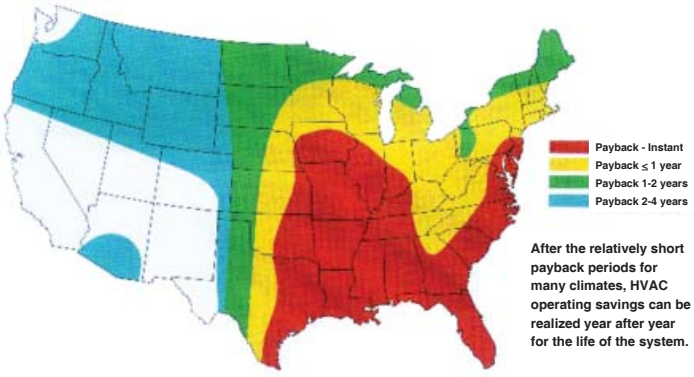
▼ BENEFITS OF ENERGY RECOVERY:

INDOOR AIR QUALITY

- The Indoor Air Quality (IAQ) of a building can have broad, potentially harmful, implications for occupants that live, work, or study there every day. IAQ is a measurement of the amount of undesirable substances in the air that can have adverse health effects such as Volatile Organic Compounds (VOC), carbon monoxide, natural gas, mold, bacteria, and particulates, just to name a few. The harmful effects that can result from poor IAQ range from health issues and lack of general wellbeing, to decreased mental acuity and productivity.
  - **Health and Wellness Effects:** Acute allergies, headaches, coughs, asthma, skin irritations, and breathing difficulties, as well as chronic illnesses such as cancer, liver disease, kidney damage, and nervous-system failure.
  - **Cognitive Function Effects:** Studies by the Harvard School of Public Health and the Lawrence Berkeley National Laboratory found that carbon dioxide (CO_2)—a constituent of exhaled breath—negatively impacted thinking and decision-making at levels commonly found inside homes and buildings.
    - Researchers have found the scores increase by as much as 10% on standardized tests when ventilation rates are doubled.[1]
  - **Productivity Losses:** Worker sickness and absenteeism cause serious losses for businesses of every type, which is estimated to cost the U.S. economy $168 billion annually.
    - By doubling the ventilation rate from 20 CFM to 40 CFM per person, at a cost of just $32 per person per year, productivity improves by as much as $6,500 per person per year.[2]

ENERGY SAVINGS

- Energy Recovery (ER) media works by drawing heat and moisture from exhaust air and transferring it to an outside air supply. Based on the specific application, the efficiency of this energy transfer can be as high as 80%. Proper application of energy recovery significantly reduces the heating and cooling load requirements for a building's primary air handler, which allows for use of smaller, less costly equipment.
- The added cost of the energy recovery unit pays for itself by reducing energy costs. In some instances, paying for itself in only a few months.
  - Save up to $2,000.00 for every installed ton of cooling (including equipment costs).
  - Save up to $0.50 or more per therm of heating, and up to $0.10 per KWH of cooling. This can result in annual savings that range into the thousands of dollars!
  - Payback time for the investment of a Carnes Energy Recovery Unit is shown (right) by region.
- **Meet Design Requirements**:
  - ASHRAE – ER Products can help engineers meet the Guidelines for energy and ventilation in ASHRAE Standards 90.1, 189.1 and 62.1.
  - LEED – For buildings with LEED requirements, ER Products help to achieve the proper energy efficiencies to acquire LEED Credits in both the EA and EQ categories. Packaging is available from the factory that meets LEED requirements.



After the relatively short payback periods for many climates, HVAC operating savings can be realized year after year for the life of the system.

[1] "Frequently Asked Questions about Improved Academic Performance," U.S. Environmental Protection Agency (EPA), https://www.epa.gov/iaq-schools/frequently-asked-questions- about-improvedacademic-performance.

[2] Source of data and statements: Int. J. Environ. Res. Public Health 2015, 12 (11), 14709-14722.

