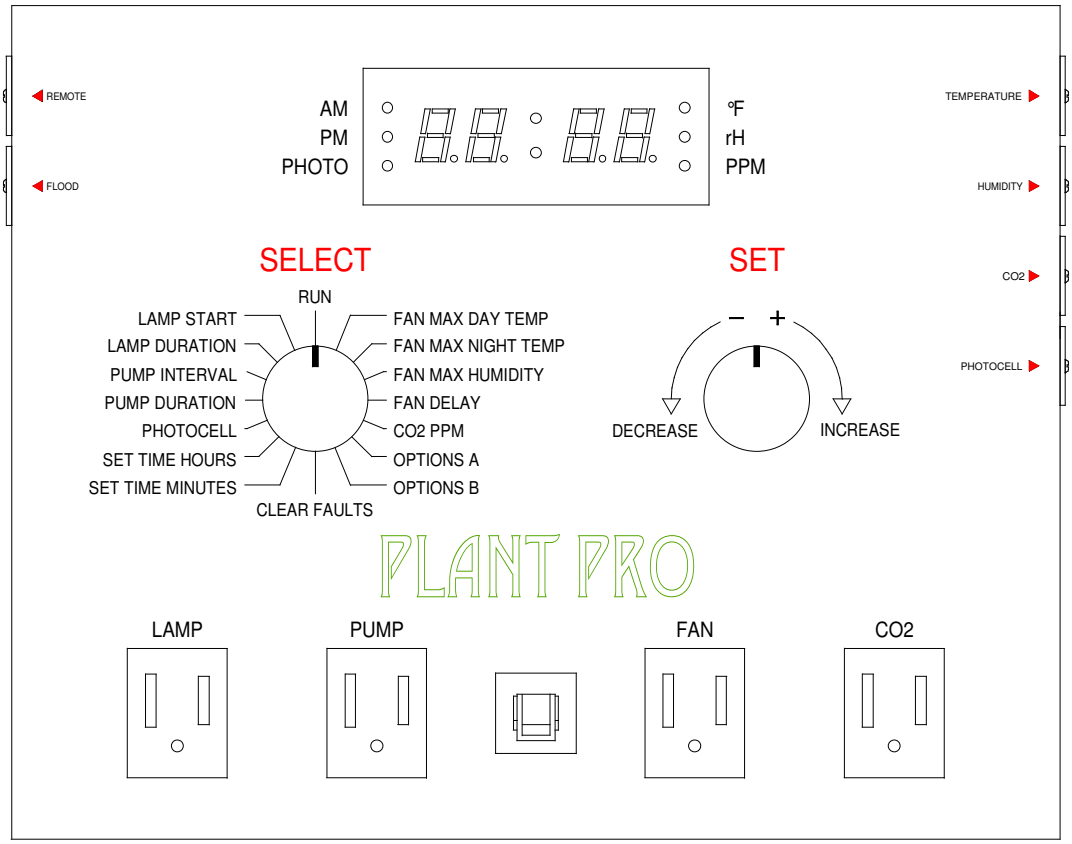
PLANT PRO OWNER'S MANUAL SUPPLEMENT S2

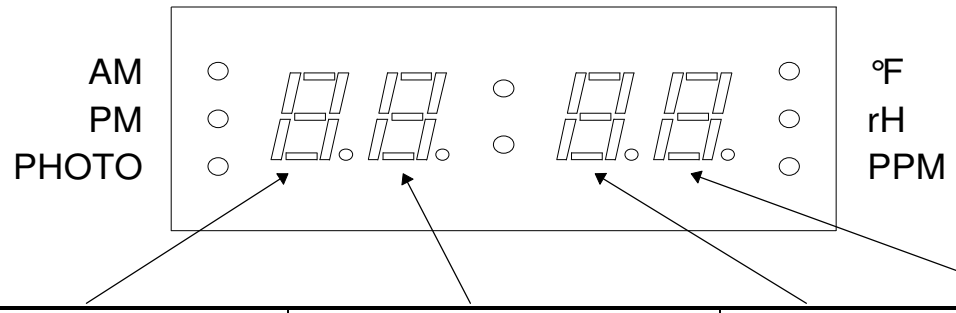


OVERVIEW

This is a supplement to the Plant Pro Owner's Manual covering new features. These are in addition to previous Plant Pro modes of operation. Generally, users wanting to operate in previous modes can still do so. The main features no longer available are fully adjustable Timed CO_2 Interval and Duration. These were removed to allow positions on the Select Knob for the additional temperature and options settings. New features are:

