S&P presents a new concept

Demand Controlled Ventilation

Up to 55% savings in energy consumption
Reduced CO2 emissions
Improvement of the environment

Efficient Ventilation Systems
Energy is scarce and expensive. One of the principal challenges of manufacturers of all sorts of equipment is to produce devices that are much more efficient, reducing consumption without sacrificing performance.

S&P, a world leader in the ventilation market, has anticipated this future by presenting the Energy Efficient Ventilation System (EEVS) concept.
The **EEVS concept** aims to promote energy savings in ventilation installations. To do this, we propose Demand Controlled Ventilation - DCV, which enables the user to control the performance of their installation, adjusting it to real needs according to use or ambient conditions of the premises to be ventilated. To achieve this, we use low-consumption fans and a wide range of **intelligent elements**: 

- Control elements, speed regulators, frequency inverters
- Presence detectors
- $\text{CO}_2$, temperature and humidity sensors
- Pressure sensors
- Motorised shutters
- Twin flow inlets valves
Saving energy should be a commitment of society as a whole: Government, companies and private individuals. Beyond the Kyoto Protocol, which indicated that the EU should reduce CO2 emissions by 8%, in Soler & Palau we are working to market efficient ventilation products and systems that not only reduce these emissions, but at the same time offer savings both in energy consumption as well as the cost of recycling products.

Cost savings
The increase of energy costs is unstoppable, affecting both the competitiveness of companies as well as private individuals. Manufacturers must clearly work hard to market ever more efficient products that contribute to reduce this economic impact.

Life-cycle cost
A mechanical product, with an average life span of 10 years, has a total life-cycle cost as indicated below:

- Investment: 10%
- Maintenance: 5%
- Operation cost: 85%

It is clear that any action to improve energy efficiency of the products will automatically mean a considerable saving in life-cycle cost.

Recyclability
Using recyclable materials as well as designing products so that major components can be replaced, avoids having to dump tonnes of waste material. This results in lower product costs, and significantly reduces the cost and energy required to process waste.

Compliance with legislation
The European Energy Performance of Buildings Directive proposes savings of over 20% in energy consumption in buildings by 2010. EU countries have carried out or are in the process of making legislative changes to adapt to these requirements, demanding greater energy efficiency while at the same time providing a cleaner and healthier interior atmosphere.

Health and Productivity
It is clear that with this approach, the European Directive, in addition to saving energy, intends to protect people’s health. A healthy work environment also helps to reduce fatigue and sickness in workers, resulting in greater productivity and reduced absenteeism due to illness.
Respect for the environment, a historical responsibility for S&P

Any policy that was not respectful of the environment, would be incompatible with S&P’s philosophy. Our ongoing concern for the environment makes us conscious of the legacy we are leaving for future generations.

Several years ago, S&P achieved ISO-14001 certification for Environmental Management. This reinforces our commitment to caring for the environment by filtering gases emitted, and recycling all liquid and solid waste generated in our production processes. Today, we are still the only company in this sector holding this certification.

Intelligent Ventilation Systems Rational

use of energy

Field experience has shown us that most premises (offices, shops, restaurants, meeting rooms, gyms, etc.), average daily occupancy does not exceed 60%.

S&P have developed a series of solutions under a concept called Demand Controlled Ventilation (DCV), which proposes ventilation systems comprising of fans with electronic and mechanical elements.

Our DCV solutions guarantee that the system uses only the energy required to provide ventilation based on occupancy.

This means a huge saving of energy during the lifetime of the installation.
It has been seen that in commercial offices, average occupancy does not exceed 60%. A traditional ventilation system based on maximum power uses energy unnecessarily. By using an intelligent system of Demand Controlled Ventilation, we can achieve significant savings of energy and money.

