NETBEAT™

USER MANUAL

V 001.01 - FEBRUARY 2019

NETAFIM™
GROW MORE WITH LESS

FOREIGN LANGUAGES

In the event that you are reading this manual in a language other than the English language, you acknowledge and agree that the English language version shall prevail in case of inconsistency or contradiction in interpretation or translation.

CONTENTS

INTRODUCTION

Netafim™ congratulates you on purchasing the NetBeat™ system.

NetBeat™ system is a family of hardware, software and cloud products designed and developed for the planning, management and monitoring irrigation and Nutrigation.

Intended Audience and How to Use This Manual

This document is the user-manual of the NetBeat™ system. It describes basic operation and maintenance of the system. Keep this manual at hand at all times.

Contact for support

This manual offers a full explanation of operation, maintenance and troubleshooting procedures of the NetBeat™ system. However, in any case you need additional support, contact your Netafim™ local representative.

Use of symbols in this document

The symbols used in this manual refer to the following:

WARNING
The following text contains instructions aimed at preventing bodily injury or direct damage to the crops, the NetBeat™ system and/or the infrastructure.

CAUTION
The following text contains instructions aimed at preventing unwanted system operation, installation or conditions that, if not followed, might void the warranty.

ATTENTION
The following text contains instructions aimed at enhancing the efficiency of usage of the instructions in the manual.

NOTE
The following text contains instructions aimed at emphasizing certain aspect of the operation of the system or installation.

ELECTRICAL HAZARD
The following text contains instructions aimed at preventing bodily injury or direct damage to the NetBeat™ system and/or the infrastructure in the presence of electricity.

PROTECTIVE EQUIPMENT
The following text contains instructions aimed at preventing damage to health or bodily injury in the presence of fertilizers, acid or other chemicals.

SAFETY FOOTWEAR
The following text contains instructions aimed at preventing foot injury.

TIP
The following text provides clarification, tips or useful information.

INTRODUCTION

Safety instructions

- All safety regulations must be applied.
- Use only approved accessories specified by Netafim™ for the NetBeat™ 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 agricultural environment - always wear protective footwear.

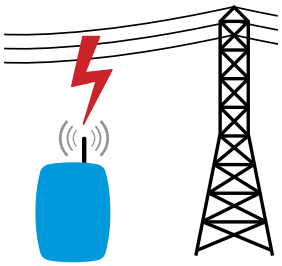
Electrical Safety Precautions

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

Overhead Power Lines

WARNING
When installing NetBeat™ units care must be taken:

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



Batteries

- Use only Netafim™ approved batteries on the NetBeat™ equipment.
- The NetBeat™ system uses Lithium acid batteries as a power source. Do not puncture the battery. If a battery is found to be punctured take caution in handling the battery and avoid contact with the corrosive material in the battery.
- All batteries can cause property damage and/or bodily injury, such as burns. Prevent contact between the terminals of a battery and objects made of conductive material (jewelry, keys, tools etc.). Failure to do so may cause a short circuit and generate significant heat. Exercise care in handling any charged battery, particularly when placing it inside a container (toolbox) amidst metal objects.
- Always dispose of a used battery in a responsible manner - in the intended places for battery recycling.
- Batteries should never be put in a fire because they could explode.
- It is important not to dispose of large numbers of alkaline batteries in a group. Used batteries are often not completely dead. Grouping used batteries together can bring these live batteries into contact with one another, allowing their charge to be released which could create safety risks.

Wireless radiation/RF radiation

The NetBeat 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 Ministry of Communication, Customs, or any other governmental agency.

WARNING
Radio frequency fields near antennas may exceed FCC rules for human exposure.

INTRODUCTION

Thunderstorms

If the area is known to be prone to thunderstorms, NetRTUs 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 NetRTUs 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.

Working at height

WARNING

Mounting the base unit and routers and erecting poles might require 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).

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.

Environmental conditions

CAUTION

The NetMCU should be:

- placed in a roofed building
- protected from direct sunlight
- kept at an ambient temperature between 10°C and 40°C (50°F and 104°F)
- kept at a maximum relative air humidity of 85%
- properly ventilated
- protected from dust
- protected from splashes or direct spraying with water or chemicals

