

# Indirect Gas-Fired Make-Up Air Model IG

- 800 to 7,000 cfm
- Up to 400,000 BTU/hr

Multiple Furnace Control Options  
Optional Evaporative Cooling



## Model IG

### Indirect Gas-Fired Make-Up Air Unit

The Greenheck model IG features a power vented, 80% efficient, ETL listed, indirect gas-fired furnace. Heating is available up to 400,000 BTU/hr (input) with air flow volumes up to 7,000 cfm.

Units are factory assembled and wired to minimize field installation time and costs.

### Indirect Gas-Fired Furnaces

- Power vented with post purge cycle
- ETL listed to ANSI standard Z83.8 and CGA 2.6
- 80% thermal efficiency
- Gas control options include up to 8:1 staged turndown and up to 4:1 modulating turndown
- Aluminized steel or stainless steel heat exchanger
- Direct spark ignition system
- Easy access burner controls
- Insulated double wall construction

### Control Center

The control center includes the following standard components:

- Magnetic motor starter with solid state overload protection
- Control transformer with fusing
- Disconnect switch
- Separately fused motor
- Distribution terminal strip



Premium grade control components are selected to provide you with years of reliable operation. All electrical components are UL Listed, recognized or classified and factory prewired for single point power connection.

### Vibration Isolators

The entire fan and motor assembly is mounted on Neoprene vibration isolators to minimize noise transmission into the building.



### Filters

Filter options include 2-inch pleated 30% efficient filters or 2-inch washable aluminum mesh filters.

### Integrated Downturn Plenum

Greenheck's unique indirect furnace design includes an integrated downturned plenum, eliminating the need for an additional section to achieve a downblast discharge.

### Durable Construction

Designed for maximum weather resistance, IG housings are constructed of heavy gauge G90 galvanized steel. Insulated double wall construction and lifting lugs are standard.

### Reliable Fan Performance

Air performance ratings from Greenheck's AMCA registered test chamber ensure accurate data.

Double width, double inlet forward curved wheels for high efficiency and low sound levels are constructed of heavy gauge steel. Wheels are statically and dynamically balanced to ensure vibration free operation.



### Access Panels

Large access panels are provided for easy inspection and maintenance of motors, drives, fan wheels, filters, and heater controls.

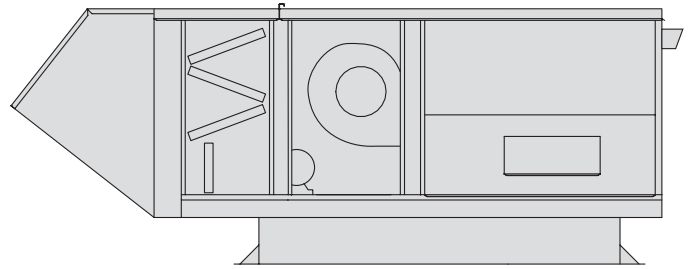
### Factory Wired and Tested

All units are tested prior to shipment to ensure Greenheck's high level of quality. Units are checked for proper fan, furnace and controls operation.



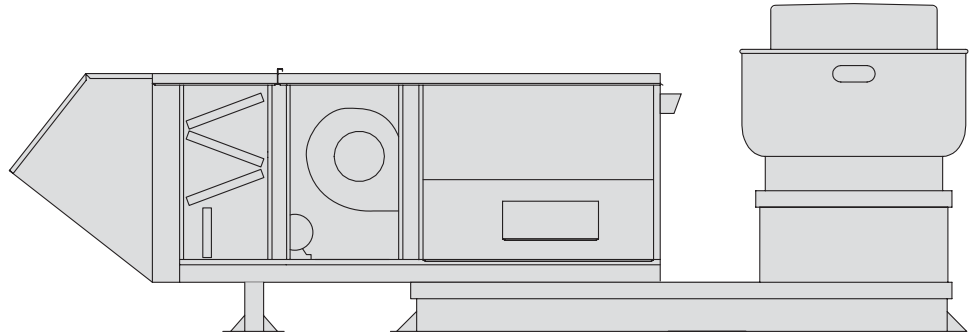
## Downblast or Horizontal Discharge

Model IG is available in either downblast (Arrangement DB) or horizontal (Arrangement HZ) discharge. Arrangement DB utilizes Greenheck's integrated downturned plenum to provide you with the most compact downturn design available.



