

# IntelliClimate

## Installation and user guide

### For louvre style enviro sensor

## The intelligent climate controller

- **USB connection to PC**
- **Advanced software supplied as standard**
- **Integrated control of all grow room parameters**
  - 2 banks of lights
  - cooling fan
  - second cooling fan or aircon
  - heater
  - dehumidifier
  - humidifier (or fogger)
  - CO2 injection
- **Measurement of all relevant grow room parameters**
  - Air temperature
  - Relative Humidity
  - Light level
  - Second sensor set optional
  - CO2 level (0..5000ppm) optional
  - Outside temperature (optional)
  - Intruder detect
  - Lamp over-temperature detect (optional)
- **Extensive fail-safe features**
- **Settings can be scheduled to automatically change to match plant growth stage**
- **Autolearn – self learning automatically adjust CO2 cycle times to minimise wastage**



## Compliance Declaration - International regulations and codes



**This equipment is designed for commercial use and complies with the following regulatory codes:-**

### USA

#### Compliance with FCC Part 15 Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Autogrow Systems Ltd could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

### Europe

**This product has been tested and found to comply with EC requirements for commercial equipment and carries the CE mark**

Radiated Emissions	EN55022 Class A
Conducted Emissions	EN55022 Class A
ESD	EN61000-4-2 (IEC 801-2)
Radiated Immunity	EN61000-4-3 ENV50204 (IEC 801-3) EN55024

### Australasia

**This product has been tested and found to comply with C-tick requirements for commercial equipment EN55022 (CISPR 22) Class A**

### RoHS

**This product is free from lead and other heavy metals**

Although this product is exempt from the RoHS regulations as it is classified as Category 9 Monitoring and control Instrument it is nevertheless made with RoHS compliant components and assembled using lead free solder.

Even so, it should be recycled at the end of its life and it may be returned to the distributors in your region for recycling or safe disposal.

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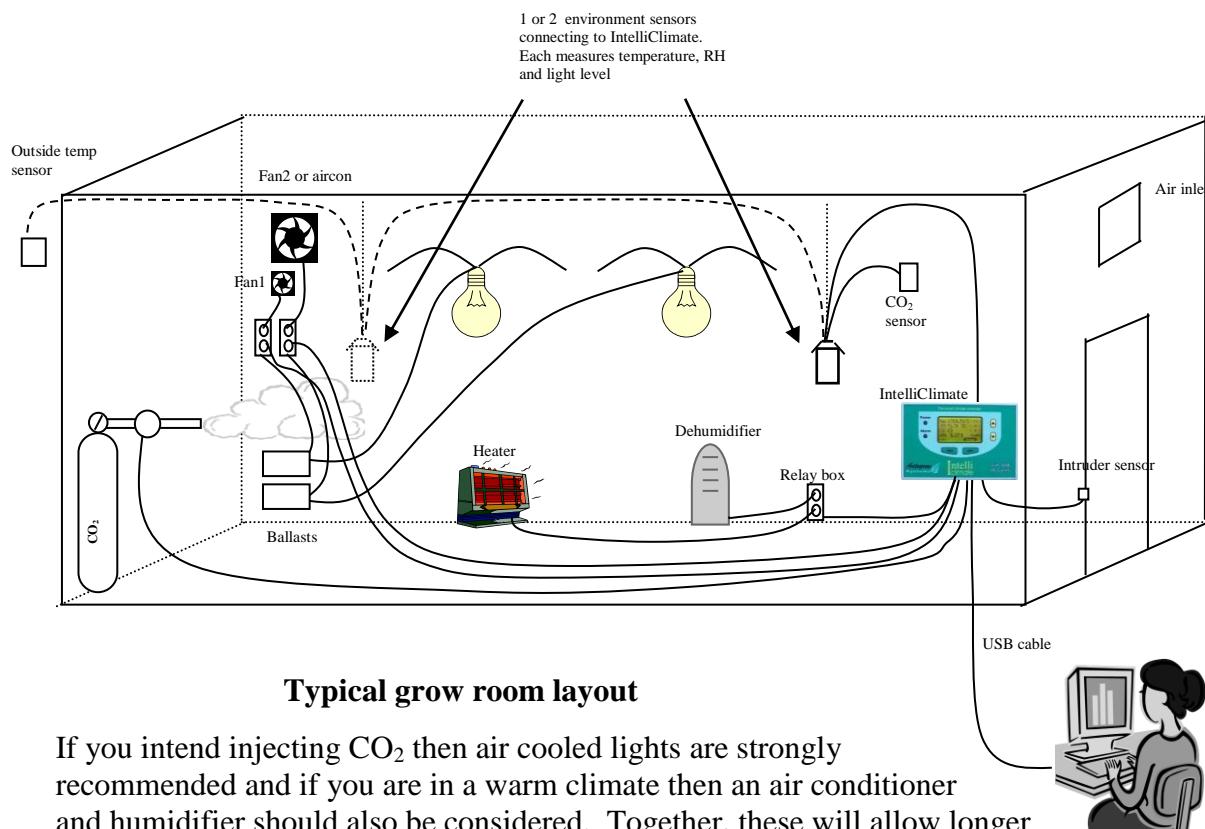
*Disclaimer:- Suggested settings are made in good faith and with care and consideration. However, Autogrow can accept no responsibility for the accuracy or appropriateness of suggestions or the outcome resulting from their use.*

# Quick-start

**This is not a substitute** for reading the relevant sections of the manual but is included to emphasise some important and useful points.

If the grow room is to be operated at high humidities for long periods (eg during cutting stage) it is preferable to mount the controller outside the growroom. This is easily done as the grow room sensors are supplied with a long 5m (15ft) cable and if necessary this can be replaced with a longer cable. If this is done then proper data cable such as CAT5 computer network cable should be used. This should be stranded cable (rather than solid core) to avoid breakages.

Note that one sensor unit (to measure temperature, RH and light) is supplied as standard and a second optional sensor unit may be attached. This is useful in larger grow rooms or where increased security is required. Control will normally be based on the average readings from the two sensors but should one sensor fail, control will automatically revert to the working sensor. The optional outside temperature sensor is useful in very cold and very warm climates.



## Typical grow room layout

If you intend injecting CO<sub>2</sub> then air cooled lights are strongly recommended and if you are in a warm climate then an air conditioner and humidifier should also be considered. Together, these will allow longer periods of CO<sub>2</sub> injection to occur without the need to vent the room and this will lead to significant improvement in growth rates with lower use of expensive CO<sub>2</sub>.

**SAFETY NOTE:** If you do inject CO<sub>2</sub> into the grow room always do the following before entering.

- 1) Disable CO<sub>2</sub>
- 2) Force on fans
- 3) Leave door open whilst inside

### **Some notes on PCs and Software**

The PC connecting via USB to the IntelliClimate and/or IntelliDose must not be allowed to go into standby or hibernation mode. If it does, then when it is woken up, the USB connection will not be re-enabled and IntelliGrow will have to be shut down and restarted. This can normally be prevented by right clicking on the desktop and then going into Display Properties/ScreenSaver and clicking the Power button. Then set Standby and Hibernate to “Always On” when connected to mains power (do not disable these when running on batteries). You may leave the screen saver working as normal or you may set it to switch off the LCD screen.