SYSTEM DESCRIPTION

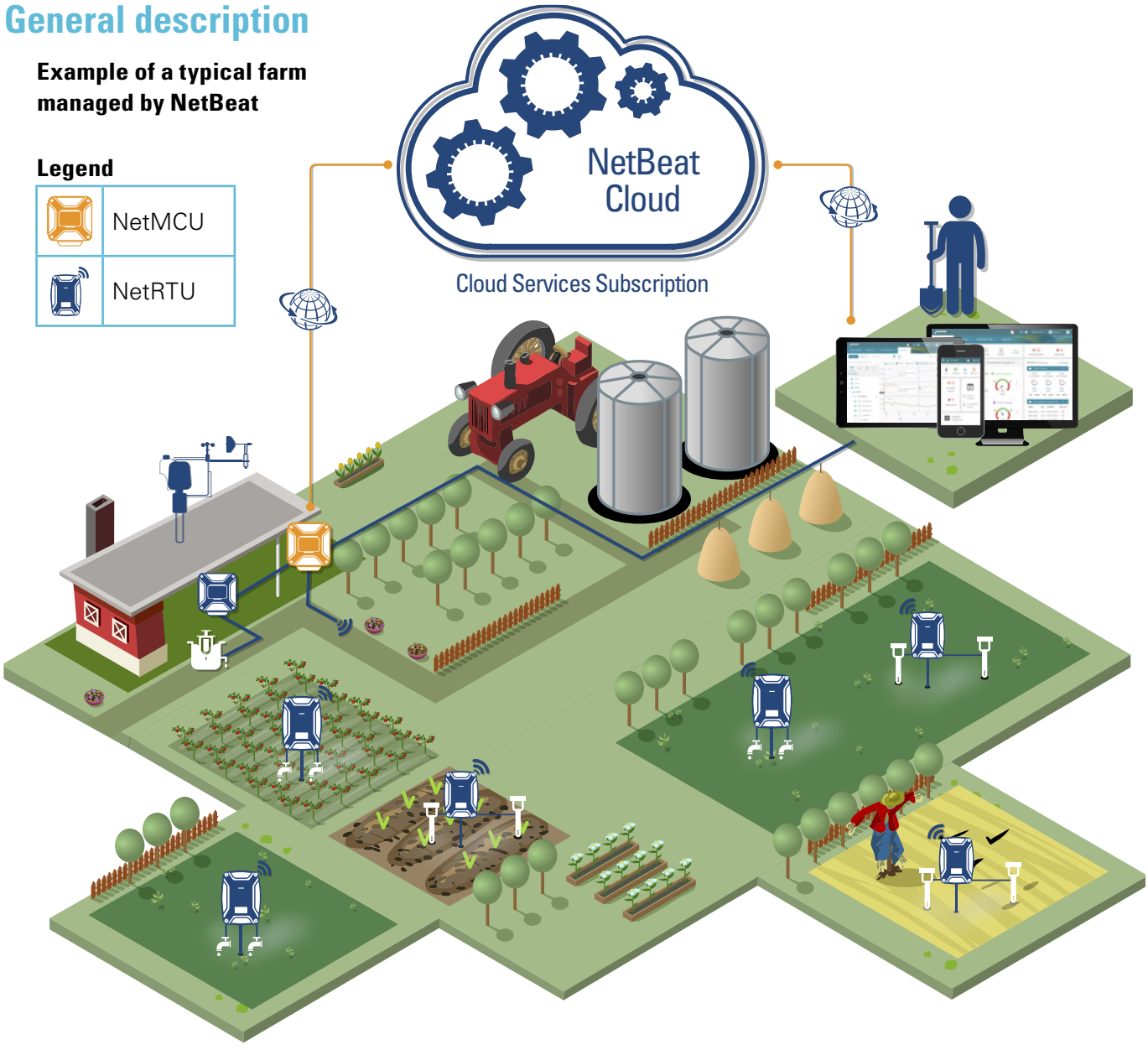
The NetBeat system is a full solution of hardware, software and cloud products designed and developed for planning and monitoring of crop management with emphasize on irrigation and Nutrigation.

NetBeat system is well suited for the following applications:

- Agricultural open field control systems including small farm to large scale agriculture projects, utilizing drip and sprinklers or any other controllable irrigation system.
- Horticultural crops in nurseries, orchards and vineyards.

General description

Example of a typical farm managed by NetBeat



SYSTEM DESCRIPTION

Features

NetBeat system contains 4 major elements:

- **Monitoring:** Data from wide range of sensors and data points, including 3rd party sensors (e.g. soil, water, fertilizers, climate and weather) and external data sources (e.g. weather services).
- **Controlling:** Easy planning, programming and executing of all irrigation and Nutrigation programs based on pre-defined programs, sensor-based trigger or Netafim's crop models..
- **Dosing:** Integration of advanced dosing systems to ensure the highest level of Nutrigation accuracy, while optimizing water.
- **Agronomical Support:** Access to more than 50 years of irrigation and Nutrigation expertise and agronomical know-how of Netafim's experts, to maximize crop quality and yield.

Benifits

Freedom & Flexibility:

Access to all relevant monitoring data and control capabilities from any device (PC or mobile), enables growers to manage their crops more effectively.

Driving efficiencies:

Data integration from all sources combined with control capabilities at the palm of their hands, allow growers to reduce water, energy & fertilizer costs:

- Use crop models to optimize the use of resources.
- More precise irrigation and nutrigation to increase crop yield and quality.
- Optimized hydraulic system.
- Saves money on fertilizers.

Peace of Mind:

Reduced risk and constant feedback increase growers' confidence.

- Automated irrigation
- Alerts
- Remote control
- Full reports and events history
- Full training and support

Standard and regulation compliance

All NetBeat system components comply with universal standards and designed to meet specific regulations as described below.