## Kitchen Combination Package

The Greenheck combination package (Arrangement DBC) simplifies installation and reduces your field labor costs. This pre-engineered design offers you the benefit of only one roof penetration for both supply and exhaust ducts, while ensuring complete compatibility and interface between the supply fan, exhaust fan, curb and combination extension.



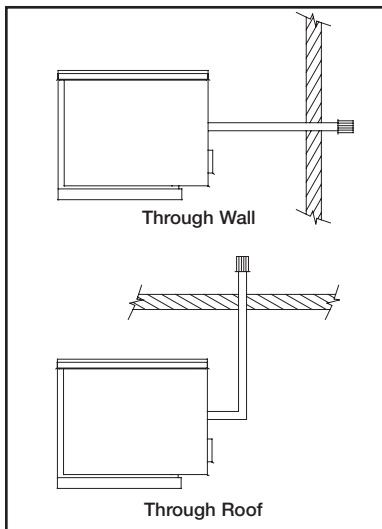
Greenheck combination packages are specifically designed to comply with NFPA 96, which states:

- Exhaust duct must terminate at least 24 in. above the roof deck.
- Exhaust fan discharge must terminate at least 40 in. above the roof deck.
- There must be at least 10 ft. of horizontal separation between the intake and exhaust discharge.

## Venting Options

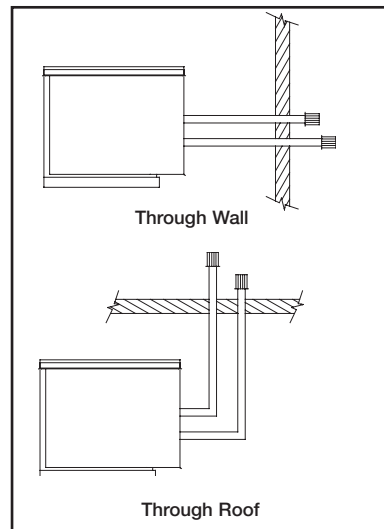
When your application calls for indoor installation, Greenheck offers multiple venting options:

### Basic Indoor Venting



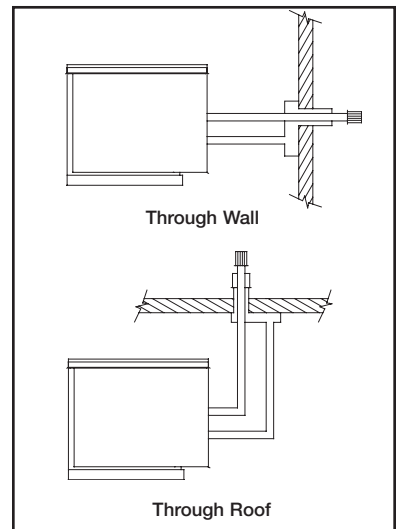
Basic indoor venting uses indoor air for combustion and vents combustion byproducts outdoors through a vent line in the wall or roof.

### Separate 2-Pipe Venting



Separate 2-pipe venting uses outdoor combustion air and vents combustion byproducts outdoors through a vent line, requiring separate roof or wall openings for each line.

### Concentric Venting



Concentric venting uses outdoor air for combustion and vents combustion byproducts outdoors through a vent line, but offers you the benefit of only one roof or wall penetration.

## Evaporative Cooling



The capabilities of the IG can be expanded to include cooling with the addition of an evaporative cooling section. The evaporative cooling section includes a galvanized steel housing with a louvered intake, 2 inch aluminum mesh filters and a stainless steel evaporative cooling module. The evaporative cooling media is 12 inch thick Munters CELdek or GLASdek for a 90% cooling effectiveness.

