

SolarGro 12i

Programming



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The **SolarGro12i** will automatically adjust the interval between irrigation cycles to hydroponic crops. On sunny days, the irrigation cycles will come more quickly which will deliver more water and fertilizers to the crops. On cloudy days, the **SolarGro12i** will stretch the timing interval between irrigation cycles to conserve water and fertilizers and to reduce runoff.

Solar Count: The Solar Count LED is your best guide to setting the Repeat Interval to Day Time irrigation. When the Solar Count LED changes 10 times, it has accumulated 00.2 Moles of Solar Energy. See Figure 1.

Day Time Repeat Interval: Figure 2 shows that the Day Time Repeat interval may be put in *wasteful* Hours mode commonly used by other timers or put in the efficient Solar (Moles) mode.

In the **Hours mode**, the **SolarGro12i** will repeat trigger the irrigation cycle on a regular timed interval. Figure 2 shows that the Day Time Repeat is set to trigger an irrigation cycle every 1.2 hours or every 1 hour and 12 minutes.

The efficient **Moles (Solar) Mode** is the mode that you want to use. To enter that mode, push the left most rocker switch on the top of the switch near the *Moles* writing in figure to the right. Then the **SolarGro12i** will trigger the irrigation after accumulating 1.2 moles of sunlight which equals 120 changes of the Solar Count LED or 60 on-off cycles of the Solar Count LED.

Many growers find that 2.4 Moles (2.0+0.4) is a good starting point. This setting will trigger irrigation cycles about every 2 hours at noon on a sunny day.

Seconds ON: Figure 3 shows the switches which control how many seconds each valve will irrigate during each irrigation cycle. There are 3 settings. Zone valves 1 and 2 have individual setting, and zone valves 3 to 12 have a common setting. This arrangement allows you to give more or less water to the outside zones 1 and 2 which may experience different growing conditions than the center zones.

Night Repeat: Figure 4 shows switches which may be used to irrigate at night. If the soil drains during the night and causes morning stress when the sun rises, night watering can put water in the roots before sunrise. Another approach is to turn-on the **Sunrise Water** option. See Other Options with Figure 7.

Manual Watering - Figure 5

The **10-second Sequence** may be used to test each valve for 10 seconds.

Note: This switch does NOT add events to cycle counters.

The **Sequence Valves** switches may be used to activate the valves and to advance through the sequence in the forward or backward directions.

NOTE: These switches add events to the cycle counters and zeros the counter which is compared to the **Day Time Repeat**.

Figure 1: **Solar Count LED** changes 10 times for each 0.2 Moles of sunlight.



Figure 2: **Day Time Repeat** interval set to trigger irrigation cycle after 1.2 Moles of accumulation of sunlight. 1.2Moles equals 120 changes of the Solar Count LED or 60 on-off cycles.



Figure 3 shows that Zone Valve #1 is set to water for 8+2=10 seconds each irrigation cycle and that Valve #2 is set to water 16+4+1=21 seconds each irrigation cycle. Valve #3 is set to water 32 seconds.

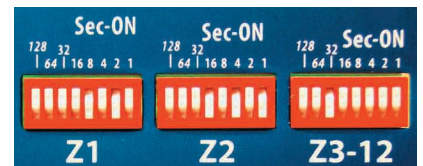
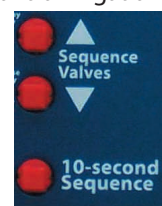


Figure 4: **Night Repeat** can be set to irrigate at night every few hours.



Figure 5: **Push Button switches** manually control irrigation



Controlling the display

There are two sets of switches which control the information shown on the display. These switches are shown in Figures 6 and 7, and discussed below. The **SolarGro12i** scans both switches from the top and responds to the first switch which is pushed on. In order to display **Solar Gain**, all **Intensity** switches MUST be off. The list below identifies the displayed information. If no switch is pushed on, then the display will show the solar intensity in **W/M*M** (watts per square meter).

NOTE: If the **SolarGro12i** is running a valve, the display will toggle between the valve number and the chosen information chosen. It will show the valve number for 3 seconds. During the fourth second, the information will reappear.

NOTE: The flashing decimal in the display is counting seconds.

Figure 6: Display of **solar intensity** or **number of recent cycles** is controlled by switch shown below.



Solar Intensities - Figure 6

W/M*M displays watts per square meter.. **Note:**186 watts/M*M shining for 10 minutes is 0.2 Moles. This fact provides another way to set the Day Time Repeat interval.

Ft-Cd displays Foot-Candles.

Kilo-Lux displays Kilo-lux.

uMole/sec/M*M displays uMoles per sec per square meter.

Langley/day displays Langleys per day.

Cycle counters - Figure 6

Cycles Today displays count of irrigation cycles since sunrise.

Cycles Yester displays count of irrigation cycles since yesterday.

7 day Cycles displays count of irrigation cycles over previous 7 days.

Figure 7: Display of **solar gain** and setting **2 watering options** is controlled by switch shown below.



Solar Gain (Solar Accumulations) - Figure 7

Down Count displays the moles or minutes remaining before next irrigation depending on whether the **Moles** or the **Hours** mode is selected in **Day Time Repeat**.

Since Sunrise displays moles accumulated since sunrise.

Previous Day displays moles accumulated yesterday.

Previous 3 displays moles accumulated during previous 3 days.

Previous 7 displays moles accumulated during previous 7 days.

Other Options - Figure 7

Sunrise Water will set the **SolarGro12i** to water each morning after 0.2 moles of sunlight are accumulated. The first 0.2 moles each day signals that start of a new day when all internal day accumulators shift. If this switch is NOT activated, then the solar count resumes from yesterday's count.

Zone Delay causes the **SolarGro12i** to insert a 6-second delay between sequencing valves. If you have hydraulic problems with valves failing to shut off quickly, the first step is to turn down the flow control on the valves. The second step may be to activate this switch to give the valve more time to close before the next one is activated and lowers the water pressure.

What is a Mole of sunlight?

The term Mole is short for "molecule" and it is the way that chemists count atoms or molecules like a "dozen eggs." The Mole is the unit of chemical measurement that creates the simplest equations. For example, it may be said that "two moles of hydrogen combine with one mole of oxygen to yield two moles of water."

Since sunlight is needed to drive the photosynthesis process, sunlight had to be added to the chemical equation to make the chemical end products. To keep the equation for photosynthesis rational and simple, the unit of measure for the required quantity of sunlight chosen by plant scientists was the Mole.