

# *PremiSys PS*

*Pre-Engineered Energy Recovery Ventilators  
with Optional Heating and Cooling*

**Commercial and Institutional**  
Applications up to 10,000 cfm,  
1.5 in. wg external static pressure



## General Capacities

- 1000-10,000 cfm of 100% outdoor air
- Up to 1.5 in. wg external static pressure

## Energy Savings

- 3-4 tons of cooling saved per 1000 cfm
- 50-60 MBH of heating saved per 1000 cfm

## Total Energy Recovery with Heating and Cooling

Innovent's PremiSys PS Series ventilators combine energy recovery, heating, and cooling in a pre-configured package offering an alternative to custom air-handling equipment. Available from 1000 to 10,000 cfm, each PremiSys PS unit is built from a list of pre-engineered options—offering engineers custom air-handler flexibility with shorter lead times and lower initial costs.

### Total Energy Wheel

At the heart of each PS unit is a total energy wheel constructed of an aluminum rotor coated with silica gel desiccant. Aluminum is used not only for high sensible energy transfer, but also because it provides a solid core for years of rotational service. Silica gel desiccant is bonded to the aluminum corrugate with a non-masking, porous adhesive that can be cleaned with low-pressure steam, compressed air, or mild detergents without degrading performance.

### Summer Operation

The PremiSys PS Series pre-treats hot and humid outdoor air by transferring sensible and latent energy from the conditioned exhaust. The addition of integral cooling gives the PremiSys PS Series the ability to fully temper outdoor air to design temperature.

### Winter Operation

Cold, dry outdoor air is heated and humidified by energy in the conditioned exhaust air through the rotating total energy wheel. Several heating options provide the ability to fully temper outdoor air into heated or neutral air.

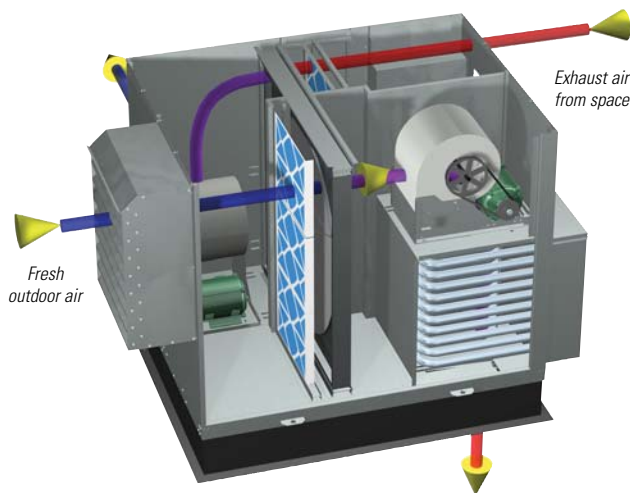
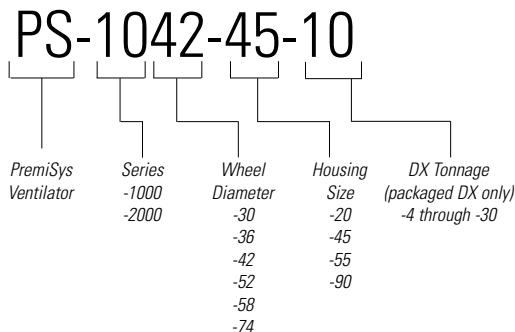
### Construction

PremiSys PS is built with features not typically found in common energy recovery equipment. Construction begins around the total energy wheel, placed in an upright position to allow space for coils and other tempering options. One-inch, double-wall construction is standard, providing improved strength and thermal efficiency over traditional single-wall ventilators with foil-faced insulation.

Air is drawn through standard two-inch pleated filters in both the supply and exhaust air streams by two adjustable, forward-curved, belt-driven fans. Wiring for all electrical components is through a central control center which includes:

- Non-fused disconnect for single point wiring
- Fan motor starters and overloads for component protection
- 24 VAC transformer and terminal strip for seamless controls integration

### Model Nomenclature



**Typical Winter Operation**

## Heating Options

### Indirect Gas Furnace

Each IG furnace is staged 2:1 with all controls included to maintain discharge air temperature. Furnace can operate with natural or LP gas.