**ENERGY SAVINGS WITH DCV VENTILATION**

<table>
<thead>
<tr>
<th>Opening times</th>
<th>Office occupation %</th>
<th>Office occupation (absolute numbers)</th>
<th>Airflow extracted without DCV (m³/h)</th>
<th>Power consumption without DCV (W/h)</th>
<th>Airflow necessary with DCV (m³/h)</th>
<th>Power consumption with DCV (W/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-9</td>
<td>20</td>
<td>16</td>
<td>3.600</td>
<td>1.100</td>
<td>720</td>
<td>220</td>
</tr>
<tr>
<td>9-10</td>
<td>65</td>
<td>52</td>
<td>3.600</td>
<td>1.100</td>
<td>2.340</td>
<td>715</td>
</tr>
<tr>
<td>10-11</td>
<td>95</td>
<td>76</td>
<td>3.600</td>
<td>1.100</td>
<td>3.420</td>
<td>1.045</td>
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<tr>
<td>11-12</td>
<td>80</td>
<td>64</td>
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<td>1.100</td>
<td>2.880</td>
<td>880</td>
</tr>
<tr>
<td>12-13</td>
<td>60</td>
<td>48</td>
<td>3.600</td>
<td>1.100</td>
<td>2.160</td>
<td>660</td>
</tr>
<tr>
<td>13-14</td>
<td>20</td>
<td>16</td>
<td>3.600</td>
<td>1.100</td>
<td>720</td>
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<tr>
<td>14-15</td>
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<td>3.600</td>
<td>1.100</td>
<td>720</td>
<td>220</td>
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<tr>
<td>15-16</td>
<td>60</td>
<td>48</td>
<td>3.600</td>
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<tr>
<td>16-17</td>
<td>60</td>
<td>48</td>
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<td>660</td>
</tr>
<tr>
<td>17-18</td>
<td>60</td>
<td>48</td>
<td>3.600</td>
<td>1.100</td>
<td>2.160</td>
<td>660</td>
</tr>
<tr>
<td>18-19</td>
<td>20</td>
<td>16</td>
<td>3.600</td>
<td>1.100</td>
<td>720</td>
<td>220</td>
</tr>
<tr>
<td>19-20</td>
<td>20</td>
<td>16</td>
<td>3.600</td>
<td>1.100</td>
<td>720</td>
<td>220</td>
</tr>
</tbody>
</table>

**Consumption kW/h DAY**

- **13,2**
- **6,38**

**Consumption kW/h YEAR**

- 50 weeks / year
- **3.300**
- **1.595**

**Reduction of consumption kW/h YEAR by using DCV**

- **1.705**

**SAVINGS (€/year)**

- at a Price of kW/h = 0.093
- **158**

**CO₂ REDUCTION (Kg/year)**

- 1 kW/h = 0,5 Kg of CO₂
- **853**

**SAVINGS (€) Life cycle (10 years)**

- **1.580**

**CO₂ REDUCTION (Kg) Life cycle (10 years)**

- **8.530**

**Graph 1**

A commonly accepted ventilation rate should be at least 12.5 l/s per person, equivalent to 45 m³/h.

If we consider the case of an office (Graph 1) with a maximum capacity of 80 people, occupancy during working hours expressed as a percentage on the vertical axis.
**Economy**

In the case of a small office such as the example below, a DCV system could save up to **17.500 €** in 10 years.

In the case of a small office such as the one in the example, a DCV system could save emissions of up to **95 Tonnes of CO₂** in a 10-year period.

**ECOLOGY**

<table>
<thead>
<tr>
<th>Days</th>
<th>Δ T</th>
<th>Ventilation consumption without DCV (kW/h)</th>
<th>Ventilation consumption with DCV (kW/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANUARY</td>
<td>22</td>
<td>6.336</td>
<td>3.062</td>
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<tr>
<td>FEBRUARY</td>
<td>20</td>
<td>5.760</td>
<td>2.784</td>
</tr>
<tr>
<td>MARCH</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>APRIL</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MAY</td>
<td>22</td>
<td>-10</td>
<td>3.168</td>
</tr>
<tr>
<td>JUNE</td>
<td>21</td>
<td>-10</td>
<td>3.024</td>
</tr>
<tr>
<td>JULY</td>
<td>22</td>
<td>-10</td>
<td>3.168</td>
</tr>
<tr>
<td>AUGUST</td>
<td>8</td>
<td>-10</td>
<td>1.152</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>NOVEMBER</td>
<td>21</td>
<td>20</td>
<td>6.048</td>
</tr>
<tr>
<td>DECEMBER</td>
<td>16</td>
<td>20</td>
<td>4.608</td>
</tr>
</tbody>
</table>

