



Precision  
Agriculture



# GrowSphere™ Max

Irrigation & Fertigation Controller

**/User Manual**



Scan to  
GrowSphere™  
website

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Controller Version 2.2

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### CAUTION:

Read the [Safety](#) instructions before installing or using the **GrowSphere™** system.

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# 1. Warranty

Netafim's products are warranted to be free from defects in material and workmanship under normal use and service, for a period of twelve (12) months from the date of purchase of the products by the customer (the "Warranty Period"), provided however, that with respect to items procured by Netafim from a third party, such warranty period shall be the shorter of (i) the Warranty Period; or (ii) the warranty period granted to Netafim by the third party from which it acquired such item.

This limited warranty shall be considered as null and void and shall not apply in any of the following events:

1. Where equipment is not used or has not been installed in accordance with Netafim's specifications and installation instructions for the recommended purpose. This warranty does not extend to repair or replacement of a Netafim product or part that results from misuse, negligence, alteration, tampering, use in conjunction with parts, products or service which have not been approved by Netafim, improper or inadequate storage, installation or maintenance of the product, or any use not in accordance with the applicable user manual provided by Netafim.
2. Where chemical concentrates are used or applied internally or externally to the product not according to Netafim's instructions, and cause harm to the product or its components.
3. If operating pressures are not within the limits specified by Netafim individual components.
4. Where damage, plugging or clogging is caused by insects, rodents or other animals.
5. External causes such as accident, abuse, misuse, or problems with electrical power.
5. Normal wear and tear.
6. Any part normally consumed in operation, or which has a normal life, inherently shorter than the specified warranty period, shall not be considered defective merely due to its consumption or failure prior to the end of the warranty period.
7. Loss or damage in transit.
8. Any alterations or repairs (or attempts to make alterations or repairs) made by a party other than Netafim.
9. Any acts or omissions which exposes the products to any environment not suitable for it, with the respective specifications, including without limitation, use of toxic, corrosive, or caustic liquids and/or gases, exposure to severe weather conditions and water.
10. Any defect or problem caused by any defect in any 3rd party product used in combination with the Netafim products;
11. Any usage that is not in accordance with the provisions of section 4 to Netafim's End User License Agreement available at: \_\_\_\_\_;

12. If failures are caused by any act or event beyond the reasonable control of Netafim, natural calamities and/or force majeure, which may include, but are not limited to, war, invasion, act of foreign enemy, terrorism, hostilities (whether war be declared or not), civil war or strike, rebellion, lockouts or other industrial disputes or actions, acts of God, acts of government or other prevailing authorities or defaults of third parties, storms, temperatures, flooding, gales, snow, landslides, fire, hailstorm, lightning, earthquakes, electrical or power failures or outages or power surges or electrical spikes, or damage due to freezing or mechanical damage, failure of energy or water supply.

If a customer of Netafim identifies a defect in a Netafim product and informs Netafim of that defect during the applicable Warranty Period, Netafim will repair, replace or refund a part or the full cost of the product's purchase price, at its sole discretion, either the product or the defective part.

To receive warranty benefits, customers should return the defective product or part to the nearest Netafim™ distributor.

Netafim's warranty does not cover transit damages or spare parts required for routine maintenance. Netafim cannot and does not assume liability for defective parts, or damage caused by products not manufactured or supplied by Netafim, even though such products may be used in conjunction with Netafim™ products and the customer assumes risk of use of such third-party products.

Netafim's obligation to repair, replace or refund the cost of its products as set forth above is the sole and exclusive warranty given by Netafim. Netafim disclaims any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose and/ or warranty of non-infringement. Netafim will not be liable to any party in strict liability, tort, contract, or any other manner for damages caused or claimed to be caused as a result of any design or defect in Netafim's products. In addition, Netafim shall not be liable, and a customer and/or any third party shall not be entitled to recover from Netafim, any, general, special, incidental, consequential, indirect, punitive, or exemplary damages of whatsoever nature and type (including, without derogating from the generality of the foregoing, damages to crops or equipment causes by product malfunction, losses or damages caused by shutdowns or service interruptions, loss of use, non-operation of the products or any equipment, loss of information, loss of power or cost of replacement power, loss of profits or revenue, loss of contracts, loss of capital inventory or use charges, cost of purchased or replacement power, interest charges or cost of capital or claims of customer's clients or any third party) even if Netafim is aware or should have been aware of the possibility of such damages. In no event shall Netafim's liability exceed the purchase price of the Netafim products.

This warranty extends only to the customer of the Netafim product. The Netafim Warranty Period commences upon the purchase date to the customer.

Netafim reserves the right to alter, modify or redesign its products, pricing and this warranty at all times without creating any liability for the obsolescence of customer inventory or such parts or products.

## 2. Safety

### 2.1 Safety Overview

Netafim congratulates you on purchasing the **GrowSphere™ MAX** system. **GrowSphere™ MAX** system is a family of hardware, software, and cloud products designed and developed for the planning, managing, and monitoring irrigation and Nutrigation.

#### 2.1.1 Intended Audience and How to Use This Manual

This document is the user manual of the **GrowSphere™ MAX** system. It describes the essential operation and maintenance of the system.



## 2.2 Safety Conventions

The symbols used in this manual refer to the following:



### WARNING

Contains instructions aimed at preventing bodily injury or direct damage to the crops, the automation system and/or the infrastructure.



### CAUTION

Contains instructions aimed at preventing unwanted system operation, installation or conditions that, if not followed, might void the warranty.



### ATTENTION

Contains instructions aimed at enhancing the efficiency of usage of the instructions in the manual.



### NOTE

Contains instructions aimed at emphasizing certain aspect of the operation of the system or installation.



### ACID HAZARD

Contains instructions aimed at preventing bodily injury or direct damage to the crops and/or the irrigation system in the presence of acid.



### ELECTRICAL HAZARD

Contains instructions aimed at preventing bodily injury or direct damage to the irrigation system components in the presence of electricity.



### SAFETY FOOTWEAR

Contains instructions aimed at preventing foot injury.



### WARNING



Contains instructions aimed at preventing damage to health or bodily injury in the presence of nutrients, acid or chemicals.



## 2.3 Safety Instructions

- All safety regulations must be applied
- Use only approved accessories specified by Netafim™ for the **GrowSphere™** equipment. Failure to do so may result in the system operating in a dangerously unsafe condition
- Unauthorized modification of the product will negate the approval rating of the product and the warranty
- Protection provided by the equipment can be impaired if the equipment is used in a manner other than that specified by the manufacturer



### **WARNING**

In an agricultural environment - always wear protective footwear.

### 2.3.1 Electrical Safety Precautions

Electrical installation, maintenance and troubleshooting procedures must be performed by an authorized electrician only.

### 2.3.2 Overhead Power Lines



### **WARNING**

When installing **GrowSphere™** units, care must be taken:

- Insure there is always clear space from overhead power lines.
- Do not erect any pole and associated **GrowSphere™** unit if power lines are in the vicinity.
- Check with your relevant authority as to the clearances from power lines required in your region.

### 2.3.3 Batteries

- Use only Netafim™ approved batteries on the **GrowSphere™** equipment
- Do not puncture the battery
- Avoid contact with the corrosive material in the battery
- Exercise care in handling any charged battery, particularly when placing it inside a container (toolbox) amidst metal objects
- Always responsibly dispose of a used battery - in the intended places for battery recycling
- It is important not to dispose of large numbers of alkaline batteries in a group

### 2.3.4 RF remote units

- The **GrowSphere™** system meets the local RF regulations of every country and state
- The system is supplied with the proper documentation to be submitted to the Local authorities, such as the Ministry of Communication, Customs, or any other governmental agency

According to the manufacture data sheet, The GS Max maximal temperature for the following components are:

- CPU: 60 degrees Celsius
- Teltonika modem: 75 degrees Celsius
- Screen: 60 degrees Celsius

## 2.3.5 Thunderstorms

If the area is known to be prone to thunderstorms, **GrowSphere™** installed in the fields, may attract lightning discharge, as they are the highest object in the vicinity.

In such case it is recommended to install a lightning rod in the **GrowSphere™** vicinity.

A lightning rod is a metal rod installed on a pole and grounded.

The lightning rod should be the highest object in the vicinity in order to properly attract the lightning discharge and direct it safely into the ground.

## 2.3.6 Working at height

**To prevent fatalities or major injuries, all safety measures regarding work at height must be observed.**

**Without limiting the foregoing:**

- Avoid work at height whenever possible
- As much work as possible should be done from the ground (whenever possible: mount the unit on the pole, wire it and then erect the fully equipped pole into position)

### **WARNING**

Mounting the base unit and routers and erecting poles might require working at height.

### **If work at height cannot be avoided:**

- All work at height must be properly planned, supervised and carried out by competent, trained and experienced personnel, authorized by the local safety authority
- Make sure equipment used for work at height is certified by the local standards authority, well maintained and inspected regularly
- Avoid standing on fragile surfaces such as shingle or asbestos cement roofs
- For the entire duration of work at height a person should be present on the ground, constantly keeping eye-contact with the workers at height, ready to assist them when needed
- When working at height make sure that nobody is standing under you
- Make sure the surface, scaffold or ladder used are stable and strong enough to support the worker's weight and that of the equipment
- Always wear a harness and make sure it is correctly anchored to a stable element
- Always use tools designed for work at height and make sure that they are secured in a basket preventing them from falling



## 3. Quick Start Guide

**1/** Internal Design

**5/** Wiring & Expantions

**2/** Local & remote control

**6/** Connect to Remote Unit

**3/** System Prefrences

**7/** Dosing Settings

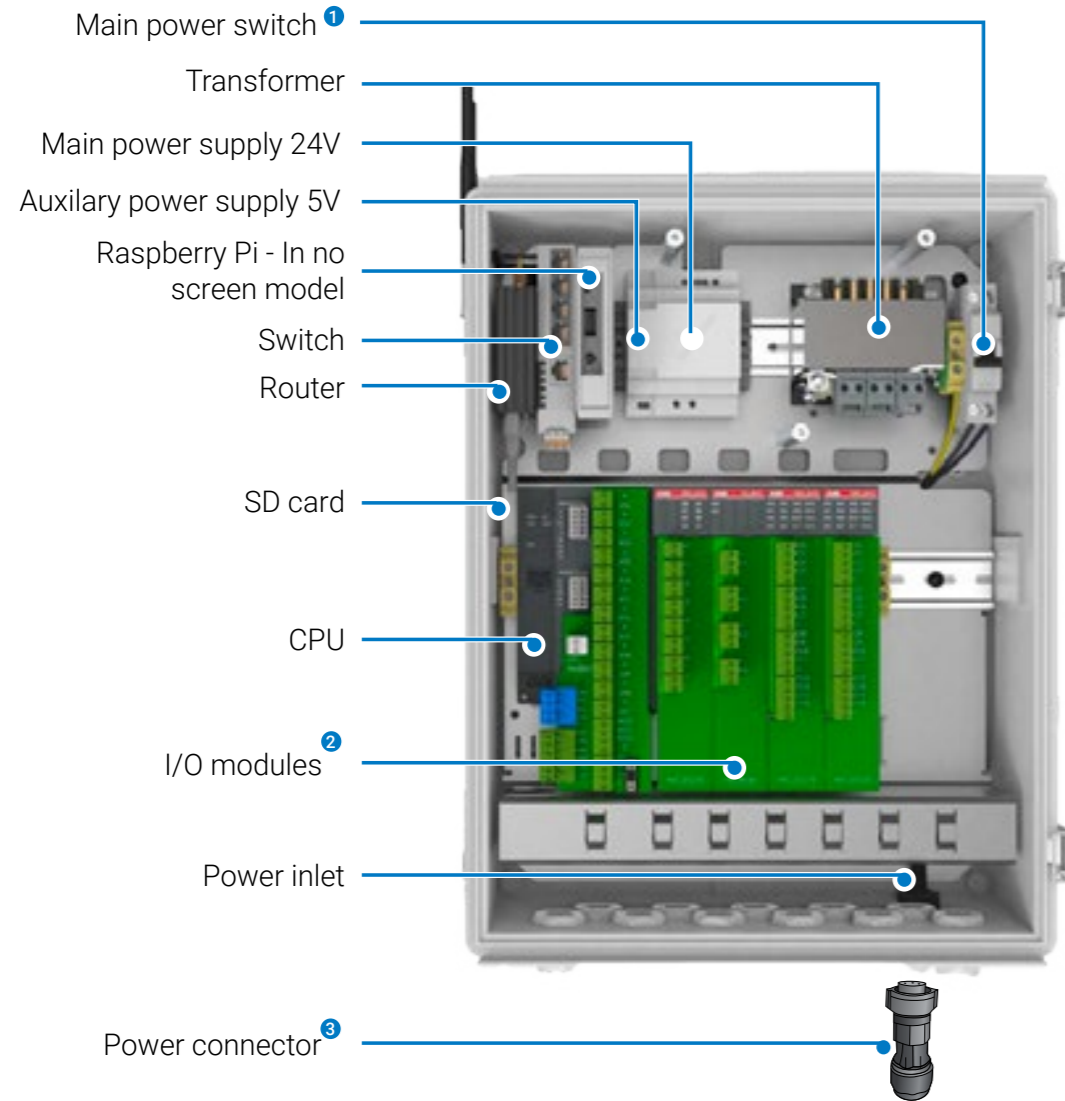
**4/** System Settings

**8/** Create Irrigation Program

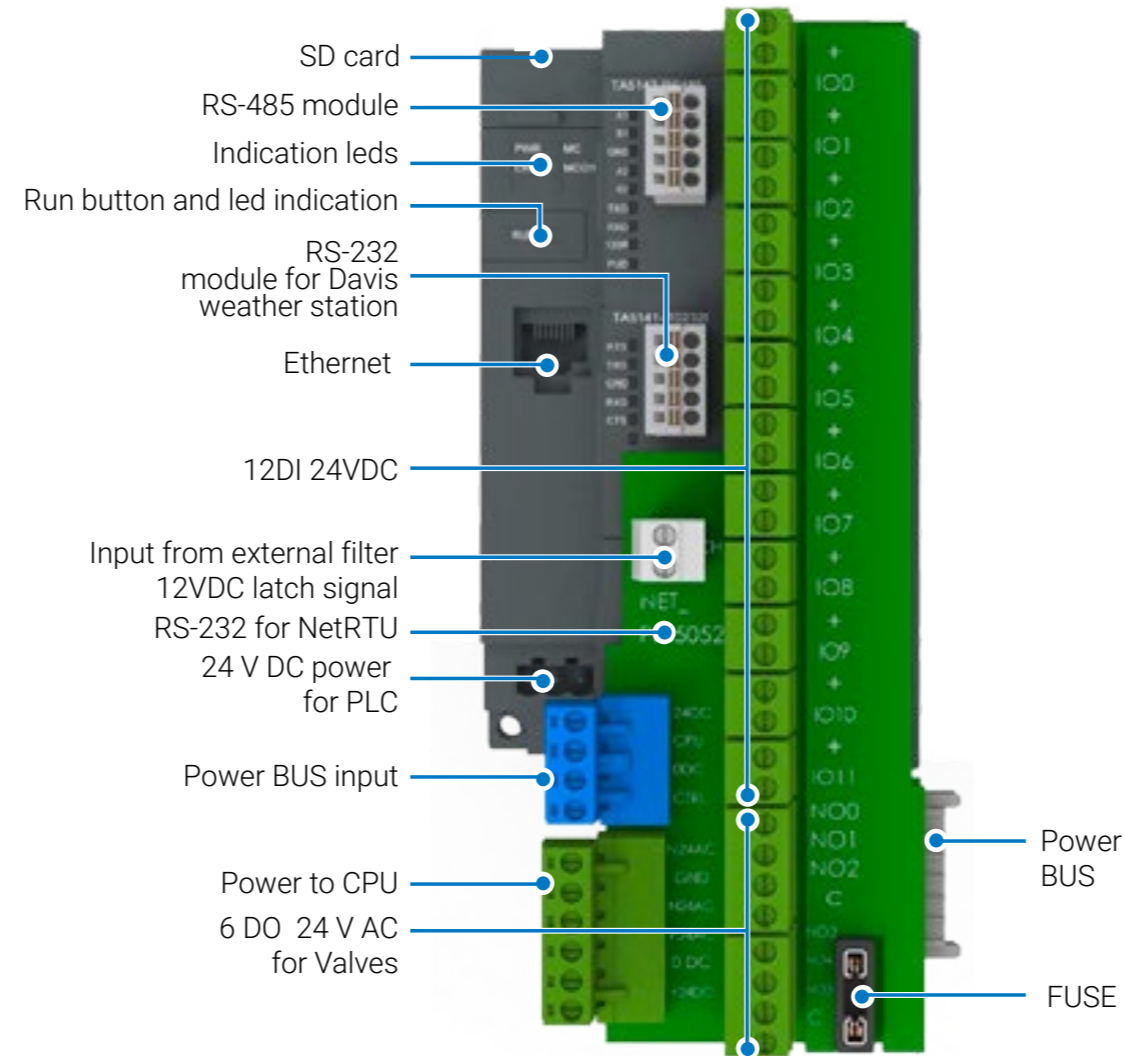


## 3.1 Internal design

### / GrowSphere™ MAX - Internal design



### / GrowSphere™ MAX - CPU



#### CPU Adaptor features

- AC protection Fuse
- CPU remote reset
- Controlled by modem remotely
- Easy visual indication
- 24AC LED
- 24DC LED
- CPU reset

#### Custom ABB controller

- Memory 80MB

### Main functionalities of the internal components

**Main Power Switch** - Switch the main power on and off.

**Transformer** - Transform AC to DC. CPU gets its power before the transformer.

**Main power supply 24V** - Provides the power to the CPU, screen, and Modem.

**Auxiliary power supply 5V** - Provides the power to the Gateway and for Davis weather station.

**Raspberry Pi - Contains the Anydesk** - for remote control through Anydesk. Supplied with the screen-less models only.

**Switch** - Connect to the controller locally via LAN or to the internet. Also, it improves modem stabilization.

**Router** - Contains the SIM card and enables communication to the internet.

**SD Card** - Back up of data and version upgrade.

**I/O Modules** - Enables connection of the peripheral components. Up to six modules can be connected to the MAX simultaneously.

**Power connector** - The connector can be found in the accessories box.

#### Expansion modules

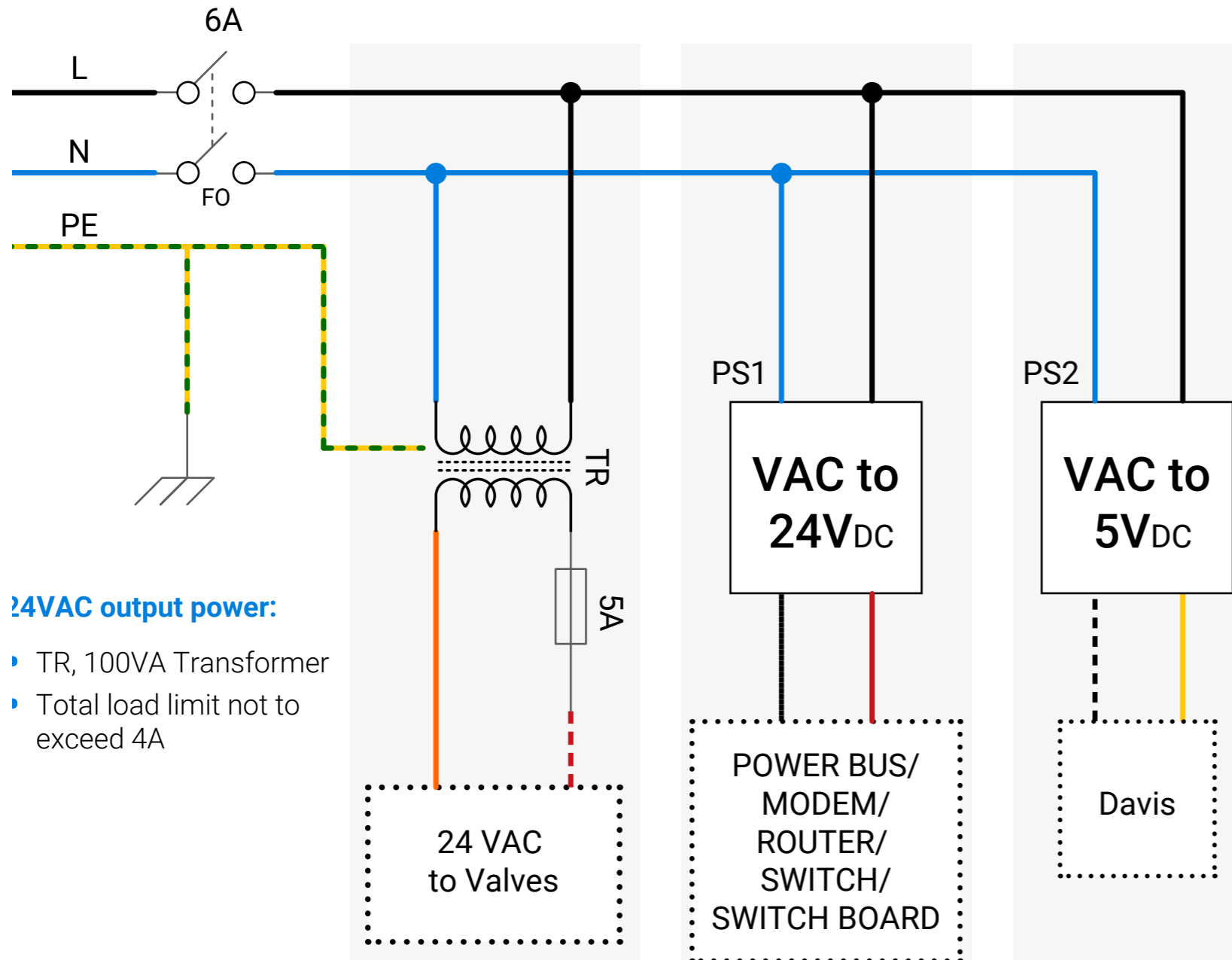
**Four types of expansion modules can be connected to the GrowSphere™ MAX**

- ① Switches the main power on and off
- ② Enable connecting the peripheral components
- ③ You can find the connector in the accessories box

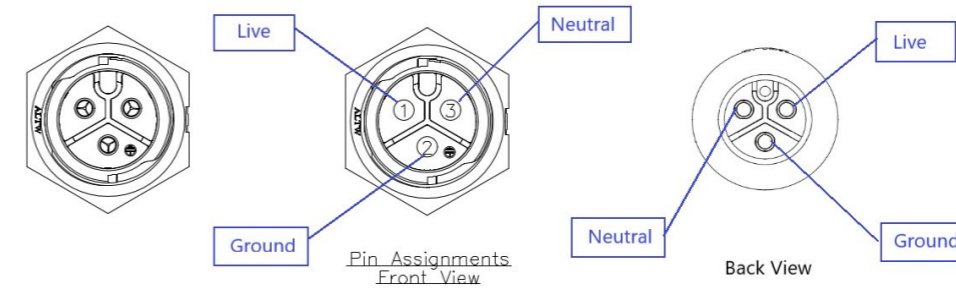
\* Subject to product configuration



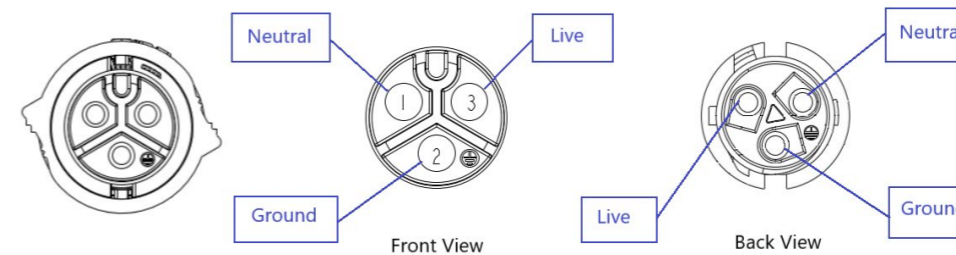
/ **GrowSphere™ MAX Power**



/ **GrowSphere™ MAX Power connector**



/ **GrowSphere™ MAX Cable connector**





## / Firmware Upgrade using SD card

To upgrade the firmware in your GrowSphere™ MAX controller, follow these steps below. Remember to stay up to date with future firmware versions.

1. Turn OFF GS Max, takeout existing SD Card
2. Prepare a clean SD card formatted with FAT32
3. Download required latest version. Unzip it to a folder.
4. Copy only the content of the folder into SD card root.
5. The SD card contents should look like:

Name	Type
FIRMWARE	File folder
USERDATA	File folder
SDCARD.INI	Configuration settings
Version.txt	Text Document
Version.txt.sig	SIG File

6. Insert this SD card into PLC
7. Power ON the PLC.
8. If a new FW is found on the SD card, RUN and ERR LEDs will start blinking in 1 HZ
9. Wait ~5min until only the RUN LED is blinking.
10. Power OFF the PLC .
11. Take out the SD card and insert SD card that was taken out from PLC before upgrade or it may be empty card.
12. Power ON the PLC.
13. The controller will reboot once again automatically, wait the process to complete. When the process complete, the RUN LED should remain constantly on. When the process complete, the RUN LED should remain constantly on.
14. if the process is successful RUN LED should be constantly on (ERR LED might be red, that is OK , MC LED will be ON, if SD Card is inserted in the slot).

## / Remote FW Upgrade (FOTA)

The FOTA process consists of 2 steps: 1) from the Admin portal, 2) from the controller.

### Preparations

Before starting the process ensure that Start and End time of the day is checked, under Settings → Preferences → System Definitions, for each mainline.

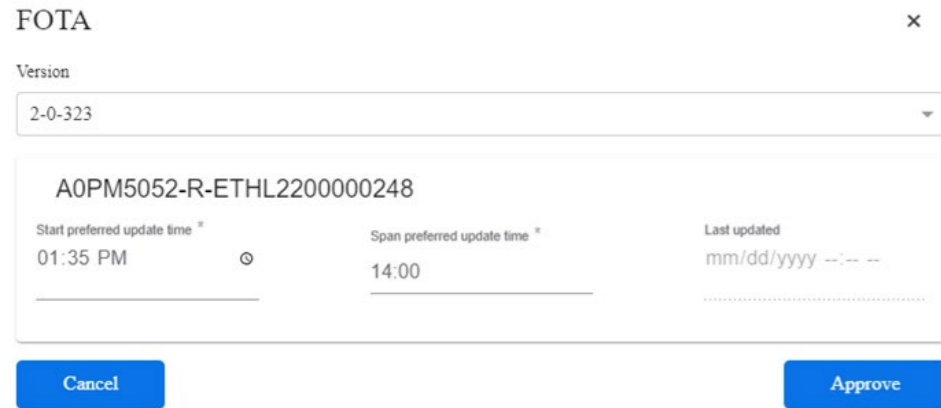
The download from cloud will take place only out of hours when there is no irrigation activity. The download process occurs in the background and takes ~2 hours.

### Process starts on cloud.

From the **Admin, Device Management**, select the MAX controller you wish to upgrade. Mark the FOTA checkbox for the device and press the **FOTA** button that appears on the top menu bar.

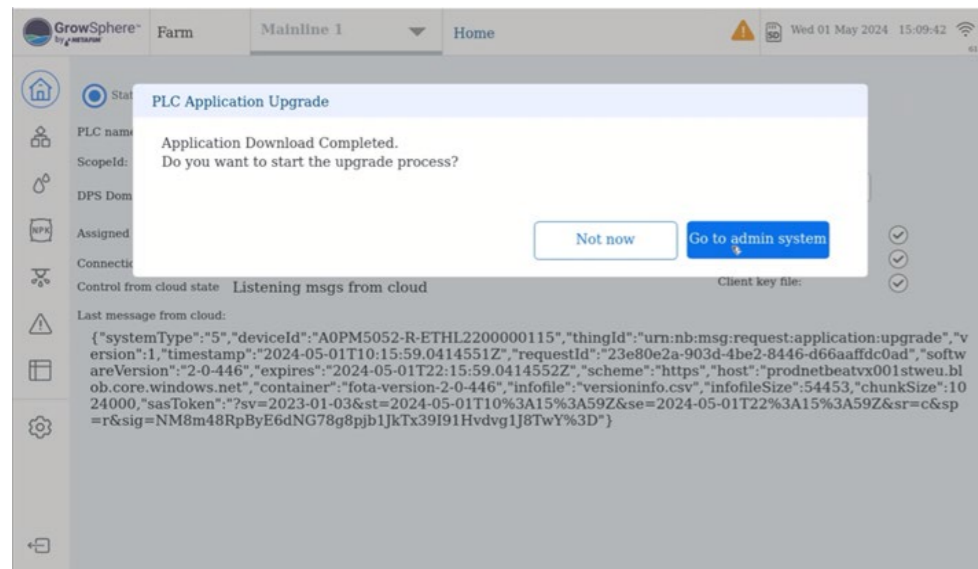
Actions	Device Reference...	Serial Number	Sim Number	SW Version	FOTA	Update Requested	Device Type
Edit   History	A1PM5052-R-ETHL220...	10-MAX-2342-1018	8935711001080577718	-	<input checked="" type="checkbox"/>		Max

On the Popup window, select the version and the time to upgrade and approve the process.



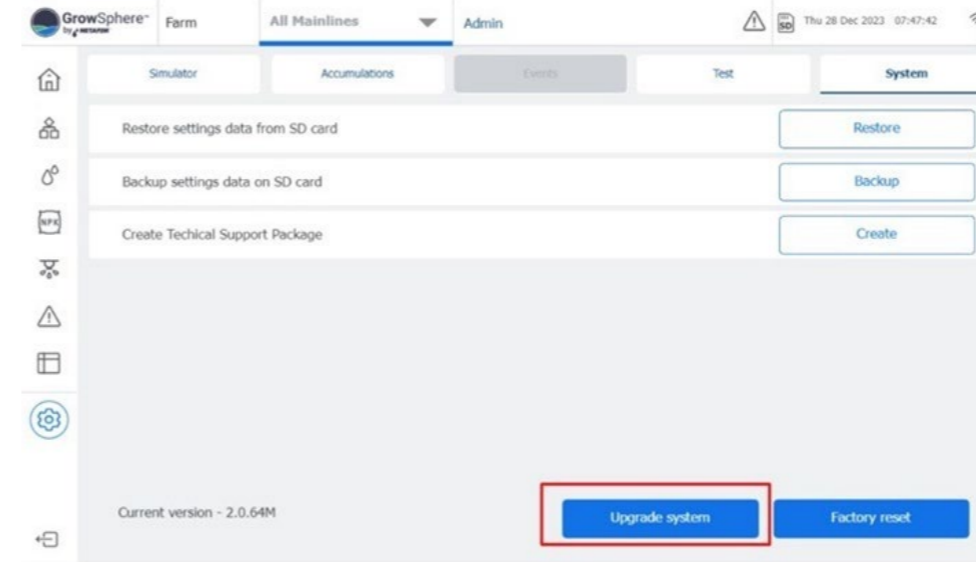
Wait for the file to be downloaded to the controller SD card.

Once the download is completed, the following message will pop up.

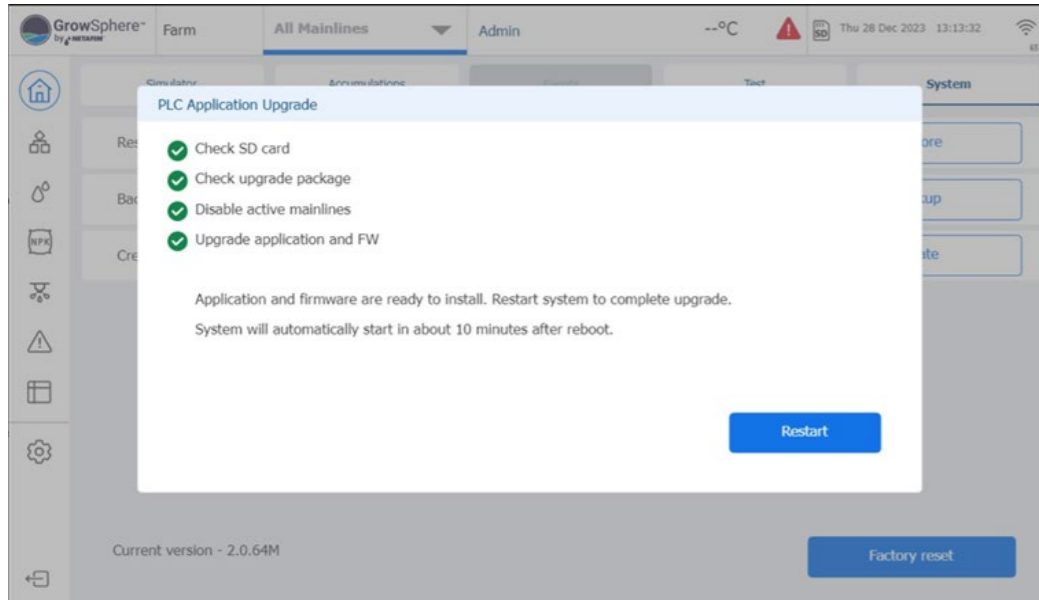


Press on the **“Go to admin → system”** button, this will take you to the admin section, you will need the password: 287451 to access this page.

On the **Admin** screen, system tab you will find the button **“Upgrade System”** press it to start the upgrade.



After pressing the “Upgrade System” the following popup will appear, when all steps appear with green check, press the “Restart” button, otherwise the controller will reboot after 10 minutes.



At the end of the process the controller screen will load with the new version. The new version can also be seen on Settings → Admin → System.





**/ Product technical specifications**

	Per Main Line	Total
Main Line	1	4
Main Valve	1	4
Main Water Meter	1	4
Pumps	3	12
Filter Station	1	4
External filter (flushing control + indication)	32	128
Dosing Stations	1	4
Dosing Channel (venturies)	8	32*
Valves	256	256

Irrigation Programs	10
Shifts per program	32
Valves Per Shift	32
Dosing Recipes	10

\* To operate more than 8 channels together, please connect with your contact person

### 3.2 Local and remote control

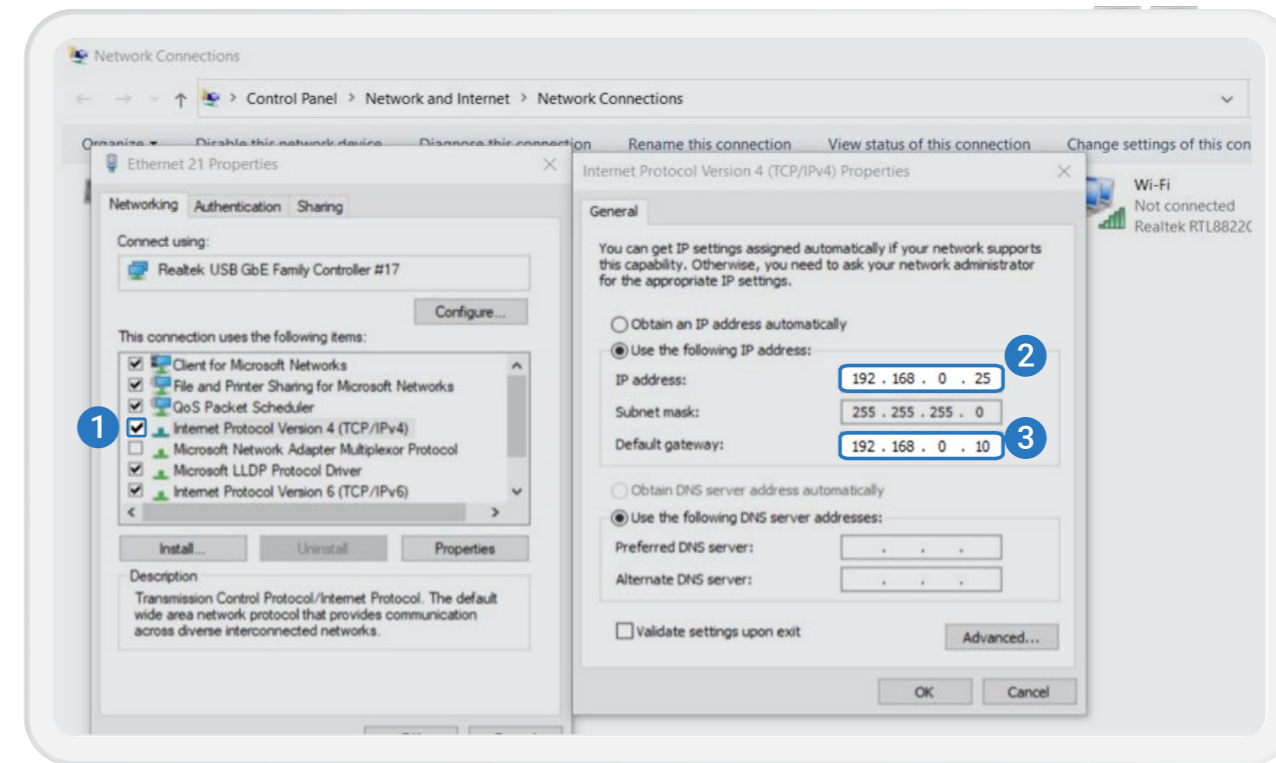
For local access, you can connect to the controller' Wi-Fi by scanning the QR code on the controller or connect via LAN. To access remotely, you can use **GrowSphere™** Cloud by clicking on the link icon or use Anydesk from any device by entering the username and password provided with the controller.

**/ Local access via LAN**

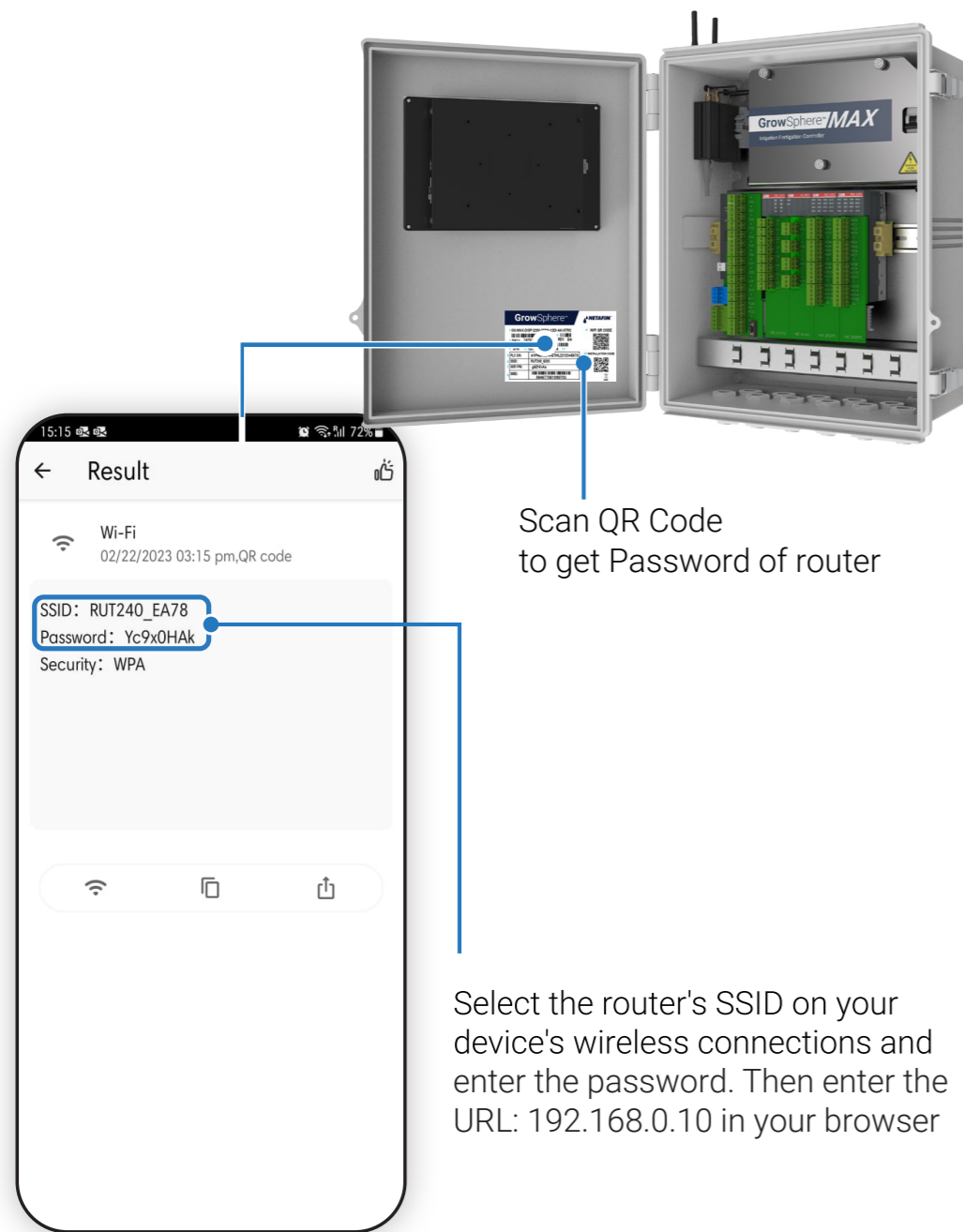
1. Create static IP address – for example: the address range of the system is 192.168.0.4
2. Ensure the Default gateway address is: 192.168.0.10
3. Connect a LAN cable to the switch and type the IP address 192.168.0.10 in the URL

Navigate to your ethernet port properties and set the TCP/IPv4 option, as demonstrated below

To easily find your Ethernet port, navigate to the Control Panel > Network and Sharing Center > Change adapter settings



**/ Local access via WIFI**

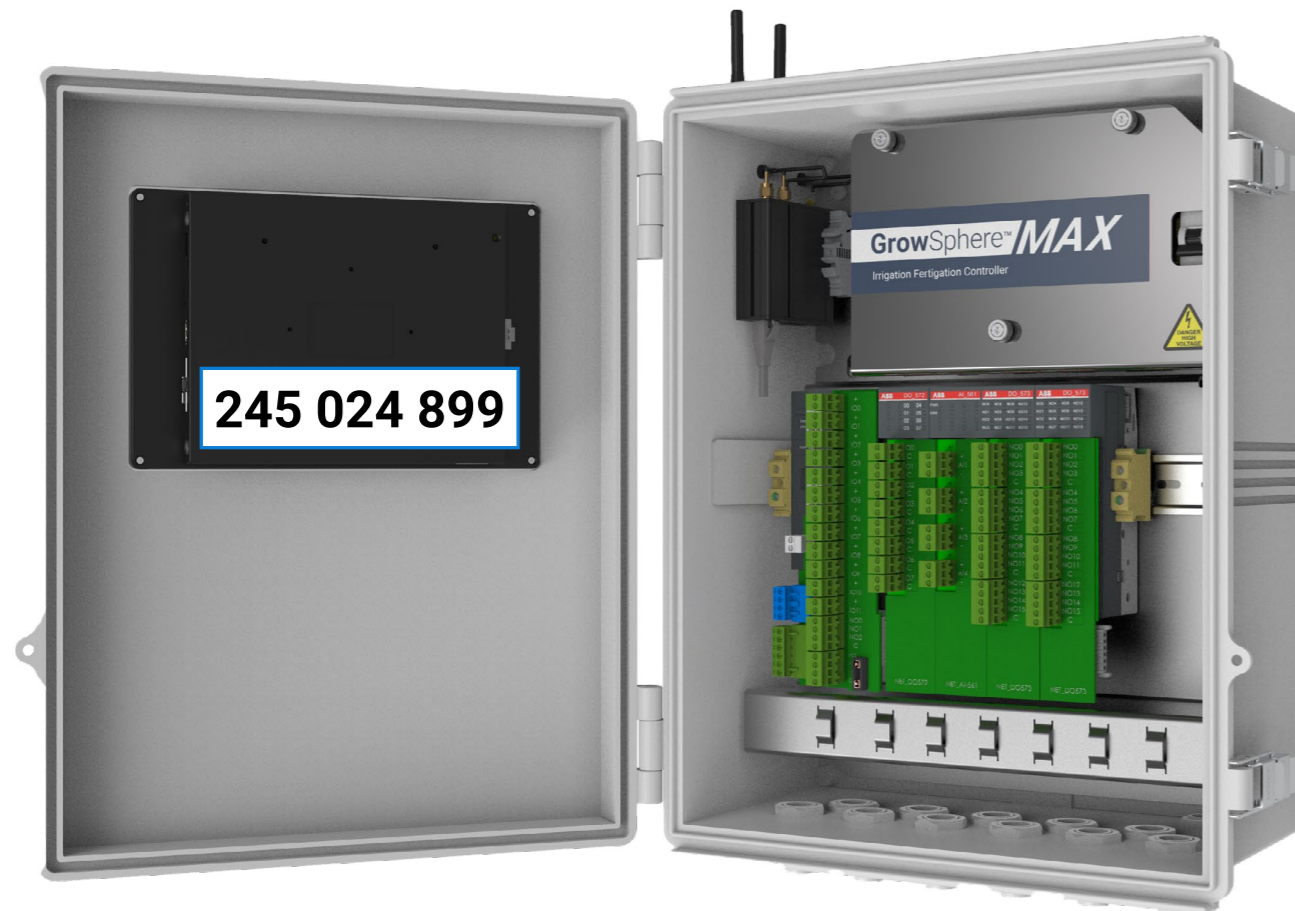


- By typing 192.168.0.10 in the URL line, you will be able to access to the controller dashboard.
- By scanning the QR code on the controller you will get the Wi-Fi address and password for the controller's modem.

## / Remote access - Using Anydesk

The controller comes with a SIM card and can be accessed through the **GrowSphere™** Cloud. However, you can also access it through AnyDesk by following these two steps:

To get started, you'll need to install Anydesk on your computer, tablet, or mobile device. Once you have it installed, you can use the AnyDesk ID found on the controller's internal door. The passwords for anydesk is **GrowSphere01**.



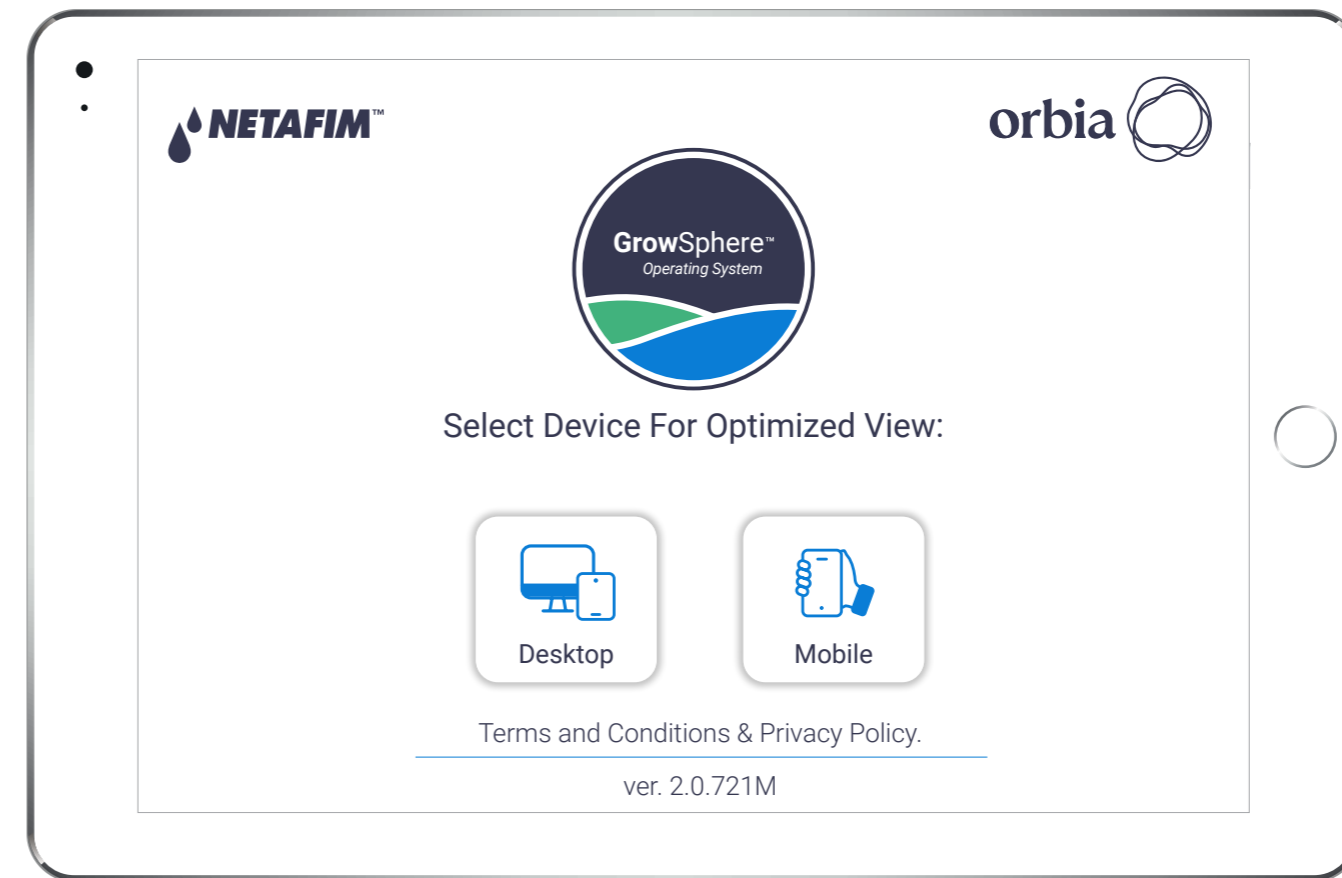
## GrowSphere™ MAX - Basic Settings

### / Getting started

Select the Desktop or Mobile view.

In the case of Tablet, it is recommended to select Desktop.

Mobile view is recommended when connecting to the controller from **GrowSphere™** Mobile app.



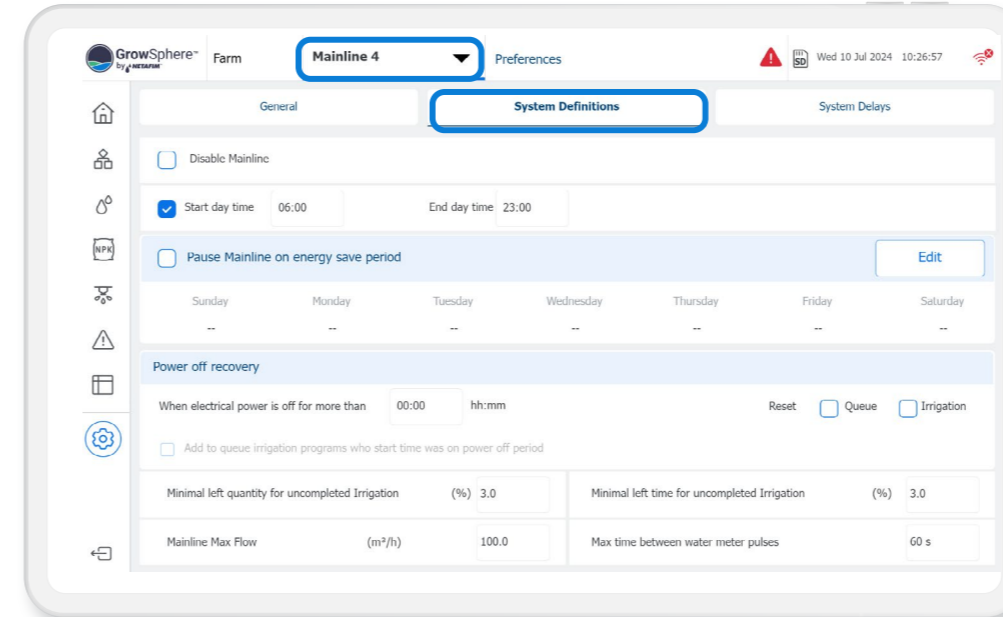
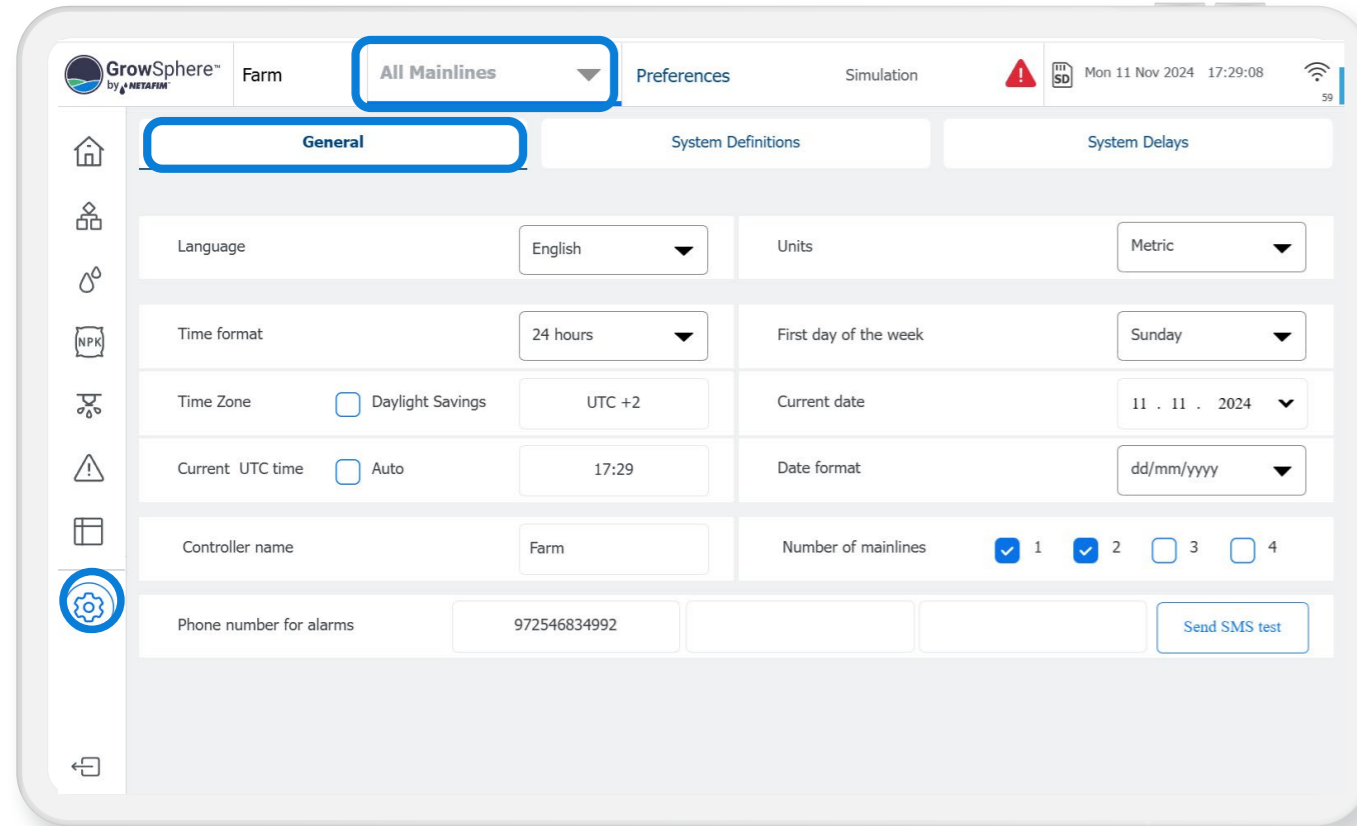
\* For more information of the available functions in the Mobile view, please see chapter 5.1.2



## 3.3 System preferences

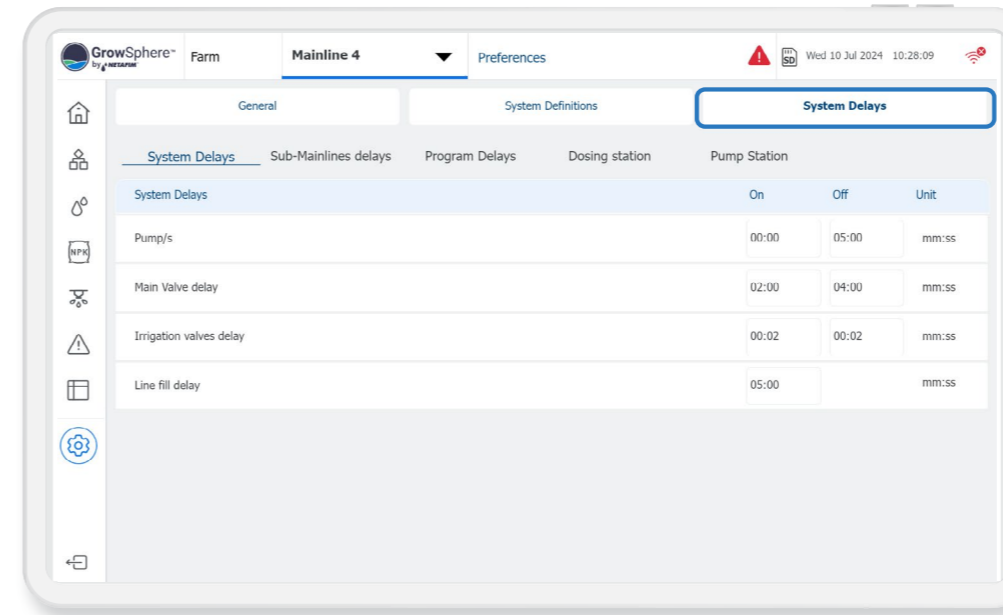
### / Remote access - Using Anydesk

Set your preferences and continue to the next step, your settings will be saved automatically



### / Set definitions for operation time and flow

Select the relevant mainline – From this stage, all the settings will be per mainline.

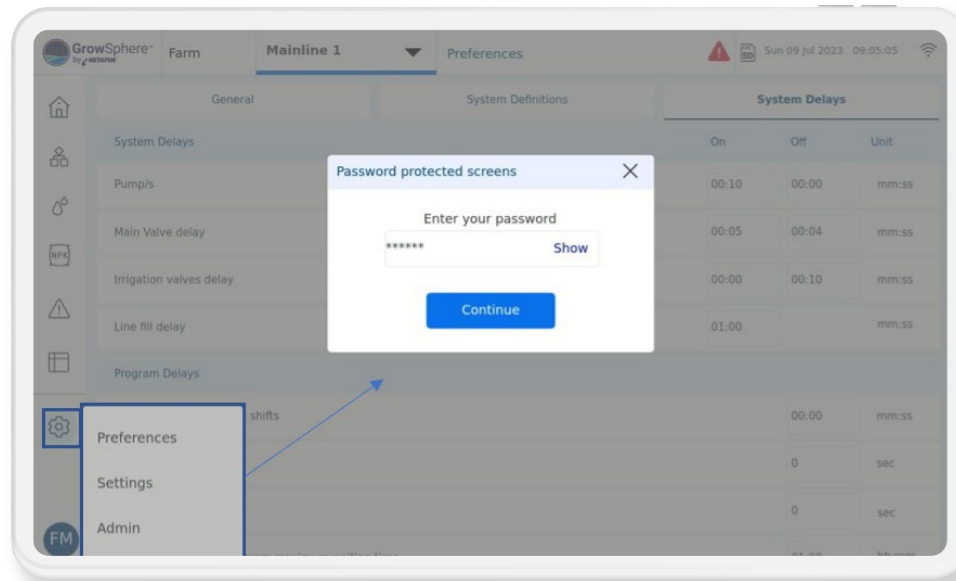


### / Define system delays

Set the delays for the mainline components

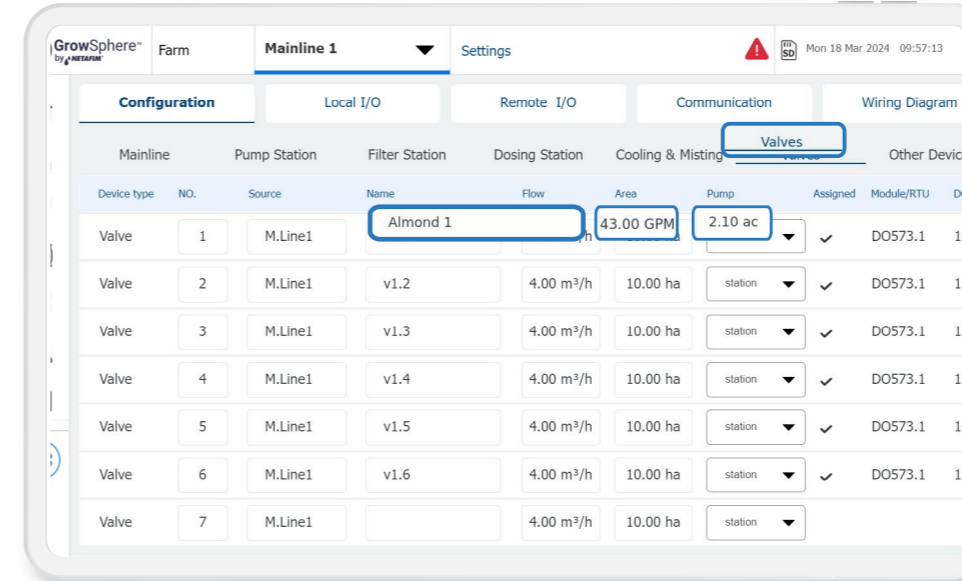


## 3.4 System settings



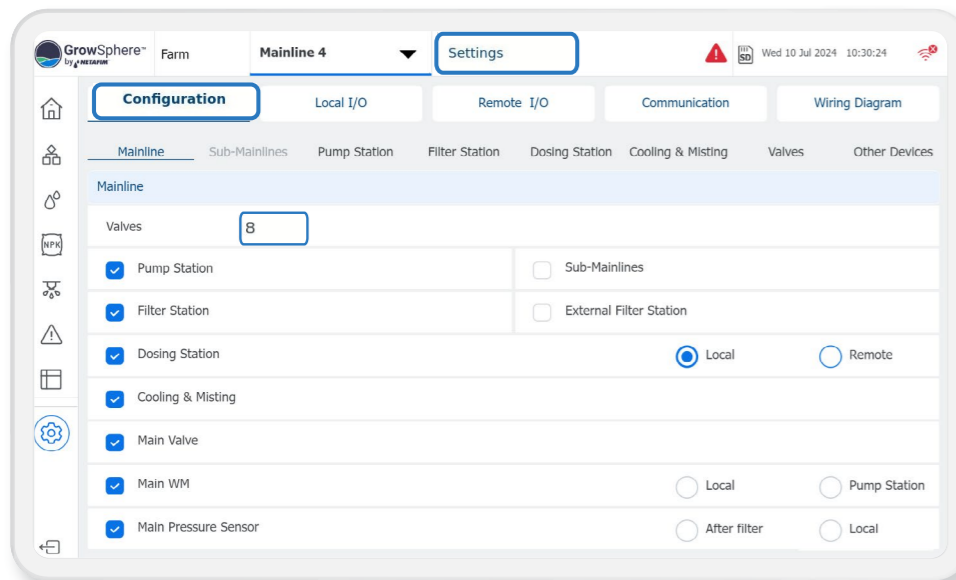
### / Navigate to settings

Enter the password 287451



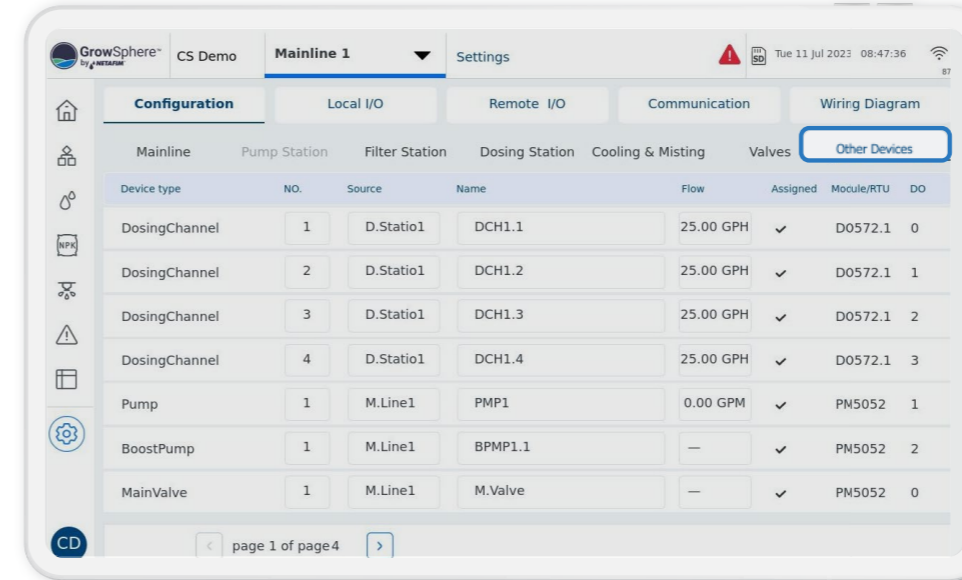
### / Set valves configurations

- Set name, flow rate, and irrigated area for each valve
- The Flow and Area are used to manage and monitor the irrigation in the **GrowSphere™** cloud, therefore, must reflect the real size of each irrigation plot (field)



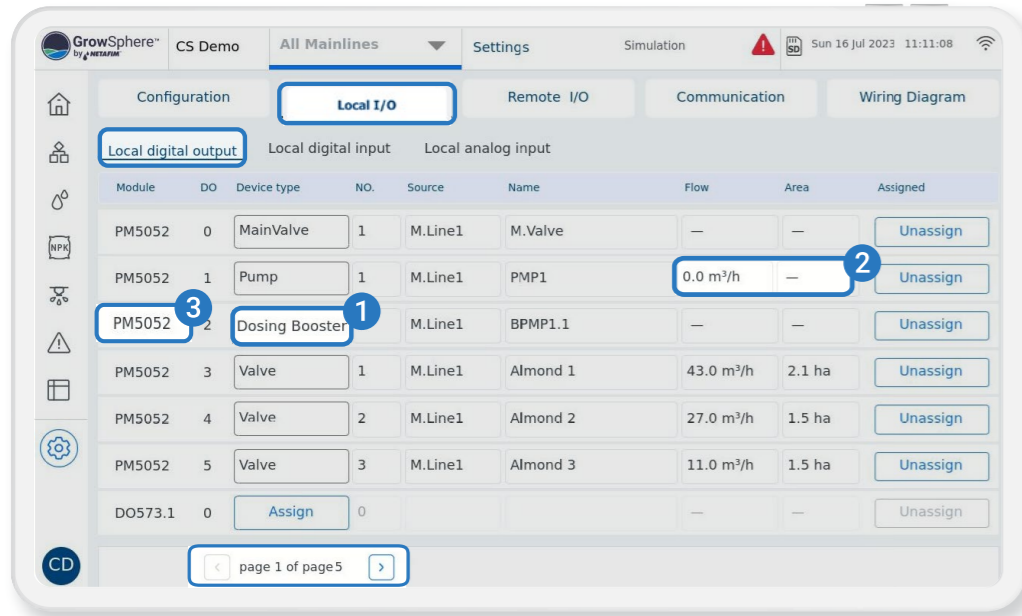
### / Set mainlines configuration

Define the number of valves and the devices that connected to each mainlines



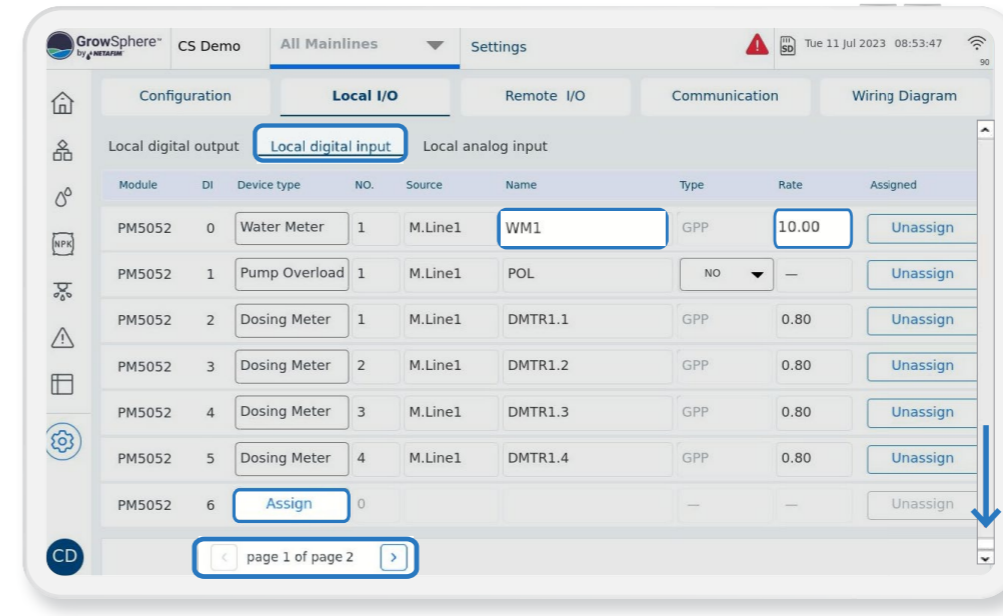
### / Define other devices configurations

Set the parameters for each device



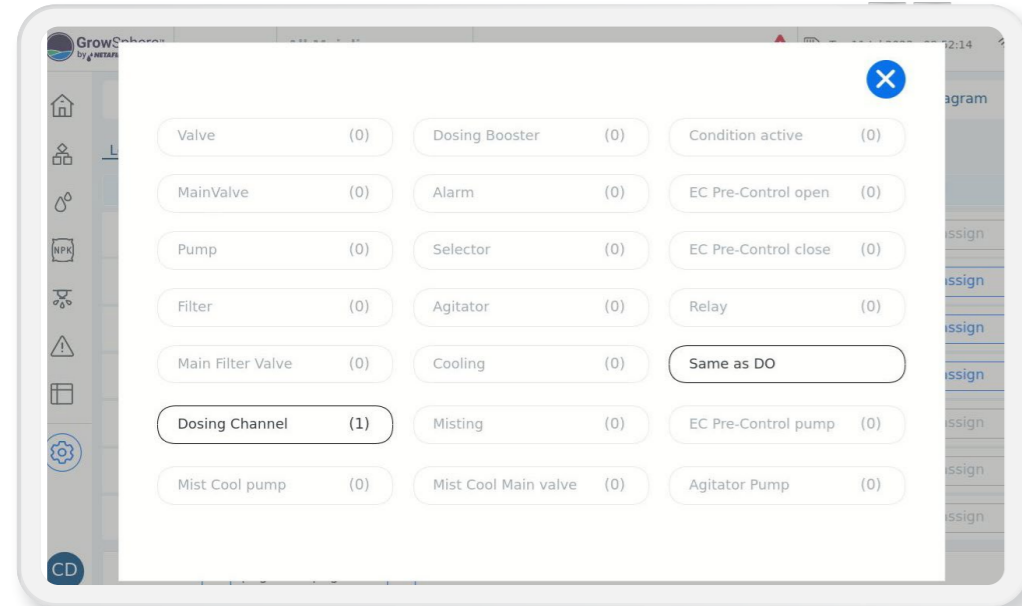
### / Assign digital outputs to I/O modules

1. Click assign for each row to assign the device to the available port in each module
2. Define the Flow and irrigated area for each valve
3. The I/O module to which the device has been assigned to can be selected by skip between pages 1-5



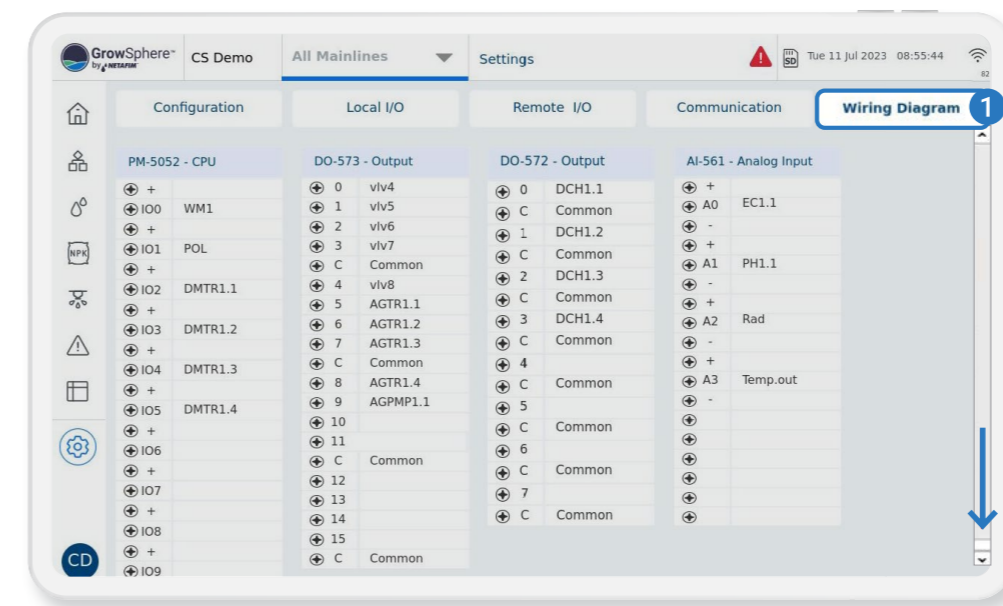
### / Assign digital inputs to I/O module

- Assign each device to I/O Module and port
- Provide the name, flow rate, and irrigated area for each input
- You can select the I/O module to which the device has been assigned by navigating between pages 1-5



### / Assign digital outputs to I/O modules

By clicking Assign, the system will indicate how many devices are not yet assigned, and will automatically assign it to the next available port

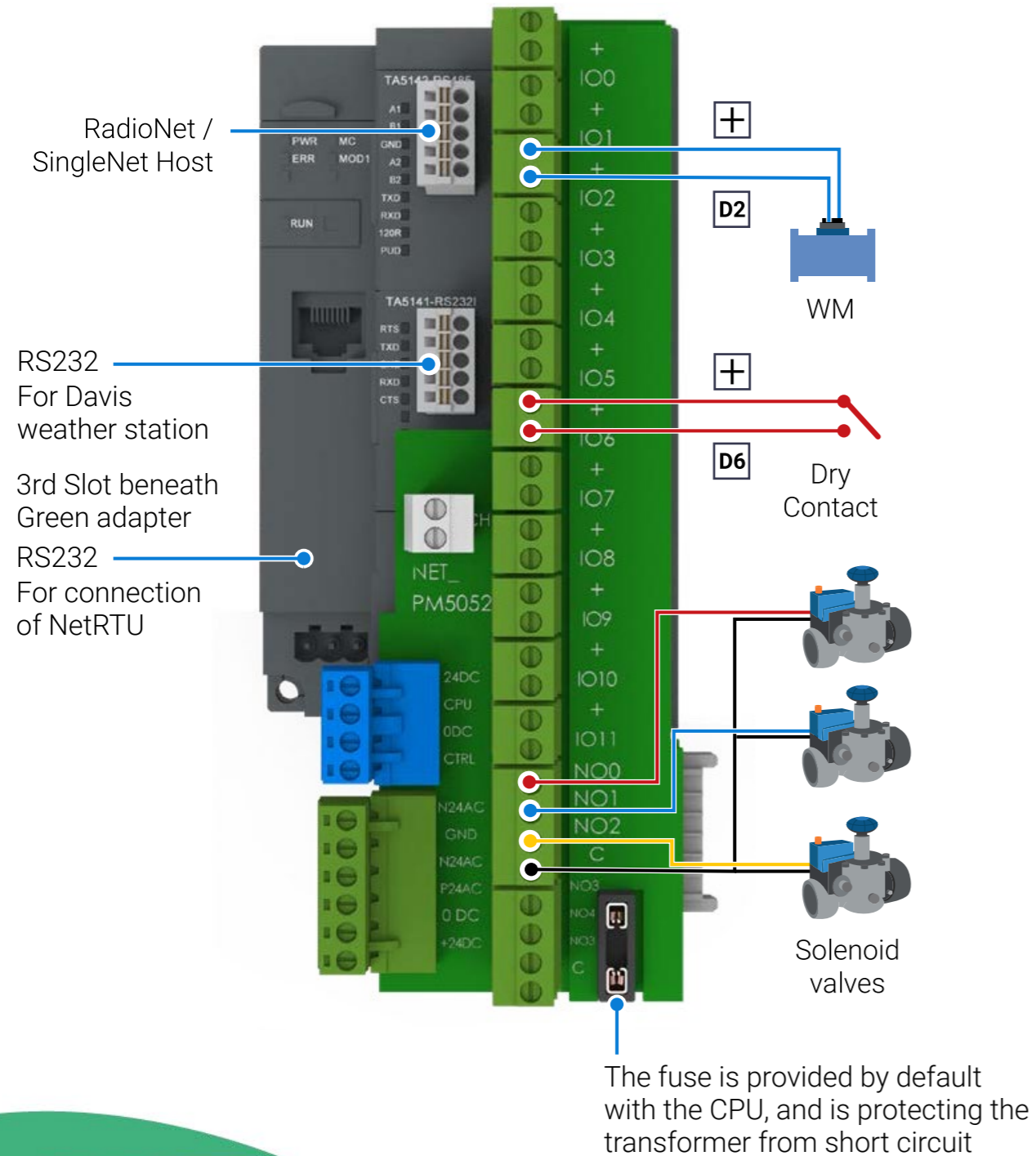


### / View the wiring diagram

The wiring diagram shows the module and port for each device that has been assigned. You can follow the diagram to properly wire the local devices

## 3.5 Wiring instructions

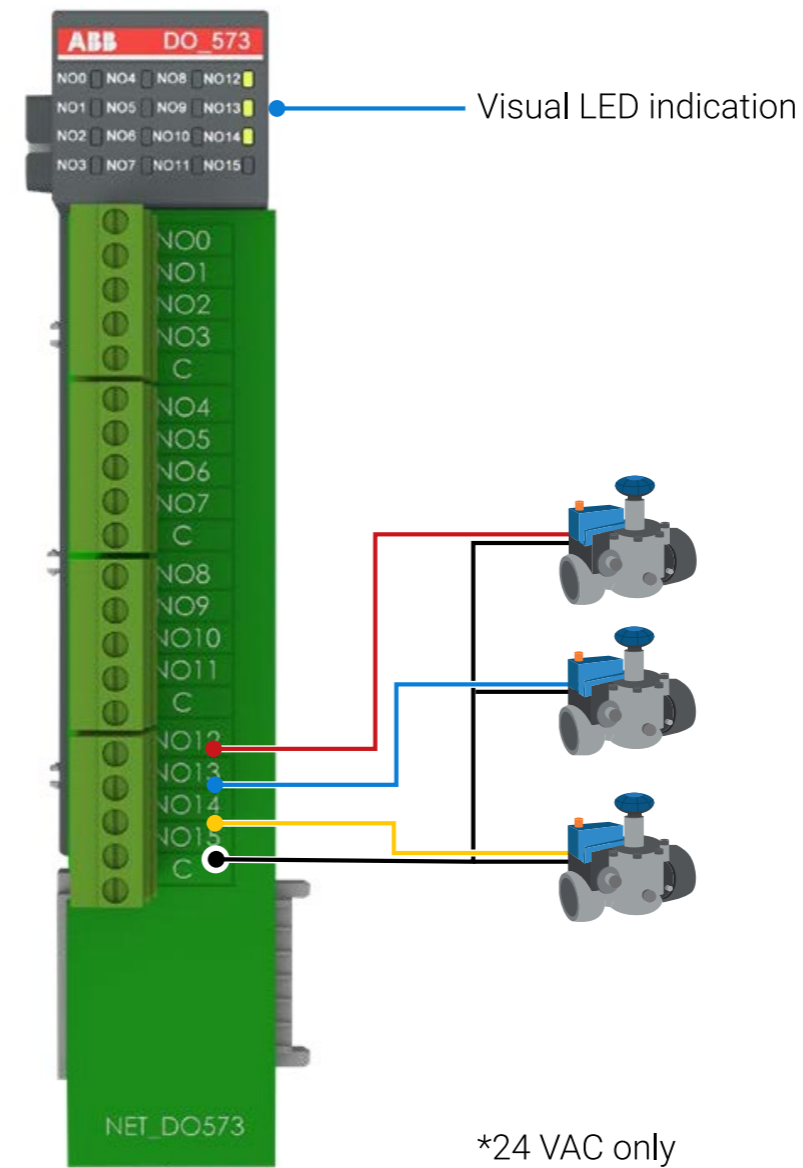
### / GrowSphere™ MAX - CPU



## Expansion modules

### / D0573 module

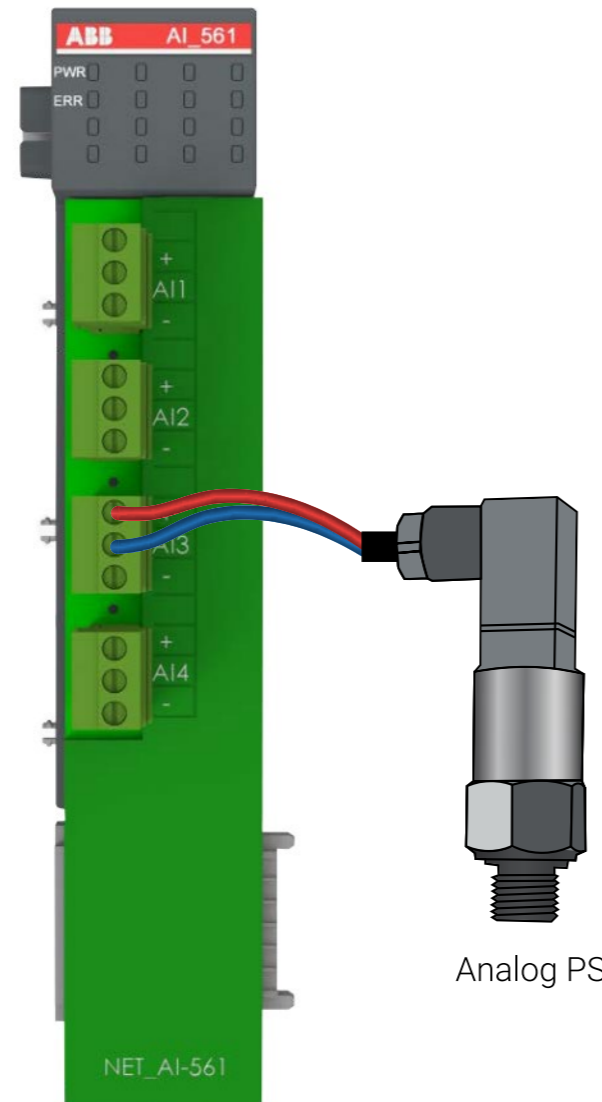
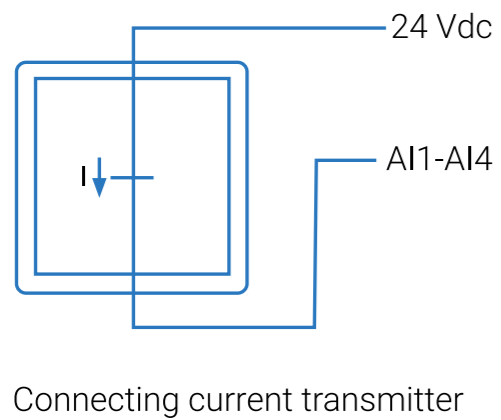
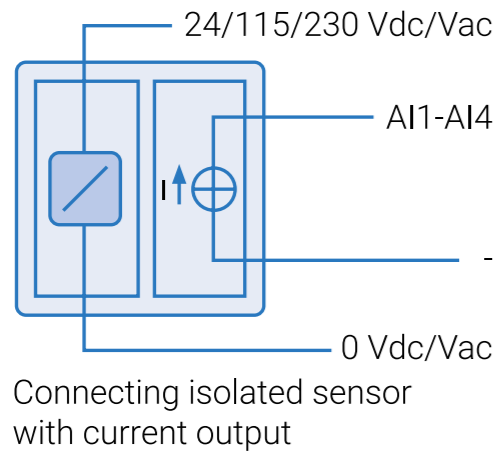
- 16 normally open relay outputs
- Output current per channel = 2 A
- Indication of output signals – 1 yellow LED per ch.