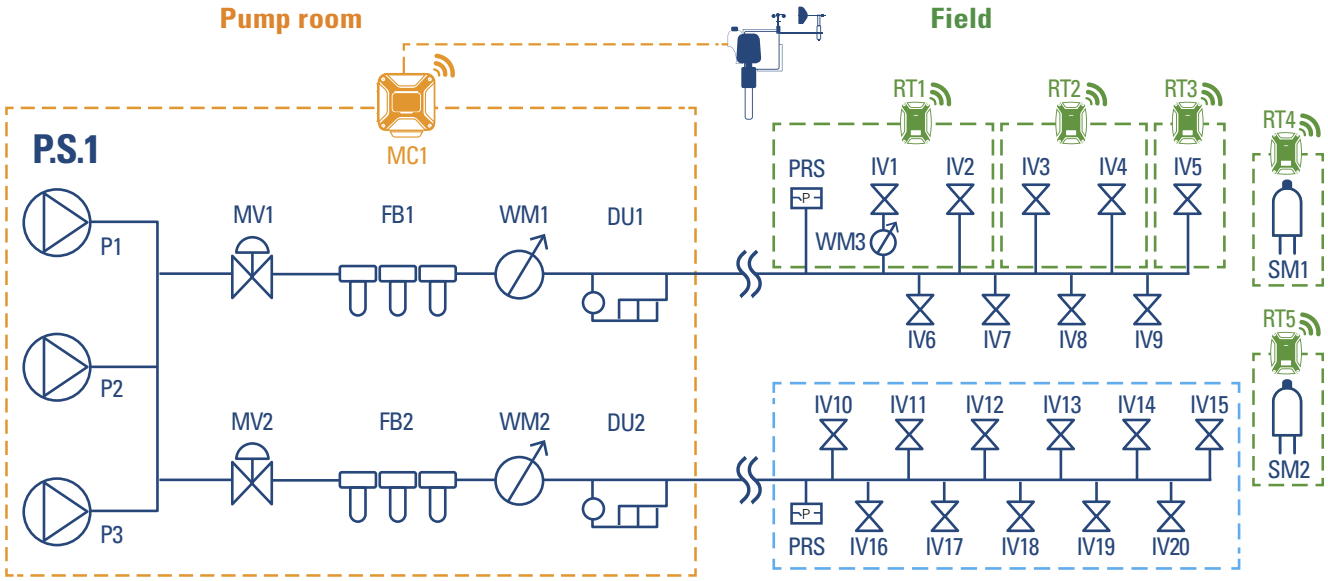
Standard	CE	FCC/CSA	UL	ROHS	EMC
Compliance	√	√	√	√	√

Wireless Regulations	**Compliance**	**Description**
Local RF Regulations	√	The system is designed to meet 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 Ministry of Communication, Customs, or any other governmental agency.
Cellular Regulations	√	The system is designed to meet the local Cellular regulations: Official authorities such as Ministry of Communications and Customs. Cellular provider certification such as Verizon, AT&T, Vodafone or any other provider.

SYSTEM DESCRIPTION

System architecture

Example of a typical farm managed by NetBeat



Legend

Radio control - NetBeat NetRTU

Line control - SingleNet

MC	NetMCU
RT	NetRTU
PS	Pump Station
MV	Main Valve

FB	Filter Battery
DU	Dosing Unit
IV	Irrigation Valve
SM	Soil Moisture Sensor

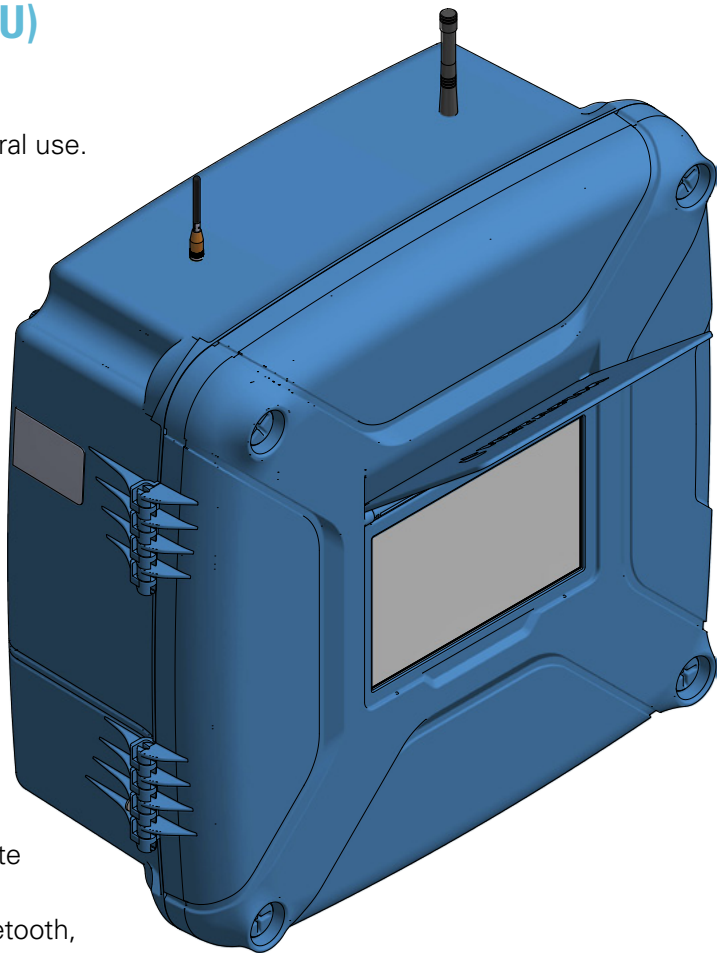
WM	Water Meter
TM	Tensiometer
WS	Weather Station
PRS	Pressure Sensor