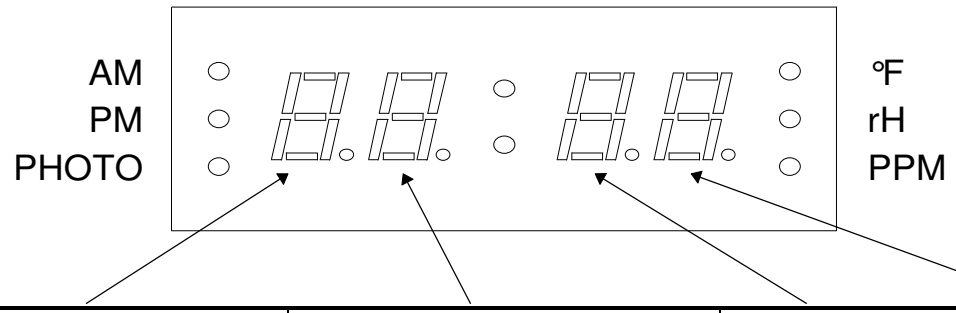
- INDEPENDENT DAY AND NIGHT TEMPERATURE CONTROL OF FAN OUTLET
- ADDITIONAL OPTIONS SETTINGS
  - Previously just one OPTIONS setting, now OPTIONS A and OPTIONS B settings
- NEW FAN AND CO_2 INTERACTION OPTIONS
  - Fan synchronized with CO_2 dispensing (as before, no overlap)
  - Fan and CO_2 can operate independently
  - Independent Fan has Sensor and Timer Modes
- OVER TEMPERATURE EMERGENCY SHUTDOWN OPTION
  - Can choose ***Disabled, 95°F, 100°F, and 105°F***
- GENERATOR OPERATION MODE WITH INTERNAL TIMEKEEPING SIGNAL
  - Use power line 60 Hz timing signal (as before, more accurate)
  - New Option for generator or noisy power line using internal timing signal
- OPERATION WITH CO_2 SENSOR PLUS 3 TIMED CO_2 SETTINGS FOR BACKUP
  - CO_2 sensor included for PPM control
  - Option to select 1 of 3 CO_2 Interval/Duration Settings for use if CO_2 sensor unavailable

OPTIONS A



CODE	PUMP	FAN	TEMPERATURE AND HUMIDITY OFFSET	CO_2 OFFSET
0	**DAY: On per settings.** **NIGHT: Off.**	**VENTED FAN** **DAY: On due to temperature or humidity.** **NIGHT: On due to temperature or humidity.** **SEALED FAN** **DAY: On due to temperature or humidity but minimum ON and OFF times set by FAN DELAY.** **NIGHT: On due to temperature or humidity but minimum ON and OFF times set by FAN DELAY.**	**1 °F, 1 %rH**	**10 PPM**
1	DAY: On per settings. NIGHT: On 15 minutes at 12 AM, 6 AM, 12 PM, 6 PM (only if it is night).	VENTED FAN DAY: On due to temperature or humidity. NIGHT: On due to temperature only. SEALED FAN DAY: On due to temperature or humidity but minimum ON and OFF times set by FAN DELAY. NIGHT: On due to temperature only but minimum ON and OFF times set by FAN DELAY.	2 °F, 2 %rH	20 PPM
2	DAY: On per settings. NIGHT: On per settings.	VENTED FAN DAY: On due to temperature or humidity. NIGHT: On due to temperature or humidity plus 5 minutes every hour. SEALED FAN DAY: On (when lamp is on) NIGHT: Off but turn off delayed by FAN DELAY.	3 °F, 3 %rH	50 PPM
3	DAY: On 1 minute every 4 minutes. NIGHT: On 1 minute every 4 minutes.	VENTED FAN DAY: On due to temperature or humidity. NIGHT: On due to temperature only plus 5 minutes every hour. SEALED FAN DAY: On but turn on delayed by FAN DELAY. NIGHT: Off but turn off delayed by FAN DELAY.	4 °F, 4 %rH	100 PPM

