Indirect Gas-Fired Heating & Ventilating

Model IG-HV

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

Optional Economizer Cooling

GREENHECK
Building Value in Air.

September
2004

Model IG-HV

Indirect Gas-Fired Heating & Ventilating

The Greenheck model IG-HV 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.

A variety of airflow and temperature control options are available to provide you with a heating and ventilating solution for your application.

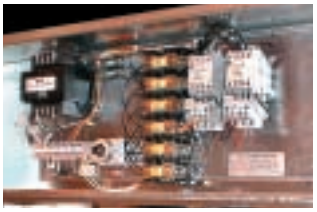
Indirect Gas-Fired Furnaces

- Power vented with post purge cycle
- Aluminized or stainless steel heat exchanger
- ETL listed to ANSI standard Z83.8 and CGA 2.6
- 80% thermal efficiency
- Insulated double wall construction
- Direct spark ignition system
- Easy access burner controls
- Electronic staged gas controls

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 in compliance to the National Electrical Code 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.

Double Wall Construction

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

Filters

Two inch pleated 30% efficient filters are standard.

Integrated Downturn Plenum

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

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.

Mixing Box

A filtered mixing box is standard on all IG-HV's and includes outdoor air and return air low leakage control dampers in a face and bypass configuration.

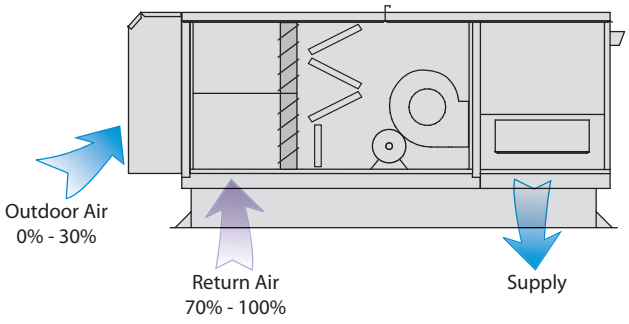
A heating and ventilation (HV) option and a mixing box (MB) or economizer (EC) control option must be specified for every IG-HV unit. Choose one of three heating and ventilation options and one of eight economizer and mixing box options to provide a heating and ventilating solution for your application.

Heating & Ventilation Options

Choose one of three ventilating options described below. The ventilation option should be chosen based on your application's minimum outside air requirements.

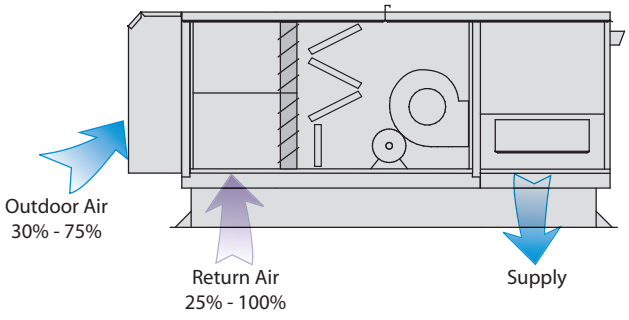
HV1: 0-30% Minimum Outdoor Air

HV1 is the most common among heating and ventilating units, allowing you to set the minimum outdoor air volume between 0 and 30% of the total supply air volume. With the relatively low percentage of outdoor air, mixed air temperatures are mild and stable. *1-stage heating and/or cooling is recommended* (2-stage is optional).



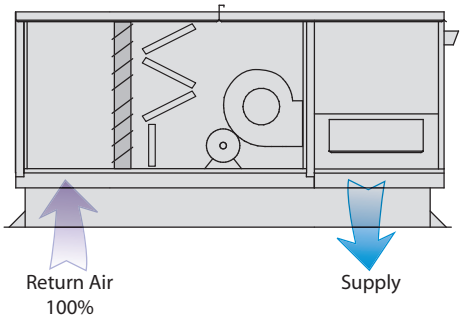
HV2: 30-75% Minimum Outdoor Air

The HV2 option is required when the minimum outdoor air volume exceeds 30% of the total supply air volume. With higher outdoor air volumes, mixed air temperatures can vary greatly. *Accordingly, 2-stage heating is required.*



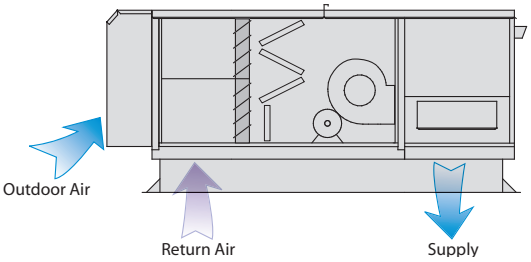
HV3: 100% Return Air

The HV3 option is available when no outdoor air is needed. With relatively stable return air conditions, *1-stage heating is strongly recommended*.



Mixing Box Controls with Economizer Cooling

The economizer control package enables free cooling using outdoor air. All EC options include a modulating actuator for controlling outdoor and return air dampers, and a field adjustable minimum outdoor air positioner. During a call for heating the economizer is locked out and the outdoor air damper holds at the minimum position.