▼ WHY CHOOSE CARNES:

- **Our Commitment**
  - Carnes Company has been doing business for over 75 years, and has been supplying Energy Recovery solutions since the technology's early days. Through the years, we have been committed to providing the best quality and service for all of the products we produce. Although no one with the last name Carnes has worked here for several years, at its core, Carnes Company is still a family business. When you call, you'll speak to a real person, who genuinely wants to help you find the solution you are looking for…
- **Technology**
  - Carnes' ER products utilize wheels and cores that are sourced only through innovative leaders in the field of energy transfer media, and all of our media are designed to provide the most efficiency energy transfer possible.
  - 3-Angstrom Molecular Sieve (ER Wheel media only) – The 3-Angstrom Molecular Sieve is still the most selective latency transfer method available. Larger sieves allow for molecules other than water to be transferred from your exhaust air stream, back into your supply air. By only accepting molecules of 3-angstrom or smaller, this method transfers only H2O, leaving behind the impurities & other chemicals that other, larger sieves may place back into your air stream!
  - The motors in Carnes' ER units are designed to maximize efficiency. Our ECM's are top of the line, and we are already looking to the next generation of electrically commutated motors. At Carnes, we are constantly pursuing the most efficient solutions available to meet your energy recovery needs…
- **Certifications**
  - AHRI 1060 – Certifies the Energy Recovery Performance of the units.
  - UL Listed – This listing ensures the safety of the unit as it pertains to all electrical components.
  - NFPA-90A – This is a set of standards for the Installation, Operation and Maintenance of air conditioning equipment, intended to protect life and property from fire, smoke, and gases. Our units meet all standards.
- **CARNES COMPLETE** (http://webapp.carnes.com)
  - Carnes Complete is a web-based selection software used for every stage of a project, from design to placing an order. Pricing and order placement are only available to official Carnes Representatives and Distributors, however, guest accounts are available, which still offer powerful tools to any engineer or contractor.
    - ER-C-Lect – This section of the selection software allows you to enter the design criteria for an Energy Recovery unit, and receive a list of units that could be applied. That list will also tell you the energy transfer efficiency of each option, in order to help you identify the unit that best fits the needs of your project. Once you've selected the best unit type and size, the selection software walks you through the available options and accessories, allowing you to select exactly what you need and leave out what you don't.
    - Schedule Generation – Once you've selected and saved the unit, you can generate a schedule directly from the same software. It's as easy as that.
    - Submittals – For any product selected by performance, Carnes Complete will allow you to generate full submittals with just a click of your mouse. Below is a list of all of product groups available to guest accounts in Carnes Complete…
      - ER-C-Lect (Energy Recovery)
      - VAV-C-Lect (VAV Terminals)
      - Fan-C-Lect (Fans & Ventilators)
      - Humidifier-C-Lect (Humidifiers & Accessories)
  - To set up a Guest Account, go to http://webapp.carnes.com, click on "Create Guest Account" and complete the form.

▼ PRODUCT OVERVIEW

The Carnes' model WPDC (Direct Drive) and WPBC (Belt Dive), fixed plate energy recovery unit/heat exchanger is the energy savings solution you've been looking for. Offering air flows ranging from 100-6,800 CFM, these fixed plate ER units offer high-efficiency energy transfer cores (plates), available for both enthalpy (plastic polymer core) and sensible only (aluminum core) applications. The standard motors for all direct drive supply and exhaust fans are Electrically Commutated (ECM), and all belt driven supply and exhaust fans use high-efficiency motors, reducing energy usage, and increasing overall efficiencies. Units are available with several media defrost options, including electric preheat, exhaust only, exhaust recirculation, plenum recirculation and bypass defrost. The larger belt driven units can be configured for outdoor applications. Add to all of this a variety of duct arrangement, component, construction and accessory options, and you are sure to find the perfect energy recovery solution to meet the needs of your current building or renovation project. Plus, all Energy Recovery units are manufactured in the USA to the same exacting standards of quality and durability that Carnes' products have been for over 75 years. Outfit your building with quality that's built to last, and improve energy efficiencies and Internal Air Quality with Carnes' Energy Recovery Units.

▼ BENEFITS OF FIXED PLATE ENERGY RECOVERY UNITS:

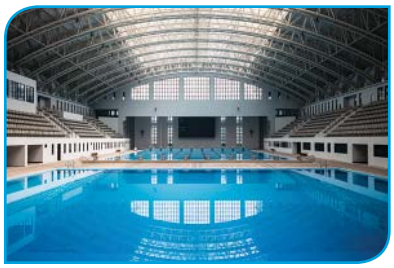
Fixed plate ER units offer benefits in specific applications that make them the ideal energy transfer solution.