The entire section mounts directly to the front of the IG unit, eliminating transitions and ductwork by others. Drain and overflow are conveniently tapped through the side of the cooling section. The supply line connection is field located where convenient. Freeze protection, automatic drain & fill and the Water Wizard™ evaporative optimizer are available.

Evaporative cooling is available up to 7,000 cfm.

## Mixing Box

You may further expand the make-up air capabilities of the IG with the addition of a mixing box. This option includes low leakage control dampers for outdoor and return air, and an actuator in a face and bypass configuration. IG units with a mixing box include a louvered intake to prevent moisture from entering the mixing box section. The Greenheck mixing box allows you to choose from three standard airflow control options:

**Two Position:** Responding to user input, the return air damper is either fully open (recirculating 100% return air) or fully closed (providing 100% outdoor air).

**Building Pressure Control:** Outdoor air and return air dampers modulate to maintain desired building pressure. Furnace control is based on discharge temperature. A remote control panel with photohelic gage is required with this option.

**Potentiometer Control:** Enables manual control of the outdoor air and return air damper positions. Furnace control is based on discharge temperature. A remote control panel is required with this option.

## Furnace Control

Choose from staged or modulating furnace control.

### Staged Control

- 1-Stage, 2-Stage or 8-Stage Control

Control	Operation Points*
1-Stage	100%
2-Stage	50, 100%
8-Stage	12½, 25, 37½, 50, 62½, 75, 87½, 100%

### Modulating Control

- 2:1 or 4:1 Modulation Control

Control	Operation Points*
2:1 Mod.	Anywhere from 50 to 100%
4:1 Mod.	Anywhere from 25 to 100%

\* Percentage of maximum furnace output.

## Temperature Control

### Discharge Temperature Control

As a make-up air unit, the IG controls the heat output based on the discharge temperature. A factory mounted discharge temperature sensor feeds information back to the unit control center. The furnace either stages or modulates the heat output to satisfy the discharge temperature set point. The set point is easily field adjusted with a temperature selector located in the unit's control center.

### Room Override



The room override option enables the IG to boost its heat output when the space temperature is cooler than desired. When the space temperature is satisfied, the IG will control the heat output based on the discharge temperature set point. The room sensor may be wall or beam mounted or included on an optional remote control panel.

## Remote Control Panels

The Industrial type remote control panel features a variety of switches and indicator lights mounted on a Permator coated galvaneal steel box. If room override is specified, the override thermostat is factory mounted on the remote panel as shown to the right.



Kitchen style remote panels features toggle switches and a stainless steel face plate for flush mounting to a wall. The junction box is also included.



## Additional Accessories

### Air Filter Gauge

Indicates when filters become dirty. An indicator light may be wall, beam or remote control panel mounted.

### Motorized Dampers

Intake or discharge dampers are available to prevent backdrafts when the fan is not in operation. Intake dampers are factory mounted and wired.

### Inlet Air Sensor

An on/off type duct stat automatically de-energizes the gas system, interrupting the flow of gas to the burners when the inlet air temperature rises above the inlet air sensor set point.

### 115 Volt Service Receptacle

A 115 volt GFCI outlet is mounted externally in a NEMA 3R box for the convenience of field service personnel. A separate 115 volt power source is required.

### Roof Curbs

Factory provided roof curbs are available to ensure compatibility between the make-up air unit and roof curb. Standard construction is G90 galvanized steel.

### Freezestat

An on/off type discharge duct stat, with timer, prevents the discharge of cold air into the building when the furnace is not providing adequate tempering.

### Special Coatings

Greenheck's Permator™ powder paint is available for cosmetic or protective purposes. Decorative baked enamel paints are also available in a variety of colors to match existing building fixtures. Consult your Greenheck representative for paint selections.

### Weatherhood

A galvanized steel weatherhood with birdscreen is standard on 100% outdoor air units. A louvered intake is optional.

### Propane Gas

A propane heater may be provided in lieu of natural gas.