If you ever find that the USB communications fails to communicate it may be necessary to either shut down and then restart IntelliGrow or to briefly remove and then replace the USB connector to that controller at either end. This will normally restart the Windows USB drivers which can sometimes get out of step.

It has been found that some older PCs running W2000 or older, may occasionally go off line when a long USB cable is used. In this case either use a short cable (less than 2m or 6ft) or else an “active” USB cable. The active cables may be 5m(15ft) or more long. For longer runs you should be able to use a “USB extender” that will allow you to cable up to 50m or 150ft. This electrical noise problem can also happen when using a large number of low cost high power electronic ballasts. Some early models of digital ballasts released onto the market did not conform to normal electromagnetic radiation standards.

When installing software it may be necessary to temporarily turn off your virus checker and/or firewall if you get an error message when the installer tries to copy into the program files folder

## Section A - Introduction to the IntelliClimate™ grow room controller

The IntelliClimate is, without doubt, the most advanced and user friendly grow room environment controller on the market. It has a wide range of possible applications which we will discuss briefly in this section. In order to keep the user interface as simple as possible, only the readings and settings relevant to the selected features are displayed on the controllers LCD and on the PC computer. To add extra features you have to select them by going into the configure menus on either the controller or the PC.

### **Features**

A full specification is attached as appendix 1. Here we will review the main features available to you. Remember, to enable any feature mentioned you will need to go into the configuration menus on either the controller or PC to select them. When the controller is supplied it is normally pre-set as a simple fan cooled environment controller with CO<sub>2</sub> injection disabled.

The controller can operate in a number of modes ranging from a simple cycle timed mode to a sophisticated system that makes optimal use of a range of attached equipment. After installing the unit, you need to enter the configuration section and select (check) all the equipment that you have connected. Once the controller knows what you have attached to it, it will automatically select the most appropriate mode of operation.

**Lighting.** The controller can switch two light banks. It is always a good idea to split your lights into two groups. Firstly, when using both banks together, it allows the controller to stagger the switch on times so that the power surge from the first bank has subsided by the time the second bank comes on. Secondly, during the vegetative phase of growth, the lights are on for longer periods (18hours) but a lower intensity may be used. The controller has the ability to switch on one bank and alternate the banks each day. This ensures that the plants receive light from both sides. If, when one bank is turned on, the light sensor detects a low light level the controller assumes that that bank is out of action (bulb blown) and automatically switches on the other bank. If alarms are enabled, then it will alert you to the fact that a light has failed. Similarly, if a power failure occurs, the controller has a settable detent before bringing the lights back on in stages. This is extremely useful when you have more than one grow room as all the lights can be sequenced to come on one by one to avoid a huge power surge. In addition, the controller automatically checks the duration of the power outage and ensures that minimum cool down periods are complied with. This has a significant impact on lamp life.

For those using air cooled lights, it is possible to fit small over-temperature cut-offs to avoid them overheating if the cooling fans should ever fail.

*Hint:- fit the cooling fan to blow air through the light fittings rather than suck out the hot air. This way the fans run cooler and last a lot longer.*

**Fans.** The fans may be used for cooling, humidity reduction, air changes and to bring in ambient CO<sub>2</sub> (if CO<sub>2</sub> injection is not used at that time). During the day when CO<sub>2</sub> is being injected, other means to control temperature or humidity will be used in

preference to the fans which will only be used to force an occasional air change and provide a fail safe in the event that the aircon or dehumidifier fails. For simple systems that have CO<sub>2</sub> injection but do not have aircon or dehumidification, the controller will operate as a cycle timer system with three timed phases 1) fans on, 2) fans off, inject CO<sub>2</sub> and 3) stop injecting CO<sub>2</sub> and wait while plants absorb CO<sub>2</sub> then repeat cycle. In this mode the controller will self adjust the timings if it finds that CO<sub>2</sub> is being wasted due to the fans being forced on by heat or humidity build up before the plants have time to use the CO<sub>2</sub>. If this situation is too bad it will stop injecting CO<sub>2</sub> and will revert to maximum venting (within temperature limits) to bring in as much ambient CO<sub>2</sub> as possible.

**Humidifier or fogger.** This output can drive either a standard fan based fogger or ultrasonic humidifier or alternatively, a nozzle type fogger. When humidifier is selected the function is very simple with the humidifier coming on when the humidity is too low and going off when it is satisfactory. In the case of the fogger selection, the operation is similar except when it is calling for humidification the output is pulsed on and off producing small puffs of fog and allowing time for each puff to dissipate before the next.

**Heater, Dehumidifier, and CO<sub>2</sub>.** The purpose and function of these devices is self explanatory and they will all work to keep the temperature, humidity and CO<sub>2</sub> close to the settings. In the advanced settings you will also find switching offsets settings for each device that allow you to set the offset from the main setting at which it will turn on and another offset at which it will turn off. Although these come preset to typical values that will avoid excessive overshoot or rapid cycling in most grow rooms it is possible for the user to customise them to achieve optimal performance.

#### ***PC interface***

A USB cable and IntelliGrow™ software are supplied with the IntelliClimate. You have a license to use this software on a single computer and you are permitted to download upgrades at no cost from the Autogrow web site [www.autogrow.com](http://www.autogrow.com) as they become available. The software will support multiple controllers which may be any combination of IntelliClimate(USB) and/or IntelliClimate(USB) controllers.

#### ***Selection of units***

You may select either degrees C or degrees F for temperature. CO<sub>2</sub> concentration is measured in ppm and for the more advanced user VPD is measured in kPa/m<sup>2</sup>. The date format is selectable between mm/dd/yy and dd/mm/yy formats.

#### ***Fail safe operation***

This controller has many fail safe functions built in and we have already mentioned some above. There are fail safes that will force on the fans if the air con or dehumidifier fail, others that will stop the CO<sub>2</sub> if the door is opened (if intruder alarm fitted) and others that will switch over lights if a bulb fails or switch off lighting if the air cooled shades overheat. If CO<sub>2</sub> should run out or stop working, the controller will detect this and revert to maximising the intake of ambient CO<sub>2</sub>. These are in addition to the power-fail light-on sequencing

### ***Advanced settings and rules***

These settings and rules are preset to typical values that will suit the majority of grow rooms, however, expert users may wish to alter them to achieve optimal performance. Note that the advanced settings are only accessible via the PC and are not available from the controller LCD menu system. If these are ever changed and the operation of the controller becomes incorrect, there is a button at the bottom of the screen which can be used to return the advanced settings to the factory default state.

### ***Alarms***

The alarms can be enabled to operate on the controller buzzer, the PC via its sound card and even make a telephone call via the PC modem. Each of these can be silenced or enabled. Any enabled alarm will sound when a relevant reading deviates outside user set limits. For humour, we have a selection of alarm sounds including regular, fun and adult. These can be selected on the PC under setup.

### ***Outputs***

The outputs voltages for dosing and irrigation control are all dependent on the power supply adapter used. A 24V DC power is normally provided with the unit in which case all outputs will be 24V DC.

### ***Power supply***

The controller requires a power supply between 12V and 24V either AC or DC. Whatever power is applied will appear at the outputs (when they are ON). The default power adapter included with this controller is 24V DC which is compatible with the relay boxes and power relays that we have available. This power supply has a universal input voltage from 100V to 240V 50/60Hz. Note that the controller outputs of are limited to a current of 1.2A (inductive) and 3A (resistive) load. The power supply should be sized according to the maximum load that can be applied at any one time. The maximum total draw at any one time should not exceed 4A. Normally we supply a universal input (any voltage and frequency within wide limits), 24V DC output power supply but this could be changed in the future or by request.