**YEARNLY TOTAL**

Reduction of consumption kW/h YEAR by using DCV

**SAVINGS (€/year)** at a price of kW/h = 0.093

**CO₂ REDUCTION (Kg/year)** 1 kW/h = 0.5 Kg of CO₂

**SAVINGS (€) Life cycle (10 years)**

**CO₂ REDUCTION (Kg) Life cycle (10 years)**
DEMAND CONTROLLED VENTILATION SYSTEMS

Below is a graphic representation of some of the many possibilities of Demand Controlled Ventilation and how the different elements are combined to provide optimum, energy efficient ventilation.

Any of the solutions presented can be implemented with Simple Extract only, Balanced supply and extract, or Heat Recovery systems.
SINGLE-ZONE SYSTEMS

DEMAND CONTROLLED VENTILATION SYSTEMS WITH PRESENCE DETECTION P.I.R.
For use when the presence of people should activate or increase the ventilation system demands.

ON / OFF type
Example: offices or rooms used occasionally.

HOW THE SYSTEM WORKS
The presence of one or more people in the room activates the ventilation system.
When the room is empty the system will return to the previous status.

ADVANTAGES OF THE SYSTEM
The room is only ventilated when occupied.
**SINGLE-ZONE SYSTEMS**

**Minimum / Maximum type**
Example: Offices or rooms used occasionally requiring minimum maintenance ventilation.

- **CPFL** presence detector
- **1-230V**
- **VFTM** frequency inverter
- **1-230V / 3-400V**
- **Three-phase ventilation unit**

**HOW THE SYSTEM WORKS**
The installation will be switched on at minimum power either by a Timer or manually, to provide maintenance ventilation. The presence of one or more people in the room will be identified by the presence Detector, which through a speed control regulator, will increase the fan to maximum speed. When the room is empty the system will return to maintenance status.

**ADVANTAGES OF THE SYSTEM**
Maximum power will only be used when there are people in the room.
SINGLE-ZONE SYSTEMS

DEMAND VENTILATION CONTROL SYSTEMS BY CO₂

Proportional type
For use when the occupation of the premises is variable and the ventilation flow must be regulated according to the occupancy levels. Example: Open plan offices, Meeting rooms, Commercial premises, Cinemas, Restaurants, Public premises.

HOW THE SYSTEM WORKS
The system will be switched on either by a Timer or manually and will ventilate the room at a low occupancy ventilation rate at reduced power. The CO₂ Sensor detects an increase in carbon dioxide levels in the room, the fan speed will be increased as required through an automatic speed controller. Where carbon dioxide levels fall, again the speed controller will adjust the ventilation rate by reducing the fan speed.

ADVANTAGES OF THE SYSTEM
Ventilation will be varied to suit the room occupancy condition thereby providing considerable energy savings over a standard total ventilation.
SINGLE-ZONE SYSTEMS

DEMAND VENTILATION CONTROL SYSTEMS BY RELATIVE HUMIDITY

Proportional type
For use when ventilation needs are conditioned by a variation in relative humidity.
Example: Public baths, gyms, sports centres, etc.

HOW THE SYSTEM WORKS
The ventilation will be activated either by a timer, or manually, and will ventilate the room at minimum power.
When the R.H. Sensor detects increased humidity a signal is sent to speed controller to increase the fan speed. As humidity falls, the fan speed will be reduced by the sensor signaling the speed controller.