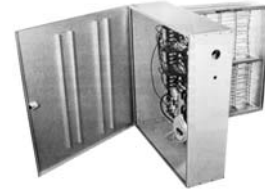
### Hot Water Coil

Coil is sized by Innovent to provide appropriate leaving air and water temperatures. Options include external or internal piping locations.



### Electric Heat

Standard features include SCR control and separate non-fused disconnect. Available in 460, 230, and 208 VAC.



## Cooling Options

Standard features on cooling coils include stainless steel drain pans to promote IAQ. Taller coils are split vertically with dual drainpans to prevent water carry-over.

### Chilled Water Coil

Coil is appropriately sized with design conditions to cool and dehumidify to specified temperatures. Options include external or internal piping locations.

### DX Coil

Many coils are available to handle R-22, R-410, R-134a, or other refrigerants for operation with any split-system condenser.

## DX Coil with Packaged DX

In addition to the DX coil, the packaged DX option includes scroll compressors (dual staged above 10 tons), condensing section, expansion valve, internal piping, and an R-22 refrigerant charge.

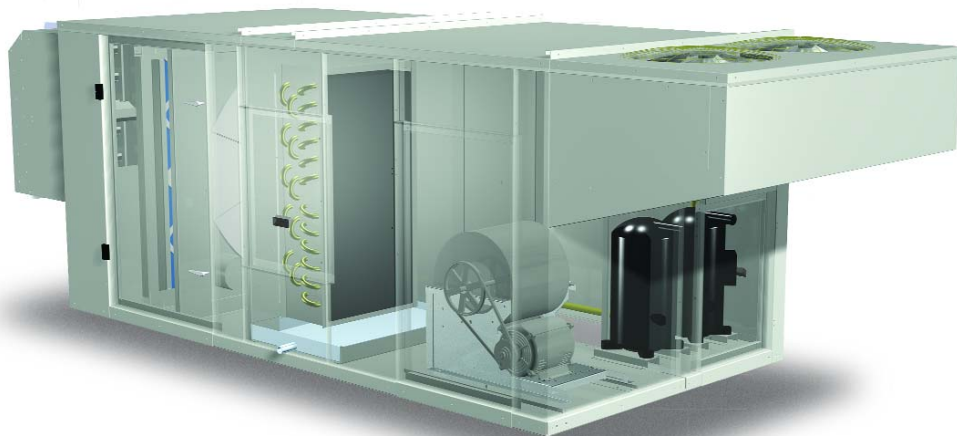
For increased control and safety, the following items are also standard:

- Hot-gas bypass
- Head-pressure control
- High pressure manual reset cutout
- Low pressure auto-reset cutout

To add to the flexibility of the PremiSys PS with packaged DX, an option for hot-gas reheat is available from Innovent. The hot-gas reheat coil is incorporated into the DX circuit with an on/off or modulating 3-way valve to provide enough reheat for neutral air.

### Packaged DX Benefits

- Single-source responsibility
- Reduced installation costs
- Single point power connection
- Reduced footprint requirements



