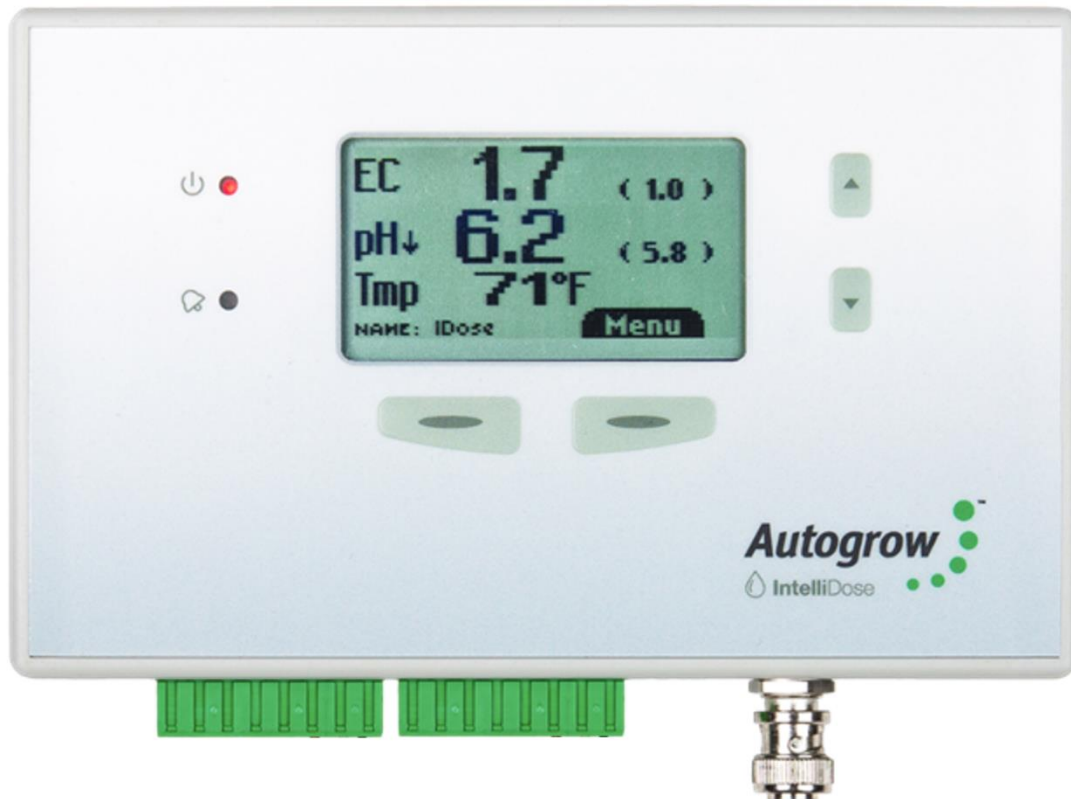# IntelliDose

## Installation and User Guide



- Doses up to 9 part nutrients, additives and pH
- Measures conductivity, pH, temperature
- Displays EC, CF, TDS, ˚C, ˚F, pH
- Remote connection via IntelliGrow (subscription required)
- Multiple nutrient recipes (change from vegetative to generative)
- Auto schedule of nutrient recipes and set points
- Proportional Dosing (for rapid dosing)
- Peristaltic pumps for easy installation and use
- Irrigation with day/night control
- Day/night EC levels
- Water level control – to lower EC

# Contents

**Important notice:**
When using automatic dosing equipment, all chemicals must be in a diluted state, especially acids and alkalis.

Acids and alkalis should be diluted to a maximum strength of 2% or less.

We recommend diluting your nutrients 1-part nutrient to 4-parts water while dialing in your dosing setting

# Compliance Declaration

## 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 complies 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. Operating this equipment in a residential area is likely to cause harmful interference, which 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 express approval of Autogrow Systems Ltd, could result in the product not meeting the Class A limits, in which 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 complies 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. It should be recycled at the end of its life. It may be returned to the distributors in your region for recycling or safe disposal.

# Quick start

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

Install the controller to one side of the mixing tank where it will not be exposed to splashes and vapours. Remember, the sensor leads (5m) must be able to reach the sample pot which should be mounted just above the top of the mixing tank. **See section G for detailed installation notes**.

## Typical installation using peristaltic pumps
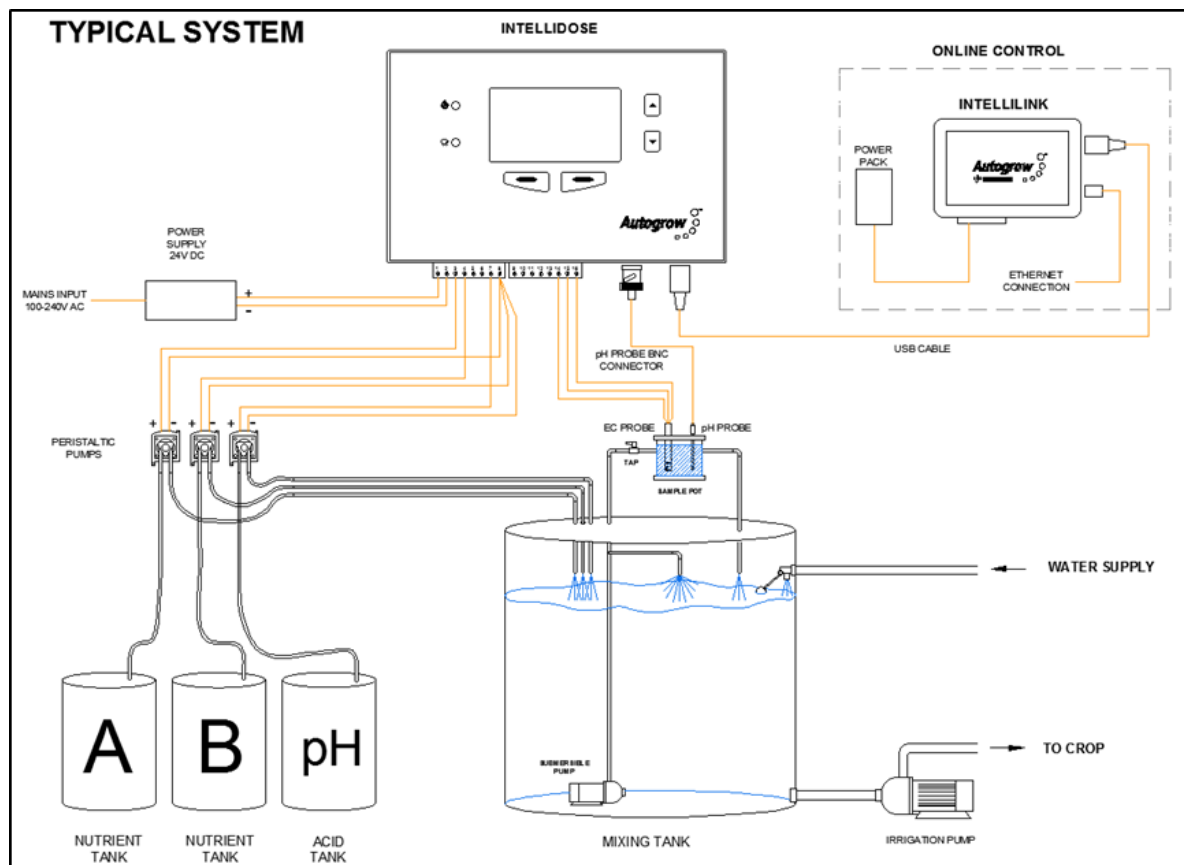


**HINTS:**
- Mount sample pot just above top of tank as many small pumps have low head pressure capability

- Mount IntelliDose away from spray and humidity from tank and stock solution, preferably just outside grow room

- Adjust the valve on inlet pipe to the sample pot to achieve a steady flow without excessive turbulence or air bubbles in the sample pot

Clean the EC sensor and calibrate all sensors before use – **See section C for details**

Fill stock tanks and mix tank with plain water and run for a day to check for leaks and observe operation is correct.

## IMPORTANT:

When using an automatic doser, the stock solutions and acid/alkali must be diluted. This is particularly important if a small mixing tank (e.g. under 1,000L/250gal) is used.

**The acid or alkali for pH adjustment must be diluted to no more than 2%**
You may need to experiment with the dilution rate of the nutrients so a 3 to 8 second dose results in a TDS change of 50ppm (0.1EC or 1CF). For pH, a 3 to 8 second dose should result in a pH change of about 0.1pH. In any event, the acid should be diluted to below 2% strength to ensure it does not react adversely with your nutrient and will also increase the life of the peristaltic tubing.

It is also important the tank is continually stirred while dosing and there is a continuous gentle flow through the sample pot. If the sample pot is mounted too high there is a danger of the flow ceasing if the pump loses pressure (head) for any reason such as wear or a partially clogged input filter.

## IntelliGrow

With IntelliGrow, your Intelli devices are accessible via your web browser so you can control your growing operation remotely from your phone, tablet, or computer. IntelliGrow gives you complete visibility 24 hours a day and enables you to manage multiple locations from the comfort of your office, using a single sign on.

Automatically manage your nutrient and pH levels, set remote alarms and data log your progress with this one simple machine.

**Though you can set most everything on the controller itself via the keypad, the below features are only available on IntelliGrow.**

- **Scheduling**
- **History**

To access the latest version of your IntelliGrow Quick Start Guide, please head to:
https://knowledge.autogrow.com/articles/intellilink-quick-start-guide

Please visit https://autogrow.com/our-products-solutions/intelligrow for more information.

