Digital Scroll Technology & EC Fans

By: Amro Said – Product Manager

Objective

- ActronAir Profile
- ESP Series
- Digital Vertical Package
- Tri-Capacity
- Q & A
Residential

Commercial
The largest Air Cooled Product Range in Australia!

Residential Products
- Residential Air Conditioning
  - Wall Hung
  - Inverter
  - Standard Cycling
  - LSP
  - LSP-SLM
  - ESP
  - ESP PLUS
  - ESP Ultima

Commercial Products
- Commercial Air Conditioning
  - Standard Cycling
  - Vertical Package
  - Tri-Capacity Package
  - Tri-Capacity
- ESP Series
  - Samsung
  - ActronAir

ESP Series

ActronAir
Australian for air conditioning™
Energy Smart Performance (ESP Series)

Sophisticated micro-technology achieves faster, more precise temperature control and energy savings.

ESP Plus's indoor Smart Fan Upgrade gives you advanced air flow control and can save up to 35% on indoor fan power consumption.

ESP Ultima's Individual Zone Control lets you create temperature settings in up to 8 different areas of your home.

EER Vs. Variable Capacity

Information based on Australian standard test in a AS/NZS 3823.1.2 psychometric lab
High Ambient Cooling Capacity

Outdoor Ambient Temperature

Capacity%

35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

ActronAir

Competition D

Information based on Australian standard test in a AS/NZS 3823.1.2 psychometric lab

EC Variable Fan
Award winning innovation for ESP Plus

- AIRAH Achievement Awards
- CoolWorld Awards

Variable Air Flow technology

- Has the intelligence to actually learn the ducting and zoning system?
- Can operate with only one zone on.
- Subject to min air flow of 20%
- Starts and Stops very quietly.
## ActronAir Variable Fan v Std Fan

<table>
<thead>
<tr>
<th>Variable Fan</th>
<th>Standard Fan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airflows as per required Duty.</td>
<td>Excess Supply air when Zoning.</td>
</tr>
<tr>
<td>Superior Energy savings using the EC motor.</td>
<td>Induction Motor is less efficient.</td>
</tr>
<tr>
<td>Reduced Noise levels on start up and zoning.</td>
<td>Noisy when Zoning and on start up.</td>
</tr>
</tbody>
</table>

### Required Air Flow Vs Delivered Air Flow (L/S)

**UPSTAIRS**
- **ZONE 1**: 1000 L/s
- **ZONE 2**: 750 L/s
- **ZONE 3**: 500 L/s
- **ZONE 4**: 250 L/s

**DOWNSTAIRS**
- **ZONE 1**: 250 L/s
- **ZONE 2**: 500 L/s
- **ZONE 3**: 750 L/s
- **ZONE 4**: 1000 L/s

**STANDARD FAN**
- **UPSTAIRS**: 1000 L/s
- **DOWNSTAIRS**: 250 L/s

**ACTRON ECM SMART FAN**
- **UPSTAIRS**: 750 L/s
- **DOWNSTAIRS**: 500 L/s

**SMART FAN DELIVERING THE REQUIRED AIRFLOW**
- **UPSTAIRS**: 750 L/s
- **DOWNSTAIRS**: 500 L/s

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*ActronAir - Australian for air conditioning*
Airflow Requirement

- **250%** OVER BLOWING
- THE REQUIRED AIR FLOW
- **CONVENTIONAL SYSTEM**
- **ACTRONAIR ESP PLUS**

FAN POWER CONSUMPTION

- **20%** ENERGY SAVING
- **85%** ENERGY SAVING

Power (W)

All Zones

- STANDARD FAN
- ACTRON EC FAN

One Zone
An independent energy modeling analysis indicates that annual energy consumption for a 2 story, 4 bedroom brick veneer home in Sydney's west is reduced by up to 60% when using ESP plus as opposed to a comparable conventional system.

The ESP Ultima Home

Configure the system to suit your needs
Variable Air Volume (VAV) Technology for Light Commercial Applications

Master Controller
- Controls system operation, fan speeds and sets master temperature limits

Individual Zone Controller
- Sets temperature for individual zone
- On/Off temperature controls for the zone

Zone Sensor
- Used in conjunction with master controller to improve temperature control

For maximum efficiency, the system has a default maximum temperature span of ±2°C between the master controller and individual zones.

DESIGN ANY COMBINATION

Max Number of sensors is = 16
Product Line-up

<table>
<thead>
<tr>
<th>Net Cooling Capacity</th>
<th>12.5</th>
<th>14.5</th>
<th>16.6</th>
<th>18</th>
<th>19</th>
<th>23</th>
</tr>
</thead>
</table>

Digital Vertical Package
Digital Vertical Package (PMD)

- Operating Range
- Digital Scroll Compressor
- EC Indoor Fan
- Large Condenser Coil
- High Ambient 3 speed condenser fan
- Designed for Australian harsh environment in mind

Product Line-up

<table>
<thead>
<tr>
<th>Total / Gross kW</th>
<th>11.5</th>
<th>16</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Only – R Type</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Reverse Cycle – R Type</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Cooling Only – X Type</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Cycle – X Type</td>
<td>●</td>
<td></td>
<td>●</td>
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</tbody>
</table>
6.2.2 Integrated Energy Efficiency Ratio (IEER).
For equipment covered by this standard, the IEER shall be calculated using test derived data and the following formula.

$$\text{IEER} = (0.020 \cdot A) + (0.617 \cdot B) + (0.238 \cdot C) + (0.125 \cdot D)$$

Where:
- A = EER at 100% net capacity at AHRI standard rating conditions
- B = EER at 75% net capacity and reduced ambient
- C = EER at 50% net capacity and reduced ambient
- D = EER at 25% net capacity and reduced ambient

- A ‘typical’ commercial building air conditioner operates between 60 to 75% capacity most of the time

- This observation is supported by the US calculation for IEER ratings (AHRI 340/360) for commercial ducted systems.
Tri-capacity Compressor Operation

- Designed for improved seasonal efficiency
- 2 compressors 470-700
- 3 compressors for the 820 / 960
- 3 capacity steps of cooling/heating
  ~ 33%, ~67% and 100% capacity

PKY 470 / 700

PKY 820 / 960

Tri-capacity Operation

470 ~ 700
Tri-capacity Operation 820 / 960

- 33% Capacity
- 67% Capacity
- 100% Capacity

ebm-papst EC plug fans and EC HyBlade axial fans
High Efficiency EC Plug Fan

- Delivers improved energy savings utilising:
  - EC motor
  - Non overloading Backward Curved fan.

- Improved performance and efficiency vs. traditional forward curve belt and pulley systems

- Other advantages:
  - Greater flexibility of supply and return air configurations.
  - High Static easily achieved. (Up to 500Pa)
  - Quick ‘dial-up’ air flow adjustment
  - Quiet start up, eliminates sudden start-up noises.

Product Line-up

<table>
<thead>
<tr>
<th>Total / Gross kW</th>
<th>47.0</th>
<th>53.5</th>
<th>63.0</th>
<th>71.0</th>
<th>82.5</th>
<th>96.0</th>
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<tbody>
<tr>
<td>Packaged Unit (PKY)</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Outdoor Unit (CAY)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
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<tr>
<td>Indoor Unit (EVY)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor Unit Low Profile (ELY)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td></td>
</tr>
</tbody>
</table>