# Air Performance PremiSys PS Series

## External Static Pressure in Inches of WG

			0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50
<b>PS-1030/2030</b>										
<i>CFM</i>	<i>OV</i>									
1000	1142	RPM	1141	1344	1498	—	—	—	—	—
		BHP	0.36	0.51	0.53	—	—	—	—	—
1300	1485	RPM	1265	1426	1578	1857	—	—	—	—
		BHP	0.55	0.72	0.90	1.05	—	—	—	—
1600	1828	RPM	1418	1553	1684	1934	2189	—	—	—
		BHP	0.87	1.03	1.21	1.67	2.17	—	—	—
<b>PS-1036/2036</b>										
<i>CFM</i>	<i>OV</i>									
1600	1828	RPM	1308	1446	1575	1816	—	—	—	—
		BHP	0.74	0.89	1.04	1.37	—	—	—	—
1900	2171	RPM	1453	1574	1691	1907	2108	2306	—	—
		BHP	1.10	1.27	1.45	1.80	2.19	2.65	—	—
2200	2514	RPM	1608	1717	1820	2020	2205	2375	—	—
		BHP	1.57	1.77	1.96	2.39	2.79	3.20	—	—
<b>PS-1042/2042</b>										
<i>CFM</i>	<i>OV</i>									
2200	2109	RPM	797	892	986	1166	1329	—	—	—
		BHP	0.68	0.81	0.96	1.29	1.65	—	—	—
2700	2588	RPM	900	977	1053	1209	1359	1494	1628	—
		BHP	1.10	1.25	1.40	1.77	2.18	2.58	3.03	—
3200	3068	RPM	1010	1079	1143	1274	1406	1533	1655	1768
		BHP	1.67	1.87	2.04	2.41	2.86	3.33	3.82	4.29
<b>PS-1052/2052</b>										
<i>CFM</i>	<i>OV</i>									
3200	2184	RPM	900	989	1071	1220	1360	1495	—	—
		BHP	1.17	1.34	1.53	1.92	2.35	2.83	—	—
3800	2593	RPM	1004	1083	1157	1297	1422	1542	1654	1769
		BHP	1.79	1.99	2.20	2.64	3.11	3.61	4.12	4.70
4400	3003	RPM	1114	1185	1252	1380	1499	1609	1713	1815
		BHP	2.60	2.85	3.08	3.57	4.09	4.64	5.18	5.78
<b>PS-1058/2058</b>										
<i>CFM</i>	<i>OV</i>									
4200	1989	RPM	749	832	906	1038	1155	—	—	—
		BHP	1.54	1.82	2.10	2.65	3.21	—	—	—
5100	2415	RPM	839	913	982	1107	1216	1318	1412	1520
		BHP	2.43	2.77	3.11	3.80	4.45	5.15	5.81	6.73
6000	2842	RPM	940	1003	1065	1181	1287	1382	1472	1558
		BHP	3.67	4.05	4.45	5.26	6.06	6.84	7.64	8.44
<b>PS-1074/2074</b>										
<i>CFM</i>	<i>OV</i>									
6000	2066	RPM	612	682	746	862	962	1058	—	—
		BHP	1.99	2.37	2.75	3.52	4.33	5.21	—	—
8000	2755	RPM	723	783	841	941	1036	1122	1202	1275
		BHP	3.91	4.41	4.95	5.94	6.97	7.98	9.08	10.14
10,000	3444	RPM	845	897	946	1040	1124	1201	1277	1348
		BHP	7.00	7.56	8.18	9.50	10.78	12.00	13.29	14.52

The air performance data on page 4 accounts for the pressure drop across the energy recovery wheel and the internal housing losses, but does not include pressure drop for filters or tempering options. Add filter and/or tempering option pressure drop (from tables below) to external static pressure to determine correct RPM and horsepower.

Filter Pressure Drop (30% eff.)		
Model	CFM	Pressure Drop (in. wg)
PS-X030	1000	0.04
PS-X036	2200	0.22
PS-X042	2200	0.06
PS-X052	4400	0.24
PS-X058	4200	0.09
	6000	0.18
PS-X074	6000	0.10
	10,000	0.27

Tempering Options Pressure Drop				
Model	CFM	Cooling Coil (in. wg)	Heating Coil (in. wg)	Indirect Gas (in. wg)
PS-X030	1000	0.17	0.02	0.03
PS-X036	2200	0.62	0.08	0.13
PS-X042	2200	0.31	0.04	0.09
PS-X052	4400	0.66	0.08	0.34
PS-X058	4200	0.38	0.04	0.10
	6000	0.64	0.08	0.26
PS-X074	6000	0.28	0.03	0.24
	10,000	0.66	0.08	0.55

Note: Coil data assumes six row cooling coils and one row heating coils. Cooling coil data is for PS-2000 models only.