ADVANTAGES OF THE SYSTEM
Ventilation, above the minimum maintenance level, will only be activated when the relative humidity in a room exceeds a pre-set level. This provides significant energy savings in comparison to total ventilation systems.
MULTI ZONE SYSTEMS

CONTROLLED VENTILATION SYSTEMS BY PRESENCE DETECTION

Minimum / Maximum type
The idea is to maintain a ducted ventilation system at a fixed pressure, regardless of the airflow moved.
A typical application is an installation with a fan connected to a system of multiple intakes each of which can be open or closed.

Example: Office premises with private closed offices, independent washrooms, etc.

HOW THE SYSTEM WORKS
The system is sized to cater for the maximum airflow, if all offices are occupied. The pressure generated in the system, at the maximum ventilation demand is determined. Each occupied area will be maintained at a minimum ventilation level, determined by ambient conditions. The system will be switched manually, or by a timer.

When the PIR detects the presence of a person in the room, it will signal the twin flow suction inlet, which will fully open. This will create a pressure imbalance in the system, which will be immediately detected by the pressure sensor. This sensor will in turn signal the speed controller to adjust the fan speed to meet the new condition. This procedure will be repeated each time the PIR detects a presence.

ADVANTAGES OF THE SYSTEM
Specific ventilation for each room served by the system using maximum power only when fully occupied. This results in considerable energy saving in comparison to a ventilation system without demand control.
MULTI ZONE SYSTEMS

DEMAND CONTROL VENTILATION SYSTEMS BY CO$_2$

Proportional type
For use in rooms with variable occupancy.

Example: Offices with multiple meeting rooms, hotels with various function rooms, restaurants with several dining rooms, etc.

HOW THE SYSTEM WORKS
The ventilation will be activated either by a timer, or manually, and will ventilate the room at minimum power.
As these are rooms which typically have variable occupancy levels, the sensor will detect the CO$_2$ level created by the number of people present and will send the reading as a digital signal to the Motorized shutter that will open (or close) in proportion to the air volume required. This variation in airflow will cause pressure differences in the system, which in turn will be detected by the pressure sensor. This sensor will in turn signal the speed controller to adjust the fan speed to meet the new condition. This system can also be combined with a minimum ventilation level, independent of room occupancy.

ADVANTAGES OF THE SYSTEM
Ventilation is determined by occupancy levels resulting in significant energy savings in comparison to a total ventilation system.
### SINGLE ZONE

<table>
<thead>
<tr>
<th>OFF - ON</th>
<th>MIN - MAX</th>
<th>PROPORTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE PHASE FAN</td>
<td>SINGLE PHASE FAN</td>
<td>SINGLE PHASE FAN</td>
</tr>
<tr>
<td>PRESENCE DETECTOR CFPL</td>
<td>START (TIMER, MANUAL)</td>
<td>NOT SUPP.</td>
</tr>
<tr>
<td>PRESENCE DETECTOR CFPL</td>
<td>CO₂ (4-20mA) SENSOR</td>
<td>SCO2</td>
</tr>
<tr>
<td>SINGLE PHASE REGULATOR VAPZ</td>
<td>SINGLE PHASE REGULATOR VAPZ</td>
<td>SINGLE PHASE REGULATOR VAPZ</td>
</tr>
<tr>
<td>THREE PHASE FAN</td>
<td>THREE PHASE FAN</td>
<td>THREE PHASE FAN</td>
</tr>
<tr>
<td>PRESENCE DETECTOR CFPL</td>
<td>START (TIMER, MANUAL)</td>
<td>NOT SUPP.</td>
</tr>
<tr>
<td>RELAY</td>
<td>NOT SUPP.</td>
<td>PRESENCE DETECTOR CFPL</td>
</tr>
<tr>
<td>FREQUENCY INVERTER VFTM</td>
<td>FREQUENCY INVERTER VFTM</td>
<td>FREQUENCY INVERTER VFTM</td>
</tr>
<tr>
<td>ECOWATT FAN</td>
<td>ECOWATT FAN</td>
<td>ECOWATT FAN</td>
</tr>
<tr>
<td>PRESENCE DETECTOR CFPL</td>
<td>START (TIMER, MANUAL)</td>
<td>NOT SUPP.</td>
</tr>
<tr>
<td>RELAY</td>
<td>NOT SUPP.</td>
<td>FREQUENCY INVERTER VFTM</td>
</tr>
<tr>
<td>ECOWATT FAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPLICATIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For applications where the presence of people is occasional and a minimum ventilation is required when the premises is empty.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For installations where the presence of people is occasional and a minimum ventilation is required when the premises is empty and the fan will work full speed when someone enters.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For installations where from a minimum ventilation, a proportional increase of airflow is required according to the degree of ambient R.H. or Temperature.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MULTI ZONE

