GrowSphere™

Operating System

GrowSphere™ **MAX**

Irrigation & Fertigation Controller

Quick Setup Guide

July 2024

orbia | Precision Agriculture

◊ **NETAFIM**™ DIGITAL FARMING

Thank you for purchasing the **Grow**Sphere™ **MAX** Controller, an intuitive and simple-to-use device designed to speak the language of growers.
GrowSphere™ **MAX** regulates water and fertilizer delivery in a precision irrigation system, activating local and remote devices such as pumps, valves, filters, dosing pumps and other hydraulic components. This ensures that crops receive the optimal amount of water and nutrients at all times.

This **Grow**Sphere™ **MAX** quick guide contains basic setup instructions and wiring diagrams for your convenience.

Contents

Technical Resources

Internal Design

GrowSphere™ MAX - Internal Design

Main Power Switch ❶

Transformer

Main Power Supply 24V

Auxilary Power Supply 5V

Raspberry Pi - In no screen model

Switch

Router

SD card

CPU

I/O Modules ❷

Power inlet
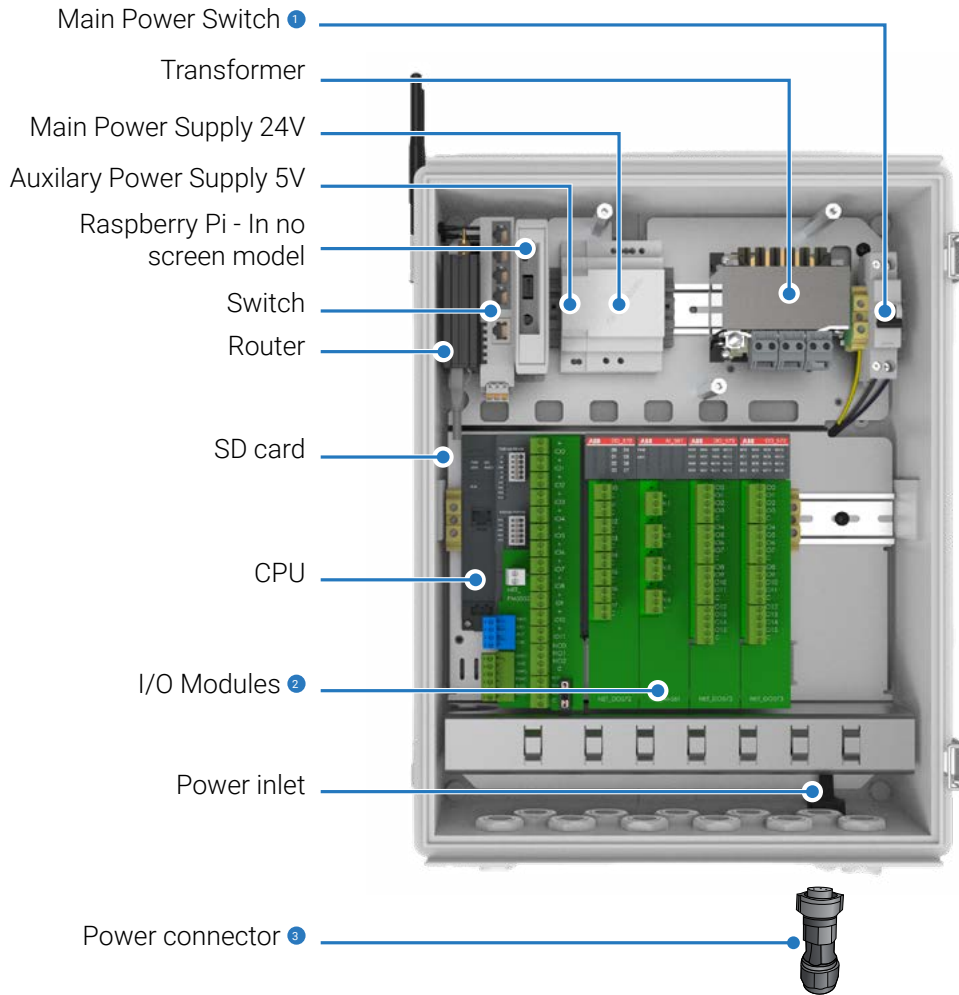
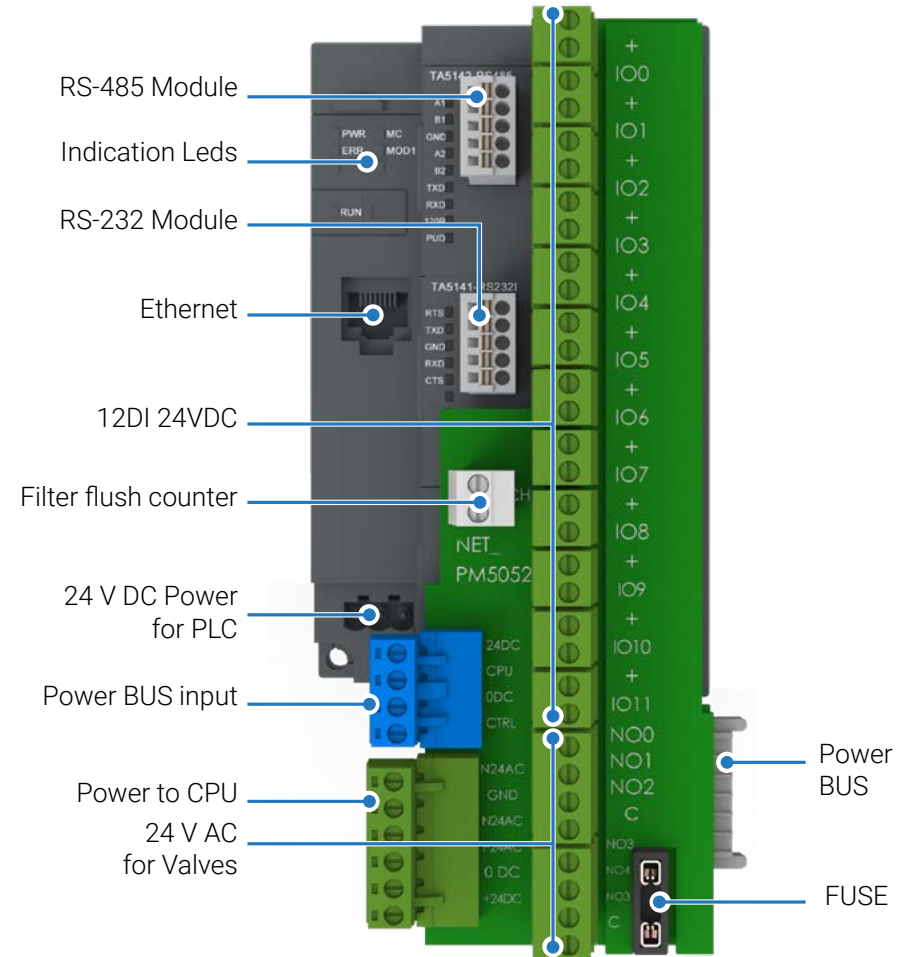Power connector ❸

❶ Switches the main power on and off
❷ Enable connecting the peripheral components
❸ You can find the connector in the accessories box

* Subject to product configuration

GrowSphere™ MAX - CPU

RS-485 Module

Indication Leds

RS-232 Module

Ethernet

12DI 24VDC

Filter flush counter

24 V DC Power for PLC

Power BUS input

Power to CPU

24 V AC for Valves

Power BUS

FUSE

Adaptor features

- AC protection Fuse
- CPU Remote reset
- Controlled by Modem remotely
- Easy visual Indication
- 24AC LED
- 24DC LED
- CPU Reset

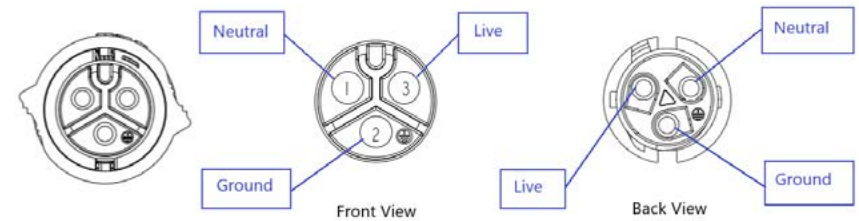**Custom ABB controller**

- Memory 80MB

What's in the box

	GrowSphere™ **MAX** controller
	3 x (colors) gaskets for power cable
	1 x BSU feed cable
	1 x electricity connector
	Wall mount adaptors
	Wall mount screws
	SIM adaptors and pin
	2 x fuses
	2 x mobile antenna
	Plastic bands
	Global SIM Card
	1 x Touch screen pen