# Section A - **IntelliDose® Hydroponic Doser**

The **IntelliDose** hydroponic doser is the most advanced and user friendly doser on the market. It has a wide range of possible applications which we discuss briefly in this section. To keep the user interface as simple as possible, only the readings and settings relevant to the selected features are displayed on the controller's LCD. For more advanced options, log in to https://intelligrow.autogrow.com/

We recommend using a quality handheld meter to spot-check your EC & pH on a regular basis, ensuring your probes are reading correctly and holding calibration.  Make sure you choose a handheld meter with the same scale as (.1-9.99EC/2-12pH).
For example: https://bluelab.com/usa/bluelab-combo-meter

## Selection of units

You may select either EC, CF or TDS (ppm) units for the nutrient strength and either degrees C or degrees F for temperature. The acidity or alkalinity is always measured in pH. In this manual, we use EC (electrical conductivity) to denote either EC, CF or TDS. The date format is selectable between mm/dd/yy and dd/mm/yy formats.

The TDS standard used for this controller is EC x 500 but it is also possible to select EC x 640 and EC x 700 (when using IntelliGrow).

## Mixing nutrients   -   IMPORTANT - PLEASE READ THIS CAREFULLY!

When using any automatic doser, it is important the nutrients and acid/alkali are diluted to 2%. The instructions on many dry powdered nutrients tell you to prepare the stock solutions to quite a concentrated level (100:1 or more). Liquid nutrients are also very concentrated. For a small mixing tank, this will be too strong and even if very short doses are given the system will overshoot. If using powdered nutrient, mix them into water so that for each 1Kg/2.24lbs of powder you obtain at least 20L/5gal of solution. Liquid nutrients should be diluted with water to make up at least 5 times their original volume. Acids and alkalis should be diluted to be less than 2% strength. If using strong acids, always wear goggles, gloves and add the acid to the water then stir well.

When you have the dilution right, you should get a 0.1 mS/cm change in EC with a 5 second dose time of A and B solutions. In a similar way, the pH should change by about 0.1pH with a 5 second dose time of pH adjuster solution. If it changes by less, that is fine, but if it changes by more, you will need to dilute the solution further.

## One part or two-part dosing

For 1-part dosing, only one dosing pump is used to add nutrient to the mixing tank. When 2-part dosing is selected then two dosing pumps will be used to add part A and part B stock solutions. In this case it is sometimes found the part A and part B do not dose at exactly the same rate (one tank empties quicker than the other). There are a number of reasons why this may occur including different pipe arrangements, filters partly blocked, tanks or dosing valves mounted at different heights and even the difference in specific densities of the stock solutions. To compensate for this, you may adjust the two dose rates electronically by reducing either A or B dose rates below 100%. For example, if you set A at 100% and B at 95% then B will dose a little less than A each time a dose is added to the tank. This is set by trial -and-error starting with both A and B at 100%. (Always leave one at 100% and reduce the other)

## Multi-part dosing

With 3 to 9-part dosing, the ratios may be varied to suit a feeding schedule as recommended by the nutrient supplier. In this case, the ratios between all the nutrient parts can be individually varied. A schedule may be added using IntelliGrow, which will automatically vary the nutrient ratios and EC as required. This can be used to gradually and automatically change the mix from vegetative to generative whilst at the same time gradually changing the EC. **Note:** On each date specified, the settings change to the new values and then stay at these settings until the next date schedule is reached. Once the last entry is reached the settings just stay at those values permanently. It is important to note, when using variable ratios for various nutrient parts, the dose time must be set to be long enough the part with the smallest ratio still gets a dose of two seconds.

## Sequential dosing (default ON)

This causes the dosing pumps or valves to activate in sequence, one after the other and allows high current valves or pumps to be connected to the unit without fear of overloading the controller or its power adapter. **If in doubt** about the current required to drive the pumps, **always select sequential dosing**. If 3 or more nutrient parts are selected sequential dosing is enforced to avoid damage to the controller.

## Proportional dosing (default OFF)

This causes the dose size to automatically vary in proportion to the difference from the current EC reading and the set point, it is useful when you want the tank to dose up quickly. If this is selected, then the dose size is specified as both a maximum and minimum dose time. The controller then looks at the size of the difference and if large, will give longer doses, as the EC setpoint is approached, the controller will give shorter doses. This is useful in irrigating (drip) systems that do not re-circulate as it allows rapid dosing after each irrigation occurs. This feature is not available with more than a 2 part mix.

## Different EC for day and night

This feature is useful for crops needing a weaker solution during the heat of the day and a stronger mix when it cools at night time (e.g. to help prevent tip burn in lettuce). The user can define when "day" starts and ends and this does not have to align in with actual day time (e.g. you can set day to start at 11am and end at 3:30pm). **Note**: The controller has capability of strengthening the mixture by dosing and weakening the mixture by adding water.

## Automatic addition of water

By installing a mixing tank with two water level ball valves, one at a low level and other at a high level, it is possible for the controller to dilute the nutrient tank by adding water. This is done by operating a solenoid valve in line with the high-level valve. **See diagram on page 21.** This function is mainly of interest to leafy greens growers.

## Irrigation

This allows a pump to switch on periodically for a set time to irrigate plants. The irrigation can be specified to operate in "day only" mode or it can have a different interval set for day and night. For example, you could set it to irrigate for 4 minutes every 1 hour during the day and for 4 minutes every 5 hours at night. Alternatively, it can be set to come on once every day at the same time. This could be used to operate lighting (instead of irrigation) for indoor crops. For more advanced irrigation settings, **see section K**.

## Fail safe dosing

Dosing may be inhibited if any of the following conditions are detected.
- EC is measured less than 0.1 or greater than 6
- pH is measured less than 4.5 or greater than 8

## Alarms

The alarms can be enabled on the controller buzzer or to text/email you when using IntelliGrow. Each of these can be silenced or enabled. Any enabled alarm will sound when a relevant reading deviates outside set limits.

## Outputs

The outputs voltages for dosing and irrigation control are all dependent on the power supply adapter used. The IntelliDose is supplied with a 24VDC power supply.

> We recommend using a 24VDC solenoid for irrigation.

## Power Supply

The outputs voltages are all dependent on the power supply adapter used. The controller is supplied with a 24VDC power supply. Note: The outputs are limited to a current 2.5A 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 2.5A.

## Getting Started

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

- Connect power to the IntelliDose
- Check the power light on the front panel is on
- Check the LCD display has some information on it
- Navigate to the Overrides menu and Force ON each piece of equipment to confirm your wiring is correct

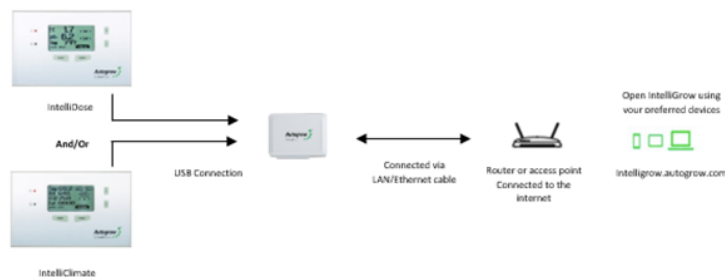# Connect IntelliDose to the cloud

Connecting your IntelliDose to IntelliGrow will allow for remote access, data logging, text/email alerts and remote tech support.

> We recommend you use the Autogrow IntelliLink gateway device to connect your controller directly to your network.

**Connect your devices as per the picture below**
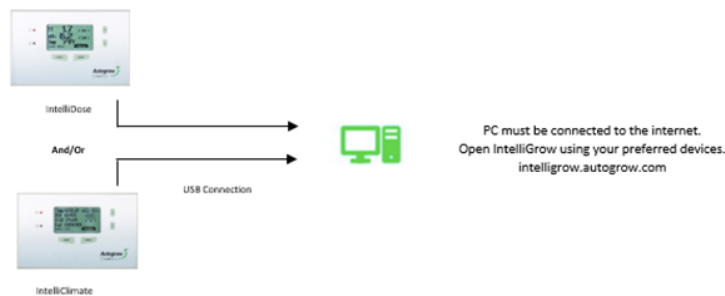


**Connect via IntelliLink (recommended):**

Please visit this page for the IntelliLink Quick Start Guide:
https://knowledge.autogrow.com/articles/intellilink-quick-start-guide

**Connect via PC:**

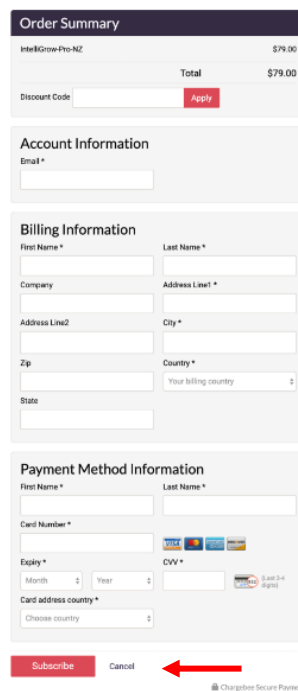Please visit this page https://knowledge.autogrow.com/articles/connecting-with-windows to download the IntelliGrow gateway software. Confirm your IntelliClimate is connected to your PC via USB cable.

If you experience any issues, please contact support@autogrow.com.