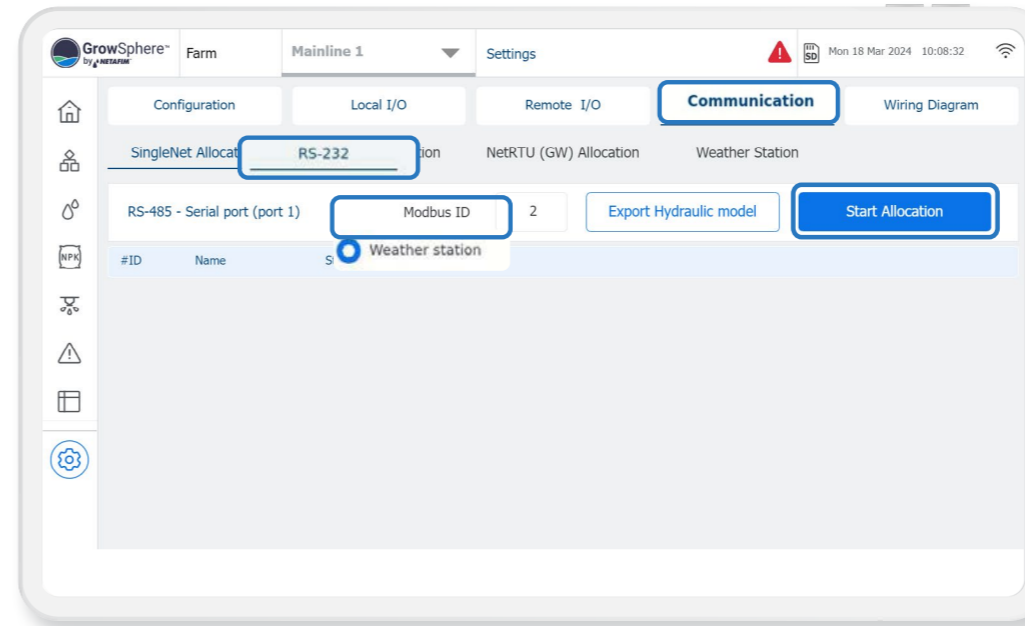
## / AI561 Module

- 4 analog inputs
- Feed (Sourcing) voltage – 24 VDC
- Resolution – 0-20mA; 4 -20mA; 12 bit
- Channel input resistance – 250 ohm
- General Purpose of only EC, pH
- Pressure sensor
- General sensor 4-20mA



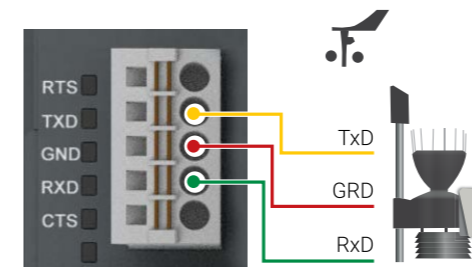
## 3.6 Connect to remote units

### / Connection of weather station – RS232



For Remote-units instructions - Please see the Appendix

### / RS232 Module



State LEDs

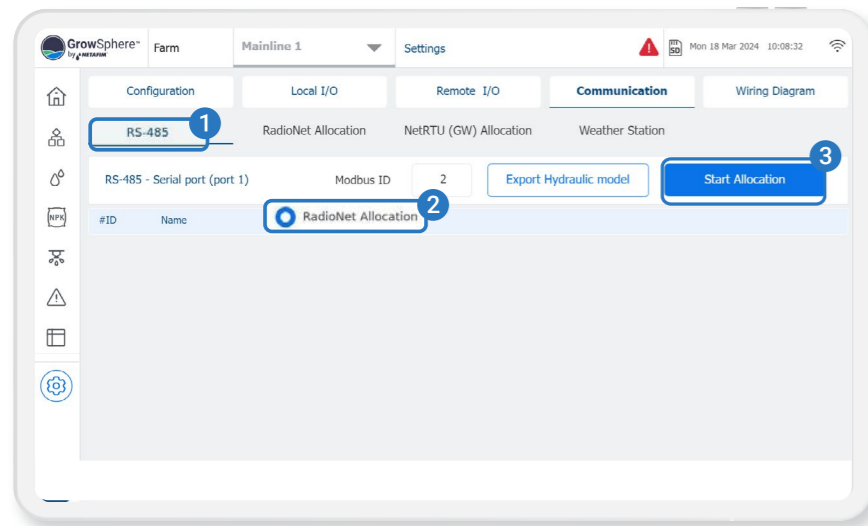
Signal	Color	State	Description
TxD	Yellow	ON (blinking)	Transmitting
RxD	Yellow	ON (blinking)	Receiving

Signal	Description
RTS	Request To Send DCE is ready to accept data from the DTE
TxD	Transmit Data (output)
GRD	Common Ground
RxD	Receive Data (input)
CTS	Clear To Send (input) DCE is ready to accept data from the DTE

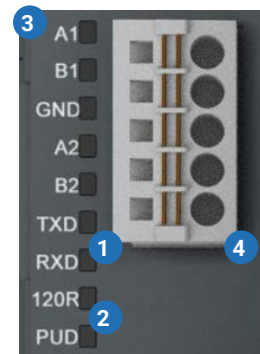


## / Connect to RadioNet / SingleNet – Serial module RS485

1. Before starting this process, please ensure you have the latest version of PoleNet & Polenet2Max Apps.
2. In order to set up the Remote units, kindly get in touch with our Global support team via email at [cmt.support@netafim.com](mailto:cmt.support@netafim.com)
3. Both RadioNet & SingleNet can be connected simultaneously



## / RS485 module



State LEDs

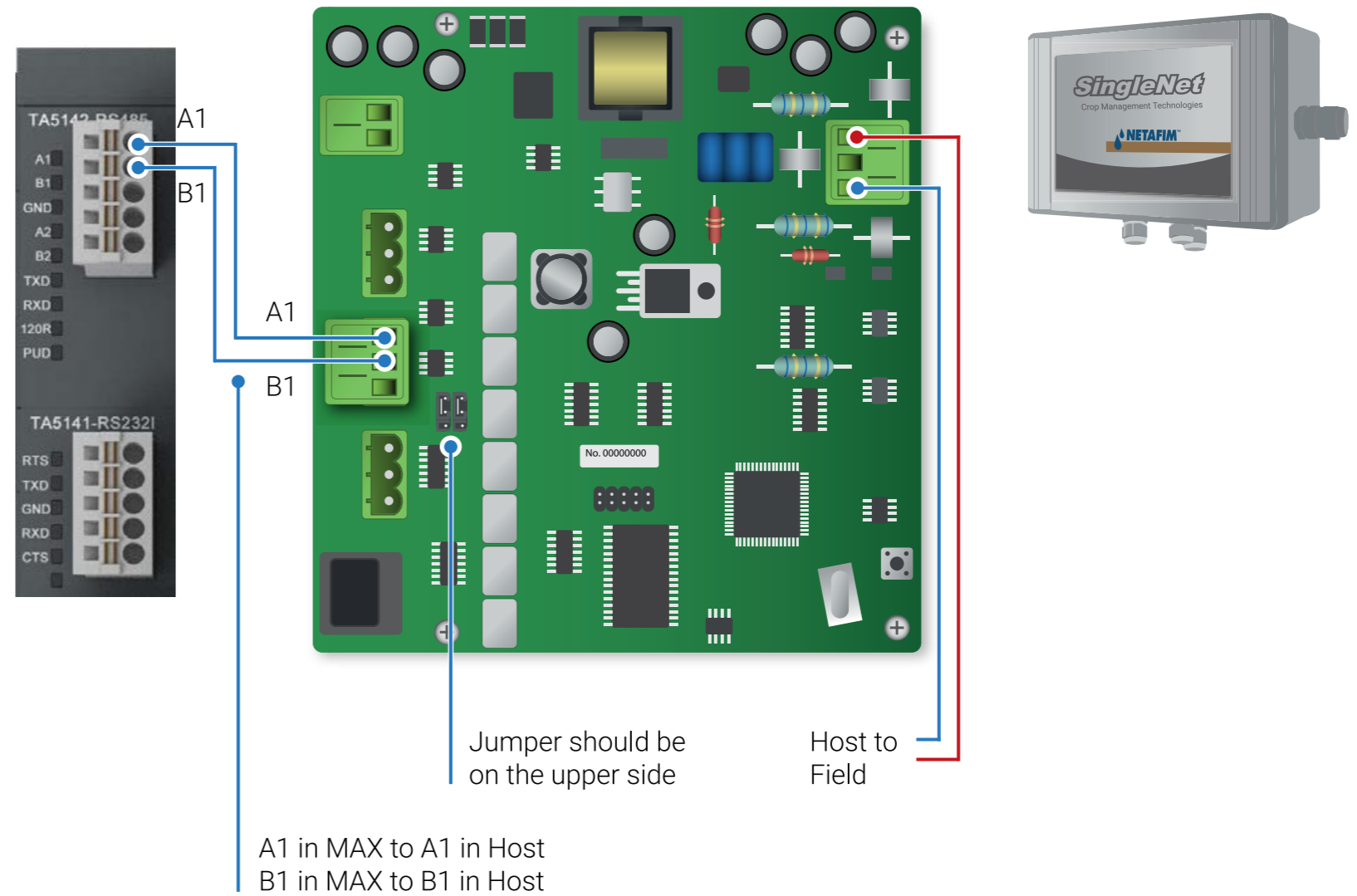
Signal	Color	State	Description
TxD	Yellow	ON (blinking)	Transmitting
RxD	Yellow	ON (blinking)	Receiving
120R	Yellow	ON	Bus termination
PUD	Yellow	ON	Pull-up / Pull-down

1. 2 LEDs for communication state display (TxD and R&D).
2. 2 LEDs for termination state display.
3. Allocation of signal name.
4. 5-pin terminal block for communication interface.

## / Wiring SingleNet host & GrowSphere™ MAX

GrowSphere™ Max

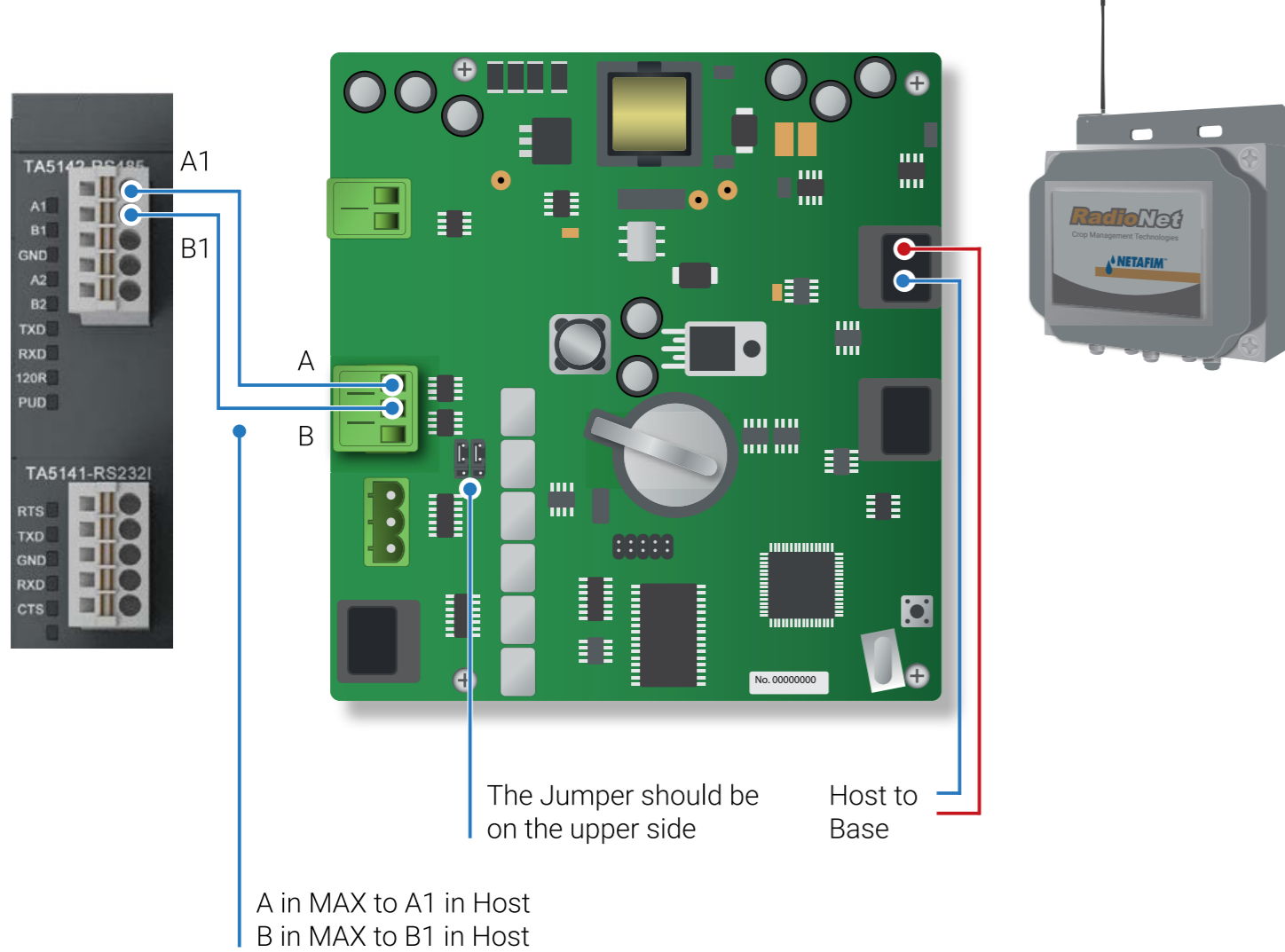
SingleNet Host



/ Wiring RadioNet host & GrowSphere™ MAX

GrowSphere™ Max

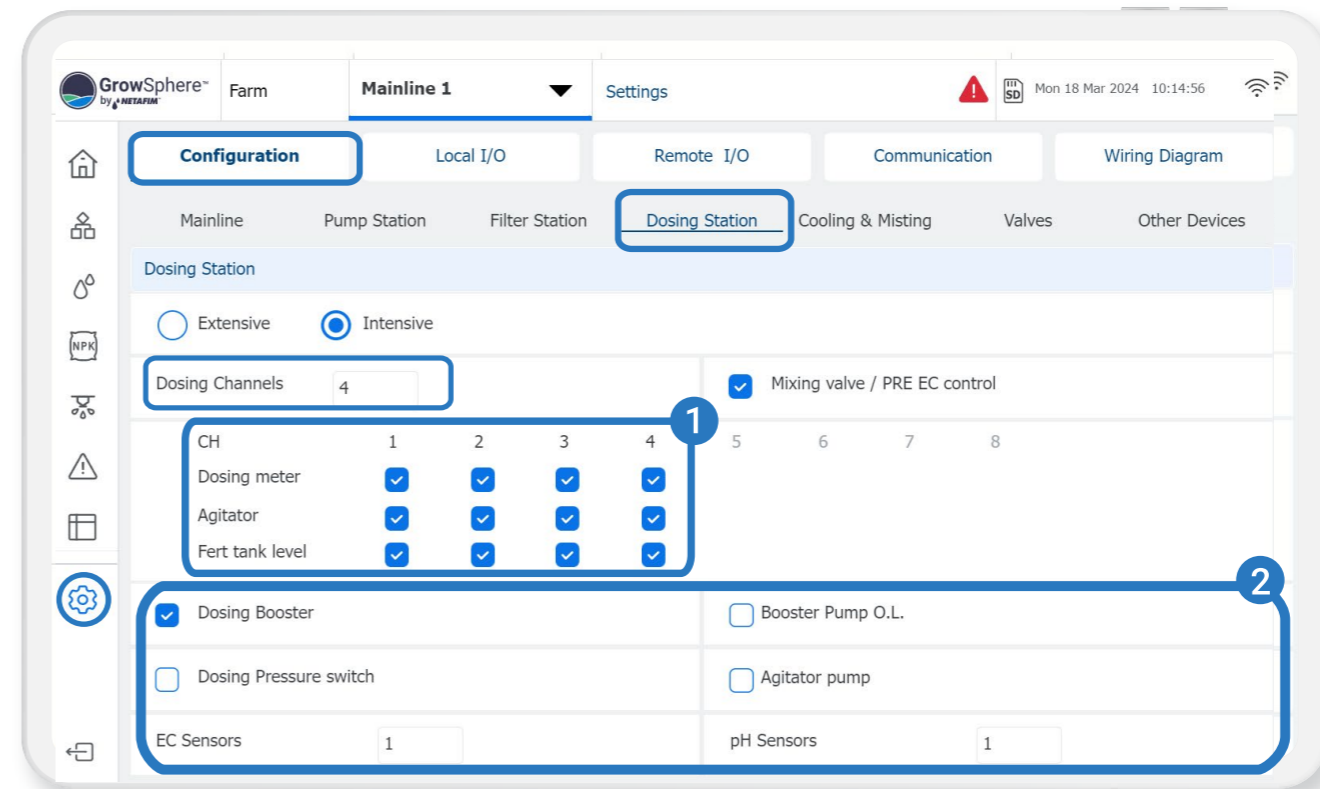
RadioNet Host



### 3.7 Dosing settings

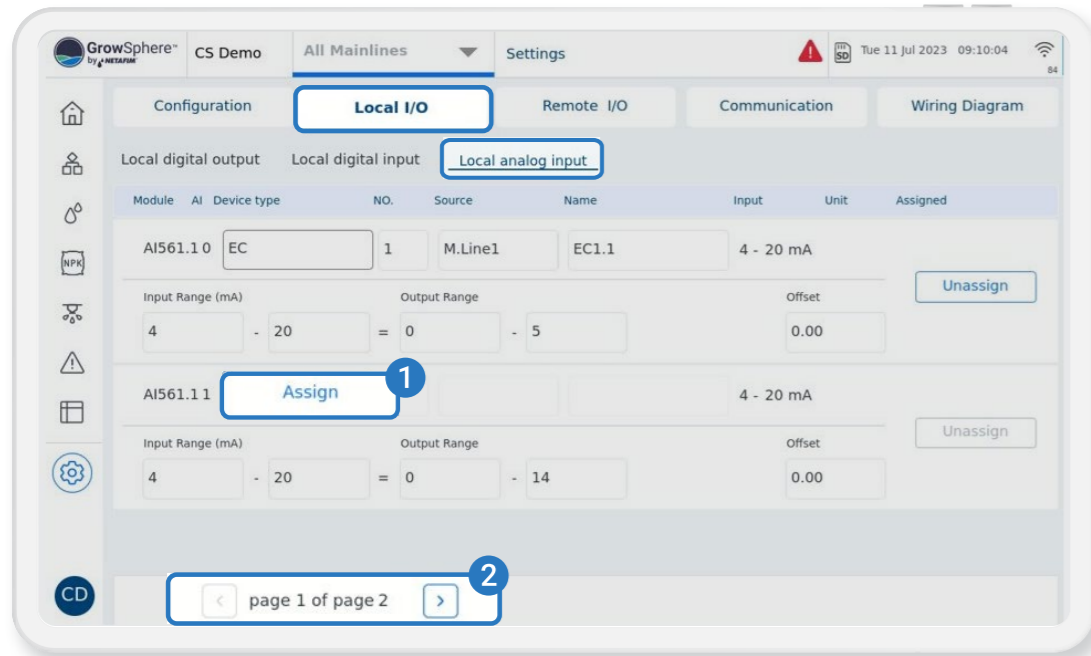
/ Set dosing station configuration

1. Define the numbers of dosing channels and agitators and activate them
2. Select the connected devices that are part of the dosing station

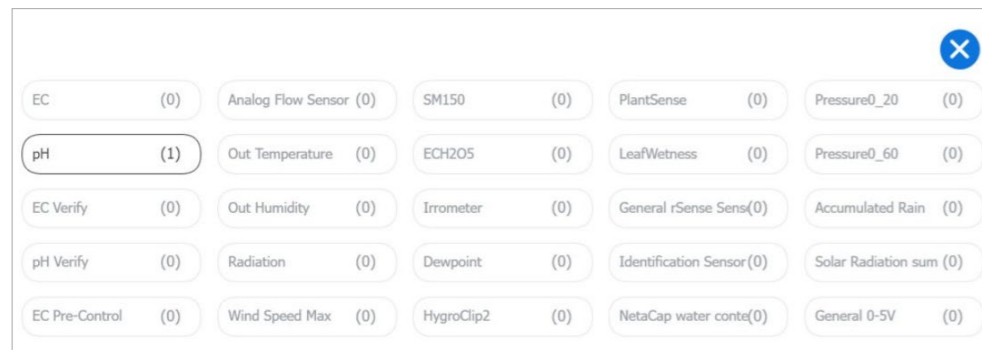


## / Define analog inputs

1. When you click on Assign, a list of devices that have been allocated will appear.
2. From there, you can choose the sensor you want to work with and set the input ranges, name, and offset for each sensor
3. To assign additional analog sensors, simply navigate between the pages

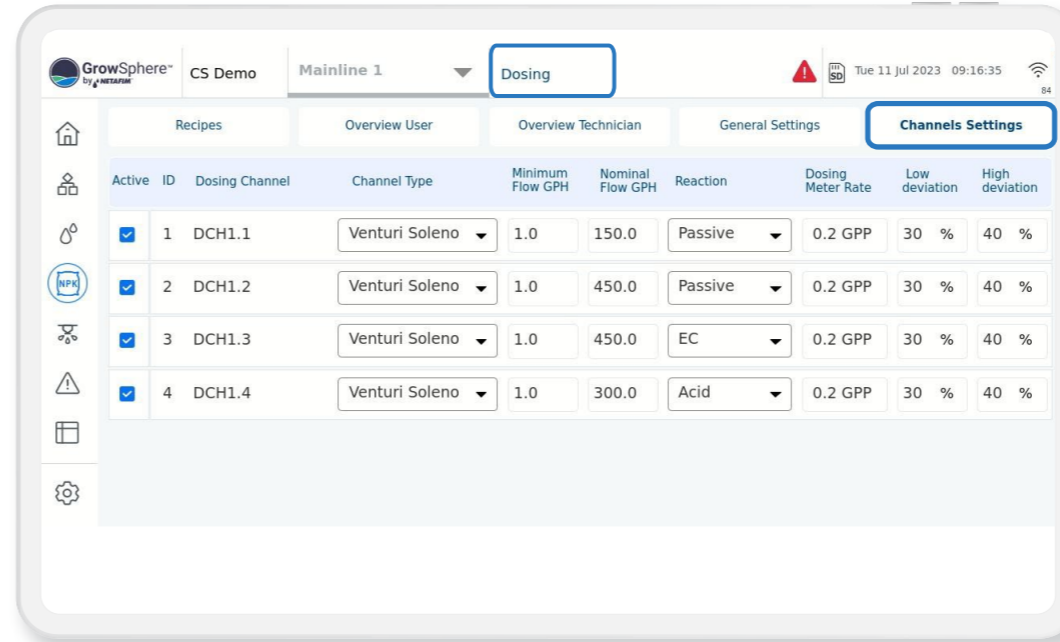


By clicking on Assign, the list below will be opened.  
The allocated devices are presented in the list



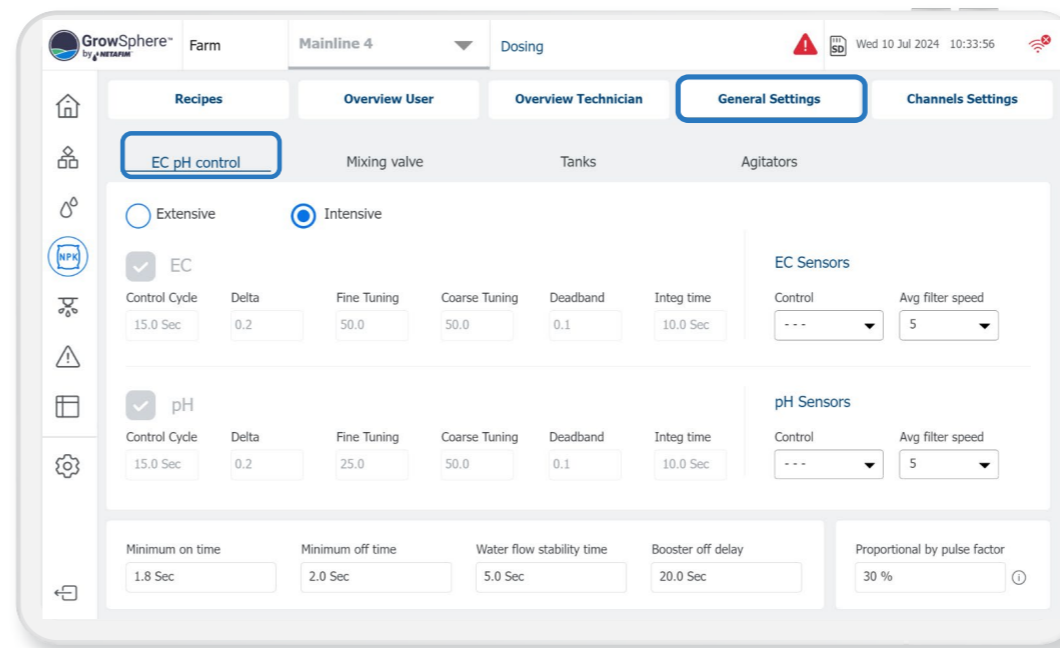
## / Set Dosing channels

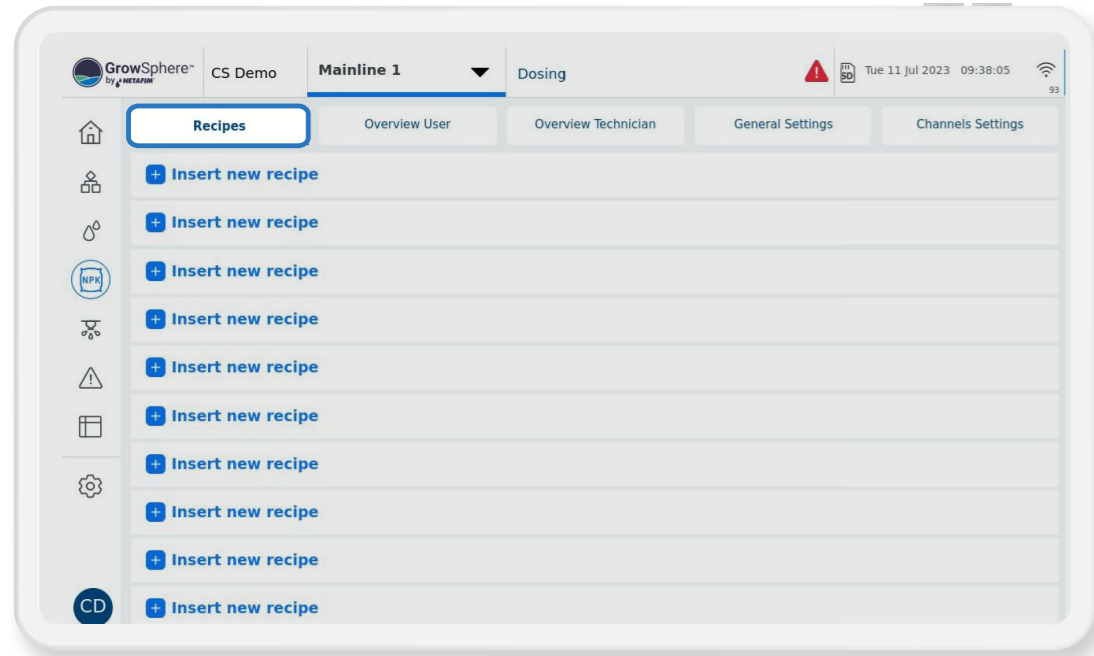
1. Activate the connected channels.
2. Define the Type, Minimum and Nominal flow, Reaction, DM rate and deviations for each of the channels.



## / Set EC and pH reaction methods

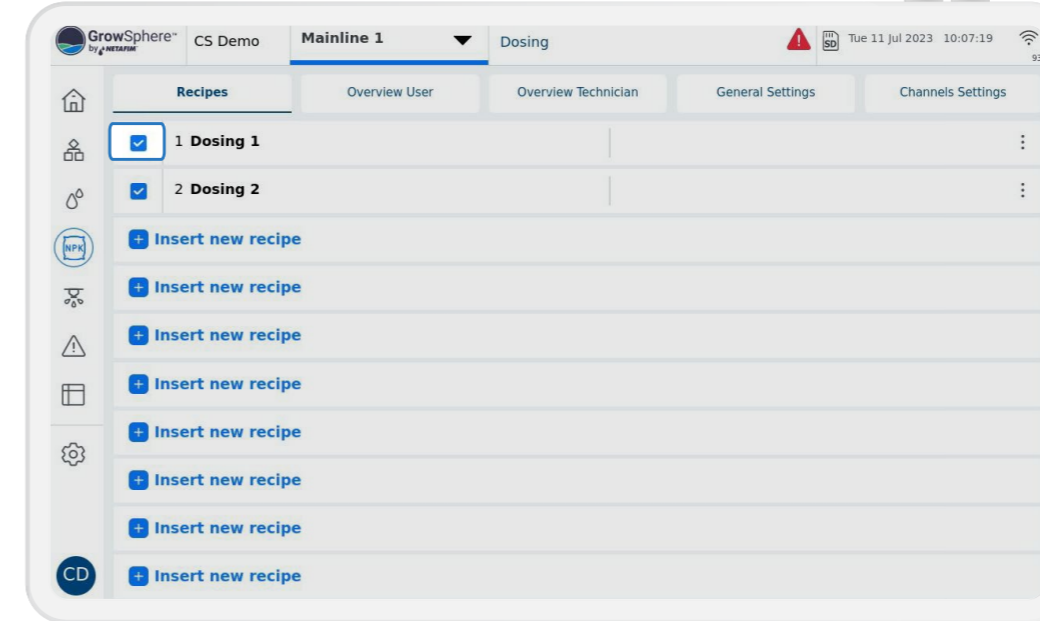
1. Select "Intensive" only for Local Dosing Channel control & EC-pH control is required.
2. Select "Extensive" only when Dosing Channels are operated by Remote Units .In this case Only Bulk or Spread methods are available.





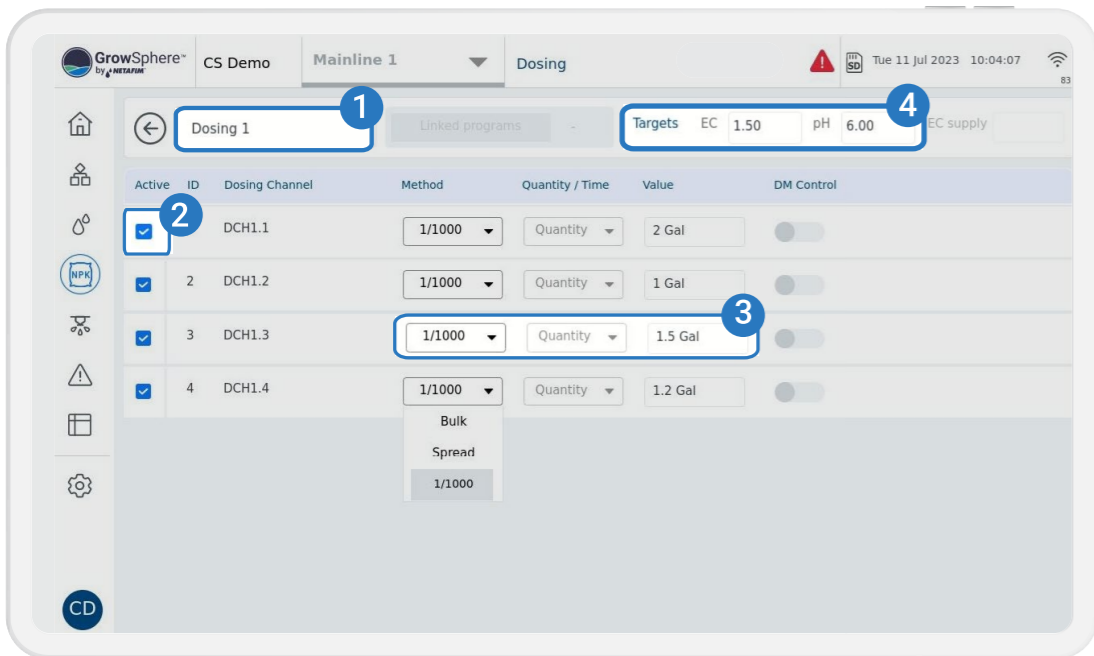
### / Create new dosing recipe

Click on the Insert new recipe to create a new dosing program.



### / Activate the recipe

Activate the recipe, and repeat this action for other dosing recipes as required.



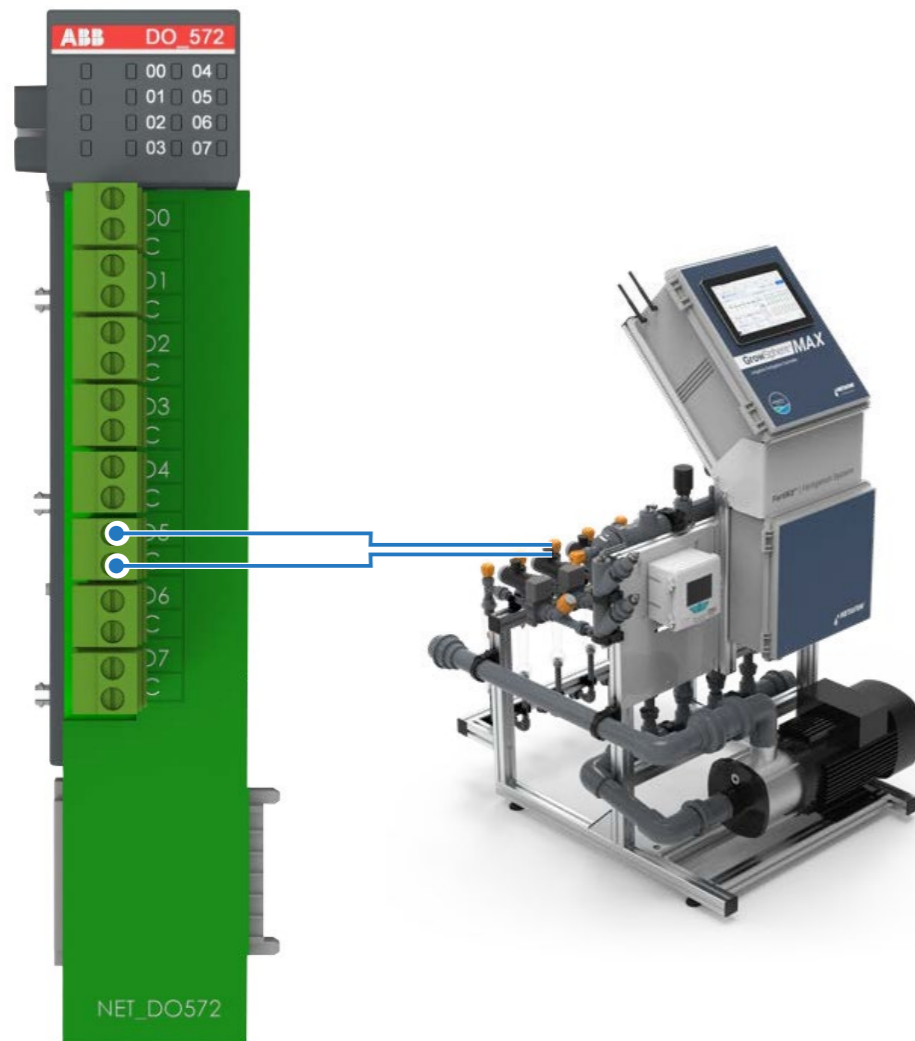
### / Define the dosing recipe' channels

1. Name the recipe
2. Activate the recipe's dosing channels.
3. Select the methods and quantities and the Value for each channel. DM Control can be activated if required.
4. Set the target EC & PH Can be set only for 1/1000 Dosing Method.

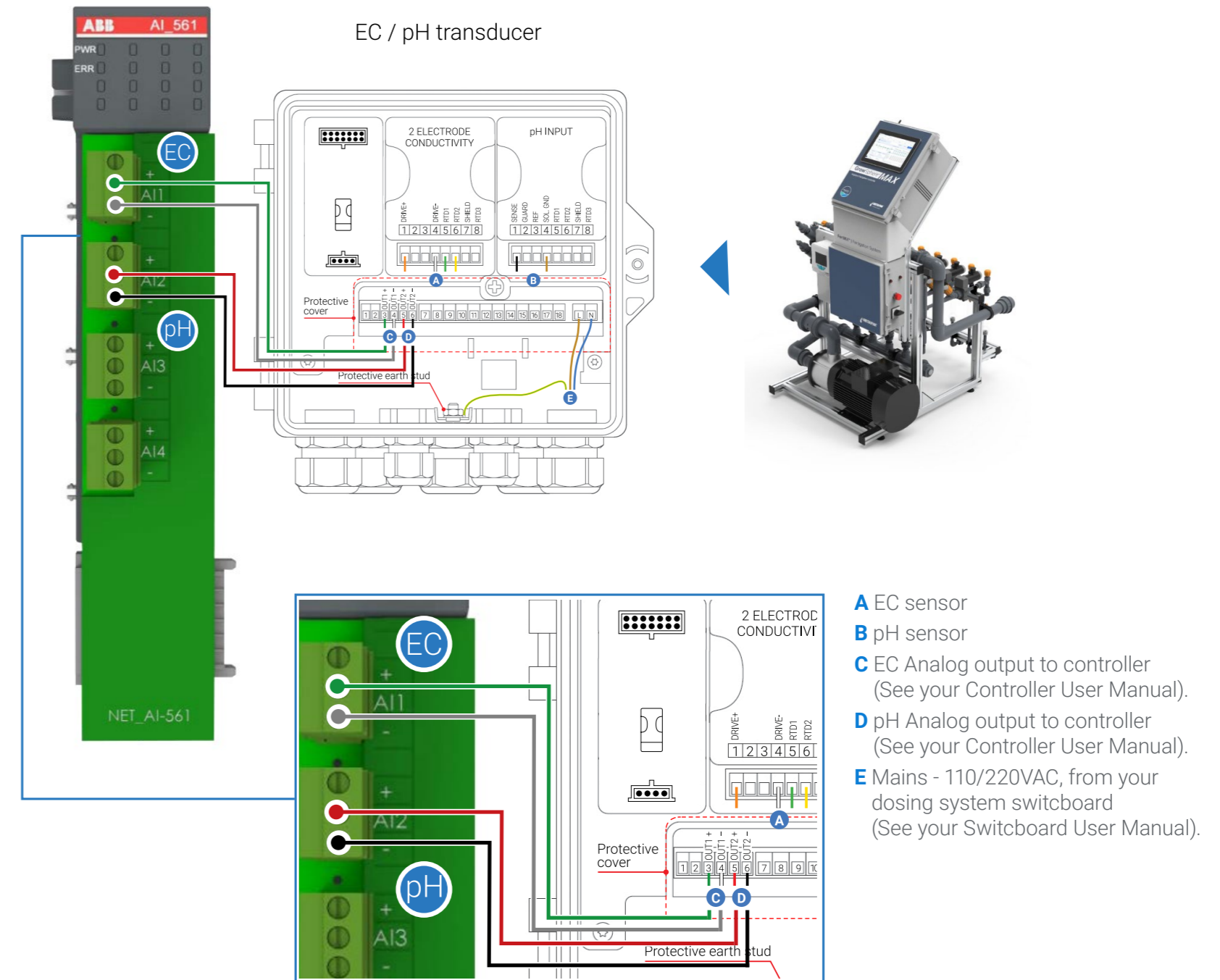


## / Connection of DO572 module

- 8 triac outputs – 24 VAC
- 'C' – Shared common
- Output current per channel = 2 A
- 2A Thermal Fuse on each channel. Not removable
- Indication of output signals – 1 yellow LED per channel
- The LED is on when output signal is high



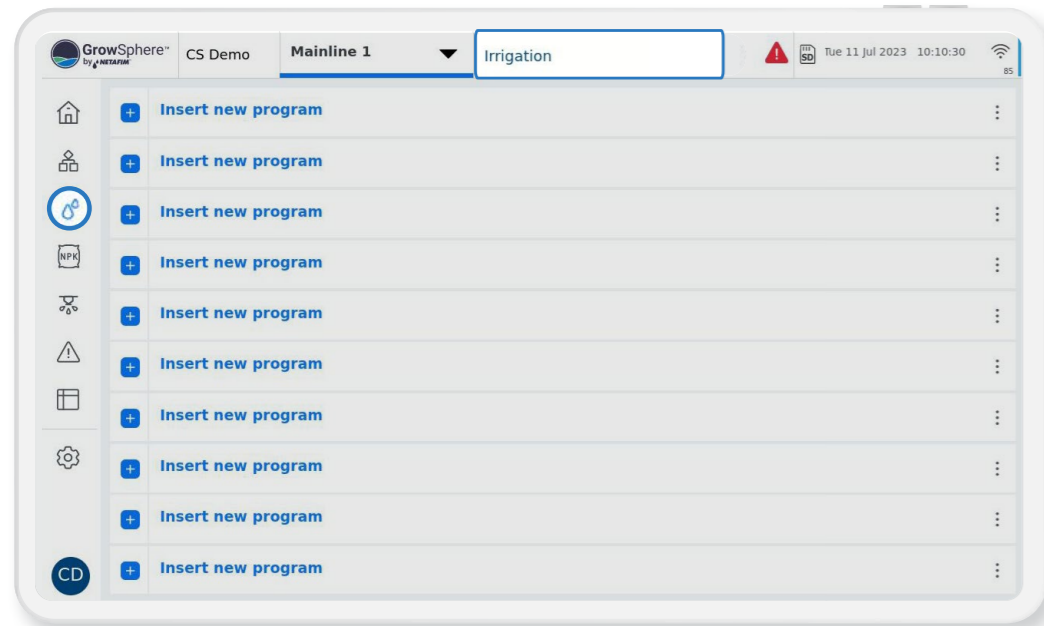
## / Connection of analog inputs module EC, pH - A1561



## 3.8 Create irrigation program

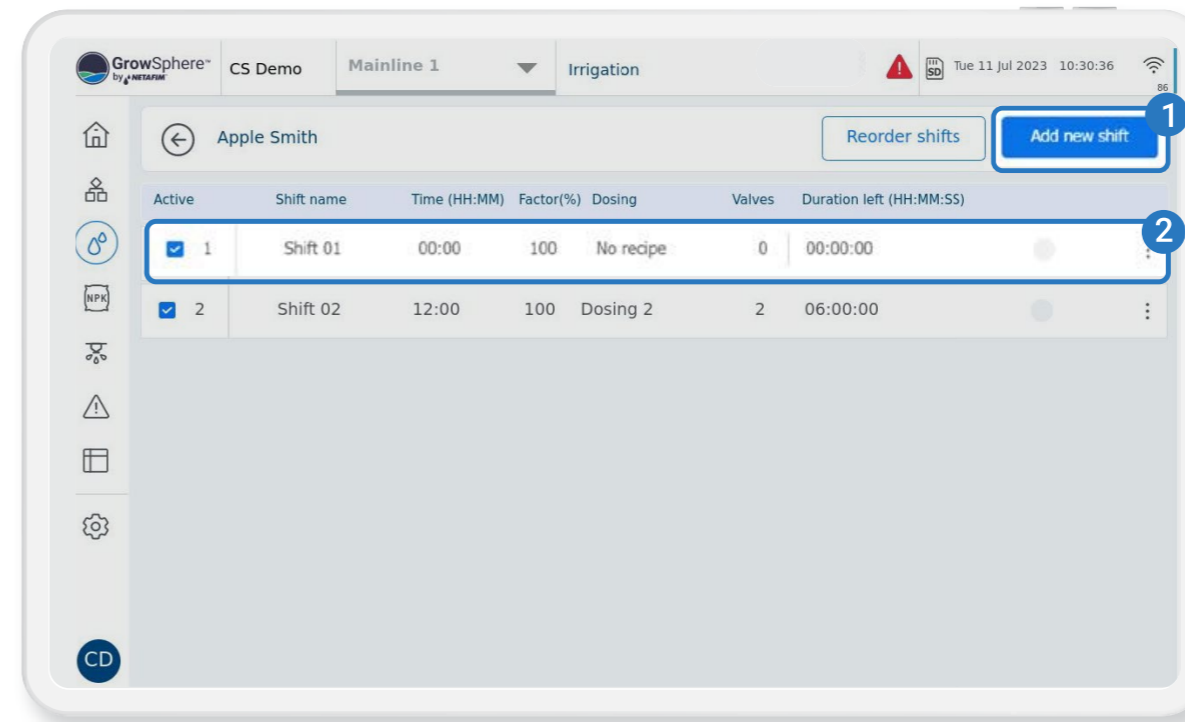
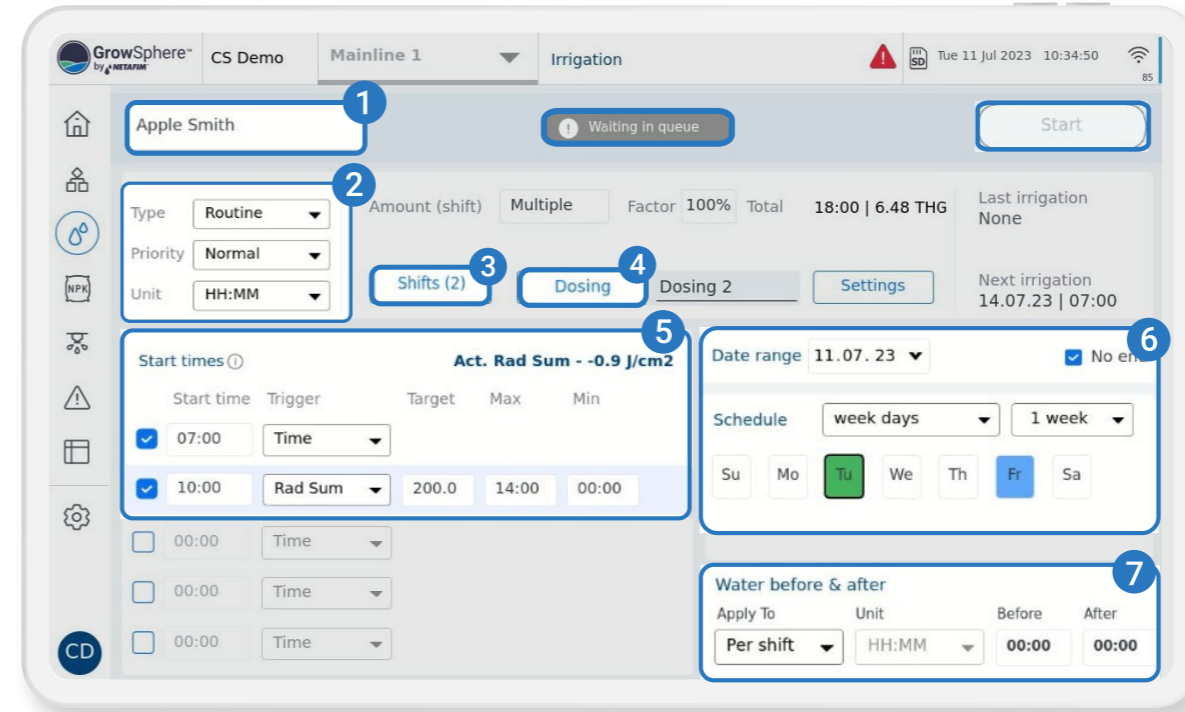
### / Create new irrigation program

Click on Insert new program



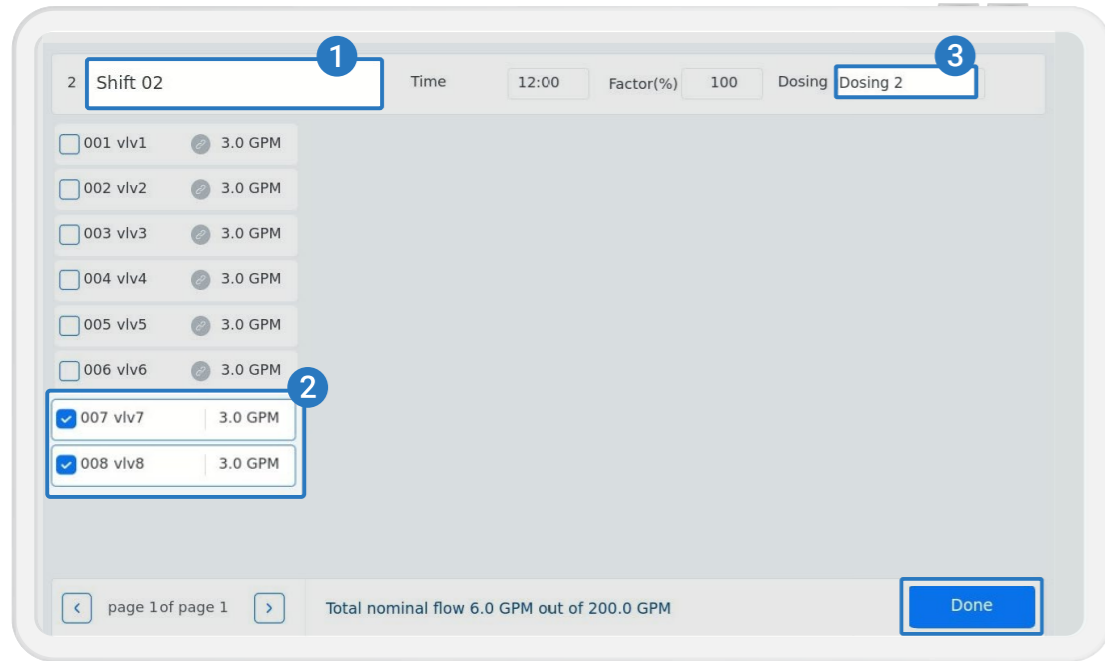
### / Set irrigation program

1. Name the irrigation program.
2. Specify the type of irrigation program, its priority, and the units to be used.
3. Click on Shifts to create shifts (see next page)
4. Click Dosing to select the Dosing program.
5. Set start times and triggers for irrigation.
6. Choose the days for irrigation and specify whether you want to use water only (indicated by blue) or dosing plus irrigation (indicated by green) for each selected day
7. Provide definitions for water before and after for a shift or program.



### / Edit and/or add a new shift

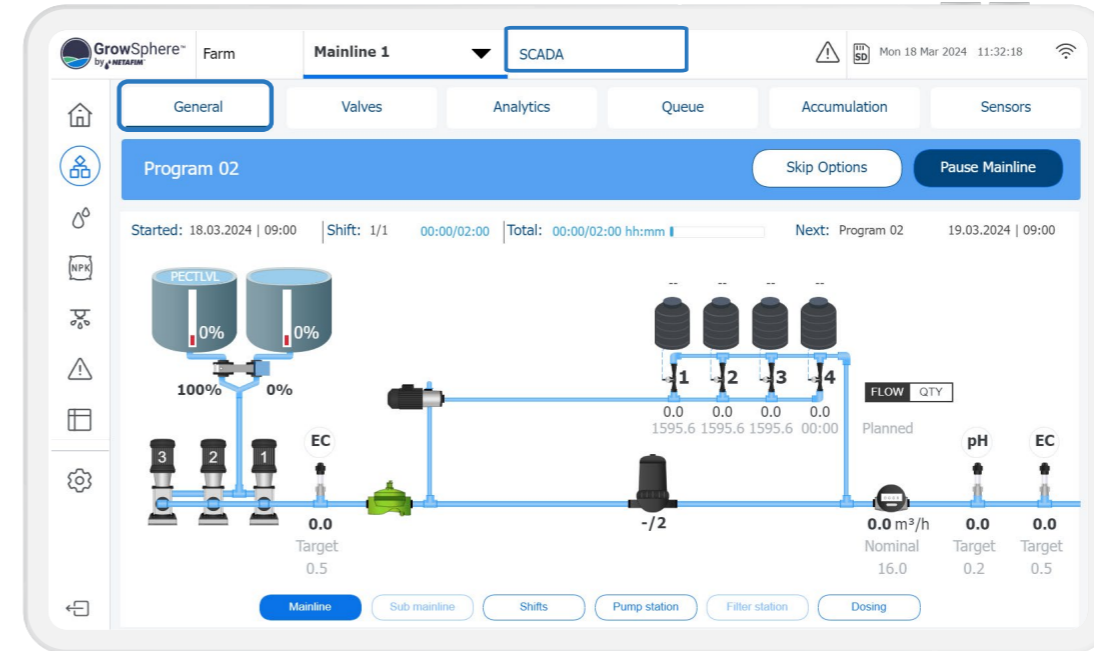
1. Click to add a new Shift
2. Click to edit an existing Shift



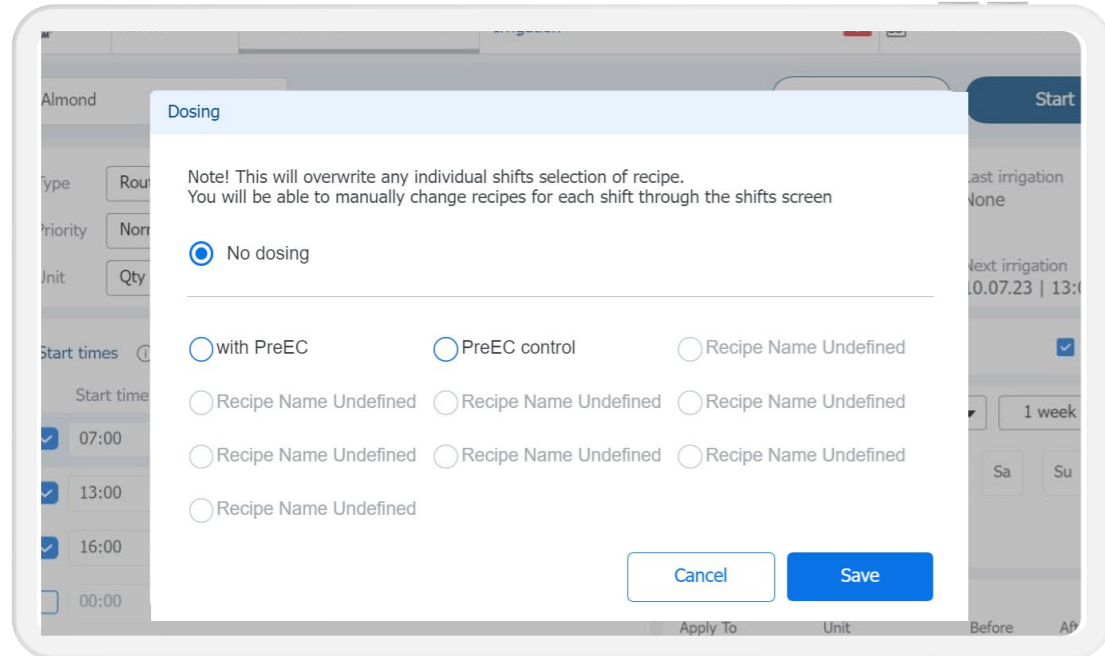
### / Edit and/or add irrigation shifts

To assign valves to a shift, follow these three steps:

1. Give the shift a name
2. Choose the valves you want to assign to the shift
3. Assign the shift to a dosing recipe
4. Assign "Run Time" for shift here
  - Mention Max. No. of Valves in a shift : 32
  - Mention Max. No. of shifts in a program : 32



### / Quick view of your irrigation operation status



### / Assign dosing recipe to irrigation program



## 4. Introduction

This chapter introduces the irrigation and fertigation controller and includes:

**1/** GrowSphere™ MAX Overview

**5/** Controller Sticker

**2/** Configurations

**6/** EC/pH Unit

**3/** Summary of GrowSphere™ MAX main features

**7/** Screen and Visualization

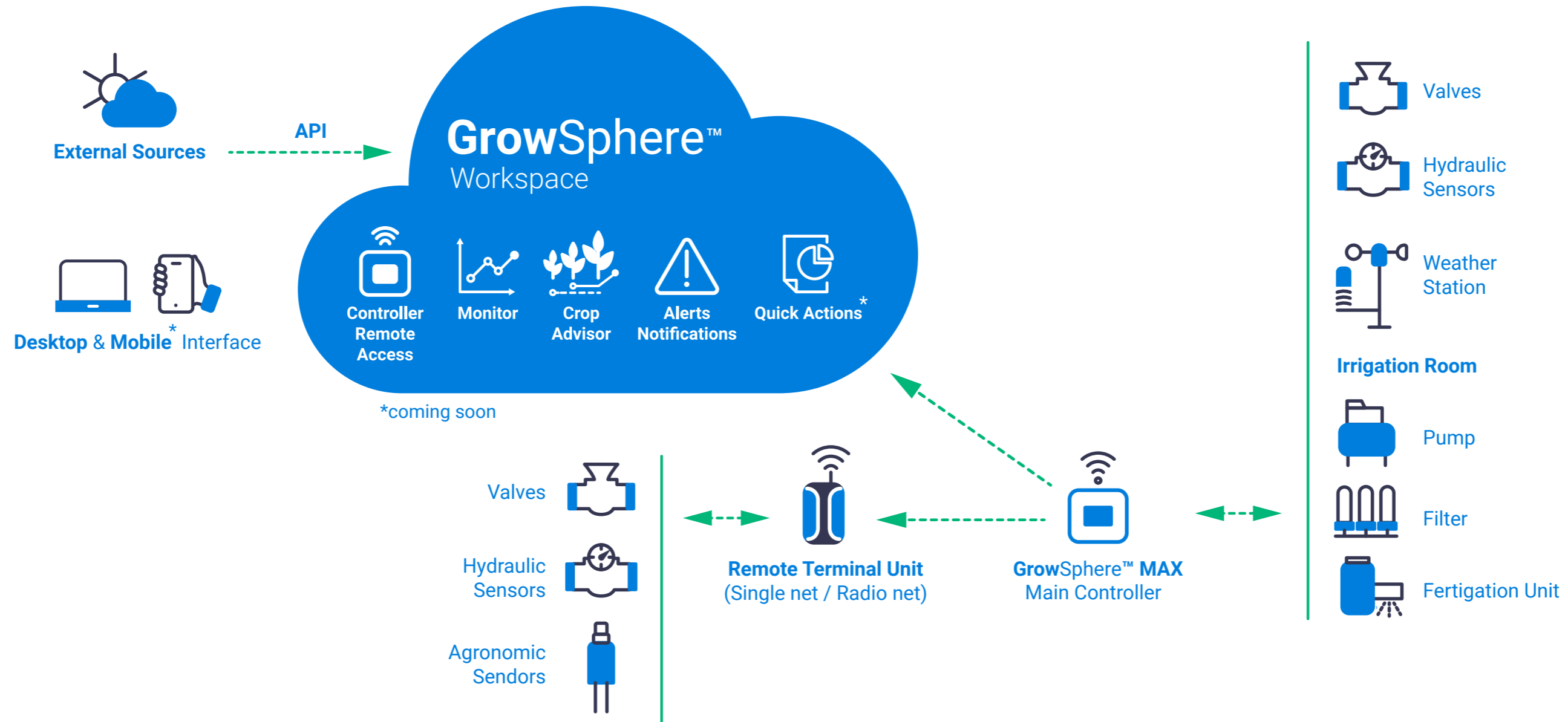
**4/** List of Connected devices

**8/** Environmental Conditions





## 4.1 GrowSphere™ MAX Overview - Architecture



## 4.2 Configurations

**GrowSphere™ MAX** irrigation controllers is designed to cater to the diverse needs of growers, providing maximum adaptability and flexibility across indoor and outdoor agricultural settings. With four different configurations, a versatile range of controllers empowers agricultural endeavors to achieve optimal performance.



### GrowSphere™ MAX with Screen

**GrowSphere™ MAX (Touch Screen):** This controller comes with a user-friendly 10.1-inch touch screen interface and 6 digital outputs and 12 digital inputs by default, that make it easy to operate in agricultural environments. It can be operated on both 110V and 220V power supplies.



### GrowSphere™ MAX Screenless model

**GrowSphere™ MAX (No Display):** The controller provides reliable functionality without a display and can be accessed remotely. It is suitable for indoor and outdoor cultivation and ensures precise control without compromising simplicity. This controller can operate on both 110V and 220V power supplies.



### GrowSphere™ MAX with Double Door

**GrowSphere™ MAX Double Door:** Designed for outdoor agricultural installations, the double-door design ensures easy accessibility, making it suitable for outdoor farming settings. This 110V or 220V controller maintains 6 Digital Outputs and 12 Digital Inputs by default.



### GrowSphere™ MAX with Fertikit

**Fertikit™ 5G with GrowSphere™ MAX:** This integration is designed specifically for open field nutrification application. It combines the specialized capabilities of **Fertikit™ 5G** with the robust functionality of **GrowSphere™ MAX**. The controller comes with 14 digital outputs and 12 digital inputs by default, offering precise and efficient nutrient management tailored explicitly for precise dosing management. This optimized crop growth and yield.