GrowSphere™ MAX Power connector
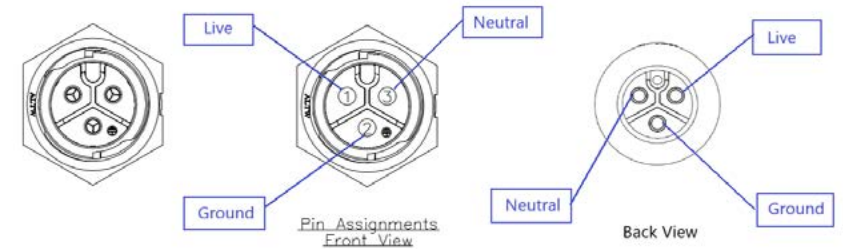
GrowSphere™ MAX Cable connector

Firmware upgrade (Manual)

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:

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).
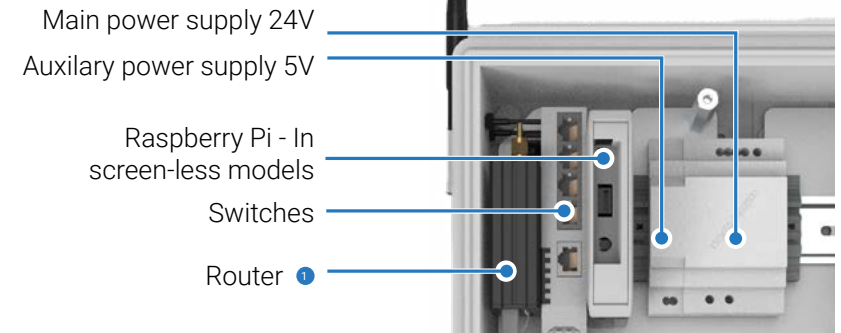
Product technical specifications

	Per mainline	Total
Mainline	1	4
Main valve	1	4
Main water meter	1	4
Pump	3	12
External filter (flushing control+indication)	32	128
Dosing station	1	4
Dosing channel	8	8
Valves	256	256

Irrigation programs	10
Shifts per program	32
Valves per shift	32
Dosing recipe	10

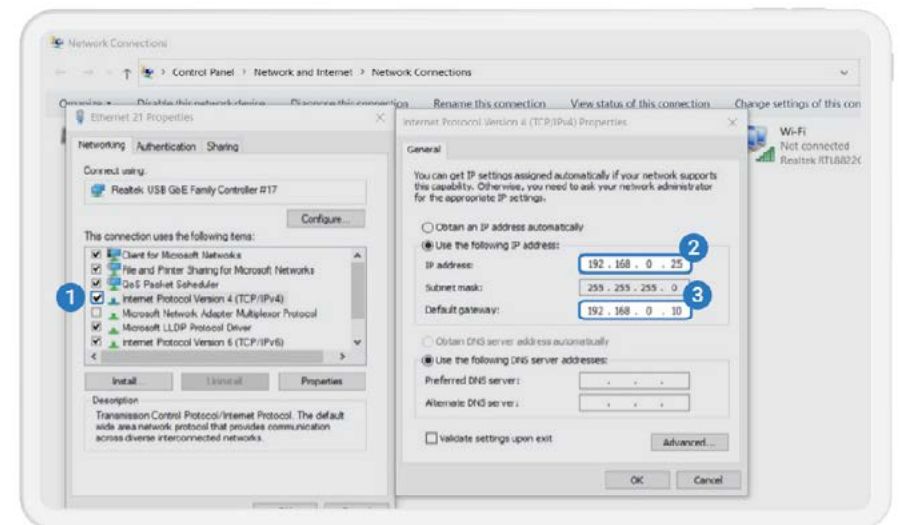# Local and Remote Control

Local access via LAN

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.
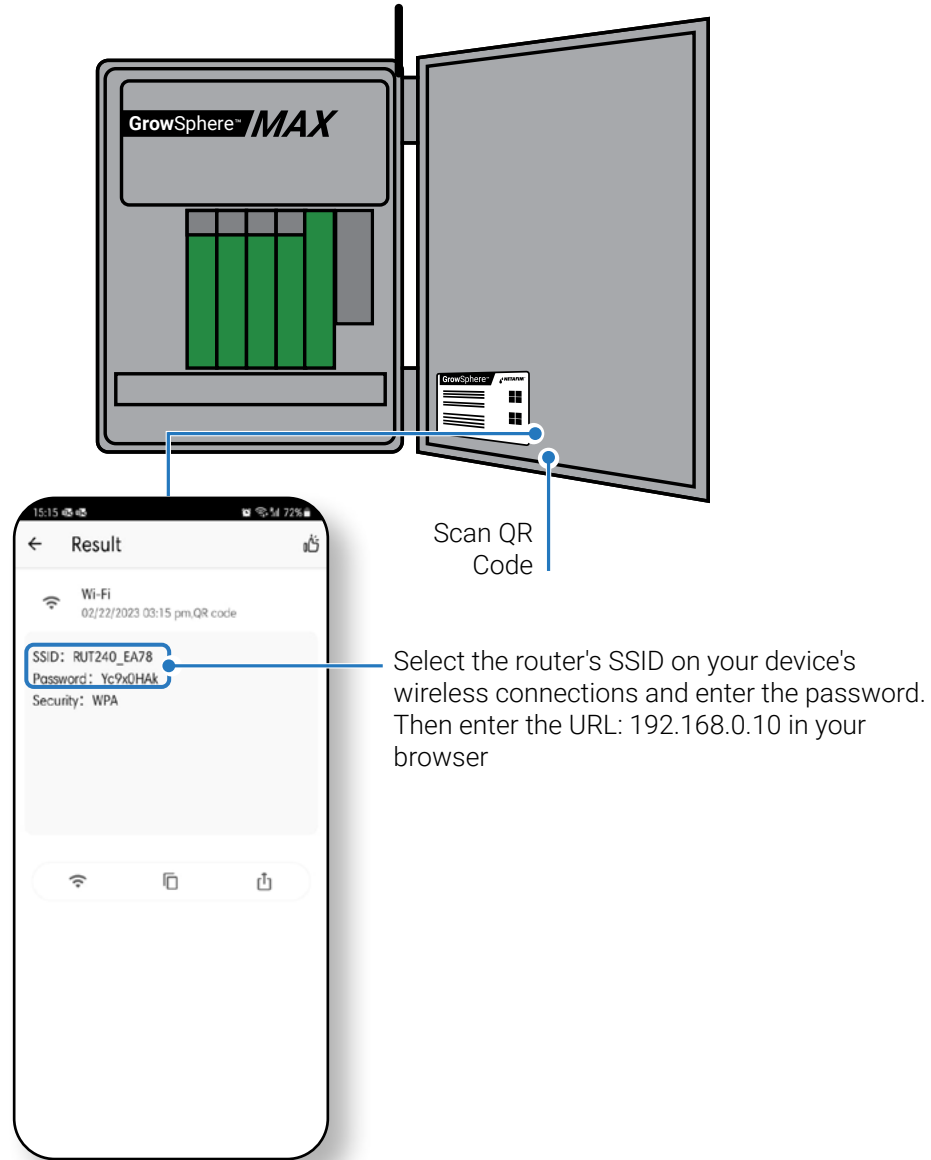

Main power supply 24V
Auxilary power supply 5V
Raspberry Pi - In screen-less models
Switches
Router ❶

1. Connect a LAN cable to the switch and type the IP address 192.168.0.10 in the URL
2. Create static IP address – In the address range of my system 192.168.0.4
3. Ensure the Default gateway address is: 192.168.0. 10

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

Scan QR Code

SSID: RUT240_EA78
Password: Yc9x0HAk

Select the router's SSID on your device's wireless connections and enter the password. Then enter the URL: 192.168.0.10 in your browser

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

Remote access - Using Anydesk

The controller comes with a SIM card and can be accessed through the **Grow**Sphere™ 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 username found on the controller's internal door. The password for this account is GrowSphere01.
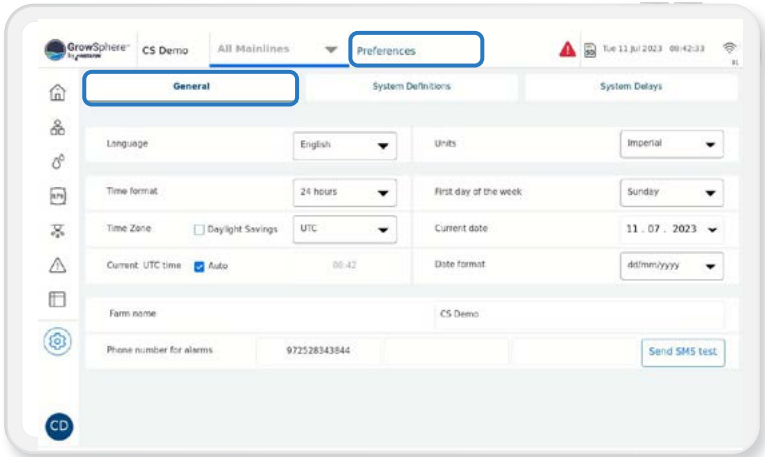