Netbeat system main components

At the heart of the NetBeat system is the NetMCU, Netafim flagship controller, accompanied by NetBeat Remote Terminal Units (NetRTU).

SYSTEM DESCRIPTION

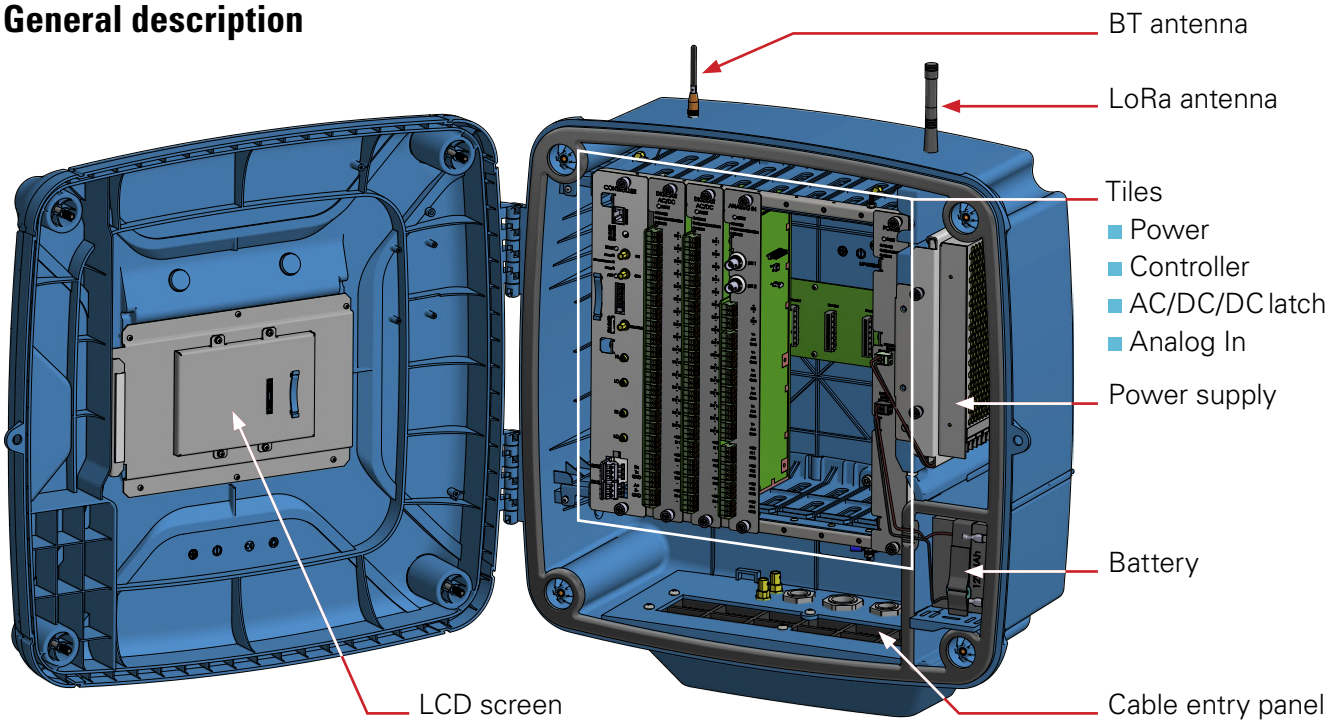
NetBeat Main Control Unit (NetMCU)



Features & benifits

- Modular controller for agriculture and horticultural use.
- Fits all farm sizes and complexities
- Manages both irrigation and fertilization.
- Controls single and multiple main lines.
- Collects data from a wide range of sensors e.g. flow, pressure, soil moisture, plant and weather station.
- Actuates local and remote devices such as pumps, main valves, field valves, filters etc.
- Crop alerts.
- Hydraulic system alerts.
- Controls remote devices via radio and Single cable.
- Works online or offline.
- Enables remote over-the-air update and maintenance.
- User friendly interface
- Hydraulic interactive schema.
- Easy expansion when required
- Compatible with RadioNet and SingleNet remote devices.
- Advanced communications options (Wi-Fi, Bluetooth, Cellular, Ethernet, LoRa RF, RS-232, RS-485) for communication with the cloud and the controlled units.

