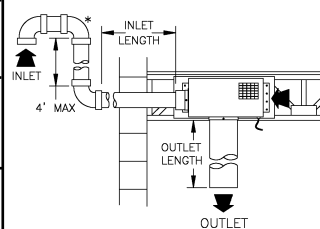
Models PAI-1G & PAI-1O • Models PAI-2G & PAI-2O

Conventional straight thru wall intake



		3" PVC INLET LENGTH			
		2 FEET	10 FEET	15 FEET	20 FEET
6" OUTLET LENGTH	0 FEET	59 CFM	53 CFM	50 CFM	47 CFM
	10 FEET	80 CFM	68 CFM	65 CFM	60 CFM
	15 FEET	56 CFM	50 CFM	46 CFM	44 CFM
	20 FEET	75 CFM	65 CFM	62 CFM	57 CFM
6" OUTLET LENGTH	0 FEET	52 CFM	47 CFM	41 CFM	N/A**
	20 FEET	70 CFM	60 CFM	57 CFM	52 CFM

Optional gooseneck intake



		3" PVC INLET LENGTH			
		2 FEET	10 FEET	15 FEET	20 FEET
6" OUTLET LENGTH	0 FEET	52 CFM	47 CFM	44 CFM	43 CFM
	10 FEET	64 CFM	58 CFM	54 CFM	53 CFM
	15 FEET	48 CFM	44 CFM	42 CFM	N/A**
	20 FEET	62 CFM	54 CFM	52 CFM	49 CFM
6" OUTLET LENGTH	0 FEET	46 CFM	42 CFM	N/A**	N/A**
	20 FEET	58 CFM	50 CFM	48 CFM	44 CFM

**BELOW FAN PROVER SET POINT

*PVC EXTENDED FOR BELOW GRADE APPLICATIONS OR ANTICIPATED SNOW LINE

Fresh Air IN-FORCERS

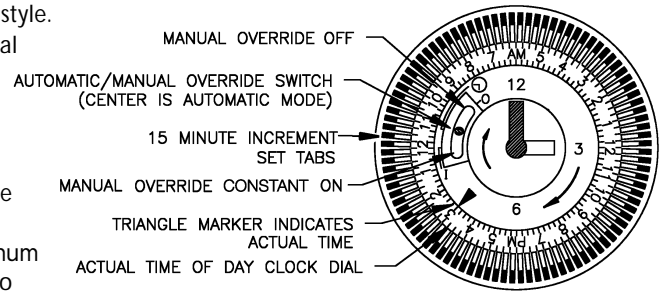
Models PAI-1T & PAI-2T

The Timer/Clock on the Fresh Air IN-FORCER may be set to operate in one of two ways. Easy-to-follow instructions and examples of these methods can be found in the IN-FORCER'S manual.

Life-Style: The IN-FORCER may be cycled according to the occupants' life-style. One scenario would be to set the timer to operate the IN-FORCER for several hours straight in the morning and evening when a family is most active cooking, using bathroom facilities and doing laundry. The IN-FORCER should be cycled for 15 minutes each hour during peak activity periods to compensate for exhausted air and to dilute indoor pollution and moisture.

Air Changes per Hour (ACH): ACH is a method to measure the volume of fresh air necessary to replace a percentage of the total volume of air inside the living space of the home. In general, studies recommend a minimum of 1/4 ACH. The IN-FORCER can be operated constantly or it can be cycled to deliver the amount of fresh air needed to achieve a desired air change rate.

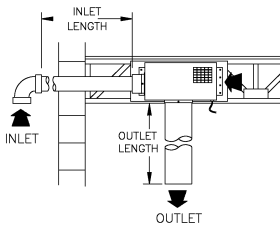
Automatic Timer/Clock



In-Forcer CFM Performance Data

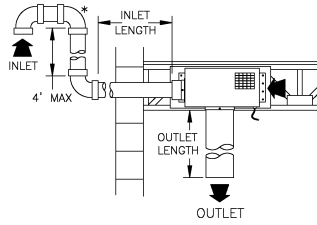
Model PAI-1T • Model PAI-2T

Conventional straight thru wall intake



		3" PVC INLET LENGTH			
		2 FEET	10 FEET	15 FEET	20 FEET
6" OUTLET LENGTH	0 FEET	59 CFM	53 CFM	50 CFM	47 CFM
	10 FEET	80 CFM	68 CFM	65 CFM	60 CFM
	20 FEET	56 CFM	50 CFM	46 CFM	44 CFM
6" OUTLET LENGTH	10 FEET	75 CFM	65 CFM	62 CFM	57 CFM
	20 FEET	52 CFM	47 CFM	41 CFM	40 CFM
		70 CFM	60 CFM	57 CFM	52 CFM

Optional gooseneck intake



		3" PVC INLET LENGTH			
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6" OUTLET LENGTH	0 FEET	52 CFM	47 CFM	44 CFM	43 CFM
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	20 FEET	48 CFM	44 CFM	42 CFM	40 CFM
6" OUTLET LENGTH	10 FEET	62 CFM	54 CFM	52 CFM	49 CFM
	20 FEET	46 CFM	42 CFM	39 CFM	38 CFM
		58 CFM	50 CFM	48 CFM	44 CFM

*PVC EXTENDED FOR BELOW GRADE APPLICATIONS OR ANTICIPATED SNOW LINE

Calculate Equivalent Length

The performance shown is based on equivalent feet. To determine the equivalent feet of an installation, add the length of the 3" PVC inlet pipe plus the equivalent length of any elbows. Do not include the intake elbow or gooseneck equivalent loss, they have already been factored into the performance data. Use the same method to determine the equivalent feet if a 6" outlet duct is installed.

EQUIVALENT LENGTH OF ELBOWS

ELBOW DIAMETER	90°	45°
3" PVC	5'	2.5'
6"	10'	5'



For larger applications, use Tjernlund Commercial Combustion Air IN-FORCERS. Models available with capacities up to 6000 CFM. Request brochure 8500402.

IN-FORCERS are available from:



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 Phone: 651.426.2993 800.255.4208 Fax: 651.426.9547
 Visit our web site: www.tjernlund.com

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