GrowSphere™ MAX - Basic Settings

Getting started
Select the Desktop / Mobile view, in the case of Tablet, you can select Desktop
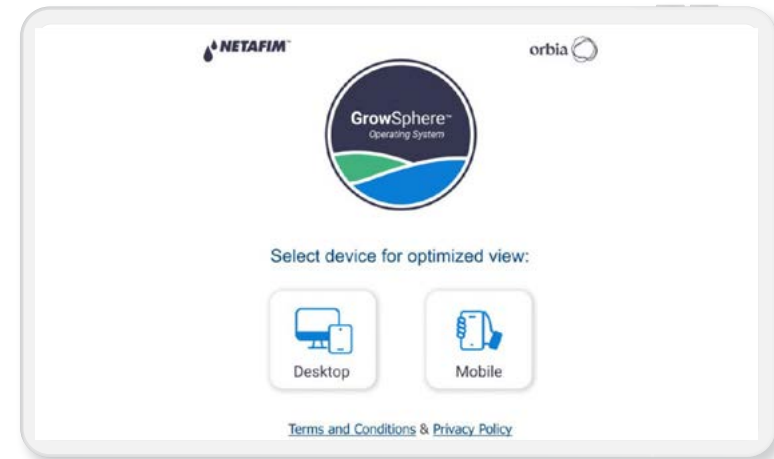
System preferences

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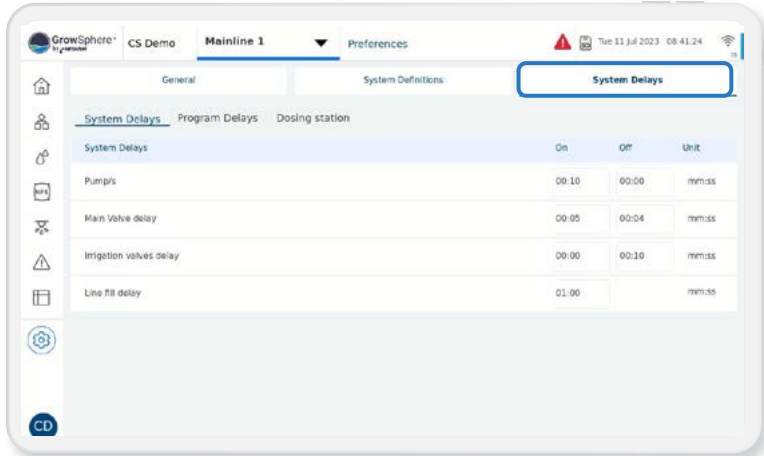

Set definitions for operation time and flow
Select the relevant mainline - From this stage, all the settings will be per mainline.
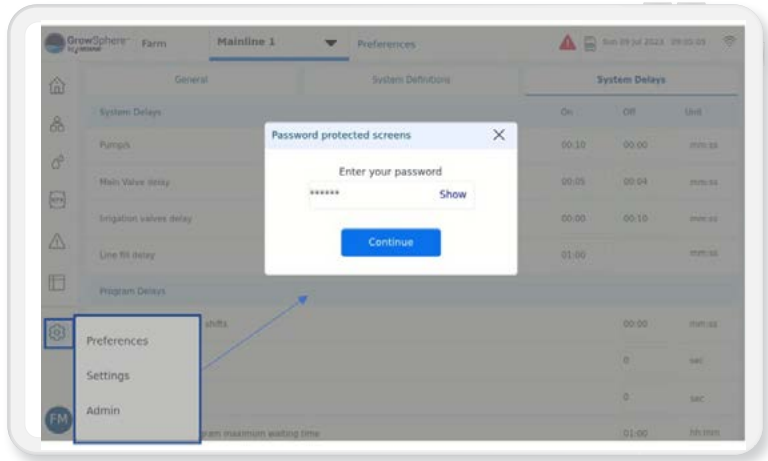Set the System Definitions
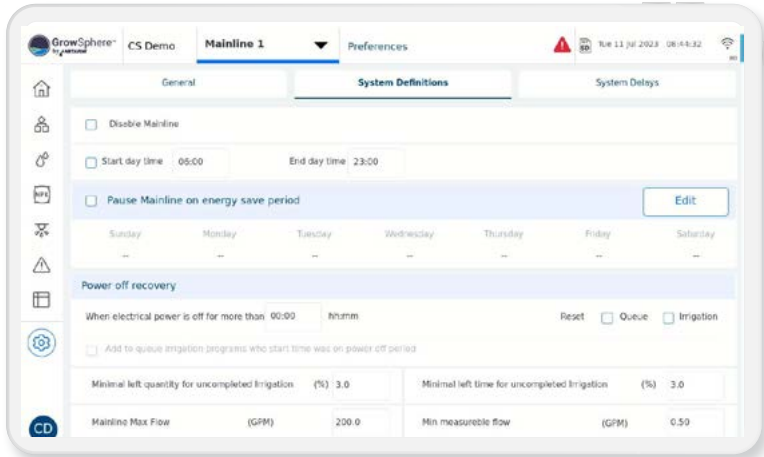
Define system delays
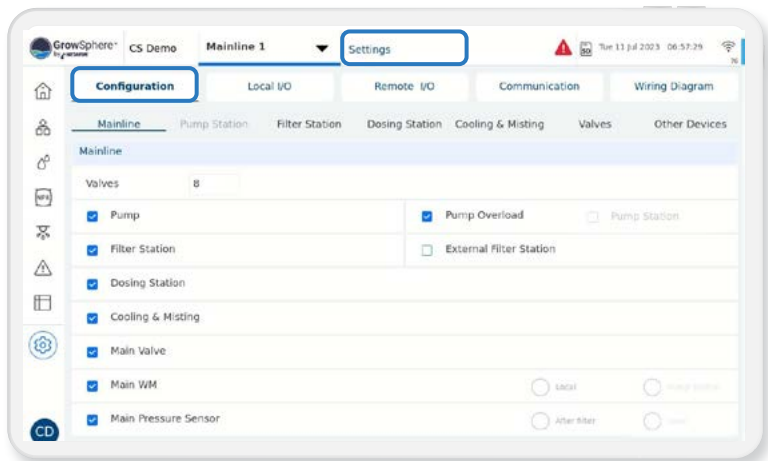Set the delays for the mainline components

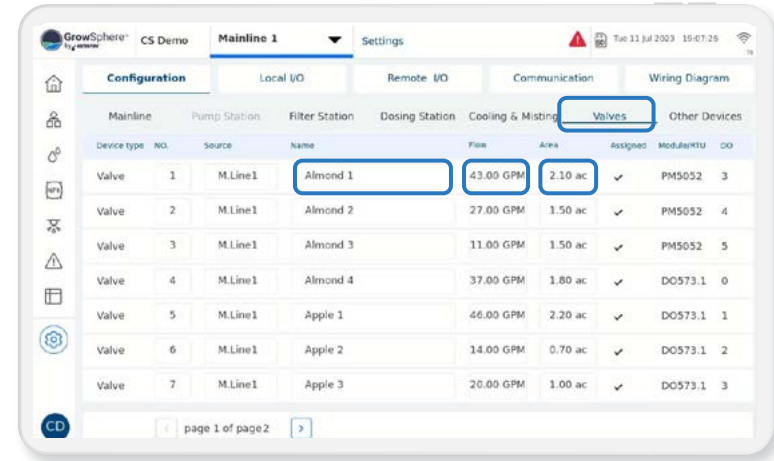# System settings

Navigate to settings
Enter the password 287451

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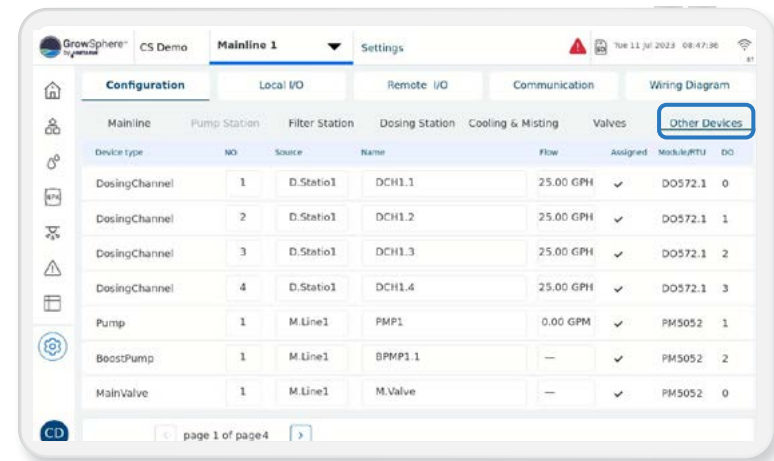