### ***How to use this manual***

The IntelliClimate has a number of advanced modes of operation and so we have divided this manual into sections, each of which represents a particular feature. For installation advice, go to the installation section at the back of this manual. And then start by reading sections B and C.

### ***Getting Started.***

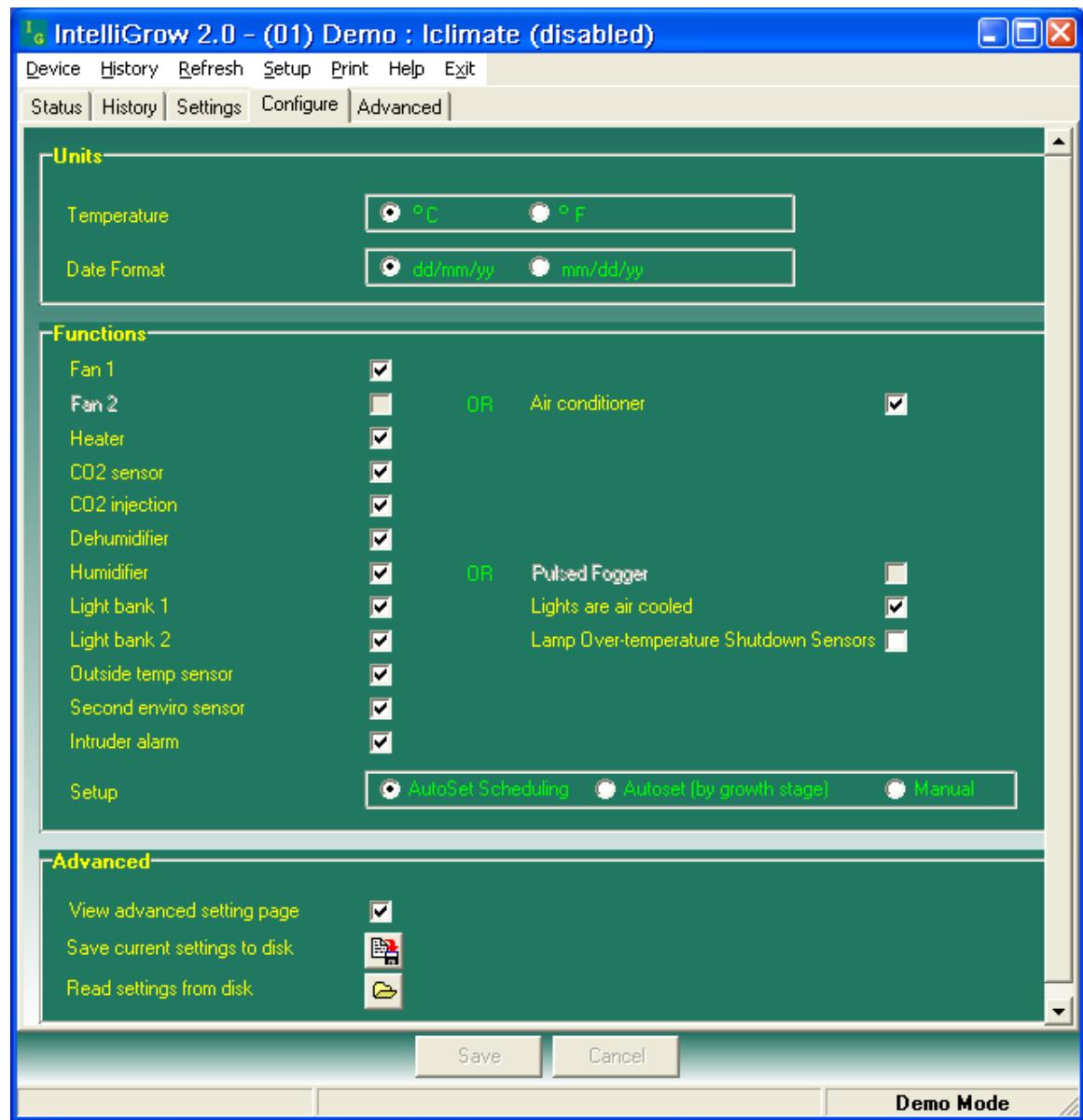
Follow the installation instructions in the installation section and when everything is installed and connected up do the following.

Switch on the power. Check that the power light on the front panel is on and that the LCD display has some information on it. Install the software on your PCs hard drive. To do this, follow the instruction in section **I** of this manual.

Once installed, execute the IntelliGrow software in the usual way.

If you have more than one new controller, connect their USB cables one-at-a-time and when the software asks, provide the requested information. For new or replacement controllers you will be asked which grow room it is in and to give the controller a name. Use a short meaningful name like Doser1, Climate2 etc then if you ever add

another controller it will be obvious which is which. Once this has been done you will see readings from the controller appear on the PC screen showing that communication has been established successfully.