## 4.3 Summary of GrowSphere™ MAX's main features

The Controller includes the following major components:

Outputs & Inputs*	Per Mainline	Total
<b>Mainline</b>	1	4
<b>Main valve</b>	1	4
<b>Main water meter</b>	1	4
<b>Pump</b>	3	12
<b>Filter (flushing control + indication)</b>	32	128
<b>Dosing station**</b>	1	4
<b>Dosing channel (venturies)</b>	8	32
<b>Valves</b>	160	256

\*Subject to I/O modules configuration and a maximum capacity of 6 modules per controller  
Capacity is including Remote Units

\*\*Above 8 dosing channels it is required to check the controller power capacity use and if needed more than 100VAT, it is required to use an external transformer to increase capacity



## 4.4 List of Connected Devices and Fertigation Functionalities

The table below demonstrates the options for connecting the **GrowSphere™ MAX** to a different device:

### MAX

	Digital output	Davis WS	Analog sensors	Serial soil sensors	Digital hydraulic sensors	EC/pH sensors	Filter flushing and indication	Dosing by bulk/spread	Proportional dosing	Dosing with EC / pH control	Pre EC control
MAX	✓	✓	4-20mA	—	✓	✓	✓	✓	✓	✓	✓

### Remote Units

	Digital output	Davis WS	Analog sensors	Serial soil sensors	Digital hydraulic sensors	EC/pH sensors	Filter flushing and indication	Dosing by bulk/spread	Proportional dosing	Dosing with EC / pH control
RadioNet	✓	—	✓	✓	✓	✓	—	✓	—	—
SingleNet	✓	—	—	—	✓	—	—	✓	—	—

## 4.5 Controller Sticker

### 1. Product description

### 2. Netafim SKU

### 3. Hardware revision

### 4. Ordinal production number

4.1 Production year

4.2 Production week

### 5. Identification number (use for Add device)

### 6. Modem SSID (Wi-Fi address)


### 7. Wi-Fi Password (to connect through Wi-Fi)

### 8. Modem IMEI



### 9. Wi-Fi username and password QR code

### 10. PLC S/N – Scan for add device


# GrowSphere™




**1** GS-MAX-DISP-220V-22DO-12DI-4AI-8TRC


**3**



**2** SKU: 74702-000062      REV D4




**4** S/N: 4.1 10-MAX-2324-1234 4.2

<b>5</b> PLC S/N:	A1PM5052-R-ETHL2212345678
<b>6</b> SSID:	RUT240_6283
<b>7</b> WIFI PW:	g9Z1KrAz
<b>8</b> IMEI:	 864677061890703

**9** WIFI QR CODE



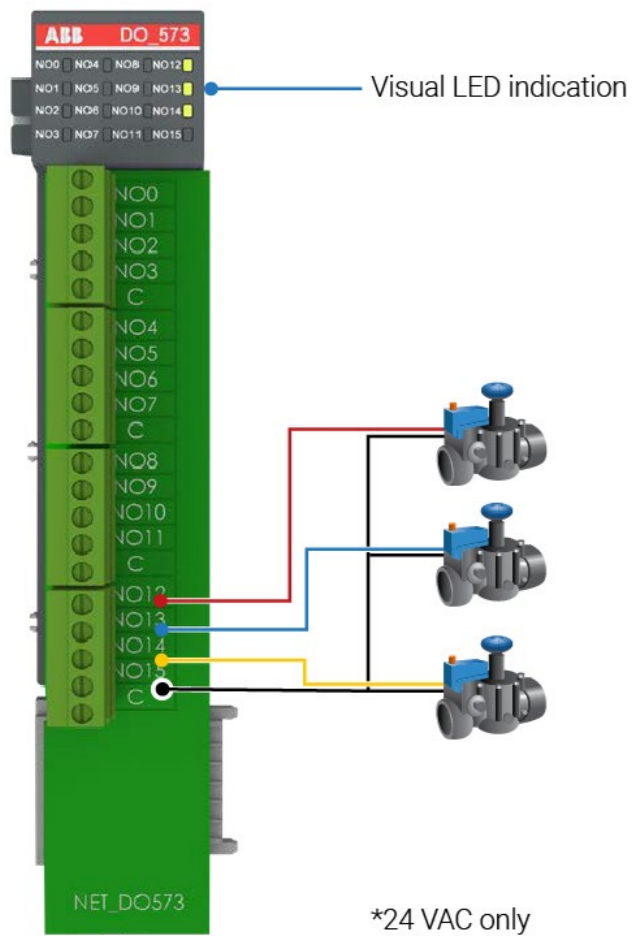
**10** INSTALLATION CODE





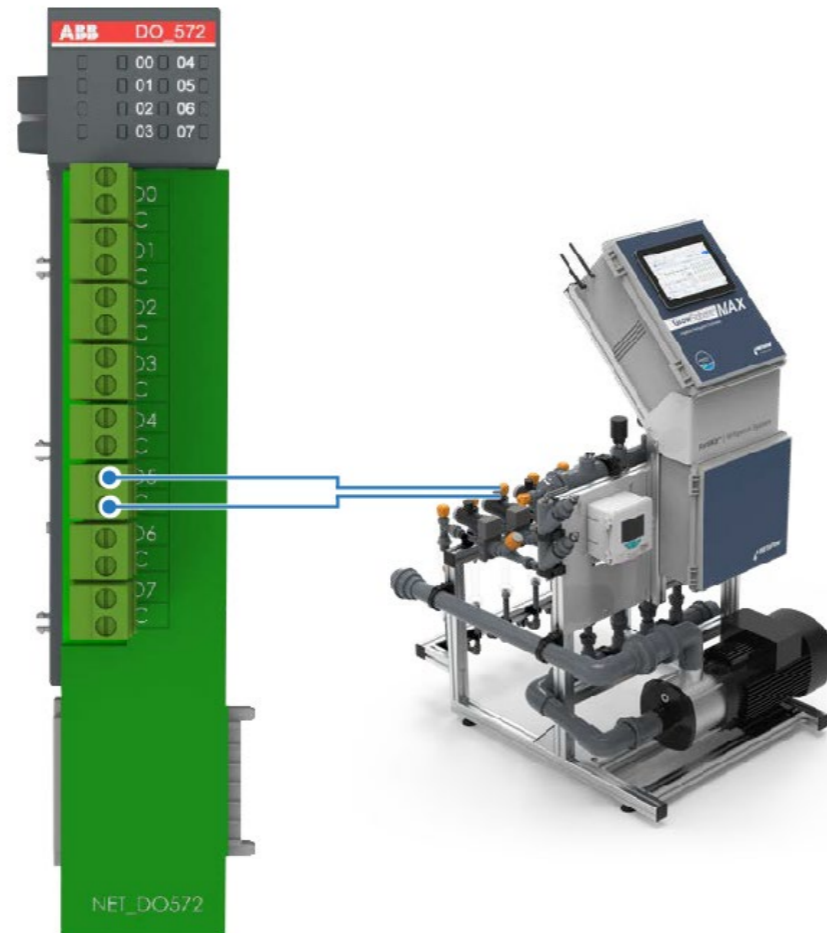
## Relay output – 16 OUT

- 16 Outputs - Relay
- Shared Common
- Kickback protection
- 24 VAC 80 VA



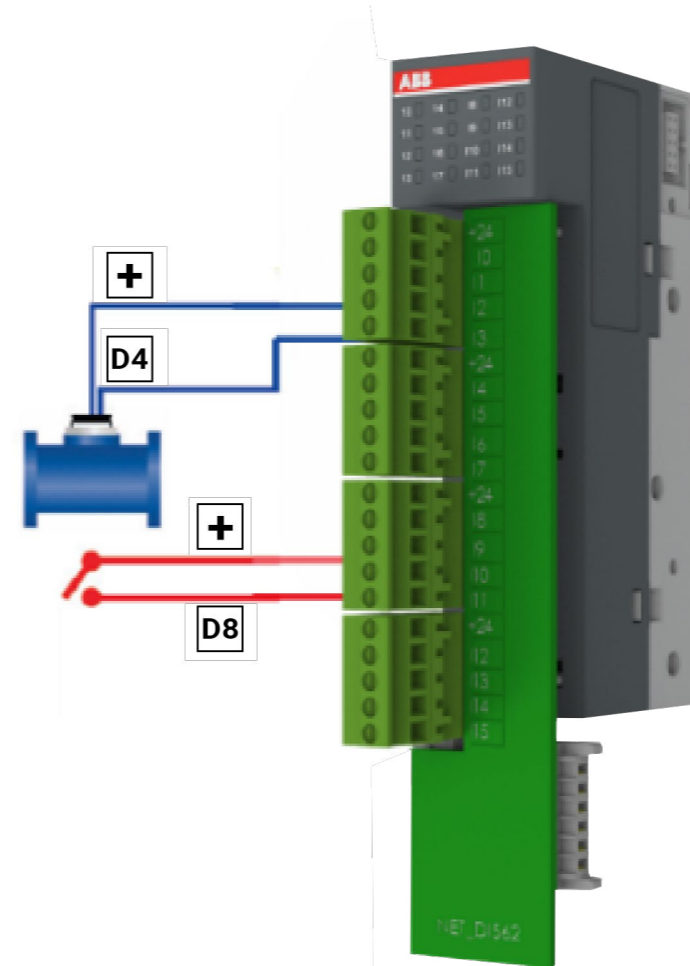
## Dosing Module – Triac

- 8 Outputs - TRIAC
- Shared Common-for each valve
- Over Current Protection
- 24 VAC @ 80 VA



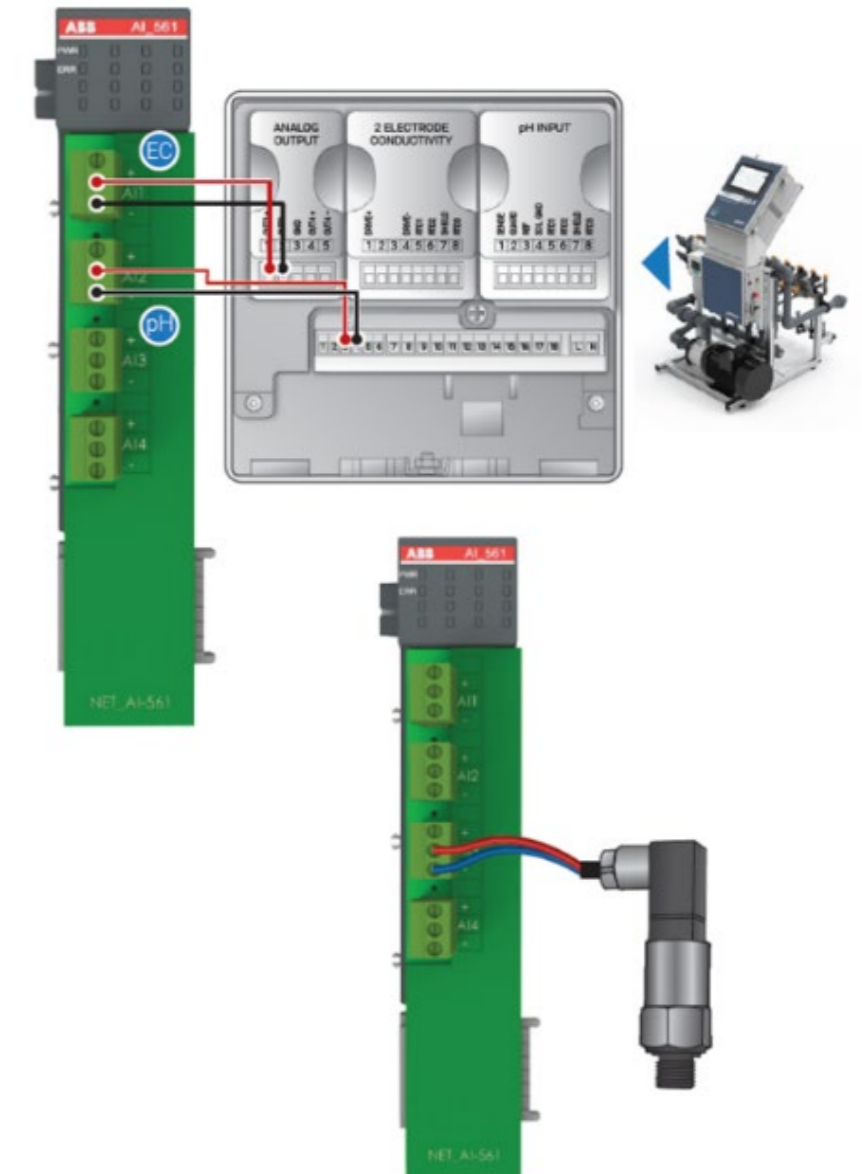
## Digital Inputs Module

- 16 Inputs
- Dry/ Active Contact
- Feed voltage - 24 DC



## Analog Inputs Module

- 4 Analog Inputs
- 0-20 mA
- Feed Voltage 24 DC





## 4.6 EC & pH connection

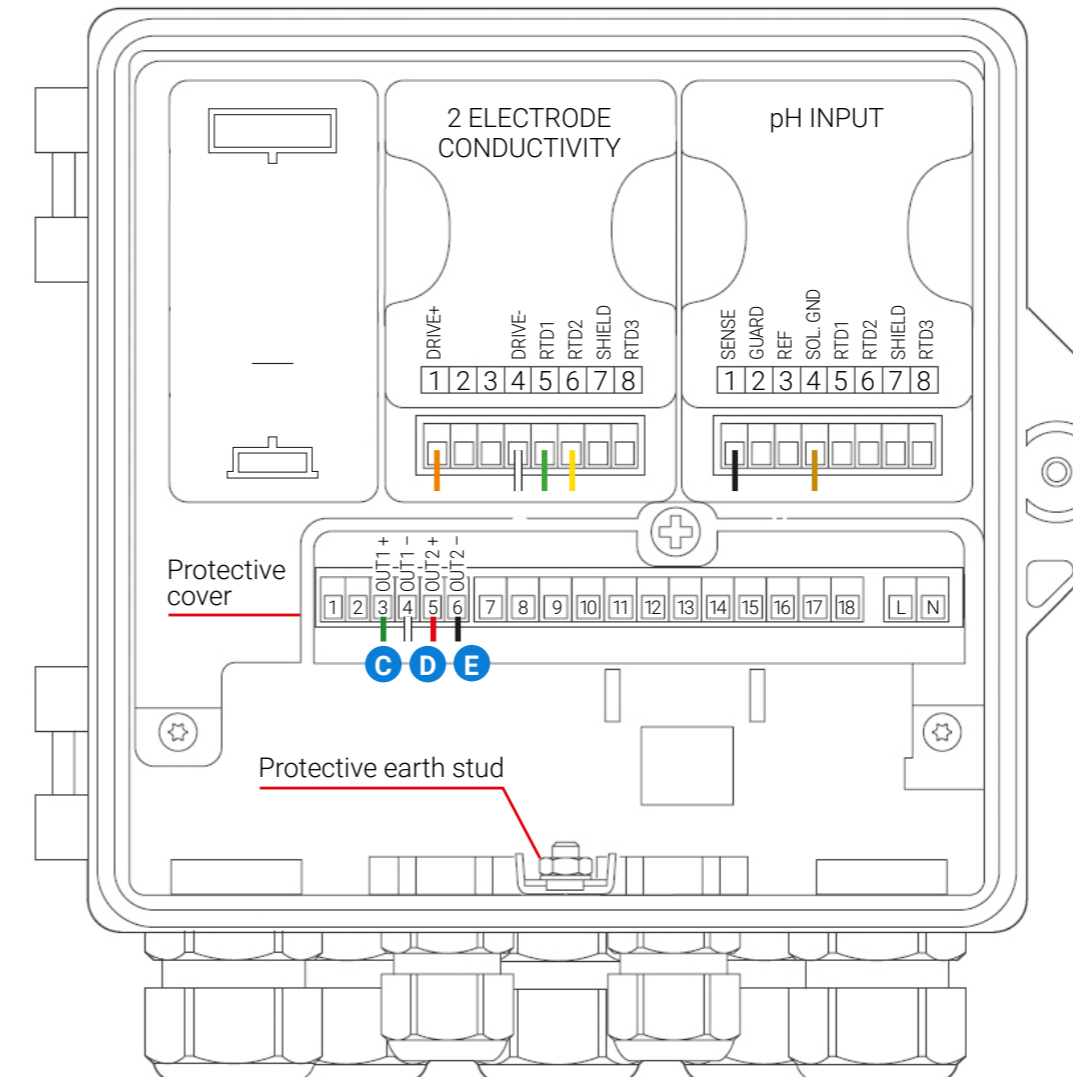
Only the connections relevant to EC and pH sensing configuration are described.  
For more details, please go to the ABB AWT420 EC pH transmitter manual

### WARNING

The main board connections are located under the protective cover. The transmitter AC version runs high current. To avoid electrocution make sure you put the protective cover back in place after wiring the transmitter.

### ABB EC/pH Transducer

- A** EC sensor
- B** pH sensor
- C** EC Analog output to controller (See your EC/pH module User Manual).
- D** pH Analog output to controller (See your EC/pH module User Manual).
- E** Common
- F** Mains - 110/220VAC, from your dosing system switchboard (See your Switchboard User Manual).



## 4.7 Screen and Visualization

- **Color touch 10.1" LCD screen** (in the **GrowSphere™ MAX** screen configuration).
- **Built-in multilingual software.** Switch languages with a single keystroke. To check the supported languages go to the app settings --> preferences.
- **Real-time operational status screen (SCADA).**



## 4.8 Environmental conditions



### The GrowSphere™ MAX should be:

- Placed in a roofed building protected from direct sunlight
- Kept at an ambient temperature between 10°C and 50°C (50°F and 104°F)
- Kept at a maximum relative air humidity of 90%
- Properly ventilated
- Protected from dust
- Protected from splashes or direct spraying with water or chemicals

### Communication

Wi-Fi	IEEE 802.11b/g/n
Mobile Module	4G (LTE) – Cat 4 up to 150 Mbps

### Specifications

Power supply	Mains Power 110/220 VAC, 50/60 Hz	
Input current	0.8A /220VAC 1.6A /110VAC	
Touch Screen	Optional	
Output 24VAC	Max. total output current (A/VA)	4A/100VA
	Max. output current per one line (A)	2A
Output 24VDC	Max. total output current (A/W) 2.5A/60W Max. output current per one line(A)	2.5A/60W
	Max. total output current (A/W) 2.5A/60W Max. output current per one line(A)	250 mA

Operation Temperature	0-50 °C
Operation Humidity	20-90 %
Storage Temperature	-10-70 °C
Storage Humidity	20-95 %
Max. operational altitude (m)	2000
IP Rating	IP65



## 5. Installation

This chapter reviews installing the controller and includes:

**1/** Mounting GrowSphere™

**5/** Connecting Digital Outputs

**2/** Connecting to the CPU

**6/** Connecting Analog Inputs

**3/** Connecting Digital Inputs

**7/** Connecting EC/ pH Units

**4/** Connecting Dosing Outputs



## 5.1 Mounting GrowSphere™

### 5.1.1 Mounting GrowSphere™ to Plate

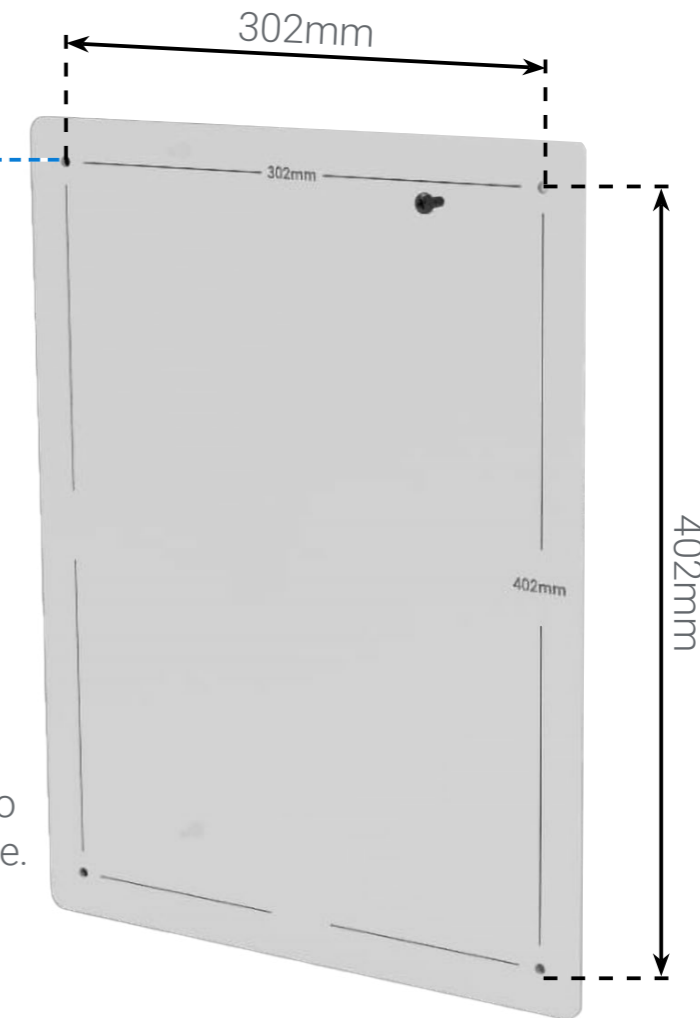
Perform the following steps to mount the controller to a plate:

#### 1. Prepare a plate



#### 2. Drill holes

Drill four holes; one on each corner of the plate according to these measurements.



#### 3. Attach Controller to plate

Use the four screws supplied to attach the controller to the plate.



## 5.1.2 Mounting GrowSphere™ to wall

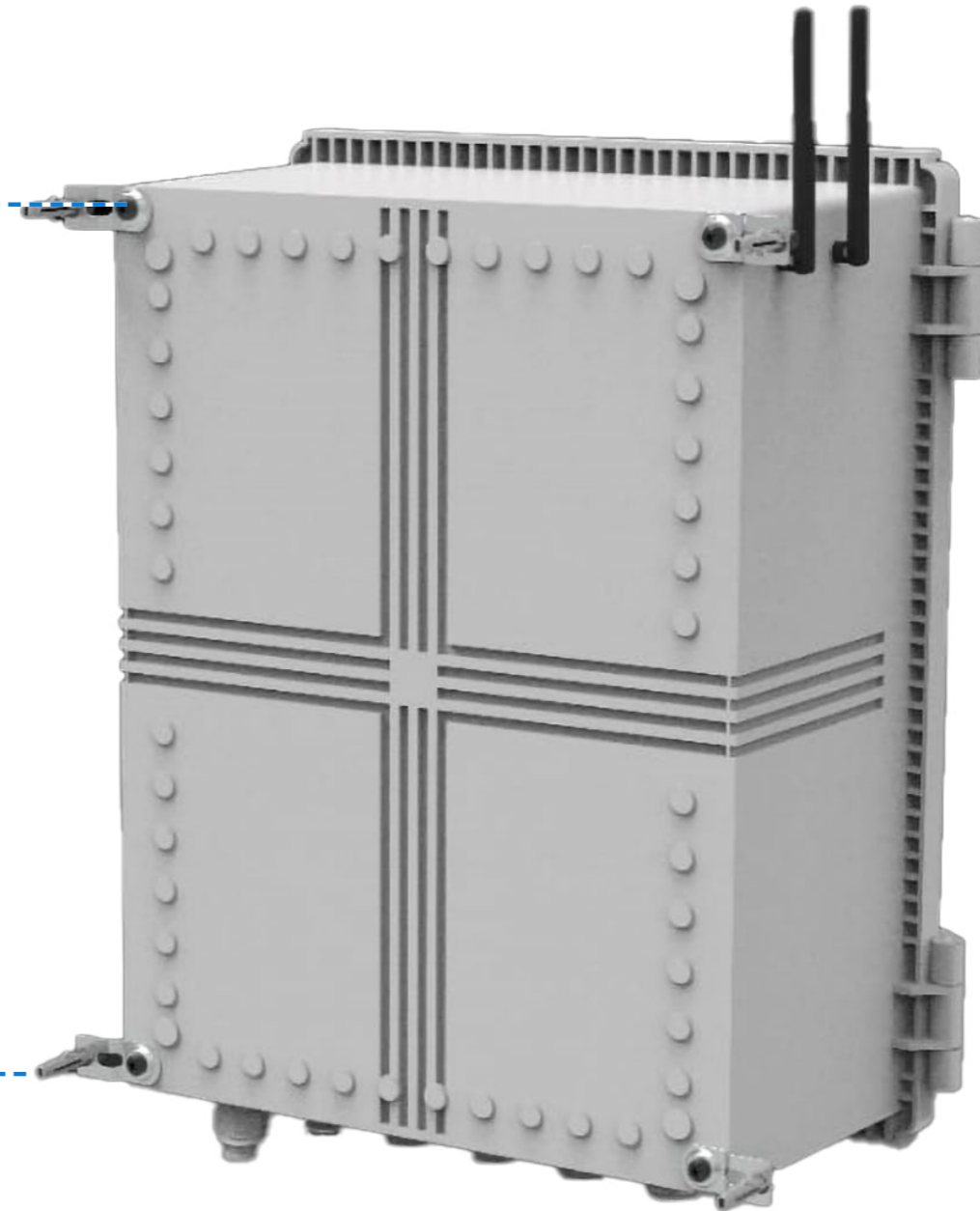
Perform the following steps to mount the controller to a wall:

### 1. Attach brackets

Attach one bracket to each corner of the controller using the screws supplied.

### 2. Drill anchors

Drill anchors in wall and attach controller to wall using the brackets.





## 5.2 Connecting to the CPU

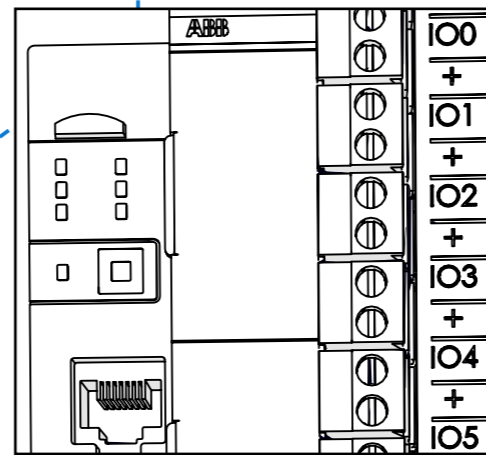
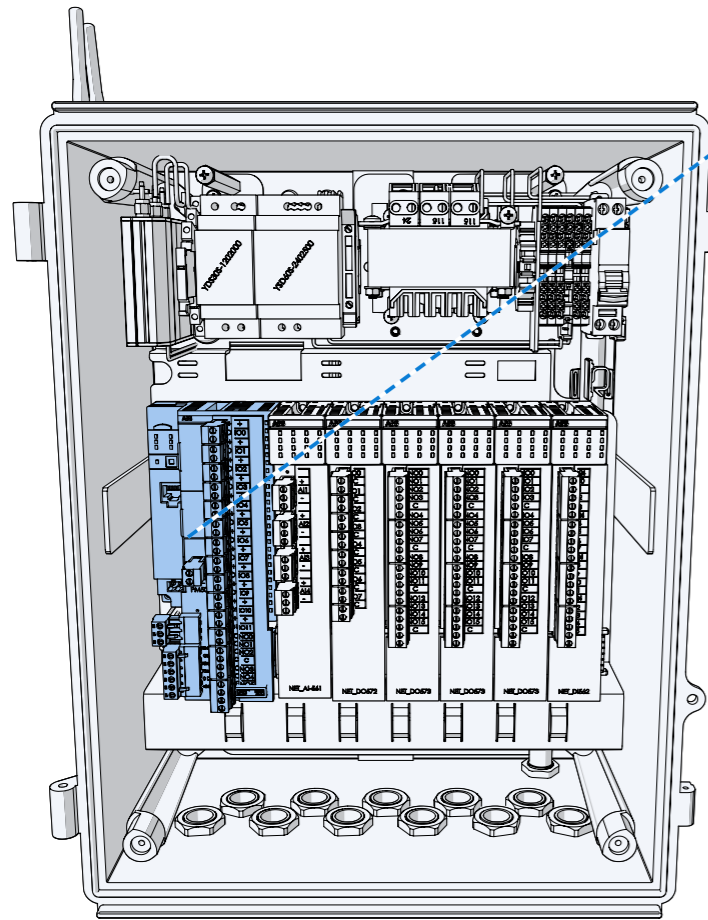
The CPU is the far left module of the controller and it contains the following connections:

- 12 digital inputs (dry/active contacts)
- 6 Outputs- relay outputs with shared common

Perform the following steps:

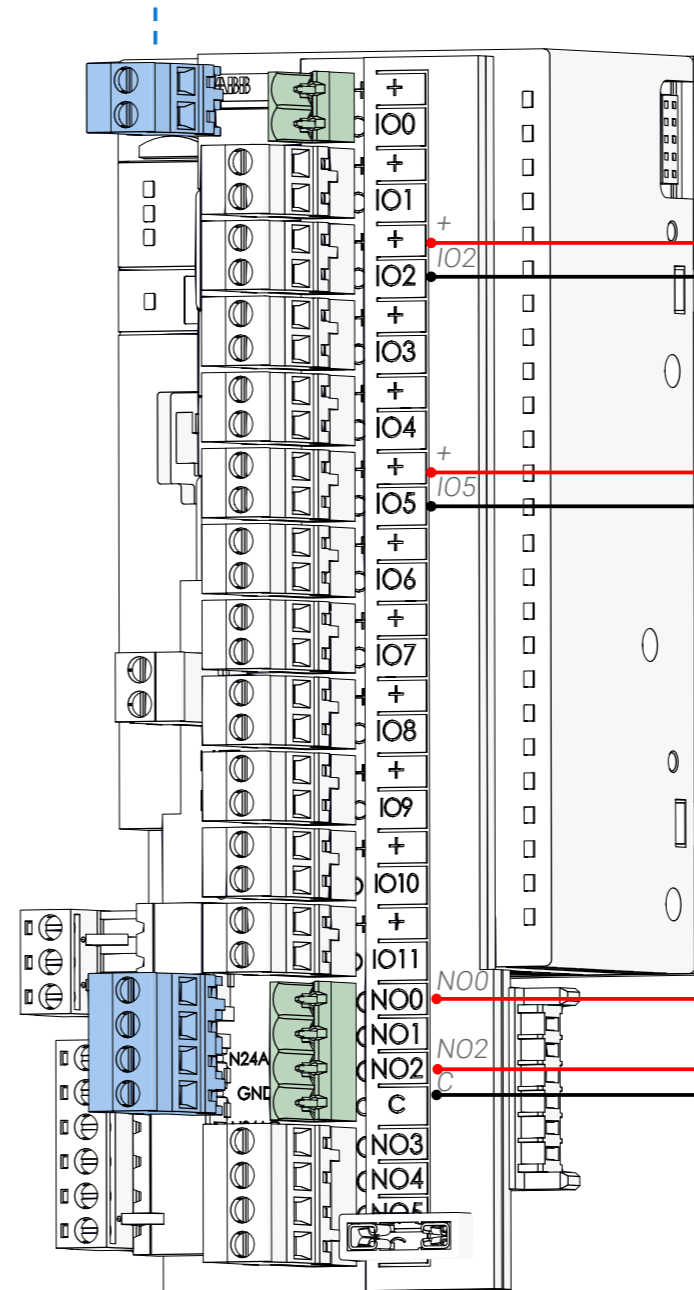
### 1. Verify the SD card exists

SD card containing the controller program should be inserted into the card slot.



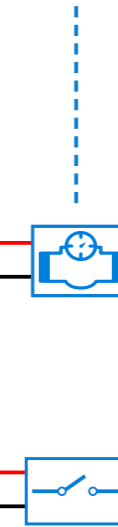
### 2. Pull the connector

Terminal connectors can be disconnected from the module to ease the connection.



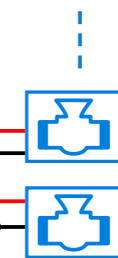
### 3. Connect digital inputs

Connect up to 12 digital inputs. Each input is connected to the (+, common) terminal, and the relevant input number.



### 4. Connect digital outputs

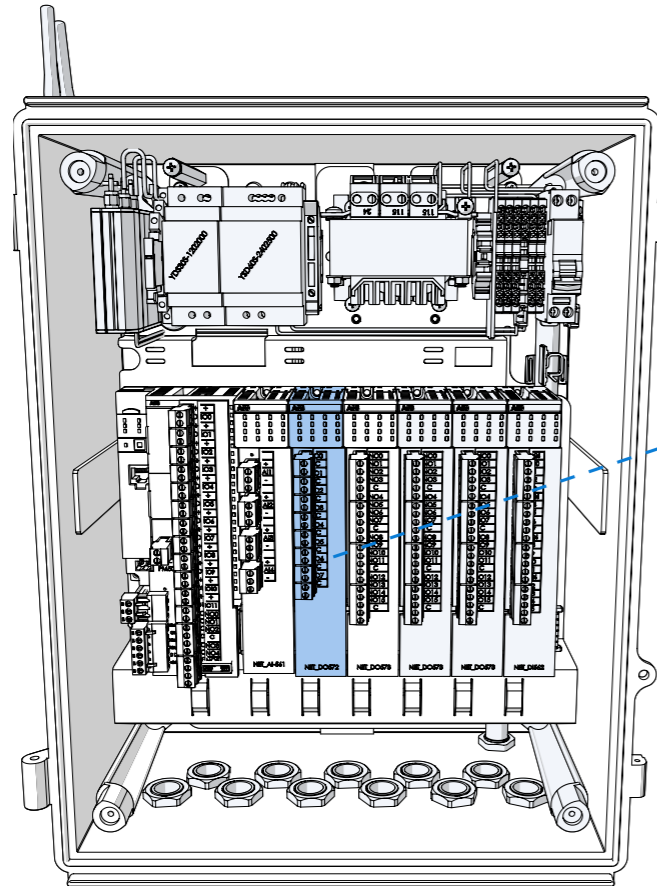
Connect up to 6 outputs. Each output is connected to the (C, common) terminal, and to the relevant output number.



## 5.3 Connecting Digital Inputs

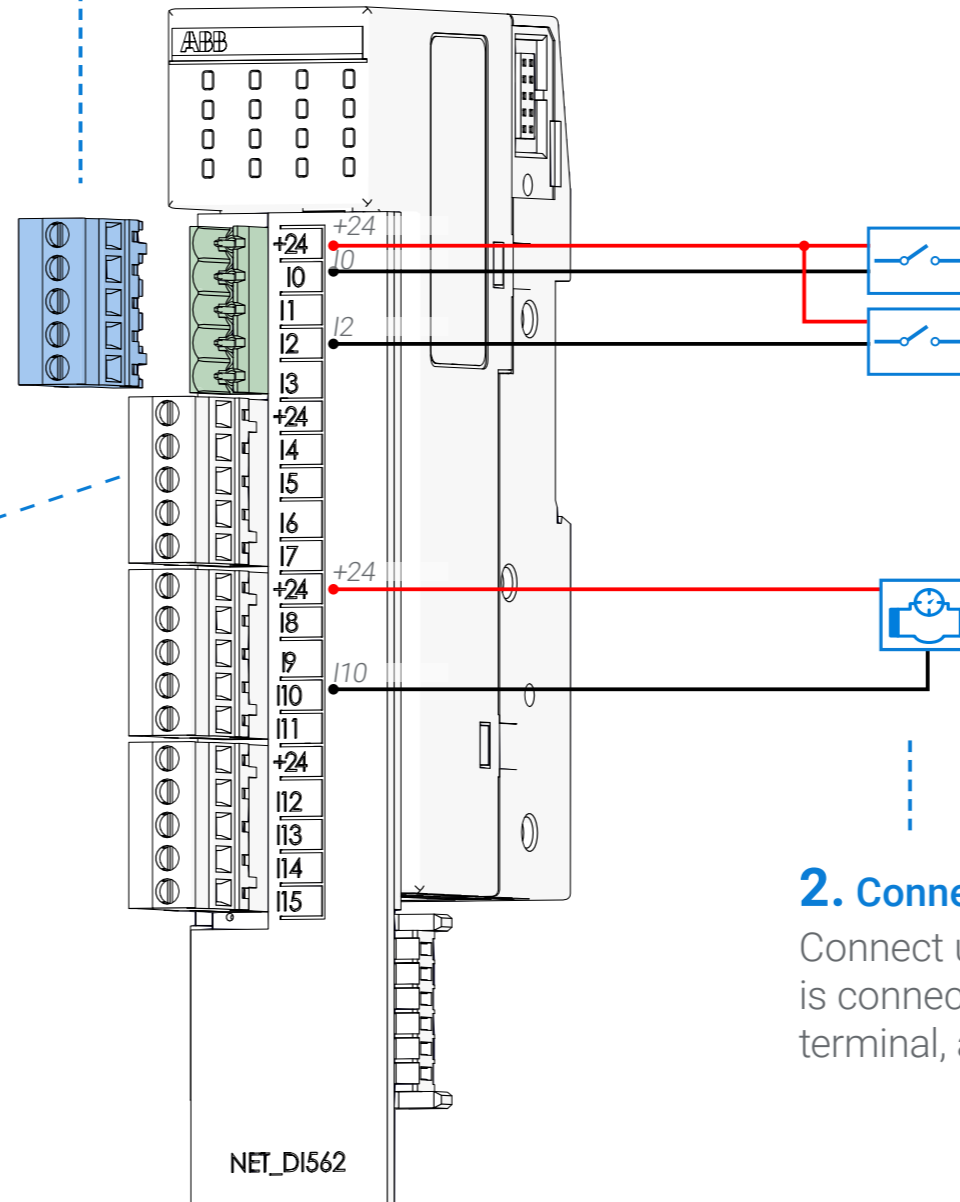
The DI562 module contains 16 digital inputs (dry/active contact).

Perform the following steps to connect digital inputs:



### 1. Pull the connector

Terminal connectors can be disconnected from the module to ease the wiring connection.



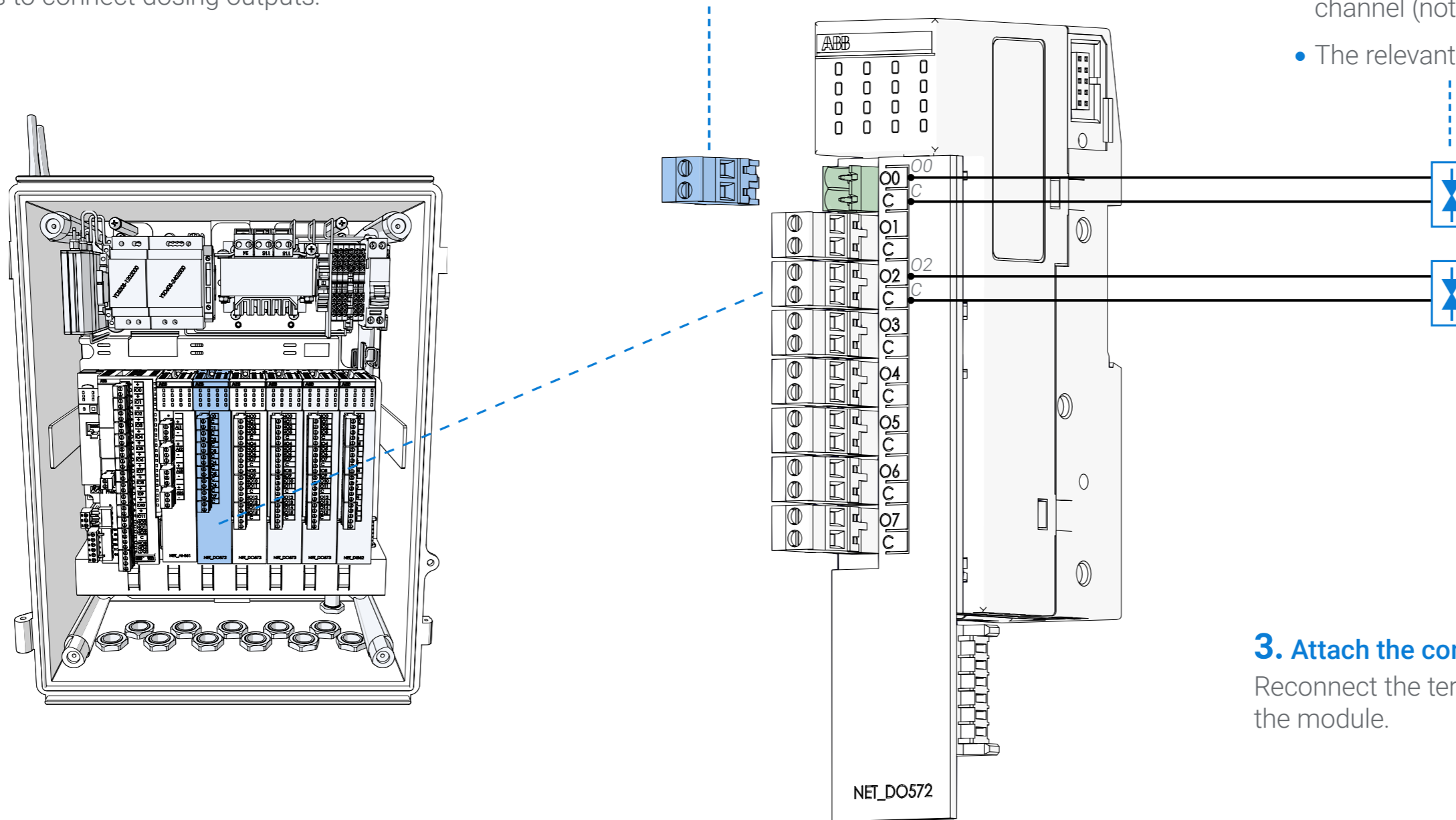
### 2. Connect digital inputs

Connect up to 16 digital inputs. Each input is connected to the (+24VDC common) terminal, and the relevant input number.

## 5.4 Connecting Dosing Outputs

The D0572 module contains 8 TRIAC outputs 24VAC @ 80VA. This module is dedicated to activate venturi dosing pumps at a high speed.

Perform the following steps to connect dosing outputs:



### 1. Pull the connector

Terminal connectors can be disconnected from the module to ease the wiring connection.

### 2. Connect dosing outputs

Connect up to 8 dosing outputs. Each output is connected to the following terminals:

- C - Use the relevant common for each dosing channel (not a shared common)
- The relevant output number (e.g. 00, 01, 02...)

### 3. Attach the connector

Reconnect the terminals connector to the module.



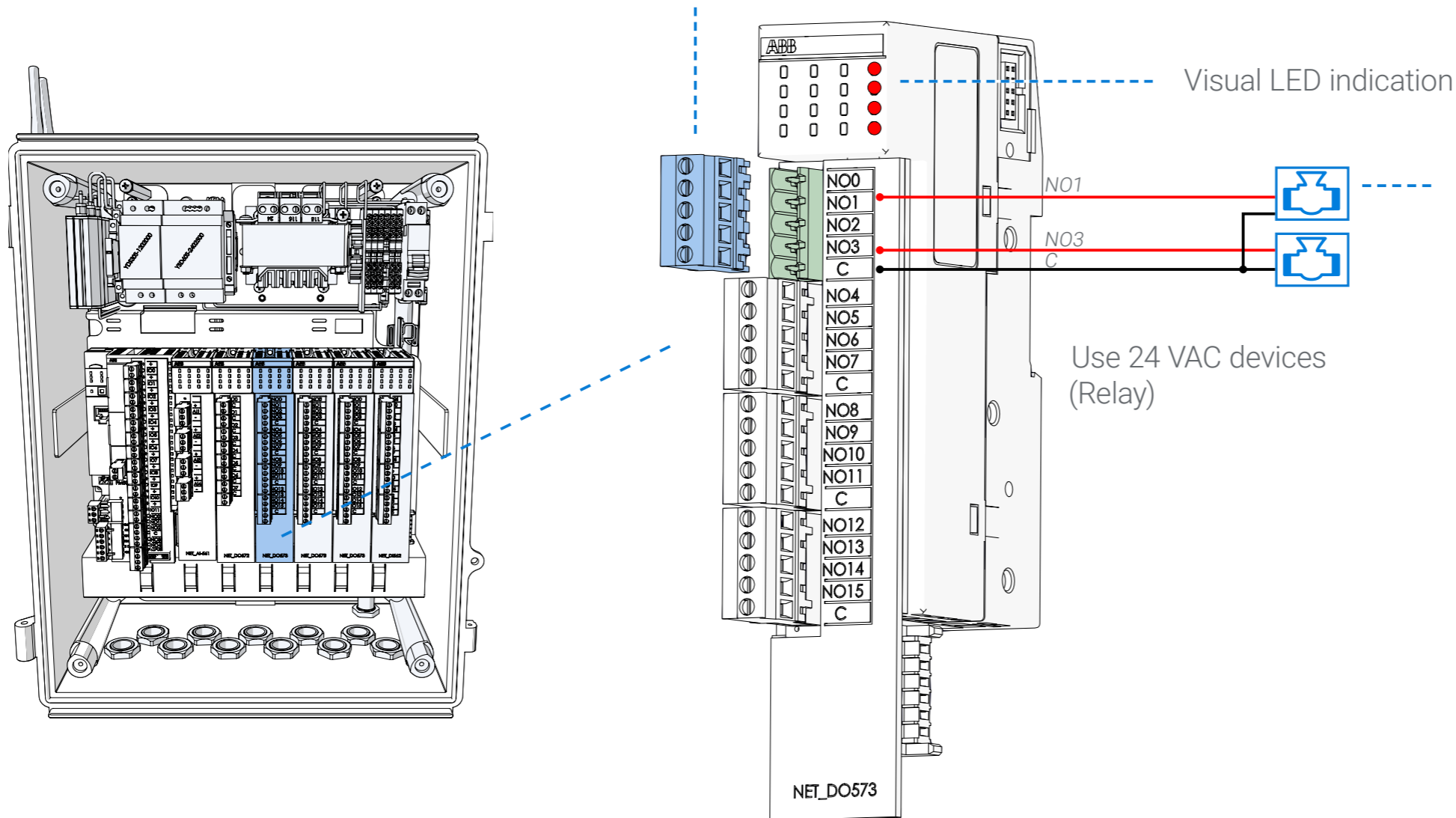
## 5.5 Connecting Digital Outputs

The D0573 module contains 16 digital relay outputs, 24 VAC @ 80 VA, with a separate common for each four outputs.

Perform the following steps to connect digital outputs:

### 1. Pull the connector

Terminal connectors can be disconnected from the module to ease the wiring connection.



### 2. Connect digital outputs

Connect up to 16 outputs. Each output is connected to the following terminals:

- C - Use the relevant common for each output
- The relevant output number (e.g. NO0, NO1..)

### 3. Attach the connector

Reconnect the terminals connector to the module.

## 5.6 Connecting Analog Inputs

The AI-561 module contains 4 analog inputs.

Perform the following steps to connect analog inputs:

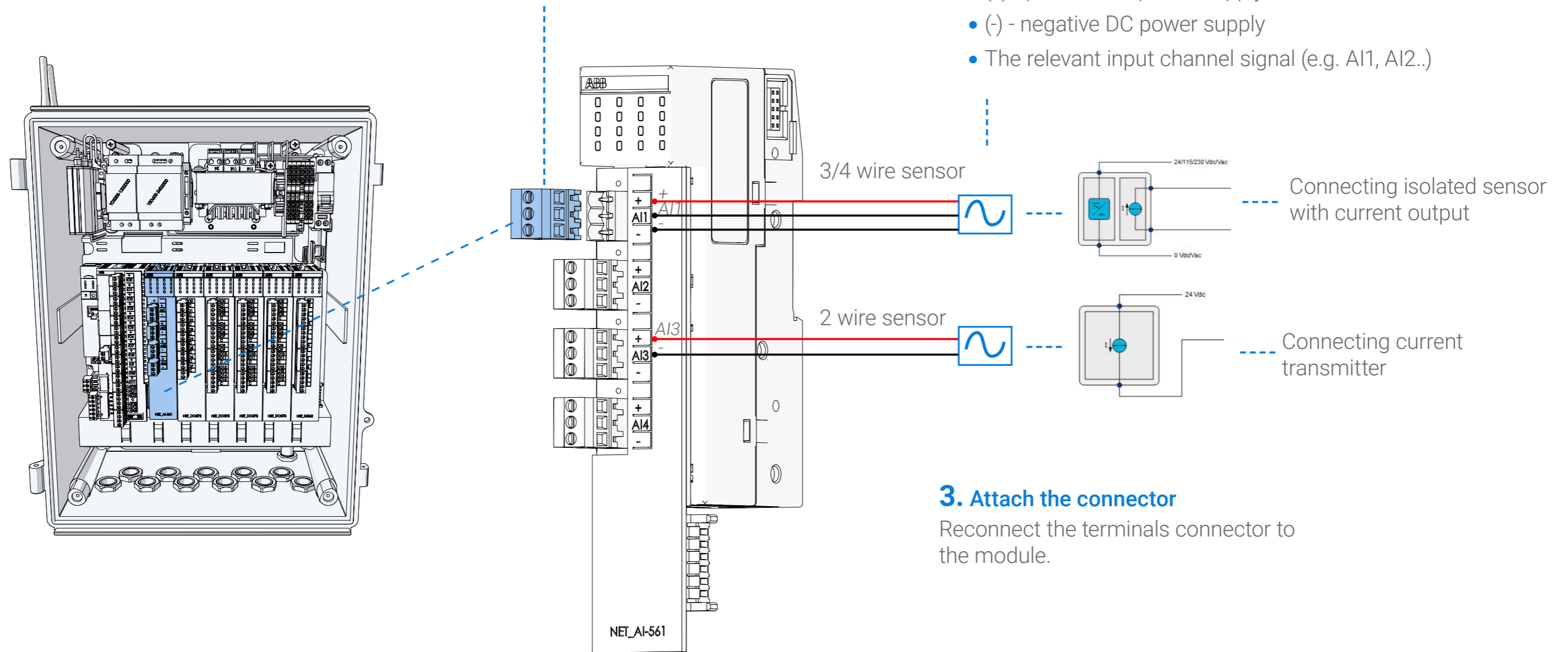
### 1. Pull the connector

Terminal connectors can be disconnected from the module to ease the wiring connection.

### 2. Connect analog inputs

Connect up to 4 analog channels. Each analog input is connected to the following terminals:

- (+) - positive DC power supply
- (-) - negative DC power supply
- The relevant input channel signal (e.g. AI1, AI2..)



### 3. Attach the connector

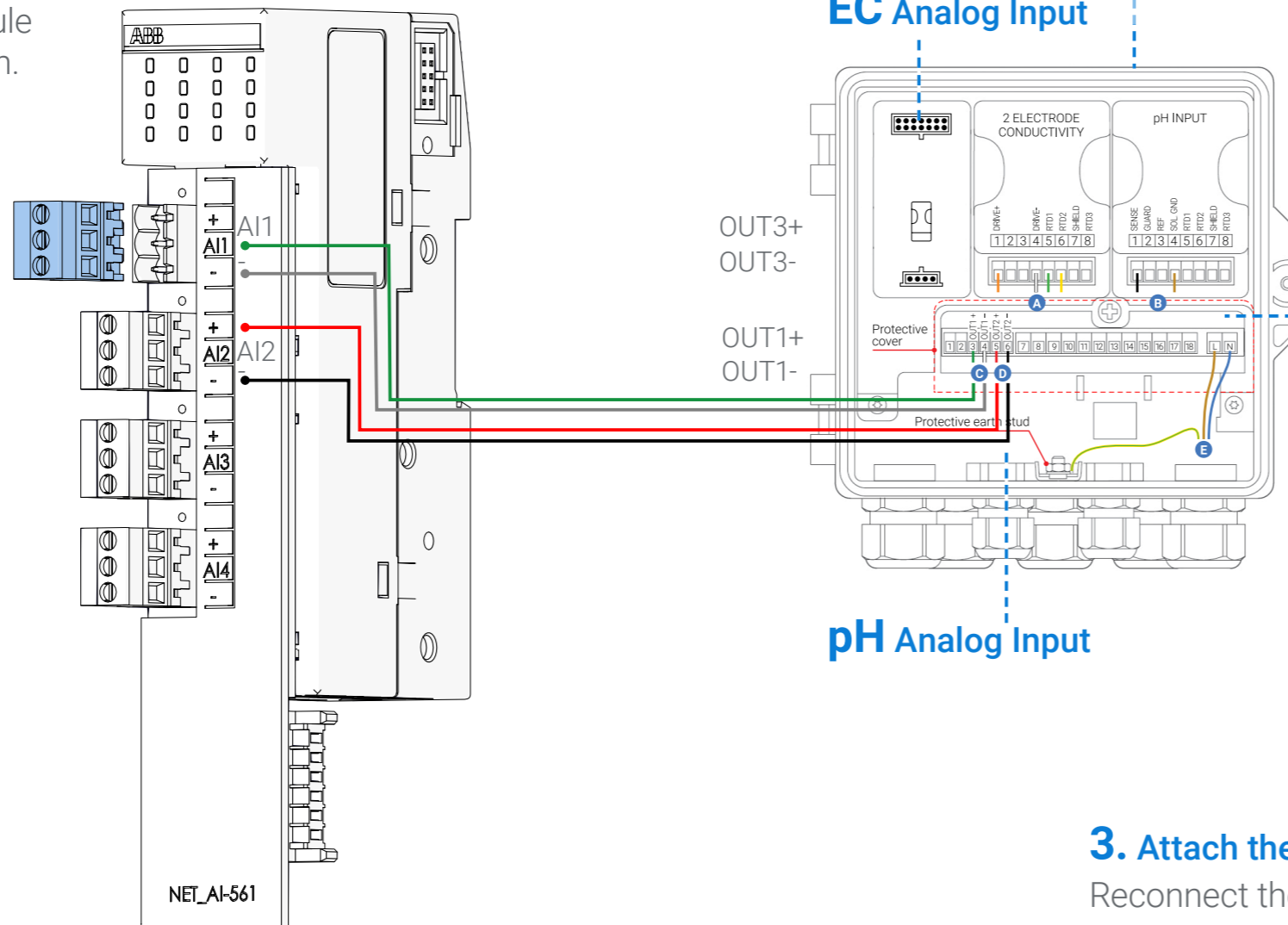
Reconnect the terminals connector to the module.

## 5.7 Connecting EC/pH Units

Perform the following steps to connect EC, pH units to the AI-561 module:

### 1. Pull the connector

Terminal connectors can be disconnected from the module to ease the wiring connection.



### 2. Connect EC, pH modules

Connect up to 4 analog channels. Each analog input is connected to the relevant input channel.

**EC:**

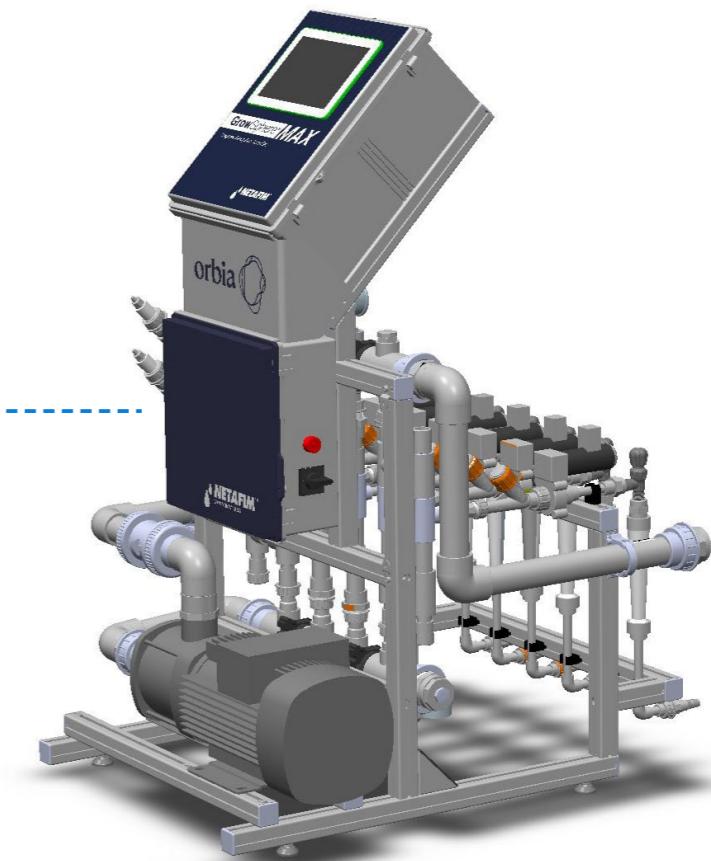
- Terminal AI1 on the module is connected to OUT3(+) on the analog input module.
- Terminal (-) on the module is connected to OUT3(-) on the EC analog input module.

**pH:**

- Terminal AI2 on the module is connected to OUT1(+) on the pH analog input module.
- Terminal (-) on the module is connected to OUT1(-) on the pH analog input module.

### 3. Attach the connector

Reconnect the terminals connector to the module.





## 6. Controller Configuration

This chapter reviews configuring the controller and includes:

**1/** Getting Started

**3/** Configuring Components

**2/** Dashboard Overview

**4/** GrowSphere™ Max Alerts

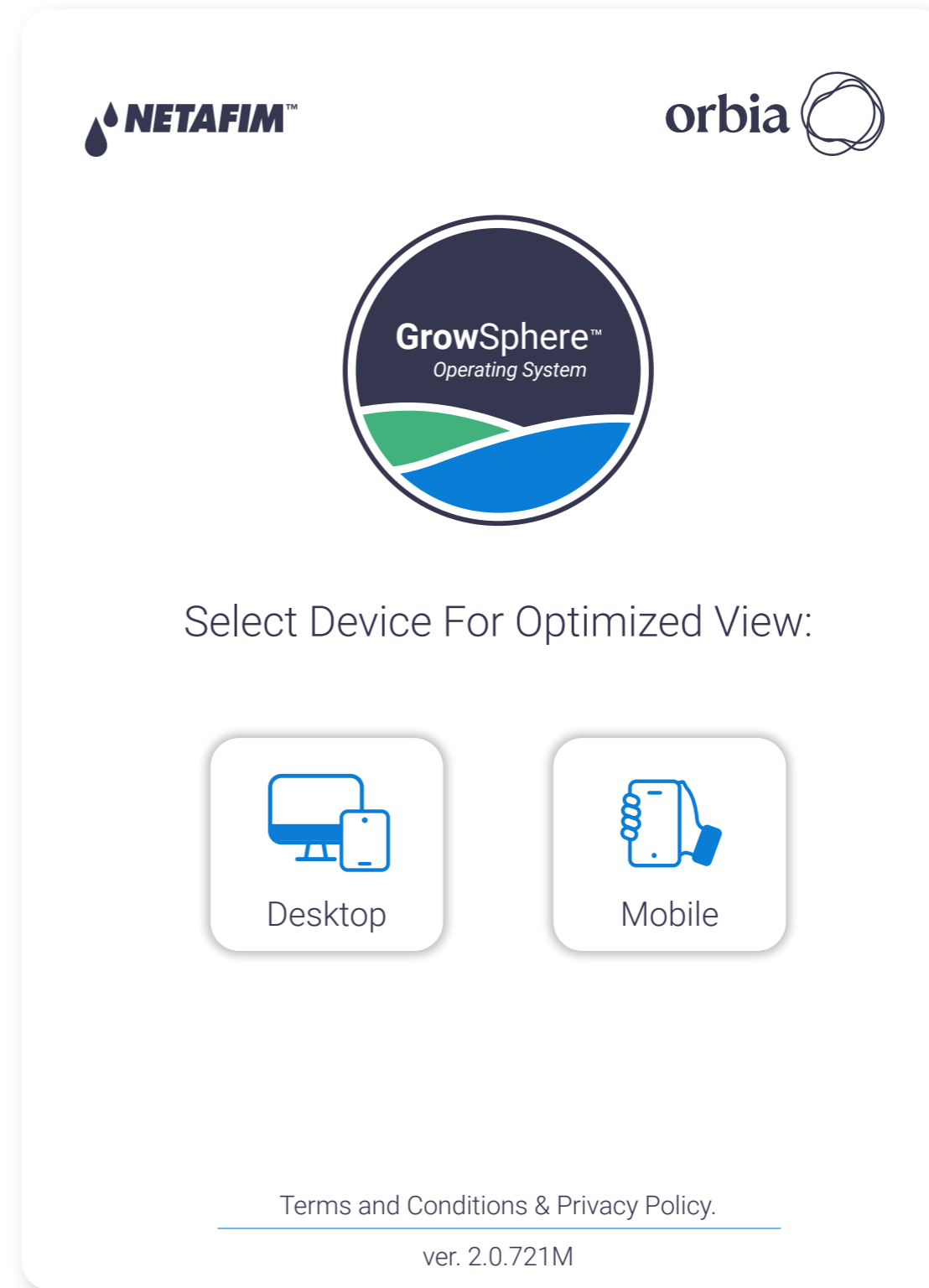


## 6.1 Getting Started

### 6.1.1 Preferences and settings

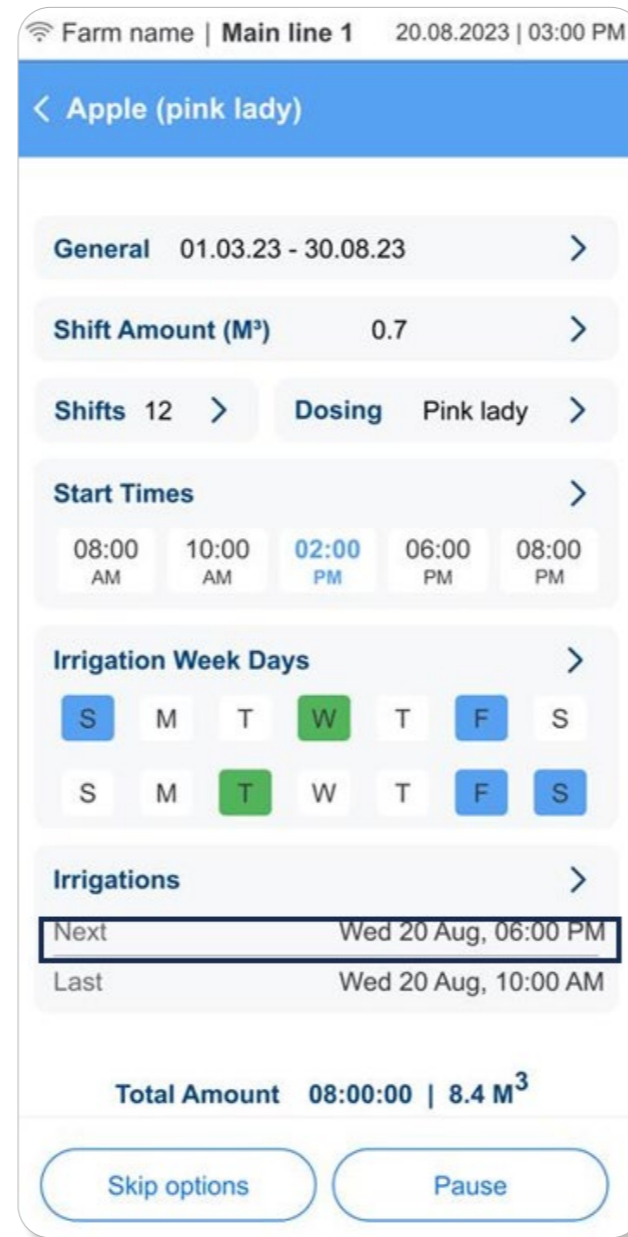
Select the Desktop/Mobile view. In the case of Tablet, select Desktop.  
For Mobile view, Please note:

- This view differs slightly from the PC view and consists of basic settings functionalities.
- The initial settings should be done through the PC view (through PC / Laptop).
- For the main functionalities in the Mobile view, please see next page.

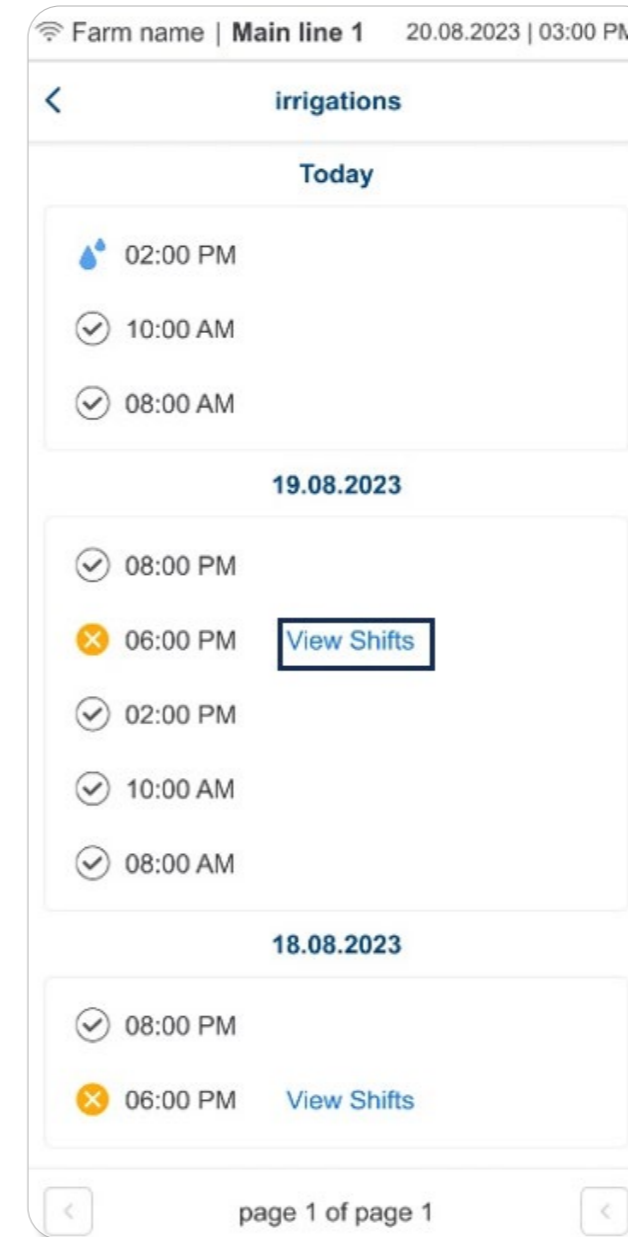


## 6.1.2 Mobile view

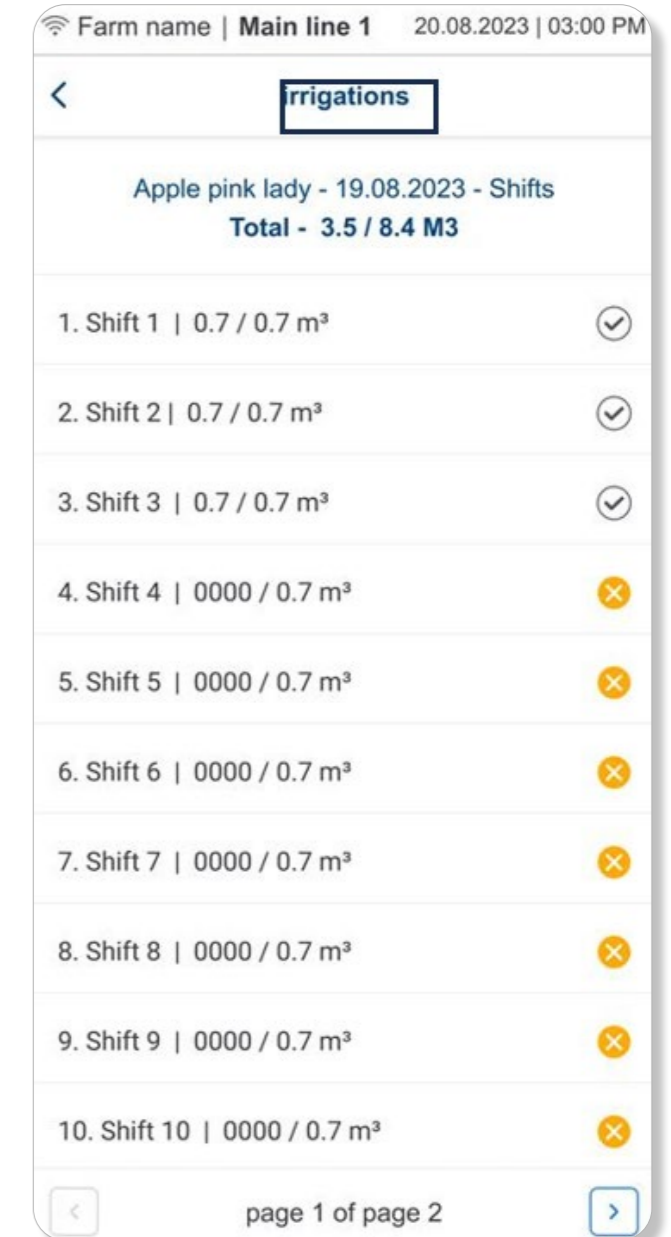
- The Mobile view can be selected from the home screen in the **GrowSphere™ MAX** dashboard.
- The main functionalities in the Mobile view are:
  - Mainlines and SCADA view.
  - Irrigation, Dosing, Cooling, and Misting programs - Add, edit, and remove programs.
  - Alerts - View and reset alerts.
  - Weather station – Current status.
  - Irrigation logs.
  - Settings – Disables mainline, disable and reset alerts and change mobile numbers for alerts.
- Unique feature that was added to the Mobile view – Ability to see the ten last cycles of the irrigation program, including the Shifts view (completed and uncompleted):



View of the Irrigation program



View of the last ten cycles of the irrigation program



View the Shifts ('explore more' of the desired Irrigation cycle)



### 6.1.3 Home Screen

The home screen is displayed with all the mainlines.

Select the Mainline to define its parameters

- **Icons:** Icons indicate mainline status.
- **Name:** The mainlines defined in numerical order.
- **Time / m<sup>3</sup>:** Amount of run time left or amount of water flowing through the mainline.

Mainline 1		1.51 / 54.0m <sup>3</sup>					
Irrigation	Flow	Pressure	Amount	Dosing	Shift	Next	Last
COTTON	18.00 m <sup>3</sup> /h	0.00 Bar	54.0m <sup>3</sup>	Bulk	1/1	COTTON	COTTON
Mainline 2		02:21/06:00 hh:mm					
Irrigation	Flow	Pressure	Amount	Dosing	Shift	Next	Last
AVOCADO HASS	36.00 m <sup>3</sup> /h	0.00 Bar	06:00 hh:mm	DESHEN	1/2	PEACH	PEACH
Mainline 3		17.0 / 78.67m <sup>3</sup>					
Irrigation	Flow	Pressure	Amount	Dosing	Shift	Next	Last
ml3 peach	80.00 m <sup>3</sup> /h	0.00 Bar	78.67m <sup>3</sup>	npk2	1/1	--	ml3 peach
Mainline 4		0.0 / 40.0m <sup>3</sup>					
Irrigation	Flow	Pressure	Amount	Dosing	Shift	Next	Last
One time	0.00 m <sup>3</sup> /h	0.00 Bar	40.0m <sup>3</sup>	--	1/1	--	One time

Displays each mainlines preferences:

- **Irrigation:** Running irrigation program.
- **Flow:** Irrigation Shift Flow Rate.
- **Pressure:** The pressure in the mainline.
- **Amount:** Shift water Quantity, It can show multiple in case different quantities in shifts.
- **Dosing:** Dosing recipe linked to the irrigation program.
- **Shift:** The shift number currently running.
- **Next in Q:** The shift that is next in queue.

## 6.2 Dashboard Overview

The main dashboard includes the following sections:

### Sidebar menu

Displayed on every screen

### Home

(see [Home Screen](#))

### SCADA

### Irrigation Programs

### Dosing programs and recipes

### Cooling and Misting

### Alerts

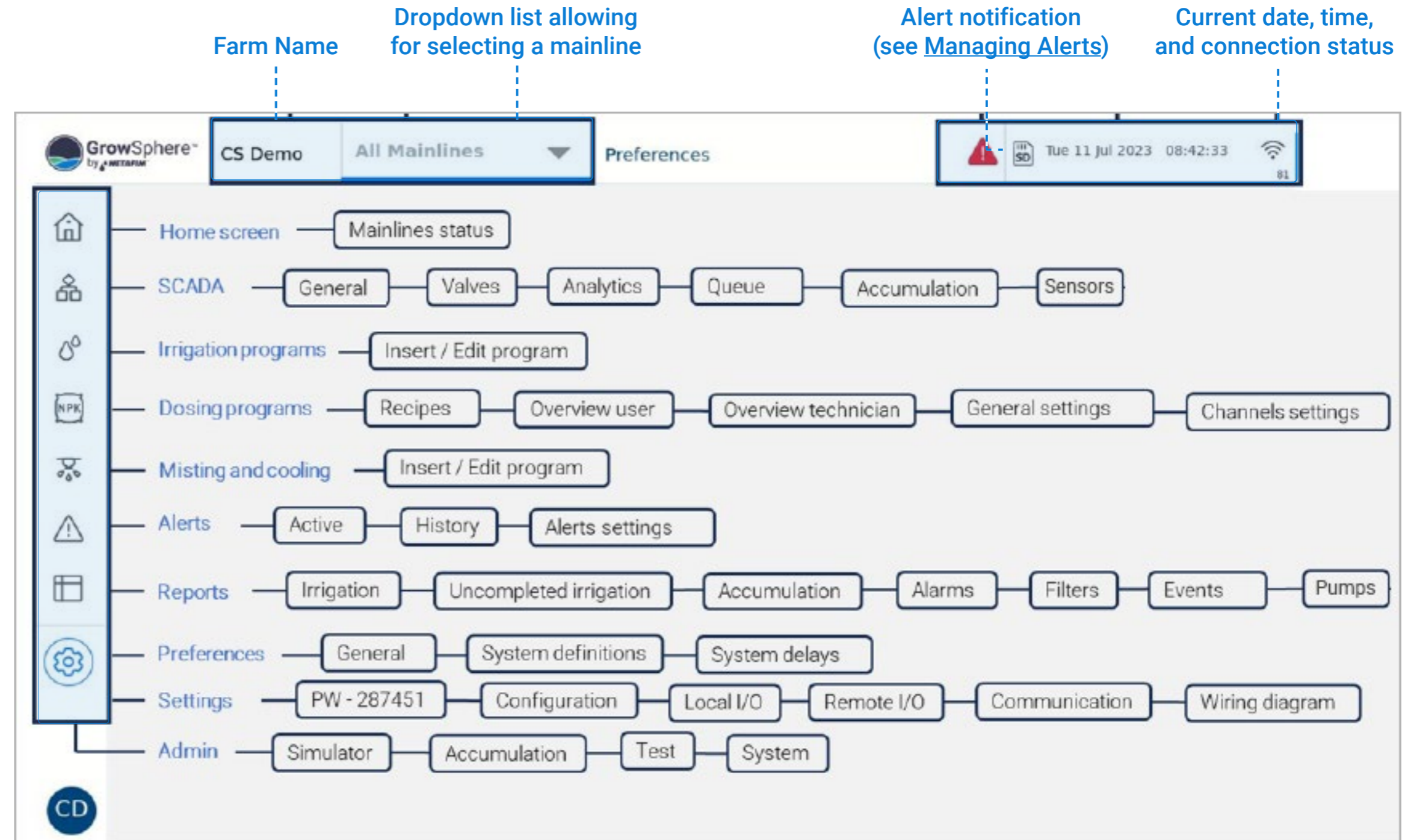
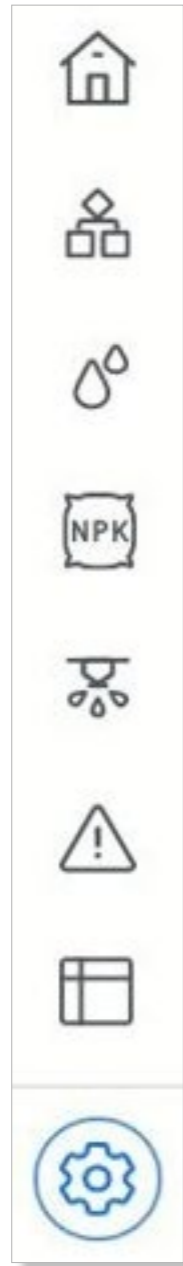
(see [Managing Alerts](#))

### Reports

(see [Viewing Logs](#))

### Configuration

(see [Defining System Preferences](#),  
[Configuring Components](#), and  
[Resetting Accumulation](#))



## 6.2.1 General Preferences

Structure changed for screen. Rearranged options or added new.

**3. Verify General tab is selected**

**4. Select language**

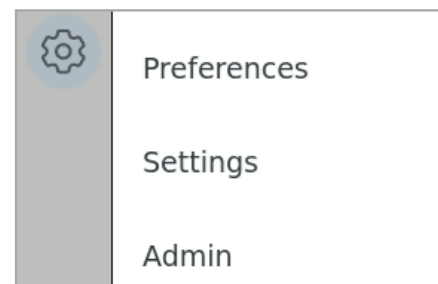
**6. Select the time format**

**5. Enter the farm name**

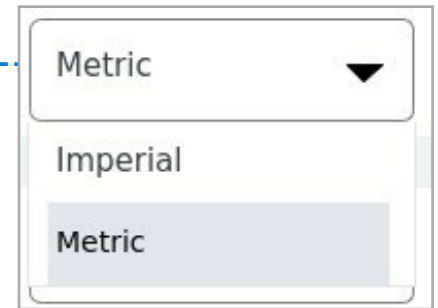
(the farm name will appear on the header)

**1. Tap the Configuration button**

**2. Select Preferences**



The screenshot shows the 'General' tab of the 'Preferences' screen. The header includes 'Farm', 'All Mainlines', and 'Preferences'. The main content area has three columns: 'General', 'System Definitions', and 'System Delays'. The 'General' column contains: Language (English), Time format (24 hours), Time Zone (UTC), Current UTC time (Auto), and Controller name (Farm). The 'System Definitions' column contains: Units (Metric), First day of the week (Sunday), Current date (18 . 03 . 2024), and Date format (dd/mm/yyyy). The 'System Delays' column contains: Number of mainlines (checkboxes for 1, 2, 3, 4). At the bottom, there is a 'Phone number for alarms' field (972528343844) and a 'Send SMS test' button. A left sidebar has icons for Home, Users, Water, NPK, Alarms, and a Configuration button (highlighted with a blue circle). A top right status bar shows a warning icon, SD card icon, date/time (Mon 18 Mar 2024 13:27:08), and signal strength.



**8. Select the first day of the week**

**9. Set the current date and format**

**11. Select the UTC**  
(Coordinated Universal Time) from the drop-list

**12. SMS Test Button**

**7. Enter the phone number where text messages will be sent when there's an alarm**



## 6.2.2 Set system definitions

Perform the following steps to define mainline preferences:

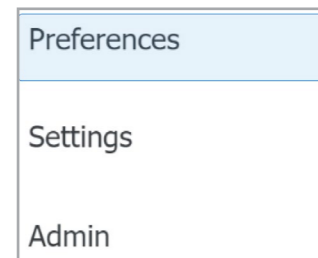
**3. Verify the correct mainline is selected**

**4. Select the System Definitions tab**

**5. Define the relevant system preferences:**

**1. Tap the Configuration button**

**2. Select Preferences and type your credentials**



- **Disable Mainline:** This disabling the mainline operation.
- **Start and end time:** Daily irrigation start and end times.
- **Pause Mainline on energy save period:** Tap Edit to define the slot per day for power saving.
- **Power off recovery:** Reset programs in the queue and those irrigating during power off.

Incomplete Irrigation Settings. The settings that define if an irrigation shift is categorized as an Incomplete Irrigation are:

- **Minimal Time Left:** The minimal irrigation time left to completion above which this irrigation shift will be categorized as having incomplete irrigation.
- **Minimal Quantity Left:** The Irrigation amount in m3 left to be completed is greater than 1% of the total irrigation amount required.