Set valves configurations
- Set name, flow rate, and irrigated area for each valve
- The Flow and Area are used to manage and monitor the irrigation in the **Grow**Sphere™ cloud
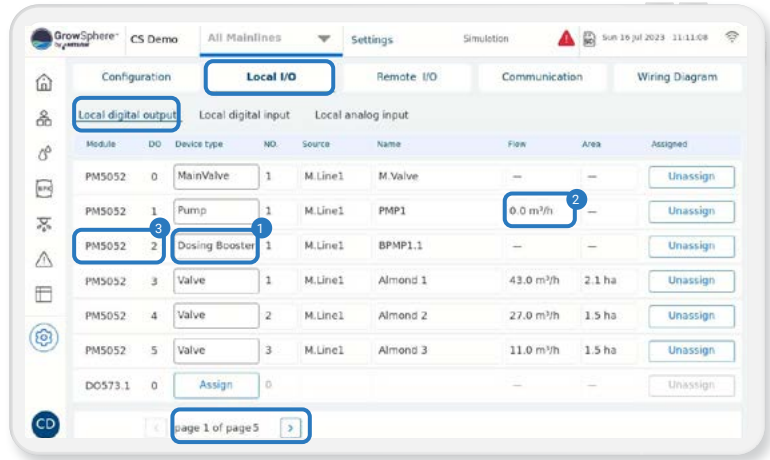

## Define other devices configurations
Set the parameters for each device

Assign digital outputs to I/O modules

① Click assign for each row to assign
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.
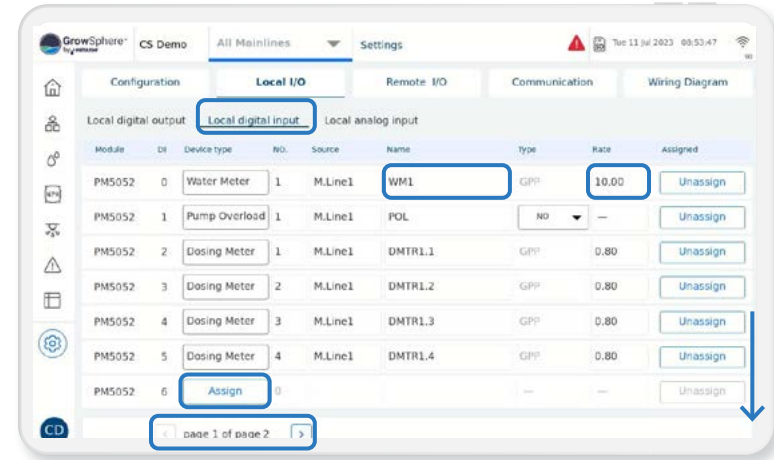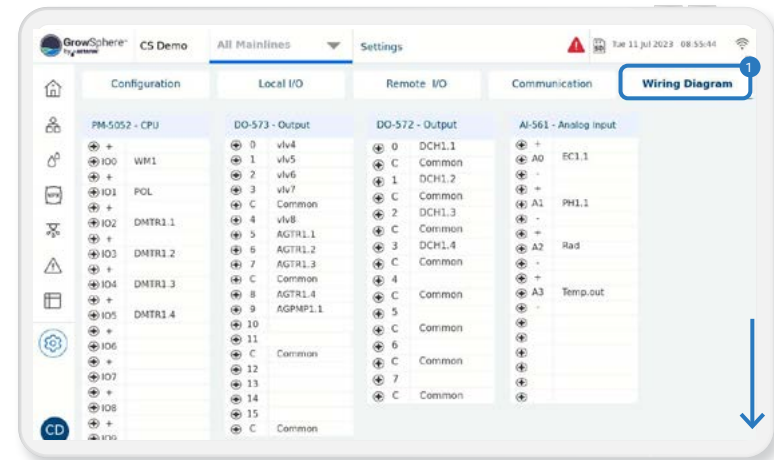

Assign digital outputs to I/O modules

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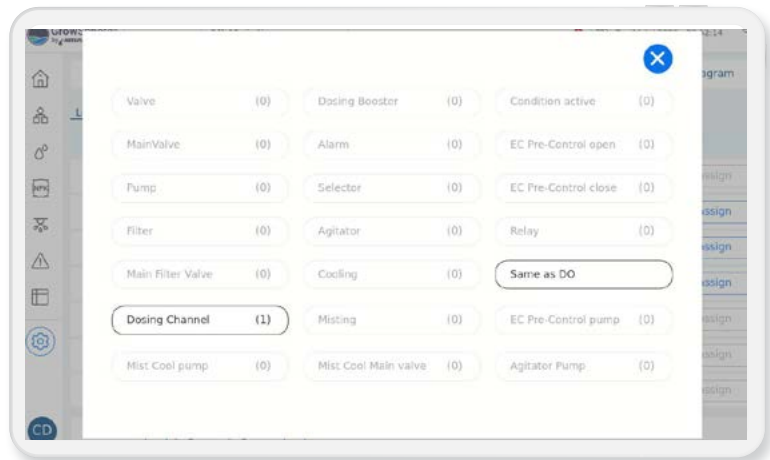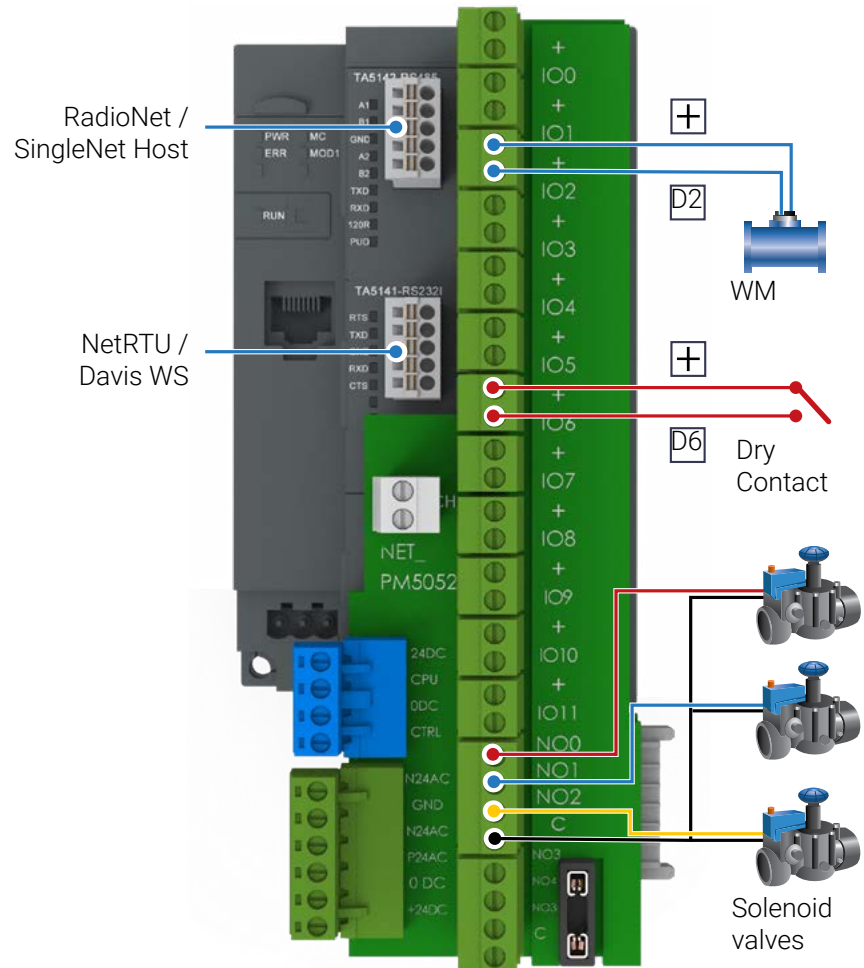

View the wiring diagram

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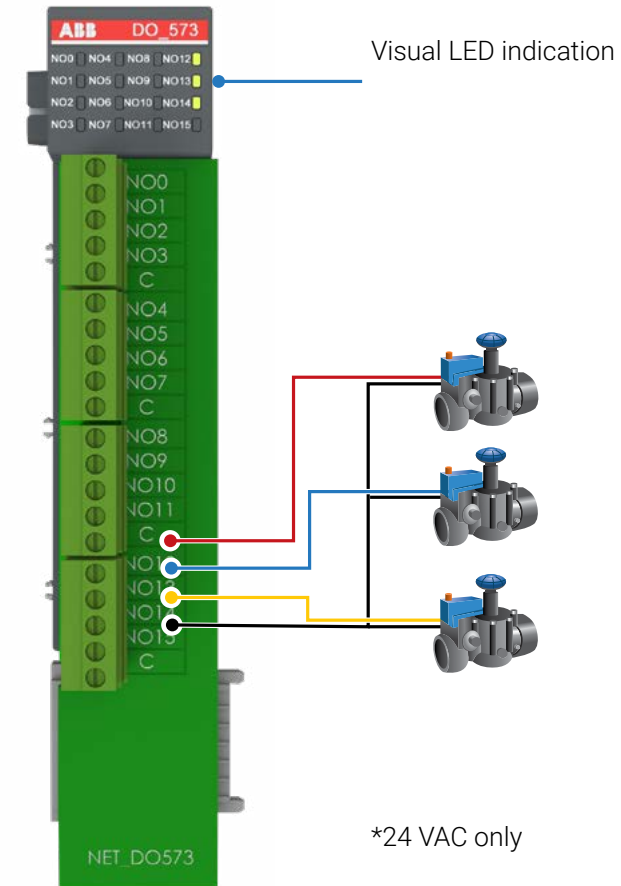
Wiring Instructions