EC1: Outdoor Temperature Reference

On a call for cooling, option EC1 compares the outside air temperature to the economizer's field adjustable set point.

- If the outside air temperature exceeds the set point, the minimum outside air is provided.
- If the outside air temperature is between the economizer set point and 55ºF, the dampers go to the 100% outside air position.
- If the outside air is below 55ºF, the dampers modulate to achieve 55ºF mixed air temperature.

EC2: Outdoor Enthalpy Reference

On a call for cooling, economizer option EC2 compares the outside enthalpy to the field adjustable enthalpy changeover set point.

- If the outside enthalpy is less than the set point, the dampers will modulate to a 55ºF mixed air temperature.
- If the outside air enthalpy is greater than the economizer's set point, the dampers go to the minimum outside air position.

EC3: Airstream Temperature Reference

On a call for cooling, economizer option EC3 compares the outdoor and return air temperatures.

- If the outdoor air temperature is greater than the return air, the dampers go to minimum outside air position.
- If the outside air temperature is less than the return air, the dampers will modulate to achieve a 55ºF mixer air temperature.

EC4: Airstream Enthalpy Reference

On a call for cooling, economizer option EC4 compares the outdoor and return air enthalpies.

- If the outdoor air enthalpy is greater than the return air, the dampers go to the minimum outside air position.
- If the outside enthalpy is less than the return air, the dampers will modulate to achieve a 55ºF mixer air temperature.

Mixing Box Controls (no economizer)

In addition to the economizer (EC) options described above, Greenheck offers four mixing box (MB) control options for applications where a factory provided economizer package is not desired.

MB1: Minimum Outdoor Air Positioner

Mixing box option MB1 includes a modulating actuator and potentiometer that control the outdoor air and return air damper positions. When the unit is energized, the dampers will travel to the position corresponding to the potentiometer setting. The potentiometer is easily adjustable, allowing you to dial in the optimum amount of outdoor air. When the unit is powered off, the outdoor air damper closes to prevent backdrafting.

MB2: 2-10 Volt External Signal

Mixing box option MB2 includes a modulating actuator controlled by an external 2-10 volt signal. This option is appropriate for applications that call for a building automation system that will control the mixing box dampers.

MB3: 4-20 mA External Signal

Mixing box option MB3 includes a modulating actuator that is controlled by an external 4-20 mA signal. Like option MB2, this option is appropriate for applications that call for a building automation system to control the mixing box dampers.

MB4: Manual Quadrant

Mixing box option MB4 uses a manual quadrant to secure the outdoor and return air in the desired position. The damper remains in the secured position and maintains the minimum outside air requirements.

Thermostat Options

Basic bi-metal thermostats with mercury switches or fully programmable electronic thermostats are available as part of your IG-HV system. Match your heating, staging, and operational requirements to the appropriate thermostat.

TC1: 1-stage heating / cooling

TC1 is a coiled bimetal thermostat used for single-stage heating systems. It is also compatible with economizer cooling.

TC2: 2-stage heating

TC2 is a coiled bimetal thermostat used for 2-stage heating systems.

TC3: 2-stage heating / cooling

TC3 is a coiled bimetal thermostat used for 2-stage heating and is also compatible with economizer cooling. It includes an adjustable heat anticipator, stops, and a locking cover.

TC4: Programmable

TC4 has full seven-day program capability. The thermostat can be set to four times and eight temperature settings for each day of the week. It can also control up to two stages of heating and economizer cooling.

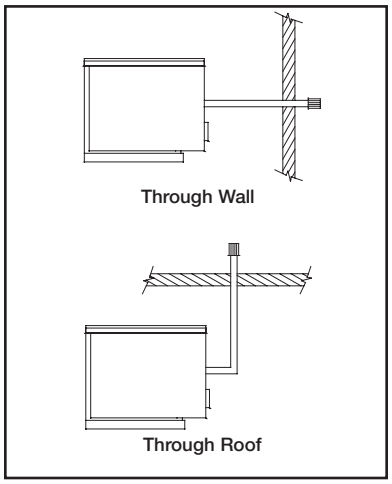
TC5: Deluxe Programmable

TC5 has full seven-day program capability. The thermostat can be set for two occupied and two unoccupied times with adjustable temperature settings for each day of the week. It can control up to three stages of heating and economizer cooling. The Intelligent Fan™ feature energizes the fan continuously during occupied mode and intermittently with a call for heating in unoccupied mode.