<table>
<thead>
<tr>
<th>MIN / MAX</th>
<th>PROPORTIONAL CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE PHASE FAN</td>
<td>SINGLE PHASE FAN</td>
</tr>
<tr>
<td>START (TIMER, MANUAL)</td>
<td>NOT SUPPLIED</td>
</tr>
<tr>
<td>PRESENCE DETECTOR CFPL</td>
<td>CO₂ SENSOR (4-20mA)</td>
</tr>
<tr>
<td>SHUTTER or TWIN-FLOW INLET RMVT or BM2D</td>
<td>CONTROL MODULE</td>
</tr>
<tr>
<td>PRESSURE SENSOR TDP</td>
<td>PROPORTIONAL SHUTTER</td>
</tr>
<tr>
<td>CONTROL FOR DEMAND CONTROLLED VENTILATION ECOWATT AC CONTROL</td>
<td></td>
</tr>
<tr>
<td>THREE PHASE FAN</td>
<td>THREE PHASE FAN</td>
</tr>
<tr>
<td>START (TIMER, MANUAL)</td>
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<tr>
<td>PRESSURE SENSOR TDP</td>
<td>PRESSURE SENSOR TDP</td>
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<td>FREQUENCY INVERTER VFTM</td>
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<td>ECOWATT FAN</td>
<td>ECOWATT FAN</td>
</tr>
<tr>
<td>START (TIMER, MANUAL)</td>
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</tr>
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<td>PRESSURE SENSOR TDP</td>
<td>PROPORTIONAL SHUTTER</td>
</tr>
<tr>
<td>CONTROL FOR DEMAND CONTROLLED VENTILATION ECOWATT DC CONTROL</td>
<td></td>
</tr>
<tr>
<td>APPLICATIONS</td>
<td></td>
</tr>
<tr>
<td>For installations where separate offices, and occasional presence of people, requiring a minimum level of ventilation when unoccupied, and full power when occupied. In such a multi zone system, it is necessary to maintain a constant pressure in the system.</td>
<td></td>
</tr>
<tr>
<td>For installations where from a minimum ventilation, a proportional increase of airflow is required according to the level of CO₂. In such a multi zone system, it is necessary to maintain a constant pressure in the system.</td>
<td></td>
</tr>
</tbody>
</table>

There may be situations where both applications are required, such as an office building with independent offices and meeting rooms.
Ranges of Ventilation Units for use in Intelligent Demand Controlled Ventilation Systems

- CAB*
- CAB-PLUS
- SLIMBOX
- CENTRIBOX
- CVB-CVT

- CVAB-CVAT*
- CHVB-CHVT
- CVTT
- CVHT

- CVST
- TD-MIXVENT
- TD-ECOWATT
- DIRECT-AIR*
  ILB / ILT

- IRAB / IRAT
- TH-MIXVENT
- MAX-TEMP*
  CTHB/T-CTVB/T
- HCTB-HCTT*

- CRHB-CRHT
- CRVB-CRVT
- HXBR / HXTR
- COMPACT*
  HCFB/T-HCBB/T
  TCFB/T-TCBB/T

*For the series marked with an asterisk, it is necessary to order a specific version of motor E-22.