GrowSphere™ MAX - CPU

RadioNet / SingleNet Host

NetRTU / Davis WS

WM

Dry Contact

Solenoid valves

Expantion modules

GrowSphere™ MAX - DO573 Module

- 16 normally open relay outputs
- Isolation Groups = 2 (8 channels per group)
- Output current per channel = 2 A
- Indication of output signals – 1 yellow LED per ch.
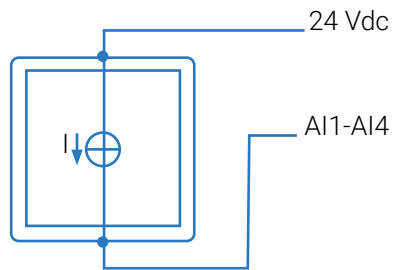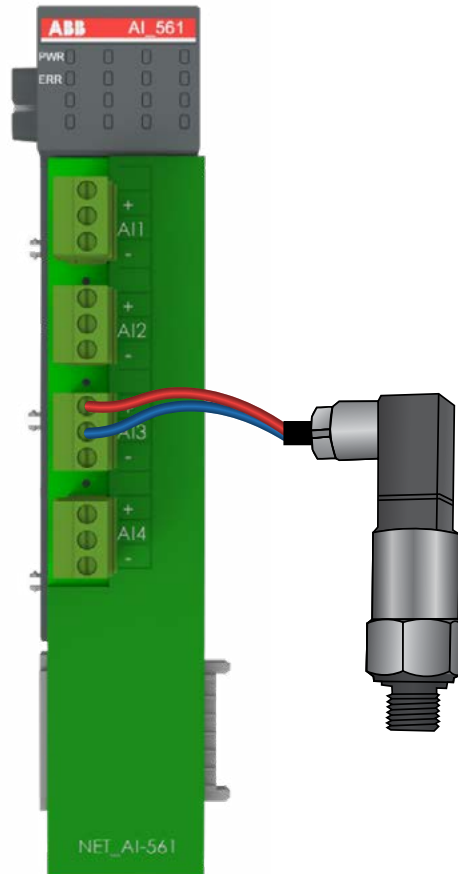

Visual LED indication

*24 VAC only

GrowSphere™ MAX - AI561 Module

- 4 Analog Inputs
- Feed (Sourcing) voltage – 24 VDC
- Resolution – 0-20mA; 4 -20mA; 12 bit
- Channel input resistance – 250 ohm

24/115/230 Vdc/Vac

AI1-AI4

-

0 Vdc/Vac
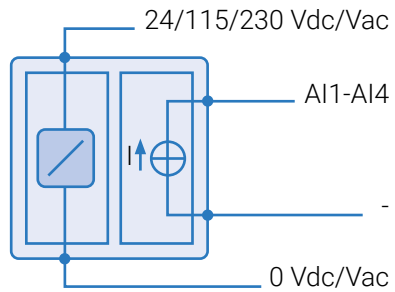
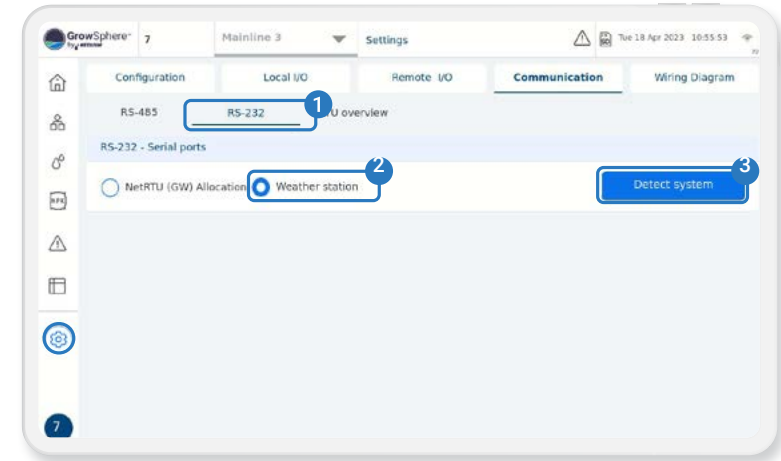Connecting isolated sensor
with current output

24 Vdc

AI1-AI4

Connecting current transmitter

Connect to remote units

Connection of Weather Station – RS232

RS232 Module
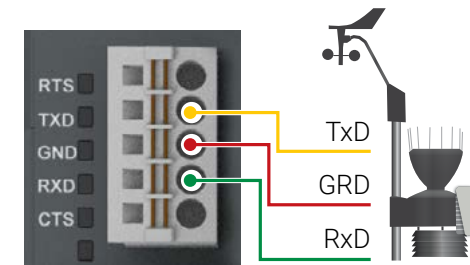
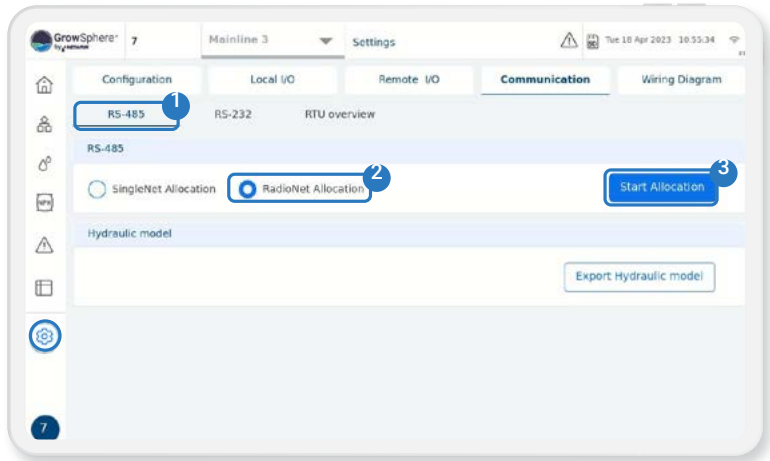| Signal	Description
RTS	Request To Send DCE is ready to accept data from the DTE
TxD	Transmit Data (output)
GRD	Common Ground
RxD	Receive Data (input)
CTS	Clear To Send (input) DCE is ready to accept data from the DTE

State LEDs

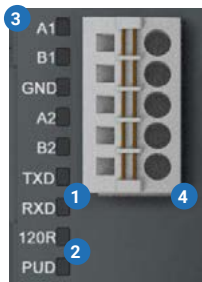| Signal	Color	State	Description
TxD	Yellow	ON (blinking)	Transmitting
RxD	Yellow	ON (blinking)	Receiving

Connection of RadioNet / SingleNet – RS485

- Please note: Before starting this process, ensure you have the latest version of PoleNet & Polenet2Max Apps.
- In order to set up the Remote units, kindly get in touch with our Global support team via email at cmt.support@netafim.com