## Here are the instructions to activate your IntelliGrow Subscription

- You will need to first register for a new account here https://intelligrow.autogrow.com/
- Login using your account details
- Click your profile in the top right of the page and select "Payments" from the menu.
- Click on IG Starter/Standard Annual "Buy Now" button.
- Fill in your details in the Order Summary and click subscribe
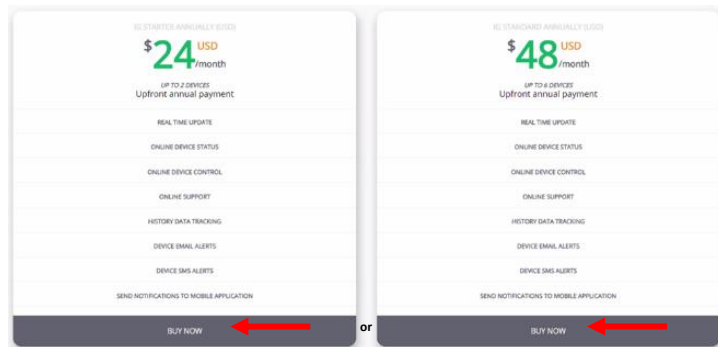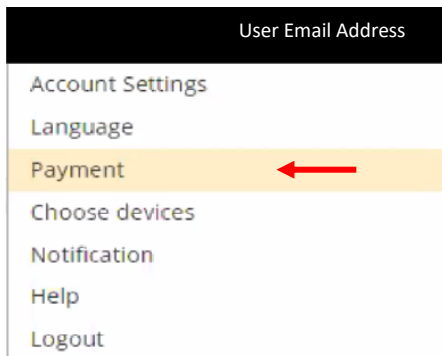
# Section B – **Settings using IntelliGrow**

**ORDER OF SETTING UP A NEW CONTROLLER**
1) Visit **https://intelligrow.autogrow.com/** to create account
2) Connect your IntelliDose to your gateway (computer or IntelliLink)
3) Ensure your IntelliDose shows as connected to your IntelliGrow account
4) Set the configuration of the controller to match the physical equipment. Print the wiring diagram and connect the dosing pumps accordingly.
5) At the controller, connect both the EC (TDS) and pH probes
6) Calibrate both EC (TDS) and pH probes
7) Enable all functions you wish to use
8) Check the time/date on the controller

## Configuration

First, under the General tab, select your temperature units, date format, EC preference and name your device.

Next, under the Functions tab, select the number of nutrient parts you wish to automatically dose. You have a total of 9 outputs, the more you use for nutrients, the less will be available for pH dosing and irrigation. Having selected the number of nutrients to be dosed, continue by selecting the pH dosing required, then whether irrigation output is required.
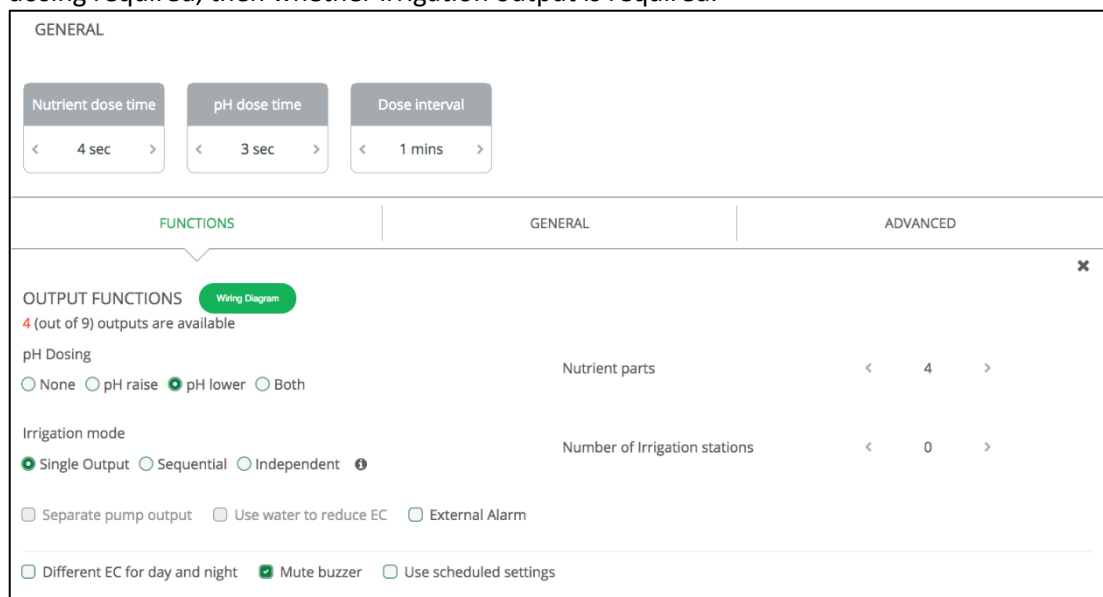


The wiring diagram is dynamic and will change according to your output configuration. Every time an output designation changes, you must check your wiring diagram to confirm your wiring is correct. This is available via IntelliGrow, under Functions.
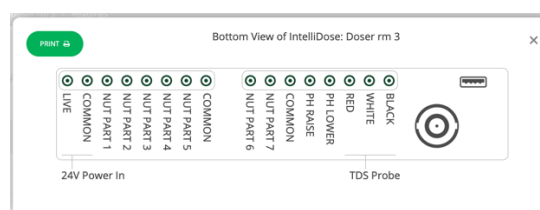
If you wish to have a different EC (TDS) for day and night, this can also be selected. If selected, you can also choose to add water automatically to reduce EC.

As soon as you have used all the 9 available outputs, the options will appear greyed out and will be un-selectable. The only way to select them is to go back and deselect some previous choices.

You can select "Use Scheduled Settings" if desired, **see page 12**. This gives you the opportunity to set up a complete growing schedule by specifying the nutrient ratios and EC for each stage of growth. This schedule is easy to modify if the plant growth is slower or faster than expected, you can make alterations at any time. It is possible to save the schedule to disk so that it can be used for future crop cycles.

In the Advanced section, you can select proportional dosing if required. This will only work satisfactorily on systems that irrigate large quantities of water from the tank and therefore need very rapid dosing to get the EC and pH back to correct levels. If this is not the case, then deselect this option. It should only be used with 1 or 2 part mixes, and where you intend setting the dose interval to zero to achieve continuous dosing. This is sometimes used on very large irrigated systems so that continuous dosing occurs while irrigation takes place and fresh make-up water is entering on a continuous basis.

Sequential dosing should always be selected. This will allow you to dose different nutrients and additives at different rates.

The fail-safe disable for dosing should always be enabled. This will prevent dosing if the controller suspects a probe has become faulty or if the EC/pH are too far from your set points.

"Save current settings to disk" will capture all your settings from the controller and store them in a file on your computer's hard drive.

"Read settings from disk" will allow you to quickly reset the controller to previously saved settings.

IMPORT/EXPORT SETTINGS

Read settings from disk        📂
Save current settings to       💾
disk

## Dose Times & Intervals

Dose times and intervals are set by trial and error. The smaller the reservoir, the smaller the dose time needs to be. The strength or concentration of your stock solutions will also affect the dose time setting. The stronger the stock solution, the shorter the time the pump runs. If you are using a small reservoir tank you must ensure your stock solutions are very dilute.

Ideally, you are trying to achieve a dose time where the EC(TDS) goes up by about 0.1EC (50 ppm) for each dose. The minimum time any pump should run for is 1 second.  For example, if you have a dose time of 10 seconds, the minimum percentage (smallest ratio) needs to be 10% or greater.  If it is lower than 10%, the pump will not run for 1 second.

The dose interval is set to allow time for a dose to fully mix in before the controller makes the decision as to whether another dose is required. As a rule, use a shorter interval time for smaller tanks and a longer interval time for larger tanks.

There is an expected time for fine-tuning the dose times and intervals, set a reasonable starting point and then adjust as needed.

Every system is unique and will have its own requirements.  If you would like help to determine the best dose times and intervals, please contact support@autogrow.com.

## pH Raise or Lower

For most growers, pH lower is the most common requirement.  Depending on water source, nutrients and plant growth, you may find you need to use pH Raise at certain growth stages.  The IntelliDose can be configured to run no pH adjuster, pH raise, pH lower or both.  If you choose to run both, you will be able to wire up a peristaltic pump to each raise and lower, **but the system will only be able to dose in one direction at a time**.  When you need to change direction, you simply login to your IntelliGrow account and switch pH from raise to lower or vice versa.  On the controller keypad navigate to Menu > Configure > Advanced > pH Output Setup.
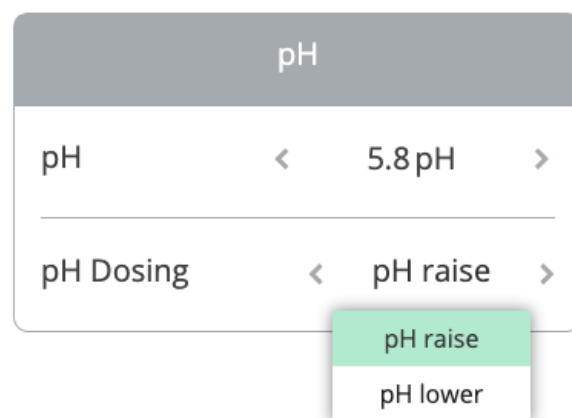
| pH | | |
|---|---|---|
| pH | < 5.8 pH | > |
| pH Dosing | < pH raise | > |
| | pH raise | |
| | pH lower | |

# Scheduling

To set up the scheduling function, scroll down the page to Functions and tick the "Use scheduled settings".
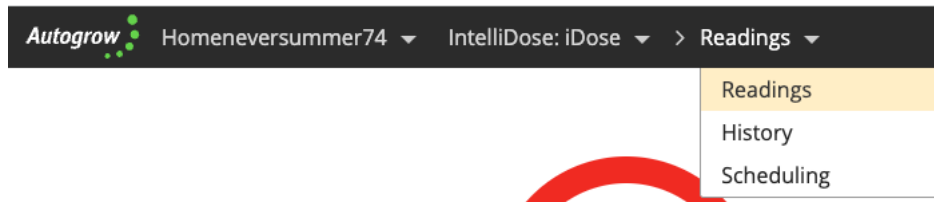
After saving the settings, you will use the drop-down menu to access your Scheduling. Please note, if scheduling has been selected, then settings like the nutrient set points and nutrient dose ratios will appear "greyed out" on the home page as they are derived from the entries on the schedule tab and cannot be altered here.