Contamination:

- Plate units operate with 0% air flow contamination, making them perfect for sensitive applications, such as laboratories, manufacturing facilities, medical buildings, or any other location that might have chemical or biological contaminants in the exhaust air.

High Efficiency:

- In the early days of fixed plate energy recovery units, the enthalpy media itself was less efficient than that used in wheel exchangers. With recent advancements in ER core technologies, fixed plate ER units are more versatile than they have ever been before.



Sensible Only Cores:

- In some applications, it may be undesirable to recover humidity from the exhaust air stream. The most common application of this is indoor swimming pools. In cases like this, plate units offer a high efficiency sensible-only option.

CFM Requirements:

- Fixed plate units can typically be designed to run at low CFM ranges and multiple units can be used together to meet high air flow requirements.

Moving Parts:

- Because the media does not move between the air streams, there are few moving components to maintain. This means less downtime and more savings on energy bills.

COMMERCIAL RECOVERY PLATE - DIRECT DRIVE | WPDC

STANDARD FEATURES

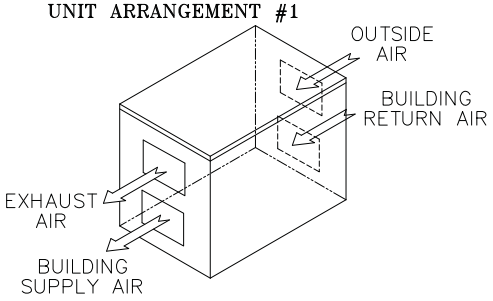
- Durable, 20 ga. galvanized construction
- 100 to 1800 CFM
- Access doors (2)
- 1" rigid duct board insulation
- Indoor applications only
- ODP Electrically Commutated (EC) Motors
  - 3-core configuration uses *DecStar ECM*
- MERV8 filters
- Control input terminal strip
  - Unit ON/OFF and filter switch
- Door interlocking disconnect
- UL listed
- AHRI 1060 certified

AVAILABLE OPTIONS

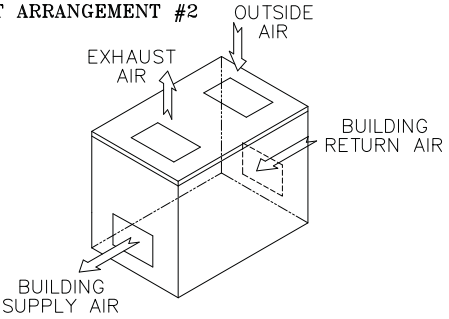
- High efficiency sensible or enthalpy cores
- 1, 2 & 3 core configurations
- Horizontal or horizontal/vertical (top) duct connections
- Multiple defrost options:
  - Exhaust only
  - Exhaust recirculation
  - Electric pre-heat (mounted in inlet hood)
- Supply and exhaust dampers with motors
  - Single phase power; 120/208/240
- Single side access
- MERV13 filters