### Duct Adapter

A duct adapter is available with factory supplied curbs and provides an easy method for connecting the ductwork to the curb.

### Exhaust Fan Starter(s)

Up to 2 exhaust fan starters may be added to the control center.

### Smoke Detector

A photoelectric smoke detector is available for duct mounting.

### Discharge Diffuser

A 3-way diffuser for horizontal discharge or 4-way diffuser for downblast discharge are available.

## Furnace, Housing and Blower Availability

MBH	Housing	Blower Size				
		108	109	110	112	115
75	10	x	x			
100	10	x	x			
125	10	x	x			
150	10		x	x		
175	10		x	x	x	
200	20		x	x	x	
225	20		x	x	x	
250	20		x	x	x	x
300	20			x	x	x
325	30			x	x	x
350	30			x	x	x
400	30			x	x	x

## Air Performance Data

Blower Size	CFM		TOTAL STATIC PRESSURE in inches of WG					
			0.75	1.00	1.25	1.50	1.75	2.00
108	800	RPM	1109	1216	1311	1399	-	-
		BHP	0.26	0.31	0.35	0.40	-	-
	1,200	RPM	1347	1445	1530	-	-	-
		BHP	0.59	0.68	0.75	-	-	-

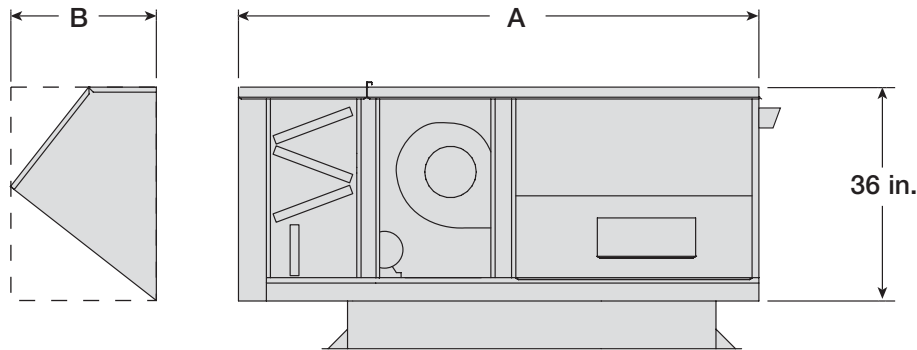
Blower Size	CFM		TOTAL STATIC PRESSURE in inches of WG					
			0.75	1.00	1.25	1.50	1.75	2.00
109	1,500	RPM	1014	1140	1255	1361	1460	-
		BHP	0.45	0.54	0.63	0.73	0.84	-
	2,400	RPM	1216	1306	1397	1484	1569	1648
		BHP	1.1	1.3	1.4	1.6	1.7	1.9

Blower Size	CFM		TOTAL STATIC PRESSURE in inches of WG					
			0.75	1.00	1.25	1.50	1.75	2.00
110	2,000	RPM	912	1013	1110	1199	-	-
		BHP	0.59	0.71	0.88	1.00	-	-
	3,000	RPM	1097	1172	1244	1315	1386	1455
		BHP	1.4	1.6	1.7	1.9	2.1	2.2

Blower Size	CFM		TOTAL STATIC PRESSURE in inches of WG					
			0.75	1.00	1.25	1.50	1.75	2.00
112	2,600	RPM	761	853	934	1009	-	-
		BHP	0.7	0.9	1.0	1.2	-	-
	4,400	RPM	939	1006	1073	1137	1197	1254
		BHP	2.1	2.4	2.6	2.9	3.1	3.3

Blower Size	CFM		TOTAL STATIC PRESSURE in inches of WG					
			0.75	1.00	1.25	1.50	1.75	2.00
115	4,000	RPM	681	756	822	892	-	-
		BHP	1.3	1.5	1.8	2.1	-	-
	7,000	RPM	889	943	994	1044	1093	1138
		BHP	4.2	4.6	5.0	5.5	5.9	6.3