**Start Date** 07/01/19 📅

| | Day | Date | Pt. 1 % | Pt. 2 % | Pt. 3 % | Pt. 4 % | Nutrient mS/cm² |
|---|---|---|---|---|---|---|---|
| ✖ | 1 | 07/01/19 📅 | 100 | 100 | 100 | 100 | 0.8 |
| ✖ | 7 | 07/07/19 📅 | 100 | 100 | 100 | 100 | 0.9 |
| ✖ | 14 | 07/14/19 📅 | 100 | 100 | 60 | 80 | 1.1 |
| ✖ | 21 | 07/21/19 📅 | 100 | 100 | 75 | 90 | 1.3 |
| ✖ | 28 | 07/28/19 📅 | 100 | 100 | 100 | 100 | 1.4 |

If you need any help with setting Schedules, please contact Autogrow at support@autogrow.com and one of our experts will help you to build your perfect feed schedule.

## History

This history screen allows you to graphically view all data logged from the controller.
This is very useful for diagnosing problems.
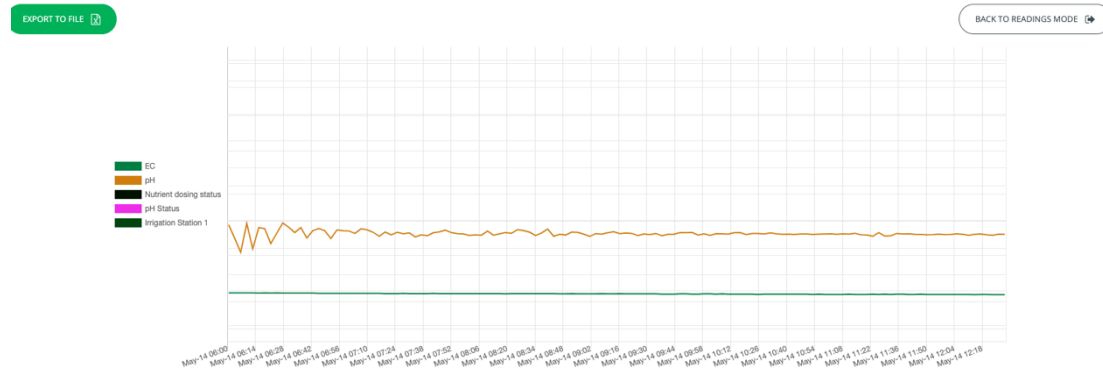


The pop-up calendar allows you to easily view records from previous days, months or years. The Options tab allows you to customize your history screen to show only attributes and functions required for your system.  Once you have customized your history screen, you can save the settings to disk to be able to pull it up quickly in the future.

## Export the data
You have the option to export the data as a .csv or .xlsx file if desired.

## Section B2 – **Settings using IntelliDose Keypad**

Though you can set most everything on the controller itself via the keypad, the Scheduling, Wiring Diagram and History features are only available on IntelliGrow. The calibration of probes can only be completed via the keypad.

The two keys at the bottom of the display are "soft keys". This means their function at any time, is shown on the screen above them. After switching on, you will see the right-hand key has the label "menu" on the LCD above it and the left-hand key is unused at this point. To the right of the LCD screen are two arrow keys. The arrow keys are used for moving up or down through the menus, and when in a screen which allows you to edit a numeric value, they are used for increasing or decreasing the values. They are also used to select between different options.

From the home screen, press "Menu" to access programming options:

**DOSING**
**CALIBRATION**
**OVERRIDES**
**IRRIGATION**
**ALARMS**
**CLOCK**
**CONFIGURE**

When you first access the menus, go to Configure > Advanced > Output and program which features you are using (ex: pH Dosing direction and Irrigation). If you do not install a feature, you will not have access to set it up in the previous menus.

If you wish to make a change to, e.g. irrigation timings, move down to irrigation and then press "enter" to enter the Irrigation sub-menu. Now by pressing the down and/or up arrows move through this sub-menu to see the item that you wish to change, press enter to access this item. After making any changes the soft keys will allow you to either save the new setting or to cancel and exit out of that screen.

The setting order is the same as when using IntelliGrow and the settings that you will access are also the same, we suggest you use the previous pages on IntelliGrow settings, to guide you through the setting procedure.

# Section C – **Calibration Instructions**

## Calibrate EC sensor

- Clean the face of the probe. Remove the shroud from the end of the probe and use a little kitchen liquid scouring cleaner such as "Jif" or "SoftScrub" on a **clean** "Scotchbrite" nylon scouring pad. Alternatively, use 600 grit wet-and-dry paper with the cleanser. Use a circular motion to scour the face of the probe and then rinse well in running water. Do not touch the face of the probe with your fingers, shake off any residual water.
  This care kit makes cleaning your pH probe very easy https://bluelab.com/usa/bluelab-probe-care-kit-conductivity

- Replace the shroud and then place in the calibrating solution. The solution supplied has an EC of 2.77mS/cm. To ensure the IntelliDose calibrates properly, you will need to use 2.77mS/cm solution to calibrate. Allow about 5 minutes for the temperature compensation to fully stabilize, press the menu button to reach the Calibration screen, press **"Enter"** to get to the Calibrate sub-menu, press **menu** to step through this sub menu until you reach the "Calibrate EC" screen. Press **"Enter"** to get into the "Calibrate EC screen".

- Press either the Up or Down arrow keys, to get the calibrated reading to correspond with the Standard calibrating solution (2.77mS/cm,). When this is achieved, press the save button.

## Calibrate pH sensor

- The glass bulb at the end of the pH electrode should be shiny and clear. If necessary, clean the glass bulb at the tip of the sensor with a very soft toothbrush or a special cleaning tool with a little liquid dish washing soap. The bulb is very delicate – **TAKE CARE.** This care kit makes cleaning your pH probe very easy https://bluelab.com/usa/bluelab-probe-care-kit-ph

- Rinse thoroughly in water and then place in the pH 7 buffer solution. **NOTE: YOU MUST ALWAYS CALIBRATE AT pH 7 BEFORE pH 4.**

- Allow a few minutes for the reading to stabilise, press menu button to reach the Calibration screen. Press Enter to get into the Calibration sub-menu, "Enter" the Calibrate pH 7 screen. Press the up and down arrows until the reading matches the calibration solution (within +/- 0.1). Press "Save" to store the calibration.

- Rinse the probe and place in pH 4 buffer solution. Allow to stand for at least 5 minutes until there is no further change in the pH reading. Use the Menu and Enter keys to navigate to the Calibrate pH 4 screen. Press the up and down arrows to get the calibrated reading to match the calibration solution (within +/-0.1) and then press "Save" to save the calibration and exit from that screen.

> The EC probe should be cleaned regularly and calibrated every other week. The pH probe should be calibrated weekly. In addition, it is advisable to use a hand-held meter to check the EC and pH every day. If ever the hand-held instrument and controller readings differ, then all probes should be cleaned, checked and recalibrated.

# Section D – **Dosing Settings**

Best dosing accuracy is achieved with longer dose times. If any ratios of a multi-part mix are set to a short dose time, then it is important to ensure dose time is still above 1 second.

For example, a dose time is set to 5 seconds, and one part is set to a ratio of 10%. This means a ratio of 100% = 5 seconds, a ratio of 10% will equal only ½ second, an insufficient time for a pump to run. The solution is to increase the dose time to 10 or 20 seconds. At 10 seconds the 10% component will dose for 1 second (just long enough but still not as accurate). At 20 seconds a 10% component will dose for 2 seconds (which will be more accurate).

However, you may see each of these larger nutrient doses increase the EC by more than the desired 0.1 EC (50ppm). The only solution to this is either dilute the stock solutions or use a larger reservoir tank or a combination of both. If diluting stock solutions, it is important to dilute them all to the same ratio. E.g. 1-part nutrient to 3-parts water (makes a 25% solution). This would result in each dose causing the EC to rise by ¼ of its previous value.

Another approach is to dilute only the nutrient parts that require the lower ratios. For example, a recipe recommends 100:50:10. If the dose time is set to 5 seconds then part A would dose for 5 seconds, part B for 2.5 and part C for only 1/2 second. By diluting part C in water with 1-part C to 4-parts water, it would reduce its strength to 1/5th of the original. Then you would schedule 100:50:50 which will be more accurate.

In "Configure" on the controller or "Functions" on IntelliGrow, select how many nutrient parts you will be using.  Then, choose whether you will be using pH raise, pH lower or both. Most frequently, pH lower (acid dosing) is used. If you see the pH continually drifts down, change this to pH raise, ensure you have a dosing pump connected to the pH raise output and to a stock tank containing pH raise (alkali).