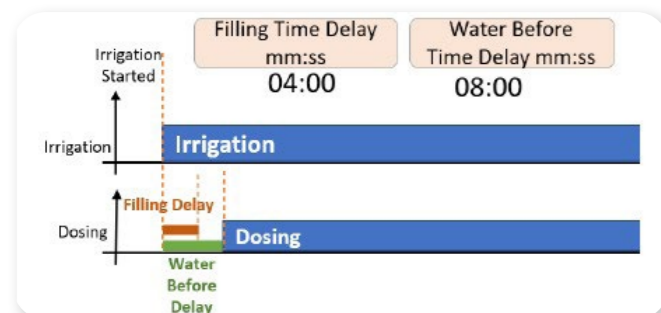
**Example:** The minimal irrigation time left to completion is set at 4 minutes. This means that if a program has less than 4 minutes left to complete the irrigation, this shift will not be categorized as having incomplete irrigation.  
\* Important: The minimal time is a highly critical setting.

**Note:** The values for Incomplete Irrigation, Amount Percentage and Time are defined by the Technician on the General Settings screen. The main purpose of these settings is to prevent the irrigation pumps from starting operation for a short period of time to irrigate an incomplete irrigation shift for less than the minimal time.

## Set system delays

### Filling line delay

The time it takes for water to fill the lines before an irrigation event starts. When the irrigation event begins, and the pumping station is activated, the Filling Time delay is triggered at the start of the irrigation. During this period, the primary line flow rate may be higher than the nominal flow rate of the active irrigation shift. To avoid adding excessive amounts of dosing during this period, the PLC controller compares the Filling Time delay with the Water Before delay values and chooses the longer of the two to delay the dosing.



### 2. Select Preferences and type your credentials

Preferences

---

Settings

---

Admin

GrowSphere™ by NETAFIM CS Demo **Mainline 1** Preferences Tue 11 Jul 2023 08:41:24

General System Definitions **System Delays**

System Delays Program Delays Dosing station

System Delays	On	Off	Unit
Pump/s	00:10	00:00	mm:ss
Main Valve delay	00:05	00:04	mm:ss
Irrigation valves delay	00:00	00:10	mm:ss
Line fill delay	01:00		mm:ss

### 1. Define the relevant system preferences:

- **On Delay:** Time between the start of irrigation and when the device starts operating.
- **Off Delay:** Time between the end of irrigation and when the device stops operating.

The example below illustrates the pump and valve on and off delay:

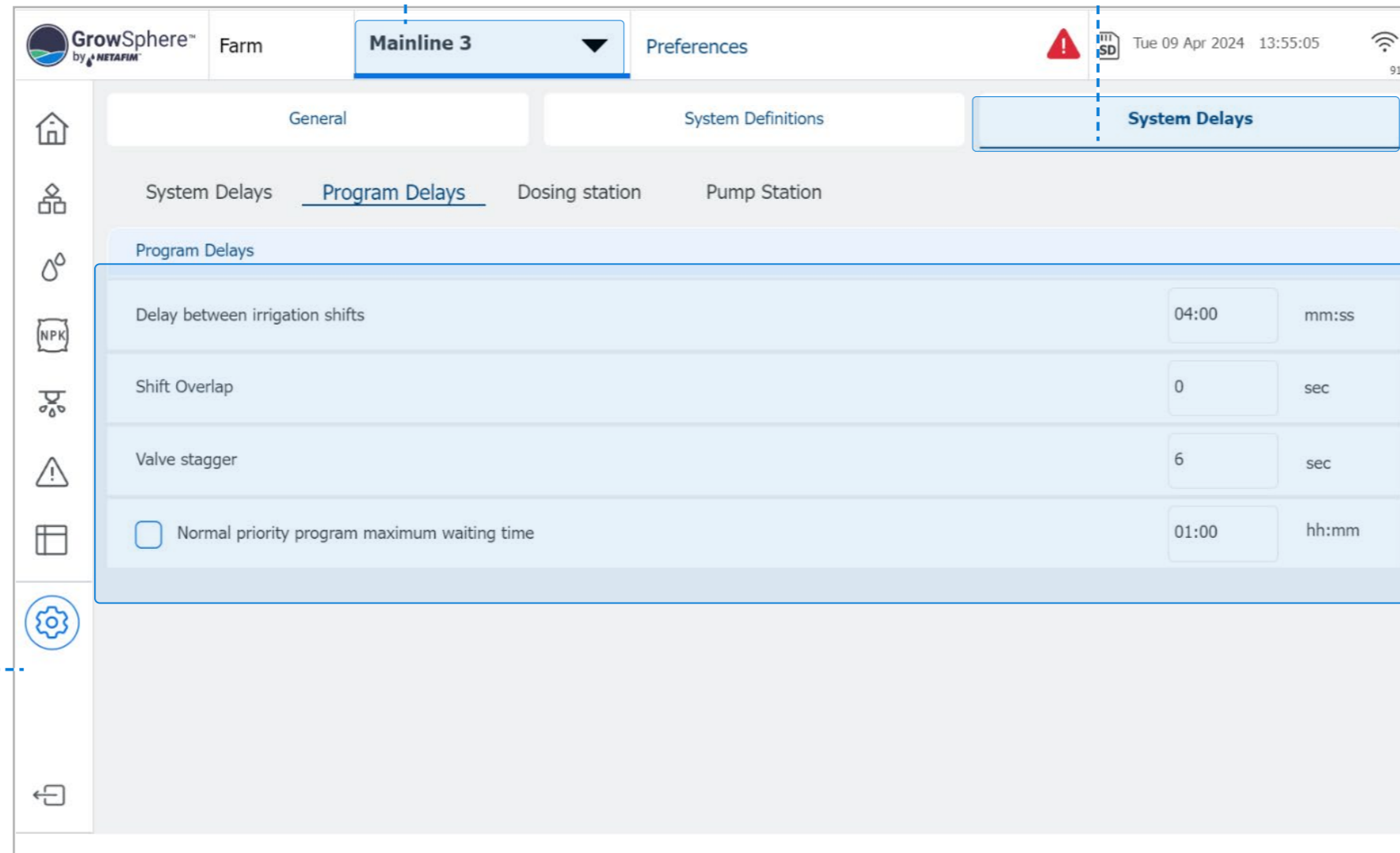
Delays	ON	OFF
Pump/s	10 sec	0 sec
Main Valve Delay	5 sec	5 sec
Irrigation Valves Delay	0 sec	10 sec

## Set Program Delays

Perform the following steps to define irrigation program delay times:

**3. Verify the correct mainline is selected**

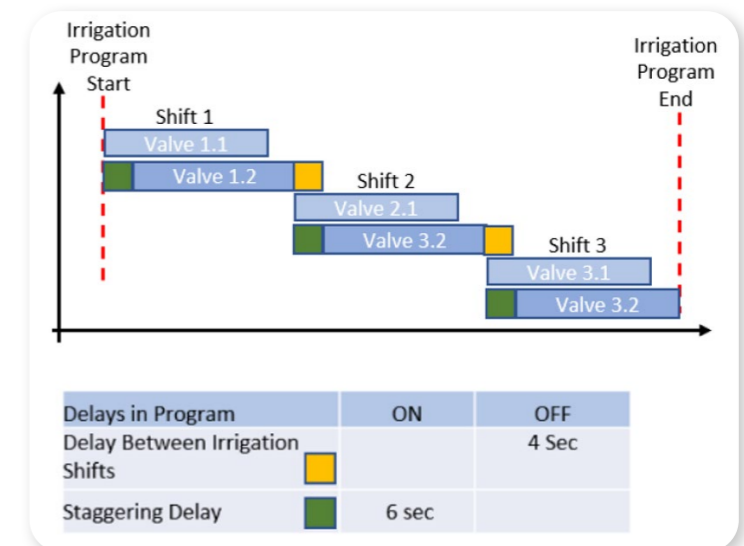
**4. Tap the System Delays tab**



**1. Tap the Configuration button**

**5. Define the irrigation program delay times:**

- **Delay between Irrigation shifts:** Amount of time between when one shift ends and another begins.
- **Shift Overlap:** Time when one shift overlaps the next shift.
- **Valves stagger delay:** Amount of delay time between the activation of successive valves in a given shift.
- **Normal priority program maximal waiting time:** After the defined amount of time, the irrigation program with normal priority that is waiting in the queue will be moved to high priority.





## Dosing station delays

Parameter	Value	Unit
Dosing valve minimum on time	1.8	sec
Dosing valve minimum off time	2.0	sec
EC cycle control	15.0	sec
pH cycle control	15.0	sec
Main flow stability time	5.0	sec
Booster pump off delay	20.0	sec

### 1. Define dosing station delays

- **Minimal On Time:** The minimal amount of time the dosing channel must be ON.
- **Minimal Off Time:** The minimal amount of time that the dosing channel can be off.
- **EC control cycle:** The time it takes the fertilizer to travel from the injection point and reach the EC sensor, during which it reacts with the irrigation water. This value changes according to the distance between the injection point and the sensor location, the diameter of the pipe and the flow rate of the active irrigation shift.
- **pH control cycle:** This time takes the acid to travel from the injection point to the pH sensor, during this time it reacts with the irrigation water.
- **Stability delay** is relevant if the active dosing recipe has an EC/pH target set for control. It is a delay at the start of the irrigation shift necessary to attain a stable flow rate. During the stability delay, the nominal flow rate will be used by the PLC controller for the calculation of the proportional amount of fertilizer/chemical injected. After the stability delay the actual flow rate.
- **recorded by the water meter will be used. Booster pump-off delay:** Causes the dosing booster to turn off the defined amount of time after the end of the dosing process.

## Pumping delays

Pump Station	On	Off	Unit
Delay between pumps	00:00	00:00	mm:ss
On delay after pump OFF	00:00		mm:ss

- Delay between pumps - pump delay between opening pumps in the pump station
- On delay after pump off - the time to wait after pump was turned off before truing it on again

## 6.3 Configuring Components

This section reviews the configuration and allocations of the devices connected to the controller and includes:

**1/** Defining System Devices

**2/** Pump Station Configuration

**3/** Configuring Filter Station

**4/** Configuring Dosing Station

**5/** Configuring Valves

**6/** Configuring Other Devices

**7/** Allocating Local Digital Outputs

**8/** Allocating Local Digital Inputs

**9/** Configuring Local Analog Inputs

**10/** View the wiring diagram

**11/** Mainline External Pause



### 6.3.1 Defining System Devices

Define the number of valves and the devices that are connected to each mainline.

**NOTE**

Need to define all the devices that are part of the hydraulic model regardless if they are connected locally or remotely.

3. Tap the Configuration tab

4. Tap the Mainline tab

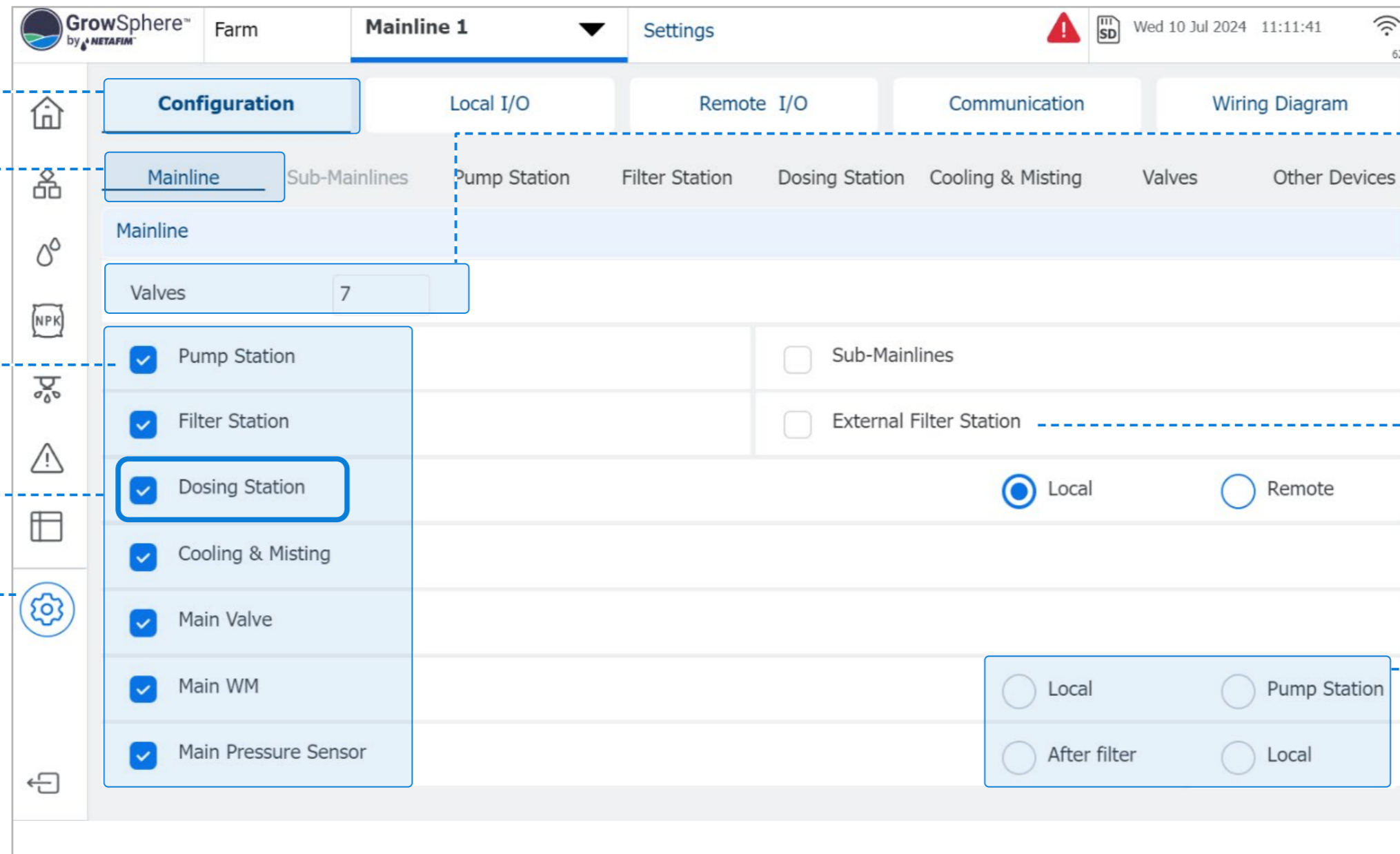
6. Select each device that is part of the irrigation system

Note that some devices require additional parameters to be entered..

Remote is for setting SubStation

1. Tap the Configuration tab

2. Select Settings and type your credentials



5. Enter the number of valves

This value represents the total number of valves used in the system.

7. External filter function

External filter function is enabled when Filtron controller is in use and a Digital Input is connected to the controller to count flashes.

8. Select the location

The water meter / pressure sensor can be located at the pump station/after filter or at the mainline (local).

## 6.3.2 Pump Station Configuration

### Pump Station Start Setting

The pump station is in charge of delivering the required amount of water for the active Shift with the required nominal flow. Pump Stations provide the mainline the required flow rate for the running shift. The users may define only one pump station per mainline. The maximal number of pumps per station is 3.

- **Pumps Belong to a Station:** In this case, the group of pumps selected for the Station, operate together to deliver the flow rate required by the Hydraulic Manager for the current irrigation shift (valves) in progress. The pump station activates the pump/s in the right combination, in order to supply the required flow rate. The pumps are activated and deactivated according to the pump/s delays setup.
- **Pumps Belong to a valve or number of valves:** In this case a valve or valves are linked to a specific pump in the Pump Station. When one of these valve/s is active (running), then the pump that belongs to them is activated. This pump is activated and deactivated according to the pump delays setup.

## Setting for 3 Pumps in Pump Station

The screenshot shows the 'Configuration' tab for 'Mainline 1' in the 'Settings' section. The 'Pump Station' sub-tab is active. The 'Number of Pumps' is set to 3. Below this, a table lists three pumps (PMP1.1, PMP1.2, PMP1.3) with their respective settings for Overload, Stand alone, Water meter, Nominal flow, and Minimal flow. The 'Input pressure switch' checkbox is checked.

Pump	Overload	Stand alone	Water meter	Nominal flow	Minimal flow
1 PMP1.1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	80.0	15
2 PMP1.2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	60.0	10
3 PMP1.3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	40.0	5

Additional settings shown:  Input pressure switch

5. Select the number of Pumps for this station

6. Water source low pressure switch or minimal water source level



## Setting for 2 Pumps in Pump Station and one Pump Stand Alone

The screenshot shows the GrowSphere MAX Controller Configuration interface. The top navigation bar includes 'Farm', 'Mainline 1', and 'Settings'. The 'Simulation 16.0°C' is displayed. The 'Configuration' tab is selected, and the 'Pump Station' sub-tab is active. The 'Number of Pumps' is set to 3. A table lists three pumps with their respective settings. Pump 2 (PMP1.2) is highlighted with a blue dashed box and a callout indicating it is set to 'Stand Alone'.

Pump	Overload	Stand alone	Water meter	Nominal flow	Minimal flow
1 PMP1.1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	80.0	15
2 PMP1.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	60.0	10
3 PMP1.3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	40.0	5

**7. Pump 2 is set to Stand Alone, to be linked to specific irrigation valves.**

## Pumps Outputs Selection

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10. Select the pumps on the system.

Module	DO	Device type	NO.	Source	Name	Flow	Area	Assigned
DO573.1	1	Filter	Valve (1)	Dosing Booster (0)	Condition active (0)		—	Unassign
DO573.1	2	Filter	MainValve (0)	Alarm (0)	EC Pre-Control open (1)		—	Unassign
DO573.1	3	Valve	Pump (3)	Selector (0)	EC Pre-Control close (1)	m <sup>3</sup> /h	1.00 ha	Unassign
DO573.1	4	Pump	1	M.Line1	PMP1.1	80.00 m <sup>3</sup> /h	—	Unassign
DO573.1	5	Pump	2	M.Line1	PMP1.2	60.00 m <sup>3</sup> /h	—	Unassign
DO573.1	6	Pump	3	M.Line1	PMP1.3	40.00 m <sup>3</sup> /h	—	Unassign
DO573.1	7	Same as DO	9	M.Line1	SAME1.1	—	—	Unassign

page 3 of page 5

## Pumps Inputs Selection

The screenshot displays the 'Local I/O' configuration page in the GrowSphere MAX interface. The page is titled 'Farm' and 'All Mainlines'. It shows a table of modules with columns for Module, DI, Device type, NO., Source, Name, Type, Rate, and Assigned. A callout box is open over the 'Pump Input Switch' option, showing a list of available device types and their counts.

Module	DI	Device type	NO.	Source	Name	Type	Rate	Assigned
PM5052	7	Dosing Meter	4	M.Line1	DMTR1.4	LPP	1.00	Unassign
PM5052	8	Pump Input Switch	1	M.Line1	PMPSW1.1	NO	—	Unassign
PM5052	9	Pump Water Meter	1	M.Line1	PMPM1.1	LPP	10.00	Unassign
PM5052	10	Pump				LPP	10.00	Unassign
PM5052	11	Pump				LPP	100.00	Unassign
PM5052	12	AC				NO	—	Unassign
PM5052	13					—	—	Unassign

**Callout Box Content:**

AC Fault (0)	Filter Flow Switch (0)	Drain Meter (0)
Water Meter (0)	Delta Pressure (0)	<b>Pump Input Switch (1)</b>
Frequency Meter (0)	Flow Indicator (0)	Fertilizer Meter (0)
Dosing Meter (0)	Dry Contact	Pump Station Pressure Tran(0)
Dosing Pressure Switch (0)	External Pause (3)	Filter Booster Pump (0)
Dosing Booster Protection (0)	Reset Alarm (0)	External Alarm (0)
Pump Overload (0)	Rain Collector (0)	Filter DP Switch (1)
<b>Pump Water Meter (3)</b>	Wind Speed (0)	External Filter (0)
Tank Low Level (2)	Tank WM (2)	Sub Water meter (0)

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12. Select the pumps water meters and input pressure switch according to the elements on the system.



## Valves Selection to the Pump Station

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GrowSphere™ by NETAFIM™ Farm Mainline 1 Settings Simulation 16.8°C Sun 10 Dec 2023 10:21:25

Configuration Local I/O Remote I/O Communication Wiring Diagram

Mainline Pump Station Filter Station Dosing Station Cooling & Misting Valves Other Devices

Device type	NO.	Source	Name	Flow	Area	Pump	Assigned	Module/RTU	DO
Valve	1	M.Line1	VLV1.1	36.00 m³/h	1.00 ha	station ▼	✓	PM5052	2
Valve	2	M.Line1	VLV1.2	30.00 m³/h	1.00 ha	station ▼	✓	PM5052	3
Valve	3	M.Line1	VLV1.3	30.00 m³/h	1.00 ha	station ▼	✓	PM5052	4
Valve	4	M.Line1	VLV1.4	10.00 m³/h	1.00 ha	station ▼	✓	DO573.1	3
Valve	5	M.Line1	VLV1.5	14.00 m³/h	1.00 ha	station ▼	✓	DO573.1	15
Valve	6	M.Line1	VLV1.6	10.00 m³/h	1.00 ha	station ▼	✓	PM5052	0

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## Valves Selection to the Pump Station and Stand Alone Pump

GrowSphere™ by NETAFIM

Farm Mainline 1 Settings Simulation 17.1°C Sun 10 Dec 2023 10:28:36

Configuration Local I/O Remote I/O Communication Wiring Diagram

Mainline Pump Station Filter Station Dosing Station Cooling & Misting **Valves** Other Devices

Device type	NO.	Source	Name	Flow	Area	Pump	Assigned	Module/RTU	DO
Valve	1	M.Line1	VLV1.1	36.00 m <sup>3</sup> /h	1.00 ha	station	✓	PM5052	2
Valve	2	M.Line1	VLV1.2	30.00 m <sup>3</sup> /h	1.00 ha	station	✓	PM5052	3
Valve	3	M.Line1	VLV1.3	30.00 m <sup>3</sup> /h	1.00 ha	2	✓	PM5052	4
Valve	4	M.Line1	VLV1.4	10.00 m <sup>3</sup> /h	1.00 ha	none	✓	DO573.1	3
Valve	5	M.Line1	VLV1.5	14.00 m <sup>3</sup> /h	1.00 ha	1	✓	DO573.1	15
Valve	6	M.Line1	VLV1.6	10.00 m <sup>3</sup> /h	1.00 ha	3	✓	PM5052	0

## Pump Station Delays

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The screenshot shows the 'System Delays' configuration page for 'Pump Station'. The page is divided into several sections: 'General', 'System Definitions', and 'System Delays'. Under 'System Delays', there are sub-sections for 'System Delays', 'Program Delays', 'Dosing station', and 'Pump Station'. The 'Pump Station' section contains a table with the following data:

Pump Station	On	Off	Unit
Delay between pumps	00:00	00:00	mm:ss
On delay after pump OFF	00:00		mm:ss

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20. ON and OFF delays between pumps activation and desactivation

21. Delays for the pump that was turns OFF to be turn ON again



## Pump Station Alerts Setting

The screenshot displays the GrowSphere MAX user interface for the 'Alerts' section. The top navigation bar shows 'Alerts' as the active tab, with a temperature of 21.3°C and a date of Sun 10 Dec 2023 14:30:25. The left sidebar contains various system icons, with the alert icon (a triangle with an exclamation mark) highlighted by a blue dashed line and the number 22. The main content area is divided into 'Active Alerts', 'History Alerts', and 'Alerts Settings'. The 'Alerts Settings' tab is highlighted by a blue dashed line and the number 23. Below the tabs, there are two checkboxes: 'Disable & Reset Alerts' and 'Alarms auto reset delay (hh:mm)' set to 10:00. A list of alert categories is shown below, with 'Pump Station' highlighted by a blue dashed line and the number 24. The categories listed are: Pump Station, Mainline, Dosing Station, Dosing Channel, Mixing valve, Filter Station, System, and Remote System.

## Pump Station Alerts Setting

**GrowSphere™** by **NETAFIM™** Farm **Mainline 1** Alerts Simulation 21.2°C Sun 10 Dec 2023 14:27:31

### Pump Station Alerts Settings

Description	Value	Delay (sec)	Action	sms	Critical Value	Delay (sec)	Action	sms
Pump station input switch		60s	Alert Only	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>
Pump Overload		60s	Alert Only	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>

\* Pump Station input pressure switch to indicate if pressure exist or not.

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### 6.3.3 Configuring Filter Station

Perform the following steps to configure the filter station parameters:

**1. Defined by the user**

**2. Located upstream of the filters**

for increasing water pressure on the filter station units

**3. The Differential Pressure Switch**

measures the water pressure differential between the filter inlet and outlet

**4. Works independently of irrigation.**

If not selected, flushing only occurs during active irrigation

**5. The irrigation shift pauses until flushing is done**

**6. Number of Filter Units:**

The number of filters that belong to the filter station. The maximal number is 32

**7. This can be measured locally or at the measurement point in the pump station.**

**8. An alert is generated if flow switch pulses don't match filter activation pulses**

**9. The current dosing recipe in the irrigation shift will be paused during the filter flushing process and resumed afterward.**

2. Tap the Configuration tab

3. Tap the Filter Station tab

For Pump Station configuration,  
please go to chapter: Mainline  
Pump Station

1. Enter settings

GrowSphere™ by NETAFIM Farm Mainline 1 Settings

Configuration Local I/O Remote I/O Communication Wiring Diagram

Mainline Pump Station **Filter Station** Dosing Station Valves Other Devices

Filter Station Program

Required Flushing Pressure (Bar/PSI)	4.5	Delay Between Filters	00:00
Delta Pressure Start Delay (mm:ss)	00:10	<input type="checkbox"/> Filters Rotation	
Filter Flushing Time (mm:ss)	00:10	DP Reiteration	5
Main Filter Valve Delay	00:30		

page 2 of page 3

5. Define the filter station parameters:

- **Required Flushing Pressure:** The minimum pressure needed to run the flushing process, to achieve effective flushing of the filters.
- **Delta Pressure Start Delay:** This parameter sets a delay in mm:ss and starts counting down when a signal from the DP device is received. If the signal remains on, the filter flushing process is triggered.
- **Filter Flushing Time:** The duration of flushing for each filter unit (mm:ss). Filter units flush one at the time.
- **Range: 00:01 to 60:00.**
- **Main Filter Valve Delay:** A delay (mm:ss) to activate the Main Valve or Filter Booster Pump before flushing the first filter unit in the sequence.
- **Delay Between Filter:** The time (mm:ss) between the end of flushing of one filter unit and the beginning of flushing of the next unit.
- **Filter Rotation:** If activated, each flushing process starts with the next filter unit in the sequence.
- **DP Reiteration:** No. of consecutive flushing cycle signals from DP Switch. Range: 1-10. Alert issued if exceeded. Default: 3.



## Define the filter station parameters:

- **Required Flushing Pressure (Bar/PSI):** Indicates the required flushing pressure.
- **Delta Pressure Start Delay:** Enter amount of delta pressure start delays.
- **Filter Flushing Time:** Enter amount of filter flushing time.
- **Main Filter Valve Delay:** Enter amount of valve delay.
- **Delay Between Filters:** Enter amount of delay between filters.
- **Filters Rotation:** Select filters rotation.
- **DP Reiteration:** Enter the DP reiteration.

The screenshot shows the GrowSphere MAX Controller Configuration interface. The top navigation bar includes 'Farm', 'Mainline 1', and 'Settings'. The main content area is divided into several sections: 'Configuration', 'Local I/O', 'Remote I/O', 'Communication', and 'Wiring Diagram'. Under 'Configuration', there are sub-sections for 'Mainline', 'Pump Station', 'Filter Station', 'Dosing Station', 'Valves', and 'Other Devices'. The 'Filter Station' section is currently selected and displays the following parameters:

Filter Station Program			
Required Flushing Pressure (Bar/PSI)	4.5	Delay Between Filters	00:00
Delta Pressure Start Delay (mm:ss)	00:10	<input type="checkbox"/> Filters Rotation	
Filter Flushing Time (mm:ss)	00:10	DP Reiteration	5
Main Filter Valve Delay	00:30		

At the bottom of the interface, there is a navigation bar with a back arrow, 'page 2 of page 3', and a forward arrow. A circular icon with 'FM' is also visible in the bottom left corner.

## Define the filter station parameters:

This screen display the currently status of the Filter Station

- **Active Filter:** Displays the active filter.
- **Filter Station Manual Operation:** Check the active filter station.
- **Test Filter Number:** Enter Filter number to test.
- **Pause / Stop / Start Filter:** Press pause, stop or start to control the filter station.
- **Reset Time & Quantity:** Press to reset time and quantity.

The screenshot shows the GrowSphere MAX Controller Configuration interface. The top navigation bar includes 'Farm', 'Mainline 1', and 'Settings'. The main content area is divided into several sections:

- Configuration:** The active tab, with sub-tabs for 'Local I/O', 'Remote I/O', 'Communication', and 'Wiring Diagram'.
- Mainline:** The active sub-tab, with other sub-tabs for 'Pump Station', 'Filter Station', 'Dosing Station', 'Valves', and 'Other Devices'.
- Active Filter:** Displays '-/0' and 'cycle start with filter 1'.
- Filter Station manual operation:** Includes a checked checkbox for 'Filter Station Active' and a 'Start Flushing' button.
- Single filter testing:** Includes a 'test filter number' input field set to '0' and a 'Start Filter' button.
- Filter Station Actual in Process:** A table with columns for 'Set' and 'Left'.

Filter Station Actual in Process	Set	Left
Next Cycle	01:00	01:00:00
Next Cycle By Quantity m3/THG	100.00	100.00
		Actual

At the bottom of the screen, there is a 'Reset Time & Quantity' button and a page indicator showing 'page 3 of page 3'.

### 6.3.4 Set dosing station configuration

- Define the numbers of dosing channels and agitators and activate them
- Select the connected devices that related to the dosing station:

2. Tap the Configuration tab

3. Tap the Dosing Station tab

1. Enter settings

The screenshot shows the 'Dosing Station' configuration screen in the GrowSphere MAX interface. The 'Configuration' tab is selected, and the 'Dosing Station' sub-tab is active. The 'Intensive' mode is selected for the dosing station. There are 4 dosing channels configured. The 'Dosing Booster' is checked, and 'Dosing Pressure switch' is unchecked. The 'EC Sensors' and 'pH Sensors' are both set to 0. A table titled 'Sensor connections' is shown below the main configuration area.

Sensor connections				
Dosing station name/number				
Sensor type	Sensor	Range	Local input number	Remote input number
4-20 mA	EC1	0 - 10mS		
4-20 mA	EC2	0 - 10mS		
4-20 mA	pH1	0 - 14		
4-20 mA	pH2	0 - 14		
Dry	Press switch	ON/OFF		
0-5 Volts	Pressure	0-10 bar		

### 5. Define the dosing station parameters:

- **Extensive:** This option is chosen when the dosing station/ dosing channels are far away from the controller. In this case, the dosing channels are activated by remote terminal units.
- **Intensive:** This option is typically chosen when precise control over the injection of fertilizers and chemicals, including EC and PH control, is required.
- **Dosing Channels:** The fertilizer meter measures and calculates the dosing channel flow rate. In the proportional method, the dosing meter reading is used as a flow reference only.
- **Mixing valve:** Selecting the Mixing Valve option will enable it. for its configuration go to NPK-->General settings
- **Booster pump OL (overload):** If the dosing booster is selected, the option to check the correct checkbox for pump overload will be enabled.

- **Agitator** - Indicates if there is an active agitator for that channel.
- **Fert Tank Level** - indicates an active tank level for that channel tank, it will be visualized in the SCADA
- **Booster pump O.L** - indicates and active Over Load sensor active for the booster.
- **Dosing Pressure Switch** - indicates active pressure switch for the booster.
- **Agitator pump** - indicates active pump for the agitator activity.
- **Ec/pH sensors** - indicate the number of sensors available for this dosing system.



## Configuring Dosing Channel Settings

Perform the following steps to configure the dosing channel settings:

1. Activate the connected channels.
2. Define each channel's Type, Minimum and Nominal flow, Reaction, DM rate, and deviations.

Active	ID	Dosing Channel	Channel Type	Minimum Flow L/h	Nominal Flow L/h	Reaction	Dosing Meter Rate	Low deviation	High deviation
<input checked="" type="checkbox"/>	1	DCH1	Venturi Soleno	1.0	60.0	EC	0.1 LPP	30 %	40 %
<input checked="" type="checkbox"/>	2	DCH2	Venturi Soleno	1.0	60.0	EC	0.1 LPP	30 %	40 %
<input checked="" type="checkbox"/>	3	DCH3	Venturi Soleno	1.0	60.0	EC	0.1 LPP	30 %	40 %
<input checked="" type="checkbox"/>	4	DCH4	Venturi Soleno	1.0	60.0	Acid	0.1 LPP	30 %	40 %

- **Channel Type** - The options are Venturi, Electric, Hydraulic. The Default is Venturi Solenoid
- **Minimal Flow** - The minimal flow rate that the dosing channel can work. The units are l/h and g/h. Default is: 1.0
- **Nominal Flow**: it is a nominal flow rate that the dosing channel was set manually at the channel. Sometimes it is known as a maximal dosing channel flow rate. The units are l/h and g/h. Default is 1.0
- **Reaction** - the type of fertilizer or chemical that has an influence on the EC/pH Control The options are: Passive, EC, Acid, and Alkaline The default is Passive.
- **Dosing Meter Ratio** - When was set a Dosing Meter then the user will set the pulse rate for each Dosing Meter. The units are PPL (pulses per liter), LPP (liter per pulse). Imperial Units: PPG (pulses per gallon), GPP (gallons per pulse). The Default is LPP.
- **Low Deviation** - the calculated minimal percentage that the dosing valve can be open compared to minimal deviation % settings
- **High Deviation** - The calculated maximal percentage that dosing valve can be open compare maximal deviation % settings



## Configuring Tanks parameters

1. Write the Tank's names/ Chemical type

2. Set the tanks volume or dimensions

3. When the Tanks shape is conical, then set the factor

4. Select agitator Active or Not

5. Select Tanks Level Sensor if there is a connected sensor.

ID	Tank name	Tank volume	Tank height	Tank Top diameter	Conical tank	Level in tank	ACT CONTENT L	ACT CONTENT %	Agitators	Level senso
1	T1	1000L	--	--	<input type="checkbox"/>	--	--	--	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	T2	1000L	--	--	<input type="checkbox"/>	--	--	--	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	T3	1000L	--	--	<input type="checkbox"/>	--	--	--	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	T4	150L	--	--	<input type="checkbox"/>	--	--	--	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## Configuring Dosing EC/pH control Settings

When the dosing recipe defines target values for EC and pH, the proportional 1:1000 dosing method must be used.

In this case, the PLC controller adjusts the proportional quantities in the dosing recipe to ensure a constant EC/pH value is delivered based on the set EC/pH target values.

The parameters included in the calculations for the EC/pH control are explained in the next two pages:

**2. Tap the General Settings tab**

**1. Tap the Fertilizer Dosing button**

The screenshot shows the 'General Settings' tab for 'EC pH control'. The 'Intensive' radio button is selected. The 'EC' and 'pH' checkboxes are checked. The parameters for EC and pH are as follows:

Parameter	EC Value	pH Value
Control Cycle	15.0 Sec	15.0 Sec
Delta	0.2	0.2
Fine Tuning	50.0	25.0
Coarse Tuning	50.0	50.0
Deadband	0.1	0.1
Integ time	10.0 Sec	10.0 Sec

At the bottom, the following parameters are set:

Parameter	Value
Minimum on time	1.8 Sec
Minimum off time	2.0 Sec
Water flow stability time	5.0 Sec
Booster off delay	20.0 Sec

**3. Select Extensive or Intensive**

**For an intensive and Extensive description:**  
See page 67. If extensively selected, the EC/pH reaction settings will be disabled.

**4. Define the parameters**

See next page.

## Dosing Parameters:

- **Control cycle:** The duration that the fertilizer needs to travel from where it is injected to where the EC sensor is located. During this duration, the fertilizer mixes with the irrigation water. The value of this cycle depends on several factors such as the distance between the injection point and the sensor location, the diameter of the pipe used, and the flow rate.
- **Delta:** The maximal deviation allowed between the readings of two EC/pH sensors. If the deviation, exceed this value, an alert will be triggered.
- **Fine Tuning:** Applied when the EC/pH values are close to the target (i.e., 0.6 deviations from the target value). The higher the set number, the faster the EC/pH target will be reached, and the more fertilizer will be injected.
- **Coarse Tuning:** Applied when the EC/pH value is far from the target. The higher the number is set, the more rapid the fertilizer quantities will be increased in order to reach the target values more quickly.  
It is important to consider that as a result of fast (aggressive) changes, the EC/pH values will overshoot the EC/pH target. If slow (less aggressive) changes are made, it will take longer to reach the EC/pH target, with less deviation as a result.
- **Deadband:** Defines a range around the reading value that the system will ignore changes of the readings.
- **Integ:** Defines how fast the system will correct between high and low deviation.
- **Control:** Enables defining what sensor/s is used to control the process.
- **Avg. Filter Speed:** Defines how often the average of the two sensors readings is calculated. 0- defines a slow update of the calculated average. 10 - the calculated average is calculated often.
- **Minimal On Time:** The minimal amount of time the dosing channel must be on. This should be set based on the minimum activation time of the control valve or dosing channel motor.
- **Minimal Off Time:** The minimal amount of time that the dosing channel can be off. This value is important to ensure good dosing distribution.
- **Water Flow Stability Time:** A delay at the start of the irrigation shift necessary for the water meter to record a stable flow rate. Relevant when using EC/pH dosing control.
- **Booster Off Delay:** Causes the dosing booster to turn off the defined amount of time after the end of the dosing process.



## 6.3.5 Set valves configurations

This tab shows all the Valves of this system, (up to 100 valves per mainline) for the parameters setup of each valve.

2. Tap the Configuration tab

3. Tap the Valves tab

1. Enter settings

Device type	NO.	Source	Name	Flow	Area	Assigned	Module/RTU	DO
Valve	1	M.Line1	Almond 1	43.00 GPM	2.10 ac	✓	PM5052	3
Valve	2	M.Line1	Almond 2	27.00 GPM	1.50 ac	✓	PM5052	4
Valve	3	M.Line1	Almond 3	11.00 GPM	1.50 ac	✓	PM5052	5
Valve	4	M.Line1	Almond 4	37.00 GPM	1.80 ac	✓	DO573.1	0
Valve	5	M.Line1	Apple 1	46.00 GPM	2.20 ac	✓	DO573.1	1
Valve	6	M.Line1	Apple 2	14.00 GPM	0.70 ac	✓	DO573.1	2
Valve	7	M.Line1	Apple 3	20.00 GPM	1.00 ac	✓	DO573.1	3

### 5. Define the valve parameters:

- **Device #:** Indicates the valve number.
- **Source:** Irrigation mainline to which the valve is connected.
- **Name:** Provide a descriptive name for the valve.
- **Flow (m<sup>3</sup>/h):** Set the valve's nominal flow rate.
- **Area (ha):** Define the area (in hectares) of the irrigation block allocated to the valve.
- **Assigned:** Indicates if the valve was assigned to an output module.
- **Module:** The controller module and port to which the device is connected.

**Please note:** The parameters defined in this section will be presented in your virtual farm in the Cloud and will influence the Farm management, Irrigation recommendation, and alerts accordingly.



## 6.3.6 Configuring Other Devices

This tab shows all the Valves of this system, (up to 256 valves per mainline) for the parameters setup of each valve.

2. Tap the Configuration tab

3. Tap the Other devices tab

1. Tap the Configuration tab

Device type	NO.	Source	Name	Flow	Assigned	Module	DO
DosingChannel	1	D.Statio1	DCH1.1	600.0	✓	DO572.1	0
DosingChannel	2	D.Statio1	DCH1.2	450.0	✓	DO572.1	1
DosingChannel	3	D.Statio1	DCH1.3	300.0	✓	DO572.1	2
Pump	1	M.Line1	PMP1.1	80.0	✓	PM5052	0
BoostPump	1	M.Line1	BPMP1.1	—	✓	DO572.1	7
MainValve	1	M.Line1	MVLV1.1	—	✓	PM5052	1
WaterMeter	1	M.Line1	WMTR1.1	—	✓	PM5052	1

5. Define the device parameters:

- **Device Type:** Indicates the device type.
- **Device #:** Indicates the device number.
- **Source:** The source to which the device is connected.
- **Name:** Provide a descriptive name for the valve.
- **Flow:** Device's nominal flow rate.
- **Module and DO:** The controller module and port to which the device is connected.

This field is not editable here. "V" means the valve is active and has an output assigned. Gray indicates it's inactive. Use this to set valves that will be added later physically.

## 6.3.7 Allocating Local Digital Outputs

1. Click assign for each row to assign
  2. From the pop up window select the desired output
  3. Define the Flow and irrigated area for each valve
  4. The I/O module to which the device has been assigned to can be selected by skip between pages 1
- Dosing valves should be assigned on the D0572 Module**

Module	DO	Device type	NO.	Source	Name	Flow	Area	Assigned
PM5052	0	MainValve	1	M.Line1	M.Valve	—	—	Unassign
PM5052	1	Pump	1	M.Line1	PMP1	0.0 m³/h	—	Unassign
PM5052	2	Dosing Booster	1	M.Line1	BPMP1.1	—	—	Unassign
PM5052	3	Valve	1	M.Line1	Almond 1	43.0 m³/h	2.1 ha	Unassign
PM5052	4	Valve	2	M.Line1	Almond 2	27.0 m³/h	1.5 ha	Unassign
PM5052	5	Valve	3	M.Line1	Almond 3	11.0 m³/h	1.5 ha	Unassign
DO573.1	0	Assign	0			—	—	Unassign

**Assign:** By clicking Assign, the system will indicate how many devices are not yet assigned, and will automatically assign it to the next available port

Valve (0)	Dosing Booster (0)	Condition active (0)
MainValve (0)	Alarm (0)	EC Pre-Control open (0)
Pump (0)	Selector (0)	EC Pre-Control close (0)
Filter (0)	Agitator (0)	Relay (0)
Main Filter Valve (0)	Cooling (0)	<b>Same as DO</b>
<b>Dosing Channel (1)</b>	Misting (0)	EC Pre-Control pump (0)
Mist Cool pump (0)	Mist Cool Main valve (0)	Agitator Pump (0)

## 6.3.8 Allocating Local Digital Inputs

The system displays all local digital inputs according to the controller configuration

1. Assign each device to the I/O Module and port.
2. Provide each input's name, type and rate. For Digital Input no need to put Irrigated area.
3. You can select the I/O module the device has been assigned by navigating between pages 1-5.

- **Type:** Options include PPL (pulses per liter) or LPP (liters per pulse), or NO for Normally Open or NC for Normally closed.
- **Rate:** Value corresponding to the Type selection.

Module	DI	Device type	NO.	Source	Name	Type	Rate	Assigned
PM5052	0	Water Meter	1	M.Line1	WM1	GPP	10.00	Unassign
PM5052	1	Pump Overload	1	M.Line1	POL	NO	—	Unassign
PM5052	2	Dosing Meter	1	M.Line1	DMTR1.1	GPP	0.80	Unassign
PM5052	3	Dosing Meter	2	M.Line1	DMTR1.2	GPP	0.80	Unassign
PM5052	4	Dosing Meter	3	M.Line1	DMTR1.3	GPP	0.80	Unassign
PM5052	5	Dosing Meter	4	M.Line1	DMTR1.4	GPP	0.80	Unassign
PM5052	6	Assign	0			—	—	Unassign



## 6.3.9 Configuring Local Analog Inputs

Perform the following steps to configure all local analog inputs (i.e., sensors):

1. When you click on Assign, a list of devices that have been allocated will appear.  
From there, you can choose the sensor you want to work with and set the input ranges, name, and offset for each sensor
2. To assign additional analog sensors, navigate between the pages

Module	AI	Device type	NO.	Source	Name	Input	Unit	Assigned
AI561.10		EC	1	M.Line1	EC1.1	4 - 20 mA		Unassign
Input Range (mA)		Output Range		Offset				
4 - 20		= 0 - 5		0.00				
AI561.11		Assign	0			4 - 20 mA		Unassign
Input Range (mA)		Output Range		Offset				
4 - 20		= 0 - 14		0.00				

EC (0)	Analog Flow Sens(0)	SM150 (0)	PlantSense (0)
pH (0)	<b>Temperature (4)</b>	ECH2O5 (0)	LeafWetness (0)
EC Verify (0)	<b>Humidity (4)</b>	Irrrometer (0)	General rSense S(0)
pH Verify (0)	<b>Radiation (4)</b>	Dewpoint (0)	Identification Sen(0)
EC Pre-Control (0)	Wind Speed Max (0)	HygroClip2 (0)	NetaCap water co(0)
EC Drain (0)	Rain Sensor (0)	RTD PT-100 (0)	NetaCap soil temp(0)
Filter Pressure Bel(0)	ET (0)	Dendrometer (0)	NetaCap ambient(0)
Filter Pressure Aft(0)	Soil temperature (0)	Pyranometer (0)	Pressure0_2p5 (0)
Pressure Sensor (0)	Tensiometer (0)	Tensiometer ANT1(0)	Pressure0_5 (0)
<b>General 0-20mA</b>	NetaSense (0)	LeafSense (0)	Pressure0_10 (0)

**Assign:** By clicking on Assign, a pop up window open with the available options. The allocated devices are presented in there.



### 6.3.10 View the wiring diagram

The wiring diagram shows the module and port for each device that has been assigned. You can follow the diagram to connect the devices properly.

3. Tap the Wiring Diagram tab

1. Tap the Configuration tab

2. Select Settings and type your credentials

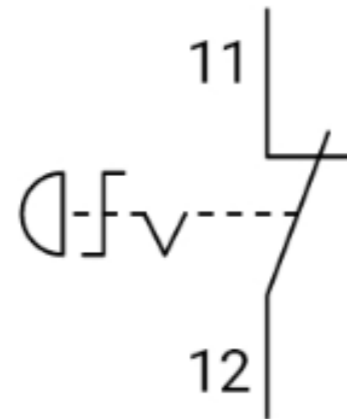
The screenshot shows the GrowSphere MAX web interface. At the top, there's a navigation bar with 'All Mainlines' selected. Below it, there are tabs for 'Configuration', 'Local I/O', 'Remote I/O', 'Communication', and 'Wiring Diagram'. The 'Wiring Diagram' tab is active. On the left, there's a sidebar with a settings gear icon. A dropdown menu is open over the settings gear, showing 'Settings' selected. The main content area displays four columns of device configurations:

PM-5052 - CPU	DO-573 - Output	DO-572 - Output	AI-561 - Analog Input
+ IO0 WM1	0 vlv4	0 DCH1.1	+ EC1.1
+ IO1 POL	1 vlv5	C Common	-
+ IO2 DMTR1.1	2 vlv6	1 DCH1.2	+ PH1.1
+ IO3 DMTR1.2	3 vlv7	C Common	-
+ IO4 DMTR1.3	4 vlv8	2 DCH1.3	+ Rad
+ IO5 DMTR1.4	5 AGTR1.1	C Common	-
+ IO6	6 AGTR1.2	3 DCH1.4	+ Temp.out
+ IO7	7 AGTR1.3	C Common	-
	8 AGTR1.4	4	
	9 AGPMP1.1	C Common	
	10	5	
	11	C Common	
	C Common	6	
	12	C Common	
	13	7	
	14	C Common	
	15		
	C Common		

## 6.3.11 Mainline External Pause

### / Definition

The mainline external pause is command to pause the mainline when the Digital Input is active. Each mainline has its own external pause Digital Input. The purpose of the mainline external pause is to permit the user to pause the mainline by an emergency push switch when it is an emergency and need to pause immediately the mainline operation. The mainline will be paused all the time that the switch (DI) is active.



### / Digital input

The **GrowSphere™ Max** has an option to select a digital input named:

- ML1 External pause
- ML2 External pause
- ML3 External pause
- ML4 External pause

Each mainline will have an option to select a mainline external pause.

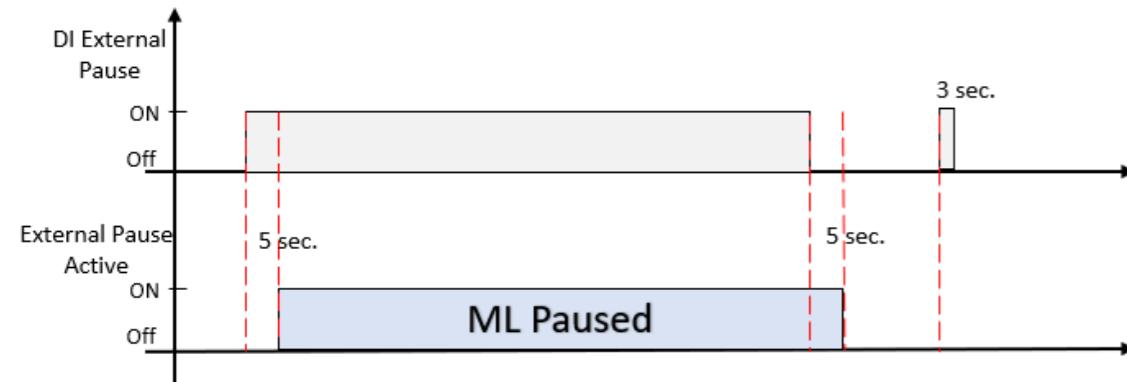
Module	DI	Device type	NO.	Source
PM5052	0	Assign	0	
PM5052	1	Assign	0	
PM5052	2	Assign	0	
PM5052	3	Assign	0	
PM5052	4	Assign	0	
PM5052	5	Assign	0	
PM5052	6	Assign	0	

Source	Count
AC Fault	(1)
Water Meter	(0)
Frequency Meter	(0)
Dosing Meter	(0)
Dosing Pressure Switch	(0)
Dosing Booster Protection	(0)
Pump Overload	(0)
Pump Water Meter	(0)
Filter Flow Switch	(0)
Delta Pressure	(0)
Flow Indicator	(0)
Dry Contact	(0)
External Pause	(0)
Reset Alarm	(0)
Rain Collector	(0)
Wind Speed	(0)
Drain Meter	(0)
Pump Input Switch	(0)
Fertilizer Meter	(0)
Pump Station Pressure Tran	(0)
Filter Booster Pump	(0)
External Alarm	(0)
Filter DP Switch	(0)
External Filter	(0)

## / External pause logic

The mainline external pause is active when:

- When the digital input is selected N.O. then when the input is close then will be active.
- When the digital input is selected N.C. then when the input is open then will be active.
- Fix delay: the External pause digital input have a fix delay of 5 seconds for ON and Off delay. See the following graph.



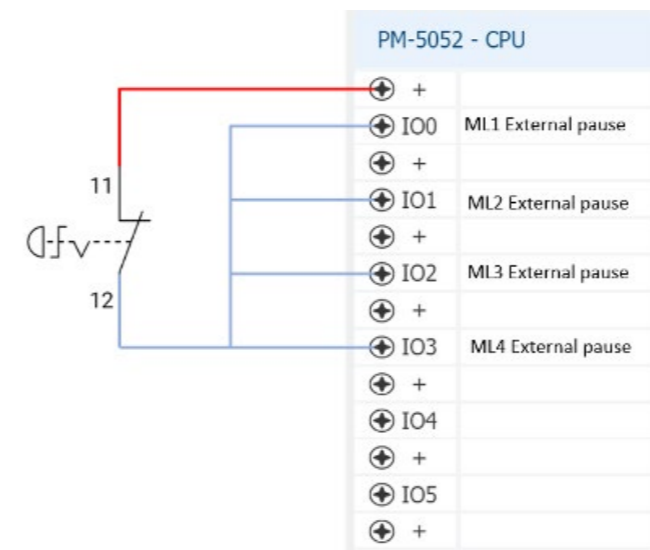
## Pause Mainline

The action of this active mainline pause is similar to the manual pause mainline command.

### ! External pause

The Scada will show the message External pause when it is paused by the external pause switch. "External pause".

- When the mainline it is paused by the External it can be canceled only by an unactive DI.
- When the user would like to use only one External pause switch to pause all the mainlines, then will wire the Switch in parallel to the mainline Di selected for each mainline.
- Example of connection one External pause switch to 4 Mainlines.



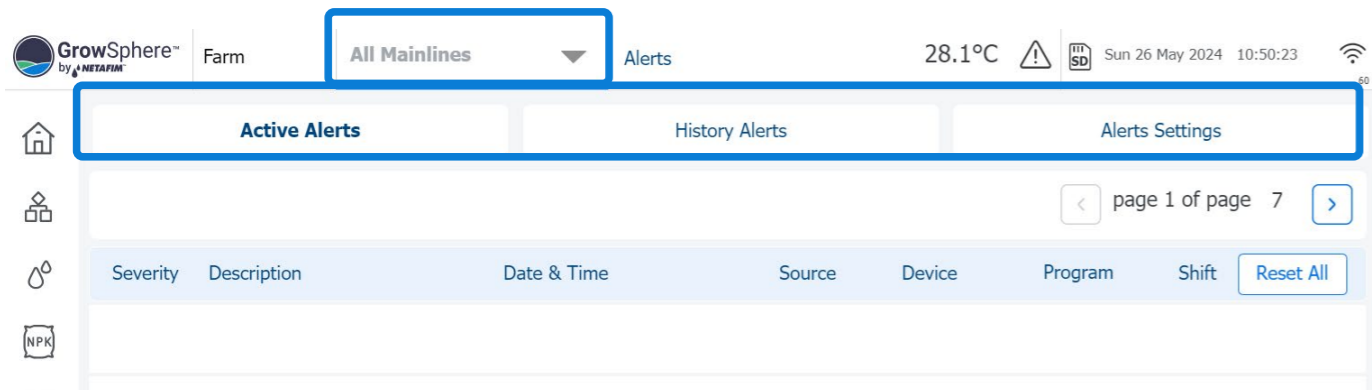
## 6.4 GrowSphere™ Max Alerts

The Alerts section's tabs are: All Mainlines tab or each Mainline tab.

When the alerts are affecting all the main lines then only the Mainlines tab will be active.

The alerts are divided on 3 sections.

- **Active Alerts**
- **History Alerts**
- **Alerts Settings**





## 6.4.1 Viewing Active Alerts

Active alerts includes all alerts that are currently active and alerts that were activated and were not reset. Perform the following steps to view information about currently active alerts:

### Active alert icon

The Active Alerts tab can be accessed from any screen by clicking the Alert button at the top of the screen.

### 2. Tap the Active Alerts tab

### 1. Tap the Alerts button

Severity	Description	Date & Time	Source	Device	Program	Shift	Reset All
<span style="color: red;">!</span>	Maximal flow	01.01.23   13:00 PM	M.line 1	22. Valve	2. Tomato...	4	Reset
<span style="color: orange;">!</span>	Base station disconnected	01.01.23   13:00 PM	M.line 1	Remote Units	2. Tomato...	4	Reset
<span style="color: red;">!</span>	Low level tank number	01.01.23   13:00 PM	Dosing	5. Tank	2. Tomato...	4	Reset
<span style="color: orange;">!</span>	Radio net host disconnected	01.01.23   13:00 PM	M.line 1	4. Channel 1	2. Tomato...	4	Reset
<span style="color: orange;">!</span>	Dosing uncontrol flow	01.01.23   13:00 PM	Dosing	3. Pump	2. Tomato...	4	Reset
<span style="color: orange;">!</span>	Uncontrol flow	01.01.23   13:00 PM	M.line 1	3. Channel 5	2. Tomato...	4	Reset
<span style="color: red;">!</span>	Uncontrol flow	01.01.23   13:00 PM	M.line 1	6. Channel 4	2. Tomato...	4	Reset

### 3. Select a date

### 4. View information about the alerts on the selected date

- **Severity:**
  - Critical
  - Not critical
- **Description:** Cause of the alert.
- **Date & Time:** When the alert was triggered.
- **Source:** The source of the alert.
- **Device:** The specific device which triggered the alert.
- **Program:** The name and number of the irrigation program which was running when the alert was triggered.
- **Shift:** The shift number at the time the alert was triggered.

### Reset buttons

Tap the **Reset** button to reset a specific alert, or tap the **Reset All** button to reset all active alerts. Once reset, these alerts are displayed in the **History Alerts** tab (see [Viewing Alert History](#)).

## 6.4.2 Viewing Alert History

History alerts displays a log of all alerts occurred in the past. Perform the following steps to view information about history alerts:

### 2. Tap the History Alerts tab

Status	Severity	Reset by	Date & Time	Description	Source	Device	Program	Shift
Triggered	N		19.10.2023   04:15:02	24VAC Recover				0
Untriggered	C		19.10.2023   00:10:11	Minimum Flow	M.line 1	WMTR1.1	Apple	3
Untriggered	N		19.10.2023   00:10:11	Minimum Flow	M.line 1	WMTR1.1	Apple	3

### 1. Tap the Alerts button

### 3. Select date

Filter the display alerts for a specific date, see [Selecting Date](#).

### 4. View information about the alerts on the selected date

- **Status:** Options include:
  - **Triggered:**
  - **Untriggered:**
- **Severity:**
  - **N:** Normal
  - **C:** Critical
- **Severity:** Whether the alert is critical or not.
- **Reset By:** Name of the logged in user who reset the alert.
- **Date & Time:** When the alert was triggered.
- **Description:** Cause of the alert.
- **Source:** The source of the alert.
- **Device:** The specific device which triggered the alert.
- **Program:** The name and number of the irrigation program which was running when the alert was triggered.
- **Shift:** The shift number at the time the alert was triggered.

## Defining Alert Settings

List of all available alerts that are part of the selected sub-system is displayed.

### Online alerts

The online Alerts icon is displayed on dashboard screens as either Active or Not active. Its color varies according to the severity of the alert.

**SMS** – Active alerts can be sent via SMS to Three phone numbers (see System preferences).

Clicking on each parameter leads to a dedicated screen, with all the functions for alerts.

**Disable & Reset Alerts** – Disable all alerts to be inactive.

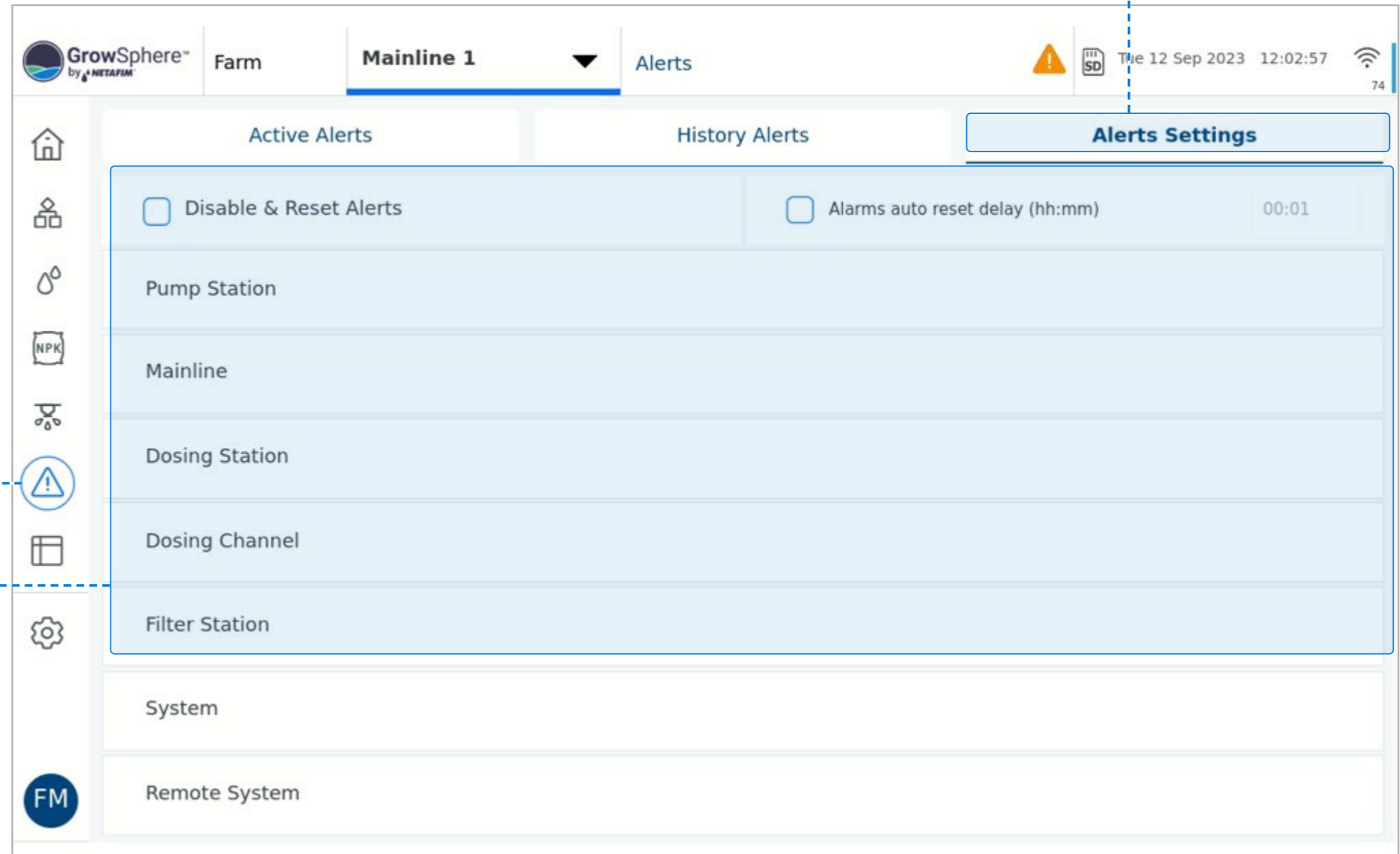
**Alarms auto reset delay** – Specific time in which all alerts will be reset.

**1. Tap the Alerts button**

**3. Select the Sub-system**

Alerts are grouped by their sub-system. Select the sub-system that the alert is part of.

**2. Tap the Alerts Settings tab**





The alert settings screen is divided into two alert levels: normal and critical.

**Normal Alert Settings**
**Critical Alert Settings**

Description	Normal Alert Settings				Critical Alert Settings			
	Value	Delay (sec)	Action	sms	Critical Value	Delay (sec)	Action	sms
Maximum Flow	200.0 m	60s	Alert Only	<input type="checkbox"/>	250.0 m	120s	Alert Only	<input type="checkbox"/>
Minimum Flow	0.1 m <sup>3</sup> /h	60s	Alert Only	<input type="checkbox"/>	1.0 m <sup>3</sup> /h	120s	Alert Only	<input type="checkbox"/>
High Flow	40.0 %	60s	Alert Only	<input type="checkbox"/>	45.0 %	120s	Alert Only	<input type="checkbox"/>
Low Flow	30.0 %	60s	Alert Only	<input type="checkbox"/>	40.0 %	120s	Alert Only	<input type="checkbox"/>
No Flow		60s	Pause Mainline	<input type="checkbox"/>		120s	Pause Mainline	<input type="checkbox"/>
Uncontrol Flow	1000.0 L	60s	Alert Only	<input type="checkbox"/>	1500.0 L	120s	Alert Only	<input type="checkbox"/>
Maximum Pressure	6.0 Bar	60s	Alert Only	<input type="checkbox"/>	8.0 Bar	120s	Alert Only	<input type="checkbox"/>

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**4. Define the following parameters:**

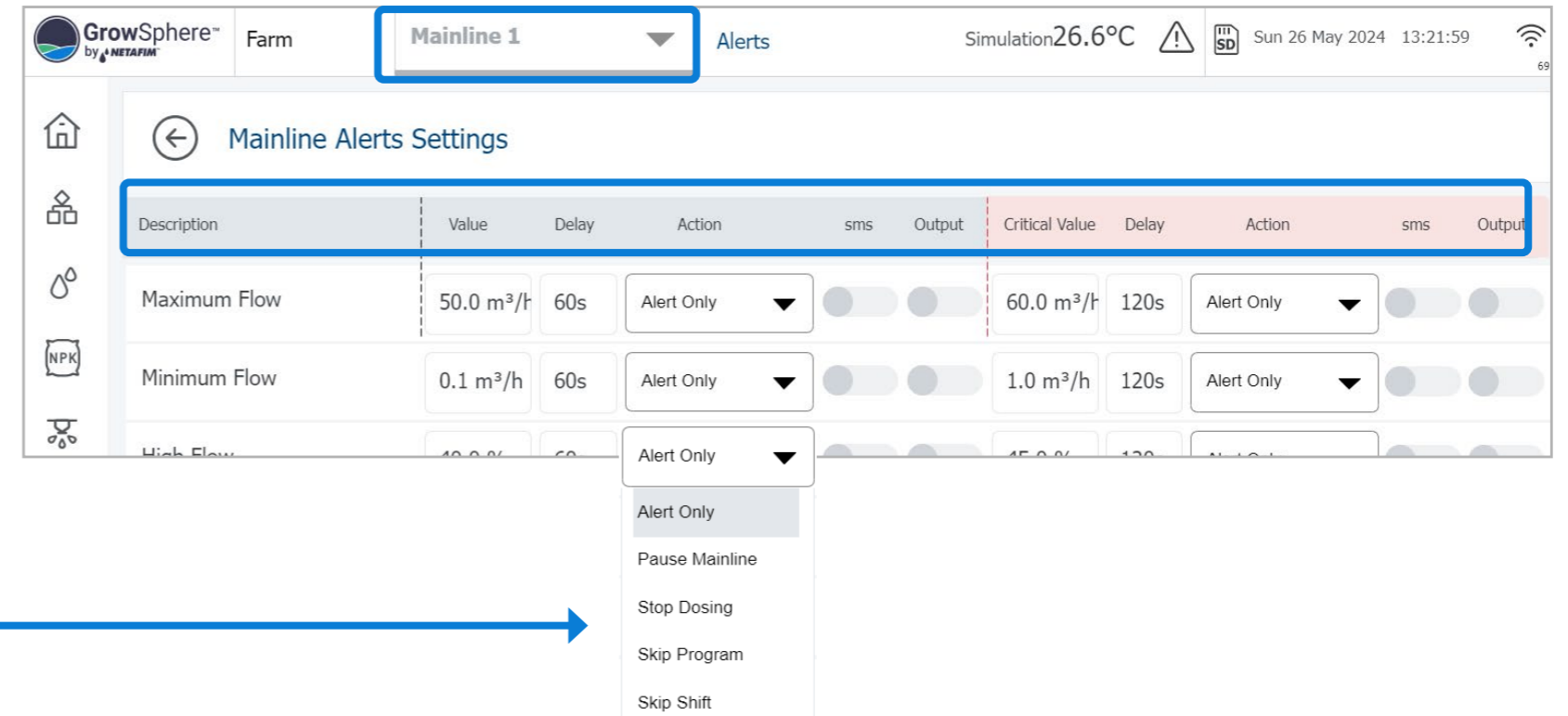
- **Description:** The system displays the description/name of the alert.
- **Value/Critical value:** The value that will trigger an alert.
- **Delay:** Defines the amount of time between when a fault is detected and the alert is triggered.
- **Action:** Action to take when an alert is triggered. Options include: Alert only, Pause Mainline, Stop dosing, Skip program.
- **SMS:** Option to receive an SMS notification when an alert is triggered.



## Alerts Settings

On this screen are the user settings for all the alerts.

- The user can select the mainline for the setting.
- Disable & Reset Alerts: when this box is selected all the active alerts will be reset and will be disable all the alerts.
- Alerts auto reset delay: when it is selected all the alerts will be reset automatically after the set time.
- The following sections are for the settings of each device. Each device settings in explained on the following screens.



### Alerts Settings - Fields

The alerts fields for alerts settings are common for all the alerts devices.

The settings are for normal alerts and critical alerts. The fields are:

- Description: it is the alert description
- Value: it is a value to active the alert
- Delay: is the time that the alert need to active to turn to active alert.
- Action: the user can select the action that will be performance when the alarm is active.
- sms: when turned on an SMS with the alert description will be sent to the user.
- Output: when on the system I/O was defined an output for alerts (normal or critical), and the selector was turned to ON, then when the alert is active the output will be powered ON.
- These settings are the same for normal or critical alerts.

## Alerts Settings – Pump Station

The Pump Station settings are per mainline.

- Pump station input switch: When input pressure switch at pump station is activated, it will trigger this alert after the set delay.  
It is an alert to protect the pump when there is no water/pressure in the pump inlet.
- Pump Overload: it is a pump protection.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
Pump station input switch		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Pump Overload		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>

## Alerts Settings – Mainline

The mainline settings are per mainline.

Page 1.

- Maximum Flow: when the mainline flow rate exceeded the set value, the alert is activated.
- Minimum Flow: when the mainline flow rate is under the set value, the alert is activated.
- High Flow: when running shift flow rate is over its nominal flow rate by the set %, the alert is activated.
- Low Flow: when running shift flow rate is under its nominal flow rate by the set %, the alert is activated.
- No Flow: when there is an active irrigation and the water meter is not recording flow, the alert is activated.
- Uncontrol Flow: when the water meter is recording flow, when there is no running program.
- Maximum Pressure: when the mainline pressure is over the set value the alert is activated.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
Maximum Flow	50.0 m <sup>3</sup> /h	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	60.0 m <sup>3</sup> /h	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Minimum Flow	0.1 m <sup>3</sup> /h	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	1.0 m <sup>3</sup> /h	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
High Flow	40.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	45.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Low Flow	30.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	40.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
No Flow		60s	Pause Mainlin	<input type="checkbox"/>	<input type="checkbox"/>		120s	Pause Mainlin	<input type="checkbox"/>	<input type="checkbox"/>
Uncontrol Flow	1000.0 L	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	1500.0 L	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Maximum Pressure	6.0 Bar	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	8.0 Bar	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>

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## Alerts Settings – Mainline

The mainline settings are per mainline.

Page 2.

- Minimum Pressure: when the mainline pressure is under the set value the alert is activated.
- External Alarm: when a digital input was selected for external alarm, then when this DI is active the alarm will be activated after the delay.

The screenshot shows the 'Mainline Alerts Settings' page for 'Mainline 1'. The page title is 'Mainline Alerts Settings'. The interface includes a navigation menu on the left with icons for Home, Farm, Alerts, NPK, and Settings. The main content area contains a table of alert settings. The table has columns for Description, Value, Delay, Action, sms, and Output. There are also columns for Critical Value, Delay, Action, sms, and Output. The table lists three alert types: Maximum Pressure, Minimum Pressure, and External Alarm. The Maximum Pressure alert has a Value of 6.0 Bar, a Delay of 60s, and an Action of Alert Only. The Minimum Pressure alert has a Value of 0.5 Bar, a Delay of 60s, and an Action of Alert Only. The External Alarm alert has a Delay of 60s and an Action of Alert Only. The Critical Value, Delay, Action, sms, and Output columns are highlighted in red. The page indicator at the bottom shows 'page 2 of page 2'.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
Maximum Pressure	6.0 Bar	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	8.0 Bar	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Minimum Pressure	0.5 Bar	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	1.0 Bar	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
External Alarm		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>



## Alerts Settings – Dosing Station

The dosing station settings are per mainline.

Page 1.

- **Booster Pump Overload:** it is a pump protection, when it is activated, the alert will be triggered after the set delay.
- **EC1/ EC2 Sensor Malfunction:** when sensor readings are out of the sensor minimal or maximal values, the alert is activated after the set delay.
- **pH1/ pH2 Sensor Malfunction:** when the sensor readings are out of the sensor minimal or maximal values the alert is activated after the set delay.
- **EC Sensor Delta:** when the system has 2 EC sensor, and the difference of the sensor reading is bigger or smaller than the set delta value, the alert is activated after the set delay.
- **pH Sensor Delta:** when the system has 2 pH sensor, and the difference of the sensor reading is bigger or smaller than the set delta value, the alert is activated after the set delay.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
Booster Pump Overload		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
EC1 Sensor Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
EC2 Sensor Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
pH1 Sensor Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
pH2 Sensor Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
EC Sensors Delta	1.0	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	1.5	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
pH Sensors Delta	1.0	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	1.5	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>

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## Alerts Settings – Dosing Station

The dosing station settings are per mainline.

Page 2.

- Low EC values: when the EC values are lower than the target on the running shift recipe target, by the set %.
- High EC values: when the EC values are higher than the target on the running shift recipe target, by the set %.
- Emergency EC: when the EC values are higher then the set value.
- Low pH values: when the pH values are lower than the target on the running shift recipe target, by the set %.
- High pH values: when the pH values are higher than the target on the running shift recipe target, by the set %.
- Emergency pH : when the pH values are lower than the set value.

GrowSphere™ by NETAFIM Farm **Mainline 1** Alerts Simulation 27.5°C Sun 26 May 2024 14:34:59

### Dosing Station Alerts Settings

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
pH Sensors Delta	1.0	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	1.5	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Low EC values	40.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	50.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
High EC values	40.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	45.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Emergency EC	4.0	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	3.5	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Low pH values	40.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	45.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
High pH values	40.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	45.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Emergency pH	4.0	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	3.5	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>

page 2 of page 2

## Alerts Settings – Dosing Channel

The dosing channels settings are per mainline.

- **Dosing ch high flow:** when the dosing channel flow rate exceeds the nominal flow of the running recipe by the set %.
- **Dosing ch low flow:** when the dosing channel flow rate is under the nominal flow of the running recipe by the set %.
- **Dosing ch no flow:** when the dosing channel has a dosing meter, and it is not recording flow when the dosing channel is running.
- **Uncontrol flow:** when the dosing channel has a dosing meter, and it is recording flow when the dosing channel is not running.
- **Dosing Pump Overload:** when the dosing channel has a protection, and it will activate the alert.
- **Fert Tank QTY:** when the fertilizer tank has an analog level sensor, and the value is lower than the set % value.
- **Fert Tank Low Switch:** when the fertilizer tank has a low-level Digital Switch, and it is activated it will activate the alert

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
Dosing ch high flow	30.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	40.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Dosing ch low flow	80.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	88.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Dosing ch no flow		60s	Stop Dosing	<input type="checkbox"/>	<input type="checkbox"/>		120s	Stop Dosing	<input type="checkbox"/>	<input type="checkbox"/>
Uncontrol flow	30.0 L	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	50.0 L	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Dosing Pmp Overload		50s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Fert Tank Low QTY	20.0 %	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	15.0 %	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Fert Tank Low Level switch		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>

## Alerts Settings – Mixing valve

The Mixing valve settings are per mainline.