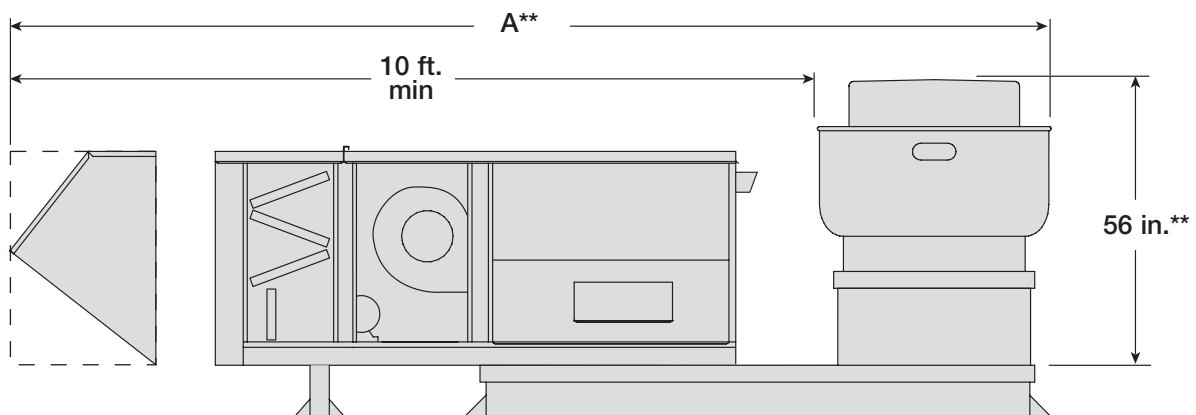
Note: The air performance data shown does not include internal static pressure losses due to items such as filters, dampers and furnaces. For exact air performance data based on specific unit configuration, use the Greenheck CAPS selection program.

**Arrangement HZ and DB**

**Without Evaporative Cooling**

		Intake	A	B	Width
Housing 10	100% Outside Air	Standard	73 ¼	26	43 ½
		Louvered		11 ½	
	Recirculation	Standard	90	26	
		Louvered		11 ½	
Housing 20	100% Outside Air	Standard	76 ¼	26	52 ½
		Louvered		11 ½	
	Recirculation	Standard	93	26	
		Louvered		11 ½	
Housing 30	100% Outside Air	Standard	85 ¼	26	52 ½
		Louvered		11 ½	
	Recirculation	Standard	102	26	
		Louvered		11 ½	

**With Evaporative Cooling**

		Evap*	A	B	Width
Housing 10	100% Outside Air	3500 cfm	73 ¼	36	52 ½
		7000 cfm			68 ¾
	Recirculation	3500 cfm	90		52 ½
		7000 cfm			68 ¾
Housing 20	100% Outside Air	3500 cfm	76 ¼	36	52 ½
		7000 cfm			68 ¾
	Recirculation	3500 cfm	93		52 ½
		7000 cfm			68 ¾
Housing 30	100% Outside Air	3500 cfm	85 ¼	36	52 ½
		7000 cfm			68 ¾
	Recirculation	3500 cfm	102		52 ½
		7000 cfm			68 ¾

**Arrangement DBC**

**Without Evaporative Cooling**

		Intake	A	Width
Housing 10	Standard	182	48	
	Louvered			167 ½
Housing 20	Standard	183	52 ½	
	Louvered			168 ½
Housing 30	Standard	181	52 ½	
	Louvered			167

**With Evaporative Cooling**

		Evap*	A	Width
Housing 10	3500 cfm	169 ½	52 ½	
	7000 cfm		68 ¾	
Housing 20	3500 cfm	182	52 ½	
	7000 cfm		68 ¾	
Housing 30	3500 cfm	191	52 ½	
	7000 cfm		68 ¾	

\* Maximum evaporative cooler air volume (cfm).

\*\* Arrangement DBC dimensions are based on the largest compatible CUBE fan. For specific dimensions, use the Greenheck CAPS selection program. All dimensions are in inches.