Set desired EC & pH Set Points - **On IntelliDose Keypad**

- **Navigate Menu > Dosing > EC > EC Set Point**
  This should be set so that each dose raises the EC by 0.1mS/cm (1CF or 50ppm)
- **Navigate Menu > Dosing > EC > EC Dose Time**
  The amount of time the pumps will run when a dose is activated.
- **Navigate Menu > Dosing > EC > EC Dosing Interval**
  The dose interval is set to allow time for a dose to fully mix in before the controller makes the decision as to whether another dose is required. As a rule, use a shorter interval time for smaller tanks and a longer interval time for larger tanks
- **Navigate Menu > Dosing > pH > pH Set Point**
  The pH dose time so that each dose alters the pH by about 0.1pH
- **Navigate Menu > Dosing > pH > pH Dose Time**
  The amount of time the pumps will run when a dose is activated.
- **Navigate Menu > Dosing > pH > pH Dosing Interval**
- The dose interval is set to allow time for a dose to fully mix in before the controller makes the decision as to whether another dose is required. As a rule, use a shorter interval time for smaller tanks and a longer interval time for larger tanks

Set desired EC & pH Set Points - **On IntelliGrow**
- Set the desired EC and pH set points on the home screen.

## Section E – **Proportional Dosing (default OFF)**

Proportional dosing allows rapid dosing toward the set point. A maximum and minimum dose time must be entered. The maximum time should be set so that a dose of this size would raise the EC from its raw water value to 80% of the setpoint value in a single dose. The minimum dose time should be set to achieve a rise in EC of 0.1mS/cm (CF=1, ppm=50). The controller will then select the most appropriate dose time within this range, depending on the measured EC. When starting with a tank of pure water, the controller will make one very large dose followed by smaller doses as the setpoint is approached. Note that proportional dosing is not available for use with 3 (or more) part mix.

## Section F – **Sequential Dosing (default ON)**

By selecting sequential dosing, the dosing outputs will operate in sequence, one after the other. This ensures each nutrient is dosed separately into the tank. Also, the IntelliDose is supplied with a 2.5A power supply, so it is safer to run the pumps individually, to avoid overloading the power supply and blowing the internal fuse.

# Section G - **Installation**

The IntelliDose controller should be installed in a cool, dry place out of direct sunlight.
Remove the screws holding the back, fit the mounting feet, then screw to the wall. If using the dry wall (plaster board) anchors, use the longer screws supplied. If fixing to a plywood board, use the shorter screws.
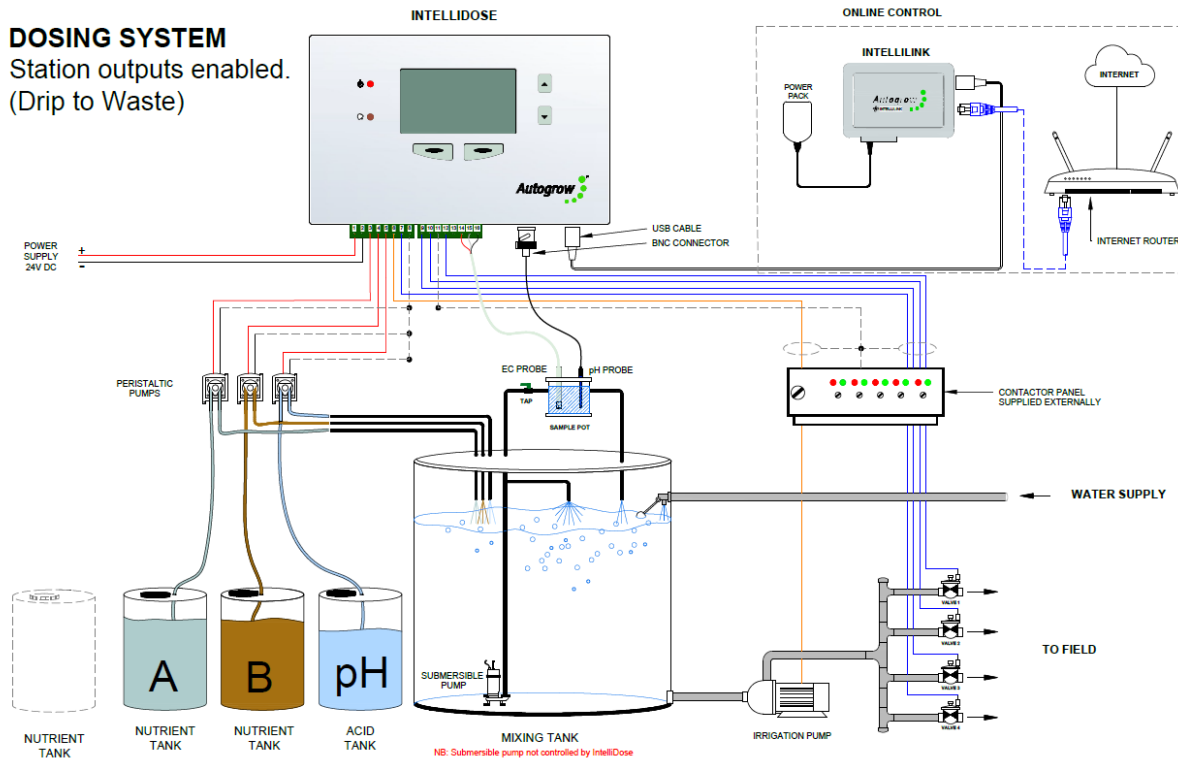
## Typical Installation for NFT
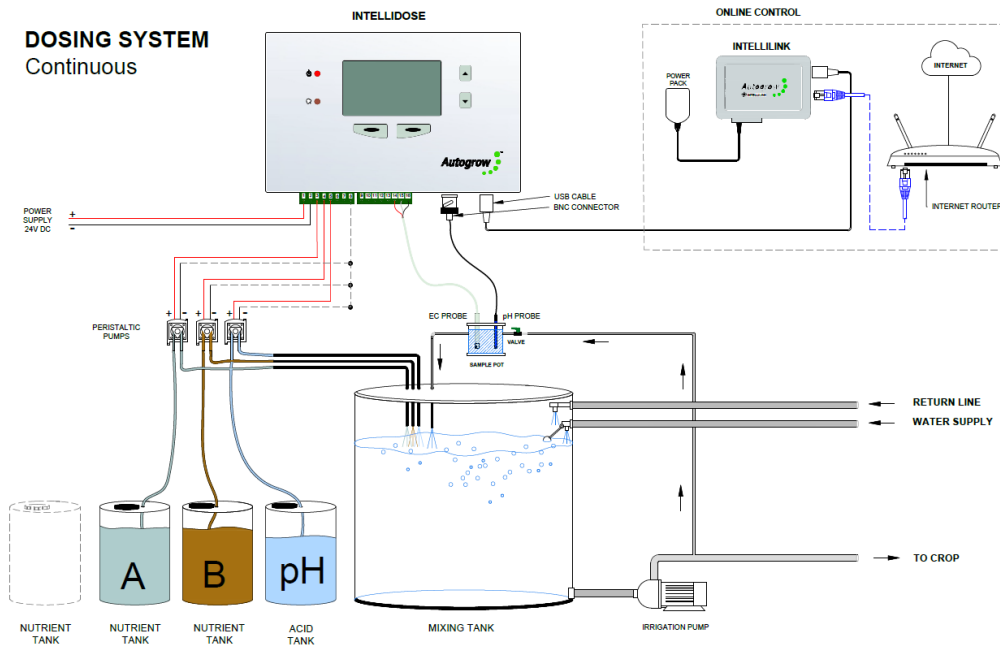