Note to data on page 4: Gross supply air performance ratings (airflow, pressure, and power) are at port 2 with port 1, port 3 and port 4 at 0.0 in. wg. Gross exhaust air performance ratings (airflow, pressure, and power) are to port 3 with port 1, port 2 and port 4 at 0.0 in. wg. Power rating (BHP) does not include drive losses. Performance ratings do not include the effects of appurtenances in the airstream.

### Intake and Discharge Options

The PremiSys PS series is available in many airflow configurations for custom indoor and outdoor installations. Outdoor units are typically specified with a louvered weather hood for outdoor air intake, exhaust hood with integral back-draft damper, and Innovent's *Permatector™* exterior finish. All units are fully caulked for air and water leakage regardless of indoor or outdoor use. Refer to the table below for outdoor air (OA) and exhaust air (EA) configurations.

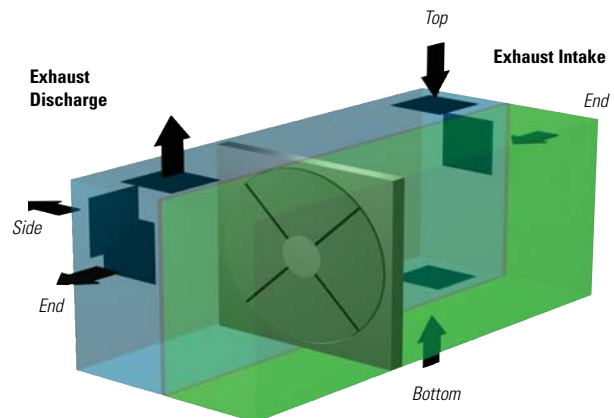
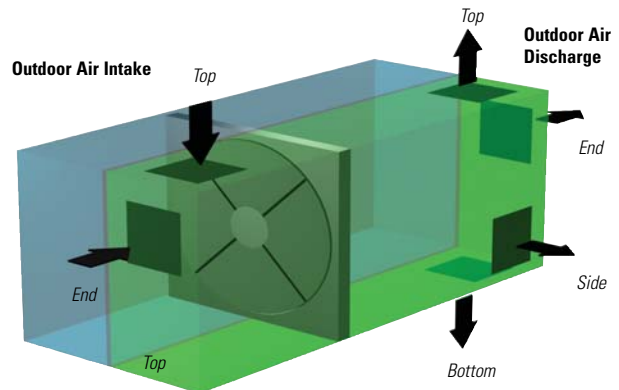
	Bottom	Top	Side	End
OA Intake		X		X <sup>4</sup>
OA Discharge	X <sup>3</sup>	X	X <sup>1</sup>	X <sup>2</sup>
EA Intake	X <sup>3</sup>	X		X
EA Discharge		X	X <sup>4</sup>	X

<sup>1</sup>Side OA Discharge is **only** available with the Indirect Gas (IG) heater.

<sup>2</sup>End OA Discharge is **not** available with the Indirect Gas (IG) heater.

<sup>3</sup>Package DX option limits OA Discharge and EA Intake to Bottom.

<sup>4</sup>Standard OA Intake and EA Discharge locations for outdoor installations.



## Controls

### Additional Accessories

- Roof curbs
- External finishes
- Weatherhood
- Motorized dampers
- Spare filters
- Spare belts

PremiSys PS models are designed for integration into new or existing control schemes. Units are typically controlled through a unitary controller, programmable thermostat, BMS system, or other third party source. Innovent offers several factory-supplied options, from basic sequence control to full DDC packages. Below are suggested sequences that can be selected with or without Innovent's DDC controller.