DUCT ARRANGEMENTS

UNIT ARRANGEMENT #1



UNIT ARRANGEMENT #2



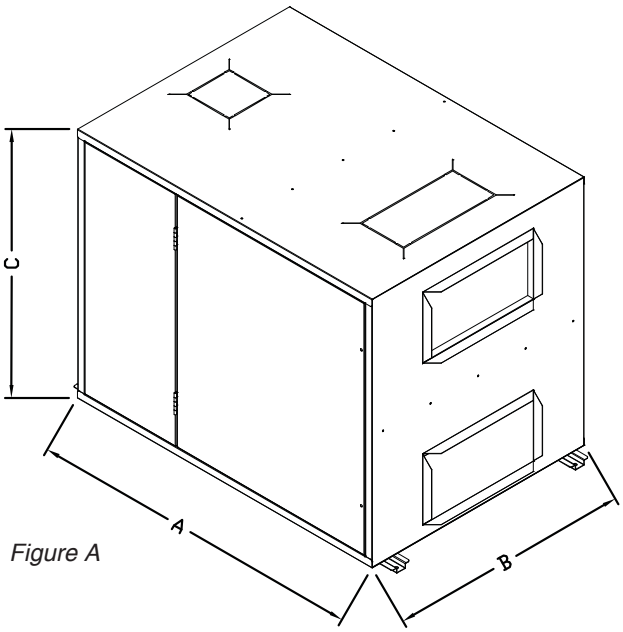


Figure A

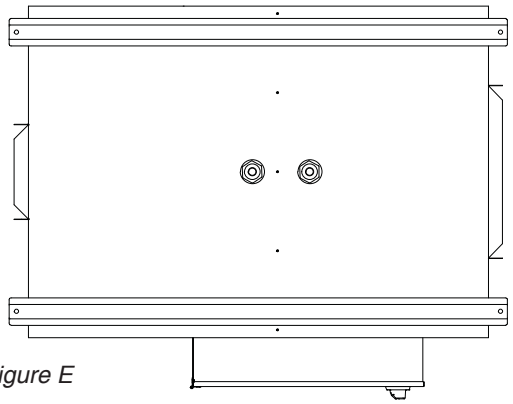


Figure E

Bottom View

Figure A Dimensions						
Size	CFM	# of Cores	A	B	C	Weight
11	100-600	1	46	18.625	34.625	300
12	200-1200	2	48	34.75	38.625	400
13	300-1800	3	57	50.625	42.625	500

Figure B

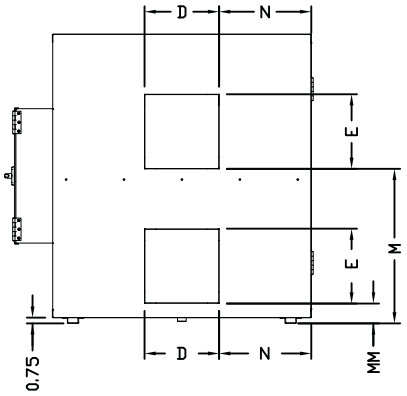


Figure B Dimensions					
Size	D	E	M	N	MM
11	8.5	9.875	18.75	5	2.625
12	9.875	9.875	20.75	12.375	2.625
13	14.75	12.125	22.75	17.875	2.625

Figure C

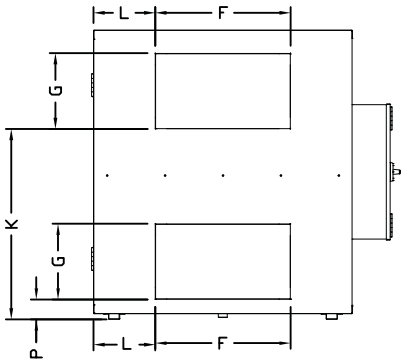


Figure C Dimensions					
Size	F	G	K	L	P
11	8.5	9.875	21.625	5	2.625
12	18	10	25.5	8.25	2.625
13	20	14	25.5	15.25	2.625