## Installation for NFT with solenoid valve to automatically add water to dilute EC
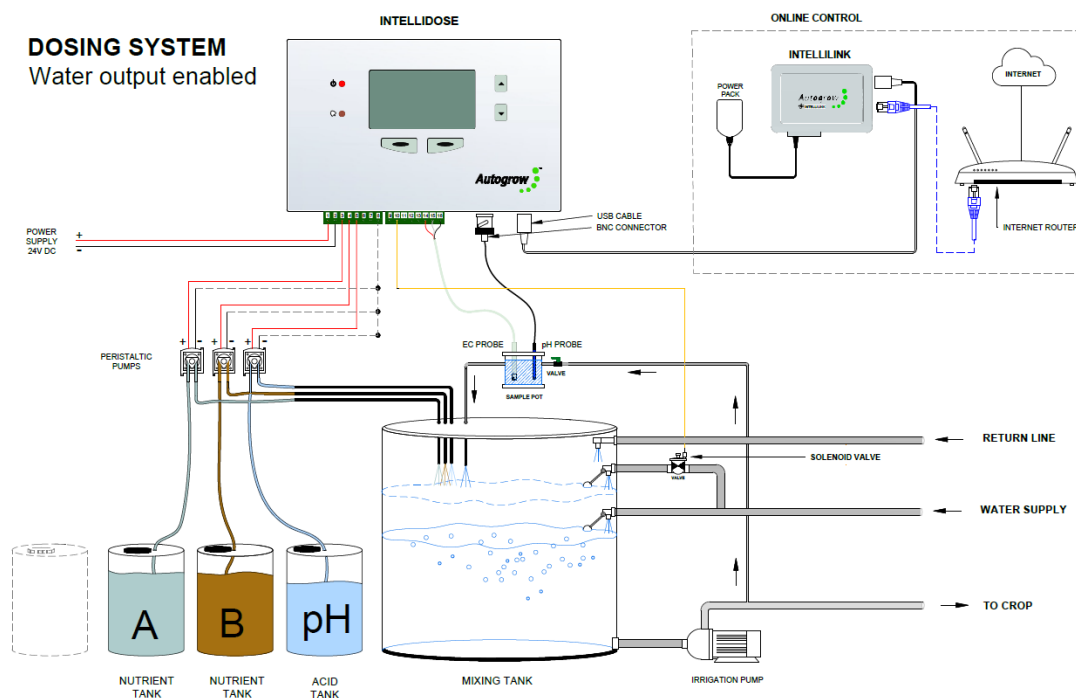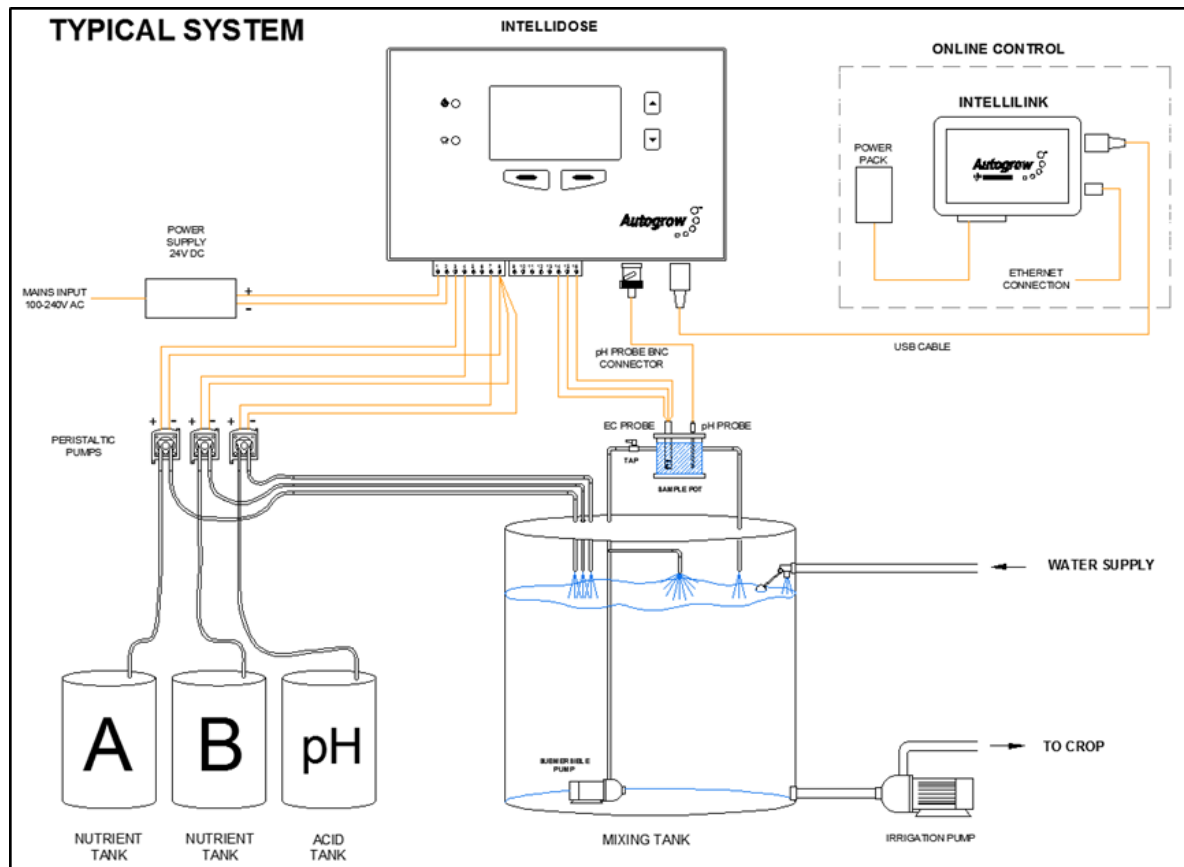
**Installation for NFT with solenoid valve to automatically control water and Irrigation pump via contactor panel**

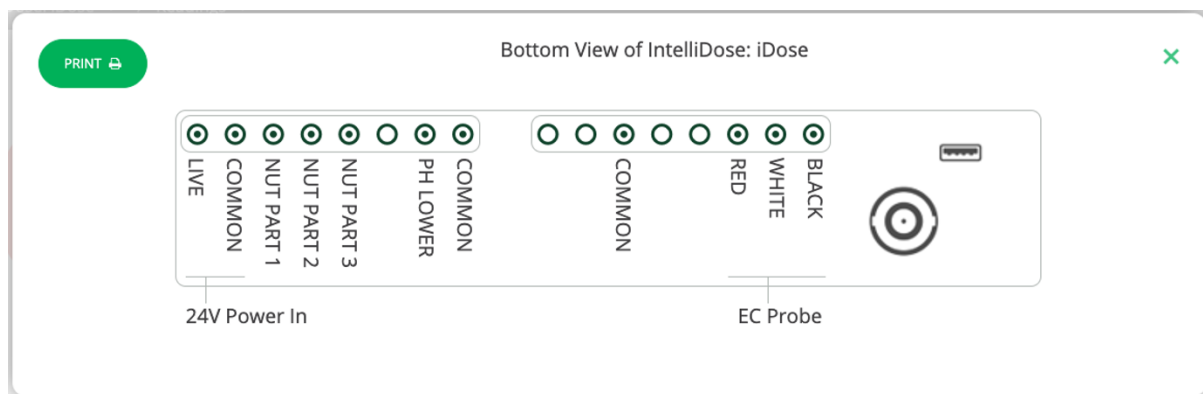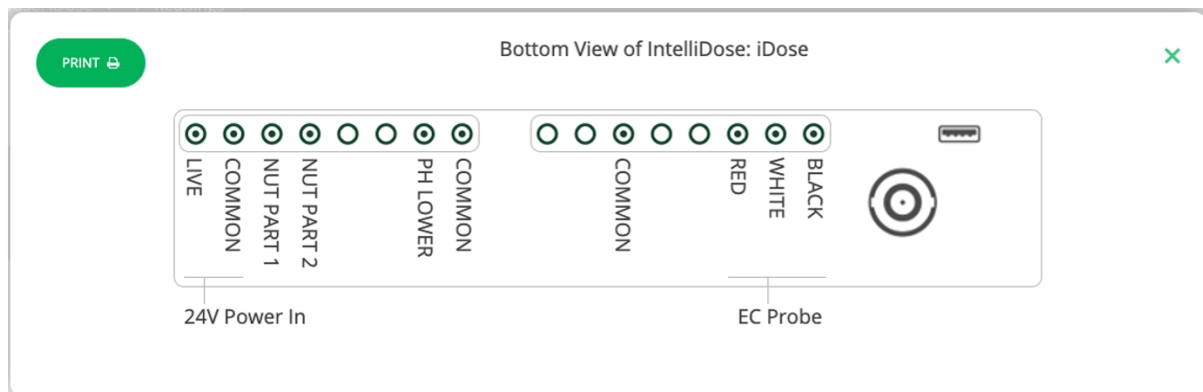**Typical installation using peristaltic pumps**



**NOTES:**

- If an irrigation pump is used, a second small pump should be used to continuously circulate the solution through the sample pot and keep the tank stirred. The irrigation pump would then need a "pump start relay" with a 24V DC coil to switch on, only when an irrigation is called for.

- If the irrigation water is returned to the reservoir tank, allowance must be made for the level to rise a little above the float valve level.

## Peristaltic pumps

Supplied peristaltic pumps are rated for 24V DC. You can run up to a total of 9 peristaltic pumps, based on your system configuration. Peristaltic pumps should be installed above the stock tanks and the reservoir. The stock tanks should be on the ground, next to the reservoir.

Important: Peristaltic Pump mounting height should not exceed maximum 2.1 metres/7 feet measured from the bottom of the stock tank.

## Connection diagram for 1, 2 or 3 part nutrient dosing

PRINT 🖨

Bottom View of IntelliDose: GH C Prod ✕

LIVE · COMMON · NUT PART 1 · PH LOWER · COMMON · COMMON · RED · WHITE · BLACK

24V Power In   EC Probe

PRINT 🖨

Bottom View of IntelliDose: iDose ✕

LIVE · COMMON · NUT PART 1 · NUT PART 2 · PH LOWER · COMMON · COMMON · RED · WHITE · BLACK

24V Power In   EC Probe

PRINT 🖨

Bottom View of IntelliDose: iDose ✕

LIVE · COMMON · NUT PART 1 · NUT PART 2 · NUT PART 3 · PH LOWER · COMMON · COMMON · RED · WHITE · BLACK

24V Power In   EC Probe

The low voltage power from the adapter is connected to the two left connection terminals on the left-hand connector. On the included power supply, the white wire is Live and the black wire is Common.

A 24V DC power supply adapter is supplied together with 24V DC peristaltic pumps.

The connection diagram for more than 3-part nutrients must be mapped by IntelliGrow software, AFTER configuration has been complete. If you are not intending to use IntelliGrow, please ask your supplier if they are able to pre-configure and print out the wiring diagram for you.