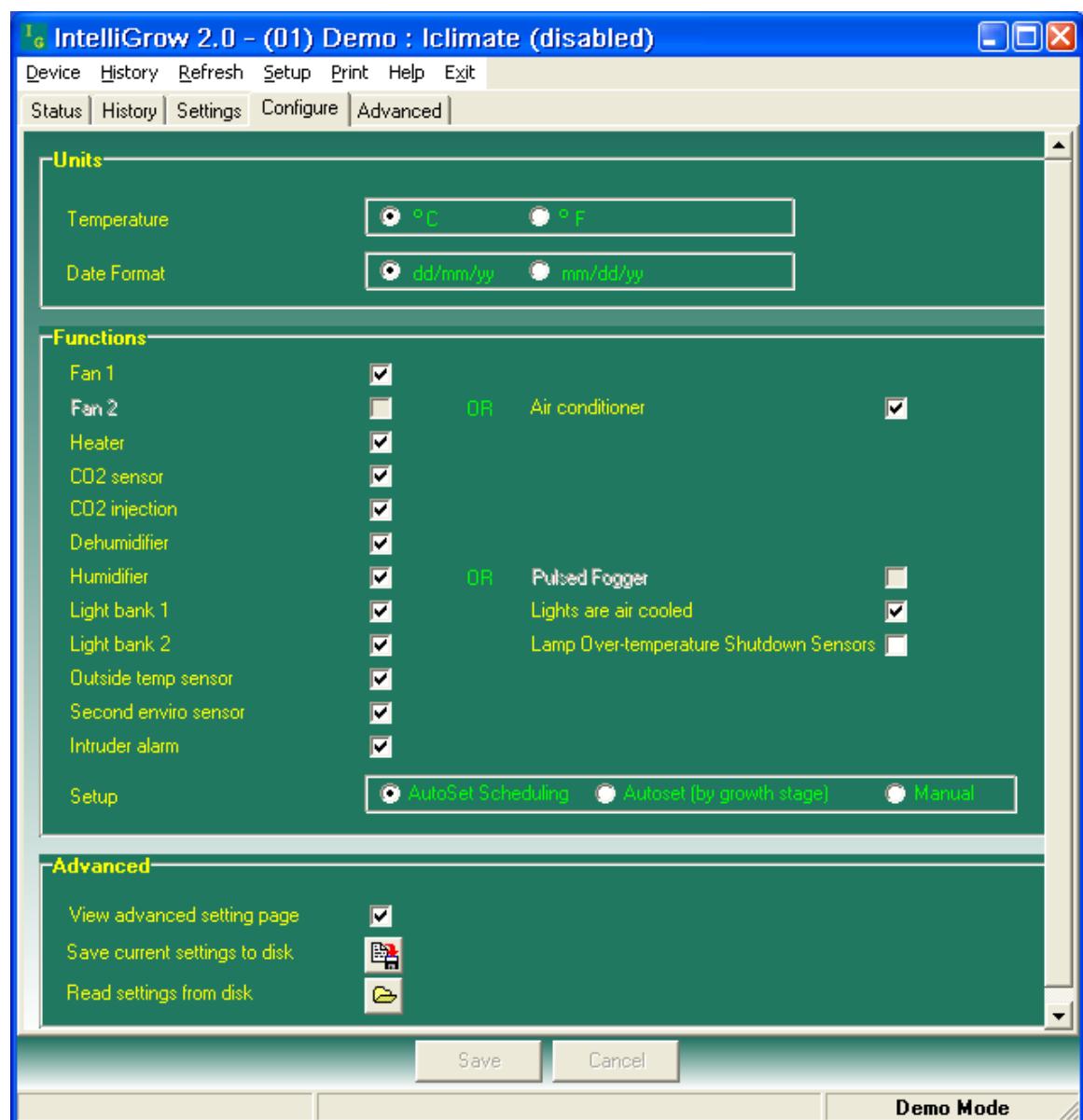


## Section B – PC software overview

### Configuration

The configuration settings are shown below and as you will see, most are self-explanatory. In the first group you can select the units that you prefer.

The next section “functions” required a little explanation. Here you need to check all devices that you have installed. Notice that some devices share one output and so you can only select one or the other. The software enforces this and when one is selected the other is automatically “greyed out”. If you want to select the greyed device, you must de-select the other one first.



Remember that after changing any settings you must click the save button at the bottom to send them to the controller.

Once you have selected all of the installed and working devices you can select whether you want to use autoset(scheduling), autoset(growth stage) or manual settings. We will discuss each of these in turn:

### **Autoset (Scheduling)**

If this is selected a table will appear on the settings tab. Here you can choose to read in a schedule from disk. This could be a ready made schedule or one that you or a friend have previously created and saved to disk. Alternatively, you can create a schedule from scratch and then save this for future use.

The idea of a schedule is that you can preload a typical growing sequence so that the environment automatically changes to match the requirements of the crop. Each line in the table is specified by a day number (and date) and specifies the settings required. These settings stay in effect until the date of the next line has been reached. For instance, you will probably start you new plantlets with a high humidity, a single (alternating) light for 18 hours per day and with a relatively low CO<sub>2</sub> level of say 500ppm. Then every two days you will set the schedule to automatically lower the RH a little and raise the CO<sub>2</sub>. During the first week or so you may also have a day/night temperature drop of 5 or 6 degrees. Then after that you may want to reduce the night drop for a week or two to help prevent too much stretch and produce shrubby plants. All this and more can be entered into the schedule so that the environment exactly matches the growth stage of the crop. If plant growth is slower or faster than expected it only takes a few minutes to modify the schedule.

Lines can be added or deleted from anywhere in a schedule by clicking on the **+** or **X** symbols at the top which makes for very simple editing whenever changes are needed.

Note that the schedule is stored on the PC and so changes will only come into effect if the PC is connected to the controller. If not connected, the settings will be updated as soon as the PC is reconnected to the controller on, or after, the date of the change specified.

### **Autoset(growth stage)**

This function can be used to set the controller approximately to the correct fixed settings for any particular stage of growth. Once set the settings will stay at those values until they are changed. If Autoset is selected a “growth stage” selector box appears on the status tab. In this you select from a list of growth stages and the setting will automatically adjust . The selector box will continue to show the growth stage selected but if you edit any setting then the selector box label will change to “user defined”

## **Manual settings**

This allows you to enter fixed settings just like in “the good ole days”

## **Advanced settings and rules**

These settings and rules are preset to typical values that will suit the majority of grow rooms, however, expert users may wish to alter them to achieve optimal performance.

### **Switching offsets**

This group of advanced settings refers to the exact point at which a device is switched on or off. The idea is to always have a small differential between the switch ON point and OFF point to avoid device switching on/off too rapidly as this would cause unnecessary wear on the relays and output devices. The switching offsets are also useful to avoid overshoots that invariably occurs when a heater or CO2 is switched off.

We will look at each setting in turn and make suggestions for initial settings which will normally be pre-programmed in when the unit is manufactured. After observing your grow room operating you may decide to change some settings slightly.

**Fans ON (+0.2C) OFF(-0.8C)** This setting applies to both fans (if two installed), the second fan coming on after the first has been on for two minutes and temperature is still above the ON point. Note that reducing the difference between ON and OFF will result in the fans switching ON/OFF more often with increased wear to both the fans and the relays.

**AirCon ON (+0.2C) OFF(-0.8C)** This is the same as for the fans. Note that auto switching from Fans to aircon has a separate rule. Normally, this rule will be to switch over to aircon at say +2C. Once in aircon mode it will stay there until the next time zone or if the temperature falls below the heater ON temp.

**Heater ON(-1.5C) OFF(-0.5C)** This gives a buffer of 0.7C between the heater going OFF and the Fan coming on. This may need to be increased a little if it is ever observed that the fan comes on soon after the heater going off.

### **Humidifier ON(-10%) OFF(-2%)**

**Dehumidifier ON(+10%) OFF(+2%)** These settings give a difference of 12% RH between one device switching off and the other switching ON. This may need to be increased if you find one switching on soon after the other has switched off

**CO<sub>2</sub> ON( -200ppm) OFF(-100ppm)** This means that the CO<sub>2</sub> will switch on when it falls below 200ppm under the setpoint and will switch off as soon as it exceeds 100ppm below the setpoint. The reason for switching off before the setpoint is reached is that there is always some overshoot with CO<sub>2</sub>. Depending on your exact setup you may need to alter this to achieve what you desire.

## Advanced Rules

Each rule is listed below with a brief description and a suggested initial value

### **Heater inhibit**

*When changing from night to day prevent heater for switching on for 15 minutes.* We know that when the lights come on the grow room will warm up quickly so we prevent the heater from coming on just before the lights will come on.

### **Minimum air change rules**

*Force fan ON for Day: 2 mins 0 secs every 1 hrs 30mins*  
*Night: 0 mins 30 secs every 4 hrs 0 mins*

This will force an air change if the fans have not been operating for other reasons.

This will expel humid stale smelly air and bring in ambient CO<sub>2</sub>. You may want to change these settings between winter and summer.