- **Tank A low level:** when the tank A has a digital low-level switch, and it turns to active, then the alert is activated.
- **Tank B low level:** when the tank B has a digital low-level switch, and it turns to active, then the alert is activated.
- **Tanks A level below threshold:** when the tank A has an analog level sensor, and the readings are under the set level by % then it will activate the alert.
- **Tanks B level below threshold:** when the tank B has an analog level sensor, and the readings are under the set level by % then it will activate the alert.
- **Low (pre) EC values:** when the pre-EC sensor readings are lower than the set value then it will activate the alert.
- **High (pre) EC values:** when the pre-EC sensor readings are higher than the set value then it will activate the alert.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
Tank A low level		60s	Pause Mainlin	<input type="checkbox"/>	<input type="checkbox"/>		120s	Pause Mainlin	<input type="checkbox"/>	<input type="checkbox"/>
Tank B low level		60s	Skip Program	<input type="checkbox"/>	<input type="checkbox"/>		120s	Skip Program	<input type="checkbox"/>	<input type="checkbox"/>
Tank A level below threshold	20.0	60s	Pause Mainlin	<input type="checkbox"/>	<input type="checkbox"/>	15.0	120s	Pause Mainlin	<input type="checkbox"/>	<input type="checkbox"/>
Tank B level below threshold	20.0	60s	Skip Program	<input type="checkbox"/>	<input type="checkbox"/>	15.0	120s	Skip Program	<input type="checkbox"/>	<input type="checkbox"/>
Low EC values	0.5	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	0.3	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
High EC values	2.5	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	2.8	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>



## Alerts Settings – Filter Station

The Filter station settings are per mainline.

- **PD over threshold:** when the pressure differential value is over the set value. the alert is activated.
- **PD Signal Reiteration:** when the flushing program runs consecutively more that the set value, then an alert will be activated.
- **Over Max Cycle:** when the flushing cycle runs more cycles than the set value during the set time (delay) then an alert will be activated.
- **Filter Unit Malfunction:** when the station has a verification switch, and it is active when there is no flushing cycle then an alert will be activated.
- **Filter Unit Fails to Flush:** when the station has a verification switch, and it is not activated when filter is flushing, then an alert will be activated.
- **Sensor Pressure IN Malfunction:** when the pressure In sensor is under or over the maximal settings values, then an alert will be activated.
- **Sensor Pressure Out Malfunction:** when the pressure out sensor is under or over the maximal settings values, then an alert will be activated.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
PD over threshold	2.0	60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	2.5	120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
DP Signal Reiteration	3.0		Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	3.0		Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Over Max Cycle	2.0	6000s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>	2.5	7000s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Filters Unit Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Filter Unit Fails to Flush		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Sensor Pressure IN Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
Sensor Pressure Out Malfunction		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>

## Alerts Settings – System

The System alerts settings are for all mainlines.

- **PLC power recovery:** Notified that the controller power is reconnected after the set delay.
- **24VACFault:** Notified that the 24 VAC (voltage) is disconnected after the set delay.
- **24VAC Recovery:** Notified that the 24 VAC power is reconnected after the set delay.

Description	Value	Delay	Action	sms	Output	Critical Value	Delay	Action	sms	Output
PLC power recovery		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
24VAC Fault		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>		120s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>
24VAC Recover		60s	Alert Only	<input type="checkbox"/>	<input type="checkbox"/>					

## Alerts Settings – Remote System

The System alerts settings are for all mainlines.

- **Remote Valve Fault:** Notified when one of the irrigation valves from a RTU is faulty.
- **Modbus disconnected:** notified after the set delay, that there is no communication between the **GrowSphere™** controller and a sub station, weather Station, NetRTU GW or RTU host.

The screenshot shows the 'Remote System Alerts Settings' page in the GrowSphere MAX interface. The page title is 'Remote System Alerts Settings'. Below the title is a table with the following columns: Description, Delay (sec), Action, and sms. The table contains three rows of alert settings:

Description	Delay (sec)	Action	sms
Remote Valve Fault	60 s	Alert Only	<input type="checkbox"/>
Modbus disconnected	60 s	Alert Only	<input type="checkbox"/>
SN: Unit disconnected	60 s	Alert Only	<input type="checkbox"/>



## 7. Controller Operation

This chapter reviews the following routine operations:

**1/** Managing Irrigation Programs

**4/** Resetting Accumulation

**2/** Managing Fertilizer Dosing

**5/** System Testing

**3/** Viewing Logs

**6/** Monitoring Irrigation





## 7.1 Managing Irrigation Programs

This section reviews managing irrigation programs and includes:

**1/** Irrigation Program Dashboard

**3/** Assigning Irrigation Program Shifts

**2/** Editing Irrigation Program Parameters

**4/** Selecting Dosing

## 7.1.1 Irrigation Program Dashboard

To create a new irrigation program, click on 'Insert new program'.

To edit an existing program – Click on the three dots of any program

### Irrigation Program Name

2. Tap the **checkbox** to enable (checked) or disable (unchecked) an irrigation program.

1. Tap the **Irrigation Programs** button to access the irrigation programs.

3. Tap the first empty line to define a new program

The Edit Program screen opens (see [Editing Irrigation Program Parameters](#)).

**Irrigation Method**  
Explained in chapter: General Program Settings.

**Amount of water to be used per shift, and total number of shifts per program**

**Date and time of next irrigation session**

Program Name	Method	Amount of water to be used per shift, and total number of shifts per program	Date and time of next irrigation session
1 Almond	Routine	00:20:00   2 Shifts	17.09.23   08:00
2 Apple	Routine	02:50:00   2 Shifts	17.09.23   07:00
+ Insert new program			
+ Insert new program			
+ Insert new program			
+ Insert new program			
+ Insert new program			
+ Insert new program			
+ Insert new program			
+ Insert new program			

### Alerts

See [Managing Alerts](#) for more information.

### Program Status

Shows one of the following program statuses:

Waiting in queue

In queue

Paused by Alarm

Paused by alarm

Manual paused

Manually paused

(Optional) Tap the **Menu** button and select **Edit** to change the irrigation program parameters (see [Editing Irrigation Program Parameters](#)).

## 7.1.2 Editing Irrigation Program Parameters

The Program screen opens when creating a new program or editing an existing one.

This screen enables defining irrigation program parameters and includes:

**GrowSphere™** by NETAFIM

Farm Mainline 1 Irrigation Simulation

Sat 16 Sep 2023 22:32:27

Program 03 ! 1 Program not activate! Activate

Type: Routine Amount (shift): 00:00 Factor: 100% Total: 00:00 | 0.00 m³ Last irrigation: None

Priority: Normal Unit: HH:MM Shifts (0) Dosing No recipe Settings Next irrigation: None

Start times ⓘ Irrigation

Start time	Trigger	Target	Max	Min
<input type="checkbox"/> 00:00	Time			
<input type="checkbox"/> 00:00	Time			
<input type="checkbox"/> 00:00	Time			
<input type="checkbox"/> 00:00	Time			
<input type="checkbox"/> 00:00	Time			

Date range: 16.09.23 to 16.09.23  No end

Schedule: Every (X) days, 1 day

Water before & after

Apply To	Unit	Before	After
Per shift	HH:MM	00:00	00:00

Irrigation Program Top Bar

General Program Settings

Date and Time Settings

Program Schedule Settings

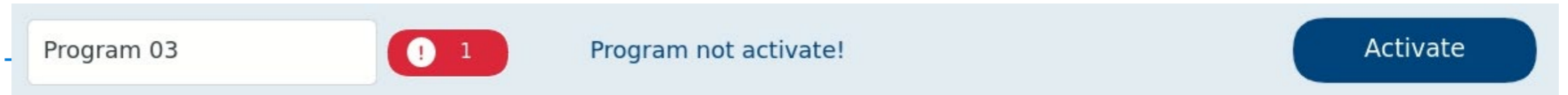
Water before and after

## Irrigation Program Top Bar

The irrigation program top bar changes depending on the state of the program as follows:

### Program is not running

Program can be activated following the initial settings by clicking Activate.



### Irrigation program is running

Options include Skip Options (Skip shift, Stop & Skip current irrigation, Skip next irrigation start time), or pausing the mainline.



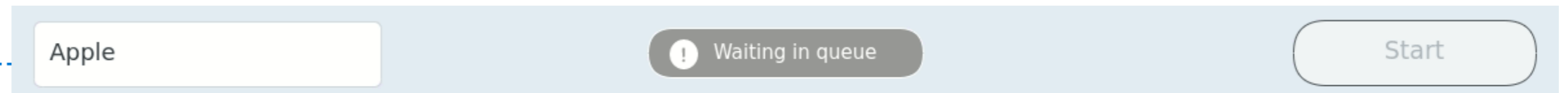
### Irrigation program is not running

Options include skipping the program (it will be placed in the queue) or starting the program.



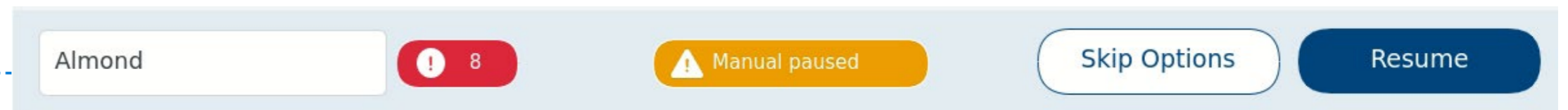
### Irrigation program is waiting in queue

The program become activated according to their order in the queue



### Irrigation program was manually paused

Options include Skip Options (skipping on the current or next program) and resume the program.



The Controller will generate alerts for the following conflicts when generating an irrigation program:

1. The program exceeds the Day End Time.
2. The total flow rate of an irrigation shift exceeds the maximal flow rate of the main line.
3. The total flow rate of an irrigation shift is below the minimal primary line flow rate.
4. An irrigation valve selected corresponds to a different main line.
5. The linked dosing recipe cannot be executed properly



## Manual Activation Start/Stop of Program

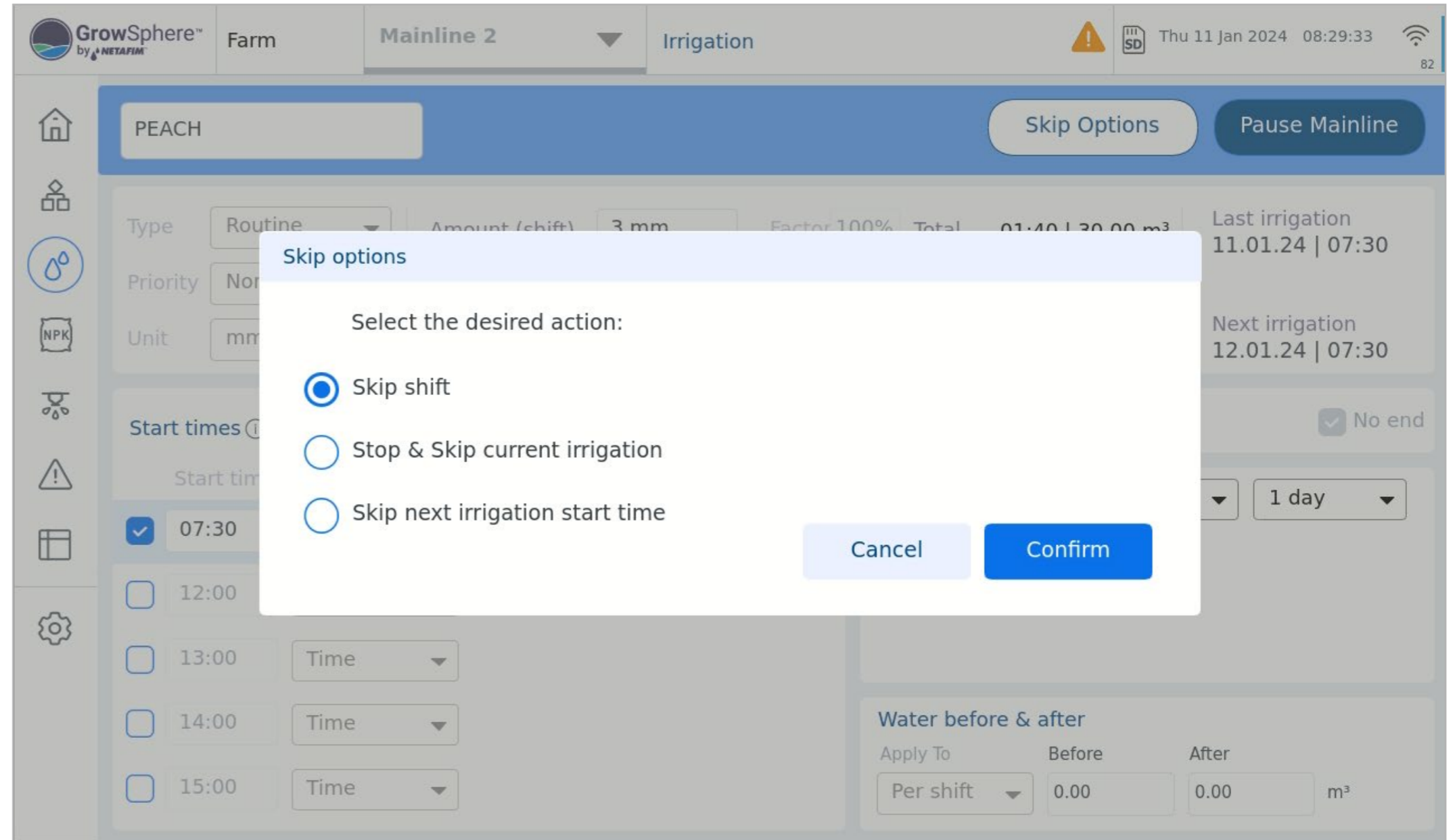
An irrigation program may be started manually by a user. If this program has a future start time and date, then the user must choose whether the program will run immediately instead of at the initially programmed start time or in addition to it. The user can select to skip the next start time. When the Irrigation program has more than one start time, only the next start time waiting to be activated will be skipped.

- The user selects whether the program runs now or at the set time and date. If the program runs now, it will wait until the current program is completed. If the user decides to cancel the irrigation program that is running, then the manual program will be executed.
- If the user wants to pause, skip a program or shift, or stop the program that is running, it keeps running until one of the following options is selected and confirmed:

1. Continue running, no change, and return to the previous screen
2. Pause the entire program, then confirm
3. End the entire program, then confirm
4. End the current irrigation shift and skip to the next shift in the sequence, then confirm. This happens when one or more shifts are in the sequence after the current shift (irrigation Vales). If it is the last shift in the irrigation program, then the program ends.

### NOTE

A shift can contain a single irrigation valve or a group of valves. A Shift can contain up to 16 irrigation valves. All the vales in a shift run simultaneously.



## General Program Settings

Perform the following steps to define the irrigation program's general settings:

### 1. Select the type

Options include One Time, Routine, Rolling and Emergency

**One-time Program** - The user can create a one-time program only for a one-time run. This program runs only on the specified day and time. Once execution is completed, it becomes inactive.

**Emergency Program** - The one with the highest priority, higher than any other programs designated with high priority. This program is executed immediately. Once completed, the Hydraulic Manager will resume the irrigation program that was paused.

**Rolling Program** - A regular program that has a Start Time, Start Date, and End Date, and it runs constantly in consecutive cycles. Once the last shift-irrigation ends, the sequence starts again.

**Routine program** - Operated routinely by date and time, and consists of Up to 5 start-times per day.

### 2. Select the priority

Enables designating the irrigation program's order in the queue. A **High** priority program is placed higher up in the queue and will thus execute before a **Normal** priority program.

### Amount

Displays amount of water used per irrigation shift (HH:MM).

### Total

Displays total amount of water to be irrigated and total irrigation time.

### Last/Next Irrigation

Displays the day/time when the last irrigation ended and when the next irrigation will start.

### 3. Select the unit

Enables defining the measurement unit. Options include: mm (millimeter), qty (quantity), and time (HH:MM or MM:SS).

### 4. Assign shifts

See [Assigning Irrigation Program Shifts](#)

### 5. Link a dosing recipe

See [Selecting Dosing](#)

**6. Set start/end time**, Triggers delays and radiation sensor (if directly wiring or weather station connected)

Fill up time for programs or shifts

## Date and Time Settings

Perform the following steps to define the irrigation program's time and parameters:

Start time	Trigger	Target	Max	Min
<input checked="" type="checkbox"/> 07:00	Time			
<input checked="" type="checkbox"/> 10:00	Rad Sum	0.0	00:00	00:00
<input type="checkbox"/> 15:00	none			
<input type="checkbox"/> 00:00	Time			
<input type="checkbox"/> 00:00	Cycle			
<input type="checkbox"/> 00:00	Rad Sum+			
<input type="checkbox"/> 00:00	Rad Sum			

### 3. Activate the irrigation start time(s)

A check mark indicates the irrigation start time is active. Up to five starting times can be activated in a 24-hour period.

### 4. Condition

To use Conditions – Please see the chapter: **Irrigation Programs – Conditions & Triggers**

Start time	Trigger
<input checked="" type="checkbox"/> 11:00	Conditions

### 2. Additional Settings

- **Target** – Target of radiation intensity to activate the irrigation cycle
- **Max** – Maximum radiation intensity beyond it irrigation will not be provided
- **Min** – Minimum radiation intensity under it irrigation will not be provided

### 1. Trigger

- **None** – Will use as an end to the previous start time without irrigation
- **Time** – By time
- **Cycle** – Every X time (set as a target)
- **Rad Sum +** - Start with irrigation and continue according to Rad sum thresholds
- **Rad Sum** – According to Radiation sum thresholds



## Program Schedule Settings

Perform the following steps to define the irrigation program's schedule:

### 1. Select one of the two scheduling options:

#### Week days

Irrigation occurs on specified days of the week, and the irrigation cycle can be either 1 or 2 weeks long.

### 2. Select whether irrigation includes only water (blue) or water and dosing (green), or no irrigation at all (None).

Tap the relevant day, The following menu appears, enabling selection of irrigation type:

### Click on the icon to skip between the next or previous week scheduling

#### Every (X) days

Irrigation occurs once every set number of days.



## Water before and after

Water before and after:

When a dosing recipe is linked to a shift, users can set delay options for Water Before and Water After using hh:mm:ss, m3, or THG units.

### 2. Select Time or Quantity

### 3. Define amount of time or quantity of water

### 1. Select Shift or Program

Defines whether water before and after delivery of fertilizer occurs before and after the irrigation program or for the shifts in the irrigation program.

### Water before & after

Apply To: Per shift ▼

Before: 00:00

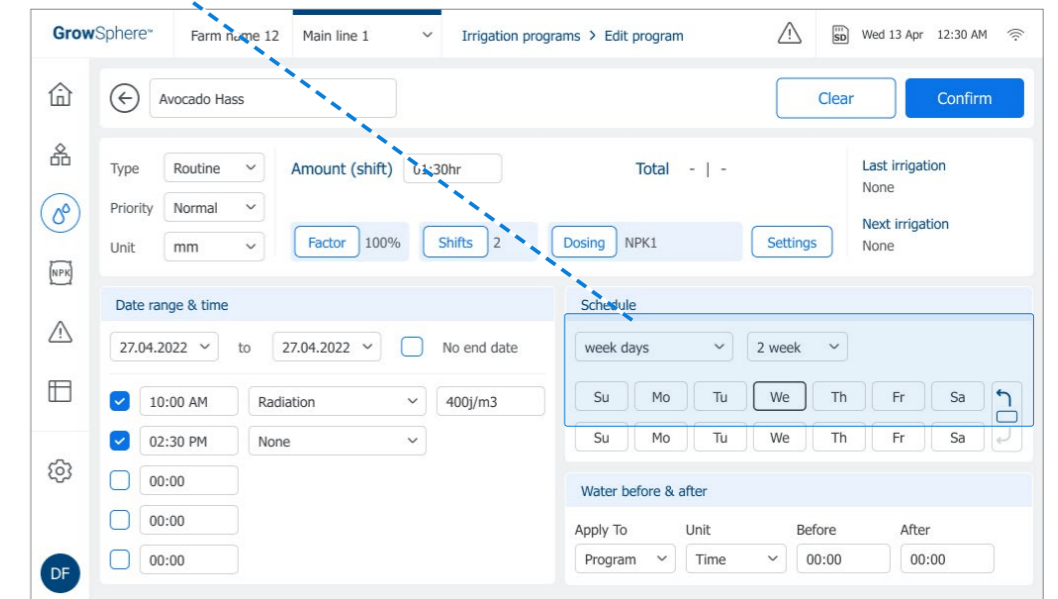
After: 00:00 mm:ss

#### Before

Dosing recipe starts to operate after the specified period or water quantity has been reached.

#### After

Irrigation continues without dosing for the set period of time or water quantity.



## 7.1.3 Assigning Irrigation Program Shifts

### Shifts Overview Screen

Perform the following steps to review, activate, add, edit, or delete shifts which are part of the irrigation program:

**1. Tap the Irrigation programs button in the irrigation program's general settings section (see [General Program Settings](#))**

A screen opens which enables managing shifts.

**2. Select the relevant shift(s)**

Select the check box of the shifts to be assigned to the irrigation program.

To change the order of the shifts, tap the **Reorder shifts** button (see [Reordering Shifts](#)).

**3. Tap the Add new shift button to create a new shift (see [Editing Shift Parameters](#)).**

Active	Shift name	Time ()	Factor(%)	Dosing	Valves	Flow (m³/h)	Duration left ()
<input checked="" type="checkbox"/>	Shift 01	03:59	100	For project book	2	50.0	23:39:14
<input checked="" type="checkbox"/>	Shift 02	03:59	100	For project book	2	50.0	03:59:00
<input checked="" type="checkbox"/>	Shift 03	03:59	100	For project book	2	50.0	03:59:00

**4. Review current shift information:**

- **Active:** Check mark indicates shift is active.
- **Shift status:** Colored bar indicates an active status of a shift.
- **Shift name:** The name of the shift.
- **Amount:** Water to be supplied per shift. Can be in mm, quantity, HH:MM or MM:SS (according to predefined units).
- **Factor:** Percentage to be added or reduced from the irrigation shift (100% is the predefined shift time or quantity).
- **Dosing:** Dosing recipe linked to the irrigation shift (see [Selecting Dosing](#)).
- **Valves:** Number of valves assigned to each shift.
- **Duration left (m3):** Amount of water until completion of a shift. .

## Editing Shift Parameters

This screen opens when editing a shift or creating a new one.  
Perform the following steps to edit the shift parameters:

### 1. Name the shift

Shift 03

### 2. Enter the amount of water used in the shift and the water budget factor

Time (HH:MM) 01:25

Factor(%) 100

### 3. Link a dosing recipe

Dosing No recipe

### NOTE

If a dosing recipe is selected for the entire irrigation program (see [Selecting Dosing](#)), it will override the dosing recipe selected here.

### 4. Select checkboxes of valves to be added to the shift

- 001 Almond1 66.0 m<sup>3</sup>/h
- 002 Almond2 65.0 m<sup>3</sup>/h
- 003 Almond3 60.0 m<sup>3</sup>/h
- 004 Almond4 55.0 m<sup>3</sup>/h
- 005 Apple1 30.0 m<sup>3</sup>/h
- 006 Apple2 30.0 m<sup>3</sup>/h
- 007 Apple3 30.0 m<sup>3</sup>/h
- 008 Apple4 30.0 m<sup>3</sup>/h

Valves assigned to a different shift are marked with a link icon.

### Total nominal flow rate

The nominal flow of the selected valves and the nominal flow of the main line. If the total flow rate of all selected valves exceeds the flow rate of the main line, the text becomes red.

### 5. Tap arrow buttons to view additional valves

< page 1 of page 1 >

Total nominal flow 60.0 m<sup>3</sup>/h out of 160.0 m<sup>3</sup>/h

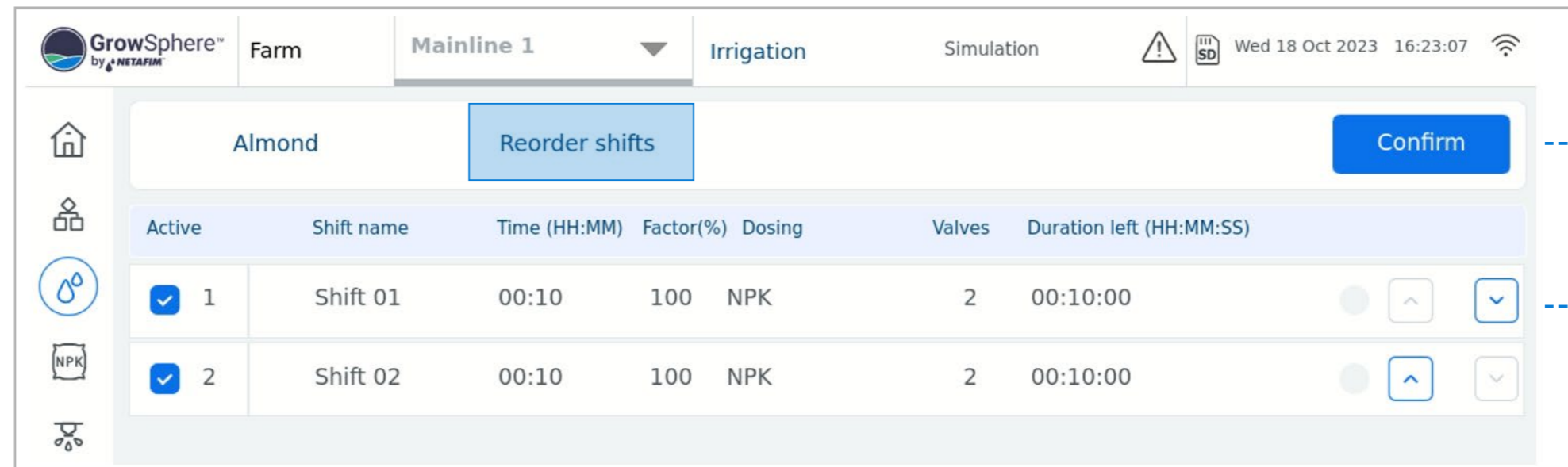
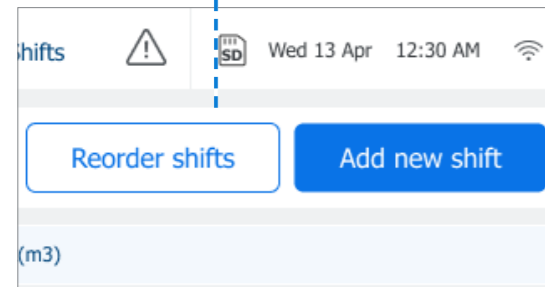
Done

### 6. Tap Done

## Reordering Shifts

The order of the shifts represents the sequence in which shifts are executed during an irrigation session. Perform the following steps to reorder shifts:

**1. Tap the Reorder shifts button in the Shifts Overview Screen**



**3. Tap Confirm to save changes**

**2. Tap the arrows to move shifts up and down**

**NOTE**

Irrigation proceeds according to the order of shifts in the list, starting from the top.



## 7.1.4 Selecting Dosing

Perform the following steps to link a dosing recipe to the irrigation program:

### 1. Tap the Dosing button in the irrigation's general settings section

A screen opens which enables the selection of a dosing recipe.

### 2. The Dosing screen opens

Enables the selection of a dosing recipe.

### 3. If no dosing is necessary, select No dosing

#### NOTES

- The dosing recipe selected here overrides the dosing recipe selected when creating a shift.
- For more information about dosing recipes, see [Managing Fertilizer Dosing](#).

### 4. Select a dosing recipe

### 5. Tap Save

## 7.2 Managing Fertilizer Dosing

This section reviews managing fertilizer dosing and includes:

**1** / Overview User Screen

**2** / Managing Dosing Recipes

## 7.2.1 Overview User Screen

When logged in as a technician, the Overview tab includes the following:

Verify the **Overview User** tab is selected.

**Target pH and Target EC**

Enables defining the dosing control method pH or EC (or both).

Verify the **Fertilizer Dosing** button is selected.

### Water Meter

Displays the water flow in either of the following:

- **Nominal:** The expected flow according to the opened valves.
- **Actual:** The water flow as measured by the water meter.

### EC/pH Channel Parameters

- **Sensor #1:** Reading of sensor #1.
- **Sensor #2:** Reading of sensor #2.
- **Average:** The average of pH sensors #1 and #2.
- **Target:** Enables defining the pH set point.
- **Control:** Enables selecting the reading will be used to control the EC/pH (can be one of the two sensors or the average of the two).

### Mixing Valve and Pre-EC

ID	Dosing Channel	On/Off	Reaction	Level	Method	Time left min	Quantity left L	Flow rate L/h
1			No Dosing.					
2			No Dosing.					
3			No Dosing.					
4			No Dosing.					

## Overview Technician Screen

When logged in as a technician, the Overview tab includes the following:

### pH Channel Parameters

- **pH:** Enables dosing control based on pH level.
- **pH #1:** Reading of pH sensor #1.
- **pH #2:** Reading of pH sensor #2.
- **Average:** The calculated pH level based on the average of pH sensors #1 and #2.
- **pH target:** Enables defining the pH set point.
- **Control:** Enables selecting the reading will be used to control the pH level (can be one of the two sensors or the average of the two).

ID	Dosing Channel	Tank level(%)	Reaction	Nominal flow(L/h)	Calculated flow(L/h)	DM flow (L/h)	DCH on (sec)	DCH off (sec)	Act deviation(%)	Low deviation(%)	High deviation(%)	Program (%)
1	DCH1	--	EC	60.00	0.00	60.00	1.80	1800.00	0.00	30.00	40.00	--
2	DCH2	--	EC	60.00	0.00	60.00	1.80	1800.00	0.00	30.00	40.00	--
3	DCH3	--	EC	60.00	0.00	60.00	1.80	1800.00	0.00	30.00	40.00	--
4	DCH4	--	Acid	60.00	0.00	60.00	1.80	1800.00	0.00	30.00	40.00	--

### Dosing Channel Parameters

- **Tank Level (%):** Indicates the amount of fertilizer in the storage tank.
- **Reaction:** Defines the kind of reaction effecting the EC/pH control expect from the fertilizer in the tank.
  - **Passive:** Fluid that does not affects the EC/pH control.
  - **EC:** Fertilizer that will increase the EC value.
  - **Acid:** Lowers the pH.
  - **Alkaline:** Increases the pH.
- **Nominal Flow:** Dosing channel flow capacity.
- **Calculated Flow:** Actual dosing channel flow rate, as calculated by the controller.
- **DM Flow:** Flow rate measured by the dosing flow meter.
- **DCH On:** Amount of time that the dosing channel's dosing valve is on, as calculated by the controller.
- **DCH Off:** Amount of time that the dosing channel's dosing valve is off, as calculated by the controller.
- **Act Deviation (%):** Correction of the calculated dosing channel cycle time (On/Off) and programmed cycle time. It is a dynamic value calculated by the Controller.
- **Low and High Deviation (%):** Define the low and high deviation allowed during EC/pH control. In this case, the dosing ratio (proportion) can be adjusted to reach a stable value within the defined thresholds.
- **Program %:** Percentage that the valve was programmed to be open on its dosing recipe for each dosing channel.



## 7.2.2 Managing Dosing Recipes

### Dosing Recipe Overview Screen

This screen displays all existing dosing recipes. Perform the following steps to manage dosing recipes:

#### 2. Tap the Recipes tab

#### 1. Tap the Fertilizer Dosing button

#### 3. Activate the relevant dosing recipes

Inactive recipes are grayed out.

Controller name	Mainline 1	19°F	Wed 13 Apr 2023 12:30 AM
Recipes	Overview	General settings	Channels settings
<input checked="" type="checkbox"/>	1 NPK 1	1 Irrigation programs connected	⋮
<input checked="" type="checkbox"/>	1 NPK 1		⋮
<input checked="" type="checkbox"/>	3 Blueberries	21 Irrigation programs connected	⋮
<input checked="" type="checkbox"/>	4 Lemons	9 Irrigation programs connected	⋮
<input type="checkbox"/>	5 Leamon	3 irrigation programs connected	⋮
<input type="checkbox"/>	6 Leamon		⋮
<input checked="" type="checkbox"/>	7 NPK 1		⋮
<input checked="" type="checkbox"/>	8 New Netafim	1 Irrigation programs connected	⋮
<input type="checkbox"/>	9 Leamon	3 irrigation programs connected	⋮
<input checked="" type="checkbox"/>	1 NPK 1		⋮

#### Linked Irrigation Programs

The number of irrigation programs a dosing recipe is connected to. An icon is displayed when a recipe is connected to at least one irrigation program.

#### 5. Edit Existing Dosing Recipe

Tap the relevant recipe to edit its parameters, or tap the **Menu** button and select **Edit** (see [Configuring Dosing Recipes](#)).

#### **NOTE**

To create a new dosing recipe, tap the **Menu** button on the empty row and select **Edit**.

## Configuring Dosing Recipes

This screen opens when creating a new dosing recipe or editing existing one. Perform the following steps to configure dosing recipes:

### 1. Name the dosing recipe

The system provides a default name, but you can edit it and provide a more meaningful name.

### 2. Activate the relevant dosing channels

Tap the **Programs linked** button to navigate to the Irrigation Dashboard.

### 3. Target EC, target pH

Displays the defined target EC/pH values.

### 4. Define the following parameters:

For each dosing channel, the following parameters can be defined.

- **Method:** Options include:

- **1/1000:** The fertilizer is injected in proportion to the water flowing in the main line. The proportion is defined using a ratio of 1 liter of fertilizer for 1000 liters of water (useful when irrigation room is very close to field).

- **Spread:** Determines amount of fertilizer to be injected during the predefined time of the irrigation.

- **Bulk:** Amount of fertilizer that will be injected constitutently during an irrigation shift. The amount can be set by time or quantity. Selected when irrigation room is far away from the field and the fertilizers are mixed with large amount of water in the distribution pipes.

The method By pulse is like a 1/1000 (proportional) but the dosing quantities are controlled by the dosing meter.

Active	ID	Dosing channel	Method	Quantity / Time	Value	DM control
<input checked="" type="checkbox"/>	1	Fertilizer 1	1/1000	Quantity	8.00 L	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	2	Fertilizer 2	1/1000	Quantity	8.00 L	<input type="checkbox"/>
<input type="checkbox"/>	3	Fertilizer 3				
<input checked="" type="checkbox"/>	4	Fertilizer 4	1/1000	Quantity	8.00 L	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	5	Fertilizer 5	1/1000	Quantity	8.00 L	<input checked="" type="checkbox"/>
<input type="checkbox"/>	6	Fertilizer 6				
<input type="checkbox"/>	7	Fertilizer 7				
<input type="checkbox"/>	8	Fertilizer 8				

GrowSphere™ by NETAFIM™ Controller name **Mainline 1** 19°F Wed 13 Apr 2023 12:30 AM

NPK 1 Linked Programs - Targets EC 0.0 pH 00.0 PRE EC 0.0

Active	ID	Dosing channel	Method	Quantity / Time	Value	DM control
<input checked="" type="checkbox"/>	1	Fertilizer 1	1/1000	Quantity	8.00 L	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	2	Fertilizer 2	1/1000	Quantity	8.00 L	<input type="checkbox"/>
<input type="checkbox"/>	3	Fertilizer 3				
<input checked="" type="checkbox"/>	4	Fertilizer 4	1/1000	Quantity	8.00 L	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	5	Fertilizer 5	1/1000	Quantity	8.00 L	<input checked="" type="checkbox"/>
<input type="checkbox"/>	6	Fertilizer 6				
<input type="checkbox"/>	7	Fertilizer 7				
<input type="checkbox"/>	8	Fertilizer 8				

**5. Continue defining the following parameters:**

- **Quantity / Time:** Options include:
  - **Quantity:** Calculates fertilizer quantity to be distributed within a specified amount of water during an irrigation shift. The Controller calculates how to spread fertilizer quantity, specified in the active dosing recipe in the amount of water of the irrigation shift.
  - **Time:** Calculates the fertilizer quantity to be distributed during an irrigation shift. The 'ON' time and 'OFF' time between pulses are calculated, and takes into account minimal ON delay-time of the dosing channel.
- **Value:** The irrigation quantity according to the selected Method.
- **DM Control:** Defines the following alert options:
  - **On:** Provides alert of both dosing quantity and dosing flow.
  - **Off:** Provides alert of dosing flow only.

## 7.3 Viewing Logs

This section reviews system event logs and includes:

**1/** Irrigation Logs

**2/** Uncompleted Irrigation Log

**3/** Accumulation events

**4/** Meters Accumulation Events Logs

**5/** Alarm Logs events

**6/** Filter Logs

**7/** Events Logs

**8/** Pumps Alarm Logs

Logs are generated for different events, presented on a dedicated Logs screen, and saved on the SD card. The main logs are:

- Irrigation events and uncompleted irrigation events
- Accumulation of water and dosing amounts for all irrigation valves
- Meters accumulation, such as water meter or fertilizer meter, etc.
- Filter flushing events
- Irrigation events include when a valve closes, a pump stops, dosing starts, etc.
- Using multiple filter options, such as Between, Equals, Greater / less than, and Reorder and sorting columns is optional.



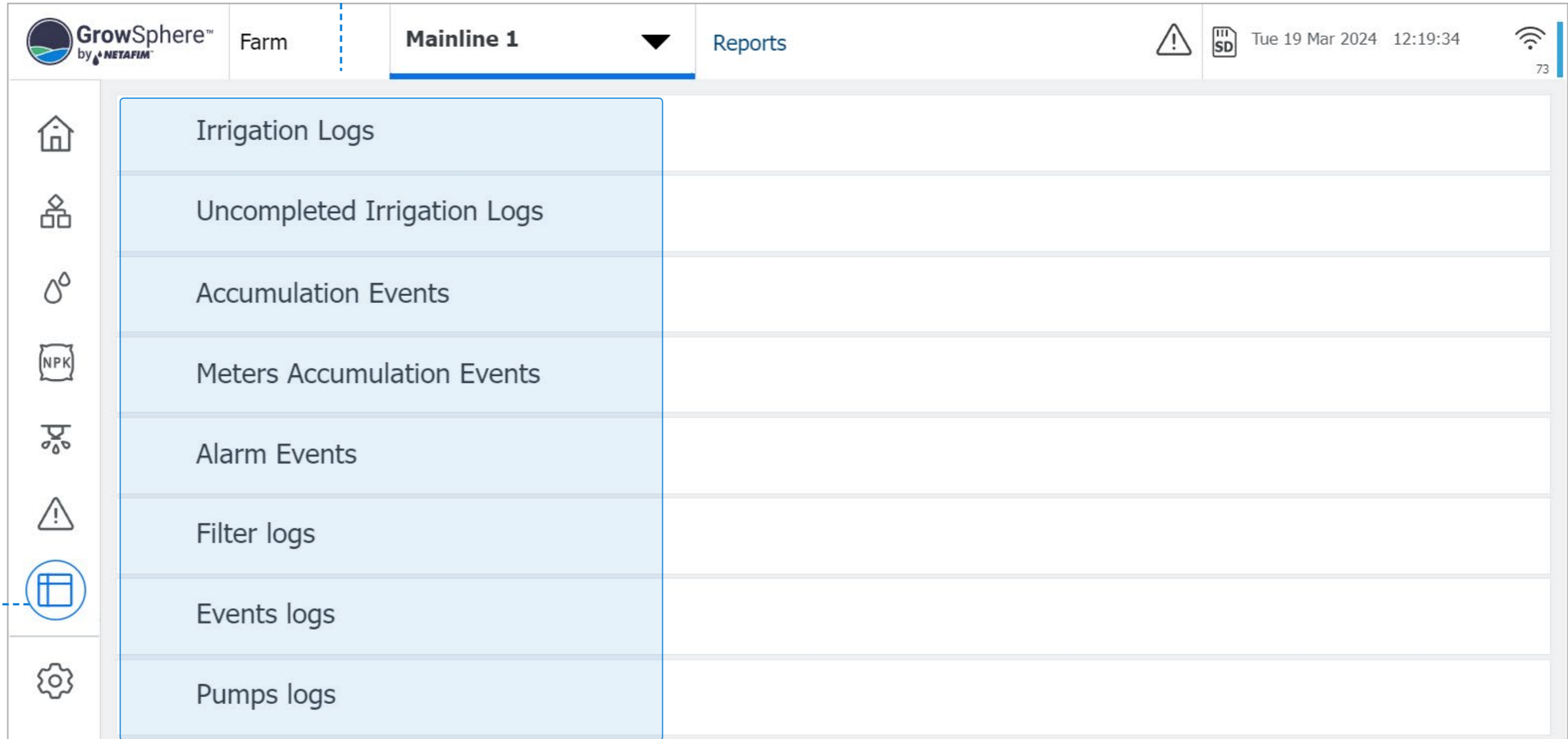
## Accessing Logs

Perform the following steps to view a log:

### 2. Select a log from the list

Select the relevant type of log report you wish to view.

### 1. Tap the Reports button



## 7.3.1 Irrigation Logs

Perform the following steps to view a log of irrigation shifts which completed successfully:

**2. Select Irrigation Logs from the list of logs (see [Accessing Logs](#))**

**1. Tap the Reports button**

**3. Select date**  
See [Selecting Date](#).

**4. Review irrigation log details:**

General													
Program	Compl	Valve	Date	Start	Trigger	Shift	Duration, hh:mm	Qty, m <sup>3</sup>	mm	m <sup>3</sup> /h	Recipe	pH Avg	
ORCHARD	N	POM	01.01.2024	21:34:10	Time	1	00:21:59	0.008	0.001	0.02	538 1L	7.8	✗
ORCHARD	N	PEACH	01.01.2024	21:34:10	Time	1	00:21:59	0.008	0.001	0.02	538 1L	7.8	✗
ORCHARD	N	CITRUS	01.01.2024	21:34:10	Time	1	00:21:59	0.008	0.001	0.02	538 1L	7.8	✗
HERB	Y	HERB	01.01.2024	20:52:17	Time	1	00:41:52	0.073	0.007	0.1	538 1L	7.8	✓
HERB	N	HERB	01.01.2024	09:43:01	Time	1	00:03:00	0.002	0	0.04	538 1L	7.6	✗

**NOTE**

A new record is added to the irrigation log when an irrigation shift ends.

- Irrigation status icon:** Indicates a valve's irrigation status. Options include:
  - ✓ Set irrigation amount was attained
  - ✗ Set irrigation amount was not attained
- Program:** Irrigation program to which the shift belongs.
- Completed:** Irrigation was completed (Yes) or not (No).
- Valve:** Irrigation valve name.
- Date:** The date when the irrigation shift occurred.
- Start:** Start time of the irrigation shift.
- Trigger:** The trigger which started the irrigation shift.
- Shift:** Shift number.
- Duration:** Total irrigation shift time.
- Qty/m<sup>3</sup>:** Water quantity delivered by the valve.
- mm:** Water quantity set for the irrigation program or shift. This quantity is the same for all valves in the shift.
- m<sup>3</sup>/h:** Average flow rate during irrigation shift as measured by the main line water meter. If the main line doesn't have a water meter, this value will be the sum of the flow rate of all valves in the shift.

## Irrigation Logs

### 4. Review irrigation log details (cont.):

- **Recipe:** The dosing recipe linked to the irrigation shift.
- **pH Avg:** The average pH measured during the shift.
- **EC Avg:** The average EC measured during the shift.

### Dosing Channels:

The amount of fertilizer injected during the shift relevant for each dosing channel:

- **Planned:** The planned amount calculated according to the recipe.
- **Actual:** The actual metered amount.

GrowSphere™ by NETAFIM		Farm	Mainline 1	Reports		Mon 01 Jan 2024 23:13:00					
Irrigation Logs		01.01.2024		Refresh		page 1 of page 1					
				1. DCH1.1		2. DCH1.2		3. DCH1.3			
Program	Compl	Valve	Recipe	pH Avg	EC Avg	Planned	Actual	Planned	Actual	Planned	Actual
ORCHARD	N	POM	538 1L	7.8	1.4						0.03
ORCHARD	N	PEACH	538 1L	7.8	1.4						0.03
ORCHARD	N	CITRUS	538 1L	7.8	1.4						0.03
HERB	Y	HERB	538 1L	7.8	1.4						0.18
HERB	N	HERB	538 1L	7.6	0.0						0.11

## Dosing Logs

Perform the following steps to view a log of dosing events:

**2. Select Irrigation Logs** from the list of logs (see [Accessing Logs](#))

**1. Tap the Reports button**

**3. Select date**

See [Selecting Date](#).

**4. Review dosing log details:**

Program	Compl	Valve	Date	Start	Trigger	Shift	Duration, hh:mm	Qty, m <sup>3</sup>	mm	m <sup>3</sup> /h	Recipe	pH Avg
ORCHARD	N	POM	01.01.2024	21:34:10	Time	1	00:21:59	0.008	0.001	0.02	538 1L	7.8
ORCHARD	N	PEACH	01.01.2024	21:34:10	Time	1	00:21:59	0.008	0.001	0.02	538 1L	7.8
ORCHARD	N	CITRUS	01.01.2024	21:34:10	Time	1	00:21:59	0.008	0.001	0.02	538 1L	7.8
HERB	Y	HERB	01.01.2024	20:52:17	Time	1	00:41:52	0.073	0.007	0.1	538 1L	7.8
HERB	N	HERB	01.01.2024	09:43:01	Time	1	00:03:00	0.002	0	0.04	538 1L	7.6

- **Irrigation status icon:** Indicates a valve's irrigation status. Options include:
  - ✓ Set irrigation amount was attained.
  - ✗ Set irrigation amount was not attained.
- **Valve:** Irrigation valve number.
- **Completed:** The irrigation was completed (Yes) or not (No).
- **Recipe:** The dosing recipe linked to the shift.
- **Date:** The date when the irrigation shift occurred.
- **Start:** Start time of the irrigation shift.
- **Duration:** Total irrigation shift time.
- **Qty/m<sup>3</sup>:** Water quantity delivered by the valve.
- **mm:** Water quantity set for the irrigation program or shift. This quantity is the same for all valves in the shift.
- **m<sup>3</sup>/h:** Average flow rate during irrigation shift as measured by the main line water meter. If the main line doesn't have a water meter, this value will be the sum of the flow rate of all valves in the shift.



## 7.3.2 Uncompleted Irrigation Logs

Perform the following steps to view a log of irrigation events which were not completed:

**3. Select date**  
See [Selecting Date](#).

**2. Select Uncompleted Irrigation Logs from the list of logs (see [Accessing Logs](#))**

**1. Tap the Reports button**

**4. Review uncompleted irrigation log details:**

- **Valve:** Valve number.
- **Reason:** The reason why the irrigation shift was not completed.
- **Program:** Irrigation program to which the shift belongs.
- **Date:** The date when the irrigation shift occurred.
- **Start:** Irrigation event start time.
- **Recipe:** The dosing recipe linked to the irrigation shift.

General							Duration, hh:mm		Qty, m <sup>3</sup>		
Valve	Reason	Program	Date	Start	Trigger	Recipe	Left	Planned	Left	Planned	Left
POM	Midnight	ORCHARD			Time	538 1L	02:00:00	02:00:00	0.4	0.4	0.04
PEACH	Midnight	ORCHARD			Time	538 1L	02:00:00	02:00:00	0.4	0.4	0.04
CITRUS	Midnight	ORCHARD			Time	538 1L	02:00:00	02:00:00	0.4	0.4	0.04

## Uncompleted Irrigation Logs

General			mm		m <sup>3</sup> /h	1. DCH1.1		2. DCH1.2		3. DCH:	
Valve	Reason	Program	Left	Planned	AVG	Left	Planned	Left	Planned	Left	Planned
POM	Midnight	ORCHARD	0.04	0.04	0						
PEACH	Midnight	ORCHARD	0.04	0.04	0						
CITRUS	Midnight	ORCHARD	0.04	0.04	0						

### 4. Review uncompleted irrigation log details (cont.):

Each of the following parameters includes two values: amount left and amount planned.

- **Duration:** Irrigation shift time.
- **Qty/m<sup>3</sup>:** Water quantity delivered by the valve.
- **mm:** Water quantity set for the irrigation program or shift. This quantity is the same for all valves in the shift.
- **m<sup>3</sup>/h:** Average flow rate during irrigation shift as measured by the main line water meter. If the main line doesn't have a water meter, this value will be the sum of the flow rate of all valves in the shift.

#### Dosing Channels:

The amount of fertilizer injected during the shift relevant for each dosing channel:

- **Planned:** The planned amount calculated according to the recipe.
- **Actual:** The actual metered amount.

### 7.3.3 Accumulation events

Perform the following steps to view a log of the filter flushing:

General					Channels				
1 Valve	2 Start date	3 Duration, hh:mm	4 mm	5 Qty, m <sup>3</sup>	1 (L)	2 (L)	3 (L)	4 (L)	5
VLV3.4	26.10.2024	03:56:59	7.9	79.04	0	0	0	0	0
VLV3.3	26.10.2024	03:56:59	7.9	79.04	0	0	0	0	0
VLV3.2	26.10.2024	03:56:59	7.9	79.03	0	0	0	0	0
VLV3.1	26.10.2024	03:56:59	7.9	79.03	0	0	0	0	0

1. Valve ID
2. Start date of the event
3. Duration of the event
4. QTY in mm
5. QTY in m<sup>3</sup>
6. Channels - Dosing channels

## 7.3.4 Meters Accumulation Events Logs

Perform the following steps to view the amount of water that was flowing through the water meter:

**2. Select Meters Accumulation Events from the list of logs (see [Accessing Logs](#))**

**1. Tap the Reports button**

**3. Select date**

See [Selecting Date](#).

**4. Review meter accumulation log details:**

- **Meter:** Name of the meter.
- **Start Date:** The date when the irrigation shift occurred.
- **Qty/m3:** The amount of water (M3) irrigated.

Meter	Start date	Qty, WM-m³ DM-L
DMTR1.4	18.03.2024	0
DMTR1.3	18.03.2024	0
DMTR1.2	18.03.2024	0
DMTR1.1	18.03.2024	0
WMTR1.1	18.03.2024	31.377

**NOTE**

The system accumulates the amounts of water/fertilizers on a daily basis and resets its counters at midnight.



## 7.3.5 Alarm Logs

This log displays alarm log reports, as selected by date.

**2. Select Alarms Report from the list of logs (see [Accessing Logs](#))**

**3. Select date**  
See [Selecting Date](#).

**4. Review alarm log details:**

**1. Tap the Reports button**

Status	Severity	Reset by	Date & Time	Description	Source	Device	Program	Shift
Reset	N		18.03.2024   14:30:42	No Flow	M.line 1	WMTR1.1	Program 02	1
Untriggered	N		18.03.2024   14:29:38	Low Flow	M.line 1	WMTR1.1	Program 02	1
Untriggered	N		18.03.2024   14:29:38	Minimum Flow	M.line 1	WMTR1.1	Program 02	1
Triggered	N		18.03.2024   14:29:37	No Flow	M.line 1	WMTR1.1	Program 02	1
Triggered	N		18.03.2024   14:29:37	Low Flow	M.line 1	WMTR1.1	Program 02	1
Triggered	N		18.03.2024   14:29:37	Minimum Flow	M.line 1	WMTR1.1	Program 02	1
Reset	N		18.03.2024   14:27:08	No Flow	M.line 1	WMTR1.1	Program 02	1

- **Status:** Alerts status
- **Number:** Alarm number.
- **Severity:** Alert severity. Options include:
  - Critical
  - Not critical
- **Reset By:** Name of the logged in user who reset the alert.
- **Date & Time:** The date & time when the irrigation shift occurred.
- **Description:** Description of the alert.
- **Source:** the mainline.
- **Device:** The specific device which triggered the alert.
- **Program:** The name and number of the irrigation program which was running when the alert was triggered.
- **Shift:** shift number inside the program.

## 7.3.6 Filter Logs

Perform the following steps to view a log of the filter flushing:

**2. Select Filter Logs**  
from the list of logs  
(see [Accessing Logs](#))

**1. Tap the Reports button**

**3. Select date**

See [Selecting Date](#).

**4. Review filter log details**

- **Date:** Date irrigation occurred.
- **Start time:** Time irrigation started.
- **Flushing trigger:** The time when the filter flushing was triggered.

GrowSphere™ by NETAFIM

Controller name **Mainline 1**

19°F

Wed 13 Apr 2023 12:30 AM




Filter Logs

21.03.23 Refresh page 1 of page 10

NO	Date	Start time	Flushing trigger
1	21.03.23	21:00	Sensor
1	21.03.23	21:00	Time
1	21.03.23	21:00	Qty
1	21.03.23	21:00	Manual
1	21.03.23	21:00	Manual
1	21.03.23	21:00	Manual
1	21.03.23	21:00	Manual
1	21.03.23	21:00	Manual
1	21.03.23	21:00	Manual
1	21.03.23	21:00	Manual

GS

## 7.3.7 Events logs

GrowSphere™ by NETAFIM™		Farm	Mainline 1	Reports	  Tue 15 Oct 2024 09:56:01 
<div style="display: flex; justify-content: space-between; align-items: center;"> <span>← Irrigation events</span> <span>&lt; 15.10.2024 &gt;</span> <span>Refresh</span> <span>&lt; page 1 of page 3 &gt;</span> </div>					
Date <b>1</b>	Time <b>2</b>	Description <b>3</b>	Device <b>4</b>	Source <b>5</b>	
15.10.2024	09:05:02	Pump Start	P2		
15.10.2024	09:02:02	Pump Stop	P3		
15.10.2024	09:01:02	Pump Stop	P1		
15.10.2024	09:00:09	Closed	Almond2	Main line 1	
15.10.2024	09:00:08	Dosing Start	Dosing station	Main line 1	
15.10.2024	09:00:08	Opened	Almond4	Main line 1	
15.10.2024	09:00:03	Closed	almond1	Main line 1	

**1. Date of the irrigation event**

**2. Time – of the irrigation event**

**3. Description – of the event during the irrigation**

**4. Device – Device in operation**

**5. Source – Mainline ID of the specific event**

## 7.3.8 Pump logs

Date <b>1</b>	Start time <b>2</b>	Pump <b>3</b>	Duration <b>4</b>	Qty mm <b>5</b>	Qty m3 <b>6</b>
14.10.2024	23:58:59	3	01:53:51	0	0
14.10.2024	23:58:59	2	03:50:22	0	0
14.10.2024	23:58:59	1	02:01:52	0	0

**1. Date of the pump event**

**2. Start time – of the pump event**

**3. Pump – ID of the pump**

**4. Duration – of pump event**

**5. QTY mm – Delivered in mm during the event**

**6. QTY Q<sup>3</sup> – Delivered in Q3 during the event**



## 7.4 Resetting Accumulation

Perform the following steps to reset accumulation counters:

**3. Tap the Reset Accumulation tab**

**4. Tap Reset**

The specific counter will be reset.

**1. Tap the Configuration button**

**2. Select Admin**

**5. Tap Reset All Counters**

All counters will be reset.

The screenshot shows the GrowSphere MAX Admin interface. At the top, it displays 'Farm Mainline 4 Admin' with a warning icon and the date/time 'Thu 19 Oct 2023 13:34:34'. Below this is a navigation bar with tabs: Simulator, **Accumulations**, Events, Test, and System. The main area contains a table of counters:

Counter Type	Value	Daily Accumulated	Total Accumulated	Reset Button	Reset All Counters Button
Water Meter	—	Daily Accumulated: 0.0 m³	Total Accumulated: 0.7 m³	Reset	
Dosing Meter	- ▼	Daily Accumulated: 0.0 L	Total Accumulated: 0.0 L	Reset	Reset All Counters
Pump	—	Daily Accumulated:	Total Accumulated:	Reset	Reset All Counters
Valve	2	Daily Accumulated: 0.0 m³	Total Accumulated: 0.1 m³	Reset	Reset All Counters
Source A	—	Daily Accumulated: 0.0 m³	Total Accumulated: 0.0 m³	Reset	
Preferences		Daily Accumulated: 0.0 m³	Total Accumulated: 0.0 m³	Reset	

At the bottom left, a settings menu is open, showing 'Preferences', 'Settings', and **Admin** (which is selected).

## 7.5 System Testing

This section reviews testing of the system and includes:

**1** / **Simulating Flow Rates and Sensor Values**

**2** / **Testing Devices**

## 7.5.1 Simulating Flow Rates and Sensor Values

Perform the following steps to perform a simulation of valves/pumps operation, sensors indications, and flow rates:

When testing without hydraulic components (valves, water/dosing meters, EC/pH & Pressure sensors) in order to properly run the system without alarm, you would require to set-up simulation mode:

This tab is separated to 3 main parts:

### 1. Water + Dosing meters

In this section you can configure your main water meter as well as dosing meters parameters:

- **Liter/Pulse:** automatically pulled from settings
- **Flow:** the required flow
  - M.WM Manual/Auto Flow
  - Unchecked – manually input main flow
  - Checked – automatically pulls the nominal flow for each shift according to the shift's valves

**2. Off delay:** a time delay in which pulses will be generated after the valve is off (designed to simulate dosing meter inertia)

### 3. Auto/On/Off

- Auto – pulses will be generated when the respected valve/channel is open
- On – pulses will be generated all the time
- Off – no pulses will be generated

**4. EC + pH Sensors:** configure you EC/pH levels

**5. Pressure:** configure you pressure sensors levels (in Bar)

Finally, turn the simulator on by pressing the On Button, an indication for working in simulation mode will appear in the top bar

### 3. Tap the Simulator tab

	Liter/Pulse	Flow	Off delay (sec)	Pulse/Min	Auto	On	Off
Main W.M	0.00	0 m³/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
DM_1	0.00	1 L/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
DM_2	0.00	1 L/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
DM_3	0.00	1 L/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
DM_4	0.00	1 L/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
DM_5	0.00	1 L/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
DM_6	0.00	1 L/h	0	0.0	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

1. Tap the Configuration button

2. Select Admin and type your credentials

4. Tap On

5. Adjust the parameters

## 7.5.2 Testing Devices

This screen is useful to manually operate or test the devices connected to the output modules and read the indications received from sensors and other devices connected to the inputs modules. Verify the following to manually test the system devices:

### C. Tap the Test tab

GrowSphere™ by NETAFIM

Controller name: All mainlines

19°F

Wed 13 Apr 2023 12:30 AM

Events			Reset Accumulation			Simulator		Test		System			
PM5052			DO572 - 1			DAI561 - 1		DI562 - 1		PM5052			
I/O	Device	Test	I/O	Device	Test	I/O	Device	value (mA)	I/O	Device	I/O	Device	
●	DI 0	M.WM	●	DO 0	DCH_1		AI 0	EC1	0		●	DI 0	VLV_
●	DI 1	WM_1	●	DO 1	DCH_2		AI 1	pH1	2		●	DI 1	VLV_
●	DI 2	WM_2	●	DO 2	DCH_3		AI 2	PT1	10		●	DI 2	VLV_
●	DI 3	WM_3	●	DO 3	DCH_4		AI 3	PT2	20		●	DI 3	VLV_
●	DI 4	WM_4	●	DO 4	DCH_5						●	DI 4	VLV_
●	DI 5	WM_5	●	DO 5	DCH_6						●	DI 5	VLV_
			●	DO 6	DCH_7						●	DI 6	VLV_
			●	DO 7	DCH_8						●	DI 7	VLV_
											●	DI 8	VLV_
											●	DI 9	VLV_
			●	DI 9	-								

### D. Tap the Test button

Tap the **Test** button of the relevant output to activate it. When the output is on, the Test button turns blue. Verify that the device is functioning correctly.

### A. Tap the Configuration button

### B. Select Admin and type your credentials



## 7.6 Monitoring Irrigation

This section reviews monitoring irrigation and includes:

**1/** **Selecting the Mainline**

**2/** **Irrigation Dashboard**

**3/** **Monitoring Valves**

**4/** **Irrigation Analytics**

**5/** **Managing Irrigation  
Program Queue**

## 7.6.1 Selecting the Mainline

Perform the following to select the relevant mainline to open the SCADA screen:

### 1. Select the relevant mainline

Select the relevant mainline to open the SCADA screen.

The screenshot shows the GrowSphere MAX SCADA interface for Farm name 12, Main Line 1. The interface displays four mainlines with their respective irrigation details and status.

Mainline	Irrigation	Flow	Pressure	Amount	Dosing	Shift	Next in Q	Status
Mainline 1	Pomme (dame rose)	50 m3/h	1 Bar	3 mm	NPK1	3/24	--	Paused by Alert
Mainline 2	Apple (pink lady)	30 m3/h	1.5 Bar	05:30 hr	Pink lady	6/8	Orange	Active
Mainline 3	Avocado Hass Su	10 m3/h	2 Bar	15m <sup>3</sup>	Hass	4/10	--	Active
Mainline 4	--	--	--	--	--	--	--	Inactive

## 7.6.2 Irrigation Dashboard

The irrigation dashboard includes the following:

### Tap the General tab

### Display the SCADA

To access the irrigation SCADA, verify the **SCADA** button is selected.

### System devices

Indicates the devices statuses and enables setup/manual activation.

### Current running program

Includes live information of the running program.

### Top bar

When an irrigation program is running, buttons enable pausing the program, skipping the current shift, or stopping the program.



### Dosing recipes

Displays the dosing recipe in use, the dosing unit devices, and information regarding the dosing channels.

## Manual Operation

Perform the following steps to enable manual operation of the pump, main valve, booster pump, and dosing channel:

### 1. Tap the relevant device

A dropdown menu is displayed.

### 2. Select the device state

Output device can be set to:

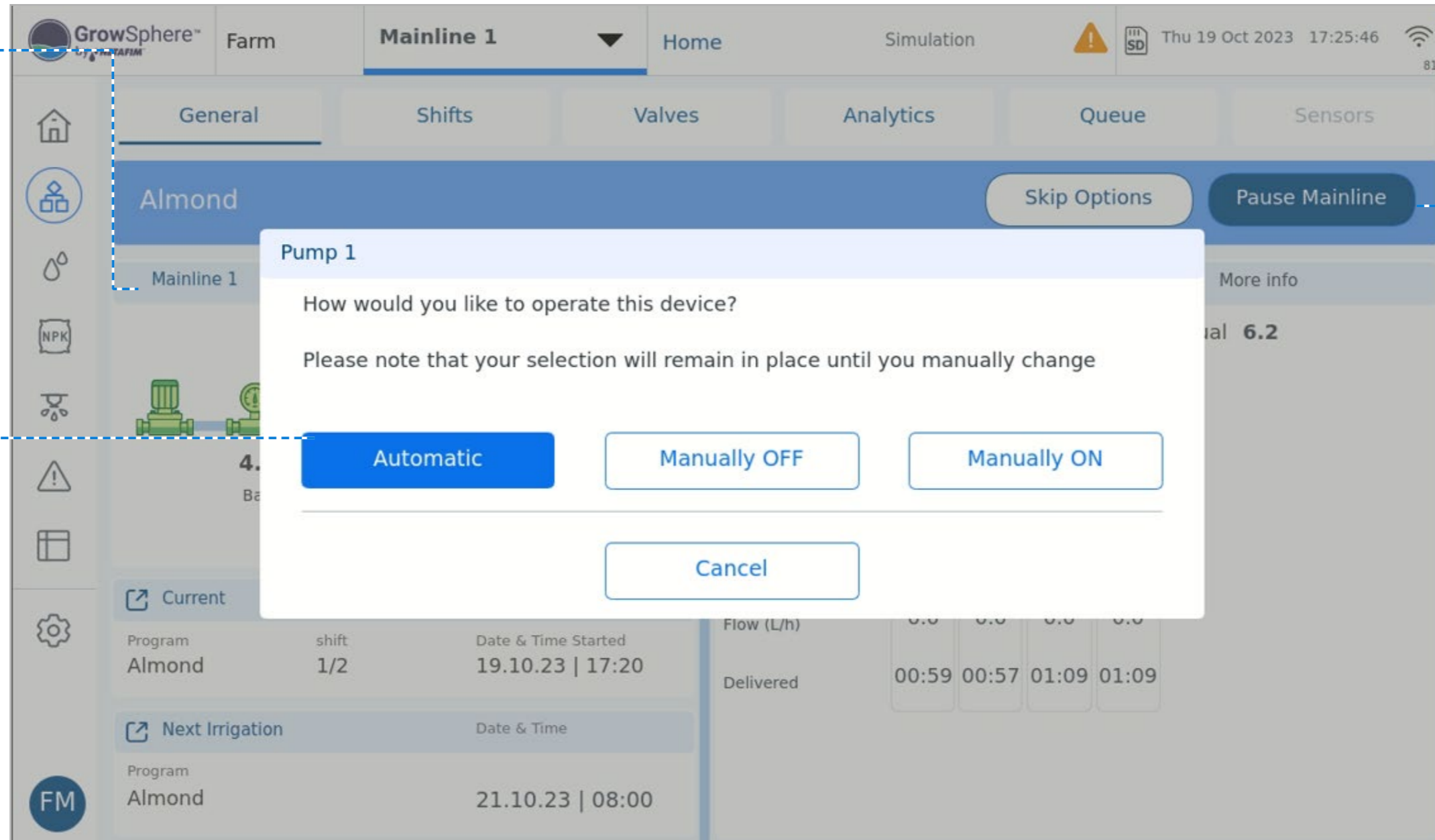
- Auto** - Device is activated according to the irrigation program.

- Manual On** - Device is activated.

- Manual Off** - Device is turned off.

### 3. Verify device state

 The icon indicates that the device is in Manual mode.



### Pause Mainline

Tap to pause the program.

### NOTE

The device remains in manual mode until it is set back to automatic.

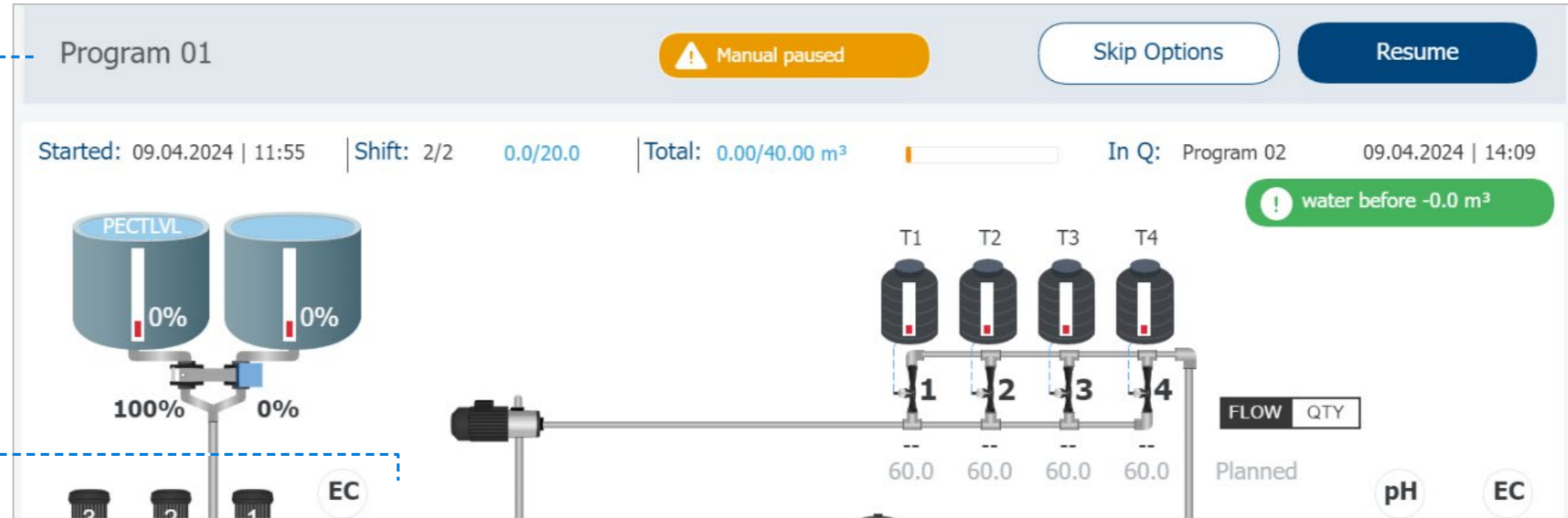


## Irrigation Program Paused

A running irrigation program can be paused for one of the following two reasons:

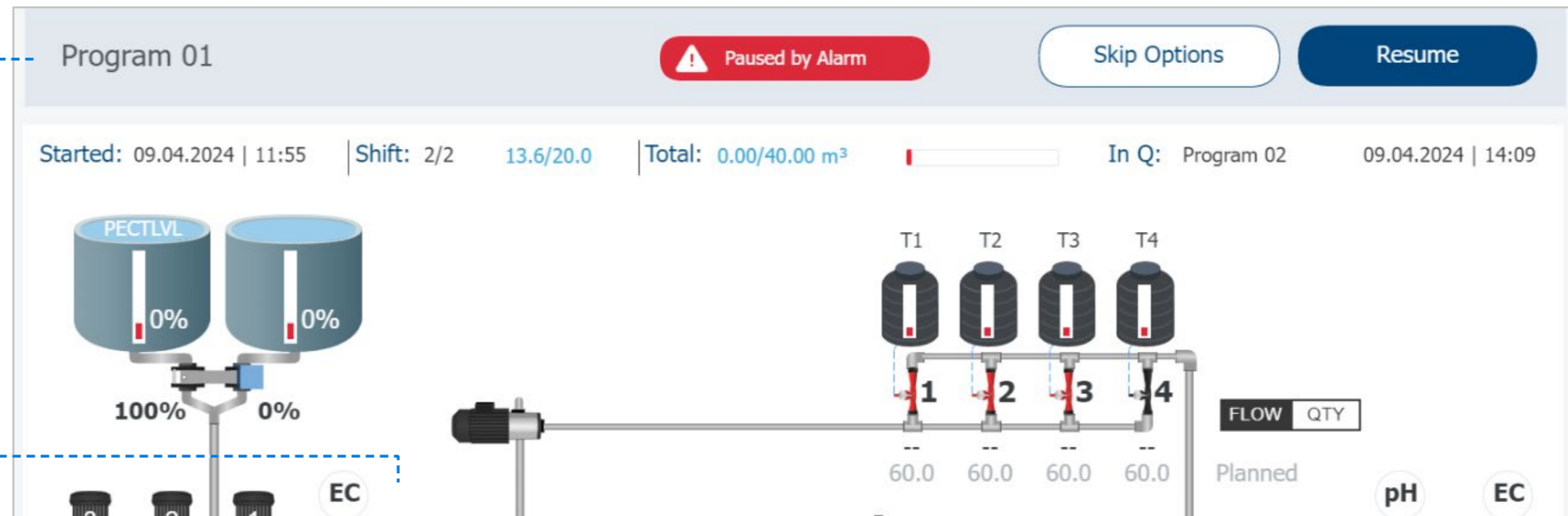
### Program manually paused

When the irrigation program is manually paused by the user, the top bar and progress bar turn orange. Top bar buttons enable skipping to the next shift or resuming the program.



### Program paused by system

When the irrigation program is automatically paused by the system (due to a high severity alert), the top bar and progress bar turn red. The top bar buttons enable stopping the program or resuming the program.



## 7.6.3 Monitoring Valves

The **Valves** tab displays all of the valves which are linked with the main line. This screen is useful to view the status of valves. Perform the following steps to view the valves:

**1. Tap the SCADA button**

**2. Tap the Valves tab**

**3. Select which valves are displayed**

Options include:

- All:** Display all valves.
- Alert:** Display only the valves which have triggered an alert.
- Manual:** Display only the valves which are manually operated.
- Not Assigned:** Display only the valves which are not assigned to a shift.

**Valve status indication:**

- Alert
- Irrigating
- Not Assigned
- Off/Not Active
- Manual On

**Updating valve activation method**

To update how a valve is activated (i.e., automatically or manually), tap the valve and select the relevant option from the menu.

**NOTE**  
Each main valve can have up to 100 irrigation valves.

## 7.6.4 Irrigation Analytics

The Analytics tab displays a live graph representing the measurements of the sensors connected to the analog inputs module. Perform the following steps to view and update the graph:

**1. Tap the SCADA button**

**3. Select the graph type**

EC and pH measurements can be displayed in relation to the water flow. Pressure can be displayed in relation to the flow.

**2. Tap the Analytics tab**

**4. Select the timeline scale**

Change the X-axis to display the relevant time-line scale.





## 7.6.5 Managing Irrigation Program Queue

The **Queue** tab displays the irrigation programs waiting to be executed, sorted by Normal priority and High priority. Perform the following steps to manage the queued programs:

**1. Tap the SCADA button**

**2. Tap the Queue tab**

**3. Select the relevant program**  
Tap the program name to select it.

**4a. Tap Remove to remove the selected program from the list.**

**4b. Tap Move to High Priority to move a selected program to the High Priority list.**

**Remove all button**  
Tap to remove all programs from the queue.

**NOTES**

- The **ID** column represents the order in which the programs are to be executed.
- The **Waiting in Q** column represents the amount of time the program has been waiting in the queue.