## Section H – **Maintenance**

### Clean EC probe

Remove shroud from end of probe. Clean the face of the probe, use a kitchen liquid scouring cleaner such as "Jif" or "SoftScrub" on a **clean** "Scotchbrite" nylon scouring pad. Alternatively, use 600 grit wet-and-dry paper with the cleanser. Use a circular motion to scour the face of the probe, to clean face, rinse in running water. Do not touch the face of the probe with your fingers, shake off residual water. Replace the shroud and check calibration.

### Cleaning the pH electrode

**The pH electrode is supplied with a protective cover. Its purpose is to keep the glass bulb wet during storage and transit. This cover must be removed before use.**

The glass bulb at the end of the pH electrode should be shiny and clear. If necessary, clean the glass bulb at the tip of the sensor with a very soft "child's" toothbrush or a special cleaning tool with a little liquid dish washing soap. The bulb is very delicate – TAKE CARE.

Note, the glass bulb on the end of the pH probe cannot go dry, it will ruin the probe.  If you are not currently using the probe, please store in calibration solution or distilled water.

### Peristaltic pump maintenance

These require very little maintenance.  The smaller, 120ml/min peristaltic pumps do not need to be maintained or lubricated.

The larger, 450ml/min & 1.4L/min pumps will need to be lubricated every 3-6 months.  You may find you need to replace the internal tubing after some time.  The faceplate of the pump is easily removed and the replacement tubing is simple to install.  Make sure there are no air leaks in the line to avoid siphoning of the nutrients.

### General maintenance

Frequently inspect your system for leaks, repair as soon as possible. Water dripping onto power supplies or pumps could cause them to fail. Ensure the controller, pump unit and power supply are kept clean and shielded from all water splashes and vapours.

# Section I - **Fault finding**

- **Unit is completely dead** – i.e. no display, no power light, no outputs. Check the power pack is functioning, (by measuring with a voltmeter if possible), is plugged in, switched on and properly connected to the controller. If unit still fails to function, the probability is the internal 4A fuse (20mm x 5mm miniature glass fuse) may have blown, likely because the wires connecting the pumps have touched together and shorted out. Inspect all wiring and ensure all wires are well insulated right to the point where they enter the terminal block. Then replace the fuse with a genuine 4A fuse. DO NOT ATTACH WIRE OR ALUMINIUM FOIL ACROSS IT.

- **Cannot calibrate pH**. Ensure your calibration solution is new and has been stored at room temperature. NEVER reuse calibration solution. If the calibration solution is fine, you will need to replace the pH probe. Any pH probe with a standard BNC connector will do.

- **EC reading varies from the expected measurement**. Ensure there is a small, non-turbulent flow of solution past the face of the EC probe. Ensure probe has been properly cleaned and is free from grease or oil (water should wet the face and should not bead).

- **pH fails to dose**. Ensure the controller is set for raise or lower to match the solution used. i.e. if you are using acid (pH down), set the controller to pH lower and ensure the pump is connected to the pH lower output.

- **pH overdoses**. Check the controller is set for pH raise or lower as described above. Also, check the dose time is not excessive. Each dose should change the pH by about 0.1pH

- **EC overdoses**. Check there is adequate flow through the sample pot and the EC dose time is not excessive. Each dose should change the EC by 0.1 (1CF or 50ppm)

- **Erratic EC Readings**. A possible air bubble in the shroud on your EC Probe. Remove the shroud and use a zip tie or rubber band to hang the probe from the top of the sample pot (see pic), just making sure the bottom of the EC probe does not sit on the bottom of the sample pot.
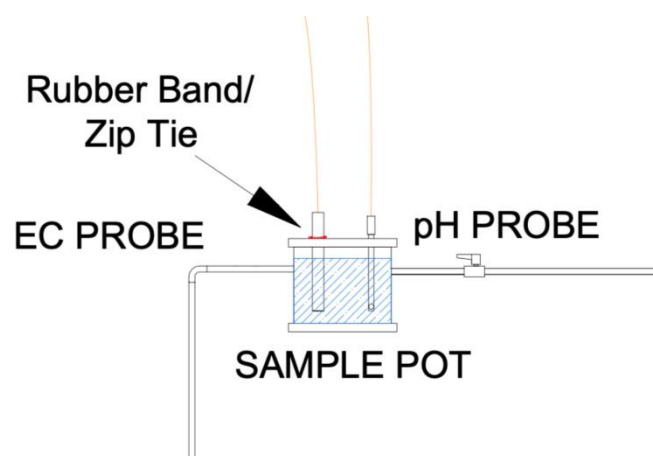
# Section J – **Specification**

9 outputs which can be flexibly configured to operate 1 to 9-part variable ratio nutrient dosing, pH raise, pH lower, Irrigation, add water or alarm

Output voltage same as supplied voltage 12V to 24V AC or DC, normally 24V DC supplied (Please contact Autogrow before using an AC power supply)

Nutrient measurement units EC, CF or TDS (EC x 500/640/700)

Measured range 0.1 to 9.9EC, 1 to 99CF, 0 to 4999 ppm

Nutrient resolution 0.1 mS/cm, 1 CF, 50 ppm

Nutrient measurement accuracy +/- 0.1 EC, 1 CF or 50ppm - temperature compensated

Nutrient dosing range 0.1EC to 5.9EC, 1 to 59CF, 50ppm to 2999 ppm

pH resolution and accuracy – 0.1 pH

pH measurement range 2pH to 12pH

Temperature resolution and accuracy 1$^o$C, 2$^o$F

Temperature measuring range 0-50$^o$C, 32-125$^o$F

Operating temperature range 0-45$^o$C, 32-110$^o$F (and not in direct sunlight)

Large graphics display using simple four key interface

Dosing fail safe shut-off (can be disabled)
- if nutrient is below 0.1EC, 1CF, 50ppm or greater than 6.0EC, 60CF, 3000ppm
- if pH below 4.5pH or above 8.0pH

USB connection and software supports multiple controllers

# Section K – **Advanced Irrigation Features**

IntelliDose provides the ability to control up to 4 irrigation stations with an optional master pump.

Each station is assigned its own duration, and control is either:
- **Sequential** - where each station is run in turn (one after the other) all being triggered by a single trigger (day/night interval or time of day)
- **Independent** – where each station is completely independent, each having its own trigger (day/night interval or time of day).

If a master pump is selected, this output will run each time any of the station outputs is set to run, to accommodate having a single irrigation pump with each station being watered by opening a solenoid valve.

Irrigation outputs are configured on the IntelliDose by navigating through the following menus:

**Menu > Configure > Advanced > Output**
- **Irrigation** – to enable all irrigation functionality
- **Station Outputs Use Station Outputs** –Yes enables up to 4 outputs to be assigned to irrigation stations
- **Station Outputs No. Station Outputs** – select from 1 to 4 stations
- **Pump Output** – Select Yes/No for a separate pump output which is activated each time any of the stations is activated
- **Station Mode** – chose between **Independent** and **Sequential**

Irrigation settings for each station in **Independent Mode** are accessed by navigating through the following menus:

**Menu > Irrigation >**
- **Irrig Stn 1** – access irrigation settings for station 1
- **Irrig Run Time** – specify how many hours/minutes/seconds the station will run
- **Irrigate every** – specify the daytime irrigation interval days/hours/minutes (if **Irrigate at same time each day** is No)
- **Irrigate every** – specify the night time irrigation interval days/hours/minutes (if **Irrigate at same time each day** is No)
- **Irrigate at**: - specify the time of day to start irrigation (if **Irrigate at same time each day** is Yes)
- **Irrigation Enabled/Disabled** – temporarily enable or disable the station (note the output remains assigned to this station even if disabled)
- **Irrigate during** – specify if irrigation will occur during both Day & Night or Day Only
- **Irrigate at same time each day** – specify if the irrigation for this station is triggered at a single time of day only (or triggered using daytime/night time interval)

 Each station's settings can be accessed in a similar manner.

Irrigation Overrides are accessed by navigating through the following menus:
**Menu > Overrides > Force Irrig. 1** – immediately start irrigating station 1
**Menu > Overrides > Force Irrig. 2** – immediately start irrigating station 2
**Menu > Overrides > Force Irrig. 3** – immediately start irrigating station 3
**Menu > Overrides > Force Irrig. 4** – immediately start irrigating station 4

Irrigation settings **in Sequential Mode** are accessed by navigating through the following menus:
**Menu > Irrigation >**
- **Irrig 1 Run Time** – specify how many hours/minutes/seconds the station will run
- **Irrig 2 Run Time** – specify how many hours/minutes/seconds the station will run
- **Irrig 3 Run Time** – specify how many hours/minutes/seconds the station will run
- **Irrig 4 Run Time** – specify how many hours/minutes/seconds the station will run
- **Irrigate every** – specify the daytime irrigation interval days/hours/minutes (if **Irrigate at same time each day** is No)
- **Irrigate every** – specify the night time irrigation interval days/hours/minutes (if **Irrigate at same time each day** is No)
- **Irrigate at**: - specify the time of day to start irrigation (if **Irrigate at same time each day** is Yes)
- **Irrigation Enabled/Disabled** – temporarily enable or disable irrigation (note the outputs remains assigned to stations/pump even if disabled)
- **Irrigate during** – specify if irrigation will occur during both Day & Night or Day Only
- **Irrigate at same time each day** – specify if irrigation is triggered at a single time of day only (or triggered using day time/night time interval)

In Sequential mode the whole irrigation cycle can be forced on by navigating to the menu:
**Menu > Overrides > Force Irrig. 1** – immediately triggering an irrigation, one station at a time

**IMPORTANT**

The irrigation cycle is taken from the **start** of the cycle. If you set an irrigation interval of 1 hour then the irrigation will start exactly one hour apart.