*Allow minimum air change while aircon is operating (Tick)*

It is good practice to allow minimum air change even when air conditioning is active to expel methane and other stale smelly air

### **CO<sub>2</sub> rules**

*Inject CO<sub>2</sub> (only when not venting or) (when only F1 is running)*

*Inject only if measured light greater than (100 J/m<sup>2</sup>/sec)*

*If hot, and frequent venting is required, then reduce CO<sub>2</sub> to avoid wastage (tick)*

Most people will want to avoid wastage and will set the system to only inject CO<sub>2</sub> when NOT venting. In fact, the controller will anticipate when venting is required and will minimise wastage by stopping CO<sub>2</sub> injection well before venting starts

The second rule ensures that there is adequate light before injecting CO<sub>2</sub>. This is useful in a glasshouse using natural sunlight in which case it might be set at 400J but in a grow room it is just useful to check that the light has indeed come on in which case a setting of say 50J is more suitable.

The last rule is for a system that is injecting CO<sub>2</sub> on a cycle timed basis. If checked, this rule will modify timings to try to avoid CO<sub>2</sub> wastage and will completely abort CO<sub>2</sub> injection if it is uneconomic. This uses the Autolearn feature of the IntelliClimate

### **Lighting rule**

This rule specifies the minimum gap between light bank1 switching on and light bank 2. Normally, 6 minutes is sufficient to allow the power surge from the first bank to subside before the second bank switches on. If electronic ballasts are used it may be possible to reduce this time.

### **Setpoint ramping**

When changing between day and night settings this rule allows a period of time for the settings to change gradually, or ramp, from one value to the other. If this is made too abrupt you can shock the plants and also cause fail safes and alarms to operate as the system fails to respond quickly enough to the new settings. 15 or 20 minutes is usually sufficient.

### **Humidification inhibit**

*When changing from day to night inhibit humidification for 30mins prior to the change.* The purpose of this is to ensure that the room and crop are left dry for the night. Remember, that as the room cools down the RH will automatically rise.

### **Air con rules**

#### *Force on air-con during day period (tick)*

During hot weather there may be no point in even attempting to use the fan for cooling.

If the air con is forced on for the day period you can also force it on a while before the day period starts, typically 10 minutes. This cools the room down in anticipation of the lights coming on.

#### *Autochange from fans to aircon if temperature exceeds 3 °C above temp target*

This rule forces the fans to stop and the aircon to start. Note that once it has switched over it will not switch back this time zone. This means that once it has switched to aircon mode it will not try to switch back to fan mode until the night time zone.

#### *Autostart aircon if outside temp greater than 3°C below temp target*

This rule switches immediately to air con if outside temperature rises too close to the target. It assumes that there is no point in wasting time trying to cool the room down by drawing in warm air from outside.

### **Fail Safe Settings**

This group allows some of the fail safes to be customised

*Aircon override.* If the temperature becomes excessive when in aircon mode the fan will switch on.

*Fan fail override.* If in fan mode and temperature continues to rise the lights will progressively shut down

*Dehumidifier override.* If the RH becomes excessive the fans will come on even though the controller is in dehumidifier mode

*CO2 fail safe.* Switch on all fans if CO2 exceeds 1800ppm. Although CO2 is not poisonous it can cause suffocation.

*CO2 injection override.* If you run out of CO2 gas and the CO2 level falls below say, 300ppm then the system will revert to using the fans to bring in ambient CO2.

*Power failure.* These settings allow you to set the minimum cool down period for the lamps (20 mins) and also the timings for the lights to come back on after a power failure.

*Light override.* If a lamp or bank of lights fails, the light level will fall below a minimum level (50J) and the controller will switch to the alternative bank and trip the alarm if enabled.

**NB: Finally there is a button that allows you to restore all advanced settings to their factory default values.**

## **Status (and settings) tab**

This screen allows you to view readings and settings for functions that have been enabled in the configuration menu.

Below is shown a typical setup for a system with most aspects enabled.

The first block shows the current readings together with their alarm minima and maxima. The alarm enable allows the alarm to be turned on or off and the detent time helps avoid false triggering as the fault condition has to be present for the full time specified.

In the next block, all of the main functions can be enabled, disabled or forced on. Note that when forced on, the function will perform a normal operation for its normal time and then stop automatically.

The “set-point” section is self explanatory and typical settings are shown above.

## **Settings (Scheduling) tab**

This is where you enter the settings as a schedule for the complete grow period. The line, highlighted in yellow shows the current settings and as time elapses the yellow highlight moves down the table. All the time that it is on a line, those settings are continuously downloaded to the controller. This will normally happen at midnight if the PC is on-line, but if not on-line, it will occur as soon as the PC is reconnected. When the bottom of the schedule is reached, the settings will remain at the values in the last line.

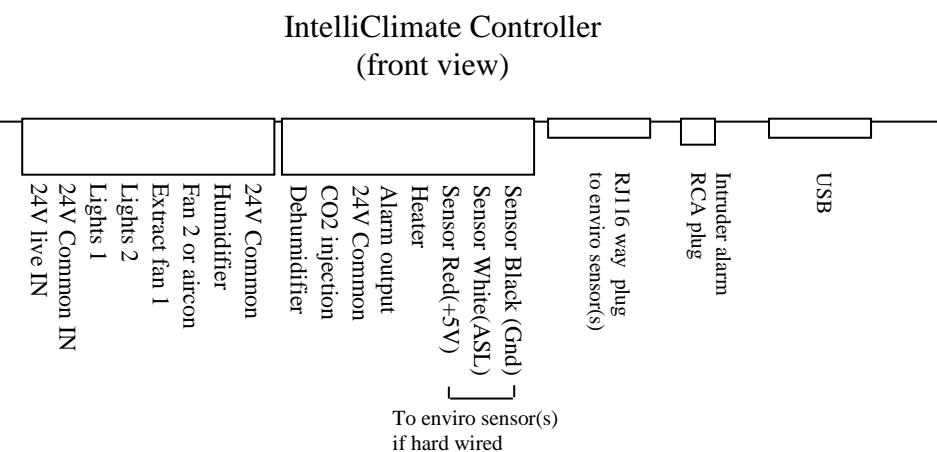
New lines are easily added using the **+** button and lines are deleted by selecting that day and clicking the **X** button.

Note that the dates in the table are relative to the specified start date. This means that a schedule that was created for a start date of say, 15 January can easily be reused starting from any other date.

## Section H - Installation

Mount the IntelliClimate controller in a position well away from water splashes or mist/vapour rising from the reservoir tank and preferably outside the grow room if you intend operating at high humidities. It should be mounted in a cool, dry place out of direct sunlight. Remove the screws holding the back on and fit the mounting feet, then screw to the wall. If using the dry wall (plaster board) anchors use the longer screws supplied but if fixing to a ply back board use the shorter screws.