### Economizer

An integral economizer option is available to reduce energy consumption when free cooling is available. If a call for cool is given and the outdoor air is below 55F (field adjustable), total energy wheel will respond in one of two methods:

#### *Stop Wheel*

Wheel rotation ceases and outdoor air is allowed to enter into conditioned space. When the call for cool is de-energized, wheel begins rotating at normal speed. Controls may be based on temperature or enthalpy settings from factory.

#### *Modulate Wheel*

Wheel speed is modulated with a VFD to maintain 55F supply air. Modulating wheel offers accurate temperature control for sensitive conditioned loads.

### Frost Control

When operating in cold climates, frost control is highly recommended by Innovent. Frost is detected through an increase in pressure drop across wheel and when outdoor air is below a field-adjustable set point. Three methods are available to alleviate frost accumulation:

#### *Timed Exhaust*

When frost is detected, the supply air blower will turn off intermittently to allow wheel to defrost from warm exhaust air.

#### *Modulate Wheel*

A VFD slows energy wheel speed when frost is detected. When the rotation speed is reduced, the energy wheel is allowed ample time in exhaust airstream to defrost.

### *Electric Preheat*

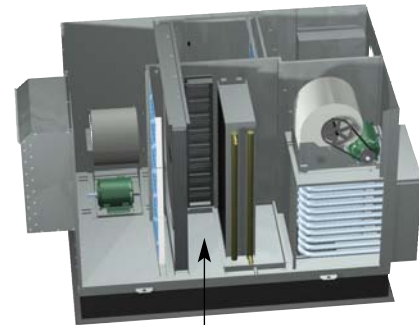
A small electric pre-heater warms outdoor air before entering the wheel when frost is detected.

### Night Setback

The PremiSys PS Series can be converted from 100% outdoor air to 100% re-circulating air operation with the night setback option. This sequence relies on a damper placed in the outdoor/exhaust air partition, located between the total energy wheel and the cooling coil. When an unoccupied signal is detected, the following actions are taken:

- Night-setback damper opens
- Energy wheel is de-energized
- Outdoor air supply damper closes
- Exhaust fan is de-energized

When these steps are initiated, indoor air is recirculated through the PS unit and tempered to maintain space temperature.



Night Setback Damper

### Variable Air Volume

Both the supply and exhaust fans can be equipped with VFD's to provide flexible levels of supply and exhaust air. Common control sequences include CO<sub>2</sub>, multi-zone, or building pressurization control.

### Additional Sensors

Many additional sensors are available factory mounted and wired to a 24 VAC terminal strip, including:

- Dirty filter sensors
- Rotation sensors
- Temperature sensors
- Humidity sensors

**General:** Energy Recovery Ventilator shall be as manufactured by Innovent or approved equal provided all specifications are met. Innovent Models PS-1000 and PS-2000 are used as the basis of design. Units shall be ETL listed and bear the ETL label. Performance shall be as scheduled on plans. Exhaust discharge and outside air intake shall not be located on the same side on roof top units.

**Unit Casing and Frames:** Unit shall be of internal frame, galvanized steel construction. Interior and exterior panels shall be constructed of G90 galvanized steel and create a 1" double wall. All exterior panels exposed to weather shall be a minimum of 18 gage galvanized steel and coated with a polyester urethane powder coat finish (*Permatect<sup>TM</sup>*). Where top panels are joined there shall be an overlapping standing seam to ensure positive weather protection. All metal-to-metal seams shall be factory sealed requiring no caulking at job site. Unit base to be designed for curb mounting. Unit base shall overhang the curb for a positive seal against water run-off.

**Insulation:** The unit casing shall be insulated with 1-inch fiberglass. Insulation shall meet requirements of NFPA 90A and tested to meet UL 181 erosion requirements. Insulation to be enclosed in double wall construction. There shall be no exposed insulation.

**Energy Recovery Wheel:** Wheel shall provide both sensible and latent energy recovery. Energy transfer ratings shall be tested in accordance with ARI Standard 1060. Desiccant shall be silica gel for maximum latent energy transfer. Wheel shall be constructed of aluminum media. Plastic wheel construction not allowed.