Figure D

Top View

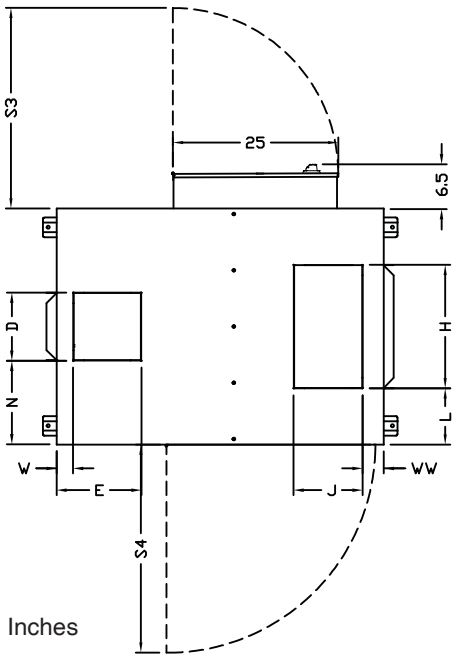
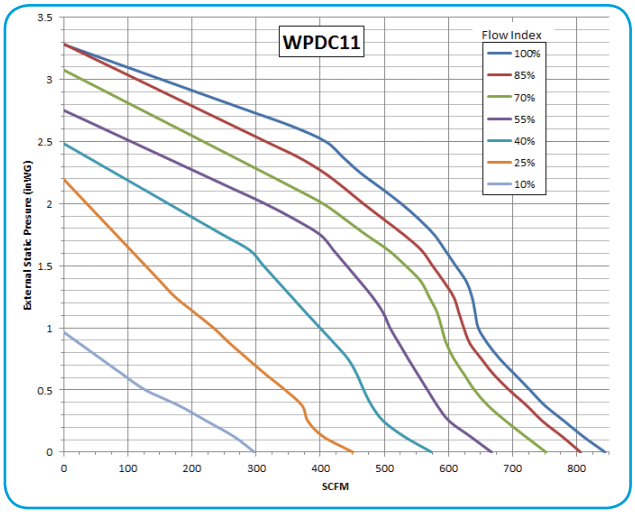
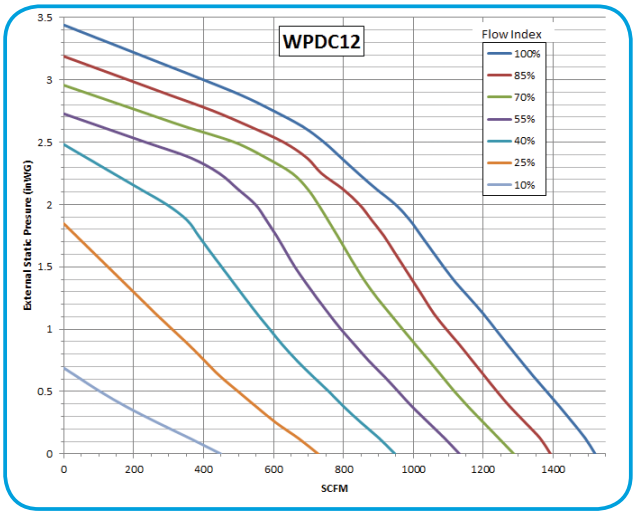


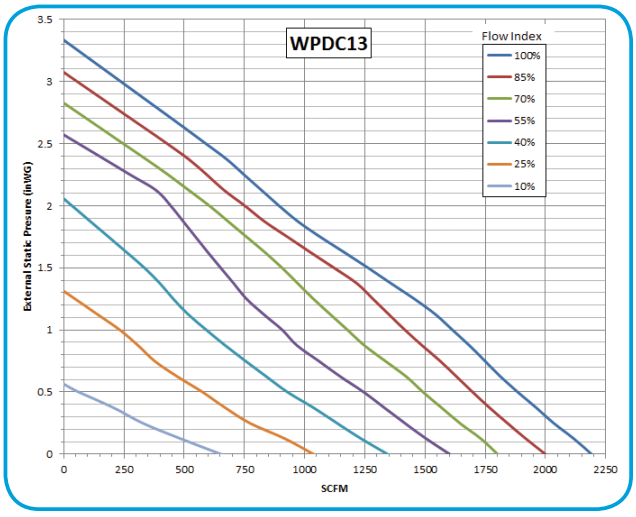
Figure D Dimensions				
Size	W	WW	S3	S4
11	2.5	3.125	32	32
12	2.5	3.125	32	32
13	2.5	3.125	32	36