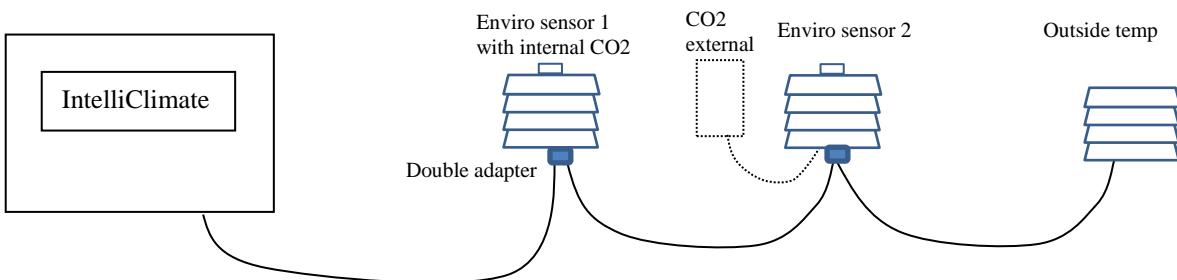
The power supply to the IntelliClimate must be between 12V and 24V either AC **OR** DC. Normally a 24V DC supply is provided and in this case all of the outputs will also be 24V DC. **Never connect a power supply exceeding 24V to the controller.**



The low voltage power from the power adapter is connected to the two left connection on the left hand connector. Some power supplies have a white line or white print on the negative wire whilst with others the cable is a screened “co-axial” type. In this case the screen should be connected to the “Common” and the centre wire to the 24V live (hot) connection on the controller. **Never connect a voltage supply greater than 24V to the controller.**

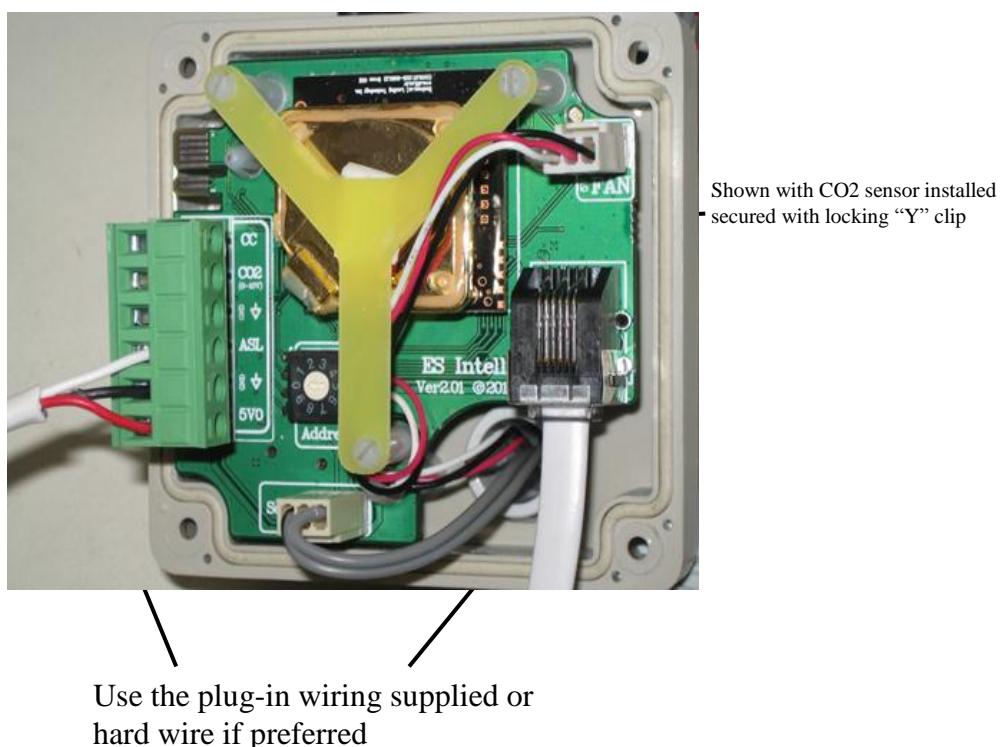
### *Connection to Enviro sensors and optional outside temperature sensor*

A single cable is run from the IntelliClimate to the first enviro sensor which then loops from the first enviro sensor on to the second sensor (if fitted) and on to the outside temperature sensor (if fitted). If using the modern louvred enviro sensors it is preferable to use the plug in RJ11 connectors. Note that when looping on to the second enviro sensor or the outside temp sensor an RJ11 double adapter will be needed. These are normally supplied with the second enviro sensor and outside sensor.



The modern louvred enviro sensors can be fitted with an internal CO2 sensor or may use an external sensor (0..10V) of that is preferred. The diagram above shows both methods. Note that if a second enviro sensor is used it is not absolutely necessary for it to have a second CO2 sensor although one may be fitted if desired and the controller will then operate according to the average value from the two sensors. The external CO2 sensors require a low voltage power supply – normally 24V but the internal sensors are powered directly over the normal 3-wire connection. The louvred type enviro sensor may be connected using the supplied plug-in wiring or can also be hard wired to the internal connector if that is desired.

To hardware to the enviro sensor and outside temp sensor, slide out the inner plastic box after rotating the holding tabs to provide a clear exit path.



#### ***Setting the address of the enviro sensors***

The first enviro sensor should have the rotary switch set to 1 with the second enviro sensor set to 2 and the outside temp sensor set to 0.

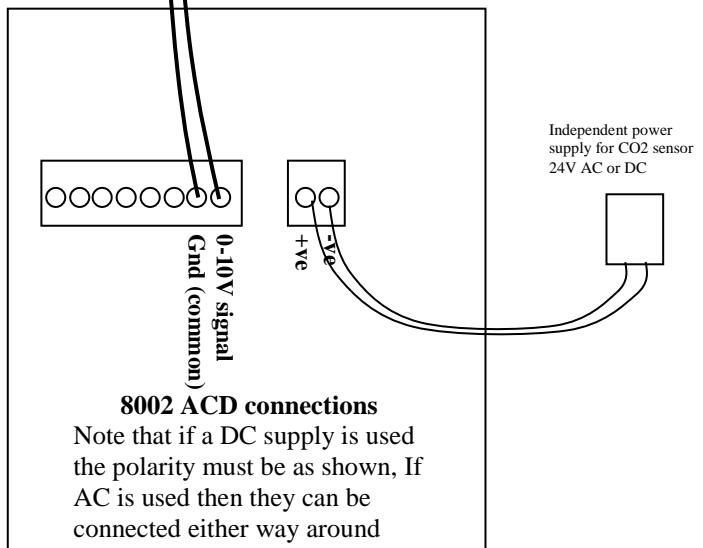
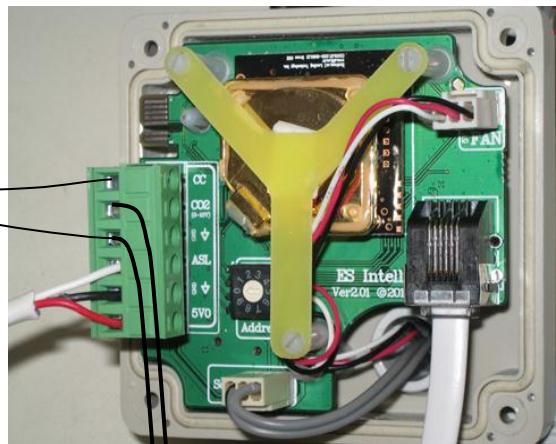
#### ***Light over-temperature sensor – CONNECT TO ENVIRO SENSOR 1***

These are useful where air cooled lights are used so that if the light cooling fan fails and the light fitting starts to overheat, the sensor contacts will open and the lights will be turned off and the alarm triggered. Note that any thermostat type sensor can be used providing its contacts are normally closed (when cool) and open when over-temperature.

It is preferable to use the type that stay open once tripped and need to be manually reset. Note that the over-temperature switch can only be connected to enviro sensor 1.