OPTIONS B



CODE	RESERVED	TIMED CO_2	OVER-TEMPERATURE SHUTDOWN	FAN TYPE AND TIME SOURCE
0		**NO TIMED CO_2**	**NO OVERTEMP**	**VENTED** **POWER LINE**
1		INTERVAL: 6 minutes DURATION: 1 minute	95 °F	SEALED POWER LINE
2		INTERVAL: 10 minutes DURATION: 3 minutes	100 °F	VENTED INTERNAL
3		INTERVAL: 20 minutes DURATION: 4 minutes	105 °F	SEALED INTERNAL

INDEPENDENT DAY AND NIGHT TEMPERATURE CONTROL OF FAN OUTLET

- Previously, there was only one setting for temperature control, FAN MAX TEMPERATURE. It has now been split into two settings, FAN MAX DAY TEMP and FAN MAX NIGHT TEMP. The fan uses day temp when the lamp is on, night when not.
- If a Photocell light sensor is installed and enabled, that is also factored in. See Plant Pro Owners Manual's PHOTOCELL MODES section. The fan uses day temp when the pump and CO_2 are cycling, night when not.

ADDITIONAL OPTIONS SETTINGS

OPTIONS A AND OPTIONS B

Previously, there was just one OPTIONS setting. Now there are two, OPTIONS A and OPTIONS B. Each operates in a similar manner but provide different features. OPTIONS A is similar to the previous OPTIONS setting. Only new or changed options functions are described. See the Options section in the Plant Pro Owner's Manual for details on those that remain unchanged.

OPTIONS OPERATION

Most settings for the Plant Pro require a large range of values. Each options setting has 4 functions that can be set over a small range. They are combined and set when the Select Knob points to the relevant options setting. Each function is assigned a digit. Each function can be set to one of four modes with codes of 0 - 3. The code for each mode is listed at the left in the previous charts. The first mode (0) is the default in **BOLD** and is recommended by Solatel for most users. In general, 0 provides operation similar to previous Plant Pro models. **WHEN IN DOUBT, USE 0.** Turn the Select Knob to point to OPTIONS A or OPTIONS B. When turning the Set Knob the digits will only go from 0-3 rather than the usual 0-9 because that is the range of the codes. For example, if the display is 0013 then turning the Set Knob in the INCREASE direction the display will change from 0013 to 0020, not to 0014. Turning the Set Knob in the INCREASE direction the display will roll-over from 3333 to 0000. Turning the Set Knob in the DECREASE direction will do the reverse, it will roll-under from 0000 to 3333. When you have the desired code displayed, turn the Select Knob to RUN and now the new setting will be used. In this document some options settings are described as xx0x or such. This means that the third digit is 0 and the other digits are determined by other functions.

NEW FAN AND CO_2 INTERACTION OPTIONS

VENTED VERSUS SEALED OPERATION

Previously, the fan and CO_2 were synchronized such that they were never on at the same time. This was for use with a vent fan that exhausted hot or humid air in the room and brought in fresh air. It is wasteful to be dispensing CO_2 and venting it out at the same time. After the CO_2 turned off, the fan would not immediately turn on. It waited the number of minutes (including zero) set by the FAN CO2 DELAY setting. Although the setting name has been changed to FAN DELAY, it still operates the same when used with a vent fan. Many grow rooms are now sealed and do not use a vent fan. In sealed operation the fan and CO_2 operate independently and can both be on at the same time. To support this situation, the choice of vented or sealed is included in the OPTIONS B setting. To select vented, use OPTIONS B code xxx0 or xxx2. For sealed, use OPTIONS B xxx1 or xxx3. The OPTIONS A codes for the fan (x0xx - x3xx) have one meaning for vented and another for sealed.