General description



SYSTEM DESCRIPTION

Specifications

Power supply	Mains power (100 to 250 VAC 50/60Hz)
	10-15 VDC (Battery & Solar panel)
Touch screen	Optional

Operation temperature	With touch screen: -20°C - 55°C / -4°F - 131°F
	Without touch screen: -20°C - 65°C / -4°F - 149°F
Dimensions	635 x 573 x 252 mm (25 x 22 9/16 x 10")

Easy expansion

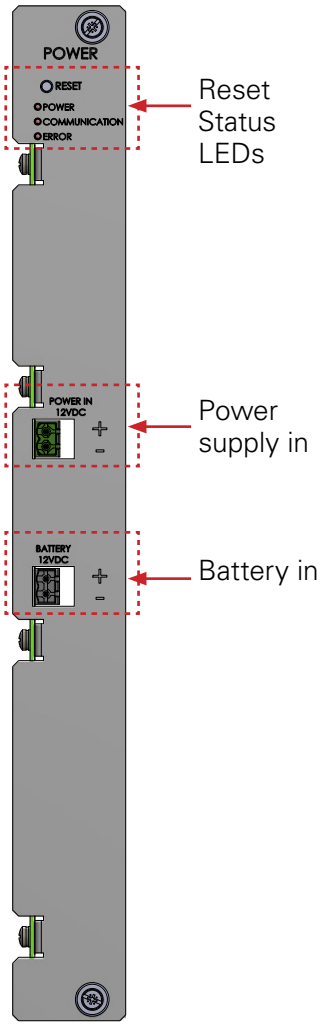
Based on internal, easy to install, I/O tiles. Integrates 2 types of I/O tiles (optional 6 tiles per NetMCU)

MCU – Power Tile

The Power tile receives 12VDC input voltage from the Power Supply.

It supplies the voltage to all tiles and charges the backup battery with 12VDC output voltage.

MCU max power is 100W at 45°C (113°F)



MCU power supply

Parameter	Rating
Input	
Voltage range	90 ~ 132VAC / 180 ~ 264VAC, by switch
Frequency range	47 ~ 63Hz
AC current	4A/115VAC 2.2A/230VAC
Output	
DC voltage	12V
Current range	0 ~ 17A
Rated power	204W

MCU backup battery

Parameter	Rating
Nominal voltage	12V
Nominal capacity	5Ah (20hr)

SYSTEM DESCRIPTION

MCU – Controller tile

Responsible for all communications between the components of the controller, and the cloud.

SOM Specifications

Parameter	Rating
Model	MSC SM2S-IMX6-133
Processor	Dual ARM Cortex A9 – 1GHz
Internal Memory	2GB DDR3
Flash	4GB
External Memory	MicroSDHC card
Operation System	Linux

LoRa

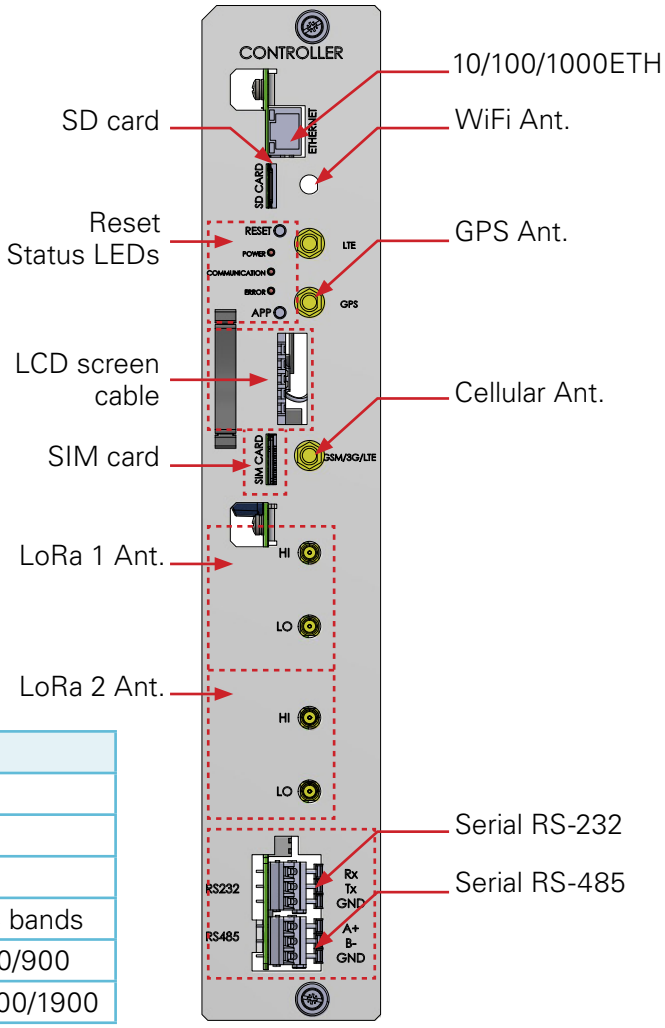
Parameter	Rating
Model	Samtech SX1726
Frequency	868/915/433 MHz
Output Power	14/20 dBm
BW	125,250,500 kHz
Spreading Factor	7 - 10

Cellular

Parameter	Rating
Model	Quectel UC20-G
Frequency Bands	UMTS:800/850/900/1900/2100
	GSM: 850/900/1800/1900
Output Power	Class 3 (24dBm +1/-3dB) for UMTS bands
	Class 4 (33dBm ±2dB) for GSM 850/900
	Class 1 (30dBm ±2dB) for GSM 1800/1900

BLE/ WiFi

Parameter	Rating
Model	Azurewave AW-CM389MA
WIFI Standard	802.11a/b/g/n/ac
Bluetooth	V4.2



Additional features:

- LAN
- RS-485
- RS-232

SYSTEM DESCRIPTION

MCU – AC/DC/DC latch tile

Serves mainly for controlling valves, pumps, dosing systems, etc.

