

# AutoVent 2™

## Advanced Greenhouse Control

### Description

An advanced environmental controller that utilizes environmental data including internal and external environmental conditions. The user then establishes what the ideal environment is to be and the controller actively works to achieve this.

The controller has many inbuilt features that don't require expensive upgrades or typically additional modules. All controllers are 'Plug & Play' and our experienced team can easily remotely support any questions the grower may have.



Users can enable and force any Function operation directly from unit

Changes in all settings can be affected from control unit

Users can scroll through settings and view current status of the environment

Robust IP 67 Splash resistant case with liquid crystal digital display of all readings and settings

### Advantages to the Grower

The AutoVent 2™ will expertly manage the environment to optimize it for your plants, this can:

- Increase fruit set and/or flower quality
- Create fewer stressed and vulnerable plants
- Provide the grower flexibility in control
- Protect vents from damage when the grower is absent
- Provide peace of mind when not on site

### Remote Monitoring & Alarms

The AutoVent 2™ has an inbuilt alarms that provide an audible sound on the control unit. In addition when connected to a PC the system will dial out via the computers modem and advise the growers nominated number that an alarm threshold has been breached.

**Applications**  
Medium to large environments

### AutoVent 2™ Controls

Roof & Side vents  
Thermal Screens (1)  
Shade Screens (1)  
Fogging/Misting  
Lighting<sup>+</sup>  
Heater  
Stir Fans (2)  
CO2 Injector<sup>+</sup>

### AutoVent 2™ Monitors

Relative Humidity\*  
Temperature\*  
Solar Radiation\*  
Rainfall  
Rain volume  
Wind speed  
Wind Direction  
Carbon Dioxide\*  
Pipe Temperature\*

\*Inside & Outside Structure  
+ Optional

### Special Features

Air Conditioner Output  
Lighting Multitask  
6 Zone Fogging/Misting  
CO2 Injection  
1-25 Additional  
Temperature Sensors to  
monitor other areas

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### Technical Specifications

#### Environment Sensors

1-4 Aspirated	Relative Humidity*
Rain sense & volume	Temperature*
Solar radiation*	Wind speed & direction
Pipe temperature	CO2 ppm

\*inside & outside greenhouse

#### Outputs Controlled

\*Optional

CO2 Injector*	Stir Fans (2 banks)
Lighting*	Heater unit
Fogging/Misting 1-6 Zones	Side & Roof Vents
Shade Screens (1 bank)	Thermal Screens (1 Bank)
Outputs	24vAC
Stir Fans	0-2 bank temperature and/or relative humidity
Heating	Proportional control uses 24vAC or 0-10v signals to position mixing valve
Fogging/Misting	1 Zone inbuilt. 2-6 Zones add output module
Lighting	3 Banks. Supplemental, accumulated top up or daylight extension. Requires output module
CO2	Electronic sensor
Shade Screens	2 banks. Control solar/relative humidity/time of day and/or temperature
PC Communication	PC Can be up to 1.2km from unit. Requires data cable. Preferably Cat 5E Stranded 4 pair twisted
System Reports	Exports CSV files. Monthly summary with max, min and average of all measured variables. Boiler run time and solar radiation total
Alarms	Contact closure on unit to sound alarm and audible on unit. Sound card activation on PC and Dial out via modem if activated
Electrical	Power 115/230v AC, 50/60Hz, 50Va
Physical	Weight 5.5kg

16 Manual Switch Controls

### Venting

The AutoVent 2 can control the roof and side vents on most types of greenhouse including gull-wing, saw-tooth and side vented. The venting algorithm will try to control both temperature AND relative humidity. If heating is available then this will also be used to try to control humidity.

The roof venting uses an intelligent algorithm to adjust the nudge size taking into account present roof position, size of error, rate of error change, differential temperature (inside – outside) and wind effect. Thus, if the vents are closed and the outside temperature is low any call to open the vents will produce a very small nudge of the leeward vent. On the other hand, if the outside temperature is warm with little wind then a larger nudge open will occur.