VENTED OPERATION NEW FEATURES

Generally, vented operation is similar to previous Plant Pro operation. Use OPTIONS B code xxx0 or xxx2 for vented. OPTIONS A codes for the fan when vented are the same as before for codes x0xx and x2xx. Previously, codes x1xx and x3xx had the fan off at night. These codes now use only temperature (not humidity) at night to control the fan. Given that there are now separate FAN MAX DAY TEMP and FAN MAX NIGHT TEMP setting, these codes can still be set to cause fan off at night. This is done by using these codes and set the FAN MAX NIGHT TEMP to 110°F. The Plant Pro's maximum temperature reading is limited to 110°F and thus can never get above this to turn on the fan. Actual temperatures above this are still reported as 110°F. One reason for the fan off at night mode was for customers in high outdoor humidity locations where the vent fan INCREASED humidity in the grow room at night. They now have even more flexibility. Previously, when both temperature and humidity settings were set to "nonE", the fan ran continuously if not blocked by CO_2 dispensing or FAN CO2 DELAY. This is now limited to vented timed CO_2 where in the fan part of the timed cycle the fan will be on independent of any sensor if relevant temperature and humidity settings are set to nonE.

SEALED OPERATION

INTRODUCTION

Sealed modes allow CO_2 and fan to operate independently. CO_2 is usually controlled by the CO_2 PPM sensor or the three timed CO_2 functions as backup. Fan control is broken into two groups based on OPTIONS A codes for the fan (x0xx - x3xx). Sensor Modes 0 and 1 are for fan control based on the temperature and possibly humidity sensors. Timer Modes 2 and 3 are for fan control based on the timing of the lamp outlet.

SENSOR MODES 0 AND 1

These can be used for a sealed lamp fan where the lamp's heat is used to warm up the room. The fan is turned on when the room exceeds the desired temperature. No exchange of room and outside air is made because the lamp fan draws external air in to cool the lamp and then exhausts this now hot air. These modes could also be used to control an air conditioner or dehumidifier. The equipment must allow control by power on/off. The Plant Pro uses a 15 Amp circuit so this would typically require a Solatel Power Expander if a lamp is also being controlled by the Plant Pro. Such compressor based equipment shouldn't be turned on and off frequently. So, for use in such cases, FAN DELAY sets a minimum on and off time to reduce constant switching. For example, assume the fan is off. Temperature goes high. Fan will not turn on until it has been off for FAN DELAY minutes or more. It could have already timed out before the temperature went high and the fan will turn on immediately. When it does turn on, it will stay on for a minimum of FAN DELAY minutes even if the temperature is brought down before then. If the temperature is still high after FAN DELAY minutes, the fan stays on until the desired temperature is reached. By setting FAN DELAY to 0, the fan will switch on and off immediately based on sensor and setting. Use OPTIONS B xxx1 or xxx3 for sealed. Use OPTIONS A fan code x0xx for control by both temperature and humidity sensors, use x1xx for control by both temperature and humidity sensors during the day but only temperature at night.

TIMER MODES 2 and 3

These can be used for control of a sealed lamp fan based on the lamp status. Mode 2 turns on the fan when the lamp turns on, and turns it off FAN DELAY minutes after the lamp turns off. Mode 3 does that plus delays fan turn on FAN DELAY minutes after the lamp turns on. Mode 2 is for those who just want to finish cooling the lamp down after turn off. Mode 3 cam be used with cooler air where the user wants to warm up the lamp for proper ionization before turning on the fan. FAN DELAY could be set to 0 but then it would be like plugging the fan into the lamp outlet. Modes 2 and 3 can also be used to control equipment other than a fan that needs to be coordinated with the lamp but need some switching delay. Mode 3 can be used as a second stage lamp sequencer but probably needs a Power Expander. Use OPTIONS B xxx1 or xxx3 for sealed. Use OPTIONS A fan code x2xx for turn off delay only, use x3xx for both turn on and off delay.