Silica gel desiccant shall be permanently bonded to wheel media to retain latent heat capability after cleaning. Wheels with "sprayed-on" desiccant coatings are not acceptable. Wheels with desiccant applied after wheel formation are not acceptable. Energy recovery device shall transfer moisture entirely in the vapor phase. Energy recovery wheel shall be in the upright position.

**Access Doors:** All components shall be easily accessible through removable doors for exhaust fan, supply fan, filters, and damper compartments. Energy recovery wheels (smaller than 58 inches) shall be mounted in a slide-out track to ease inspection, removal, and cleaning.

**Roof Curbs:** Roof curb shall be supplied by unit manufacturer for field assembly. Curb shall consist of die formed galvanized steel sections. Curb shall be full perimeter type with gasketing provided for field installation between curb and unit base.

**Fan Sections:** Centrifugal fans shall be double width, double inlet, forward curved type. All blower wheels shall be statically and dynamically balanced. Ground and polished steel fan shafts shall be mounted in permanently lubricated, sealed ball bearing pillow blocks. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged operating speeds. Separate motors for exhaust and supply blowers shall be provided. Adjustable sheaves on belt-driven fans with motors less than 10 hp shall allow independent balancing of exhaust and supply airflow. Fan and motor assemblies are mounted to unit base with neoprene isolators as standard. Fans shall be located in draw-through position in reference to the energy recovery wheel.

**Motors and Drives:** Motors shall be energy efficient, EPACT compliant with ODP or TEFC 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 of the fully machined cast type, keyed and securely

attached to the fan wheel and motor shafts; 10 horsepower and less shall be supplied with an adjustable drive pulley. Energy wheel motors shall have integral overload protection.

**Filters:** Supply and exhaust air filters shall be 2-inch thick pleated fiberglass, 30% efficient and tested to meet UL Class 2. Filter racks shall be die-formed galvanized steel. Both air streams must be filtered upstream of energy wheel.

**Electrical:** All internal electrical components shall be factory wired for single point power connection. Units with electric reheat will be wired with independent power supply. All electrical components shall be ETL listed, approved, or classified where applicable and wired in compliance with the National Electrical Code.

Weatherproof, integral door interlocking disconnect switch, motor starters, control circuit fusing, control transformer for 24 VAC circuit, and terminal strip shall be supplied as standard components in the control center. Motor starters consisting of contactor and Class 20 electronic adjustable overload protection shall be provided for all fan motors.

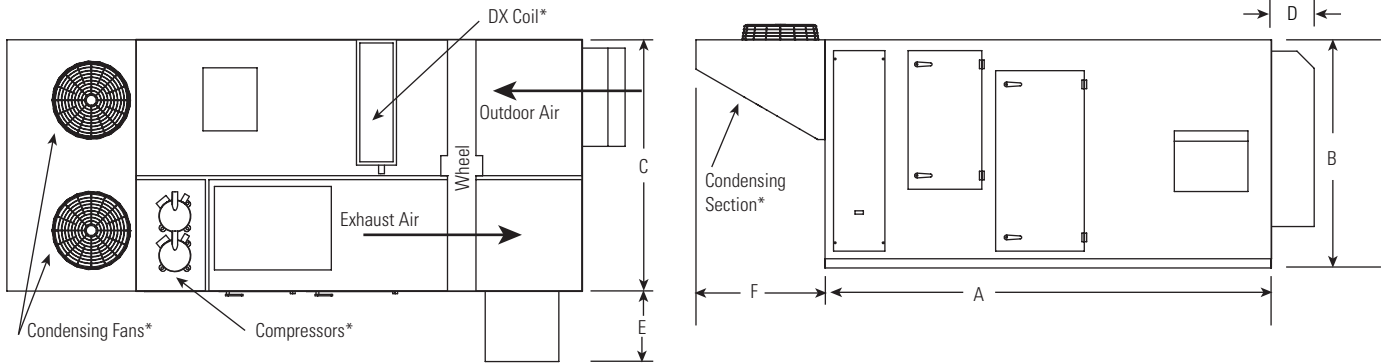
**Indirect Gas:** Indirect fired gas furnace shall be 80% efficient, UL Certified and Listed per ANSI Z83.8-2002, C.G.A. approved per 2.6-2002 and have a blow through fan design. Furnace shall be capable of operation with natural or LP gas and have a power venting system. The burner and heat exchanger shall be constructed of aluminized 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.