Normal priority			High priority		
ID	Program	Waiting in Q	ID	Program	Waiting in Q
1	5. Greenhouse tomatoes No. 20	05:07	1	1. Avocado rid	05:07
2	3. Tomato	05:07	2	7. Corn sam	05:07
3	6. Corn sam	05:07	3	1. Avocado has	05:07
4	6. Corn sam	05:07			
5	6. Corn sam	05:07			
6	6. Corn sam	05:07			
7	6. Corn sam	05:07			
8	6. Corn sam	05:07			
9	6. Corn sam	05:07			
10	6. Corn sam	05:07			



## 8. Misting, Cooling and Humidification

**1/** Misting, Cooling and Humidification settings

**4/** Cooling Program

**2/** Misting, Cooling and Humidification Program

**5/** Humidification Program

**3/** Misting Program

**6/** View programs

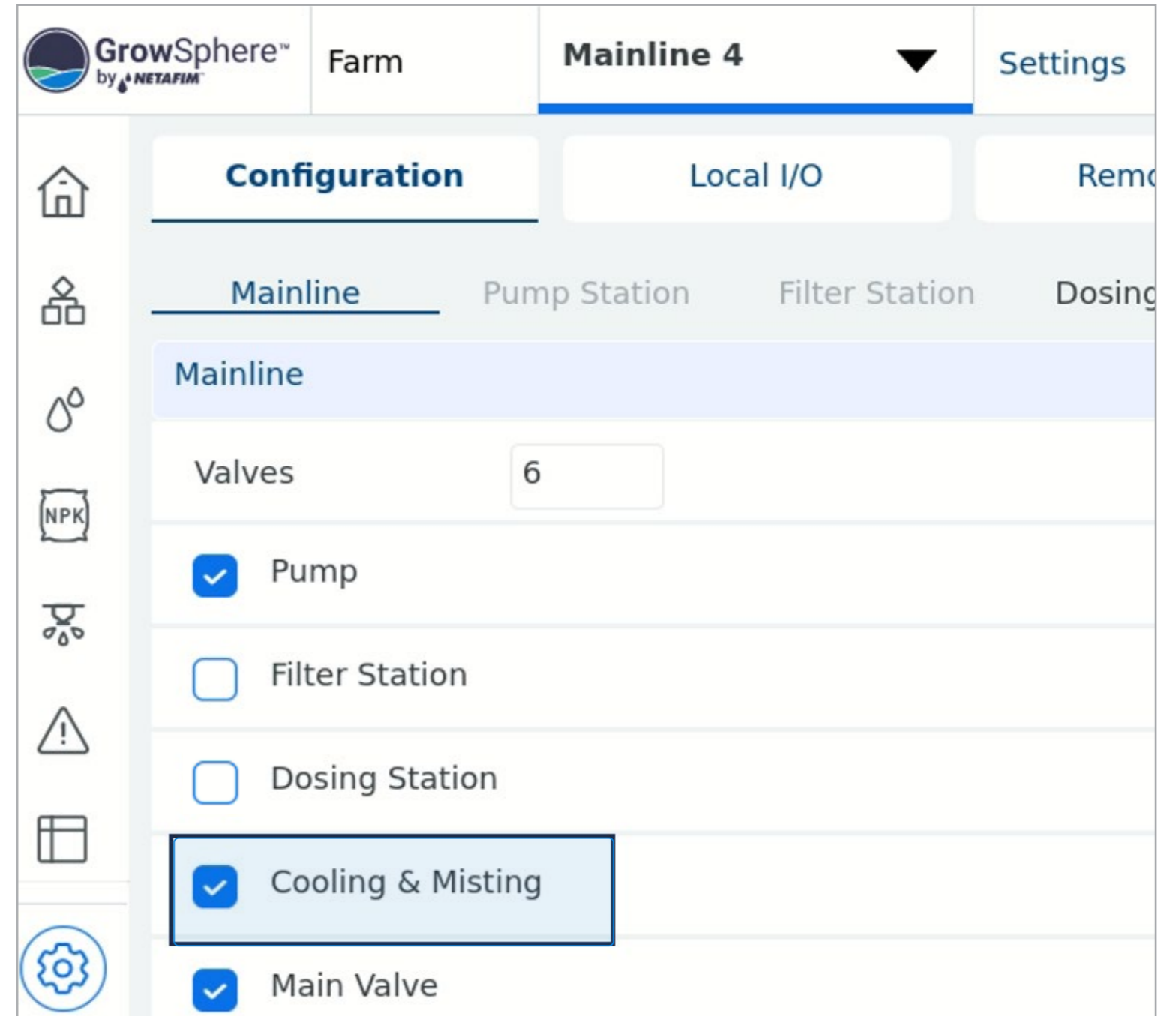


## 8.1 Misting, Cooling and Humidification settings

Select cooling and misting in the Mainline configuration screen.

The Misting program allows the operation of misting valves (foggers and or sprinklers) in dedicated settings and operation screens. The main parameters of the misting program are:

- Name of the program, Start, End, and On and Off times (cycles).
- The valves participating in this program can be selected from a pre-defined list.
- The valves will be activated according to the number of parallel vales settings: For example, if the parallel valves were set to 2, valves 1 and 2 will run together; after that, valves 3 and 4, etc. Then will be off for a defined time and will start a new cycle.
- There is an option to Start and Stop the program manually.



## In the Cooling and Misting configuration tab:

**1. Choose the water Source**

**4. Pause irrigation during misting / cooling process – Select if needed**

**7. Add program**

Direct to Programs dashboard

**3. Select Number of Cooling**

(humidification valves) and misting valves, If don't have leave it "0"

**2. Set the required flow rate**

(currently not active for alerts)

**5. Water source delay**

It is the Off delay for the water source

**6. Number of valves in parallel**

Set the number of valves to run together

## In the Local digital output screen -

GrowSphere™ by NETAFIM™ Avri Farm Agit All Mainlines Settings Simulation 31.7°C Sun 25 Jun 2023 10:53:28

Configuration **Local I/O** Remote I/O Communication Wiring Diagram

Local digital output Local digital input Local analog input

Module	DO	Device type	NO.	Source	Name	Flow	Area	Assigned
DO573.1	7	Misting	1	M.Line1	MIST1.1	1.0 m³/h	—	Unassign
DO573.1	8	Misting	2	M.Line1	MIST1.2	2.0 m³/h	—	Unassign
DO573.1	9	Misting	3	M.Line1	MIST1.3	1.0 m³/h	—	Unassign
DO573.1	10	Misting	4	M.Line1	MIST1.4	1.5 m³/h	—	Unassign
DO573.1	11	Cooling	1	M.Line1	COOL1.1	1.0 m³/h	—	Unassign
DO573.1	12	Cooling	2	M.Line1	COOL1.2	1.0 m³/h	—	Unassign
DO573.1	13	Cooling	3	M.Line1	COOL1.3	1.5 m³/h	—	Unassign

AA < page 4 of page 5 >

1. Allocate the outputs for the misting and /or cooling valves (They can be allocated to Remote I/O).

2. Set the Flow rate as required.



## Select the sensor for trigger:

The screenshot shows the GrowSphere MAX user interface. At the top, the header includes the GrowSphere logo, the farm name 'Avri Farm Agit', the system name 'Mainline 1', and the 'Settings' menu. The current simulation temperature is 31.7°C. The date and time are Sun 25 Jun 2023 10:57:35. The interface is divided into several sections: 'Configuration', 'Local I/O', 'Remote I/O', 'Communication', and 'Wiring Diagram'. Under 'Communication', there are options for 'SingleNet Allocation', 'RadioNet Allocation', 'Marked TAB', and 'Weather Station'. The 'Weather Station' option is selected and highlighted. Below this, the 'RS-232 (port 2)' connection is shown as 'connected' with a green checkmark. A blue button labeled 'Unassign Weather station' is visible. A large text box in the center of the screen reads: 'For Cooling and Humidification programs, the sensor's Temperature / Humidity can be selected from the Davis weather station or local sensors.'

## Set the analog sensor parameters

1. In the local analog input

GrowSphere™ by NETAFIM Avri Farm Agit All Mainlines Settings Simulation 32.2°C Sun 25 Jun 2023 11:12:10

Configuration **Local I/O** Remote I/O Communication Wiring Diagram

Local digital output Local digital input **Local analog input**

Module	AI	Device type	NO.	Source	Name	Input	Unit	Assigned
AI561.1	2	Out Temperature	1	M.Line1	Temp1.1	4 - 20 mA		
						Input Range (mA)	Output Range	Offset
						4 - 20	= 0 - 100	0.00
								<b>Unassign</b>
AI561.1	3	Out Humidity	1	M.Line1	Humid1.1	4 - 20 mA		
						Input Range (mA)	Output Range	Offset
						4 - 20	= 0 - 100	0.00
								<b>Unassign</b>

AA < page 2 of page 2 >

2. Set the analog input and the sensor range.

## 8.2 Misting, Cooling and Humidification Program

### 8.2.1 Create a new Cooling and misting program

1. Select a program to edit or create a new program. The total number of programs is 10 per mainline

GrowSphere™ by NETAFIM Farm Mainline 4 Misting and cooling

Fri 20 Oct 2023 11:11:34 87

Active ID	Name	Valves	Start - end time hh:mm	ON time hh:mm:ss	OFF time hh:mm:ss	Above temp. °C	Bellow RH %	Temp sensor	Hum sensor

page 1 of page 2

1. Set the program Name

2. Select the control action

The screenshot shows the GrowSphere MAX user interface for configuring a misting program. The top navigation bar includes the GrowSphere logo, the farm name 'Avri Farm Agit', the mainline 'Mainline 1', the current mode 'Misting and cooling', a simulation temperature of 32.2°C, and the date and time 'Sun 25 Jun 2023 11:22:24'. The main content area is titled 'Program 01' and features an 'Activate' button. Below this, there are fields for 'Control action', 'Start time', and 'End time'. The 'Control action' dropdown menu is open, showing options for 'Misting', 'Cooling', and 'Humidification'. The 'Start time' and 'End time' fields are both set to '00:00'. Below these fields, there is an 'OFF time (hh:mm)' field set to '00:00'. At the bottom of the screen, there is a list of six misting units, each with a checkbox and a label: '001 MIST1.1', '002 MIST1.2', '003 MIST1.3', '004 MIST1.4', '005 MIST1.5', and '006 MIST1.6'. A sidebar on the left contains various icons for navigation, including a home icon, a list icon, an NPK icon, a misting icon, a warning icon, a calendar icon, a gear icon, and a user icon labeled 'AA'.



## 8.3 Misting Program

**1. Set the program active period Start time and End time**

**2. Set the vales On time and Off time cycle**

**3. Set the vales that participate on this program**

The vales will be activating according to the number of parallel vales settings. For example, if the parallel valves was set to 2, the valves 1 and 2 will run together for 50 seconds, after that valves 3 and 4 and followed by 5 and 6. Then will be off for 30 minutes. After 30 minutes will start a new cycle.

**4. Click 'Activate' to activate the program**

When the program is active then it is an option to Start the program manually!

When a cycle is running then will be an option to Stop it.

The screenshot displays the GrowSphere MAX control interface. At the top, the header includes the GrowSphere logo, the location 'Avri Farm Agit', the selected program 'Mainline 1', the current mode 'Misting and cooling', a simulation temperature of 31.4°C, a warning icon, an SD card icon, the date and time 'Sun 25 Jun 2023 11:39:50', and a signal strength indicator. On the left, a vertical sidebar contains icons for home, system overview, misting, NPK dosing, and a misting nozzle. The main content area shows 'Program 01' with a 'Start' button highlighted by a red box. Below this, a table of control actions is visible:

Control action	Start time	End time
Misting	10:00	16:00

Below the table, there are fields for 'ON time (mm:ss)' set to 00:50 and 'OFF time (hh:mm)' set to 00:30. At the bottom, a list of active programs shows '001 MIST1.1' with a checked checkbox.

## 8.4 Cooling Program

**3. Select the control period**

**6. Set the temperature to start the cycle.**

The cycle will run when the temperature is above this value and the RH is below the RH set value.

**7. Set the RH (Relative Humidity) value.**

When the RH is below this value, the cycle will be permitted to start. When the RH is higher than this value will stop the cycle (also if the temperature is above the set value).

**1. Set the program Name**

**2. Select the control action**

**5. Set the ON and Off time**

**8. Set the vales that participate on this program**

**9. Click 'Active' to activate the program**

**4. Select the control sensors**  
For example, the temperature Sensor is from the Davis WS and the Humidity is local

## 8.5 Humidification Program

### 3. Select the control period

### 6. Set the temperature to start the cycle.

The cycle will run when the temperature is above this value and the RH is below the RH set value.

### 7. Set the RH (Relative Humidity) value.

When the RH is below this value, the cycle will be permitted to start. When the RH is higher than this value will stop the cycle (also if the temperature is above the set value).

### 1. Set the program Name

### 2. Select the control action

### 5. Set the ON and Off time

### 8. Set the vales that participate on this program

### 9. Click 'Active' to activate the program

### 4. Select the control sensors

For example, the temperature Sensor is from the Davis WS and the Humidity is local

Control action	Start time	End time	Method	Temp sensor	Act temp
Cooling	15:00	18:00		Weather station	31.3 °C
	ON time (mm:ss)	OFF time (hh:mm)	Above temp. °C	Below RH %	Hum sensor
	02:00	00:45	34.0 °C	55.0 %	Local
					Act Humidity
					47.3 %

- 001 COOL1.1
- 002 COOL1.2
- 003 COOL1.3
- 004
- 005
- 006



## 8.6 View programs

The Programs screen shows the active programs and the settings.

When one of the programs is running (valves are open) then will be uplighter to blue

Active	ID	Name	Valves	Start - end time hh:mm	ON time hh:mm:ss	OFF time hh:mm:ss	Above temp. °C	Bellow RH	Temp sensor	Hum sensor
<input checked="" type="checkbox"/>	1	Program 01	6	10:00 - 15:00	00:00:50	00:30:00	0.0 °C	0.0 %		
<input checked="" type="checkbox"/>	2	Cooling B12	4	15:00 - 18:00	00:02:00	00:45:00	34.0 °C	55.0 %	W. station	Local
<input checked="" type="checkbox"/>	3	Humid c2	6	06:00 - 10:00	00:01:30	01:00:00	25.0 °C	65.0 %	Local	Local
+ Insert new program										
+ Insert new program										
+ Insert new program										
+ Insert new program										
+ Insert new program										

GrowSphere™ by NETAFIM™ Farm **Mainline 1** SCADA Simulation Wed 13 Apr 2023 12:30 AM

General Valves Analytics Queue Accumulation Sensors

Program 01 Skip Options Pause Mainline

Started: 08.04.2024 | 10:11 | Shift: 1/1 04:01/10:00 | Total: 04:01/10:00 mm:ss | Next: Program 01 08.04.2024 | 10:25

ON 00:05 mm:ss

SLv1.1 64% SLv1.2 74%

100% 0%

N P K Acid

1 2 3 4

FLOW QTY

Planned

EC 0.0 Target 0.0

4.8 Bar -/3 4.6 Bar

50.0 m³/h Nominal 50.0

pH 5.4 Target 0.0

EC 1.7 Target 0.0

Mainline Sub mainline Shifts Pump station Filter station Dosing

When one of the programs is running, at the Scada Screen will show that the valves are ON

## 9. Dosing Other settings

**1/** Agitator Settings

**2/** Set agitators operation

**3/** Set Sub-station



## 9.1 Agitator Settings

Agitators are devices that mix the media to be metered homogeneously, especially in the case of powdery additives or liquids that are challenging to dilute. The main features of the Agitators program are:

- Automatically defined Dosing Tanks according to the number of Dosing channels in the system.
- Each dosing channel has a Dosing tank that can be selectively activated or deactivated.
- Agitator can be signed to the I/O module and port in the controller and allocated to RTU.
- Number of agitators can be activated simultaneously.
- Day and night operation times for the agitator's activity can be set.
- ON and Off time for agitators can be set During Fertigation and not delays.

In the Mainline configuration screen –  
Ensure the Dosing station is selected.

The screenshot shows the GrowSphere MAX user interface for the 'Avri Farm Agit' system, specifically the 'Mainline 1' configuration screen. The interface includes a top navigation bar with the GrowSphere logo and various menu items. The main content area is divided into sections for 'Configuration', 'Local I/O', and 'Remote I/O'. Under 'Configuration', there are tabs for 'Mainline', 'Pump Station', 'Filter Station', and 'Dosing Station'. The 'Mainline' tab is active, showing a list of components with checkboxes: 'Valves' (set to 4), 'Pump' (checked), 'Filter Station' (unchecked), 'Dosing Station' (checked and highlighted with a blue box), 'Cooling & Misting' (unchecked), 'Main Valve' (checked), 'Main WM' (checked), and 'Main Pressure Sensor' (checked). A dashed blue line points from the text 'Ensure the Dosing station is selected.' to the 'Dosing Station' checkbox.



## Assign dosing channels and agitators

1. In the Dosing station configuration screen

Select the Dosing Channels (tanks) that have Agitator

GrowSphere™ by NETAFIM Avri Farm Agit Mainline 1 Settings Simulation Mon 26 Jun 2023 14:06:47

Configuration Local I/O Remote I/O Communication Wiring Diagram

Mainline Pump Station Filter Station **Dosing Station** Cooling & Misting Valves Other Devices

Dosing Station

Extensive  Intensive

Dosing Channels 4

CH	1	2	3	4	5	6	7	8
Dosing meter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
Agitator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Fert tank level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Dosing Booster  Booster Pump O.L.

Dosing Pressure switch  Agitator pump

EC Sensors 1 pH Sensors 1

2. Select when there is a Main Agitator Pump

## Allocate agitator outputs

Agitator can not be assigned to RTU.

GrowSphere™ by NETAFIM Avri Farm Agit All Mainlines Settings Simulation Mon 26 Jun 2023 14:15:42

Configuration **Local I/O** Remote I/O Communication Wiring Diagram

Local digital output Local digital input Local analog input

Module	DO	Device type	NO.	Source	Name	Flow	Area	Assigned
DO573.1	7	Agitator Pump	1	M.Line1	AGPMP1.1	—	—	Unassign
DO573.1	8	Agitator	1	M.Line1	AGTR1.1	—	—	Unassign
DO573.1	9	Agitator	2	M.Line1	AGTR1.2	—	—	Unassign
DO573.1	10	Agitator	3	M.Line1	AGTR1.3	—	—	Unassign
DO573.1	11	Agitator	4	M.Line1	AGTR1.4	—	—	Unassign
DO573.1	12	Assign	0			—	—	Unassign
DO573.1	13	Assign	0			—	—	Unassign

AA < page 4 of page 5 >

Valve (6) Dosing Booster (0) Condition active (0)

MainValve (1) Normal Alarm (4) EC Pre-Control open (1)

Pump (0) Selector (0) EC Pre-Control close (1)

Filter (0) Agitator (8) Relay (0)

Main Filter Valve (0) Cooling (0) Same as DO

Dosing Channel (4) Misting (0) EC Pre-Control pump (1)

Mist Cool pump (0) Mist Cool Main valve (1) Agitator Pump (1)

Sub Main valve (0) Critical Alarm (4)

## 9.2 Set agitators operation

### 3. Set the ON and Off time for the mixing period

1. Define the number of agitators work in parallel

2. Set the parameters for the Night activity

The screenshot shows the 'Agitators' configuration page in the GrowSphere MAX interface. The page title is 'Avri Farm Agit Mainline 1 Dosing Simulation'. The navigation menu includes 'General Settings' and 'Channels Settings'. The 'Agitators' section is highlighted, showing a table for setting ON and OFF times for different functions. A vertical dashed line separates the 'General Settings' area from the 'Agitators' table.

Function	Start time	End time mm:ss	ON time mm:ss	OFF time
Day Period	08:00	16:00	00:05	00:30
Night Period	16:00	08:00	00:05	01:30
When Fertigation is ON			00:03	00:10

## 9.3 Setting the sub station

- Go to the communication TAB, Sub-Dosing station and check if the system is in communication with the substation.

The screenshot shows the GrowSphere MAX user interface. At the top, there is a navigation bar with the GrowSphere logo, 'Farm', 'Mainline 1', and 'Settings'. A warning icon and a date/time stamp 'Wed 10 Jul 2024 11:15:09' are also visible. Below the navigation bar, there are several tabs: 'Configuration', 'Local I/O', 'Remote I/O', 'Communication' (which is selected), and 'Wiring Diagram'. Under the 'Communication' tab, there are sub-tabs: 'SingleNet Allocation', 'RadioNet Allocation', 'NetRTU (GW) Allocation', 'Weather Station', and 'Sub-Dosing station' (which is selected). The main content area displays a table with the following data:

Mainline	Status	IP Address	Allocation
1	⊗ Not detected	192.168.0.11	<a href="#">Set and Allocate</a>
2	⊗ Not detected	192.168.0.12	<a href="#">Set and Allocate</a>
3	⊗ Not detected	192.168.0.13	<a href="#">Set and Allocate</a>
4	⊗ Not detected	192.168.0.14	<a href="#">Set and Allocate</a>

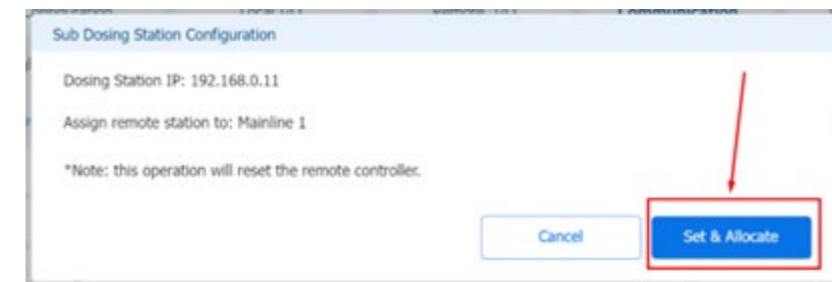


- If the substation is not in communication, press the “set and allocate”

The screenshot shows the GrowSphere MAX interface. At the top, there's a navigation bar with 'Farm', 'Mainline 1', and 'Settings'. Below this, there are tabs for 'Configuration', 'Local I/O', 'Remote I/O', 'Communication', and 'Wiring Diagram'. The 'Communication' tab is active, showing sub-tabs for 'SingleNet Allocation', 'RadioNet Allocation', 'NetRTU (GW) Allocation', 'Weather Station', and 'Sub-Dosing station'. The 'Sub-Dosing station' sub-tab is selected, displaying a table with the following data:

Mainline	Status	IP Address	Allocation
1	⊗ Not detected	192.168.0.11	Set and Allocate
2	⊗ Not detected	192.168.0.12	Set and Allocate
3	⊗ Not detected	192.168.0.13	Set and Allocate
4	⊗ Not detected	192.168.0.14	Set and Allocate

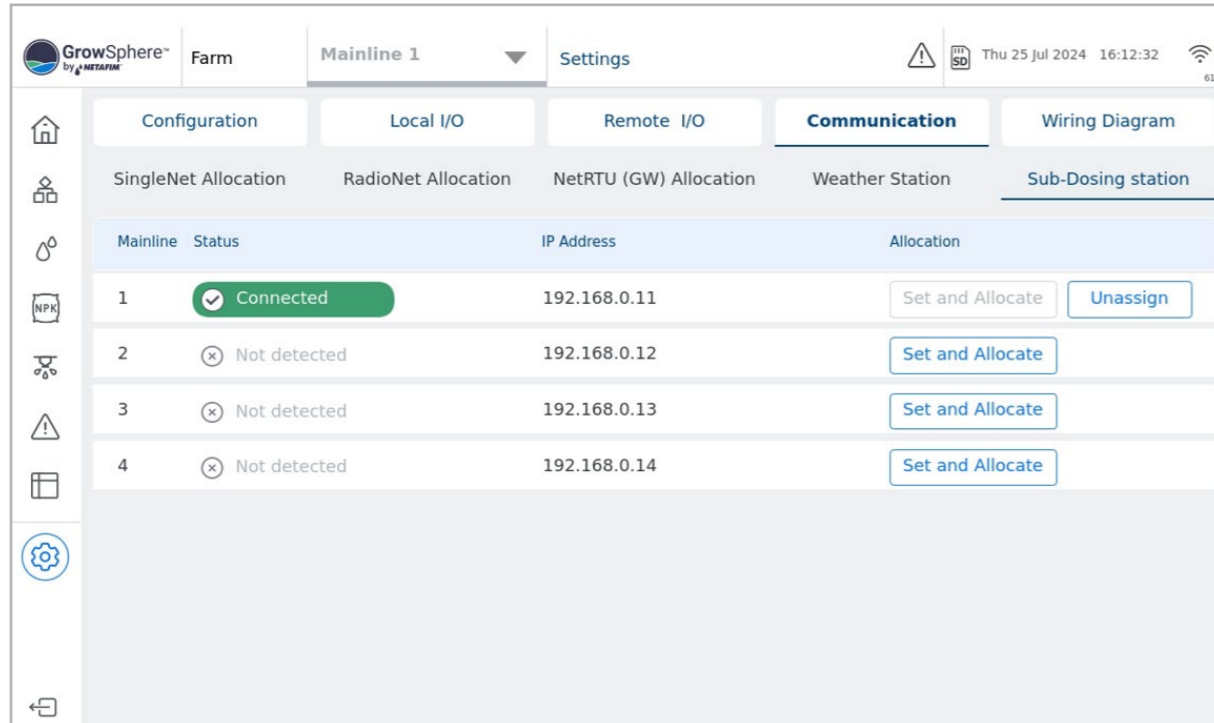
- A popup window will appear, press the “Set & Allocate” button



- After about 2 minutes the following popup window will appear, press the “Done” button

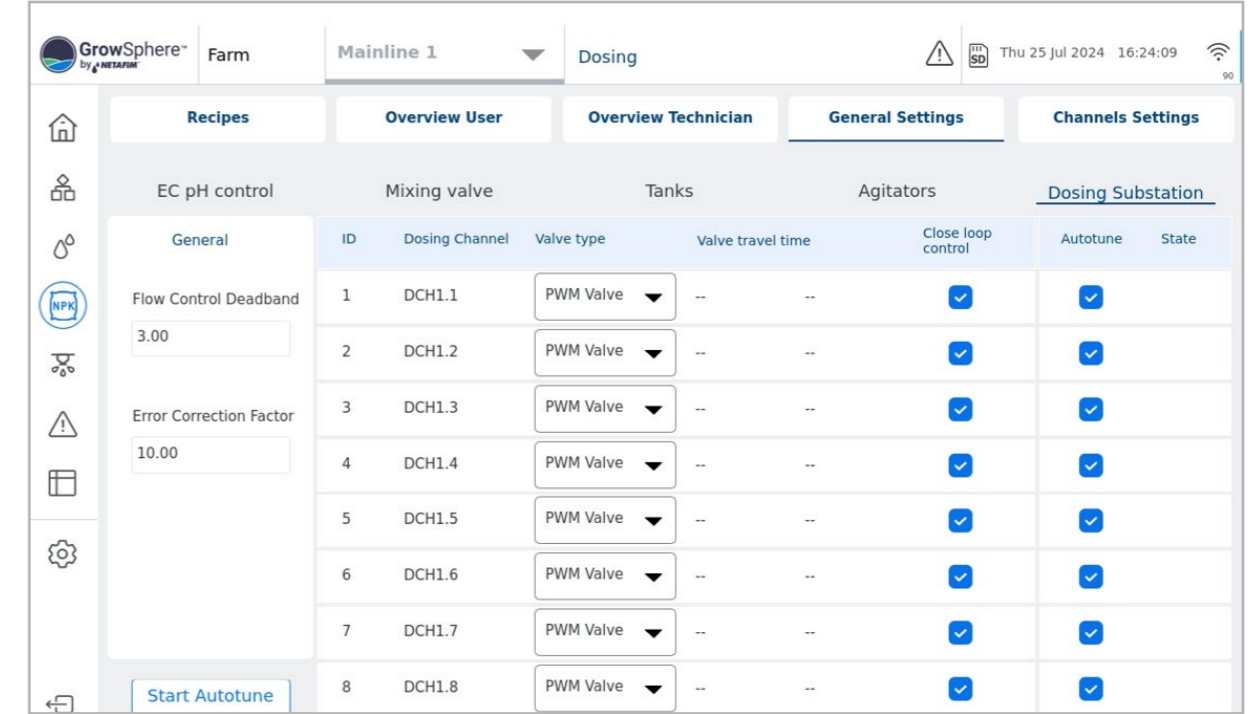


- Once the “Connected” appear as in the below image, the connection process is done.

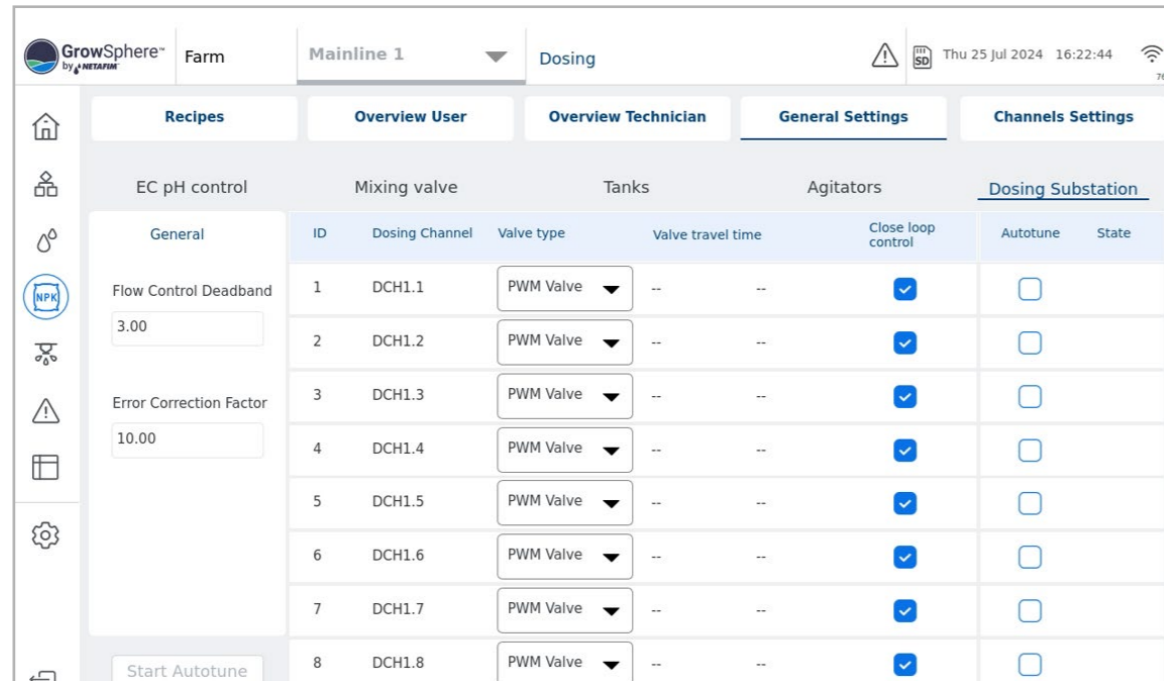


- Check the boxes on the Autotune column according to the number of channels in your system and press the “Start Autotune” button.

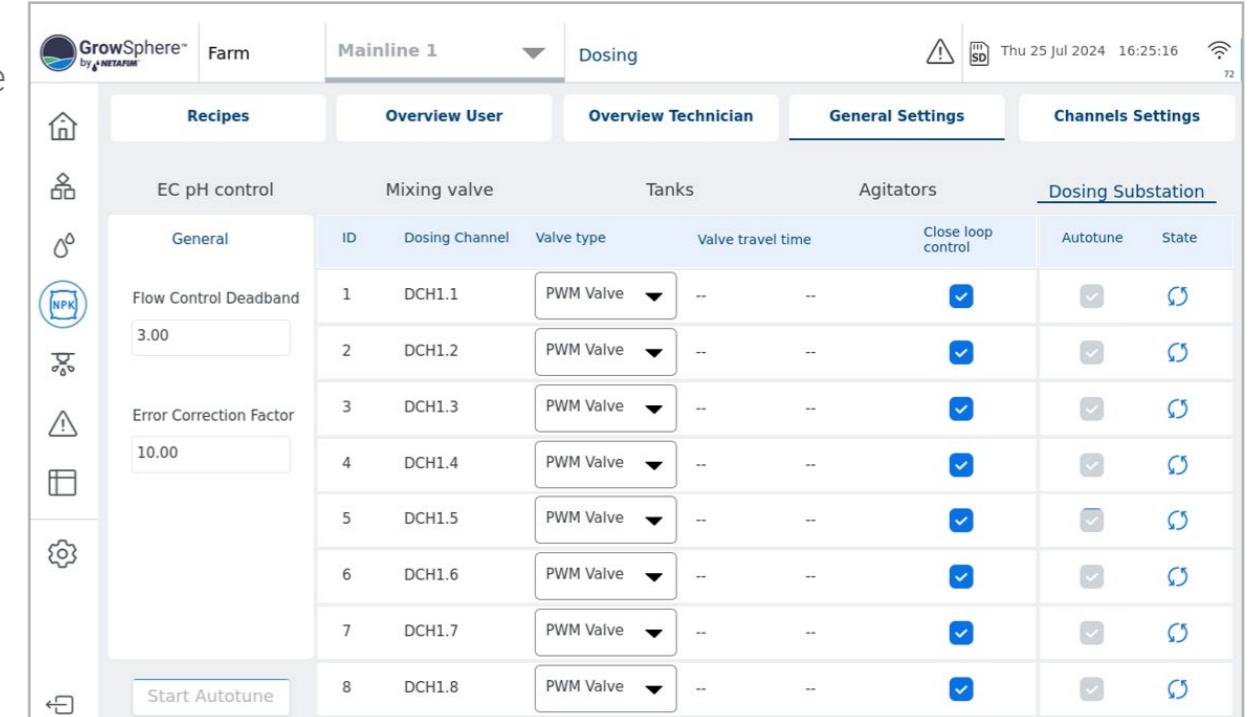
\* Before pressing the Auto-tune, start a program to circulate water in the system. manually start the booster pump. then start the auto-tune process.



- Once the system is in communication go to the NPK General settings → Dosing Substation



- As part of the process, the system will operate the booster pump and will calibrate the analog valves.



- When the Autotune process is completed the state indication of the channel will appear as in the below image. Can be pass or fail.
- If the channels are properly wired and water flows correctly, channels should be in pass state.

General	ID	Dosing Channel	Valve type	Valve travel time	Close loop control	Autotune	State
Flow Control Deadband: 3.00	1	DCH1.1	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Error Correction Factor: 10.00	2	DCH1.2	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	3	DCH1.3	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	DCH1.4	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	DCH1.5	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	6	DCH1.6	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	7	DCH1.7	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	8	DCH1.8	PWM Valve	--	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- The channel's nominal flow will appear following the successful autotune process.

Active	ID	Dosing Channel	Channel Type	Minimum Flow L/h	Nominal Flow L/h	Reaction	Dosing Meter Rate	Low deviation	High deviation
<input checked="" type="checkbox"/>	1	DCH1.1	Venturi Analog	40.0	1.0	EC	5000 PPL	100 %	100 %
<input checked="" type="checkbox"/>	2	DCH1.2	Venturi Analog	40.0	1.0	EC	5000 PPL	100 %	100 %
<input checked="" type="checkbox"/>	3	DCH1.3	Venturi Analog	40.0	1.0	EC	5000 PPL	100 %	100 %
<input checked="" type="checkbox"/>	4	DCH1.4	Venturi Analog	40.0	1.0	Acid	5000 PPL	100 %	100 %
<input type="checkbox"/>	5	DCH1.5	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %
<input type="checkbox"/>	6	DCH1.6	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %
<input type="checkbox"/>	7	DCH1.7	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %
<input type="checkbox"/>	8	DCH1.8	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %

- Now, from the NPK → channel settings

Active	ID	Dosing Channel	Channel Type	Minimum Flow L/h	Nominal Flow L/h	Reaction	Dosing Meter Rate	Low deviation	High deviation
<input checked="" type="checkbox"/>	1	DCH1.1	Venturi Analog	40.0	1.0	EC	5000 PPL	100 %	100 %
<input checked="" type="checkbox"/>	2	DCH1.2	Venturi Analog	40.0	1.0	EC	5000 PPL	100 %	100 %
<input checked="" type="checkbox"/>	3	DCH1.3	Venturi Analog	40.0	1.0	EC	5000 PPL	100 %	100 %
<input checked="" type="checkbox"/>	4	DCH1.4	Venturi Analog	40.0	1.0	Acid	5000 PPL	100 %	100 %
<input type="checkbox"/>	5	DCH1.5	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %
<input type="checkbox"/>	6	DCH1.6	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %
<input type="checkbox"/>	7	DCH1.7	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %
<input type="checkbox"/>	8	DCH1.8	Venturi Analog	40.0	1.0	Passive	5000 PPL	30 %	40 %



## 10. Conditions & Triggers

**1/** Conditions to start the Irrigation Program by external triggers.

**2/** Triggers definition

**3/** Settings of Analog trigger - Sensors

**4/** Trigger irrigation

**5/** General triggers





## 10.1 Conditions to start the Irrigation Program by external triggers.

To activate the irrigation program, external triggers need to be identified. The user can select the trigger type, which could be a dry contact or an analog sensor, and specify a condition to start the program.

The conditions can be of type and value, which determine when to start or stop the program.

The program types available are Only if ON, One Shot, and Multi Shot.

In all options, an emergency switch (DI dry contact) can be used to stop the program if needed.

A general sensor, such as a tank-level sensor, can also be selected. The sensor must be 0-20mA.

## 10.2 Triggers definition

1. The user / technician will define the triggers that have on his system.

2. The triggers can be digital or analog. Select and set the following steps.

4. Choose Dry contact

GrowSphere™ by NETAFIM™ Farm - Trigger All Mainlines Settings Simulation Sun 27 Aug 2023 09:13:44

Configuration **Local I/O** Remote I/O Communication Wiring Diagram

Local digital output **Local digital input** Local analog input

Module	DI	Device type	NO.	Source	Name	Type	Rate	Assigned
PM5052	0	Water Meter	1	M.Line1	WMTR1.1	LPP	0.00	Unassign
PM5052	1	Dry Contact	1	M.Line1	Emrgcy	NO	—	Unassign
PM5052	2	Dry Contact	2	M.Line1	Dry ON	NO	—	Unassign
PM5052	3	Assign						Unassign
PM5052	4	Dosing Meter	1	M.Line1	DMTR1.1	LPP	0.10	Unassign
PM5052	5	Dosing Meter	2	M.Line1	DMTR1.2	LPP	0.10	Unassign
PM5052	6	Dosing Meter	3	M.Line1	DMTR1.3	LPP	0.10	Unassign

FT < page 1 of page 2 >

3. Choose the digital input where the Dry Contact is connected.

1. Click to edit the name of the Dry contact, example Dry OFF

GrowSphere™ by NETAFIM™ Farm - Trigger All Mainlines Settings Simulation Sun 27

Configuration Local I/O Remote I/O Communication

Local digital output Local digital input Local analog input

Module	DI	Device type	NO.	Source	Name	Type	Rate
PM5052	0	Water Meter	1	M.Line1	WMTR1.1	LPP	0.00
PM5052	1	Dry Contact	1	M.Line1	Emrgcy	NO	—
PM5052	2	Dry Contact	2	M.Line1	Dry ON	NO	—
PM5052	3	Dry Contact	4	M.Line1	DRYC1.4	NO	—
PM5052	4	Dry Contact	3	M.Line1	Low Swch	NO	—
PM5052	5	Dosing Meter	2	M.Line1	DMTR1.2	LPP	0.10
PM5052	6	Dosing Meter	3	M.Line1	DMTR1.3	LPP	0.10

Device name (Up to 8 characters) Dry OFF

1 2 3 4 5 6 7 8 9 0 - =

q w e r t y u i o p

a s d f g h j k l

z x c v b n m , . /

# += Space

NO

NO

NC

Unassign

Unassign

Unassign

Unassign

Unassign

Unassign

Unassign

FT < page 1 of page 2 >

2. Select the DI type normally open or normally close.

## 10.3 Settings of Analog sensors

Module	AI	Device type	NO.	Source	Name	Input	Unit	Assigned
AI561.1	0		0			4 - 20 mA		
AI561.1	1	Temperature	1	M.Line1	Temp A	4 - 20 mA		

**1. Select Local analog Inputs**

**2. Select the AI where the sensor is connected**

**3. Choose the sensor type.**

For example, if it is a sensor level, choose General 0-20 mA



## Settings of Analog triggers – Sensors

### 4. Edit the sensor Name. For example, Low Level

The screenshot displays the GrowSphere MAX user interface for configuring analog triggers. The main configuration area is titled "Local I/O" and includes a table of sensor settings. A keyboard overlay is visible, showing the "Device name (Up to 8 characters)" field being edited to "Low Level". A callout box highlights the "Input Range (mA)" and "Output Range" fields, with a callout text "5. Set the sensor range" pointing to them.

Module	AI	Device type	NO.	Source	Name
AI561.1	0	General 0-20mA	2	M.Line1	GENAI1.2
AI561.1	1	General 0-20mA	1	M.Line1	Level 1

Input Range (mA): 4 - 20 = Output Range: 0 - 100

Input Range (mA): 4 - 20 = Output Range: 0 - 100

Offset: 0.00

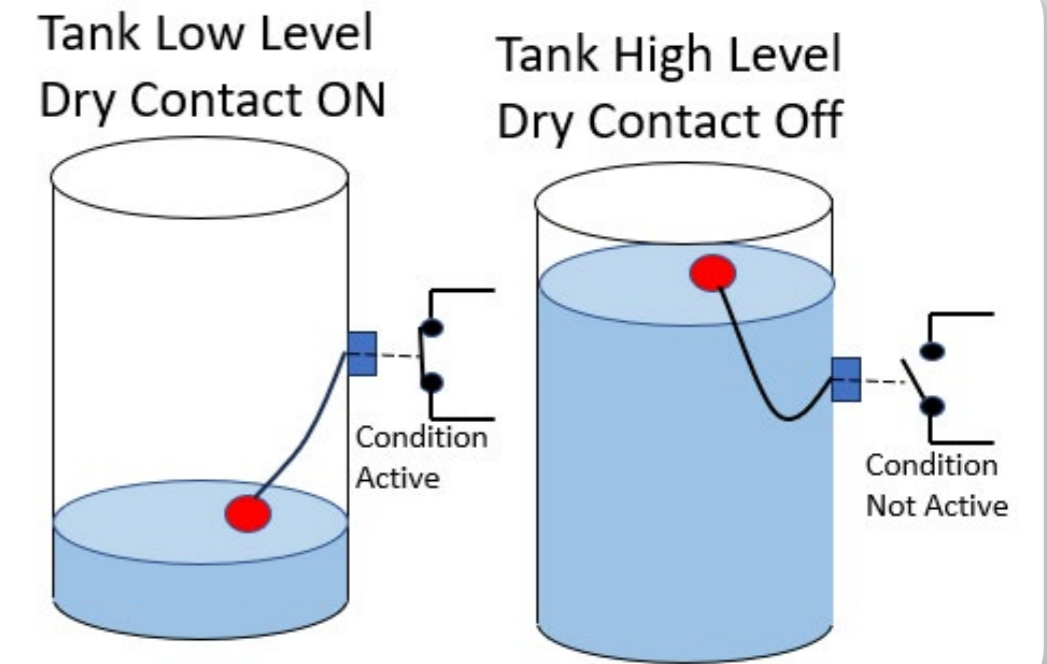
Unassign

## Type - Only if ON

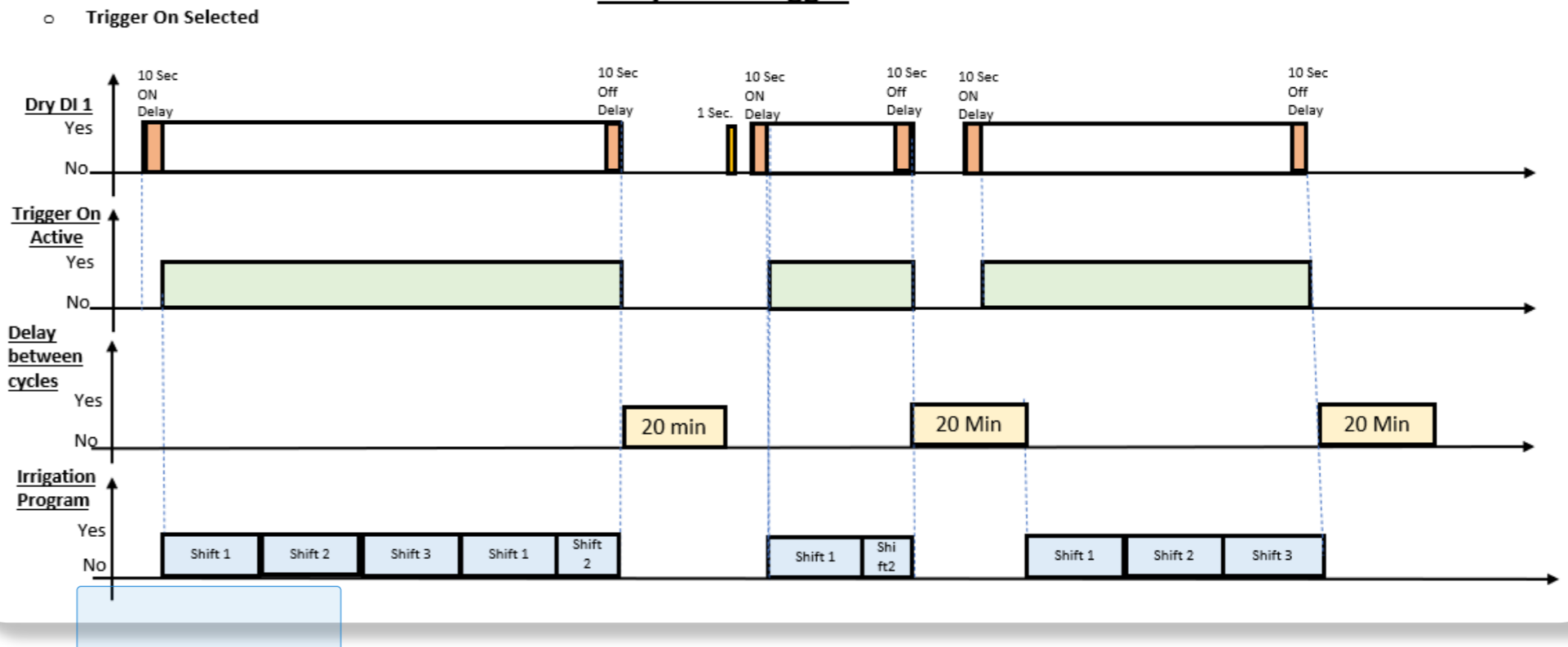
1. The program types are: Only if ON , One Shot and Multi Shot.
2. The external triggers are set as a condition to activate the irrigation program.
3. The user will choose the trigger type, dry contact or analog sensor, and the condition to start the program.
4. The conditions are type and trigger to start or stop the program.
5. The program has two periods, each period has an independent Start time, End time and triggers.
6. For Only if ON condition can be selected Trigger ON.
7. Emergency switch (DI dry contact) is a DI switch to stop the program when it is active or prevent it from being activated.

Example of Condition Only If On

With storage tank and One float (N.O. Switch)



### Only if On Trigger



## 10.4 Define irrigation by conditions

- Edit the condition and chose relevant netacap sensor.

The screenshot shows the configuration page for 'Program 01'. At the top, there are 'Skip' and 'Start' buttons. Below, various settings are displayed: Type (Routine), Amount (5 m³), Factor (100%), Total (00:05 | 5.00 m³), Last irrigation (04.06.24 | 12:03), Priority (Normal), Unit (Qty), and Next irrigation (06.06.24 | 00:01). A 'Conditions' dropdown menu is highlighted with a red arrow. Below this, a table shows time periods and triggers. The first row is selected, showing '00:01 - 23:25' with 'ON - No device' and 'OFF - No device' triggers. A red arrow points to an edit icon next to this row. At the bottom, there are 'Water before & after' settings.

- Select “Analog” type condition.
- All sensors related to the netacap will appear as trigger options for the program.
- Set up the on and off thresholds.

The screenshot shows the 'Period 1 - settings' dialog box. It has radio buttons for 'Analog' (selected) and 'Digital'. Below, there is a table with columns: Active, Start time, End time, Type, Trigger ON, Value, Trigger OFF, and Value. The first row is checked, with '00:01' start, '23:25' end, 'Multi Shot' type, 'No Device' trigger ON, a value of '20.0', 'No Device' trigger OFF, and a value of '10.0'. Below the table, a grid of sensor buttons is shown, including NC1WC1 through NC1WC6, NC1ST1 through NC1ST6, and NC1AT1. A red box highlights these sensor buttons, with a red arrow pointing to them. At the bottom right, there are 'Unassign' and 'Done' buttons.

- Program is triggered by netacap sensor.
- Actual value from sensor can be seen.

The screenshot displays the configuration for 'Program 01'. Key elements include:

- Program Details:** Type: Routine, Amount (shift): 5 m<sup>3</sup>, Factor: 100%, Total: 00:05 | 5.00 m<sup>3</sup>, Last irrigation: 05.06.24 | 07:01, Next irrigation: 06.06.24 | 00:01.
- Conditions:** A table with columns for 'Time period', 'Trigger', and 'Actual'.
 

Time period	Trigger	Actual
<input checked="" type="checkbox"/> 00:01 - 23:25	ON - ● NC1AT1 > 20 OFF - ○ NC1AT1 < 10	Act.NC1AT1: 21 On
<input type="checkbox"/> 00:00 - 00:00	ON - No device OFF - No device	
- Schedule:** Date range: 22.05.24, No end checked, Schedule: Every (X) days, 1 day.
- Water before & after:** Apply To: Per shift, Before: 0.00, After: 0.00 m<sup>3</sup>.



## 10.5 General triggers

### Digital Input (Dry Contact)

GrowSphere™ by NETAFIM

Farm - Trigger **Mainline 1** Irrigation Simulation Sun 27 Aug 2023 12:29:32

Program 01 Program not activate! **Activate**

Type: Routine Amount (shift): 10:00 Factor: 100% Total: 30:00 | 14.50 m<sup>3</sup> Last irrigation: None

Priority: Normal Unit: MM:SS Shifts (3) Dosing Prop 1 Settings Next irrigation: None

Start times	Time period	Actual	device
<input type="checkbox"/>	00:00 - 00:00		OFF - <input type="radio"/> No device
<input type="checkbox"/>	00:00 - 00:00		ON - <input type="radio"/> No device OFF - <input type="radio"/> No device
<input type="checkbox"/>	Emergency OFF Switch		Emrgcy

Date range: 27.08.23 - 27.08.23  No end

Schedule: Every (X) days - 1 day

Water before & after

Apply To	Unit	Before	After
Per shift	HH:MM	00:00	00:00

1. Select Conditions

2. Select the Edit icon to edit the 1st Time Period. The same settings are for the 2nd Time Period. The start and end times can not be overlapping between periods.

The same settings are for Period Two. The start and end times can not be overlapping between periods.

## Digital Trigger

**1. Select Digital**  
(for dry contact DI)

**3. Choose the**  
type **Only if ON**

Period 1 - settings

Analog  Digital

Active	Start time	End time	Type	Trigger on	Trigger off
<input type="checkbox"/>	00:00	00:00	Only if On ▼	No Device	No Device

Only if On ▼

- Only if On
- One Shot
- Multi Shot

Done

**2. Select the checkbox for**  
activating the condition

Period 1 - settings

Analog  Digital

Active	Start time	End time	Type	Trigger on	Trigger off
<input checked="" type="checkbox"/>	08:00	14:00	Only if On ▼	Dry ON	No Device

Emrgcy Dry ON DRYC1.4 Low Swch

Unassign

Done

**4. Select the trigger,**  
In this example **Dry ON**

**5. To unassigns the**  
trigger that was selected

## Only if ON - Digital Trigger

**1. Click on Settings**

**2. ON delay: it is a time that the DI must be ON to be an active trigger (mm ss)**

**3. Off delay: it is a time that the DI must be Off to be a not active trigger (mm ss)**

**4. It is a minimal time between cycles ; when the trigger turns OFF and ON again the program will start after this delay. (mm:ss)**

## Only if ON - Digital Trigger

GrowSphere™ by NETAFIM™ Farm - Trigger Mainline 1 Irrigation Simulation Sun 27 Aug 2023 12:51:13

Program 01 Program not activate! **Activate**

Type: Routine Amount (shift): 10:00 Factor: 100% Total: 30:00 | 14.50 m<sup>3</sup> Last irrigation: None

Priority: Normal Unit: MM:SS Shifts (3) Dosing Prop 1 Settings Next irrigation: None

Start times: Conditions

Time period	Trigger	Actual
<input checked="" type="checkbox"/> 08:00 - 14:00	ON - <input checked="" type="radio"/> Dry ON OFF - <input type="radio"/> No device	
<input type="checkbox"/> 00:00 - 00:00	ON - <input type="radio"/> No device OFF - <input type="radio"/> No device	

Emergency OFF Switch:  Emrgcy

Date range: 27.08.23 - 27.08.23  No end

Schedule: Every (X) days, 1 day

Water before & after: Apply To: Per shift, Unit: HH:MM, Before: 00:00, After: 00:00

1. Activate the program



2. When the condition is ON, and it is on the period window the program will be posted to the Queue to be activated.

The screenshot shows the 'Conditions & Triggers' configuration page for 'Mainline 1' in the GrowSphere MAX software. The interface includes a top navigation bar with the following items: Farm - Trigger, Mainline 1, Irrigation, Simulation, and a date/time display (Sun 27 Aug 2023 12:52:23). The main content area is divided into several sections:

- Program 01**: Includes 'Skip Options' and 'Pause Mainline' buttons.
- General Settings**: Type (Routine), Amount (shift) (10:00), Factor (100%), Total (30:00 | 14.50 m³), Priority (Normal), Unit (MM:SS), and buttons for 'Shifts (3)', 'Dosing', 'Prop 1', and 'Settings'. It also shows 'Last irrigation' (27.08.23 | 12:52) and 'Next irrigation' (None).
- Start times**: A table with columns for 'Time period', 'Trigger', and 'Actual'.
 

Time period	Trigger	Actual
<input checked="" type="checkbox"/> 08:00 - 14:00	ON - <input checked="" type="radio"/> Dry ON OFF - <input type="radio"/> No device	
<input type="checkbox"/> 00:00 - 00:00	ON - <input type="radio"/> No device OFF - <input type="radio"/> No device	
- Date range**: 27.08.23 to 27.08.23, with a 'No end' checkbox.
- Schedule**: 'Every (X) days' (1 day) and a green box with the number '1'.
- Water before & after**: 'Apply To' (Per shift), 'Unit' (HH:MM), 'Before' (00:00), and 'After' (00:00).

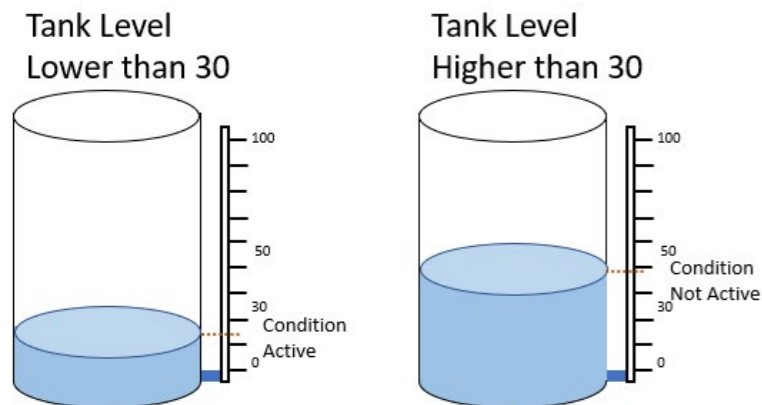
## Only if ON - Analog Input

### Example: Condition Only If On with Analog Sensor Level

The set point is 30

When the Tank level is lower than 30 then the Irrigation program will run.

When the tank level is higher than 30, the irrigation program will stop.



**1. Select Analog** (Highlighted button for Analog and written as Digital)

**2. Select the start and End times for the period the condition will be active**

**3. Choose the type Only if ON**

Period 1 - settings

Analog  Digital

Active	Start time	End time	Type	Trigger on	Value	Trigger off	Value
<input checked="" type="checkbox"/>	08:46	15:00	Only if On ▼	No Device	< 30.0	No Device	> 30.0

Done

Only if ON Digital Trigger.

2. Actual is the actual value of the sensor.

3. Select Activate to make the program activate.

1. These value is the target trigger to activate the irrigation program

GrowSphere™ by NETAFIM™ Farm - Trigger Mainline 1 Irrigation 33.6°C Sun 03 Sep 2023 11:43:25

Program 04 Program not activate! **Activate**

Type: Routine Amount (shift): 03:00 Factor: 100% Total: 06:00 | 3.00 m³ Last irrigation: None

Priority: Normal Unit: MM:SS Shifts (2) Dosing prop Settings Next irrigation: None

Start times Conditions Date range: 03.09.23 03.09.23 No end

Time period	Trigger	Actual
<input checked="" type="checkbox"/> 08:46 - 15:00	ON - Tank 1 < 30 OFF - Tank 1 > 30	
<input type="checkbox"/> 00:00 - 00:00	ON - No device OFF - No device	
<input type="checkbox"/> Emergency OFF Switch	No device	

Schedule: Every (X) days 1 day

Water before & after: Apply To: Per shift Unit: HH:MM Before: 00:00 After: 00:00

5. When the sensor value is lower than the target, the program will be posted in the Queue.

4. When it is a running program then will wait to be send to the hydraulic manager to run this program.

GrowSphere™ by NETAFIM™ Farm - Trigger Mainline 1 Irrigation 33.3°C Sun 03 Sep 2023 12:02:50

Program 04 **Waiting in queue** Start

Type: Routine Amount (shift): 03:00 Factor: 100% Total: 06:00 | 3.00 m³ Last irrigation: None

Priority: Normal Unit: MM:SS Shifts (2) Dosing: prop Settings Next irrigation: None

Start times Conditions Act. Tank 1: 29 Date range: 03.09.23 - 03.09.23 No end

Time period	Trigger	Actual
<input checked="" type="checkbox"/> 08:46 - 15:00	ON - ● Tank 1 < 30 OFF - ● Tank 1 > 30	On
<input type="checkbox"/> 00:00 - 00:00	ON - No device OFF - No device	
<input type="checkbox"/> Emergency OFF Switch	No device	

Schedule: Every (X) days 1 day

Water before & after: Apply To: Per shift Unit: HH:MM Before: 00:00 After: 00:00



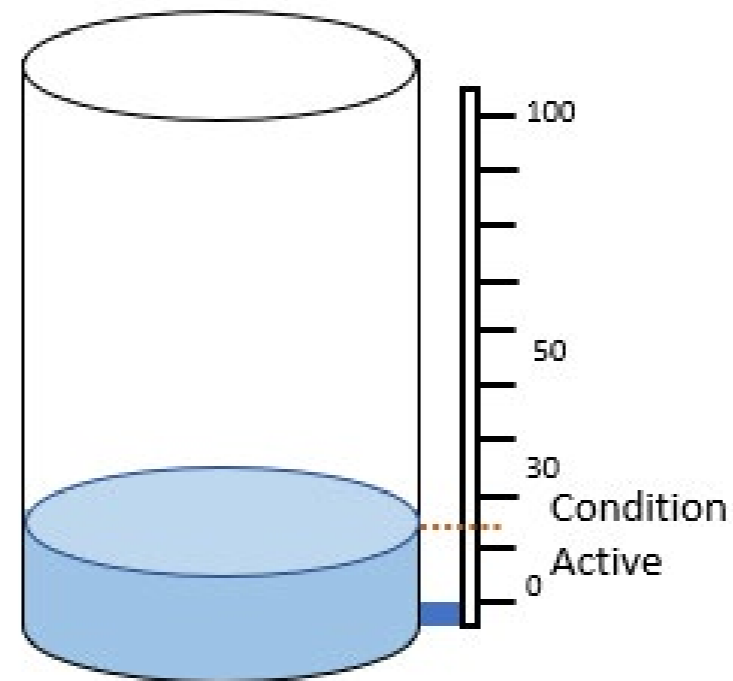
### Example: Condition Only If On with Analog Sensor Level

The set point is 30

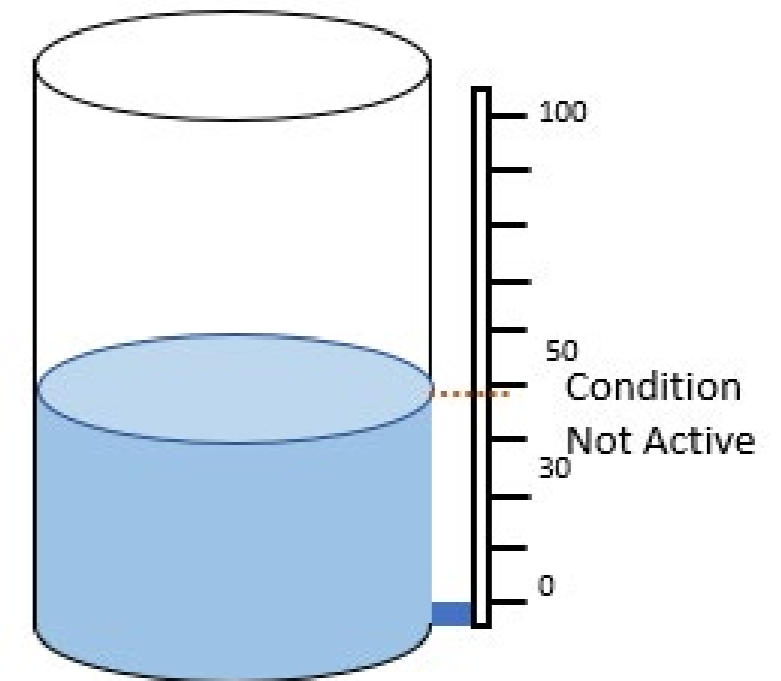
When the Tank level is lower than 30 then the Irrigation program will run.

When the tank level is higher than 30, the irrigation program will stop.

### Tank Level Lower than 30



### Tank Level Higher than 30



## Emergency Off Switch

The screenshot shows the 'Conditions & Triggers' configuration page for 'Mainline 1' in the GrowSphere MAX system. The page is titled 'Farm - Trigger' and 'Irrigation'. The main content area is divided into several sections:

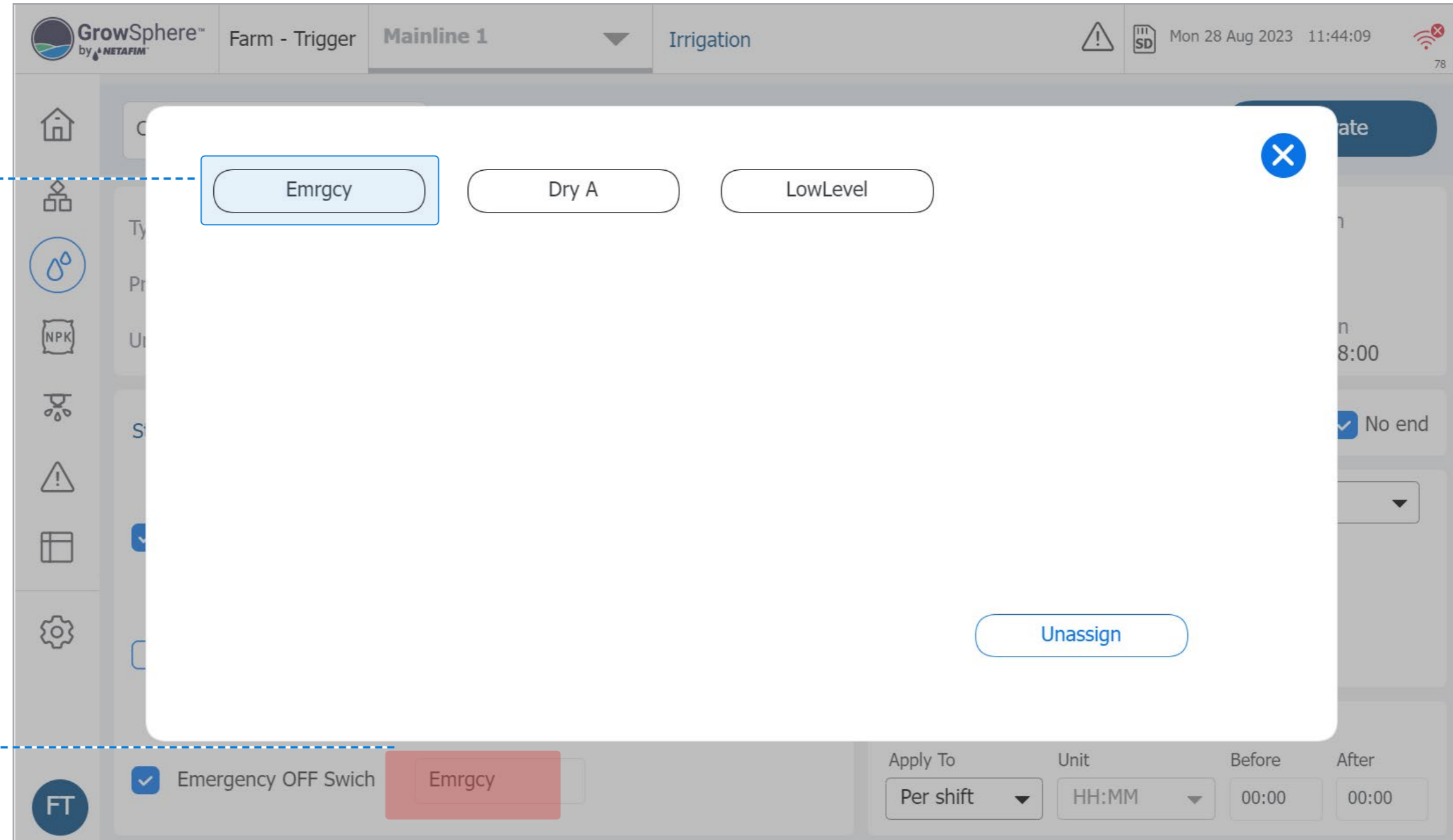
- Header:** 'Condition A', 'Program not activate!', and an 'Activate' button.
- General Settings:** Type (Routine), Priority (Normal), Unit (MM:SS), Amount (shift) (10:00), Factor (100%), Total (30:00 | 14.50 m³), Last irrigation (None), and Next irrigation (29.08.23 | 08:00).
- Start times:** A table with columns for 'Time period', 'Trigger', and 'Actual'. It lists two time periods: 08:00 - 14:00 (checked) and 00:00 - 00:00 (unchecked). The trigger for the first period is 'ON - Dry A' and 'OFF - No device'. The trigger for the second period is 'ON - No device' and 'OFF - No device'.
- Emergency OFF Switch:** A section with a checked checkbox and the text 'Emergency OFF Switch' and 'No device'.
- Date range:** 28.08.23, with a 'No end' checkbox checked.
- Schedule:** 'Every (X) days' (1 day).
- Water before & after:** 'Apply To' (Per shift), 'Unit' (HH:MM), 'Before' (00:00), and 'After' (00:00).

A callout box on the left side of the page points to the 'Emergency OFF Switch' option, stating: 'It is a Digital input that can be selected to stop the running program or prevent a program from running when this switch is active. Select the DI for Emergency stop'.

It is a Digital input that can be selected to stop the running program or prevent a program from running when this switch is active. Select the DI for Emergency stop

**2.** The emergency switch has priority of the Trigger ON and Trigger Off.

**3.** When the emergency Off switch is active, it will be shown Red



Farm - Trigger

Mainline 1
▼

Irrigation

⚠
SD
Mon 28 Aug 2023 11:48:46
📶
82

Condition A

⚠
Uncompleted

Skip

Resume

Type Routine ▼

Priority Normal ▼

Unit MM:SS ▼

Amount (shift) 10:00

Factor 100%

Total 30:00 | 14.50 m³

Last irrigation  
28.08.23 | 11:47

Next irrigation  
29.08.23 | 08:00

Start times Conditions ▼

	Time period	Trigger	Actual
<input checked="" type="checkbox"/>	08:00 - 14:00	ON - <span style="color: green;">●</span> Dry A OFF - <span style="color: gray;">●</span> No device	<span style="border: 1px solid #ccc; padding: 2px 5px;">✎</span>
<input type="checkbox"/>	00:00 - 00:00	ON - <span style="color: gray;">●</span> No device OFF - <span style="color: gray;">●</span> No device	<span style="border: 1px solid #ccc; padding: 2px 5px;">✎</span>

Date range 28.08.23 ▼  No end

Schedule Every (X) days ▼ 1 day ▼

1

Emergency OFF Switch Emrgcy ● Alert ON

Water before & after

Apply To Per shift ▼

Unit HH:MM ▼

Before 00:00

After 00:00

**3.** When the emergency Off switch is active, it will be shown Red

21 | Conditions & Triggers

Rev 01 | GrowSphere MAX User Manual



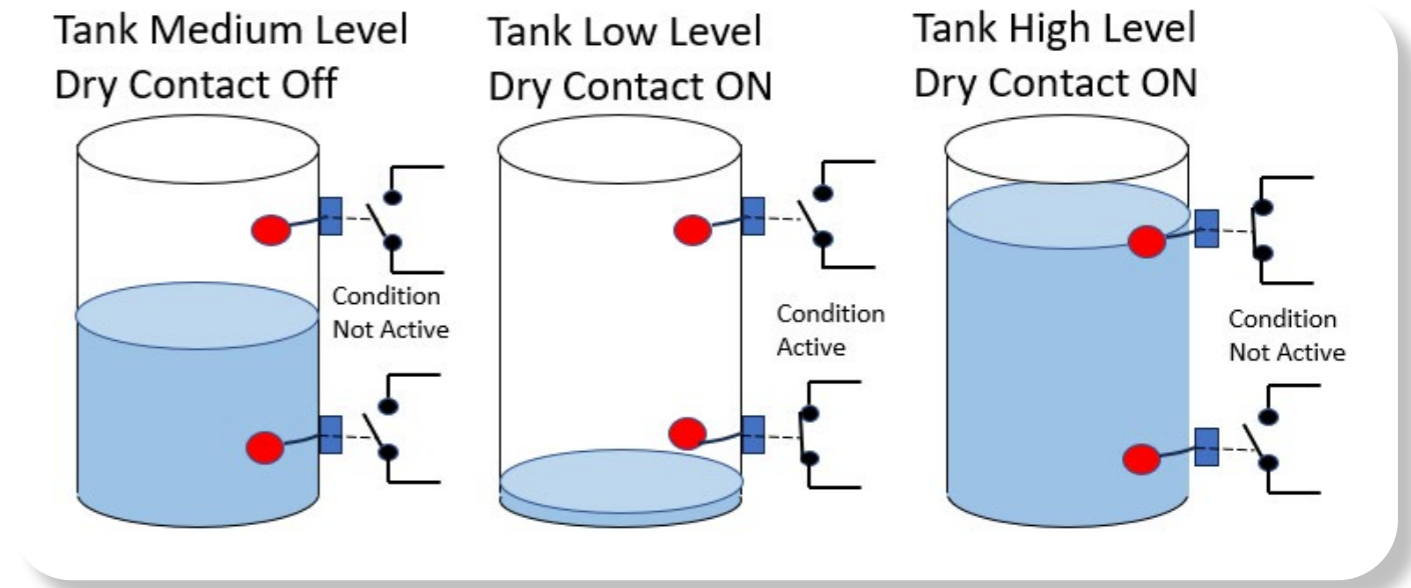
## Type One Shot Digital Input Dry Contact / Analog Input Sensor

- This irrigation program will only run a single cycle when the Trigger is ON. If the Dry Contact trigger or sensor trigger is ON, the program will be queued for execution, but it will only be activated if the Trigger remains ON for the specified On delay time.
- If the Trigger is still ON after the program has completed its cycle, the irrigation program will not start again until the Trigger changes from ON to OFF, and then back to ON again.
- All the program settings are the same for all types, including Only if On, One Shot, and Multi Shots. However, One Shot and Multi-Shot programs have an additional setting for Trigger Off.
- If the Trigger Off (dry contact or sensor) is selected, it will stop the running irrigation program immediately after the Off Delay.
- The Trigger Off has a higher priority than the Trigger ON. When both are active together, the program will not start.

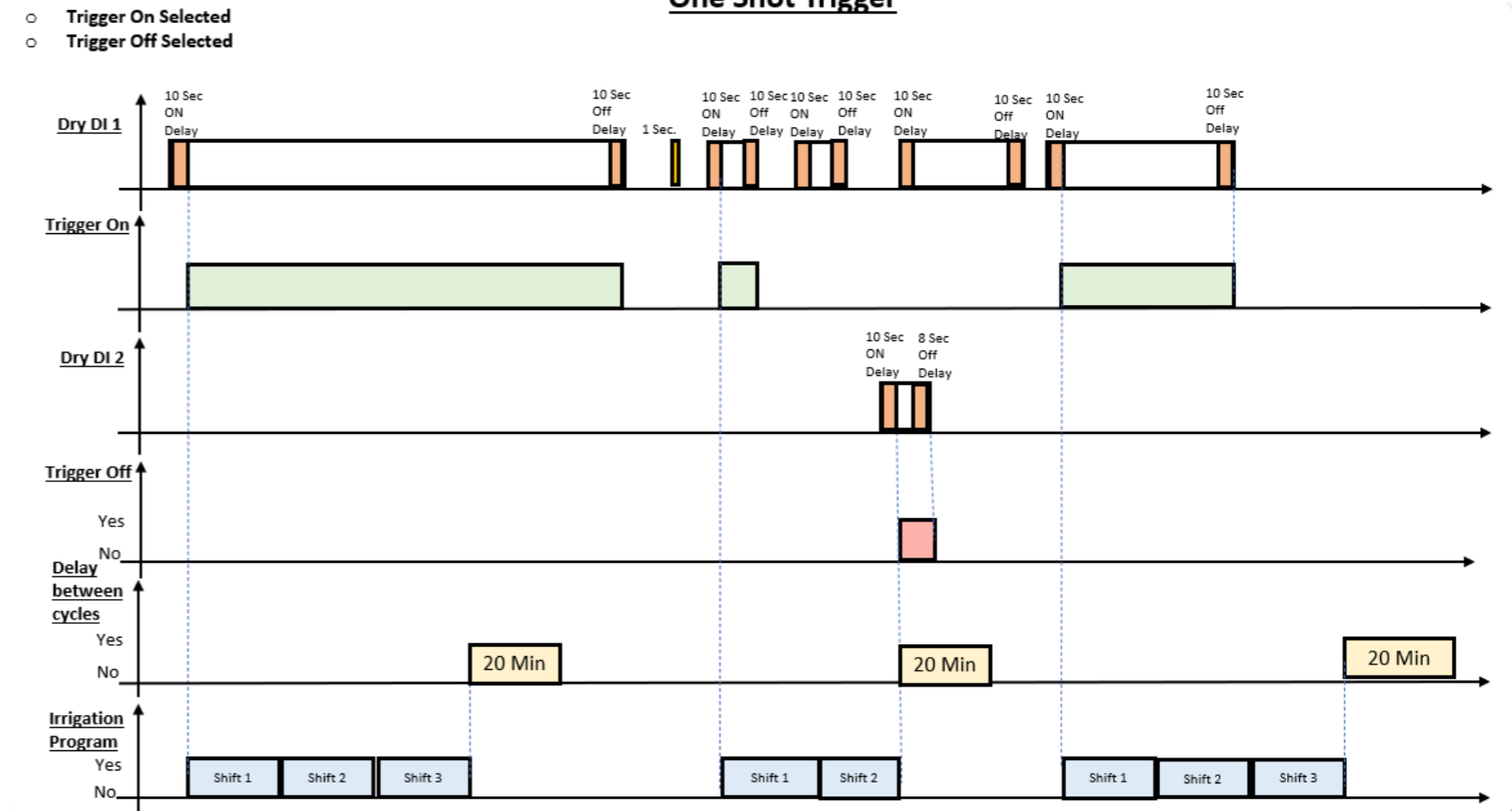
### One Shot Trigger

Example of Condition One Shot

With storage tank and Two float (N.O. Switch)



### One Shot Trigger



## Type - Multi Shots

- When using this function, the irrigation program will only run multiple cycles if the Trigger is ON.
- Once the Trigger is ON, the program will be posted in the Queue manager to be executed. The Trigger must remain ON for the On delay time that has been set by the user in the Settings section. If the Trigger stays ON when the program has finished running all the shifts, the irrigation program will start again.
- The program will only stop running when the Trigger changes from active to inactive, allowing the running program to complete all the shifts. The next time the Trigger is ON, the program will be triggered to start again.
- If the Trigger is turned Off, the program will end immediately after the set Off delay.