1. From the settings → communication → RS485 screen.
2. Mark the RadioNet allocation.
3. Start allocation.

RS485 Module

State LEDs

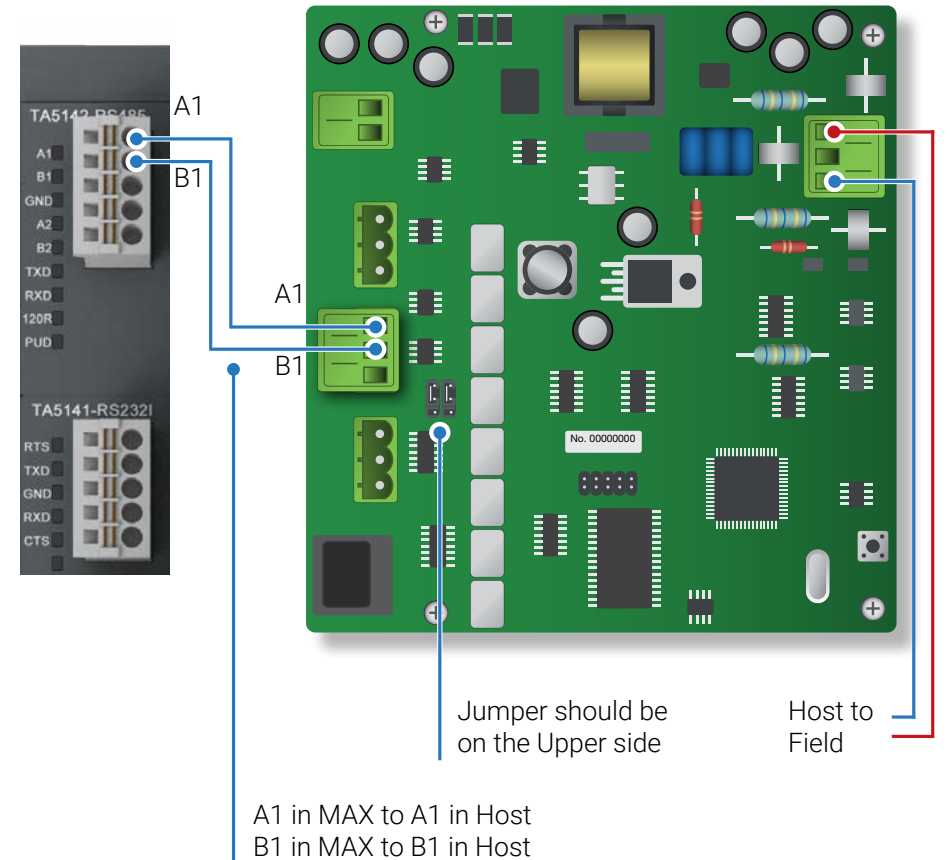| Signal	Color	State	Descrition
TxD	Yellow	ON (blinking)	Transmitting
RxD	Yellow	ON (blinking)	Receiving
12OR	Yellow	ON	Bus termination
PUD	Yellow	ON	Pull-up / Pull-down

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 & **Grow**Sphere™ MAX
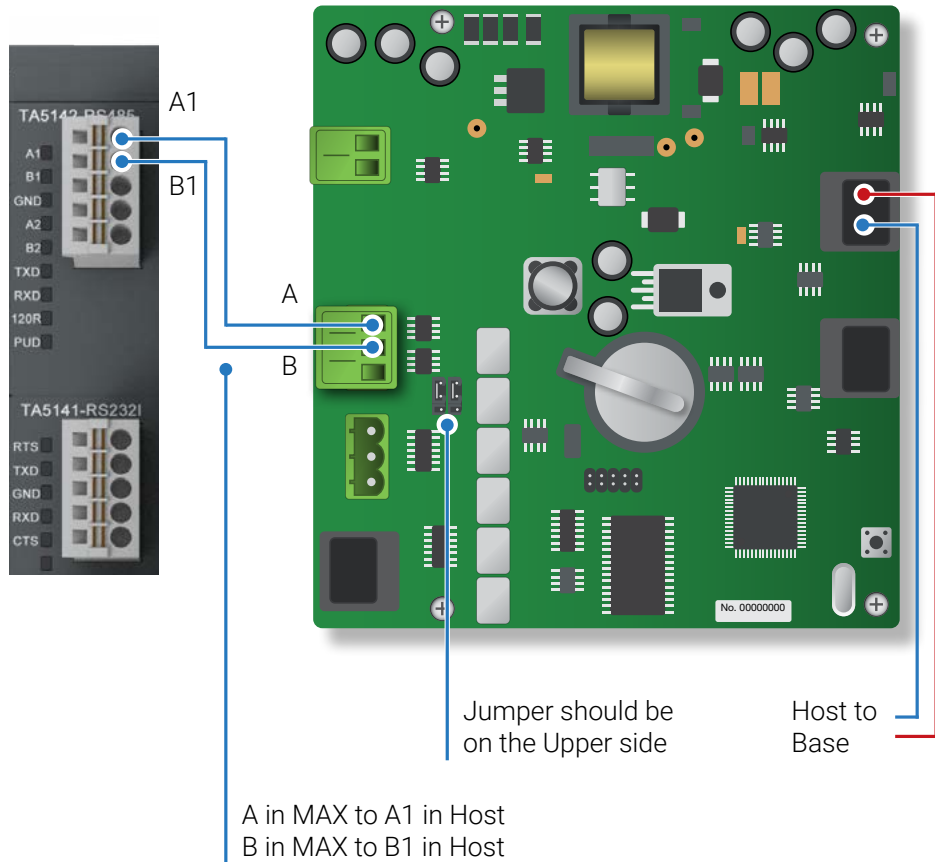

GrowSphere™ **Max**   **SingleNet** Host

Jumper should be on the Upper side

Host to Field

A1 in MAX to A1 in Host
B1 in MAX to B1 in Host

Wiring **RadioNet** to **Grow**Sphere™ MAX

GrowSphere™ **Max**   **RadioNet** Host

A1

B1

A

B

Jumper should be
on the Upper side

Host to
Base
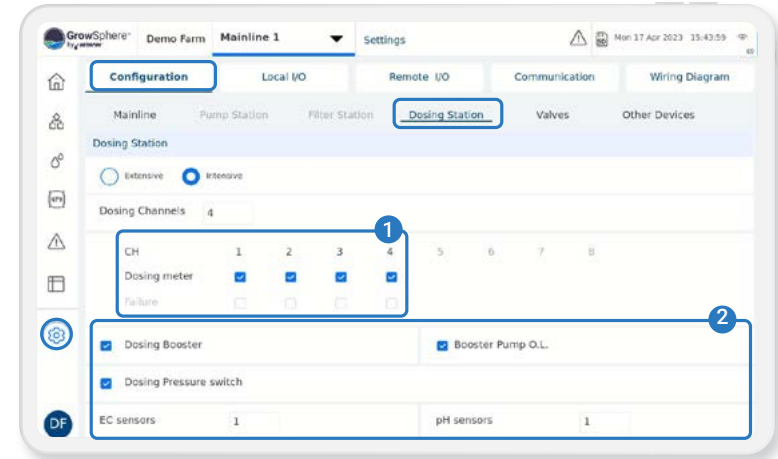
A in MAX to A1 in Host
B in MAX to B1 in Host

Dosing Setting

Set dosing station configuration
1. Define the numbers of dosing channels and agitators and activate them
2. Select the connected devices that relates to the dosing station

Define analog inputs

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
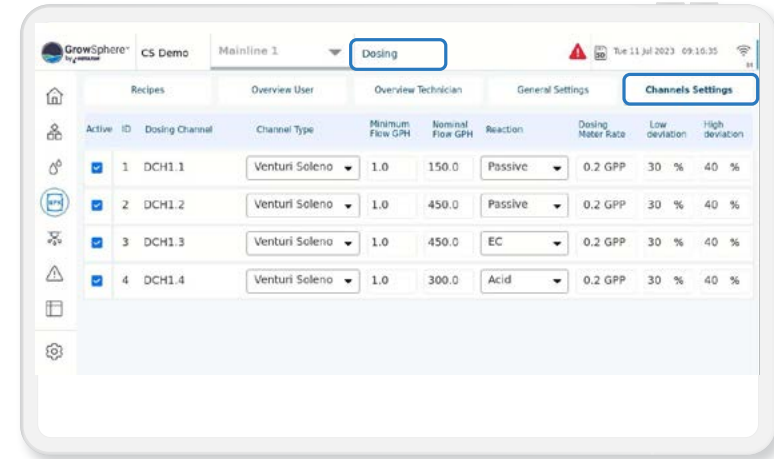2. To assign additional analog sensors, simply navigate between the pages
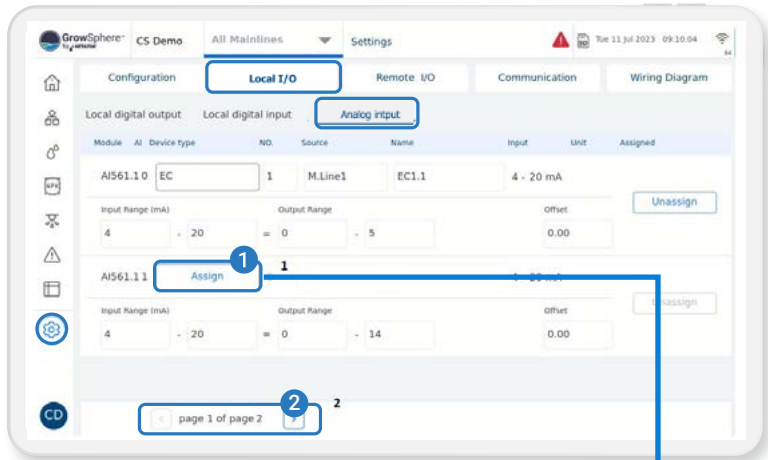
By clicking on Assign, the list below will be opened.
The allocated devices are presented in the list
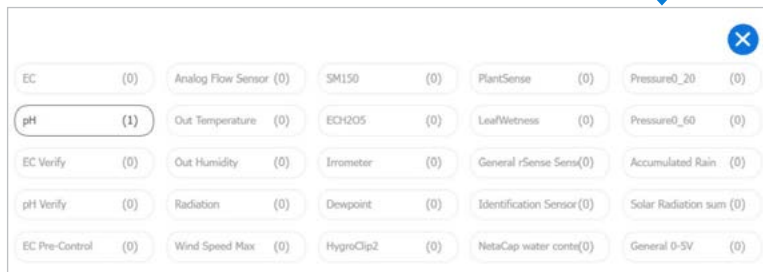
Set Dosing channels