The variable speed exhaust operates at a small (user settable) differential above the normal set point so that if the normal setpoint is not achieved the exhaust fans come on to assist.

The vents of gull-wing or Venlo style houses operate taking into account the wind from each side. Wind approaching from an angle to a vent is factored so that only the component at right angles to the vent is taken into account. When wind speed increases the windward vent will close first followed by the leeward vent. In the case of saw-tooth roofs, the leading vent (vent 1) will close first followed by the intermediate vents (vent 2).

### Heating

Air heating can be by either proportional control or ON/OFF control. Proportional control is normally used in conjunction with a boiler heating water pipes. This provides a very gentle heat and the heating pipes can be positioned either under the grow beds or between the rows of plants. In this way less heat need be supplied as compared with general warm-air heating. Water pipe heating is gentle, economical and avoids sudden drying of the air.

The heating is used to control both the temperature and the relative humidity.

### Time Zones

Up to four time zones may be selected together with the possibility of pre-dawn heating to give a very detailed temperature profile. At the boundaries between time zones, temperature ramp-rates may be specified which cause the controller to ensure gradual changes of temperature from zone to zone. The PC software provides a mimic diagram which clearly shows both the venting and heating profiles to assist the grower in setting the system for optimum performance.

### Humidity Control

Humidity is controlled by varying the heating and venting temperature set points, by switching on stirring fans, by fogging and, in extreme conditions, by purging. Temperature set points are varied, within user-set limits, in order to open the vents to try to open the vents to allow excess humidity to escape or close them in order to try to retain humidity from transpiration. Within a user-set "proportional range" this effect is progressive. Outside the proportional range the effect will be at one of the user-set

limits. Again, the Compugrow software assists the grower in optimizing these settings by providing graphical interpretation of settings in real time.

### Purging

Two purging regimes are possible. First is the "cyclic purge" which can be enabled by the grower to crack the vents periodically whenever they are closed. This has the effect of allowing an air change in order to release trapped humidity and also introduce CO<sub>2</sub> from the outside.

The second method is one set by the grower to only be invoked when the humidity is excessive. When active this has the effect of raising the heating temperature and periodically nudging open a vent to allow the warm moist air to escape. The fresh air entering is warmed by the raised heating temperature (which tends to dry it further) but gradually the transpiring crop will raise the humidity until the vents are again nudged open.

### Fogging

Fogging may be used to assist with cooling or to increase humidity in dry weather. Two outputs are used; one that comes on constantly while three puffs of fog are emitted and a second that pulses on for short periods to inject the puffs of fog. This function may also be used with high or low pressure fogging systems. After each three puffs of fog, there is a fixed 5 minute detent before it can fog again.

### Stirring fans

A single stage of stirring is provided. This is normally set to come on whenever the vents are closed, when humidity is excessive or when injecting CO<sub>2</sub>. It may be disabled during fogging if desired

### Shading

Shading is available only in houses having less than two side wall vents. (Output S2 is used). It operates to maintain the light level below a user set maximum. If the maximum light level is exceeded it will start to close immediately, but once closed requires the light to remain below the set point for at least the time specified by the user.

### Optional CO<sub>2</sub>

CO<sub>2</sub> is measured and injected providing 1) there is sufficient light or 2) the vents are below a set limit. The user may specify any desired level of CO<sub>2</sub> from 0 to 2000ppm and the system will try to provide this when the above conditions are satisfied. It may be set to only operate during certain time zones.

**Optional Lighting** By adding a low cost output expander module, up to three banks or lights may be added.

### PC interface

The optional PC interface allows the settings to be viewed and set from the user-friendly CompuGrow software. It also facilitates the collection of measured data and events from the controller for logging to the hard drive whence it may be displayed graphically for ease of interpretation. The computer interface also allows for alarms to sound at the PC (via the PC sound card) or even be auto-dialled out to a telephone or pager (via the PC MODEM).