**General:** Make-up air unit shall be as manufactured by Greenheck or approved equal provided all specifications are met. Greenheck Model IG is used as the basis of design. Performance shall be as scheduled on plans.

**Furnace:** Indirect fired gas furnace shall be 80% efficient, ETL Listed and have a blow through fan design. Furnace shall be capable of operation with natural or LP gas and have a power venting system. The heat exchanger shall be constructed of aluminized steel or stainless steel. Standard furnace features shall include main gas pressure regulator, main gas valve, electronic staged or electronic modulating controls, direct spark ignition system, high limit and a 24 volt control transformer.

**Temperature Control:** Furnace heat output shall be controlled based on a field adjustable discharge temperature set point. Discharge temperature sensor shall be factory mounted and wired to the unit control center. Furnace shall have electronic modulation or electronic staged control.

**Unit Casing and Frames:** Unit shall be of internal frame type construction of galvanized steel. All frames and panels shall be G90 galvanized steel. Where top panels are joined there shall be a standing seam to insure positive weather protection. All metal-to-metal surfaces exposed to the weather shall be sealed. All components shall be easily accessible through removable doors.

**Insulation:** Units equipped with a mixing box shall be insulated from the mixing box intake through to the supply discharge. 100% outside air units shall be insulated from the filter section intake through to the supply discharge. Insulation shall be in accordance with NFPA 90A and tested to meet UL 181 erosion requirements. Double wall construction is standard.

**Fan Section:** Centrifugal fans shall be double width, double inlet. Fan and motor shall be mounted on a common base and shall be internally isolated. All blower wheels shall be statically and dynamically balanced. Ground and polished steel fan shafts shall be mounted in permanently lubricated ball bearings. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged speeds.

**Filter Section:** Filters shall be mounted in a V-bank arrangement such that velocities across the filters do not exceed 550 feet per minute. Filters shall be easily accessible through a removable access panel.

**Weatherhood:** Weatherhood shall be constructed of G90 galvanized steel with birdscreen mounted at the intake.

**Motors and Drives:** Motors shall be energy efficient, complying with EPACT standards, for single speed ODP and TE enclosures. Motors shall be permanently lubricated, heavy duty type, matched to the fan load and furnished at the specified voltage, phase and enclosure. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be cast and have machined surfaces, 10 horse power and less shall be supplied with an adjustable drive pulley.

**Electrical:** All internal electrical components shall be prewired for single point power connection. All electrical components shall be UL listed, recognized or classified where applicable and wired in compliance with the National Electrical Code. Control center shall include motor starter, control circuit fusing, control transformer for 24 VAC circuit, integral disconnect switch and terminal strip. Contactors, Class 20 adjustable overload protection and single phase protection shall be standard.

**Mixing Box (2-Position):** Damper shall be either fully open or fully closed. Damper position shall be controlled by a remotely mounted switch. Mixing box shall provide 100% make-up air when the damper is closed and recirculate 100% return air when the damper is open.

**Mixing Box (Building Pressure):** Mixing box shall modulate outdoor and return air volumes to maintain desired building pressure. A remote control panel shall be provided by the make-up air unit manufacturer and include a photohelic gauge. Furnace shall be multi-stage or modulating and operate based on discharge temperature control.

**Mixing Box (Potentiometer):** Mixing box shall enable manual modulation of outdoor and return air volumes from a remote potentiometer. The potentiometer shall be mounted on a control panel provided by the make-up air manufacturer. Furnace shall be multi-stage or modulating and operate based on discharge temperature control.

**Evaporative Cooling Section:** Evaporative cooling section shall include a galvanized steel housing with louvered intake, 2 inch aluminum mesh filters and a stainless steel evaporative cooling module all provided by the make-up air unit manufacturer. Evaporative cooling media shall be Munters CELdek or GLASdek with a depth of 12 inches for a cooling effectiveness of 90%. Drain and overflow connections shall be piped through the side of the evaporative cooling section.



## Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

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