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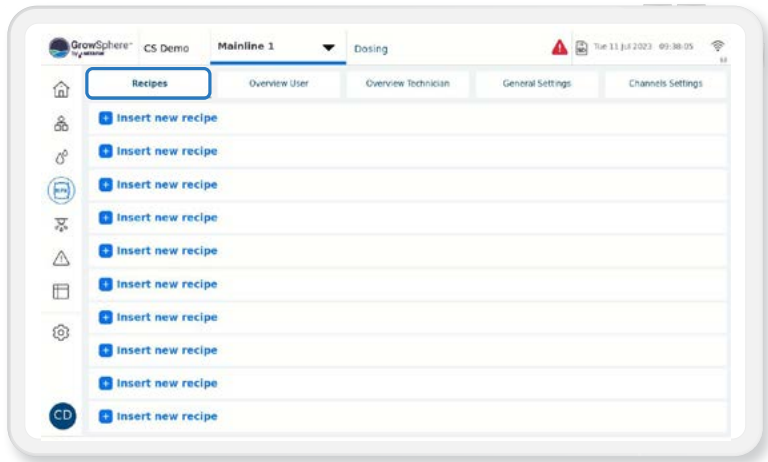

Set EC and pH reaction methods

1. Select Intensive dosing method Extensive can be selected when dosing is controlled by remote units, then EC and pH control are not optional.
2. Activate the relevant reaction method (EC/pH) and set the reactions parameters for each of the sensors
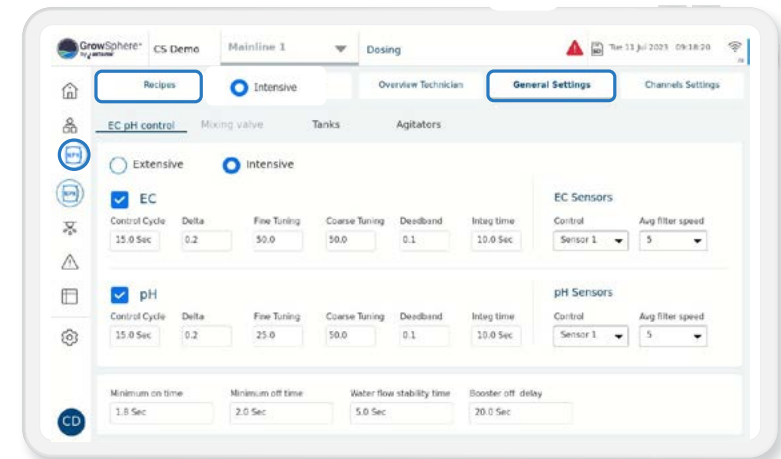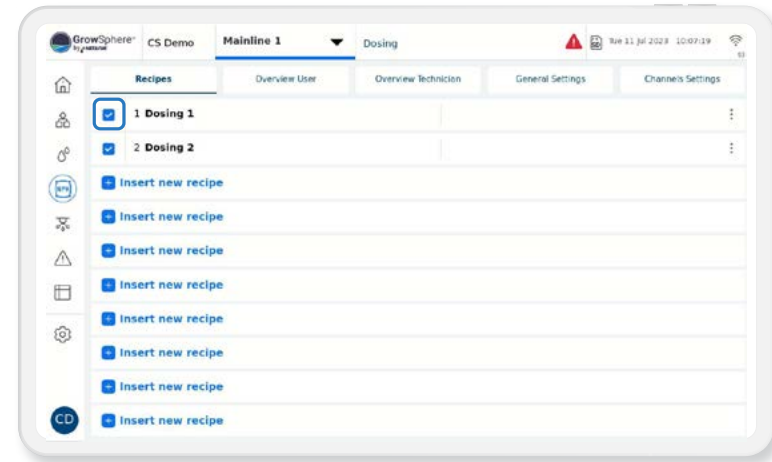
Create new dosing recipe

Click on the Insert new recipe to create a new dosing program. Activate the recipe, and repeat this action for other dosing recipes as required.
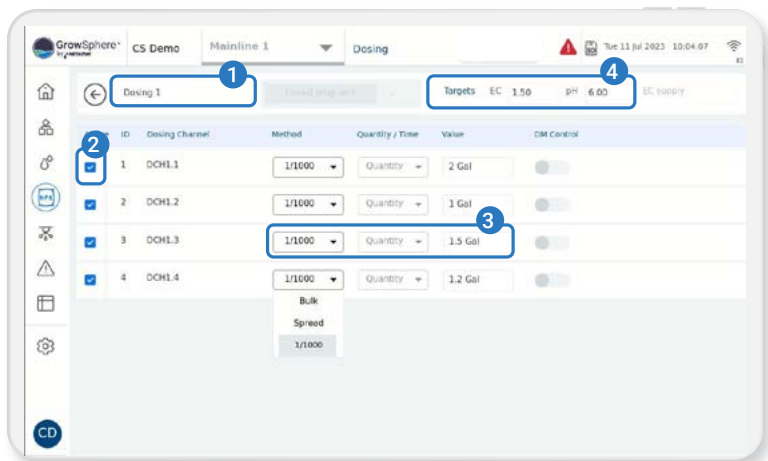

Define the dosing recipe channels

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 and pH.

Activate the recipe

CActivate the recipe, and repeat this action for other dosing recipes as required.
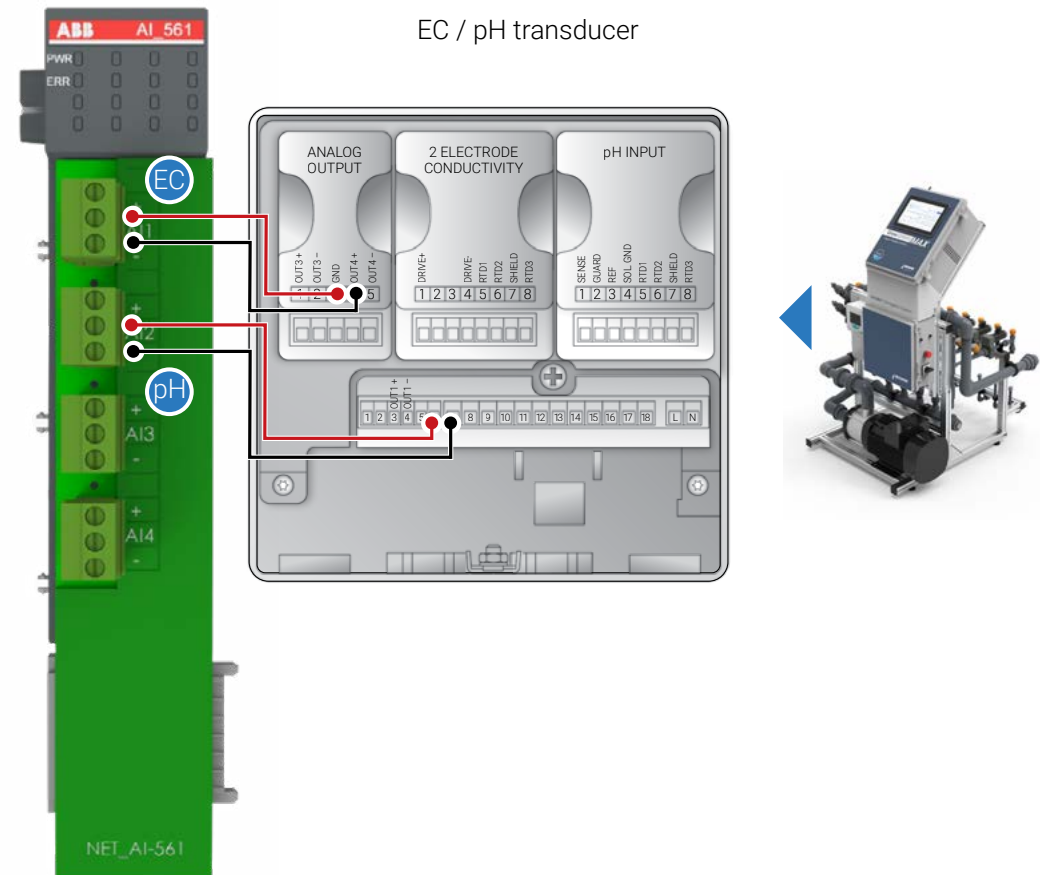
Connection of DO572 Module