Example: when the temperature is lower than 2 C then the condition is Active

When the temperature is higher than 5 C then the condition is Not Active

Temperature Sensor  
Temp Lower than 2°C.  
Condition Active



Temperature Sensor  
Temp Lower than 5°C.  
Condition Not Active



The screenshot displays the 'GrowSphere by NETAFIM' interface for 'Farm - Trigger Mainline 1' under the 'Irrigation' section. The status is 'Uncompleted'. Key settings include:

- Condition A:** Uncompleted, with 'Skip' and 'Resume' buttons.
- Type:** Routine (dropdown), **Amount (shift):** 10:00, **Factor:** 100%, **Total:** 30:00 | 14.50 m³.
- Priority:** Normal (dropdown), **Unit:** MM:SS (dropdown).
- Buttons:** Shifts (3), Dosing, Prop, Settings.
- Start times:** Conditions (dropdown).
- Time period / Trigger / Actual:**
  - 08:00 - 14:00: ON - Dry A (checked)
  - 00:00 - 00:00: ON - No device (unchecked), OFF - No device (unchecked)
- Emergency OFF Switch:** Emrgcy (dropdown), Alert ON (red dot).
- Date range:** 28.08.23, No end (checked).
- Schedule:** Every (X) days (dropdown), 1 day (dropdown).
- Water before & after:** Apply To: Per shift (dropdown), Unit: HH:MM (dropdown), Before: 00:00, After: 00:00.

## 11. Mixing Valves + Pre-Ec

**1** / Mixing valves and  
Pre-EC - Diagram

**2** / Scada diagram with  
Pre-EC control

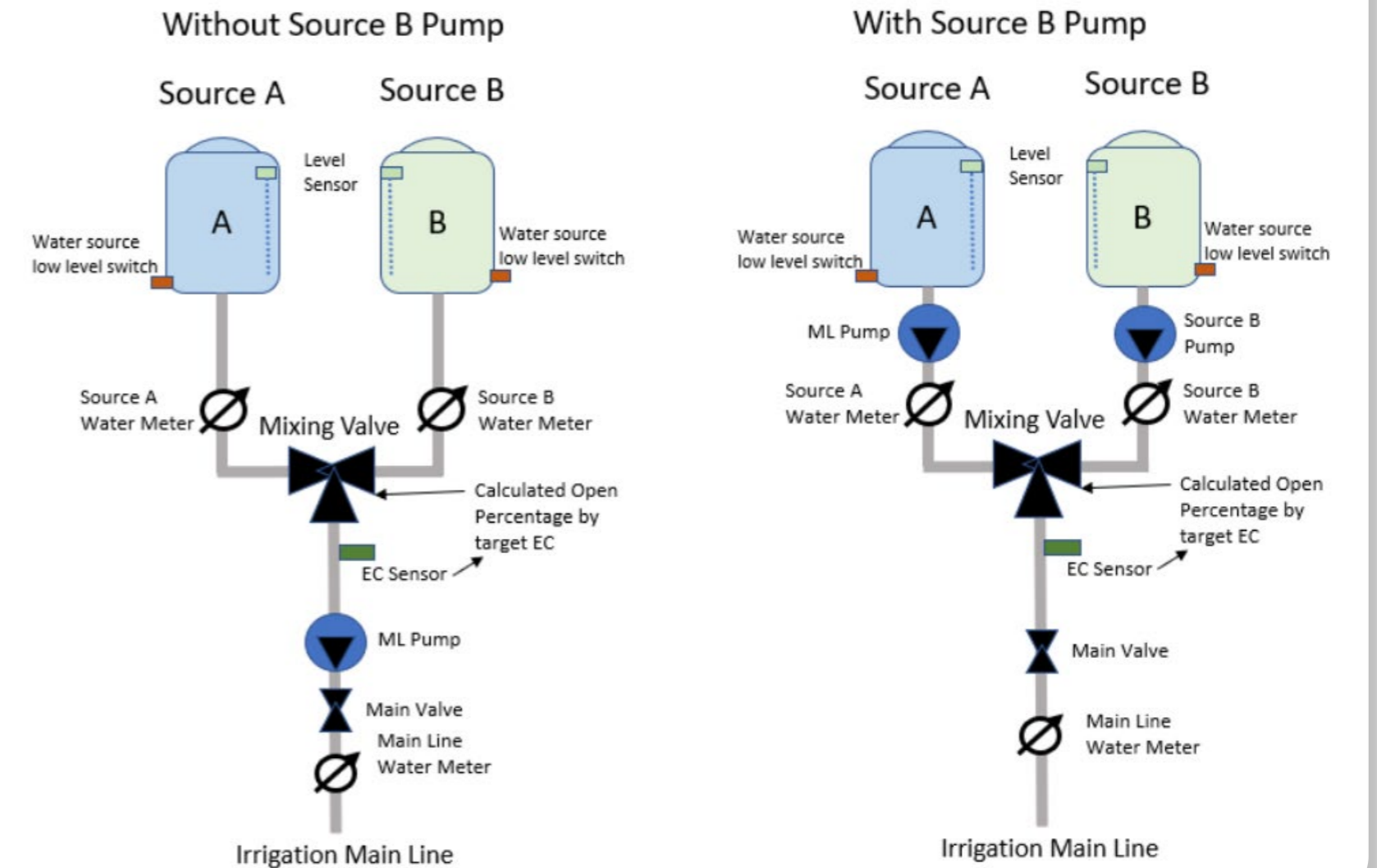
**3** / Mixing Valve Selection  
for Pre-EC Control





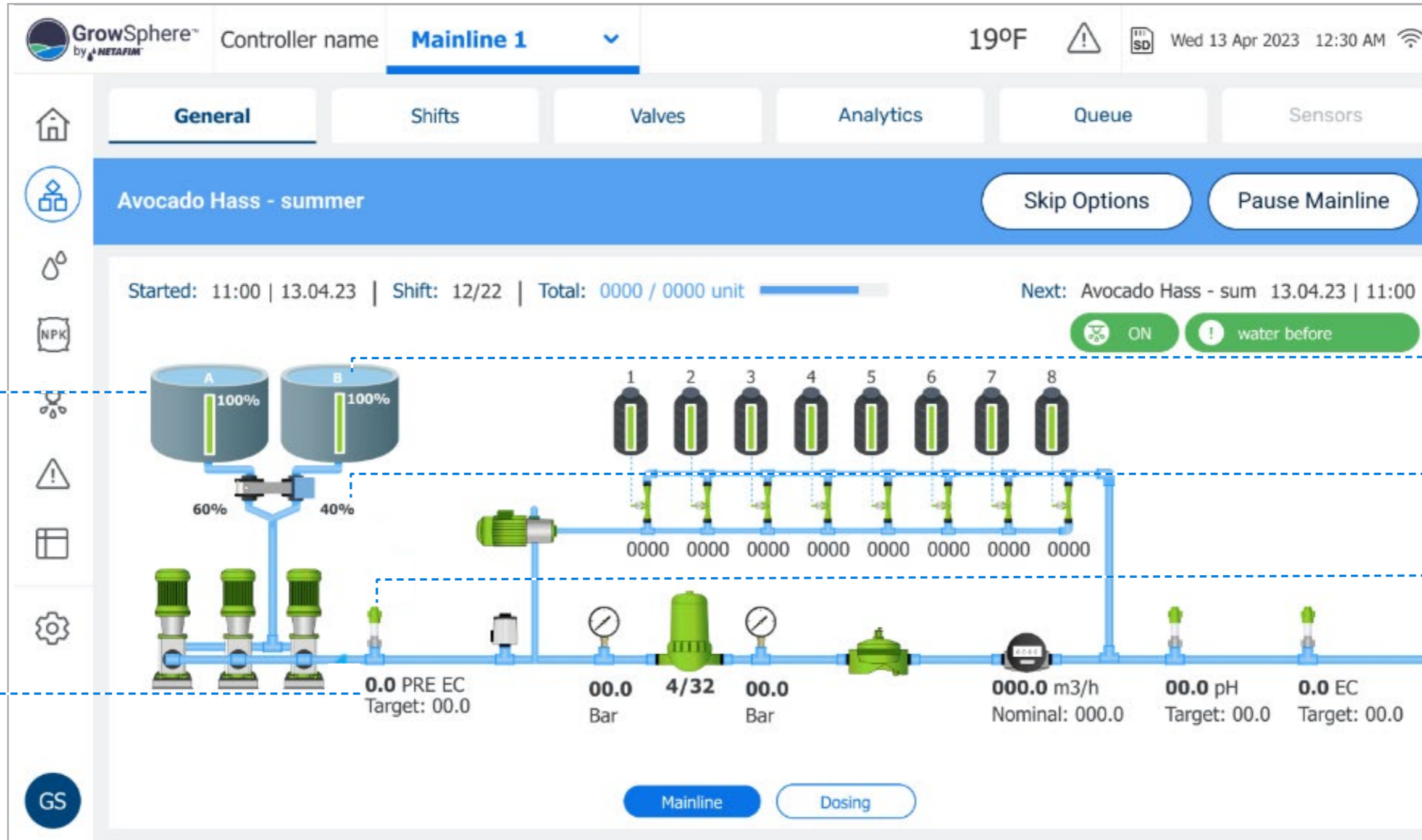
## 11.1 Mixing valves and Pre-EC - Diagram

- The Pre-EC control module controls the two sources of water quantities via a 3-way mixing valve to reach a target Pre-EC value.
- The mixing valve is a motorized 3-way valve with two Inlets, Source A and Source B, and one outlet C.
- The mixing valve will control the Pre EC (Electrical Conductivity) value of the mixing of the Fresh Water Source A with Drained/Maneuver Water Source B; the system has an EC sensor located at the C outlet of the mixing valve.
- The required EC Pre-Control Value can be set in the Dosing Program. The mixing valve will change the opening percentage of water sources A and B to obtain the required pre-EC value measured by the pre-EC sensor.
- Source A will always be with fresh water.
- Source B will always be with drained (maneuver) water. The water Source Low-Level Switch is a digital input from a low-level/low-flout switch. This device will send a signal when there is low-level water from each water source. When the signal is active, it will pause the irrigation process and raise a fault alert.
- The level sensor is an analog sensor that measures the tank level of each water source tank. At the Alerts settings, there will be an option to select the tank level for alerts and alert type.





## 11.2 Scada diagram with Pre-EC control



Source A Fresh Water  
and tank level

Source B Recycle  
Water and tank level

Source B actual  
percentage

Pre EC sensor

Pre EC actual value  
and target

## 11.3 Mixing Valve Selection for Pre-EC Control

The screenshot shows the 'Dosing Station' configuration screen in the GrowSphere MAX software. The top navigation bar includes 'Farm', 'Mainline 1', 'Settings', 'Simulation', and a date/time display. Below the navigation bar are tabs for 'Configuration', 'Local I/O', 'Remote I/O', 'Communication', and 'Wiring Diagram'. The 'Configuration' tab is active, and the 'Dosing Station' sub-tab is selected. The 'Dosing Station' configuration includes:

- Mode selection: 'Extensive' (unselected) and 'Intensive' (selected).
- Dosing Channels: 4 channels.
- Channel configuration table:

CH	1	2	3	4	5	6	7	8
Dosing meter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Agitator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Fert tank level	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				

- Global settings: 'Dosing Booster' (checked), 'Dosing Pressure switch' (unchecked), 'Booster Pump O.L.' (unchecked), 'Agitator pump' (checked).
- Sensors: 'EC Sensors' (1), 'pH Sensors' (1).

In the Dosing Station configuration screen

Sign the Mixing valve indication

## Pre-EC control Mixing Valve – outputs settings

Under Local I/O tab, click on Assign to select the outputs that are related to the EC Pre control

Once clicking Assign, a list of related outputs will be presented

Ensure that the devices below are selected:

The screenshot shows the 'Local I/O' configuration page for a 'PreEc Pump' (Module DO573.1, DO 0). The 'Assign' button is highlighted with a blue arrow. A modal window is open, displaying a list of available outputs. The following table represents the data from the modal window:

Output Name	Count
Valve	(6)
MainValve	(1)
Pump	(0)
Filter	(0)
Main Filter Valve	(0)
Dosing Channel	(4)
Mist Cool pump	(0)
Sub Main valve	(0)
Dosing Booster	(0)
Normal Alarm	(4)
Selector	(0)
Agitator	(8)
Cooling	(0)
Misting	(0)
Mist Cool Main valve	(1)
Critical Alarm	(4)
Condition active	(0)
EC Pre-control open	(1)
EC Pre-control close	(1)
Relay	(0)
Same as DO	(0)
EC Pre-control pump	(1)
Agitator Pump	(1)

Numbered labels on the right side of the modal window indicate the selected outputs:

- 1. Pre-EC pump
- 2. EC Pre-control open
- 3. EC Pre-control close



## Pre-EC control Mixing Valve – Digital Inputs settings

Under Local I/O tab, click on Assign to select the inputs that are related to the EC Pre-control

Ensure you assign the below devices, if are connected:

- Source Low Level (sensor 1)
- Source Low Level (sensor 2)
- Source WM 1(sensor 1)
- Source WM 1(sensor 2)
- Dosing pressure swich

Module	DI	Device type	NO.	Source	Name	Type	Rate	Assigned
PM5052	0	Water Meter	1	M.Line1	WMTR1.1	LPP	0.00	Unassign
PM5052	1	Source Low Level	1	M.Line1	L			
PM5052	2	Source Low Level	2	M.Line1	L			
PM5052	3	Dosing Pressure Sw	1	M.Line1	D			
PM5052	4	Assign	0					
PM5052	5	Source WM	2	M.Line1	SC			
PM5052	6	Source WM	1	M.Line1	W			

AC Fault (0)	Filter Flow Switch (0)	Drain Meter (0)
Water Meter (1)	Delta Pressure (0)	Pump Input Switch (0)
Frequency Meter (0)	Flow Indicator (0)	Fertilizer Meter (0)
Dosing Meter (0)	Dry Contact	Pump Station Pressure Tran(0)
Dosing Pressure Switch (0)	External Pause (4)	Filter Booster Pump (0)
Dosing Booster Protection (0)	Reset Alarm (4)	External Alarm (8)
Pump Overload (0)	Rain Collector (0)	Filter DP Switch (0)
Pump Water Meter (3)	Wind Speed (0)	External Filter (0)
Pre EC tank low level (2)	Pre EC Tank WM (2)	Sub Water meter (0)
Fertilizer Tank Low Level (4)		



## Pre-EC control Mixing Valve – Analogs Inputs settings

1. Under Local I/O tab, Assign the analog sensors that are related to the EC Pre-control

GrowSphere™ by NETAFIM Farm All Mainlines Settings 23.5°C Wed 04 Oct 2023 08:48:36

Configuration Local I/O Remote I/O Communication Wiring Diagram

Local digital output Local digital input Local analog input

Module	AI	Device type	NO.	Source	Name	Input	Unit	Assigned
AI561.1	0	EC	1	M.Line1	EC1.1	4 - 20 mA		Unassign
Input Range (mA)		Output Range		Offset				
4	-	20	=	0	-	5	0.00	
AI561.1	1	EC Pre-Control	1	M.Line1	PreEC1.1	4 - 20 mA		Unassign
Input Range (mA)		Output Range		Offset				
4	-	20	=	0	-	5		

EC Pre-Control (1) Wind Speed Max (0) HygroClip2 (0) NetaCap water conten(0) General 0-5V (0)  
 EC Drain (0) Rain Sensor (0) RTD PT-100 (0) NetaCap soil temperat(0) Drainage Measure Set(0)  
 Filter Pressure Before(0) ET (0) Dendrometer (0) NetaCap ambient tem(0) Wind Direction (0)  
 Filter Pressure After (1) Soil temperature (0) Pyranometer (0) Pressure0\_2p5 (0) Brightness (0)  
 Pressure Sensor (0) Tensiometer (0) Tensiometer ANT100(0) Pressure0\_5 (0) DP Filter Sensor (0)  
 General 0-20mA (0) NetaSense (0) LeafSense (0) Pressure0\_10 (0) Source Level (3)

page 1 of page 2

2. Set the output and input range, name of the sensor and offset

## Pre-EC control Mixing Valve – Analogs Inputs settings

GrowSphere™ by NETAFIM Farm All Mainlines Settings 23.6°C Wed 04 Oct 2023 08:49:13

Configuration **Local I/O** Remote I/O Communication Wiring Diagram

Local digital output Local digital input **Local analog input**

Module	AI	Device type	NO.	Source	Name	Input	Unit	Assigned
AI561.1	2	Source Level	1	M.Line1	Sourc A	4 - 20 mA		Unassign
Input Range (mA)		Output Range		Offset				
4 - 20		= 0 - 100		0.00				
AI561.1	3	Source Level	2	M.Line1	Sourc B	4 - 20 mA		Unassign
Input Range (mA)		Output Range		Offset				
4 - 20		= 0 - 100		0.00				

EC Pre-Control (1) Wind Speed Max (0) HygroClip2 (0) NetaCap water conten(0) General 0-5V (0)

EC Drain (0) Rain Sensor (0) RTD PT-100 (0) NetaCap soil temperat(0) Drainage Measure Set(0)

Filter Pressure Before(0) ET (0) Dendrometer (0) NetaCap ambient tem(0) Wind Direction (0)

**Filter Pressure After (1)** Soil temperature (0) Pyranometer (0) Pressure0\_2p5 (0) Brightness (0)

Pressure Sensor (0) Tensiometer (0) Tensiometer ANT100(0) Pressure0\_5 (0) DP Filter Sensor (0)

General 0-20mA (0) NetaSense (0) LeafSense (0) Pressure0\_10 (0) **Source Level (3)**

page 2 of page 2

By skip between the pages, the source Level sensors can Assigned as well

## Pre-EC control Mixing Valve – Settings

**1. Mixing Valve Travel control Time:** it is the time that takes the mixing valve to change from Home Position to full open; travel time from source A full open to source B full open. This value is described on the mixing valve data sheet. Other option is to measure with a stoper the travel time.

**2. Return to Home Position:** When this option is selected, at the end of the process the mixing valve will return to Home Position, Source A (fresh water) fully open to outlet C.

**3. EC Pre Control activation.**

**4. Pre EC-Control cycle,** it is a travel time from the valve last position change time to the EC Sensor reaction. The units are Second, the default value is 8 Sec.

**5. Dead Band, it is the delta value,** set by the user, from the Pre EC target. When the actual value reaches these limits, the valve will stay at this position. No corrections will be made. The default value is 0.1mS/cm.

**6. EC Pre- Fine Tuning Control Range,** it is a control range for fine-tuning adjusting. The value is a delta value from the target Pre EC value. The default is 0.4, it is a fixed value.

**7. Pre-EC Control Course Tuning:** Step It is a calculated time for the length of the time that the valve will be activated for a correction of the course tuning. This value is the percentage of the total Valve control time.

**8. Pre-EC Control Fine Tuning:** Step It is a calculated time for the length of the time that the valve will be activated for a correction of the fine tuning. This value is the percentage of the total Valve control time.

Setting	Value	Unit
Mixing valve travel control time	90	sec
Return to home position	<input checked="" type="checkbox"/>	
Pre EC control	<input checked="" type="checkbox"/>	
EC Pre- Control Cycle	6	sec
Control dead Band	0.10	mS/cm
EC Pre- Fine Tuning Control Range	0.40	mS/cm
Pre-EC Control Course Tuning - Step	5.00 %	
Pre-EC Control Fine Tuning - Step	2.00 %	

## Pre-EC control Mixing Valve – Dosing Recipe

The screenshot displays the GrowSphere MAX web interface. At the top, the header includes the GrowSphere logo, the farm name 'Farm', the mainline 'Mainline 1', and the active menu 'Dosing'. The date and time are shown as 'Wed 04 Oct 2023 10:32:37'. Below the header, there are navigation tabs: 'Recipes' (selected), 'Overview User', 'Overview Technician', 'General Settings', and 'Channels Settings'. The main content area shows a list of recipes. The first recipe is '1 Pre EC', which is checked. Below it are several 'Insert new recipe' buttons, each accompanied by a plus sign and a small icon representing a different fertilizer or nutrient (NPK, a warning triangle, a calendar, a gear, and FM).



## Pre-EC control Mixing Valve – Dosing Recipe

The screenshot displays the GrowSphere MAX user interface for configuring a dosing recipe. The top navigation bar includes the GrowSphere logo, farm name 'Farm', mainline 'Mainline 1', and the 'Dosing' section. The interface shows a 'Pre EC' configuration with a 'Linked programs' field set to '-'. Target values are displayed as EC 1.70 and pH 6.00. The 'EC supply' is set to 1.30. Below this, a table lists four dosing channels (DCH1.1 to DCH1.4) with their respective methods (1/1000), quantities (11 L, 8 L, 6 L, 3 L), and DM Control status (-). A sidebar on the left contains navigation icons, with the 'NPK' icon highlighted. The bottom left corner features an 'FM' icon.

Active	ID	Dosing Channel	Method	Quantity / Time	Value	DM Control
<input checked="" type="checkbox"/>	1	DCH1.1	1/1000	Quantity	11 L	-
<input checked="" type="checkbox"/>	2	DCH1.2	1/1000	Quantity	8 L	-
<input checked="" type="checkbox"/>	3	DCH1.3	1/1000	Quantity	6 L	-
<input checked="" type="checkbox"/>	4	DCH1.4	1/1000	Quantity	3 L	-

## 12. Remote Units

**1** / Weather station

**2** / RadioNet to  
GrowSphere™ MAX

**3** / SingleNet to  
GrowSphere™ MAX

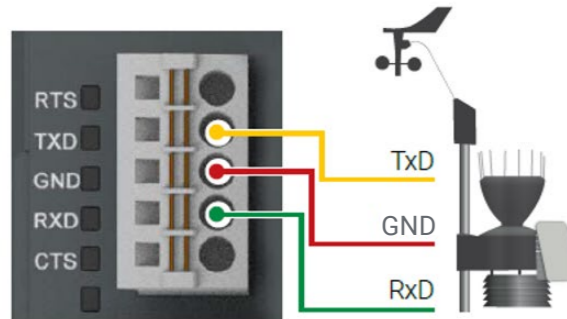


## 12.1 Weather Station

The controller Supports RadioNet, SingleNet, NetRTU & Davis WS.

- SingleNet and RadioNet - RS485
- Davis Weather Station - RS232
- NetRTU - RS232, 2nd module/ The module for the NetRTU should be ordered and connected separately.

/RS232 Module



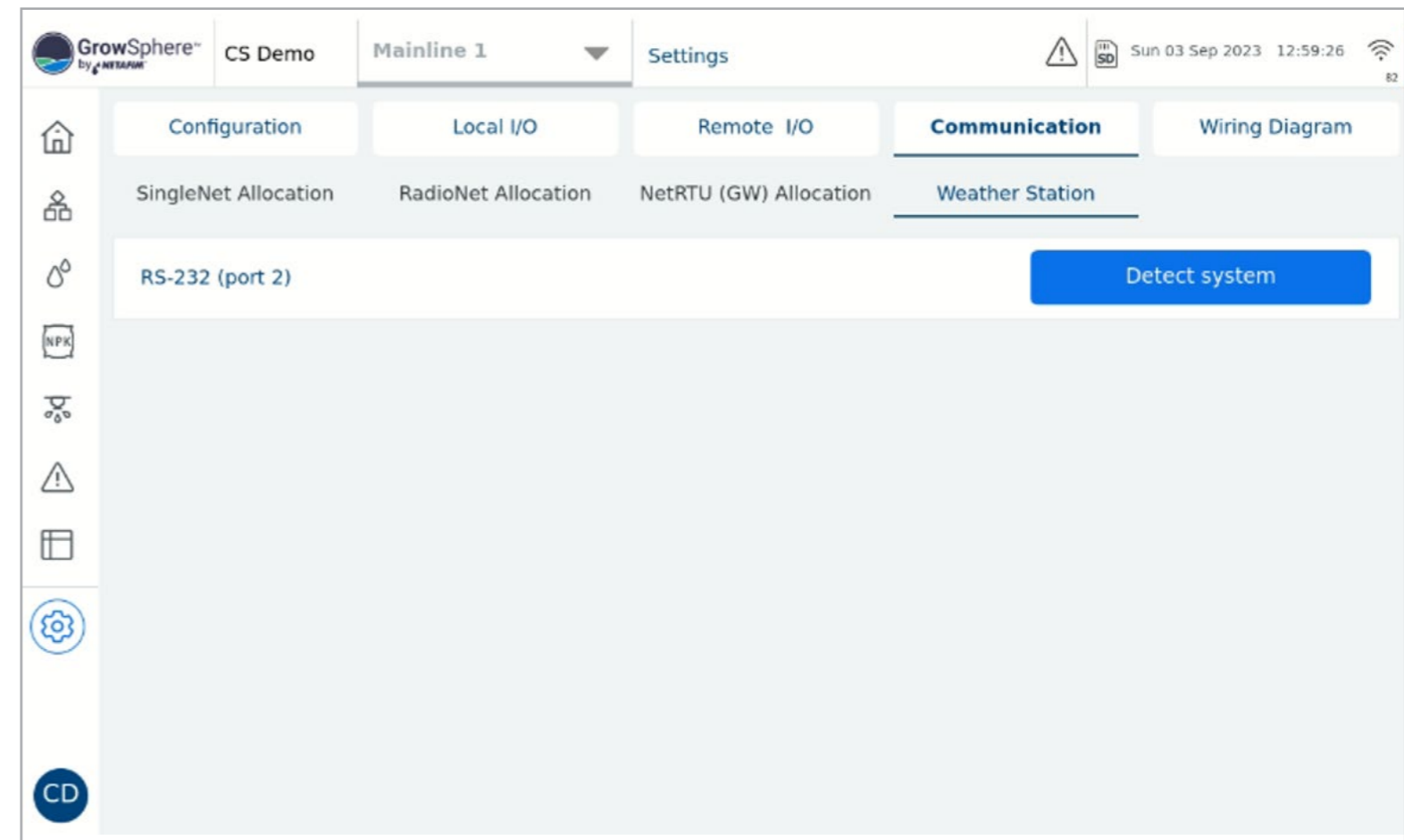
Signal	Description
RTS	Request To Send DCE is ready to accept data from the DTE
TxD	Transmit Data (output)
GND	Common Ground
RxD	Receive Data (input)
CTS	Clear To Send (input) DCE is ready to accept data from the DTE

State LEDs

Signal	Color	State	Description
TxD	Yellow	ON (blinking)	Transmitting
RxD	Yellow	ON (blinking)	Receiving

**Connect to Davis Weather station.**

**The data has been collected and will be presented on the GrowSphere(TM) Cloud.**



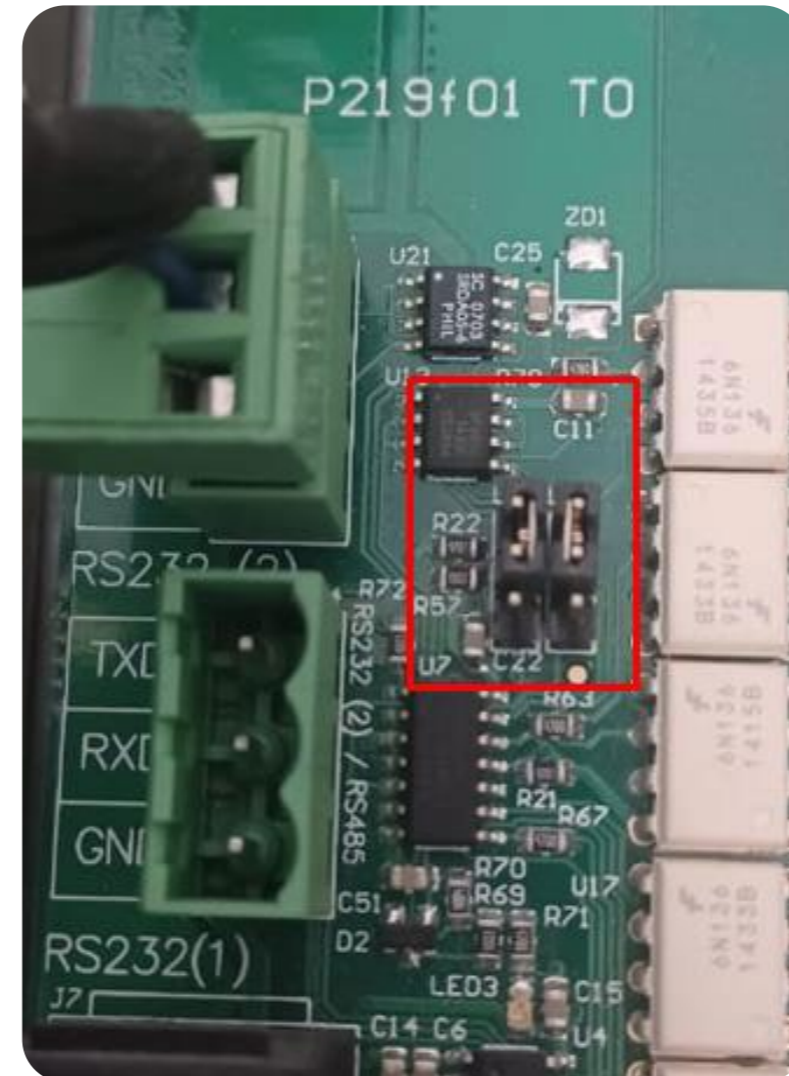
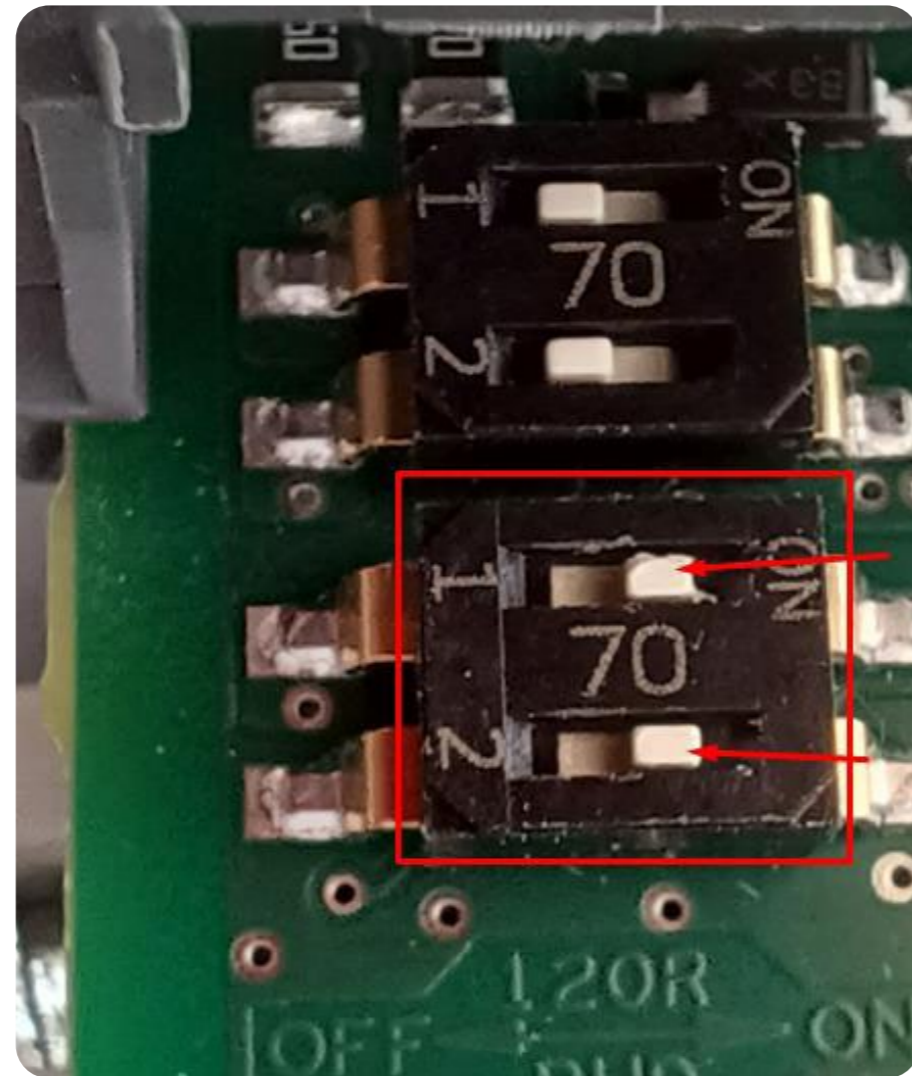


## 12.2 RadioNet to GrowSphere™ MAX

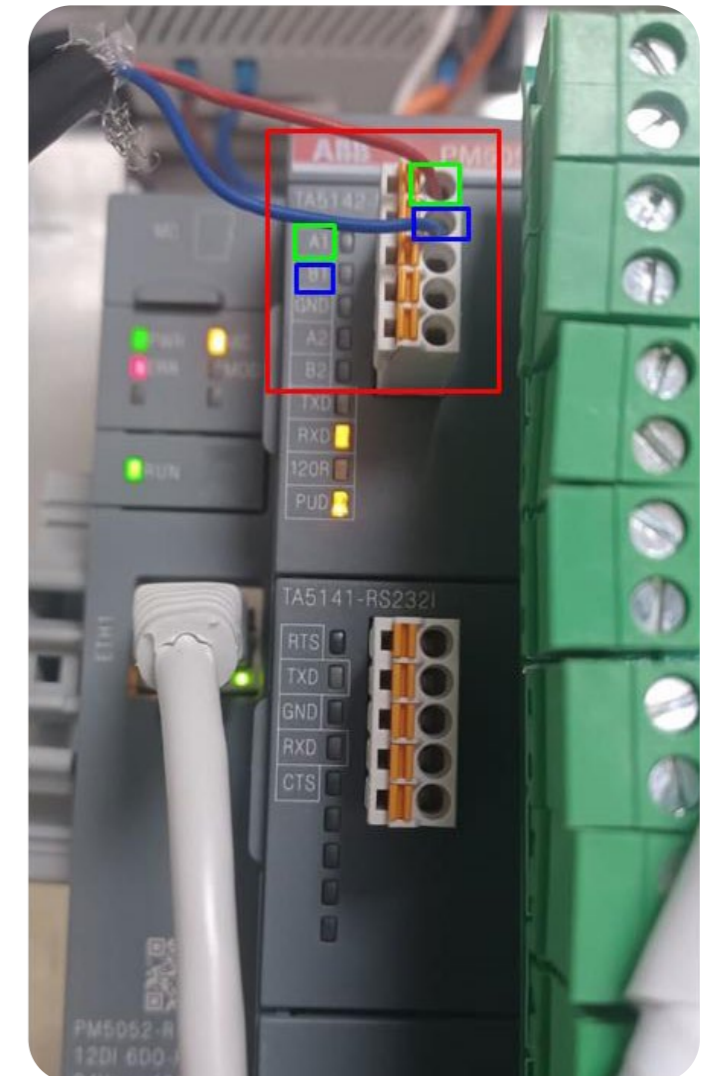
RadioNet interface with GS is currently only via RS485. RS485 Module must be installed on Upper Port. Note the “DIP Switch” position on the RS 485 module marked in RED Must be towards the “ON” Side

### I Wiring Between Host & GS max Controller

A to A & B To B. LK1 & LK2 Jumper on the RadioNet Host should be on Upper side



RadioNet host

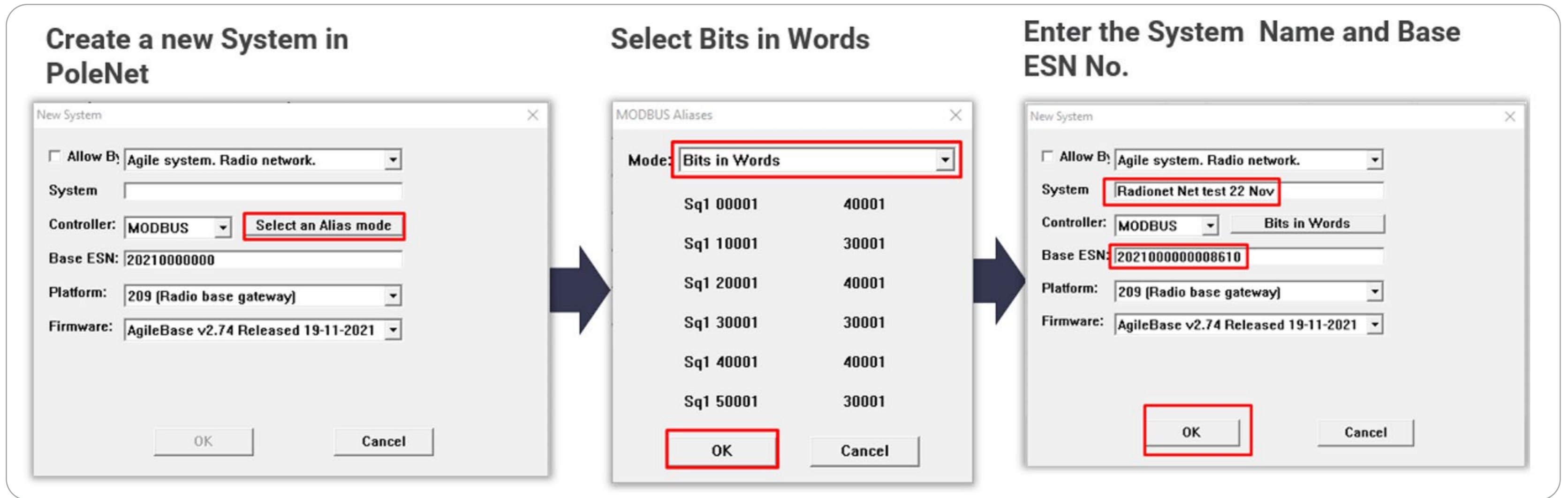


GrowSphere™ Max

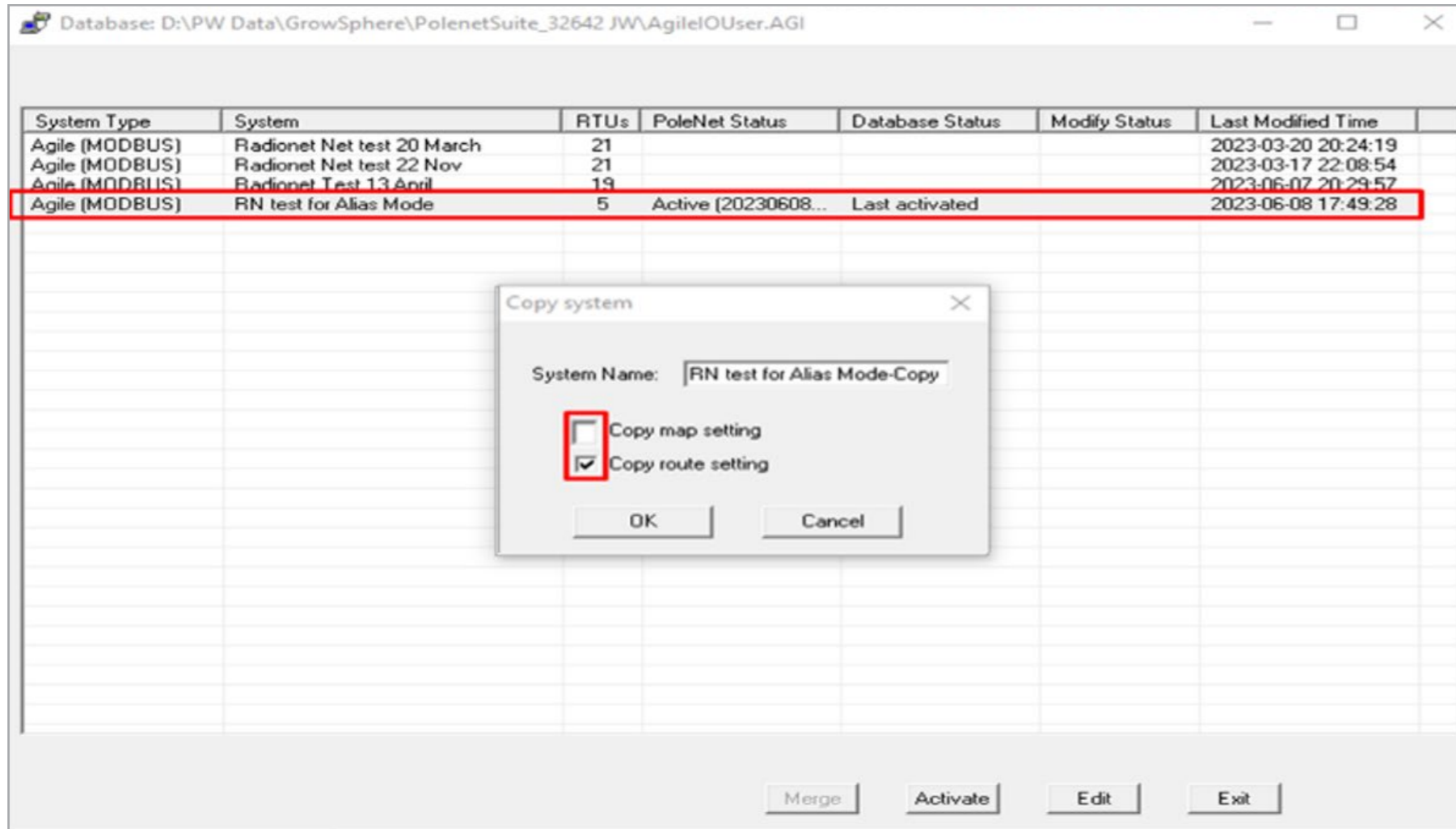


Required Polenet Version - Always Check for Latest & Recommended Versions of PoleNet & Polenet2Max App. Use PoleNet Version: 3.26.42 Or latest Version.

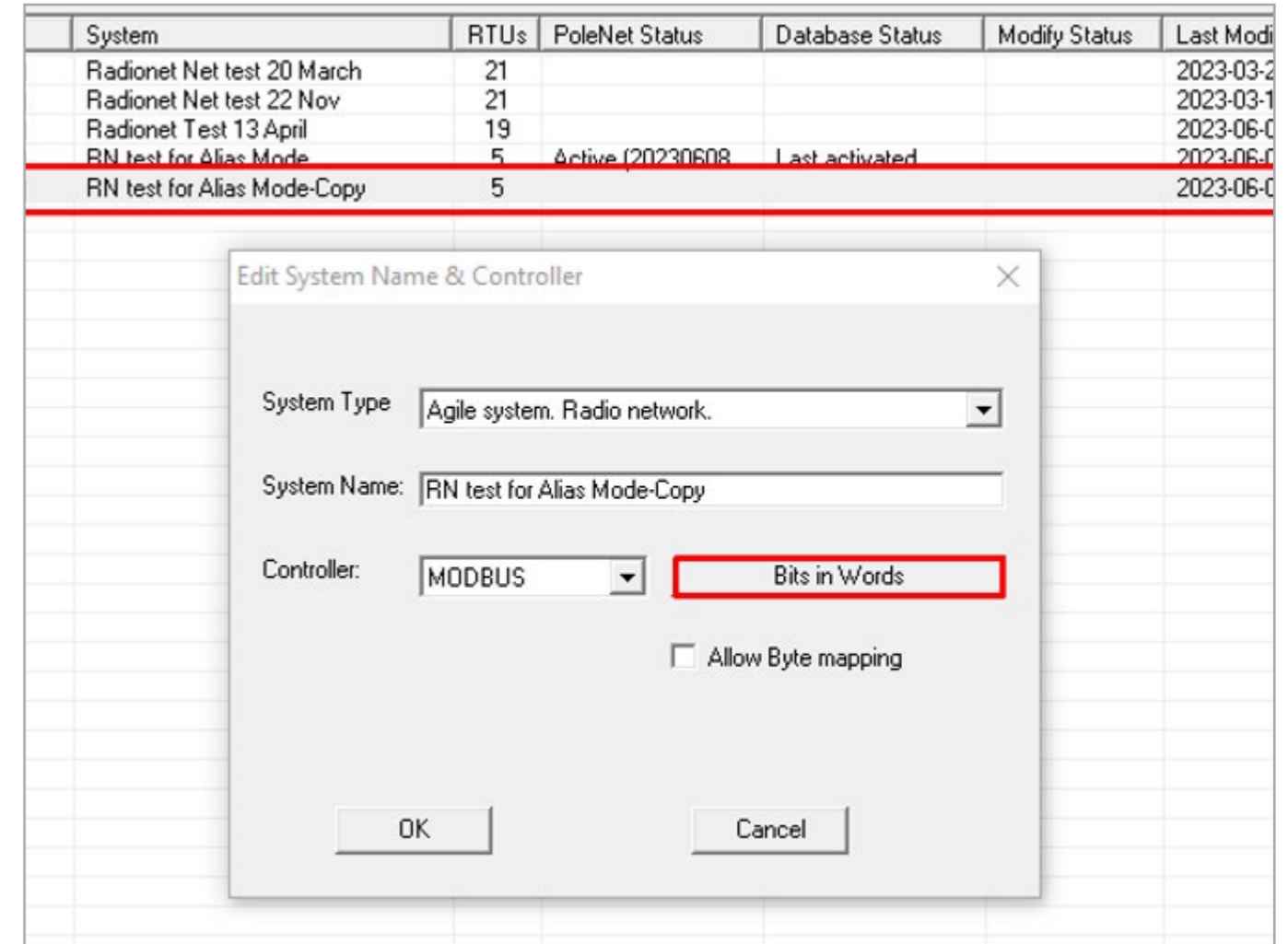
- Use Host Firmware Version: 3.29.24 Or the latest Version
- Use Base Firmware Version: 2.74 Or the latest Version



If you want to connect the existing “RadioNet from NetBeat to GS Max,” then you need to make some Changes in Polenet:

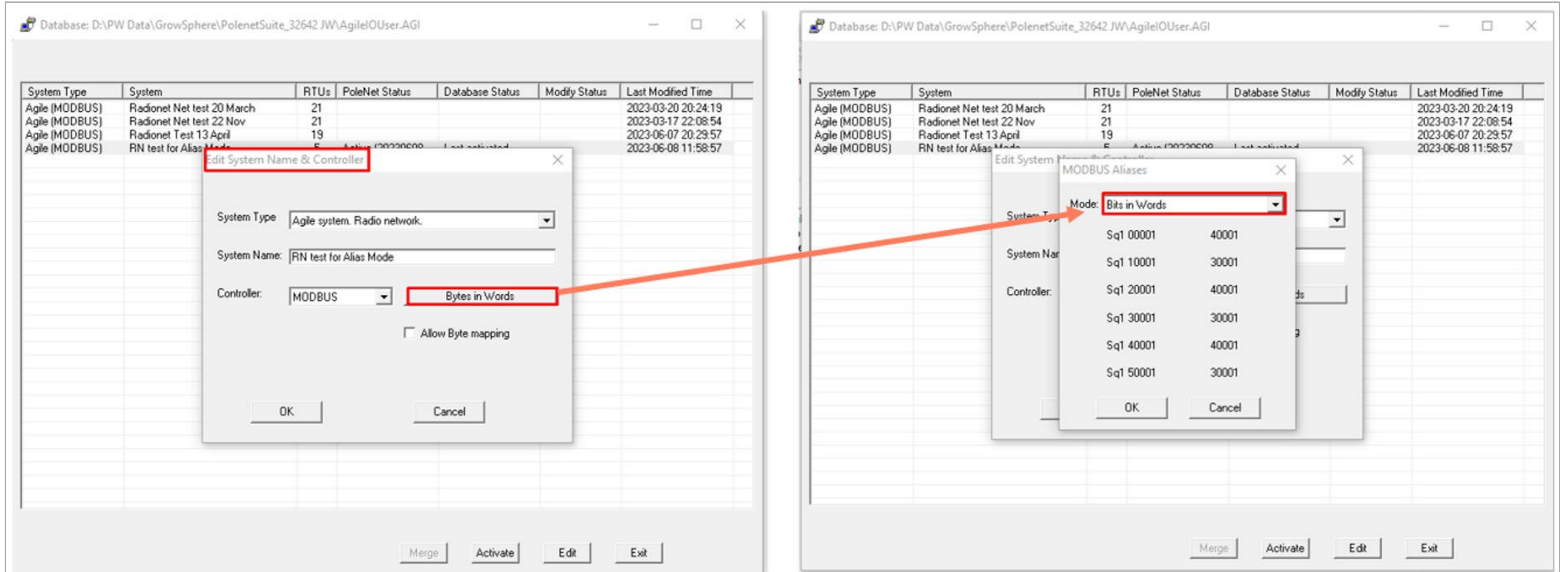


Right-click on Activated File and Copy Radionet System. Uncheck Map & Route Setting & Click “OK”



Right Click on Copied System and Select “ Edit System name & Controller” and Change Alias Mode to “Bits in Words”

Earlier System Alias Mode was “Bytes in Words.” for GS Max, we Need to Change to “Bits in Words”.





If your Radionet System Connected with NMC, then you need to Change Controller Type to “ModBus” & Alias Mode “Bits in Words” for GS Max .

Database: D:\PW Data\GrowSphere\PolenetSuite\_32642 JW\AgileIOUser.AGI

System Type	System	RTUs	PoleNet Status	Database Status	Modify Status	Last Modified Time
Agile (MODBUS)	Radionet Net test 20 March	21				2023-03-20 20:24:19
Agile (MODBUS)	Radionet Net test 22 Nov	21				2023-03-17 22:08:54
Agile (MODBUS)	Radionet Test 13 April	19				2023-06-07 20:29:57
Agile (MODBUS)	RN test for Alias Mode	5	Active (20230608...	Last activated		2023-06-08 17:49:28
Agile (MODBUS)	RN test for Alias Mode-Copy	5				2023-06-08 17:49:28

Database: D:\PW Data\GrowSphere\PolenetSuite\_32642 JW\AgileIOUser.AGI

System Type	System	RTUs	PoleNet Status	Database Status	Modify Status	Last Modified Time
Agile (MODBUS)	Radionet Net test 20 March	21				2023-03-20 20:24:19
Agile (MODBUS)	Radionet Net test 22 Nov	21				2023-03-17 22:08:54
Agile (MODBUS)	Radionet Test 13 April	19				2023-06-07 20:29:57
Agile (MODBUS)	RN test for Alias Mode	5	Active (20230608...	Last activated		2023-06-08 17:49:28
Agile (MODBUS)	RN test for Alias Mode-Copy	5				2023-06-08 17:49:28

System Type: Agile system. Radio network.

System Name: RN test for Alias Mode-Copy

Controller: NMC PRO Bits in Words

MODBUS Bits in Words

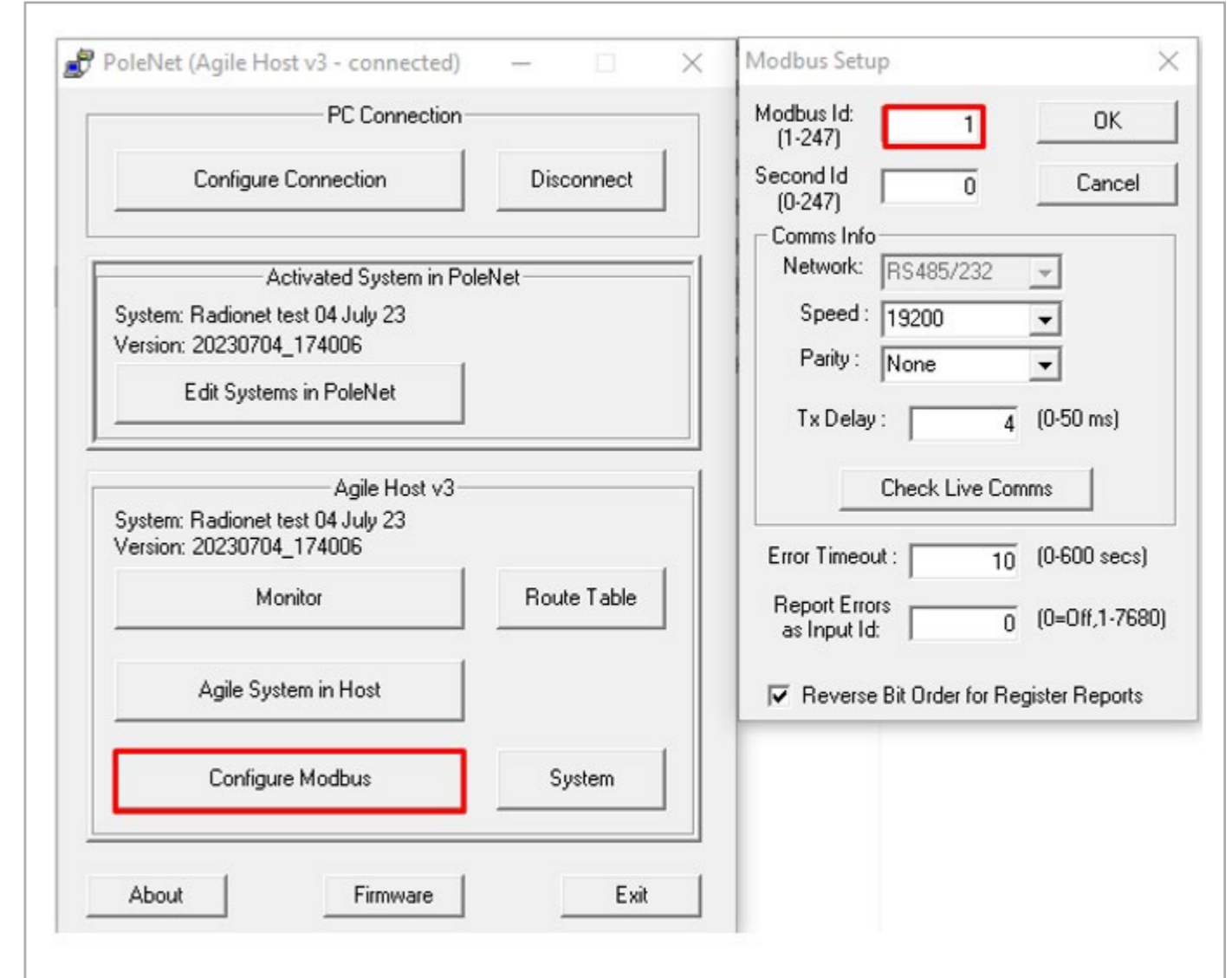
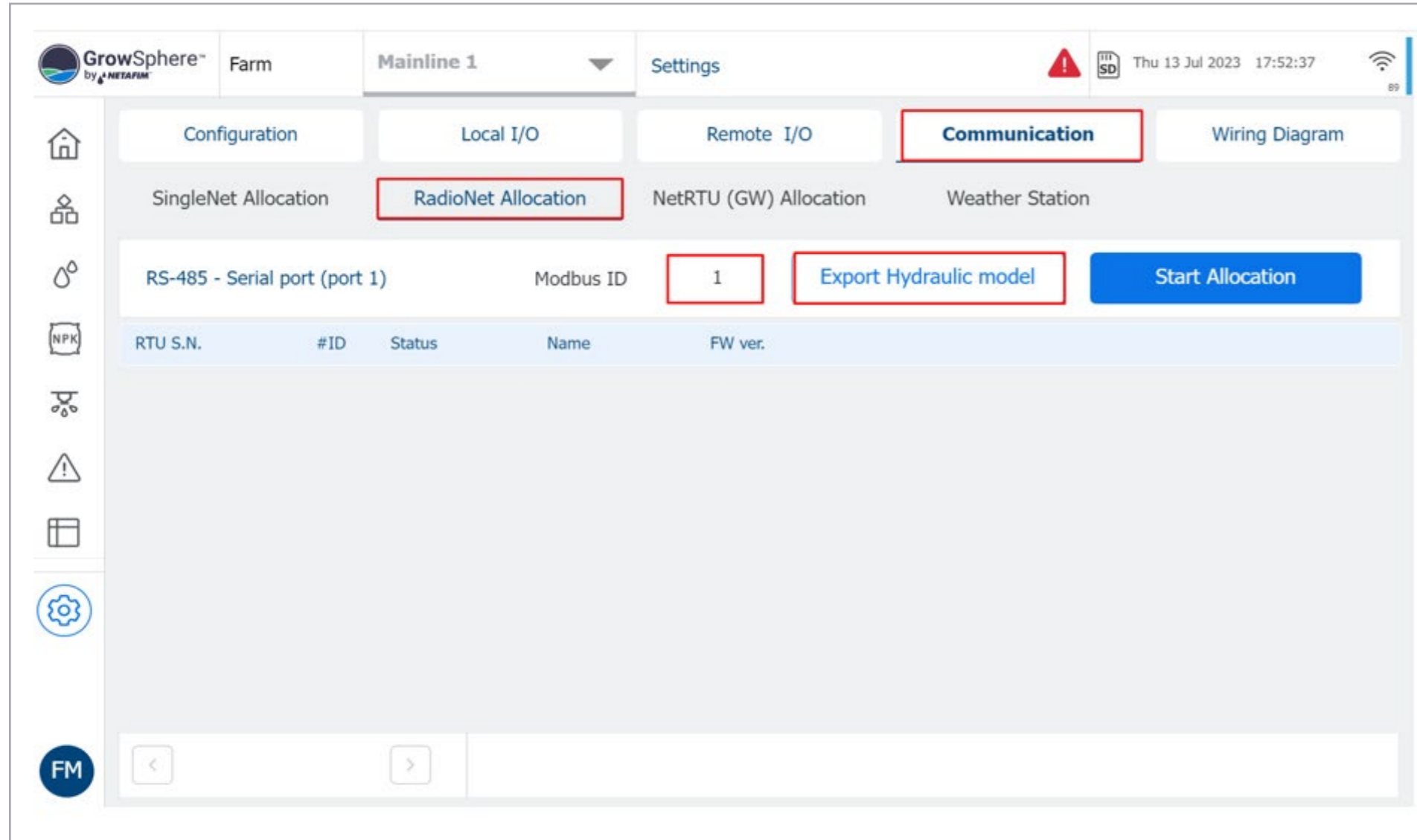
Allow Byte mapping



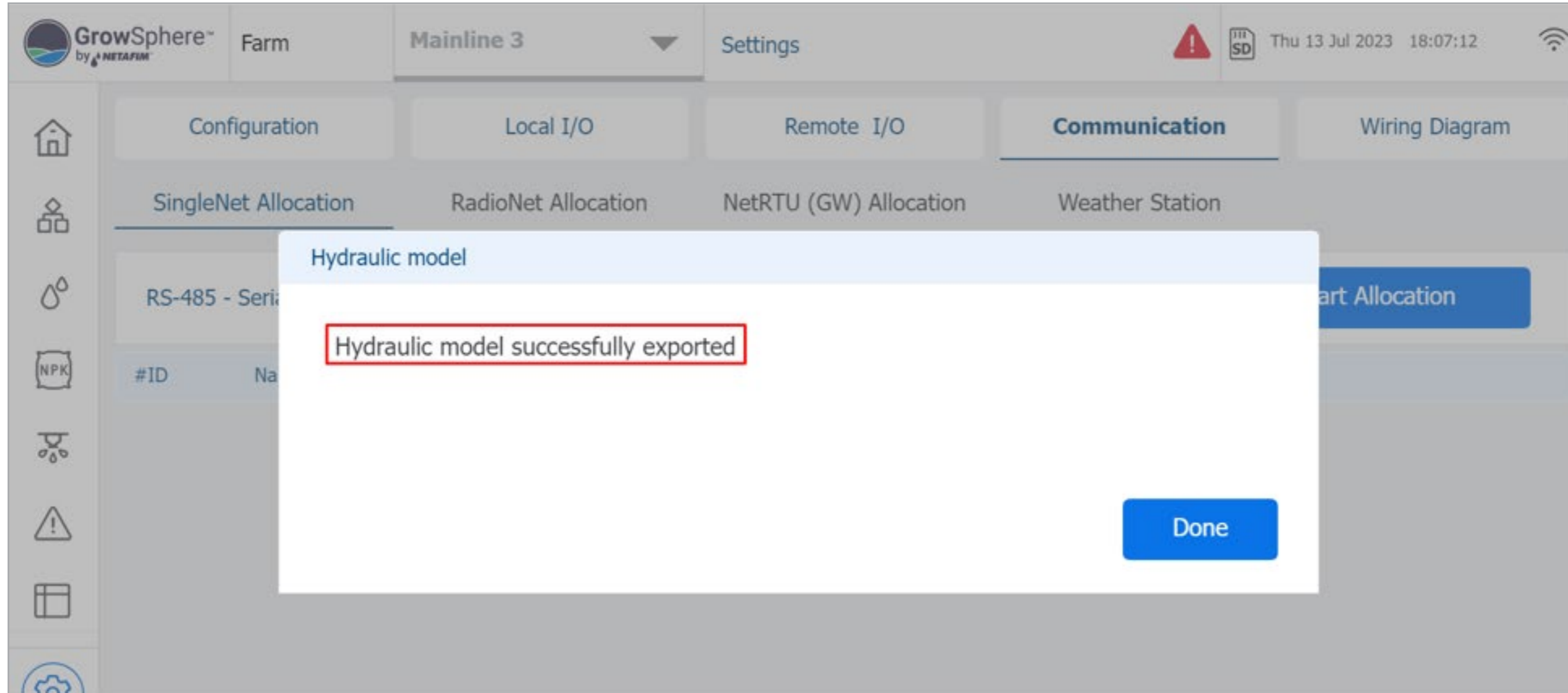
Make sure that all RTUs with expansion cards are added & Activate the System.

System Type	System	RTUs	PoleNet Status	Database Status	Modify Status	Last Modified Time
Agile (MODBUS)	Radionet 12Jan22	10				2023-01-12 19:42:31
Agile (MODBUS)	Radionet Net test 22 Nov	21	Active (20230103...	Last activated		2023-01-03 22:29:22













Navigate to Settings >> Communication >> Select RadioNet >> Export Hydraulic Model. Also Check Modbus ID is same on Modbus Setup & Allocation Screen.



## After Successful “Export”, Click on Done



## Open “Polenet2Max” Application

Name	Date modified	Type	Size
 configuration.properties	11/15/2022 1:13 PM	PROPERTIES File	1 KB
 D3DCompiler_47_cor3.dll	5/6/2022 8:46 PM	Application extens...	4,031 KB
 devices_types	11/10/2022 7:00 PM	JSON File	23 KB
 illust58-1841	11/28/2022 5:35 PM	JPG File	1,468 KB
 Penlmc_cor3.dll	11/19/2022 11:16 PM	Application extens...	143 KB
 Polenet2Max	1/18/2023 2:32 PM	Application	155,001 KB
 Polenet2Max.pdb	1/18/2023 2:31 PM	PDB File	50 KB
 PresentationNative_cor3.dll	10/13/2022 11:46 PM	Application extens...	924 KB
 sni.dll	7/12/2017 4:54 PM	Application extens...	134 KB
 SQLite.Interop.dll	11/2/2021 11:17 PM	Application extens...	1,343 KB
 vcruntime140_cor3.dll	11/10/2022 8:04 AM	Application extens...	89 KB
 wpfgfx_cor3.dll	11/19/2022 11:18 PM	Application extens...	1,763 KB



# GrowSphere™

## Legacy System Configuration Tool

V 3.6.0.2

### Chose System Type

Radionet

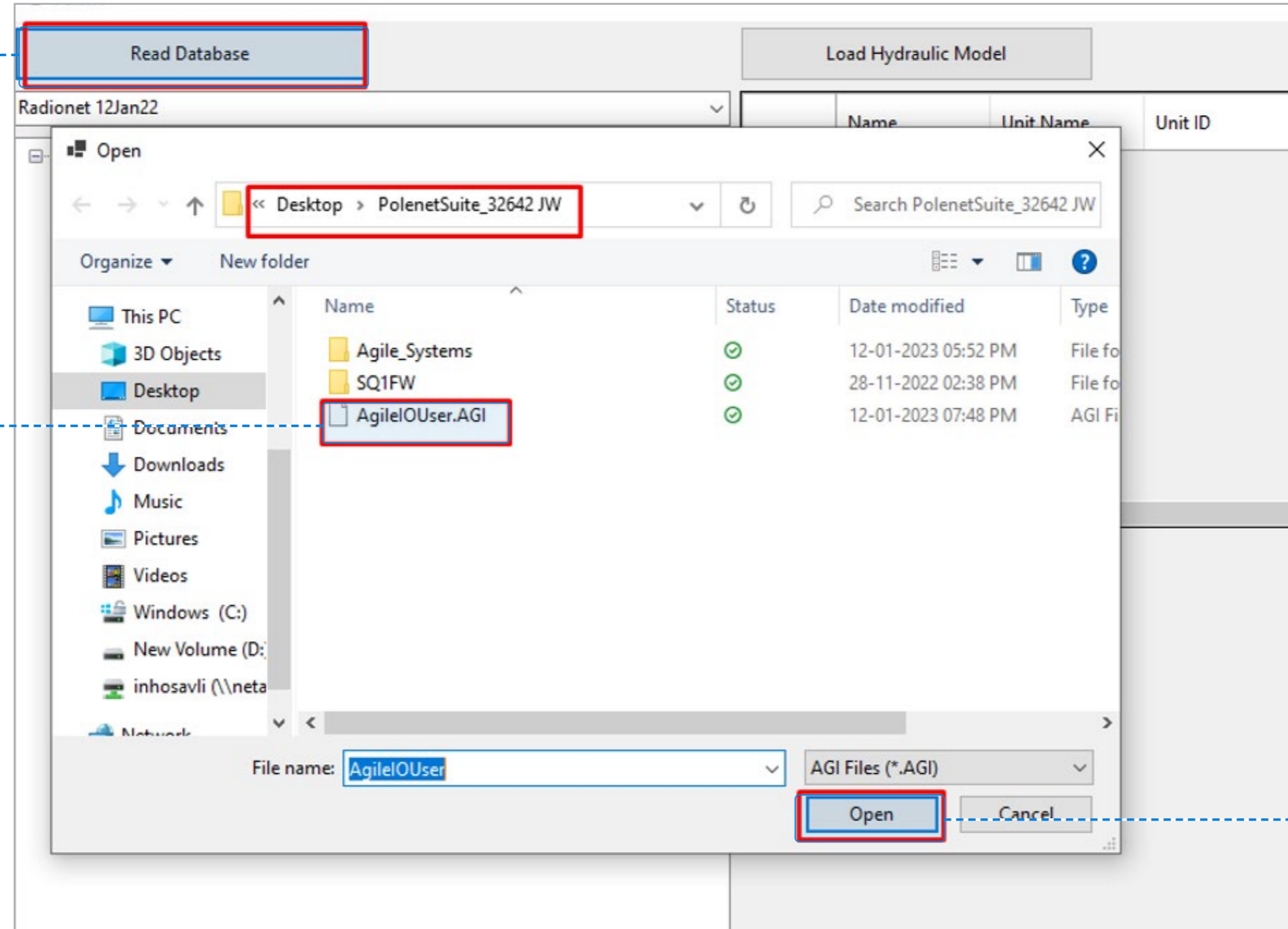
Singlenet

Select RadioNet

Select Read Database, Select AgileIOUser.AGI file from the PoleNet folder, click Open

Select Read Database

Select AgileIOUser.AGI file from the PoleNet folder



Click open

Chose correct file from list after Read Database.

The screenshot displays a software interface with several tabs: 'Read Database', 'Load Hydraulic Model', 'Digital Outputs', 'Digital Inputs', and 'AI+ Serial'. A dropdown menu is open under 'Read Database', listing various files such as 'adionet Net test 22 Nov', 'adionet Test Or GS 04 Sep', and 'Unit 11025 (2021000000011025)'. The 'Load Hydraulic Model' tab is active, showing an empty table with the following columns: Name, Unit Name, IO Card, IO Address, Modbus Addresses, Mapped Device Type, Main Line, and Device Type ID. On the right side, there is a 'Utilities' panel with buttons for 'Open Polenet', 'Auto Modbus Mapping', 'configuration', and 'Load Previous System'. A 'Save and Export' button is located at the bottom right of the interface.

PoleNet File and list of RTUs will be displayed

The screenshot shows the 'Form1' window in the GrowSphere MAX software. On the left, a tree view is expanded to 'Radio Test 13 Feb', showing a list of RTUs including a Base and multiple Units with their respective Modbus addresses. A red box highlights the 'Radio Test 13 Feb' folder name. A blue dashed line points from the text above to this folder. The main area of the window is a table with the following columns: Name, Unit Name, IO Card, IO Address, Modbus Addresses, Mapped Device Type, Main Line, Device Type ID, Device Number, Nominal Area, and Nominal Flow Rate. The table is currently empty. On the right side, there is a 'Utilities' panel with buttons for 'Open Polenet', 'Auto Modbus Mapping', 'configuration', 'Load Previous System', and 'Save and Export'.



Click Auto Modbus Mapping and wait for message "Mapping Done", click Ok

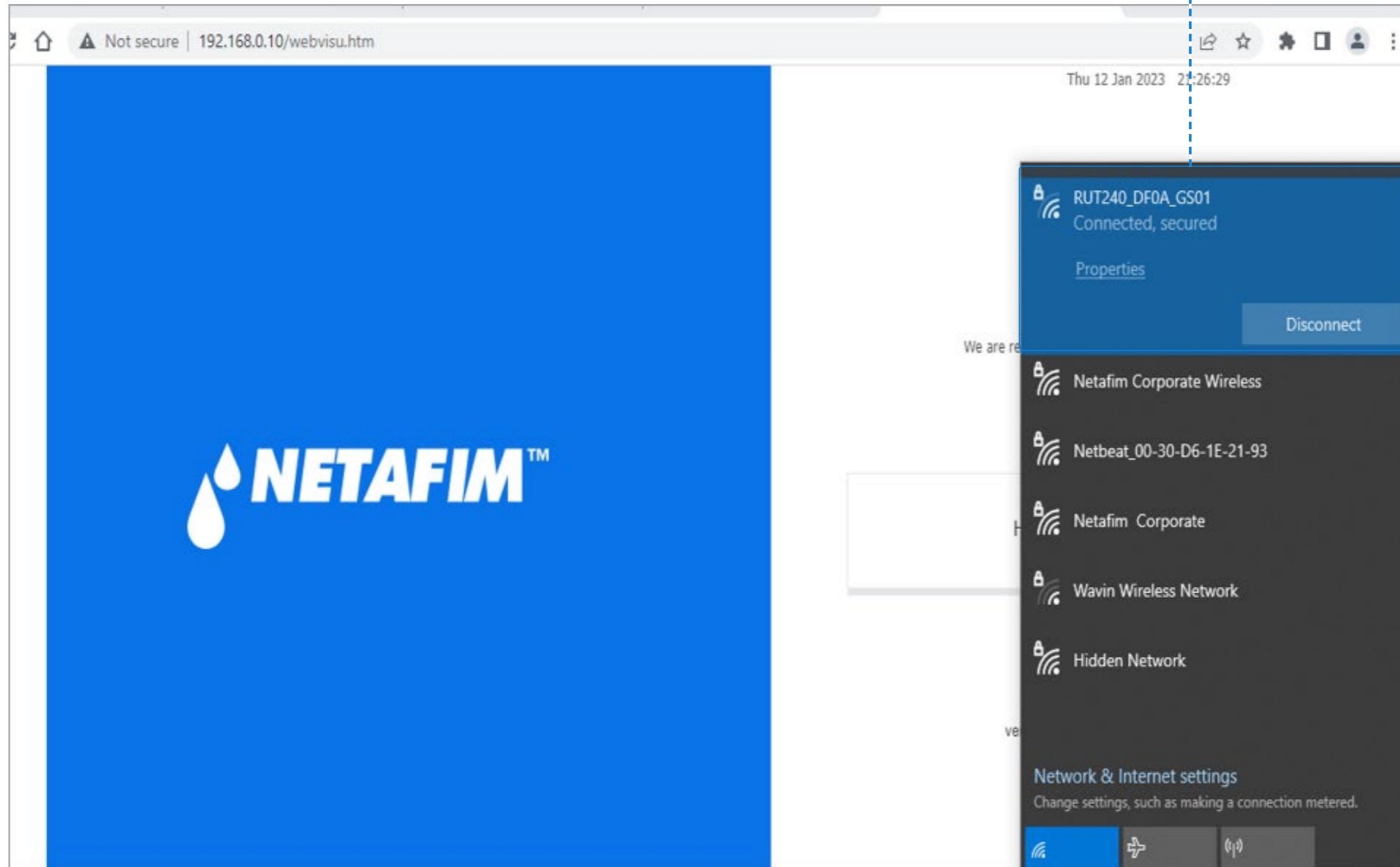
The screenshot shows the software interface with the following components:

- Left Panel:** A tree view showing a folder 'Radionet Net test 22 Nov' containing a 'Base (202100000008610)' and a list of units from 'Unit 09279' to 'Unit 26309'.
- Top Panel:** A series of tabs: 'Read Database', 'Load Hydraulic Model', 'Digital Outputs', 'Digital Inputs', and 'AI+ Serial'.
- Right Panel:** A 'Utilities' panel with buttons for 'Open Polenet', 'Auto Modbus Mapping' (highlighted with a blue border), 'configuration', and 'Load Previous System'.
- Main Table:** A large empty table with columns: Name, Unit Name, Unit ID, Mapped Device Type, Main Line, Remote/Local, IO Card, IO Address, Modbus Address A, Modbus Address B, Modbus Address C, and Dev ID.
- Bottom Panel:** A 'Device Parameters' section with the following data:
 

IO Type	<b>Digital Input</b>
RTU	Unit 09279
IO Number	1
- Dialog Box:** A small window titled 'Mapping done' with an 'OK' button, overlaid on the main interface.



Connect to GS (in pic it is via RUT240 xx Modem)





Wait for Message "File loaded successfully", Click OK

Click on "Load Hydraulic Model", Select Path sdcard >> RemoteSys >> Hydraulic Model.csv & Click on Open

The screenshot shows the software interface with the following components:

- Left Panel:** A tree view showing a hierarchy of units from Unit 000 to Unit 035.
- Top Center:** A 'Load Hydraulic Model' dialog box with an 'Open' button highlighted in red.
- Center:** A file explorer window showing the path '192.168.0.10 > sdcard > RemoteSys > Hydraulic Model.csv'. The file is highlighted in blue, and the 'Open' button is also highlighted in red.
- Right Panel:** A table with columns 'IO Address', 'Modbus Address A', 'Modbus Address B', and 'Modbus Address C'. It contains 17 rows of data.
- Bottom Panel:** 'Device Parameters' section for a 'Digital Output' device. Fields include RTU (Unit 000), IO Number (1), Mainline (Main Line 1), Device Name (Pump 1), Flow (4), Area (1), and Unit (dropdown). A list of devices is shown on the right, with 'Pump 1' selected.