FAN DELAY OPERATION

At power on the FAN DELAY timer is set to the maximum to "time out". This is also done when the FAN DELAY setting is changed to 0 and SELECT KNOB put to RUN. Otherwise, the timer increments every minute until it gets to 61 and stays there. It is reset to 0 and a new delay started at certain events depending on the mode. Reset events are:

- Vented 0-3: while CO_2 is on.
- Sealed 0,1: when the fan switches on or off.
- Sealed 2: when the lamp switches off.
- Sealed 3: when the lamp switches on or off.

When the Plant Pro is powered on or the fan mode is changed, the fan delay may not operate properly until the appropriate reset event listed above has occurred. Timed CO_2 implements the fan delay without using this timer.

OVER TEMPERATURE EMERGENCY SHUTDOWN OPTION

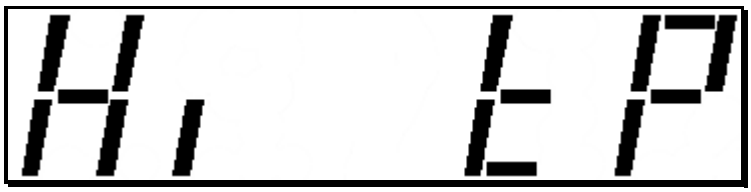
INTRODUCTION

This option is used for emergency situations where the normal methods to control temperature are insufficient. Overtemp starts when temperature gets equal to or above the selected over temperature value. Operation returns to normal when the temperature gets below the relevant FAN MAX DAY TEMP or FAN MAX NIGHT TEMP setting. Operation also returns to normal at power on if power is interrupted. Overtemp is set up in Options B xx0x - xx3x. It is selectable for disabled, 95 °F, 100 °F, or 105 °F.

OUTLETS

Overtemp turns on the Fan and turns off the lamp, pump, and CO_2 . Overtemp outlet control is over ridden by Flood Fault or Panic Fault which shut off everything. When the fault ends, Overtemp continues if still valid.

DISPLAY



The overtemp error message is "Hi tP" (High Temperature). See image at right. The message alternates with the actual temperature. Temperature is the standard display with the °F indicator. The display shows the message for 2 seconds, the temperature for 2 seconds and then repeats. The display switches at the same rate as when the RUN display rotates (alternates) between time and sensor readings. The overtemp display only occurs when the Select Knob points to RUN. All other positions are normal. It is blanked by Display Blanking At Night mode when the lamp would normally be off. Any fault, including Clock Fault, Setting Fault, Flood Fault or Panic Fault causes the display to flash. It still shows the alternating message and temperature but they are flashed. When the fault ends, overtemp display continues if still valid.

SETTINGS

Changes to settings by the user will have different results when done in normal conditions versus in an overtemp condition.

- NORMAL - OVERTEMP NOT ACTIVE
    - User changes the FAN MAX DAY TEMP or FAN MAX NIGHT TEMP or Overtemp setting (Options B xx0x - xx3x). The Plant Pro uses the new setting.
- DURING OVERTEMP
    - User changes the relevant FAN MAX DAY TEMP or FAN MAX NIGHT TEMP. If the actual temperature is now below this, overtemp ends and the Plant Pro goes back to normal.
    - User changes the Overtemp setting to a new temperature (Options B xx1x - xx3x) . No effect. It doesn't keep track of what the highest temperature was before it went into overtemp. The Plant Pro only remembers that overtemp is active.
    - User changes the Overtemp setting to disable overtemp (Options B xx0x). Overtemp ends, Plant Pro goes back to normal.