Venting Options

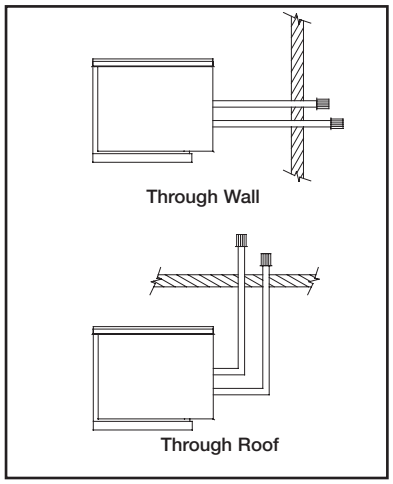
When your application calls for indoor installation, Greenheck offers multiple venting options:

Basic Indoor Venting



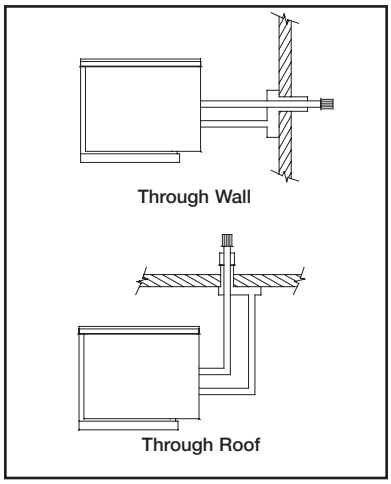
Basic indoor venting uses indoor air for combustion and vents combustion by-products outdoors through a vent line in the wall or roof.

Separate 2-Pipe Venting



Separate 2-pipe venting uses outdoor combustion air and vents combustion by-products 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 by-products outdoors through a vent line, but offers you the benefit of only one roof or wall penetration.

Furnace 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

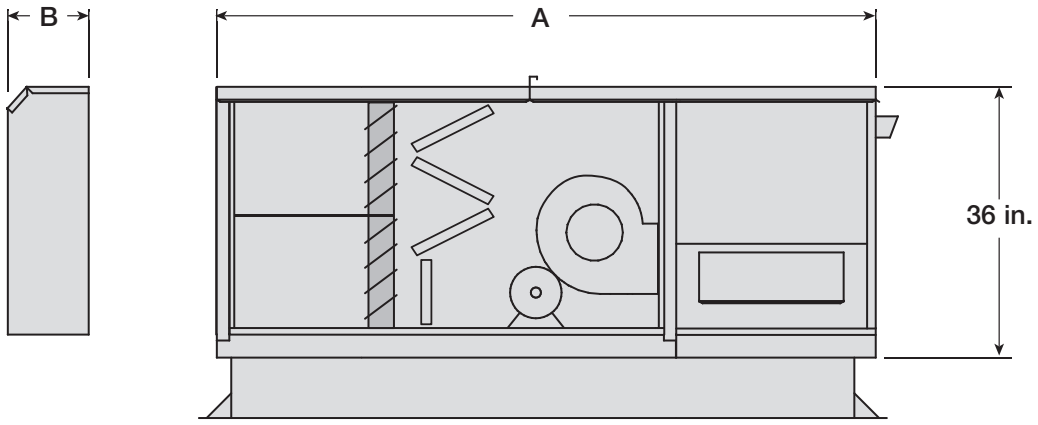
Blower Size	CFM		TOTAL STATIC PRESSURE in inches of WG					
			0.75	1.00	1.25	1.50	1.75	2.00
110	2,000	RPM	912	1013	1110	1199	-	-
		BHP	0.59	0.71	0.08	0.10	-	-
	3,000	RPM	1097	1172	1244	1315	1386	1455
		BHP	1.4	1.6	1.7	1.9	2.1	2.2

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.

Dimensional Data



	A	B	Width
Housing 10	90	11½	43½
Housing 20	93	11½	52½
Housing 30	102	11½	52½

All dimensions are in inches.

Additional Accessories

Motorized Dampers
Discharge dampers are available to prevent backdrafts when the fan is not in operation. Intake and return air dampers are factory mounted, wired and are standard.

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.

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

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

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.

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

Special Coatings
Greenheck's Permatector 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.

Typical Specifications

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General: Heating and Ventilating unit shall be as manufactured by Greenheck or approved equal provided all specifications are met. Greenheck Model IG-HV is used as the basis of design. Performance shall be as scheduled on plans.

Furnace: Indirect gas fired 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 with post purge cycle. 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 controls, direct spark ignition system, high limit and a 24 volt control transformer. Furnace shall be insulated and have double wall construction.

Temperature Control: Heating and cooling output shall be controlled by a room thermostat to maintain desired room temperature. Economizer control shall provide the first stage of cooling, where specified. Furnaces shall provide 1 or 2 stages of heat output control.

Unit Casing and Frames: 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, requiring no caulking at job site. All components shall be easily accessible through removable doors.

Unit shall have double wall construction and be insulated from the mixing box intake through to the supply discharge. Insulation shall be in accordance with NFPA 96 and tested to meet UL 181 erosion requirements.

Intake: The intake shall be louvered with aluminum mesh filters.

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.

Mixing Box: Mixing box shall contain outside air and return air dampers with low leak, pressure activated, extruded vinyl blade seals, aluminum jamb seals, Belimo actuator and 30% efficient pleated filters 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. The mixing box shall modulate the amount of outdoor and return air by use of dampers. Input signal for return damper shall be from economizer controller, potentiometer, 2-10 volt signal, 4-20 mA signal or manual quadrant controller.

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 (up to size 118) or ball bearing pillow blocks (size 120 and larger). Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged speeds.

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 with separate motor fusing and terminal strip. Contactors, Class 20 adjustable overload protection and single phase protection shall be standard.









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.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

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