- 8 triac outputs – 24 VAC
- 'C' – Shared common
- Output current per channel = 2 A
- 2A Fuse on each channel. Not removable
- Indication of output signals – 1 yellow LED per ch.
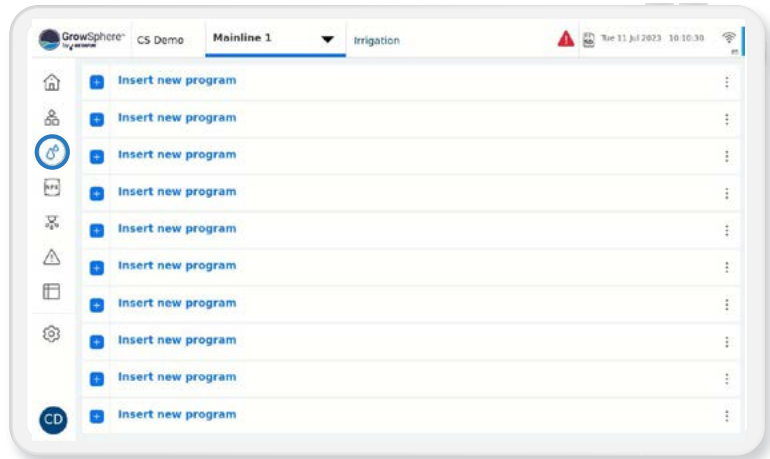- The LED is on when output signal is high
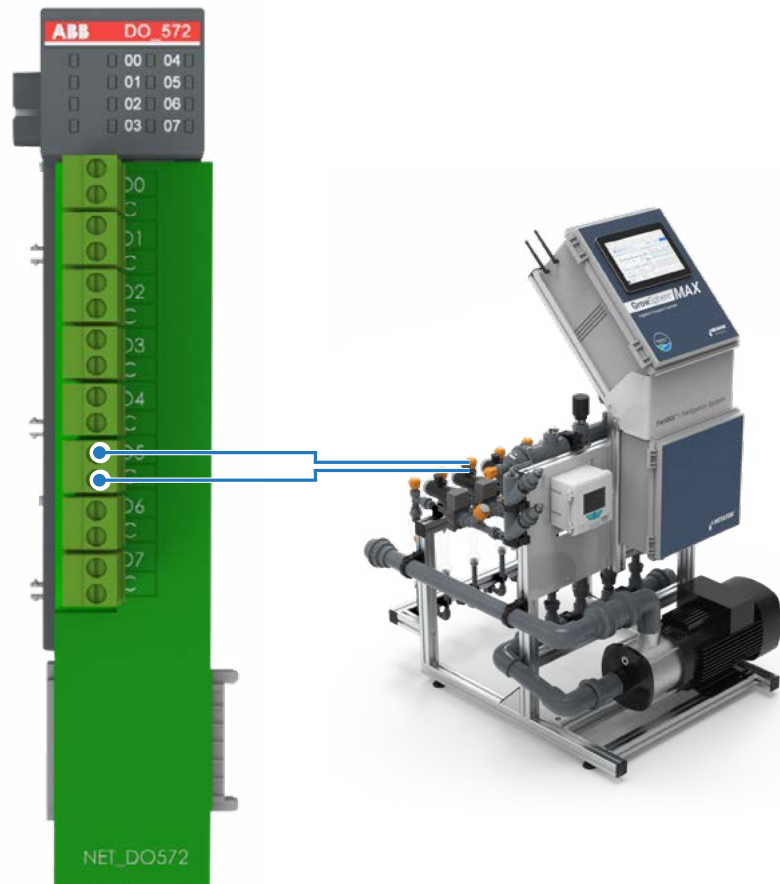
Connection of Analog Inputs Module EC, pH - A1561

EC / pH transducer
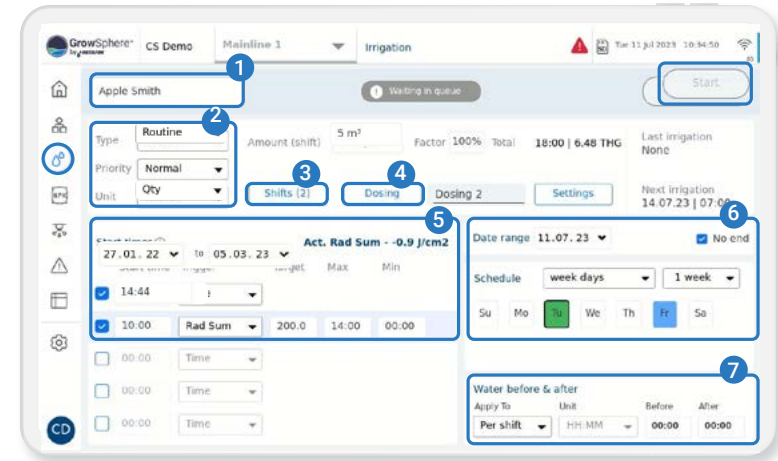
Create irrigation program

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 a shift or program.

Edit and/or add a new shift
1. Click to add a new Shift
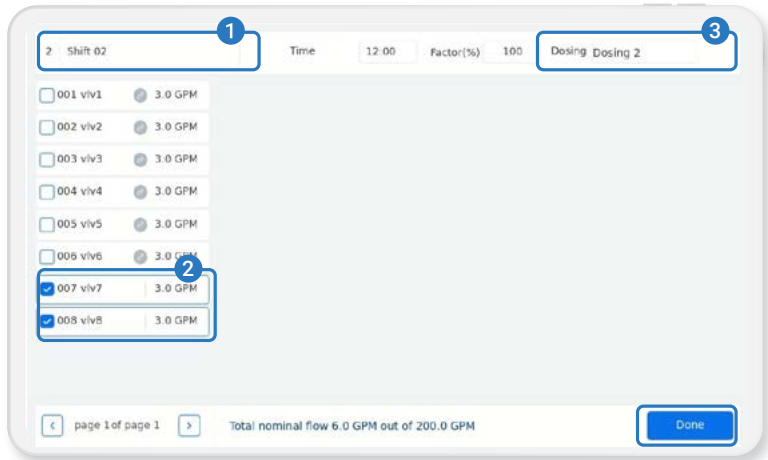2. Click to edit an existing Shift
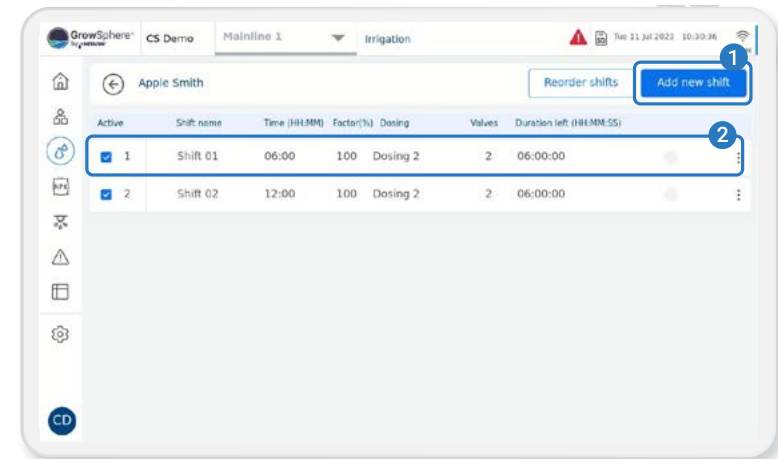
Edit and/or add irrigation shifts

Assign dosing recipe to irrigation program
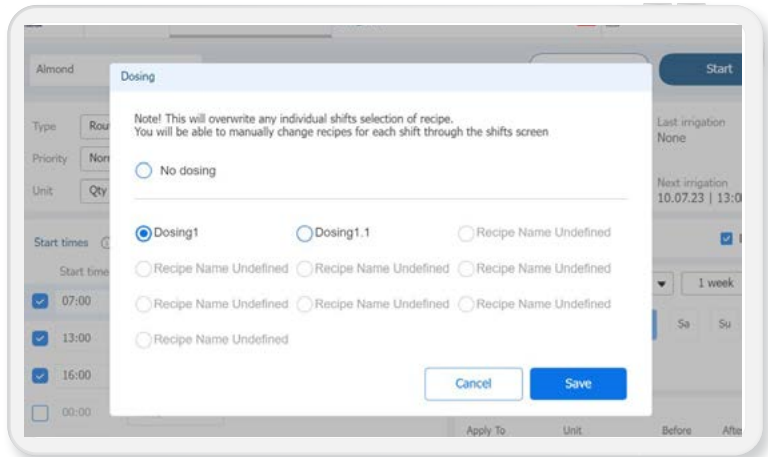To assign valves to a shift, follow these three steps:
1. Give the shift a name
2. Choose the valves you want to assign to the shift
3. Assign the shift to a dosing recipe

Quick view of your irrigation operation status

Assign dosing recipe to irrigation program

GrowSphere™
Operating System

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An Orbia business.