Parameter	Rating
Number of outputs	16
Output voltage	24 DC/AC/PWM
Max output current per ch.	1500 mA
Frequency	50/60 Hz
Max switching frequency	2.5 Hz

Digital Inputs

Parameter	Rating
Number of inputs	4
Nominal voltage of inputs	12 V
Max sample rate	472 Hz
Signal voltage "0"	<0.8 V
Signal voltage "1"	>2.1 V

MCU – Analog In Tile

Serves mainly for external data input into the system,

Analog Channels

Parameter	Rating
Number of analog inputs	6
Channel Type	-5mV - 15mV
	0-10V
	0-20mA

Thermocouple

Parameter	Rating
Models	PT100/1000/10000, 0-200Ohm, 0-30kOhm
Output current	120 mA
Sensor power supply	3.3 – 12 Vdc

Digital Inputs

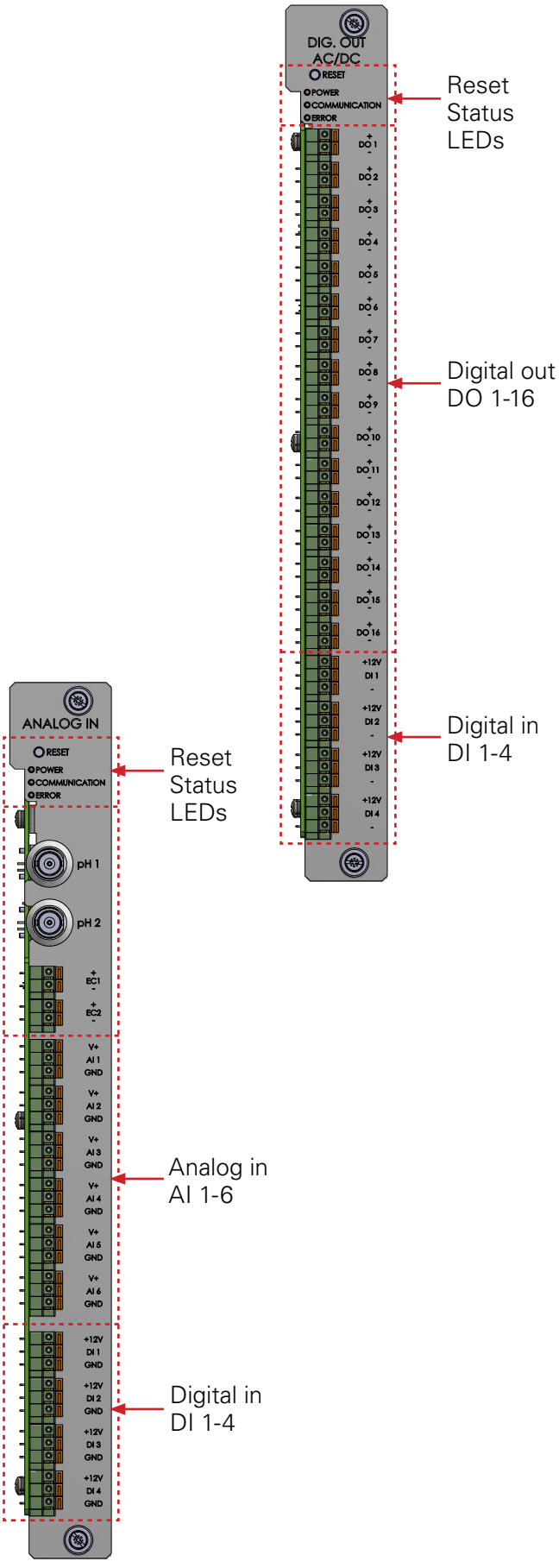
Parameter	Rating
Number of inputs	4
Nominal voltage of inputs	12 V
Signal voltage "0"	<0.8 V
Signal voltage "1"	>2.1 V

EC Channel

Number of inputs	2

pH Channel

Number of inputs	2



SYSTEM DESCRIPTION

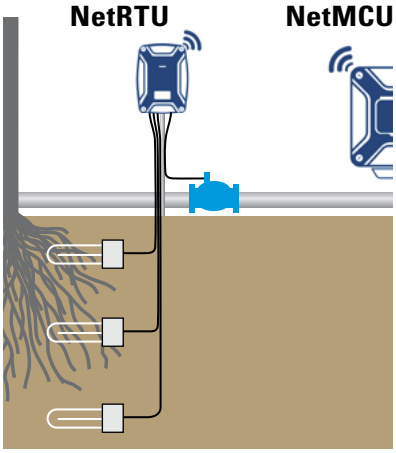
NetBeat Remote Terminal Unit (NetRTU)

Transmits field data and activates remote system components such as field valves.
The NetRTU can also be used as a repeater* to extend communication range.

