



# COMBUSTION AIR IN-FORCER™

Today's most advanced and cost-effective way to assure adequate combustion air for maximum performance of commercial and residential heating appliances



## The Problems:

**Insufficient combustion air causes:**

- ◆ Flue gas spillage, flame roll-outs, decreased efficiencies, and reduced heating equipment life

**Conventional metal louvers often are a major cause of these problems:**

- ◆ Unregulated outdoor air supply that changes with temperatures, speed and direction of winds
- ◆ Architecturally unsightly large outside wall openings that often require structural reinforcement
- ◆ Mechanical room freeze ups in northern climates
- ◆ Often not compatible with below grade or interior mechanical rooms



## The Solution:

**The In-Forcer commercial combustion air intakes are packaged systems engineered to provide controlled, interlocked combustion air**

- ◆ Wall or roof opening size can be reduced by up to 80% compared to conventional metal louvers
- ◆ In-Forcers include matching, low profile intake hoods that can be mounted on either a roof or side wall
- ◆ Use small diameter duct to deliver outdoor air up to 100 feet away from intake hood
- ◆ Complies with Mechanical Code requirements for combustion air supply



## Variety of Applications

- ◆ Restaurant kitchens with negative pressure caused by exhaust fans
- ◆ Interior mechanical rooms with no direct access to an outside wall
- ◆ Conversions from electric to gas or oil heating appliances
- ◆ Confined space installations
- ◆ Below grade mechanical rooms
- ◆ Factories where processes cause backdrafting of heating equipment
- ◆ Laundries, dry cleaners, indoor pools, etc. with chemically contaminated atmosphere



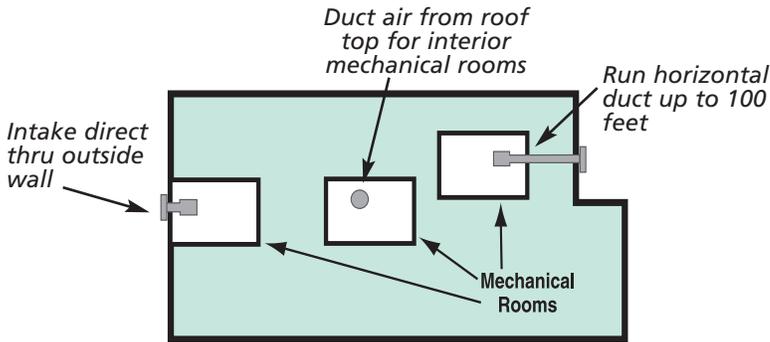
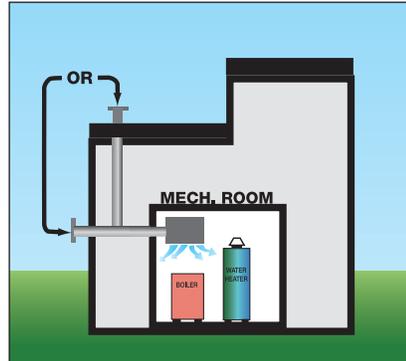


# The original and most practical alternative to metal louvers



## Use in virtually all mechanical room locations

The IN-FORCER can be ducted up to 100 equivalent feet from the intake hood. Even isolated mechanical rooms can easily be supplied with outdoor combustion air. Cold outdoor air can be distributed through standard ducts and diffusers at ceiling level, allowing the air to be tempered as it drops to the floor, eliminating cold spots in the mechanical room. Mechanical room noise transfer to the outside is further reduced since there is no direct wall opening, typical of standard air intake louvers.



sidewall mounted hood



roof mounted hood

## Small wall opening lowers installation cost

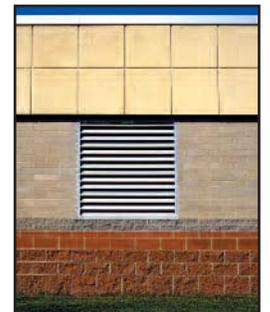
### Improves building's exterior appearance

Compared to standard louvers, wall openings can be reduced by up to 80%. This eliminates the need for extra support around the opening that can cost far more in extra construction labor and materials than the total installed cost of an IN-FORCER.

What's more, IN-FORCER'S low profile hood blends into a sidewall or roofline and is designed to keep wind and rain out. Heavy duty 5052 aluminum construction will not corrode.



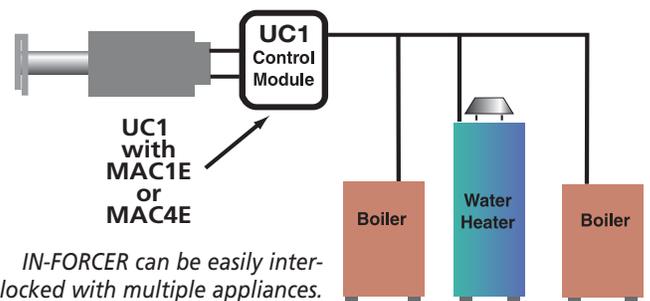
IN-FORCER requires maximum 12" opening and no extra support



Support beams are typically required on larger louvered intakes

## Easy interlock options

- ◆ Add UC1 or UC1-1HP for model PAI-7 to interlock a single burner
- ◆ Add MAC1E to interlock one additional 24/115 VAC burner
- ◆ Add MAC4E to interlock up to four additional 24/115 VAC burners
- ◆ Add WHKE in conjunction with UC1 or MAC-Series controls to interlock with self generated millivolt gas heaters



IN-FORCER can be easily interlocked with multiple appliances.