For example, if the interval is 1 hour and the duration is 20 minutes and irrigation begins at the start of the day at 6am then irrigations will be as follows:
6:00am-6:20am
7:00am-7:20am

# Using the advanced Irrigation Features in IntelliGrow software

**Configure Tab**

**Irrigation Mode** - chose between:
- **Single Output** - only one output is used for irrigation
- **Sequential** - for single trigger and each irrigation station runs in order
- **Independent irrigation** - up to 4 irrigation stations with individual triggers and durations

**Number of irrigation stations** - 0 to 4, where 0 means no irrigation is configured

**Separate pump output** – indicate if a main pump output should be activated along with each station

For **Single output** or **Sequential** irrigation, you can specify whether the trigger is 'Irrigate at same time each day' OR 'Irrigate during day only'

For **Independent** irrigation, these settings can be set for each station
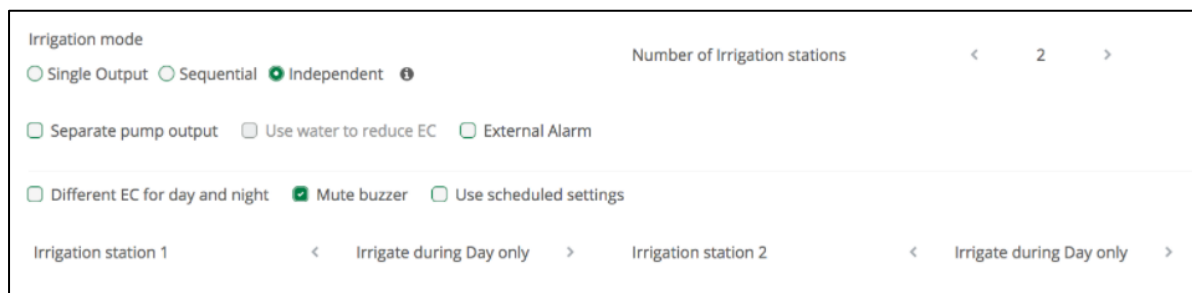


The wiring diagram has been updated to accommodate the new irrigation scheme:
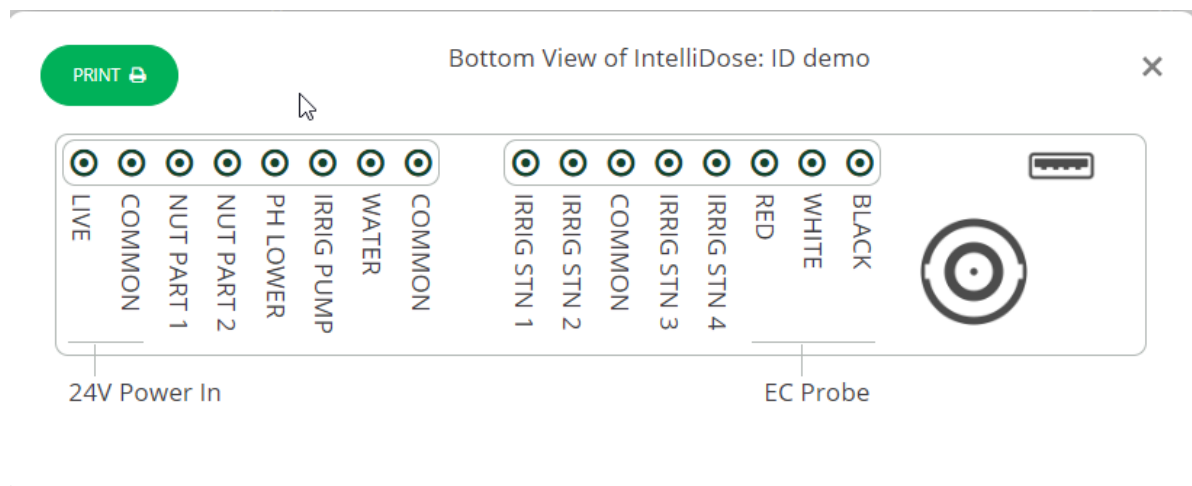
## IMPORTANT

When using **sequential** or **independent** irrigation stations and a **separate pump output** there will be one additional output allocated to the irrigation pump. This is to accommodate the scenario where a single pump drives the irrigation while individual solenoid valves are operated for watering each station. This additional output is labelled as '**Irrig pump**' on the wiring diagram and only needs to be used if using a single irrigation pump.
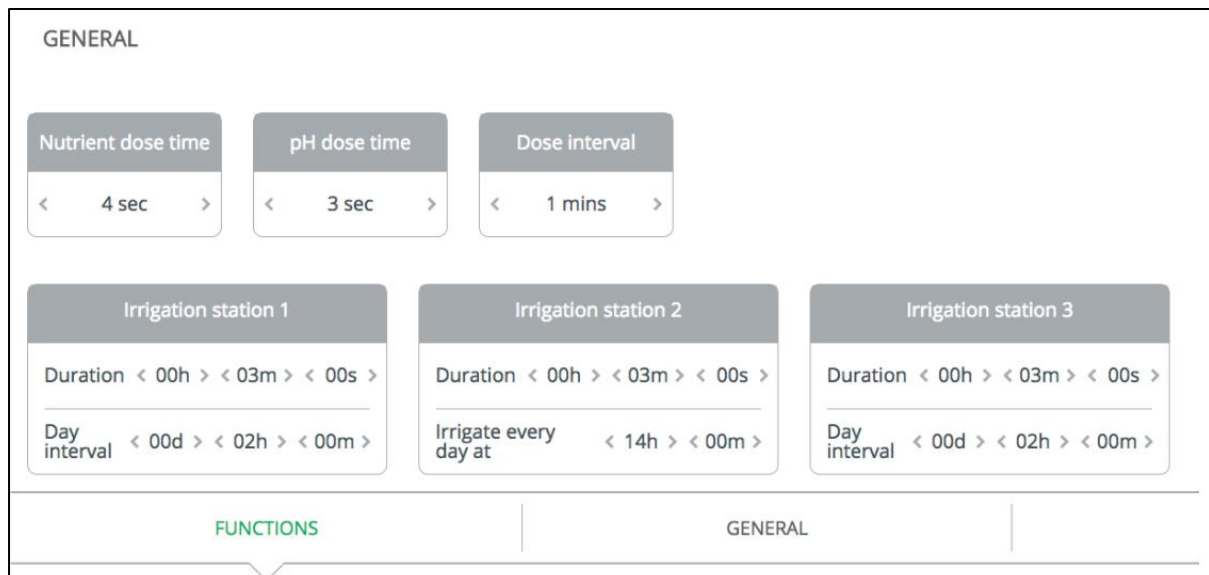
If individual irrigation pumps are used for watering each station, then it is not necessary to use the Separate pump output.

## Status Tab

Each **independent** irrigation station can be disabled or forced on:
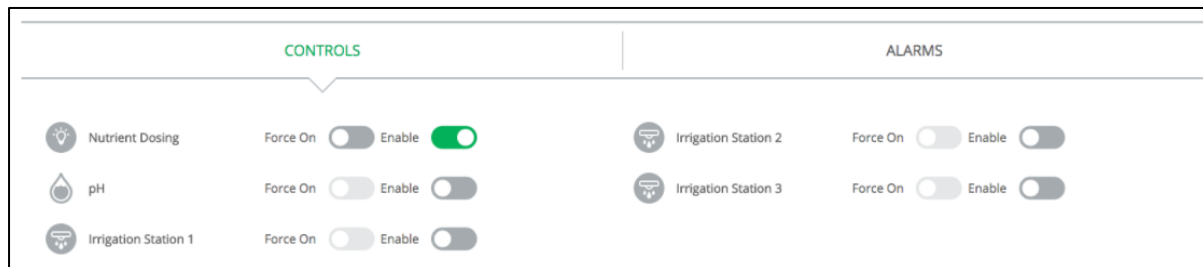


Each **independent** irrigation station can be set to use a different duration and trigger:



When using single output or sequential irrigation then only one irrigation trigger can be specified.

# Thank you for your purchase.

Get the most out of your IntelliDose or IntelliClimate control systems with IntelliGrow. IntelliGrow is a cloud-based solution allowing you to access, set, monitor and manage your growing operation - anywhere, anytime.
The IntelliGrow App is available for download from both Google Play App Store and Apple App Store

**Better growing control, more freedom.** Manage your growing operation anywhere, anytime by logging in on your PC, tablet or phone

**Base today's decision on real time data.** Leverage up to 5 years of historical grow data to make smarter, data driven decisions.

**Best in class infrastructure.** Protect your growing data with enterprise level data security, at small business prices.

**Keep your site running smoothly.** Invite Autogrow's experts to log in remotely when you need them.

**We'll handle the tech.** Seamless product updates means you get more functionality, without any disruption.

### In the box:

#### IntelliDose Controller

1 x IntelliDose controller
1 x Mounting hardware
1 x Instruction manual

#### IntelliDose Kit

1 x IntelliDose controller
1 x 24V DC 2.5A power supply with universal plug
1 x EC Probe
1 x pH Probe
1 x Sample Pot
3 x Starter Sized Calibration solutions
1 x 3m USB cable
1 x Mounting hardware
1 x Instruction manual

### Warranty and Replacements

If you have equipment purchased from Autogrow and it has developed a fault, please complete this form
so that our support staff can diagnose the problem.

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