Note: All sizes in Inches

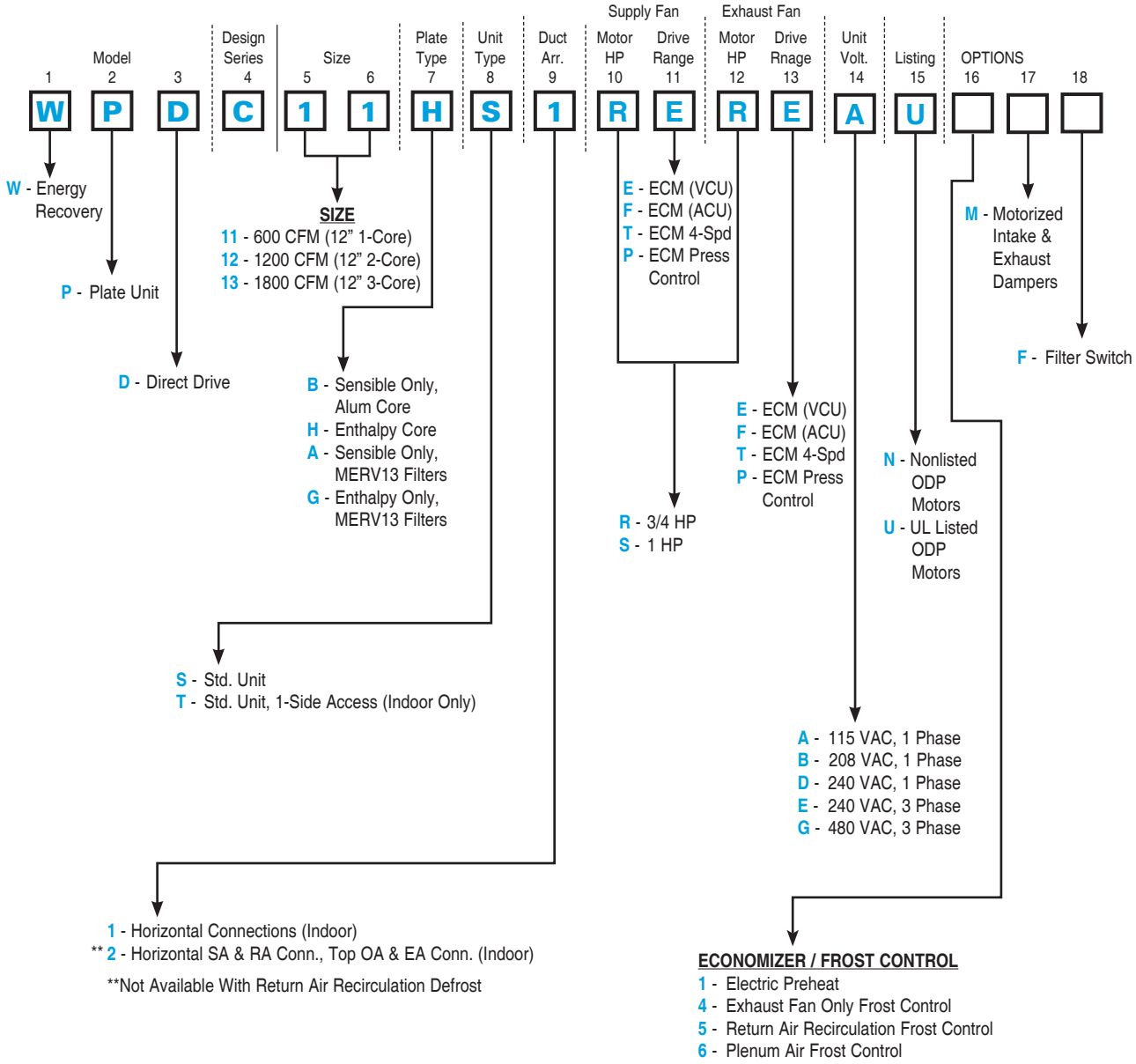
▼ Fan Performances



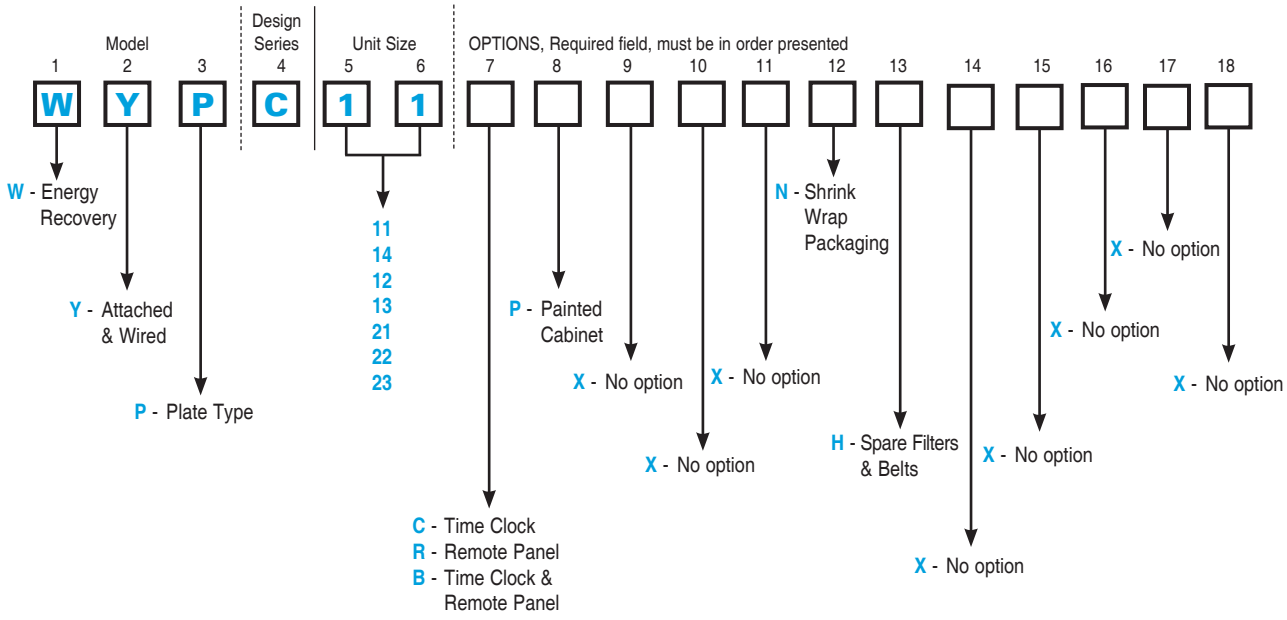




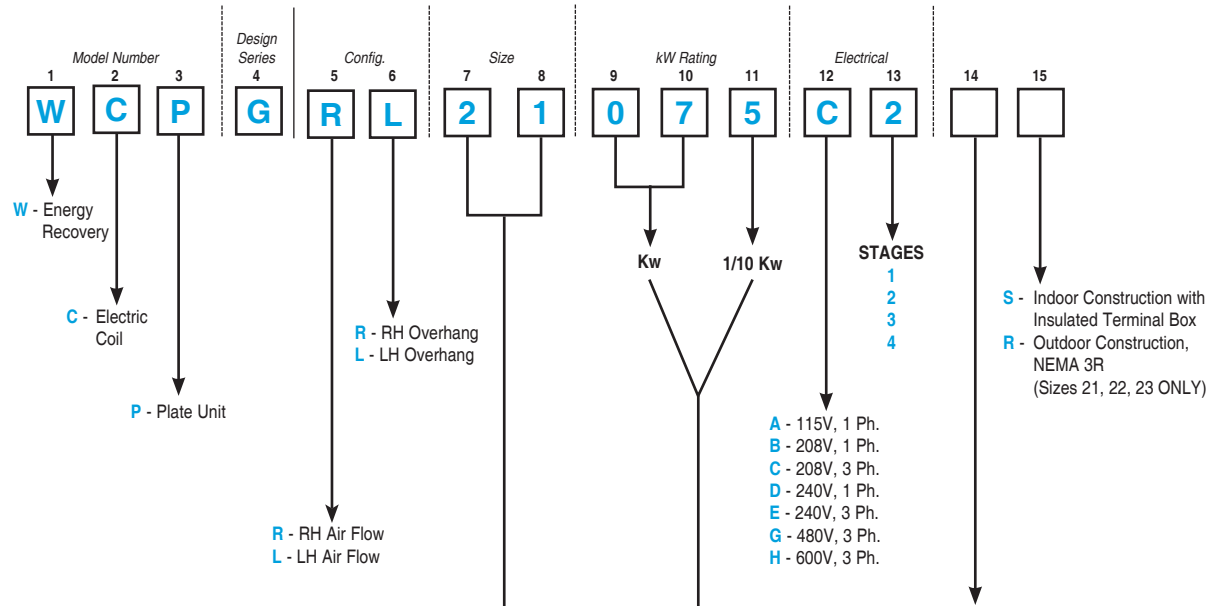
ENERGY RECOVERY VENTILATOR



ENERGY RECOVERY OPTIONAL CONTROLS



ELECTRIC HEATING COIL



Coil Size		Kw Rating		
Code	Size (W x H)	Low	Med	High
11	8.5 x 10	02.0	04.0	07.0
12	18.5 x 10.75	04.0	08.0	14.0
13	20.5 x 14.25	06.0	12.0	21.0
21	15.5 x 17.5	07.5	15.0	26.3
22	24.5 x 15.25	15.0	30.0	52.5
23	38 x 16.5	22.7	45.3	79.3

NOTE:
All coils are slip-in construction, open coil type, horizontal air flow, with door interlocking disconnect, fuses per NEC, 24VAC control.