GENERATOR OPERATION MODE WITH INTERNAL TIMEKEEPING SIGNAL

Like previous models, the Plant Pro can operate from the power line's 60 Hz (60 cycles per second) timing signal. In most of North America this is typically accurate within a few seconds a year and is the best option for most situations. There is a new option that uses the power line only for power. The Plant Pro then uses an internal timing signal for time keeping. This can be used with a generator which generates power that is not kept accurately to 60 Hz. It can be used with a noisy power line. Other equipment can create noise spikes on the power line that interfere with properly measuring the 60 Hz timing signal. Internal timekeeping is typically accurate within 1/2 to 2 minutes a week. Use OPTION B xxx0 or xxx1 for power line time source and xxx2 or xxx3 for internal time source.

OPERATION WITH CO_2 SENSOR PLUS 3 TIMED CO_2 SETTINGS FOR BACKUP

The CO_2 sensor is included for PPM control. Previously, settings were also provided for timed CO_2 control of CO2 INTERVAL and CO2 DURATION. These have been removed to provide new settings for separate day time and night time temperature control and additional options. For situations where the CO_2 sensor is unavailable, the option to select 1 of 3 fixed CO_2 Interval/Duration Settings is provided as a back up.

- OPTIONS B Timed CO_2 x0xx - x3xx settings include: No Timed CO_2 , Interval 6 minutes / Duration 1 minute, Interval 10 minutes / Duration 3 minutes, and Interval 20 minutes / Duration 4 minutes. The shorter two would typically be used with a CO_2 tank, the longer one with a CO_2 generator.
- Normal PPM control using the CO_2 sensor is selected by putting the CO2 PPM setting to some value other than nonE.
- To use timed CO_2 , put CO2 PPM to nonE. Then use OPTIONS B Timed CO2 x1xx - x3xx to pick the desired CO_2 interval and duration.
- If no CO_2 dispensing equipment is connected or you wish to disable it, put CO2 PPM to nonE and OPTIONS B to x0xx.
- When CO2 PPM is set to other than nonE, OPTIONS B Timed CO_2 x0xx - x3xx have no effect.

USING THIS SUPPLEMENT WITH THE PLANT PRO OWNER'S MANUAL

INTRODUCTION

This supplement describes new features not in the Manual. Some features described in the Manual are no longer present. Listed below are relevant chapters and sections in the Manual and how to use this supplement with them.

LOCATION OF CONTROLS

Diagram on page 3 is valid but use this supplement's front panel drawing on page 1 as a reference for the settings on the right side of the Select Knob.

QUICK START

- Relevant in the beginning starting on page 4.
- *SETTING THE VENT FAN TEMPERATURE* on page 6 describes the previous single FAN MAX TEMPERATURE setting. Follow these steps for both settings, FAN MAX DAY TEMP and FAN MAX NIGHT TEMP.
- *OTHER SETTINGS* on page 6 includes information on the CO2 INTERVAL and CO2 DURATION settings. These are no longer present so ignore them. The setup of the OPTIONS setting should be done for both OPTIONS A and OPTIONS B. FAN MAX HUMIDITY and CO2 PPM are both instructed to disable these sensors by setting to "nonE". Doing this will simplify initial operation for checkout. Once basics are working, these can then be enabled by setting them to appropriate values. Experienced users of the Plant Pro may wish to just enable them and set them up to the desired values from the start.

FAN AND CO2

Starting on page 22 it describes CO2 INTERVAL, and CO2 DURATION for use with timed CO2. These settings are no longer available on the Select Knob but there are 3 fixed settings that operate the same. See OPERATION WITH CO_2 SENSOR PLUS 3 TIMED CO_2 SETTINGS FOR BACKUP in this supplement above.

OPTIONS

Starting on page 27 this describes the more limited single Options setting. See ADDITIONAL OPTIONS SETTINGS in this supplement above. The Manual should be reviewed as it goes into greater detail than this supplement on the general use of this type of setting. The Manual also has details on those functions that remain unchanged.