**Electric Heat:** Electric heat shall be ETL listed and circuit fused per NEC over 48 amps. Heater shall be multi-step controlled, factory wired and installed. Control will be 24 volt with class 2 transformer. Provide air flow switch to shut down heater if air ceases to flow across heater.

**Hot Water Coil:** Hot water coils shall be factory tested and rated in accordance with ARI 410. Coils shall have copper tubes with permanently expanded aluminum fins, 12 FPI or less.

**Cooling Coil (PS-2000 models only):** Direct expansion (DX) and chilled water coils shall be factory tested and rated in accordance with ARI 410. Coils shall have copper tubes with permanently expanded aluminum fins, 12 fpi or less. DX coils shall be equipped with distributors to receive expansion valves at the liquid connections (TXV by others). Cooling coils shall include stainless steel drain pan.

**Condensing Section (PS-2000 with Packaged DX option):** Unit shall be equipped with a pre-piped and wired air-cooled condensing unit. There shall be no field piping required. Compressors shall be hermetic scroll type, mounted on neoprene vibration isolation to minimize vibration transmission and noise. Compressors shall be mounted in an isolated compartment to be serviceable without affecting airflow. Compressors shall be equipped with a crankcase heater. The system shall come equipped with a thermal expansion valve to control refrigerant flow. System shall also be equipped with a liquid-line filter drier, high-pressure manual reset cutout, low-pressure auto-reset cutout, time delay relays for compressor protection, service/charging valves, and moisture indicating sight valve. Condenser fans shall be direct drive, statically and dynamically balanced, and AMCA Licensed for Air Performance. Multiple condensing fans shall be supplied to allow fan cycling for head pressure control. Units that are 10 tons and above shall have 2 stages of capacity control.



\*Drawing illustrates PS-2000 with Packaged DX cooling option. Units without Packaged DX are dimensioned as shown but omit condensing section, condensing fans, and compressors.

Unit dimensions (in inches)								
Model	A	B	C	D	E	F	Approx. weight (in lbs.)*	Airflow (cfm)
<b>Heating Only</b>								
PS-1030/36	78	50	56	18	18	N/A	1500	1000-2200
PS-1042/52	86	69	66	16	20	N/A	2300	2200-4400
PS-1058	99	70	76	16	25	N/A	2400	4200-6000
PS-1074	111	85	96	16	27	N/A	4000	6000-10,000
<b>Heating and Cooling (without Packaged DX)</b>								
PS-2030/36	98	50	56	18	18	N/A	1800	1000-2200
PS-2042/52	106	69	66	16	20	N/A	2700	2200-4400
PS-2058	118	70	76	16	25	N/A	3100	4200-6000
PS-2074	131	85	96	16	27	N/A	5000	6000-10,000
<b>Heating and Cooling with Packaged DX</b>								
PS-2030/36	110	50	56	18	18	27	2150	1000-2200
PS-2042/52	121	69	66	16	20	38	3500	2200-4400
PS-2058	135	70	76	16	25	39	4450	4200-6000
PS-2074	153	85	96	16	27	46	6200	6000-10,000

\*Actual weight is dependent upon unit configuration.

## Warranty

Innovent warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of five years 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 Innovent prove defective during this period, they should be returned to the nearest authorized motor service station. Innovent will not be responsible for any removal or installation costs. As a result of our commitment to continuous improvement, Innovent reserves the right to change specifications without notice.