Digital Outputs / Inputs / AI+Serial can be assigned by selecting relevant Tabs

The screenshot displays the software interface for configuring digital outputs, inputs, and AI+Serial. The interface is divided into several sections:

- Top Navigation:** A series of tabs at the top, including "Read Database", "Load Hydraulic Model", "Digital Outputs", "Digital Inputs", and "AI+ Serial". The "Digital Outputs", "Digital Inputs", and "AI+ Serial" tabs are highlighted with red boxes, and a dashed blue line points from the text above to the "Digital Inputs" tab.
- Left Panel:** A tree view showing a hierarchy of units under "Radionet Net test 22 Nov". The units listed include "Base (202100000008610)" and a series of "Unit" entries with IDs ranging from 09279 to 26309.
- Central Table:** A table with columns: Name, Unit Name, Unit ID, Mapped Device Type, Main Line, Remote/Local, IO Card, IO Address, Modbus Address A, Modbus Address B, Modbus Address C, and Dev ID. The table is currently empty.
- Right Panel:** A "Utilities" panel with buttons for "Open Polenet", "Auto Modbus Mapping", "configuration", "Load Previous System", and "Save and Export".

Click on "Digital Outputs" Tab, this will show DOs available on all RTUs

The screenshot shows a software window titled 'Form1' with several tabs: 'Read Database', 'Load Hydraulic Model', 'Digital Outputs' (highlighted with a red box), 'Digital Inputs', and 'AI+Serial'. Below the tabs is a tree view on the left showing a project structure for 'Radionet Net test 22 Nov-Copy'. The main area contains a table with the following columns: Name, Unit Name, IO Card, IO Address, Modbus Addresses, Mapped Device Type, Main Line, and Device Typ ID. The table lists various digital outputs for different units. On the right side, there is a 'Utilities' panel with buttons for 'Open Polenet', 'Auto Modbus Mapping', 'configuration', 'Load Previous System', and 'Save and Export'.

Name	Unit Name	IO Card	IO Address	Modbus Addresses	Mapped Device Type	Main Line	Device Typ ID
	Unit 09279	1	3	6   10006   0		0	0
	Unit 09279	2	3	7   10007   0		0	0
	Unit 09279	2	4	8   10008   0		0	0
	Unit 09279	3	3	9   10009   0		0	0
	Unit 09279	3	4	10   10010   0		0	0
	Unit 09292	1	3	1   10001   0		0	0
	Unit 09292	2	3	2   10002   0		0	0
	Unit 09292	2	4	3   10003   0		0	0
	Unit 09292	3	3	4   10004   0		0	0
	Unit 09292	3	4	5   10005   0		0	0

**2. Select Device to Allocate IO . Enter Details Device Name , Flow and Area Click Attach**

**1. Click on any DO. This will open the window below, enter details such as Mainline, Device Name, flow, Area & Flow indicator**

**Device Name & Details**

**Flow Indicator : Select Unit and Input to which it is connected**

The screenshot shows a software interface with a tree view on the left and a table of IO devices in the center. A red box highlights the first row of the table, which is selected. Below the table, a configuration window for a Digital Output is open. The configuration window has several fields: IO Type (Digital Output), RTU (Unit 09279), IO Number (3), Mainline (Main Line 1), Device Name (Banana 1), Flow (10), Area (1), Flow indicator (Unit 09279), Card (1), and Input (1). A red box highlights the 'Attach' button at the bottom right of the configuration window. A dashed blue line connects the 'Attach' button to the text in the top right corner of the page.

Name	Unit Name	IO Card	IO Address	Modbus Addresses	Mapped Device Type	Main Line	Device Typ
	Unit 09279	1	3	6   10006   0		0	0
	Unit 09279	2	3	7   10007   0		0	0
	Unit 09279	2	4	8   10008   0		0	0
	Unit 09279	3	3	9   10009   0		0	0
	Unit 09279	3	4	10   10010   0		0	0
	Unit 09292	1	3	1   10001   0		0	0
	Unit 09292	2	3	2   10002   0		0	0
	Unit 09292	2	4	3   10003   0		0	0
	Unit 09292	3	3	4   10004   0		0	0
	Unit 09292	3	4	5   10005   0		0	0



A Prompt message will appear, click Yes

Unit 09279	2	4	8   10008   0
Unit 09279	3	3	9   10009   0
Unit 09279	3	4	10   10010   0
Unit 09292	1	3	1   10001   0
Unit 09292	2	3	2   10002   0
Unit 09292	2	4	3   10003   0
Unit 09292	3	3	4   10004   0
Unit 09292			5   10005   0

**Digital Output**

Unit 09279

3

Main Line 1

Banana 1

10

1

Valve 3

Valve 4

Valve 5

Valve 6

Valve 7

Valve 8

Valve 9

Valve 10

Valve 11

Valve 12

Valve 13

Attach

Attach Valve 1 To DigitalOutput?

Yes No

Device will be mapped to Output on RTU & will be displayed in table

Load Hydraulic Model		Digital Outputs		Digital Inputs		AI+Serial	
Name	Unit Name	IO Card	IO Address	Modbus Addresses	Mapped Device Type	Main Line	Device Typ ID
Banana 1	Unit 09279	1	3	6   10053   0	Valve 1	1	1
	Unit 09279	2	3	7   10007   0		0	0



Click Digital Inputs Tab and Proceed to add Digital Input, select Mainline, Enter Device name etc, and click Attach Device Name (WM 1 here and associated with DI)

The screenshot displays the 'Digital Inputs' configuration window. On the left, a tree view shows the system hierarchy. The main area contains a table of digital inputs. A dialog box is open, prompting the user to attach a water meter to a specific digital input. The 'Main Line' is set to 'Main Line 1' and the 'Device Name' is 'WM 1'. The 'Attach' button is highlighted.

Name	Unit Name	IO Card	IO Address	Modbus Addresses	Mapped Device Type	Main Line	Device ID
Flow indicator 1	Unit 09279	1	1	10053   30644   ...	Flow indicator 1	1	31
	Unit 09279	1	2	10054   30645   ...		0	0
	Unit 09279	2	1	10055   30648   ...		0	0
	Unit 09279	2	2	10056   30650   ...		0	0
	Unit 09279	3	1	10057   30652   ...		0	0
	Unit 09279	3	2	10058   30654   ...		0	0
	Unit 09292	1	1	10047   30632   ...		0	0
	Unit 09292	1	2	10048   30634   ...		0	0
	Unit 09292	2	1	10049   30636   ...		0	0
	Unit 09292			10050   30638   ...		0	0

## Netacap (DFM) support via RatioNet RTU connection

### Setup Netacap on GS MAX

#### Polenet2max

- Select AI+serial
- Select mainline then sensor.
- Press on the Attach button.
- Press on Save and Export to PLC

The screenshot shows the 'Form1' window with the 'AI+Serial' tab selected. The left pane shows a tree view of the 'RadioNet 10' structure, with '1-SER\_IO netacap' highlighted. The main table lists IO cards, with the 'netacap' card selected. The bottom panel shows the configuration for this card, including the 'Attach' button and 'Save and Export' button. Red annotations indicate the steps: '1. Select your sensor' points to the 'Netacp80 1' selection in the 'Select Device to Allocate to this IO' list; '2. Attach' points to the 'Attach' button; and '3. Should appear here' points to the 'netacap' row in the IO card table.

Name	Unit Name	IO Card	IO Address	Modbus Addresses	Mapped Device Type	Main Line
Netal	Unit DCP	1	4	30708   0   0	General 0-20m...	1
netacap	Unit DCP	3	1	30709   30723   0	Netacp80 1	1

After all I/Os devices are assigned ,  
Click "Save and Export ".

The screenshot shows a software window titled 'Form1' with several tabs: 'Read Database', 'Load Hydraulic Model', 'Digital Outputs', 'Digital Inputs', and 'AI+ Serial'. The 'Digital Inputs' tab is active, displaying a table of I/O devices. Below the table is a 'Device Parameters' section for a selected device. A 'Save and Export' button is highlighted in the bottom right corner. A dialog box titled 'OK' with the message 'Saved To CSV' and an 'OK' button is overlaid on the interface.

Name	Unit Name	IO Card	IO Address	Modbus Addresses	Mapped Device Type	Main Line	Device Typ ID
Flow indicator 1	Unit 09279	1	1	10053   30644   ...	Flow indicator 1	1	31
WM 1	Unit 09279	1	2	10054   30646   ...	Water meter 1	1	18
	Unit 09279	2	1	10055   30648   ...		0	0
	Unit 09279	2	2	10056   30650   ...		0	0
	Unit 09279	3	1	10057   30652   ...		0	0
	Unit 09279	3	2	10058   30654   ...		0	0
	Unit 09292	1	1	10047   30632   ...		0	0
	Unit 09292	1	2	10048   30634   ...		0	0
	Unit 09292			10049   30636   ...		0	0
	Unit 09292			10050   30638   ...		0	0

Device Parameters

IO Type: **Digital Input**

RTU: Unit 09279

IO Number: 2

Mainline: Main Line 1

Device Name: WM 1

Pulse Rate: 10

Buttons: Attach, Dettach, **Save and Export**

Dialog Box: OK, Saved To CSV, OK

A message will appear  
"Saved to CSV". Click OK



After saving CSV, Go to the PoleNet Application and disconnect the system.  
Click on “Edit System in PoleNet” and select the last activated system &  
Activate again and connect PoleNet.

The screenshot displays two windows from the PoleNet application. The left window, titled "PoleNet (Agile Host v3 - connected)", contains three main sections: "PC Connection" with "Configure Connection" and "Disconnect" buttons; "Activated System in PoleNet" showing system details and an "Edit Systems in PoleNet" button; and "Agile Host v3" with "Monitor", "Route Table", "Agile System in Host", "Configure Modbus", and "System" buttons. The right window, titled "Database: D:\PW Data\GrowSphere\PoleNetSuite\_32642 JW\Agile\OUser.AGI", shows a table of system data. The second row is highlighted in red, corresponding to the system being edited. At the bottom of the database window, the "Activate" button is also highlighted in red.

System Type	System	RTUs	PoleNet Status	Database Status	Modify Status	Last Modified Time
Agile (MODBUS)	Pressure Sensor test 15 Feb	2				2023-02-15 21:30:45
Agile (MODBUS)	Radonet Net test 22 Nov	21	Active (20230313)	Last activated		2023-03-13 17:08:19
Agile (MODBUS)	Radonet U3	3				2023-02-23 17:53:26
Agile (MODBUS)	Sergio	5				2023-02-20 17:52:07



The system will ask to Re-load the modified system. Click “Yes”. The system will ask to Select “Program database version into Host” and Confirm

Database: D:\PW Data\GrowSphere\PolenetSuite\_32642 JW\AgileIOUser.AGI

System Type	System	RTUs	PoleNet Status	Database Status	Modify Status	Last Modified Time
Agile (MODBUS)	Pressure Sensor test 15 Feb	2				2023-02-15 21:30:45
Agile (MODBUS)	Radionet Net test 22 Nov	21	Active (20230313...	Last activated	Newer	2023-03-17 22:08:54
Agile (MODBUS)	RadioNet Q3	3				2023-02-23 17:53:26
Agile (MODBUS)	Sergio	5				2023-02-20 17:52:07

Exporting Re-load system

Re-load the modified Agile system:  
Radionet Net test 22 Nov

Yes No

Host Capture - Options

SITUATION

Database contains a newer version of the system in the Host.

POSSIBLE ACTIONS TO TAKE

- Program database version into Host. (Restarts radio system)
- Replace version in the Database with version from Host

Cancel Confirm

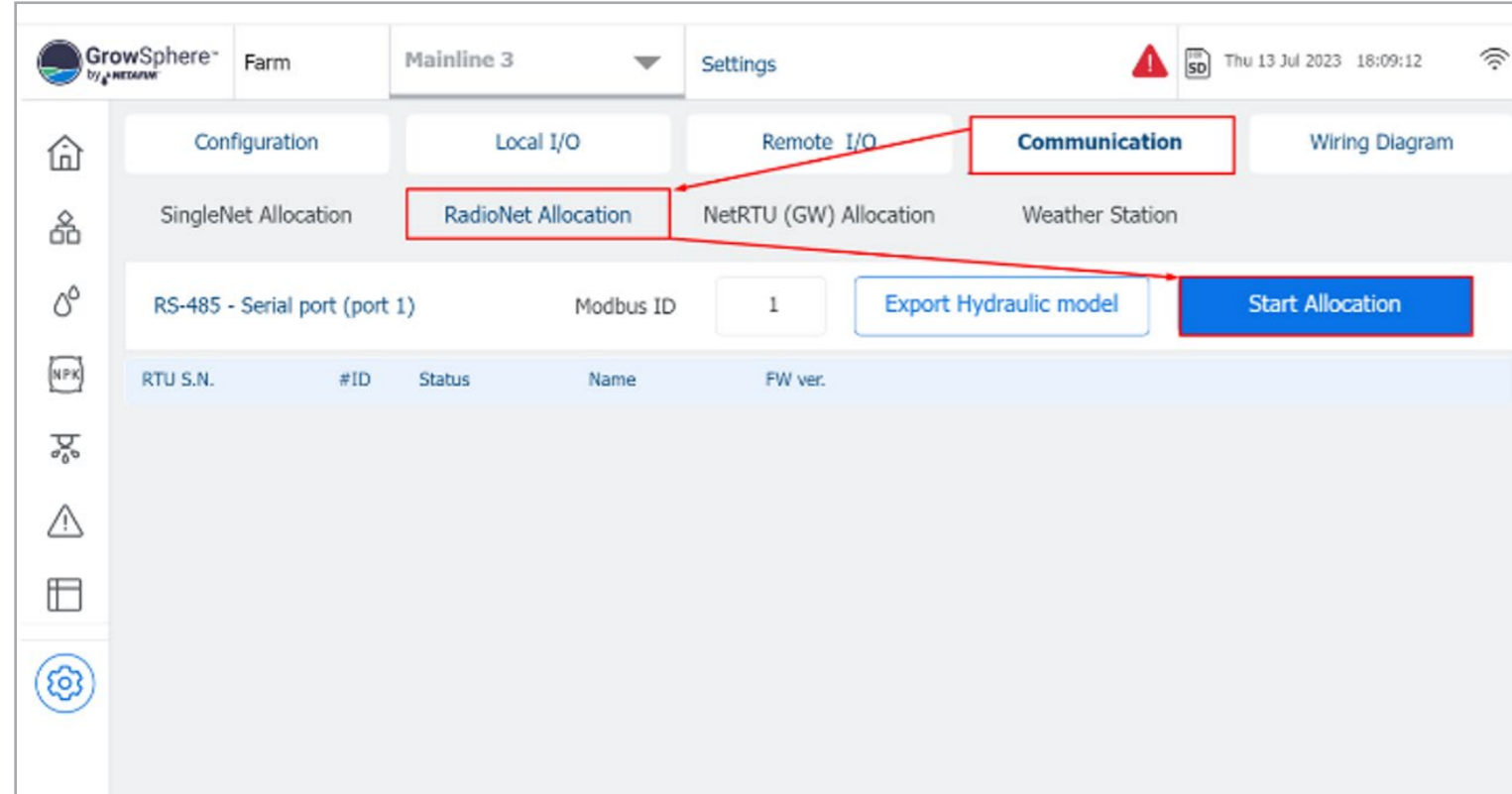
Merge Activate Edit Exit

After a CSV upload, you can view the details in the "Mapping View" section of the PoleNet system.

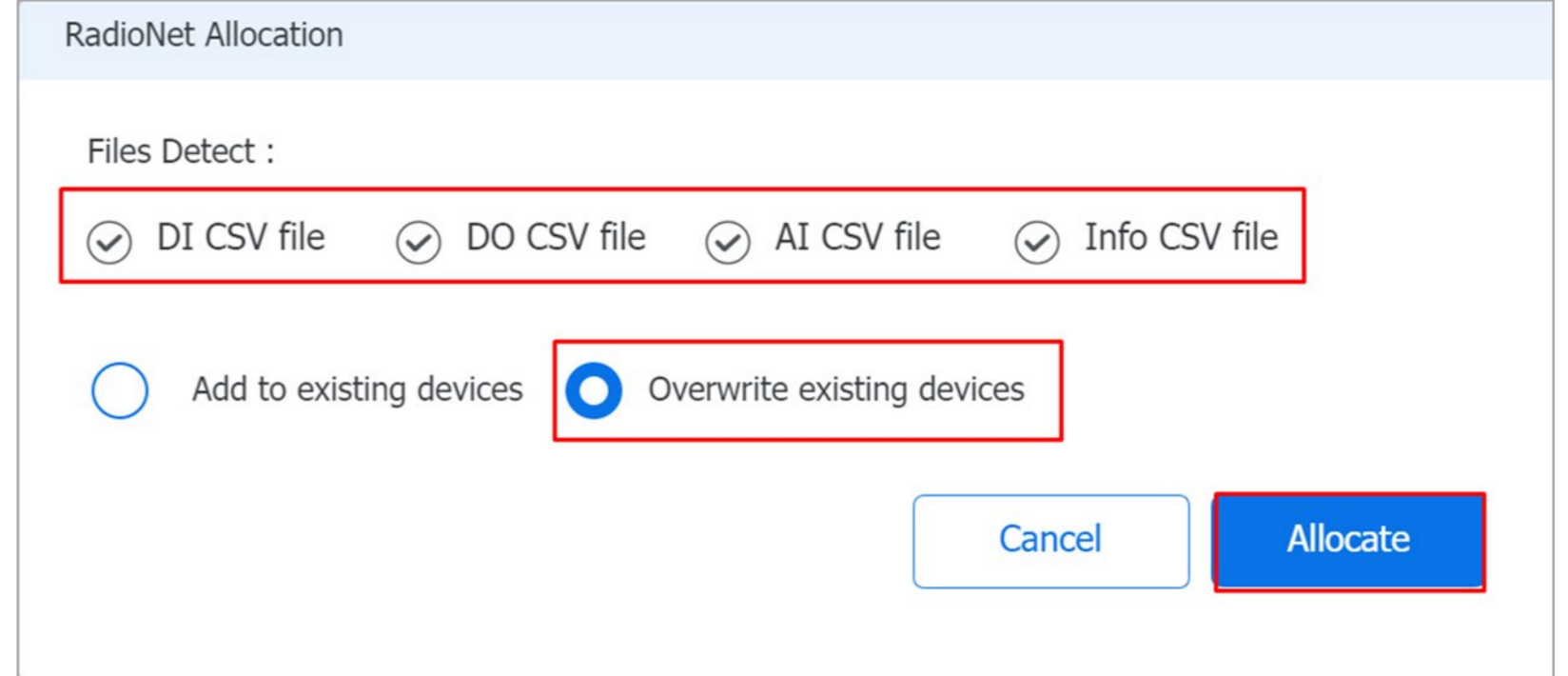
Agile System: Radionet Net test 22 Nov, using MODBUS

System	Mapping Edit	Mapping View	Direct Mapping View	Route	AutoMap						
Modb...	Bit Out	Bit In	Word...	Word...	Unit	Card	IO	IO T...	Param...	Playb...	
1	1		40001		2021000000009292	1 [207]	3 [Pomo 3]	DO	desired		
2	2		40001		2021000000009292	2 [208]	3 [Apple 1]	DO	desired		
3	3		40001		2021000000009292	2 [208]	4 [Apple 2]	DO	desired		
4	4		40001		2021000000009292	3 [208]	3 [Apple 3]	DO	desired		
5	5		40001		2021000000009292	3 [208]	4 [Kiwi 1]	DO	desired		
6	6		40001		2021000000009279	1 [207]	3 [Banana 1]	DO	desired		
7	7		40001		2021000000009279	2 [208]	3 [Banana 2]	DO	desired		
8	8		40001		2021000000009279	2 [208]	4 [Banana 3]	DO	desired		
9	9		40001		2021000000009279	3 [208]	3 [Pomo 1]	DO	desired		
10	10		40001		2021000000009279	3 [208]	4 [Pomo 2]	DO	desired		
11	11		40001		2021000000009687	1 [307]	1 [Kiwi 2]	DO	desired		
12	12		40001		2021000000009687	1 [307]	2 [Kiwi 3]	DO	desired		
13	13		40001		2021000000010528	1 [307]	1 [Vegitable 3]	DO	desired		
14	14		40001		2021000000010528	1 [307]	2 [Vegitable 4]	DO	desired		
15	15		40001		2021000000026309	1 [207]	3	DO	desired		
16	16		40001		2021000000010489	1 [307]	1 [Vegitable 1]	DO	desired		
17	17		40002		2021000000010489	1 [307]	2 [Vegitable 2]	DO	desired		
18	18		40002		2021000000026299	1 [207]	3 [DC 1]	DO	desired		
19	19		40002		2021000000026300	1 [207]	3 [DC 2]	DO	desired		
20	20		40002		2021000000026300	2 [208]	3 [DC 3]	DO	desired		
21	21		40002		2021000000026300	2 [208]	4 [DC 4]	DO	desired		
22	22		40002		2021000000026260	1 [207]	3 [Vegi 6]	DO	desired		
23	23		40002		2021000000026302	1 [207]	3	DO	desired		
24	24		40002		2021000000026302	2 [208]	3	DO	desired		
25	25		40002		2021000000026302	2 [208]	4	DO	desired		
26	26		40002		2021000000026259	1 [207]	3 [Vegitable 5]	DO	desired		
27	27		40002		2021000000026301	1 [207]	3 [DB Fk]	DO	desired		
28	28		40002		2021000000026301	2 [208]	3 [MV Fruit & Vegi]	DO	desired		
29	29		40002		2021000000026301	2 [208]	4 [Fruit and Vegi]	DO	desired		
30	30		40002		2021000000026308	1 [207]	3	DO	desired		
31	31		40002		2021000000026308	2 [208]	3	DO	desired		
32	32		40002		2021000000026308	2 [208]	4	DO	desired		
33	33		40003		2021000000026261	1 [207]	3 [Vegi 7]	DO	desired		
34	34		40003		2021000000026307	1 [207]	3	DO	desired		
35	35		40003		2021000000026307	2 [208]	3	DO	desired		
36	36		40003		2021000000026307	2 [208]	4	DO	desired		
37	37		40003		2021000000026262	1 [207]	3 [Vegi 8]	DO	desired		
38	38		40003		2021000000026306	1 [207]	3	DO	desired		
39	39		40003		2021000000026306	2 [208]	3	DO	desired		
40	40		40003		2021000000026306	2 [208]	4	DO	desired		
41	41		40003		2021000000026304	1 [207]	3	DO	desired		
42	42		40003		2021000000026303	1 [207]	3	DO	desired		
43	43		40003		2021000000026305	1 [207]	3	DO	desired		

Go to GrowSphere Screen , Under “Communication” select “RadioNet Allocation” and click on “Start Allocation”



Confirm all CSV files are detected. Click on “ Overwrite existing devices if already system have definition for SingleNet or NetRTU





Check all I/O s are appeared.

The image shows two screenshots of the GrowSphere MAX user interface. The top screenshot displays the 'Remote I/O' configuration page, and the bottom screenshot displays the 'Remote digital input' configuration page. Both pages are part of the 'Settings' section for 'All Mainlines' on a 'Farm'.

**Top Screenshot: Remote I/O Configuration**

Navigation: Configuration, Local I/O, **Remote I/O**, Communication, Wiring Diagram

Sub-navigation: Remote digital output, Remote digital input, Remote analog input, Remote serial sensors, Unallocated devices

RTU	Card	IO	Device type	NO.	Source	Name	Flow	Area (ha)	Assigned
26300	1	3	Valve	3	M.Line3	Valve3	10.0 m³/h	0.00	Unassign
26300	2	3	Valve	4	M.Line3	Valve4	10.0 m³/h	0.00	Unassign
26300	2	4	Valve	5	M.Line3	Valve5	10.0 m³/h	0.00	Unassign
10489	1	1	Valve	1	M.Line3	Valve1	10.0 m³/h	0.00	Unassign
10489	1	2	Valve	2	M.Line3	Valve2	10.0 m³/h	0.00	Unassign
26302	1	3	Pump	1	M.Line3	Pump1	10.0 m³/h	—	Unassign

**Bottom Screenshot: Remote digital input Configuration**

Navigation: Configuration, Local I/O, **Remote I/O**, Communication, Wiring Diagram

Sub-navigation: Remote digital output, **Remote digital input**, Remote analog input, Unallocated devices

RTU	Card	IO	Device type	NO.	Source	Name	Type	Rate	Assigned
	1	1	Water met	1	M.Line1	Banana1	LPP	10.00	Unassign



→ To test Valve operations from UI.

Click on any Valve and  
Click on "Manual On"

GrowSphere™ Farm All Mainlines Settings Wed 05 Jun 2024 06:57:20

Configuration Local I/O **Remote I/O** Communication Wiring Diagram

Remote digital output Remote digital input Remote analog input Remote serial sensors Unallocated devices

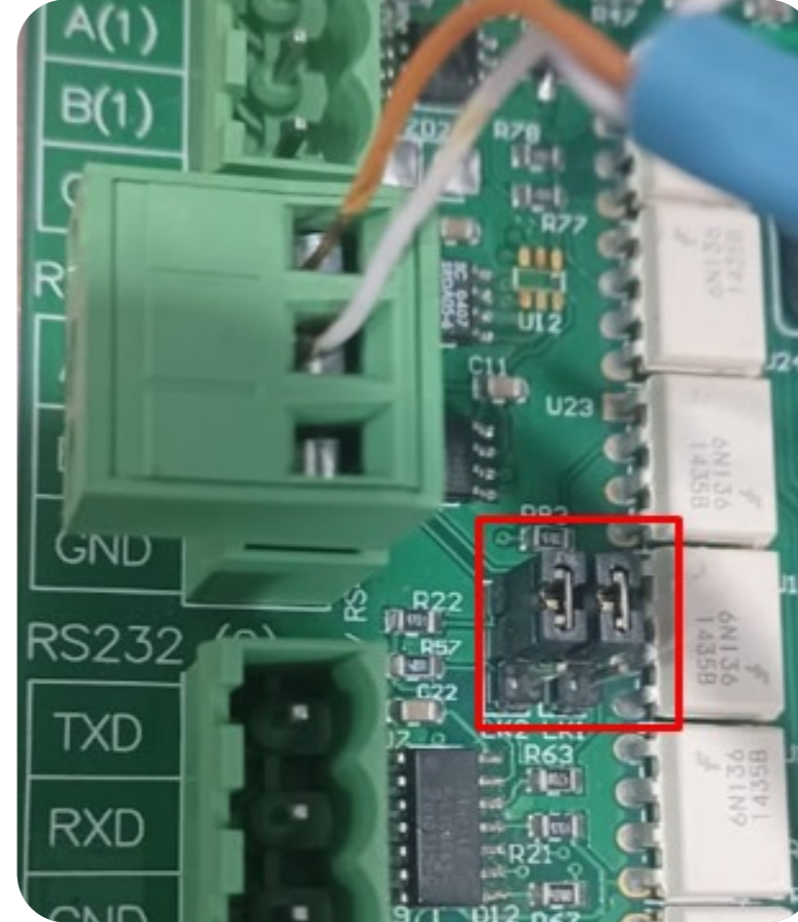
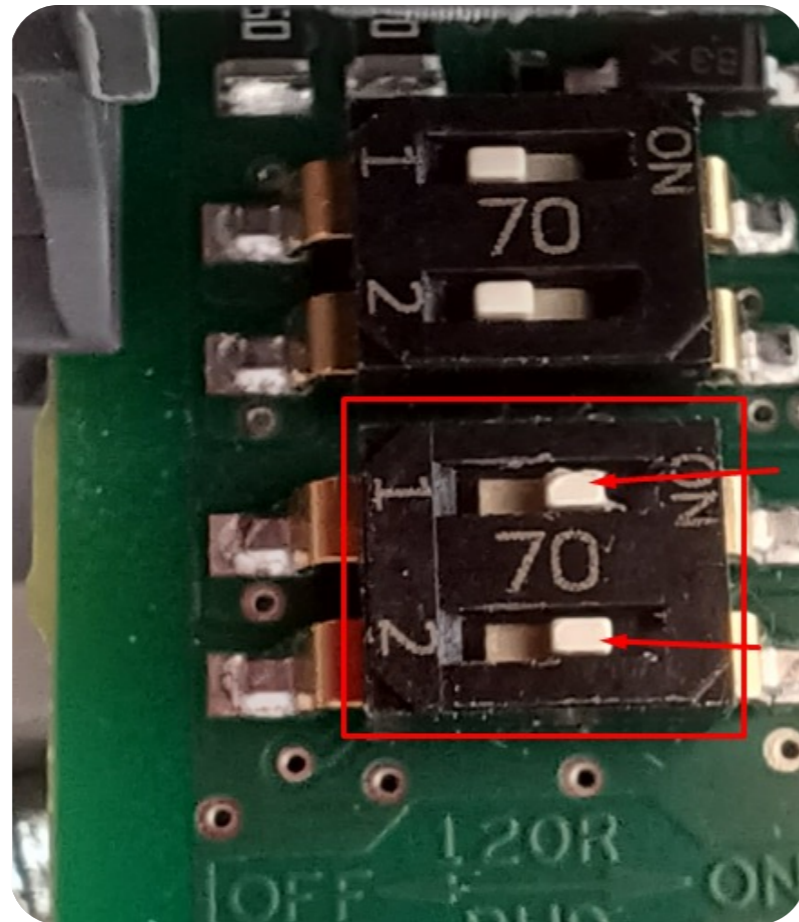
RTU	Card	IO	Device type	Container device type	NO.	Source	Name	Assigned
	3	1	NetaCap water co	NetaCap 80 cm	1	ML 1	NC1WC1	Unassign
	3	1	NetaCap water co	NetaCap 80 cm	2	ML 1	NC1WC2	Unassign
	3	1	NetaCap water co	NetaCap 80 cm	3	ML 1	NC1WC3	Unassign
27768	3	1	NetaCap water co	NetaCap 80 cm	4	ML 1	NC1WC4	Unassign
27768	3	1	NetaCap water co	NetaCap 80 cm	5	ML 1	NC1WC5	Unassign
27768	3	1	NetaCap water co	NetaCap 80 cm	6	ML 1	NC1WC6	Unassign
27768	3	1	NetaCap soil temp	NetaCap 80 cm	1	ML 1	NC1ST1	Unassign

Valve1  
Auto  
Manual - On

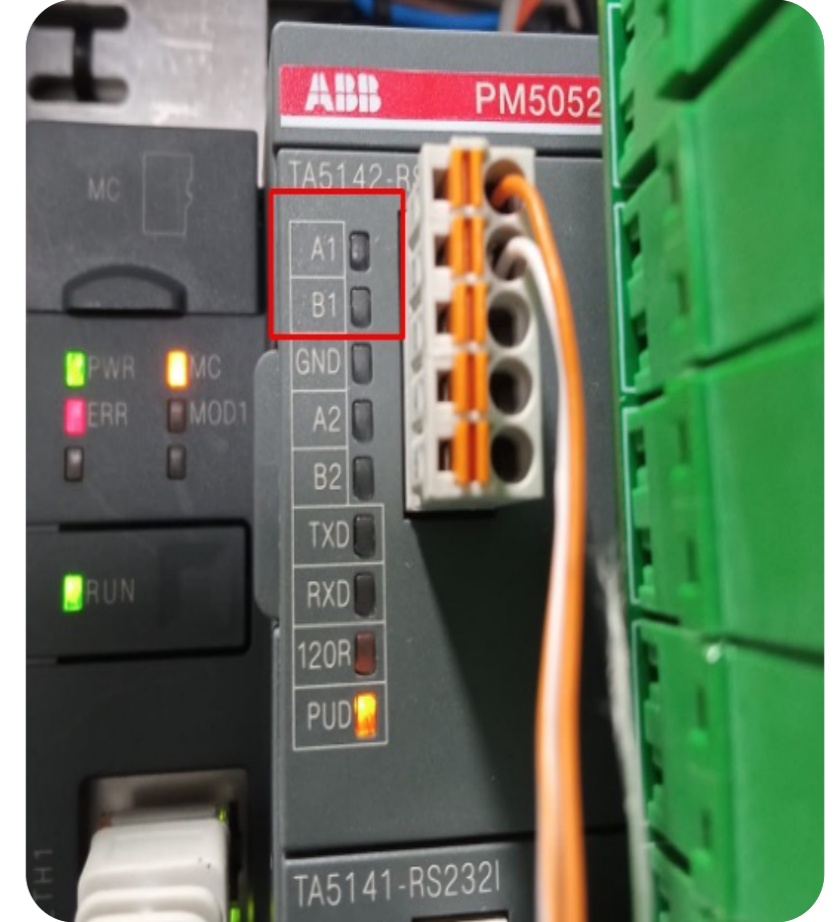
## 12.3 SingleNet to GrowSphere™ MAX

SingleNet interface with GS is only via RS485. RS485 Module must be installed on Upper Port. Note the “DIP Switch” position on the RS 485 Module marked in RED must be towards the “ON” Side

Wiring Between Host & GS max Controller A to A & B To B. also LK1 & LK2 Jumper on the SingleNet Host should be Upper side



SingleNet Host

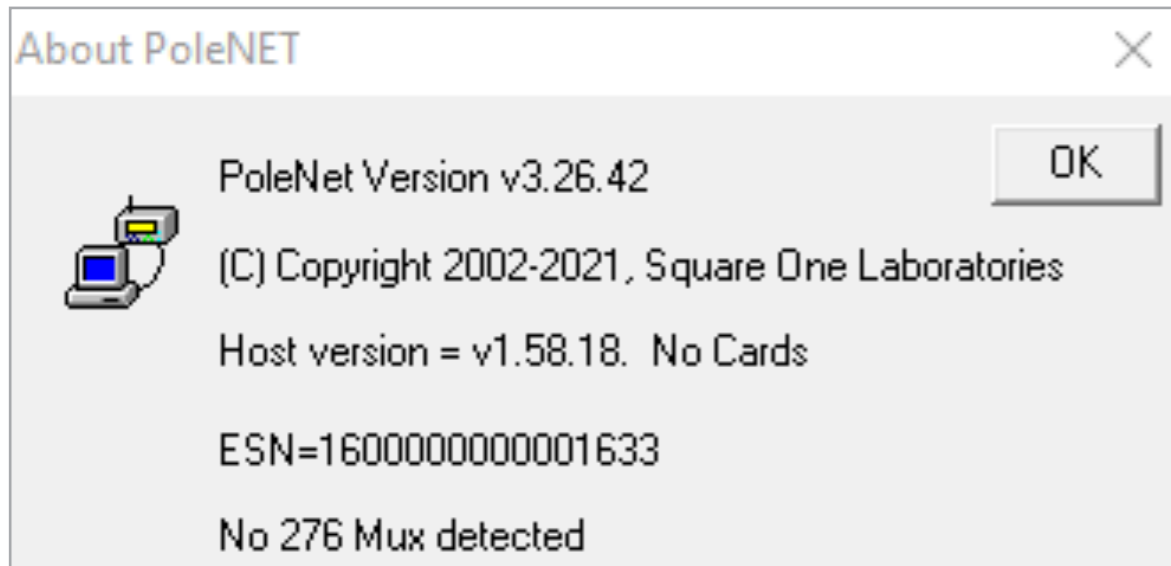
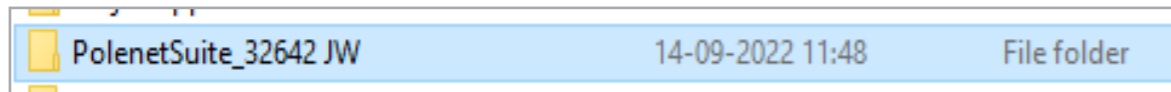


GrowSphere™ Max Controller

## / Required Polenet Version

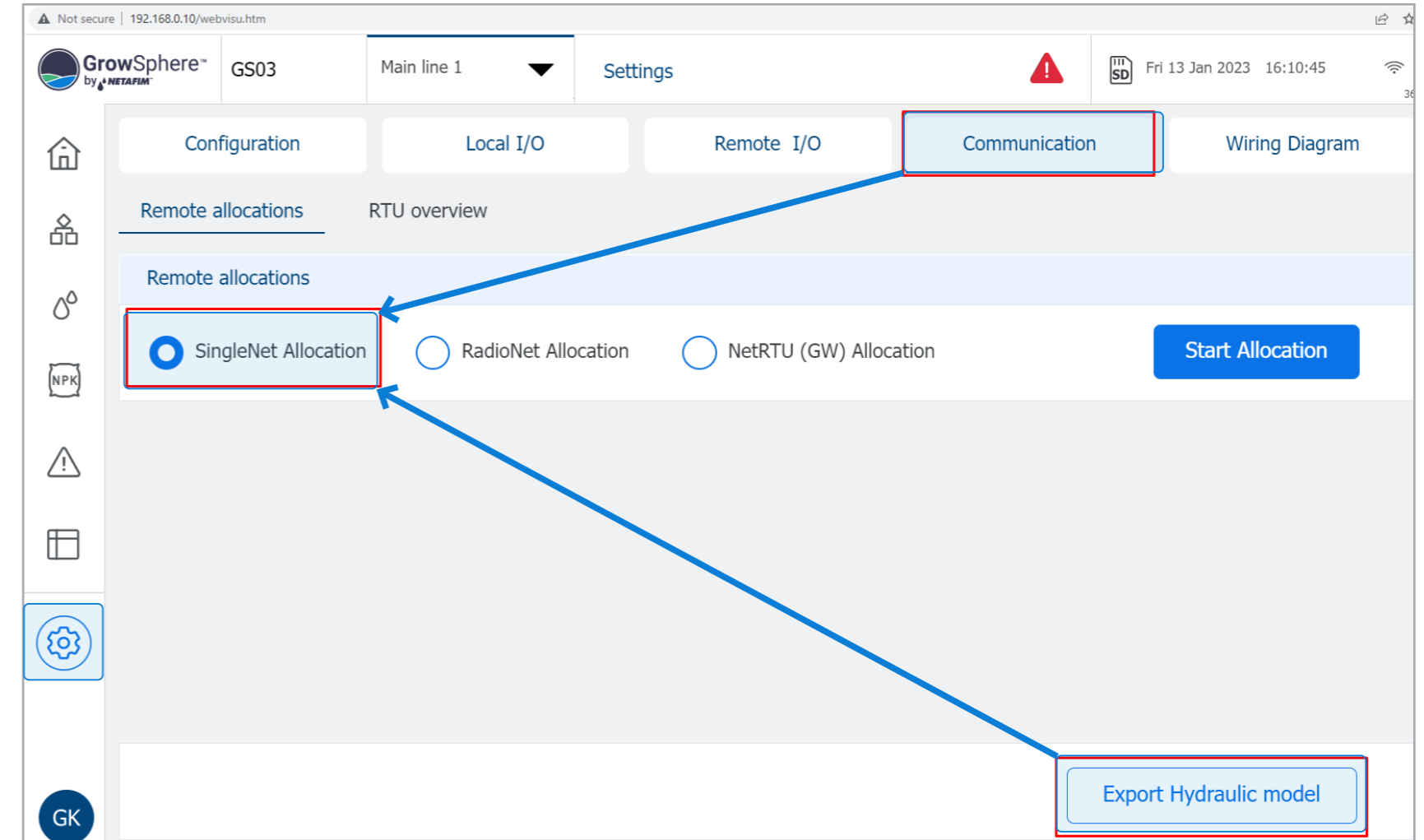
Always Check for Latest & Recommended Versions of PoleNet & Polenet2Max App.

- **Use Polenet Version:** 3.26.42 Or Newer Version



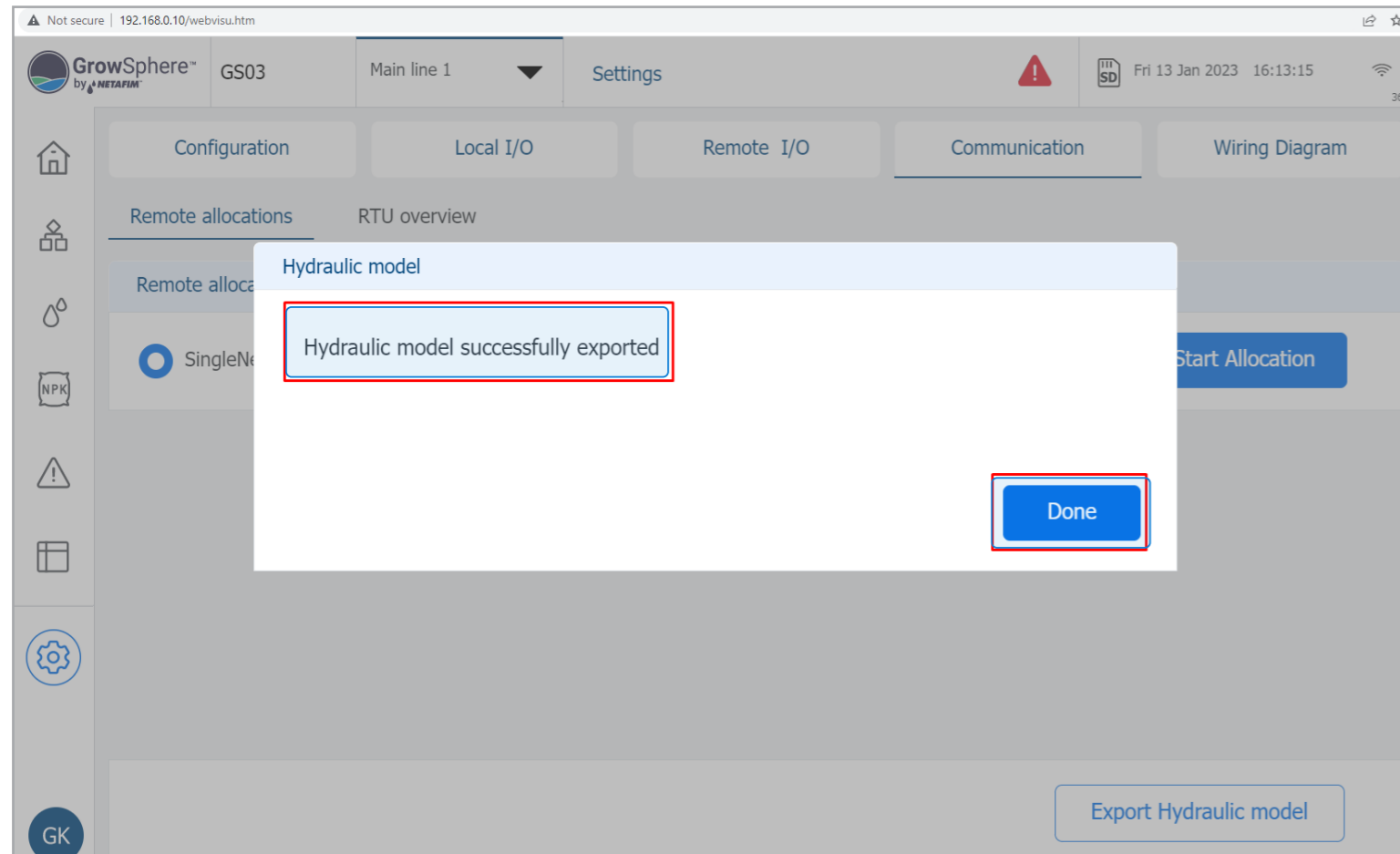
- **Use Host Firmware Version:** 1.58.18 Or Newer
- **Use RTU Firmware Version :** 1.66 Or Newer

## / Navigate to Settings >> Communication >> Select SingleNet >> Export Hydraulic Model

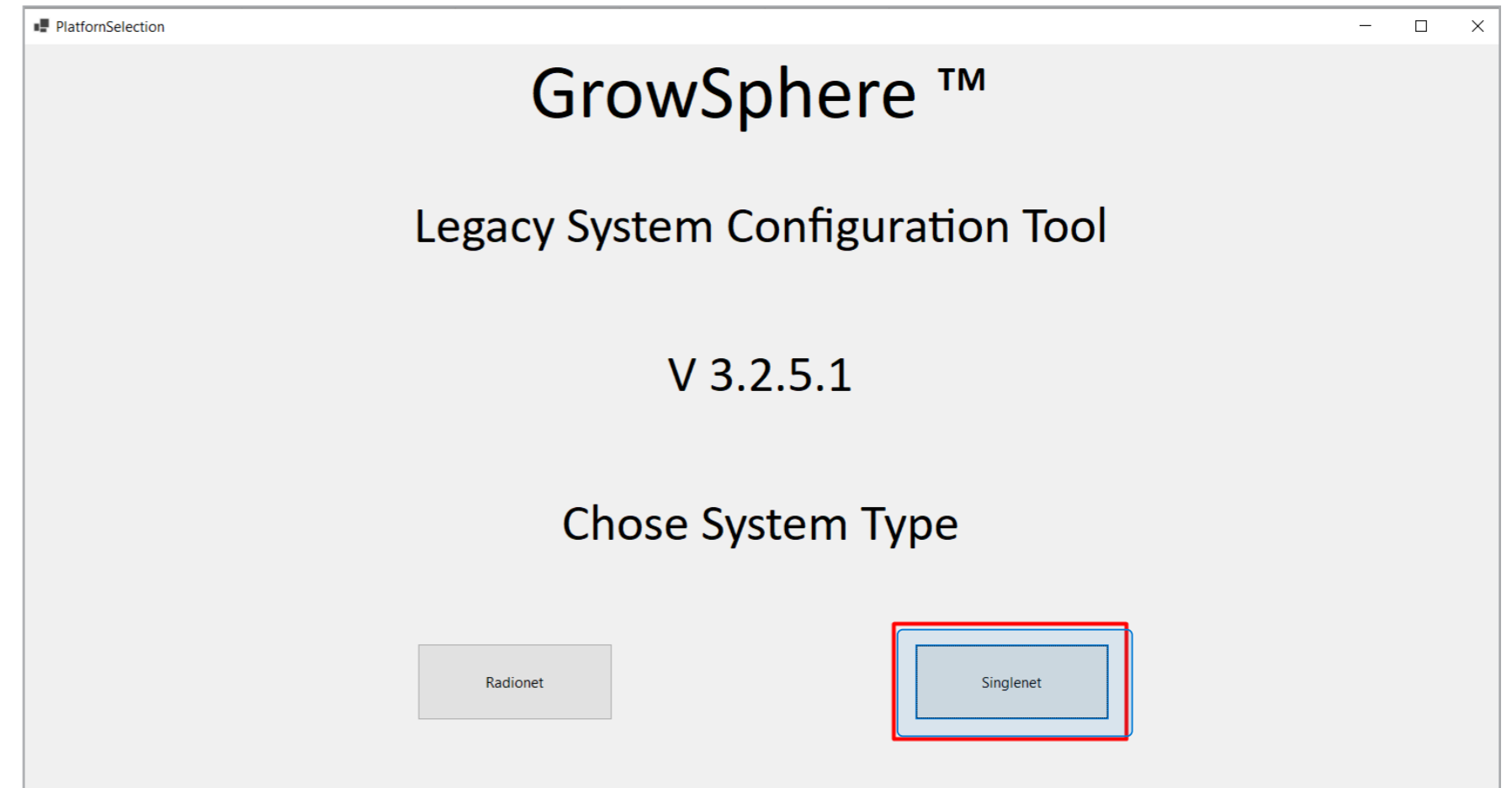




### / After Successful "Export", Click Done



### / Select SingleNet





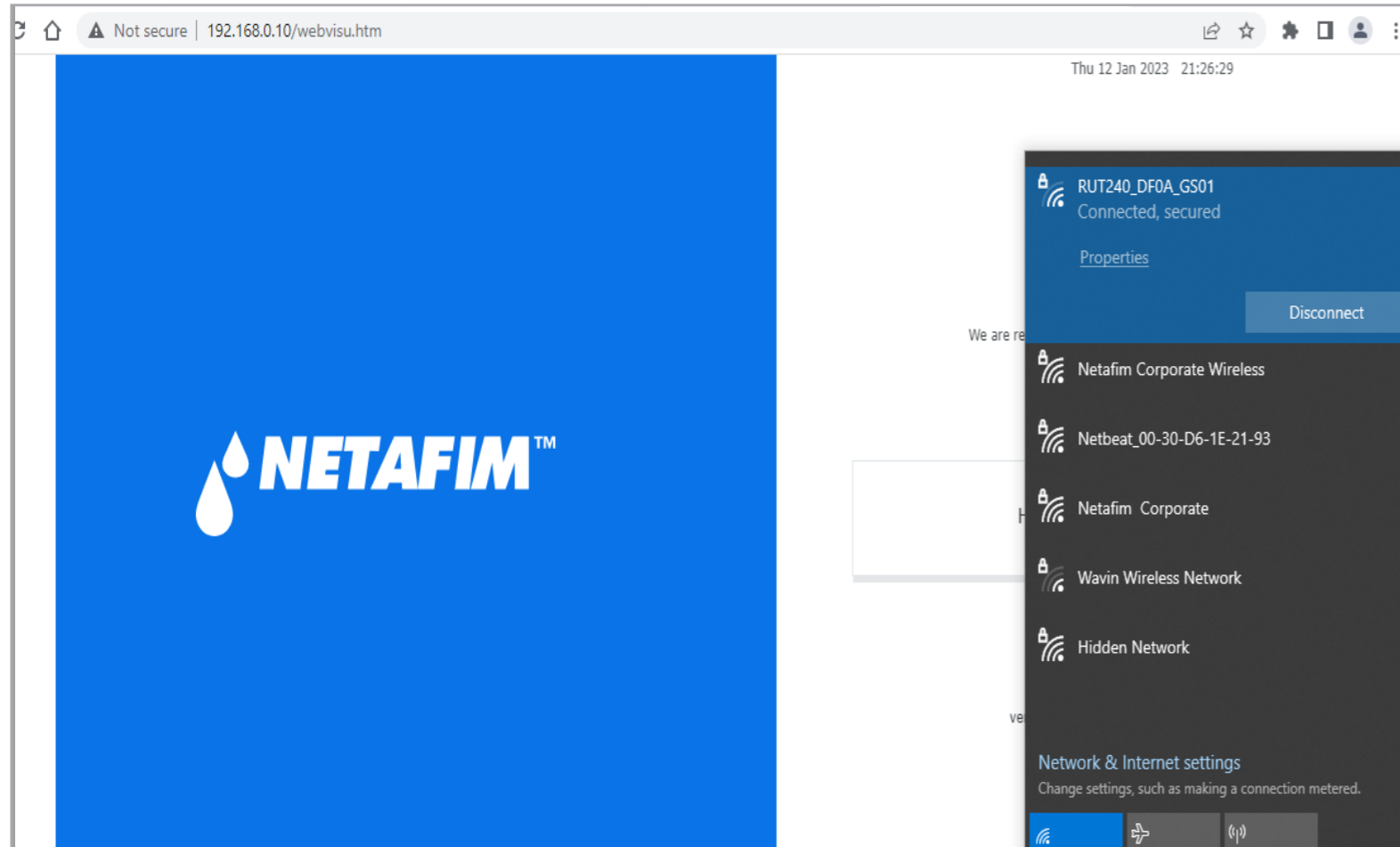
/ Open "Polenet2Max" Application

Name	Date modified	Type	Size
configuration.properties	11/15/2022 1:13 PM	PROPERTIES File	1 KB
D3DCompiler_47_cor3.dll	5/6/2022 8:46 PM	Application extens...	4,031 KB
devices_types	11/10/2022 7:00 PM	JSON File	23 KB
illust58-1841	11/28/2022 5:35 PM	JPG File	1,468 KB
Penlmc_cor3.dll	11/19/2022 11:16 PM	Application extens...	143 KB
<b>Polenet2Max</b>	<b>1/18/2023 2:32 PM</b>	<b>Application</b>	<b>155,001 KB</b>
Polenet2Max.pdb	1/18/2023 2:31 PM	PDB File	50 KB
PresentationNative_cor3.dll	10/13/2022 11:46 PM	Application extens...	924 KB
sni.dll	7/12/2017 4:54 PM	Application extens...	134 KB
SQLite.Interop.dll	11/2/2021 11:17 PM	Application extens...	1,343 KB
vcruntime140_cor3.dll	11/10/2022 8:04 AM	Application extens...	89 KB
wpfgfx_cor3.dll	11/19/2022 11:18 PM	Application extens...	1,763 KB

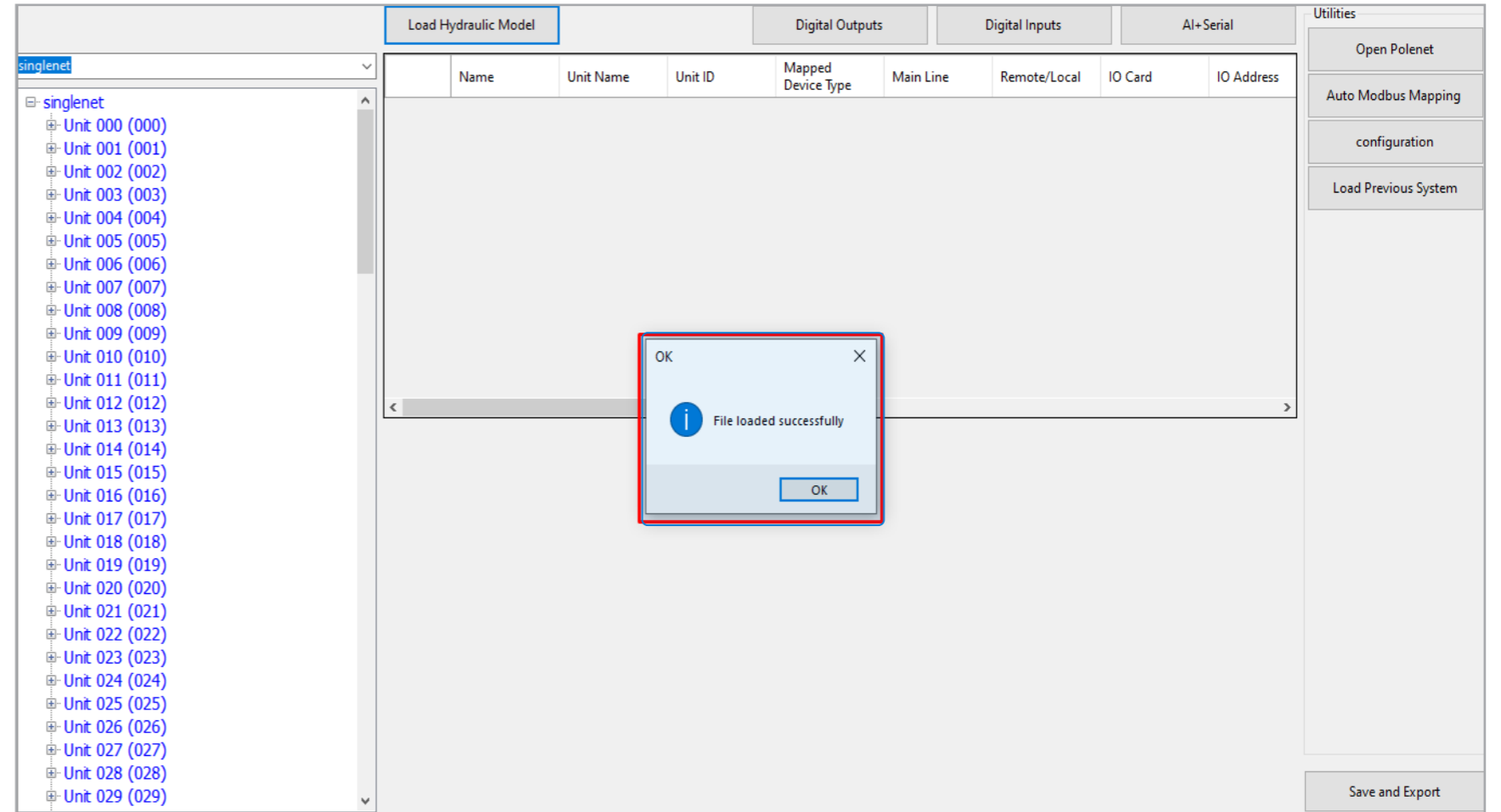
/ Total 128 Units 0 to 127, will be listed by default

The screenshot shows the 'Form1' window of the Polenet2Max application. It features several tabs: 'Load Hydraulic Model', 'Digital Outputs', 'Digital Inputs', and 'AI-Serial'. Below these tabs is a table with columns: Name, Unit Name, Unit ID, Mapped Device Type, Main Line, Remote/Local, IO Card, IO Address, Modbus Address A, and Modbus Address B. A list of units is displayed on the left side of the table, ranging from 'Unit 000 (000)' to 'Unit 026 (026)'. The 'Unit 000 (000)' row is highlighted with a red box. On the right side of the window, there are utility buttons: 'Open Polenet', 'Auto Modbus Mapping', 'configuration', 'Load Previous System', and 'Save and Export'.

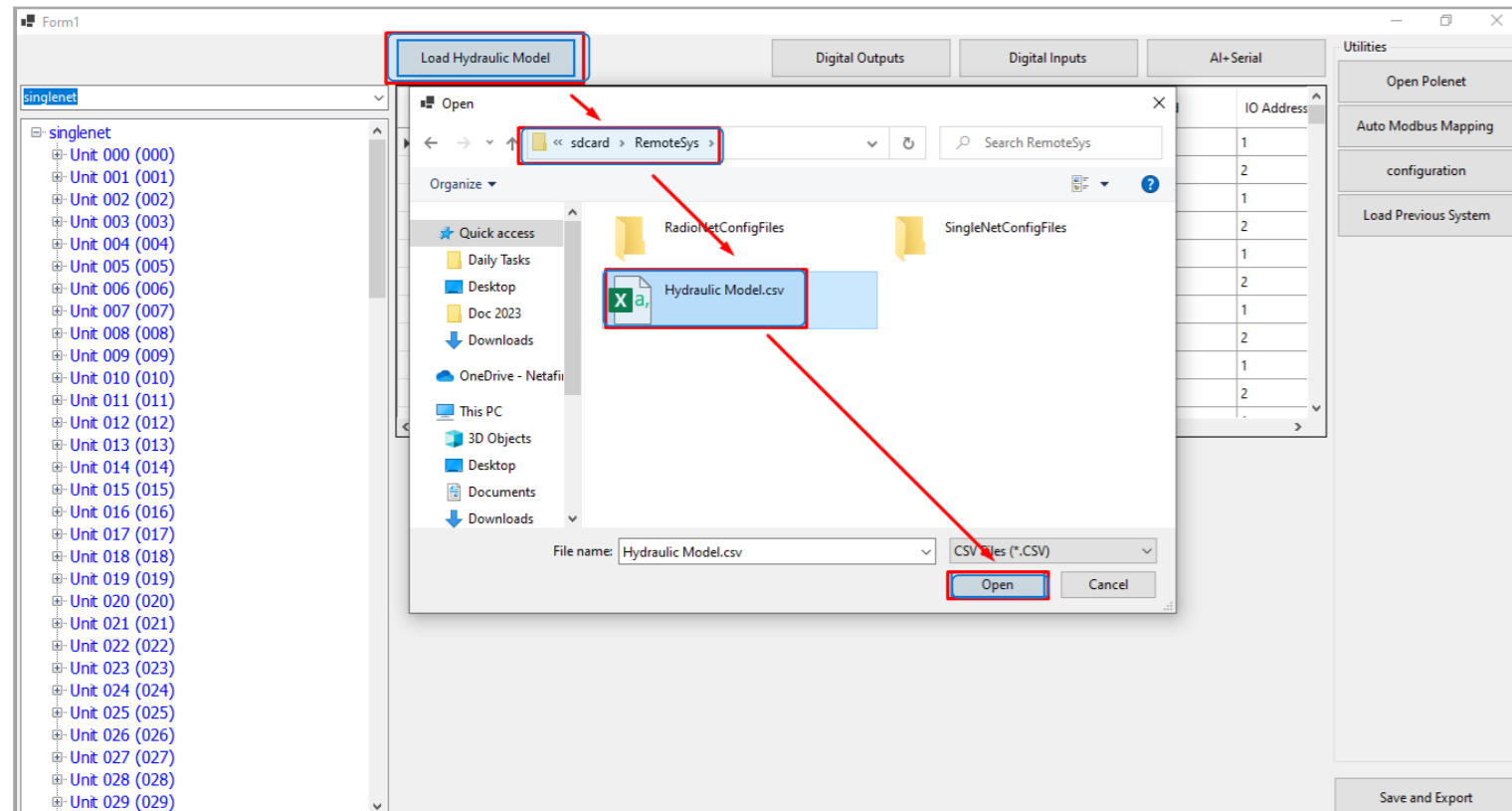
/ Connect to MAX (in pic it is via RUT240 xx Modem)



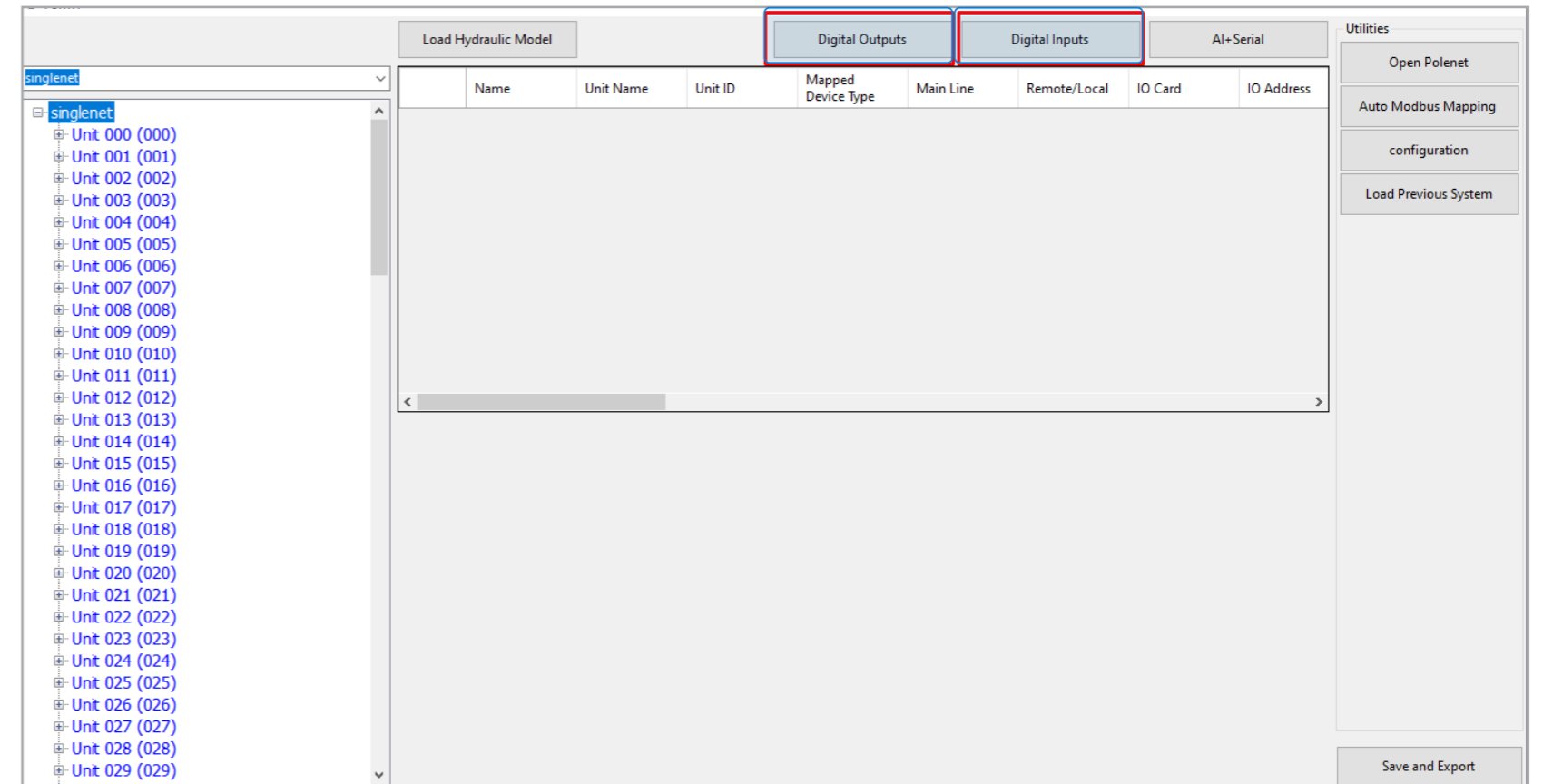
/ Wait for Message "File loaded successfully", Click OK



/ Click on “Load Hydraulic Model”, Select Path sdcard >> RemoteSys >> Hydraulic Model.csv & Click on Open



/ Digital Outputs / Inputs can be assigned by selecting relevant Tabs



/ Click on “Digital Outputs” Tab, this will show DOs available on all RTUs

/ Select Device to Allocate IO. Enter Details Device Name , Flow and Area Click Attach

**Flow Indicator:**     **Device Name & Details**

Select Unit and Input to which it is connected



/ Click on any DO. This will open the window below, enter details such as Mainline, Device Name, flow, Area & Flow indicator

The screenshot shows the 'Digital Outputs' configuration window. A table lists various DOs with columns for Name, Unit Name, Unit ID, Mapped Device Type, Main Line, Remote/Local, IO Card, IO Address, Modbus Address A, Modbus Address B, and Modbus Address C. The 'DO 1.1' row is highlighted. Below the table, the 'Device Parameters' section is visible, showing fields for IO Type, RTU, IO Number, Mainline, Device Name, Flow, Area, Flow indicator, Unit, Card, and Input. A 'Select Device to Allocate to this IO' list is also present, with 'Valve 1' selected. The 'Attach' button is highlighted.

/ A Prompt message will appear, click Yes

The screenshot shows the same 'Digital Outputs' configuration window, but with a dialog box titled 'Attach' open. The dialog box asks 'Attach Valve 1 To Digital Output?' and has 'Yes' and 'No' buttons. The 'Yes' button is highlighted. The background window shows the 'Digital Output' configuration for 'SugarCane V1' with fields for IO Type, RTU, IO Number, Mainline, Device Name, Flow, Area, Flow indicator, Unit, Card, and Input. The 'Attach' button is also highlighted.

/ In Digital Inputs Details of flow Indicator assigned to DO can be seen here

Name	Unit Name	Unit ID	Mapped Device Type	Main Line	Remote/Local	IO Card	IO Address	Modbus Address A	Modbus Address B	Modbus Address C
DI 0.1	Unit 000	000		0	4	1	1	49	49	305
DI 0.2	Unit 000	000		0	4	1	2	50	50	306
Flow indicator 1	Unit 001	001	Flow indicator 1	1	4	1	1	51	51	307
Flow indicator 3	Unit 001	001	Flow indicator 3	1	4	1	2	52	52	308
DI 2.1	Unit 002	002		0	4	1	1	53	53	309
DI 2.2	Unit 002	002		0	4	1	2	54	54	310
DI 3.1	Unit 003	003		0	4	1	1	55	55	311
DI 3.2	Unit 003	003		0	4	1	2	56	56	312
DI 4.1	Unit 004	004		0	4	1	1	57	57	313
DI 4.2	Unit 004	004		0	4	1	2	58	58	314
DI 5.1	Unit 005	005		0	4	1	1	59	59	315
DI 5.2	Unit 005	005		0	4	1	2	60	60	316
DI 6.1	Unit 006	006		0	4	1	1	61	61	317
DI 6.2	Unit 006	006		0	4	1	2	62	62	318

/ If there are Digital Input on RTU, Click on relevant Tab to assign it.

Name	Unit Name	Unit ID	Mapped Device Type	Main Line	Remote/Local	IO Card	IO Address	Modbus Address A	Modbus Address B	Modbus Address C
DI 0.1	Unit 000	000		0	4	1	1	49	49	305
DI 0.2	Unit 000	000		0	4	1	2	50	50	306
Flow indicator 1	Unit 001	001	Flow indicator 1	1	4	1	1	51	51	307
Flow indicator 3	Unit 001	001	Flow indicator 3	1	4	1	2	52	52	308
DI 2.1	Unit 002	002		0	4	1	1	53	53	309
DI 2.2	Unit 002	002		0	4	1	2	54	54	310
DI 3.1	Unit 003	003		0	4	1	1	55	55	311
DI 3.2	Unit 003	003		0	4	1	2	56	56	312
DI 4.1	Unit 004	004		0	4	1	1	57	57	313
DI 4.2	Unit 004	004		0	4	1	2	58	58	314
DI 5.1	Unit 005	005		0	4	1	1	59	59	315
DI 5.2	Unit 005	005		0	4	1	2	60	60	316
DI 6.1	Unit 006	006		0	4	1	1	61	61	317
DI 6.2	Unit 006	006		0	4	1	2	62	62	318

**Note:**

Flow Indicator Input is not to be defined in Growsphere Hydraulic Configuration anywhere. It is only to "confirm" the Valve is OPEN & there is flow. On Growsphere >> Remote Valves, it will show "P". This facility is only for Valves on RTU

/ Click Digital Inputs Tab and Proceed to add Digital Input, select Mainline, Enter Device name etc, and click Attach Device Name (HU WM 1 here and associated with DI)

/ After all I/Os devices are assigned, Click "Save and Export ". A message will Appear "Saved to CSV". Click OK

Name	Unit Name	Unit ID	Mapped Device Type	Main Line	Remote/Local	IO Card	IO Address	Modbus Address A	Modbus Address B	Modbus Address C
DI 0.1	Unit 000	000		0	4	1	1	49	49	305
DI 0.2	Unit 000	000		0	4	1	2	50	50	306
Flow indicator 1	Unit 001	001	Flow indicator 1	1	4	1	1	51	51	307
Flow indicator 3	Unit 001	001	Flow indicator 3	1	4	1	2	52	52	308
DI 2.1	Unit 002	002		0	4	1	1	53	53	309
DI 2.2	Unit 002	002		0	4	1	2	54	54	310
DI 3.1	Unit 003	003		0	4	1	1	55	55	311
DI 3.2	Unit 003	003		0	4	1	2	56	56	312
DI 4.1	Unit 004	004		0	4	1	1	57	57	313
DI 4.2	Unit 004	004		0	4	1	2	58	58	314
DI 5.1	Unit 005	005		0	4	1	1	59	59	315
DI 5.2	Unit 005	005		0	4	1	2	60	60	316
DI 6.1	Unit 006	006		0	4	1	1	61	61	317
DI 6.2	Unit 006	006		0	4	1	2	62	62	318

Name	Unit Name	Unit ID	Mapped Device Type	Main Line	Remote/Local	IO Card	IO Address	Modbus Address A	Modbus Address B	Modbus Address C
Pump 1	Unit 000	000	Pump 1	0	4	1	1	1	257	0
MV 1	Unit 000	000		0	4	1	2	2	258	0
SugarCane V1	Unit 001	001	Valve 1	1	4	1	1	3	515	0
Banana V2	Unit 001	001	Valve 3	1	4	1	2	4	516	0
Pomo V2	Unit 002	002	Valve 2	1	4	1	1	5	261	0
Ginger V4	Unit 002	002	Valve 4	1	4	1	2	6	262	0
Custard V5	Unit 003	003	Valve 5	1	4	1	1	7	263	0
Banana V6	Unit 003	003	Valve 6	1	4	1	2	8	264	0
SugarCane V7	Unit 004	004	Valve 7	1	4	1	1	9	265	0
Pomo V 8	Unit 004	004	Valve 8	1	4	1	2	10	266	0
Custard V9	Unit 005	005		4	4	1	1	11	267	0
Ginger V10	Unit 005	005		4	4	1	2	12	268	0
Pomo V11	Unit 006	006		4	4	1	1	13	269	0
Veg V12	Unit 006	006		4	4	1	2	14	270	0

/ Confirm all CSV files are detected. Click on "Overwrite existing devices"

GrowSphere™ GS03 Main line 1 Settings

Configuration Local I/O Remote I/O Communication Wiring Diagram

Remote allocations RTU overview

Remote allocations

SingleNet Allocation  RadioNet Allocation  NetRTU (GW) Allocation Start Allocation

DI CSV file ✓  
DO CSV file ✓  
AI CSV file  
Info CSV file ✓

Add to existing devices Overwrite existing devices Cancel

Export Hydraulic model

/ Check that all I/O appear

GrowSphere™ GS03 Main line 1 Settings

Configuration Local I/O Remote I/O Communication Wiring Diagram

Remote digital output Remote digital input Remote analog input Unallocated devices

RTU	Card	IO	Device type	NO.	Source	Name	Flow	Area (ha)	Assigned
	1	1	Pump	1	M.Line0	Pump1	4.0 m³/h	—	Unassign
	1	1	Valve	1	M.Line1	SugarCan	4.0 m³/h	1.00	Unassign
	1	2	Valve	3	M.Line1	BananaV2	4.0 m³/h	1.00	Unassign
	1	1	Valve	2	M.Line1	PomoV2	4.0 m³/h	1.00	Unassign
	1	2	Valve	4	M.Line1	GingerV4	4.0 m³/h	0.00	Unassign
	1	1	Valve	5	M.Line1	CustardV	4.0 m³/h	1.00	Unassign
	1	2	Valve	6	M.Line1	BananaV6	4.0 m³/h	1.00	Unassign

GrowSphere™ GS03 Main line 1 Settings

Configuration Local I/O Remote I/O Communication Wiring Diagram

Remote digital output Remote digital input Remote analog input Unallocated devices

RTU	Card	IO	Device type	NO.	Source	Name	Type	Rate	Assigned
	1	1	Water metr	1	M.Line1	HUWM1	LPP	10.00	Unassign
	1	2	Dosing mel	1	M.Line1	DosingBa	LPP	1.00	Unassign



/ To test, Click on Valve, Select Manual-On >> "M"(Manual) & "P"(Pending) will appear. "P" will disappear and Valve will turn Green when Status Changes to ON in PoleNet

GrowSphere™ GS03 Main line 1

General Shifts

Valves

SugarCan PomoV2

Auto

Manual - On

Manual - Off

SugarCan PomoV2

BananaV2

CustardV GingerV1 PomoV11

General

Valves

SugarCan PomoV2

CustardV GingerV1

Two-wire Monitor

Units: 14 On: 1 Missing: 0 Extra: 0

Unit	Out1	Out2	In1	In2	Capt	Avail	Drops
0			8	0	Yes	Yes	0
1			0	0	Yes	Yes	0
2	On		0	0	Yes	Yes	0
3			0	0	Yes	Yes	0
4			0	0	Yes	Yes	0
5			0	0	Yes	Yes	0
6			0	0	Yes	Yes	0
7			0	0	Yes	Yes	0
8			0	0	Yes	Yes	0
9			0	0	Yes	Yes	0
10			0	0	Yes	Yes	0
11			2	8	Yes	Yes	0
12			0	0	Yes	Yes	0
13			0	0	Yes	Yes	0

/ To close Valve from UI, click the Valve & Select Auto >> You can see the Valve Status disappears in PoleNet and Valve In UI turns Black

Valves

SugarCan PomoV2

CustardV

Auto

Manual - On

Manual - Off

SugarCan PomoV2

CustardV GingerV1

Valves

SugarCan PomoV2

CustardV GingerV1

Note:

If "Manual -OFF" is chosen, Valve will not open in AUTO mode. Need to Select " AUTO " to make it active. "M" against the Valve is the indication of Manual OFF



Precision  
Agriculture



# Thank you!