### Enviro sensor connections

**Connecting the enviro sensor to the 8002 ACD CO<sub>2</sub> sensor and light over-temperature switch**



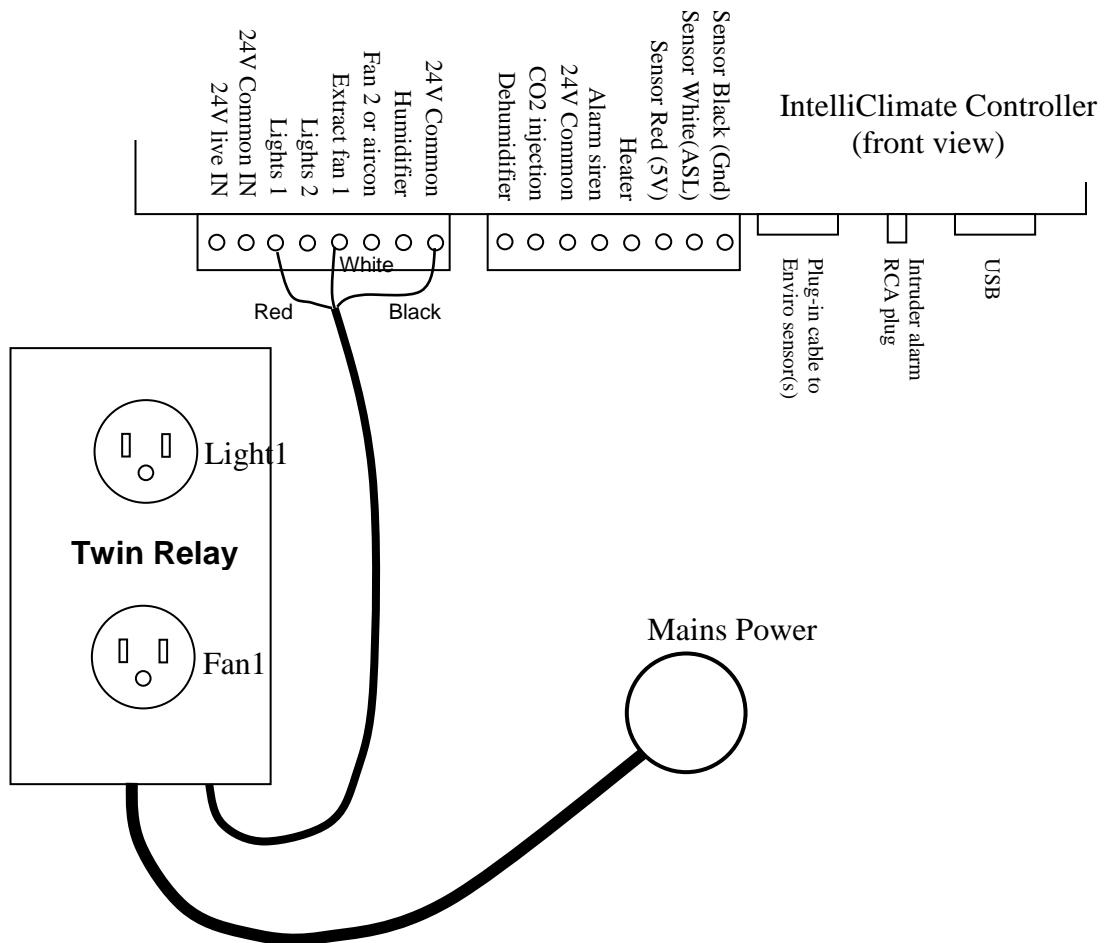
### Relay Boxes

In order to drive mains powered equipment, the 24V DC outputs must be connected to relays or contactors that have 24V DC coils. We normally supply twin relay boxes that provide a convenient method of achieving this.

Note that the **total** mains current draw from a relay box should not exceed the rating as printed on its label.

Secure the Relay boxes to the wall. If using plaster board anchors, screw the anchors in firmly until they are flush with the wall. The anchors supplied are self drilling and so there is no need to pre-drill the wall. Just position them, give them a light tap to get started and then turn to drill/screw in with a Phillips or Pozi screw driver. Use the longer metal screws to fix the valve plate to the nylon anchors or if fixing to a solid wood back board, use the shorter screws supplied. A thin flexible cable is used to connect the relay box to the controller. The black wire is the common, the red is for the upper socket outlet and the white is for the lower socket outlet.

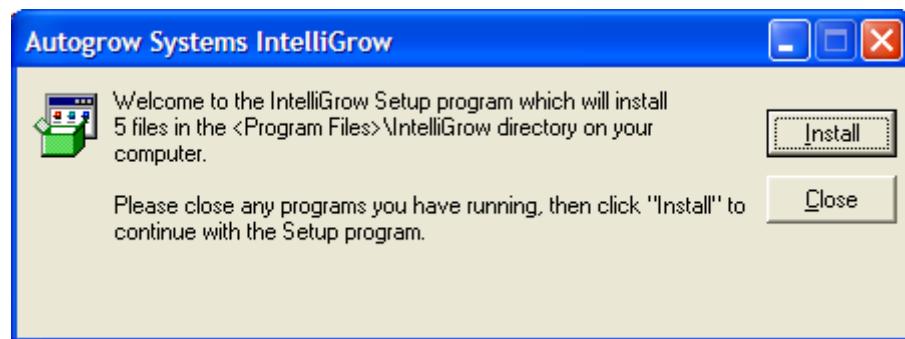
## Example connection of a relay box to operate Light1 and Fan1



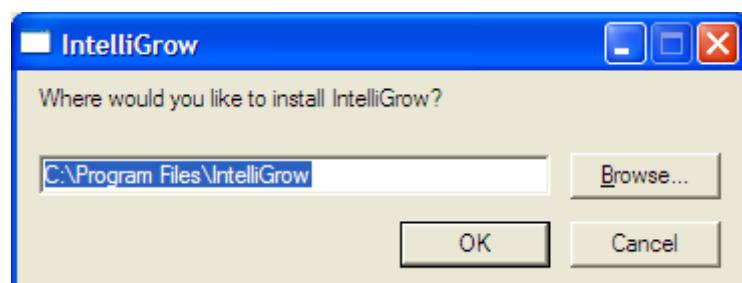
## Section I – Software installation

Note that you may need to temporarily disable your virus checker during the installation process otherwise you may get an *error copying files* message during the installation

Double click the Intelligrow installation executable to start the installation process. Click **Install** to begin the Installation.



Choose the Directory to install the Intelligrow Software.  
"C:\Program Files\Intelligrow" is the default and is recommended.



When the Installation Complete window pops up you have successfully installed IntelliGrow

## **Section J – Maintenance**

Very little maintenance is required and is really limited to keeping all equipment clean, dry and cool. Observe and double check all readings from time to time to ensure that sensors are still accurate. This is particularly important for the CO<sub>2</sub> sensor. The recalibration procedure for the 8002 – ACD sensor is provided as appendix 1.