# Easy installation & servicing



The IN-FORCER attaches with integral mounting brackets or "eye" bolts. The inlet/outlet collars are 2 1/4 inches deep for easy duct connection. The IN-FORCER features a blower that slides out for easy servicing and a washable aluminum mesh pre-filter.

## Standard safety features

Commercial IN-FORCERS include a high limit switch to deactivate the system in the event of a mechanical room fire and a pressure switch to detect blockage or system malfunction.

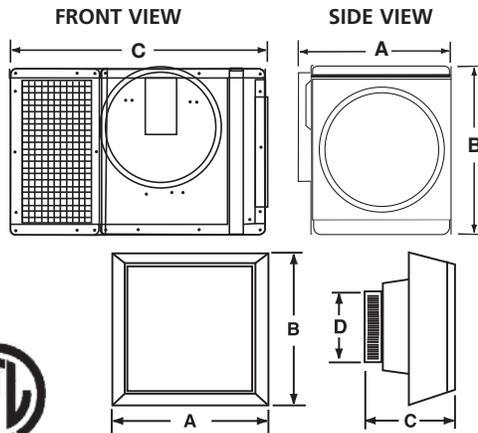


## SPECIFICATIONS:

Model	Max. Btu/Hr. Gas Draft Hood	Max. Btu/Hr. Fan Assisted or Power Burner	Max. Btu/Hr. Oil Fired Flame Retention	Max. CFM
PAI-4	450,000	850,000	775,000	250
PAI-6	1,300,000	2,500,000	2,300,000	680
PAI-7	2,100,000	3,700,000	3,700,000	1175

This table is for general reference only. Refer to complete selection table in IN-FORCER specifications sheet or instructions for details.

## DIMENSIONS (in inches):



	UNIT SIZE			DIA. IN/OUT
	A	B	C	
PAI-4	12	9-1/2	20	8
PAI-6	13-3/4	15-1/4	24-1/4	10
PAI-7	16-5/8	18	32	12

	HOODS			
	A	B	C	D
PAI-4	17-1/2	17-1/2	10-3/4	8
PAI-6	24-1/2	24-1/2	10-1/2	10
PAI-7	31	31	11	12

*Tjernlund also offers intelligent modulating draft & combustion air systems for precise control of exhaust and ventilation.*

## IN-FORCERS for residential and light commercial applications feature:



- ▶ Automatic regulated control of fresh combustion air
- ▶ Light indicating proper operation
- ▶ Interlock shuts down burner if intake elbow is blocked or performance is significantly reduced
- ▶ Split wheel blends outdoor/indoor air for comfort
- ▶ Includes off-cycle damper



## Installation is Simple and Fast

**1.** Install standard 3" PVC pipe through wall at desired location. (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.

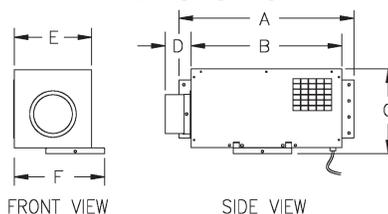


**3.** **24 VAC CONTROLLED MODEL PAI-2G**  
Connect color-coded low voltage control cable to burner circuit. Plug cord into outlet.

**115 VAC CONTROLLED MODEL PAI-2O**  
Wire in series with controls.



## 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

# PAI-2 Series Application Tables

• PAI-2G for 24 VAC Control Circuits

• 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-G or PAI-O Series based on control circuit voltage.

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

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	—

## Table B Calculate Equivalent Length

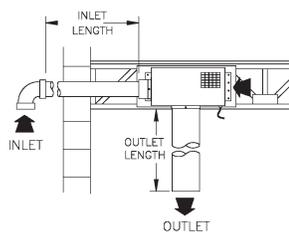
The performance shown is based on equivalent feet. To determine the equivalent feet, add the length of the 3" PVC inlet pipe plus the equivalent length of any elbows. Do not include intake elbow or gooseneck equivalent loss, they have already been factored into the performance data. Use the same method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

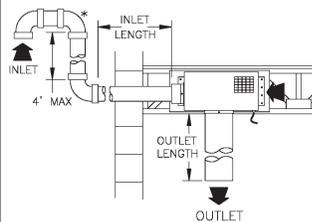
## Table C In-Forcer CFM Performance Data

### Conventional straight thru wall intake



6" OUTLET LENGTH	3" PVC INLET LENGTH			
	2 FEET	10 FEET	15 FEET	20 FEET
0 FEET	80 CFM	68 CFM	65 CFM	60 CFM
10 FEET	75 CFM	65 CFM	62 CFM	57 CFM
20 FEET	70 CFM	60 CFM	57 CFM	52 CFM

### Optional gooseneck intake



6" OUTLET LENGTH	3" PVC INLET LENGTH			
	2 FEET	10 FEET	15 FEET	20 FEET
0 FEET	64 CFM	58 CFM	54 CFM	53 CFM
10 FEET	62 CFM	54 CFM	52 CFM	49 CFM
20 FEET	58 CFM	50 CFM	48 CFM	44 CFM

\*PVC EXTENDED FOR BELOW GRADE APPLICATIONS OR ANTICIPATED SNOW LINE

DISTRIBUTED BY:

Also available: model FAI-4 Fresh Air In-Forcer



Model FAI-4 provides a simple and economical way to provide fresh, outside air to dilute trapped pollutants and replace air vented by exhaust fans and fuel burning equipment. 75 CFM, 18 Watts.



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