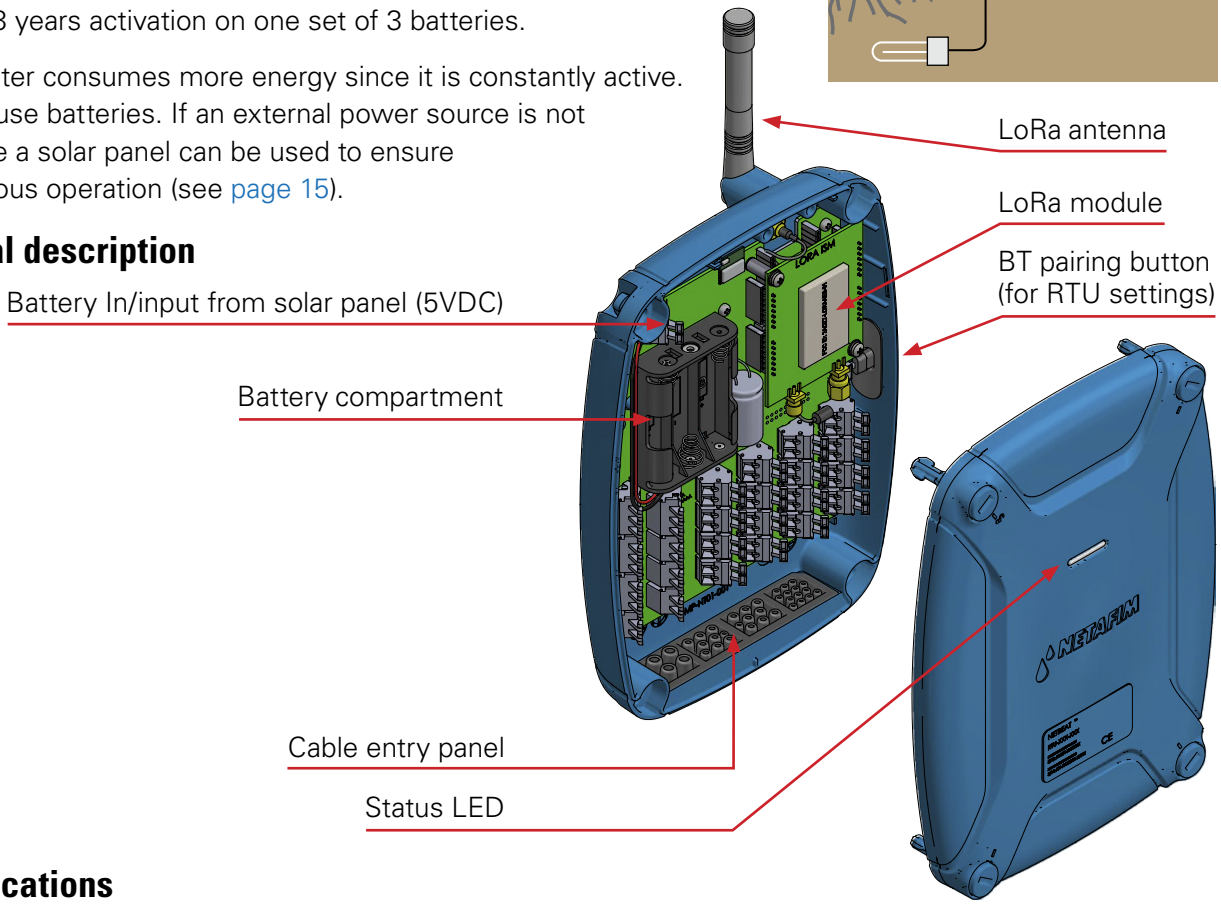
Features & benifits

- Open unit for any input (sensors) or any output (valves, pumps, dosing)
- Enables remote control of field devices.
- Measures field parameters e.g. flow, pressure, soil moisture, plant and weather station.
- Managed by the NetMCU via radio using (LoRa) low power radio. **communication of up to 10km** with a clean line of sight (with repeaters).
- Enables over-the-air maintenance and automatic firmware updates.
- Various mounting options - on a wall, a pole or a rod.
- Up to 3 years activation on one set of 3 batteries.

*A repeater consumes more energy since it is constantly active. Do not use batteries. If an external power source is not available a solar panel can be used to ensure continuous operation (see page 15).