## **Section K - Fault finding**

- 1) Unit is completely dead – ie no display, no power light and no outputs  
Check that the power pack is functioning (by measuring with a voltmeter if possible) and that it is plugged in, switched on and properly connected to the controller. If the unit still fails to function then the probability is that the internal 4A fuse (20mm x 5mm miniature glass fuse) may have been blown. The most likely cause of this happening is that wires connecting to the peripheral equipment have touched together and shorted out. To fix this it is important to clear the fault first. Inspect all wiring and ensure that all wires are well insulated right to the point where they enter the connector. Also check the connections at the relays or peripherals. Then replace the fuse with a genuine 4A fuse. **DO NOT ATTACH WIRE OR ALUMINIUM FOIL ACROSS IT.**
- 2) Lights or other equipment do not come on when expected. Test the relevant output using a voltmeter set on a range suitable for measuring 24V DC.  
Measure between the output pin in question and one of the Common connections. If the pin has 24V on it then the fault lies with the peripheral or relay driving it. If there is not 24V on the relevant pin then recheck all settings starting with configuration. If advanced settings have been changed then it may be advisable to use the button at the bottom to restore them to factory defaults. Finally double check all other settings and readings to be absolutely sure that the peripheral in question should be ON.

## **L Warranty**

The warranty on the controller and environment sensor is limited to 2 years – return to factory. Before returning the unit for service you must call Autogrow Systems Ltd for a return authorization and the preservice check sheet must be completed .

The plug-in, easily replaceable, Temperature/RH sensors and any fans used carry a 12 month warranty.

This warranty specifically excludes any parts that have been broken or damaged by water, chemical attack or excessive temperature. In particular, the controller and power adapter must be stored and used in a dry, shaded and well ventilated situation. At no time must the case temperature be allowed to exceed 55 deg C (130 deg F).

This warranty expressly excludes liability for consequential damages or for charges for labour or other expense in making repairs or adjustments, or loss of time or inconvenience.

## **Appendix 1 –**

### **Calibration of Internal CO2 sensor (0-5000ppm)**

The CO2 sensors which may be fitted inside the louvered type environment sensor box are calibrated at the IntelliClimate controller as follows:-

#### **1) SOFT CALIBRATION – allows calibration against an accurate CO2 sensor or known CO2 level**

On the IntelliClimate go enter the “Configure” menu and navigate to “Enviro 1 (or 2) CO2 Calib”. Place the sensor in a known CO2 concentration eg outside in open air (CO2 = 380ppm) or else compare with another accurately calibrated CO2 sensor.

When doing this try not to breath near the sensors and do not do this near any other sources of CO2.

Use the up or down arrows to change the scaling away from the normal 100% scaling until the scaled or calibrated CO2 reading below the box is correct and press “Save” to store the new calibration. When doing this the percentage change needed is displayed on the screen. The normal percentage is 100% and if this ever needs to be set below 50% or above 150% this may indicate some deterioration of the sensor. In this case first try the hard calibration below to see if that corrects the reading. If not you may require a new CO2 module.

#### **2) HARD CALIBRATION – This allows the sensor to self-calibrate when placed in fresh air at ambient CO2 levels. As this is less convenient than the SOFT calibration mentioned above it is suggested that this is carried out only once per year. NOTE THAT AFTER COMPLETING A HARD CALIBRATION A SOFT CALIBRATION MUST ALSO BE CARRIED OUT.**

Place the sensor box outside in fresh air and connect to an IntelliClimate controller. Navigate to, and enter, the Configure Menu. Navigate and enter “CO2 configuration” then move down and enter “Open air configuration” then press edit and a screen with instruction will appear. On pressing start a new screen with a timer counting down from 11 minutes will appear. During this time leave the enviro sensor in fresh air and avoid breathing near it. It will self calibrate to the ambient CO2 level. At the end of this navigate back to the softwa calibration screen “CO2 scale factor” and set this to 100% ie no scaling.

## Calibration and settings for the Telaire external 8002-ACD sensor

- 1) **Calibrate** to ambient air (or calibrate against a known accurate hand-held CO<sub>2</sub> meter).  
Move the sensor into fresh air (ie outside or next to open window) and apply power – leave to settle for at least 5 minutes. Try not to breath too closely to the sensor.  
Press “clear” and “enter” and hold for about 5 seconds. The screen will change to CAL AIR. Now press enter and you will enter the calibrate screen. Now press the up/dn rocker switch to make the displayed PPM to match the ambient value. If you have an accurate hand-held sensor then adjust the displayed PPM to read the same. If not then adjust to read 380ppm which is the typical ambient CO<sub>2</sub> level. (If in the countryside away from all industry use 350 and if near a city or industrial area use 400ppm).  
Press “enter” again and the instrument will self calibrate for about 5 minutes so that it will read the ambient CO<sub>2</sub> level correctly. Again, do not breath near the unit while it is calibrating. At the end of calibration it will return to the normal readout screen.
- 1) To **change altitude** setting. The default setting is 0 ft above sea level. For good accuracy at higher altitudes you can enter the altitude of your position in feet (in steps of 500ft) above sea level.  
Press and hold “clear” and “mode”, this will take you to the Altitude screen. Now press the rocker up/down key quite firmly to make it operate). Once the altitude is correct press “enter” to lock it in. This will return you to the “normal” display screen.
- 2) To **switch off ABC logic** (TEMA logic)  
Press and hold “clear” and “mode”, this will take you to the Altitude screen. Now press “mode” once and you will be in the TEMA screen. This must be OFF for greenhouse operation. If ON, use the rocker key to turn OFF. Then press “enter” to save the setting. This will return you to normal screen

To change **CO<sub>2</sub> range to 0 to 2000ppm**. For Autogrow climate controllers to work correctly, the CO<sub>2</sub> sensor must be set so that 0 to 2000ppm corresponds to 0 to 10 Volts.

Press and hold “clear” and “mode”, this will take you to the Altitude screen. Now press “mode” key twice. You should see NONSTD. If not, press the rocker key through screens STDSET1 to STDSET9 until you get to NONSTD. Then press “mode” and you will see the low end of the measurement range – this should be 0ppm. Press “mode” again and you will see “To xxxxPPM”. Use the rocker key to make this 2000PPM and then press “enter” to save. Now press “mode” key repeatedly until you step through the complete menu and eventually return to the “normal” screen. On your way through the screens check that the voltage range is 0V to 10V.

## Appendix 2 – Specification

### Power supply adapter

The unit is normally supplied with a universal input (100V to 240V 50/60Hz) power adapter which provides the IntelliClimate with a safe, low voltage supply of 24V DC at 2.5Amps

### Outputs

8 outputs that have the same voltage as the supply (normally 24V DC)

Ratings of individual outputs are 3Amps but of course the total draw from all 8 outputs must not exceed the rating of the supply adapter.

### Inputs

The temperature, RH, Light sensors all connect on a bus cable. The three wires in the bus cable supply the sensor units with 5VDC power and receive digital data back along the third wire. Maximum length of this bus cable is 20m (60ft). The unit is supplied with one temperature/RH/light sensor box on a 5m (15ft) cable. A second sensor box and an external temperature sensor may be added. These would be connected in daisy chain fashion on the single bus cable.

### Temperature/RH/Light enviro sensors

Temperature accuracy +/- 0.5°C

RH accuracy +/- 3% to 95% then +/-5%

Light accuracy +/- 5%; Total light 0 to 1000Joules

CO2 input: 10 bit resolution (1 part in 1000)

### CO2 sensor – Internal

0 to 5000ppm range. Either 1 or 2 of these may be installed and with 2 installed the controller will work to the average of the two. Each CO2 sensor can be calibrated separately – see appendix 1

### 3 x Relay Boxes

The twin relay boxes have a total current capability as follows:-

USA 110V 15A total draw

UK 240V at 13A

Australasia 240V at 10A