General description



Specifications

Power	Battery operated - 3 x L92 (1.5V@1.2AH)
Inputs and outputs Integrates digital, analog and serial inputs, with digital outputs	Up to 8 outputs for DC Latch valves
	Up to 2 digital inputs for water meters, switches and condition triggers to dry contact
	Up to 3 analog inputs for sensors (e.g. pressure sensor, tensiometer etc.)
	2 serial ports for serial communication sensors (RS-232, SDI-12)
LED indicator	Bluetooth operation status
Enclosure	Robust UV stabilised enclosure rated to IP65
Operation temperature	-20°C - 65°C / -4°F - 149°F
Dimensions	215 x 160 x 40 mm / 8.5 x 1 ½ x 6"

SYSTEM DESCRIPTION

Peripherals

NetBeat™ sensors

The NetBeat system supports a wide array of diverse sensing devices for various soil, water, plant and environmental measurements:

		Entry - tile*
Soil sensors	SM150T, soil moisture content	RTU - Analog In
	NetaSense, soil moisture content	RTU - Analog In
	NetaCap, soil moisture profile	RTU - RS232
	Tensiometer	RTU - Analog In
	Temperature	RTU - Analog In
Plant sensors	Trunk dendrometer	RTU - Analog In
Environmental sensors	Weather station	MCU - RS232 or RS485 RTU - RS232
	Temperature and humidity sensor	RTU/MCU - Analog In
	Rain gauge (udometer)	RTU/MCU - Digital In
Hydraulic sensors	Water meter	RTU/MCU - Digital In
	Fertilizer meter	RTU/MCU - Digital In
	Pressure sensor	RTU/MCU - Analog In
General sensors	General purpose sensor	RTU/MCU - Analog In
	General purpose switch/counter	RTU/MCU - Digital In

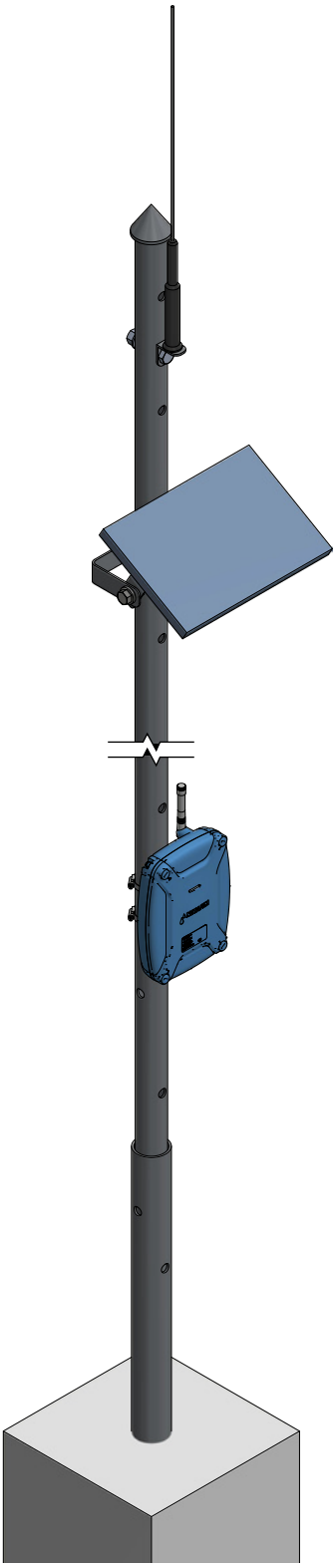
*See the NetMCU tiles on the NetBeat user manual, pages 11-13

NetBeat™ Net RTU solar panel

Under most applications, the RTU battery should last up to 3 years. In cases of increased power use due to high operation/data sampling requirement, or if the RTU needs to serve as a repeater, a solar panel can be used to ensure continuous operation.

Technical data

Model No	12V5Wp
Max Wp	5Wp
VOC	22V
VMP	18.4V
ISC	0.34A
IMP	0.26A
Dimensions	285 x 185 x 3mm
IEC Compliant	IEC 61215
Warranty	25 Years of performance warranty
Make	Standard MNRE approved



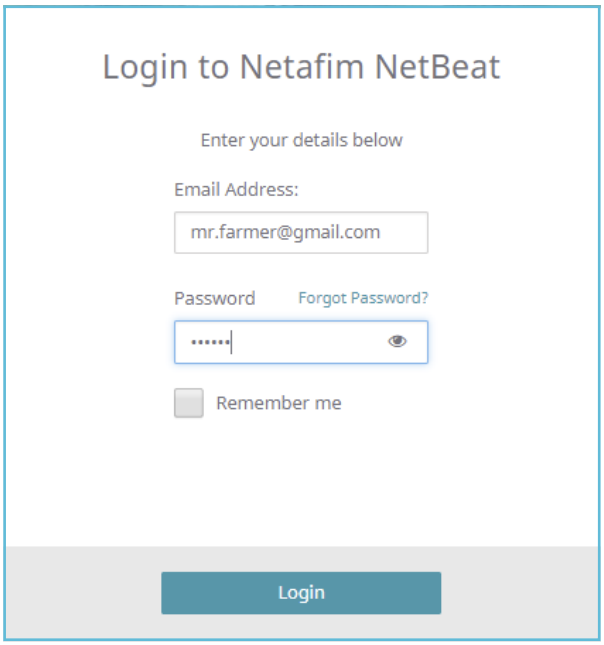
OPERATION

1. User Interface Overview

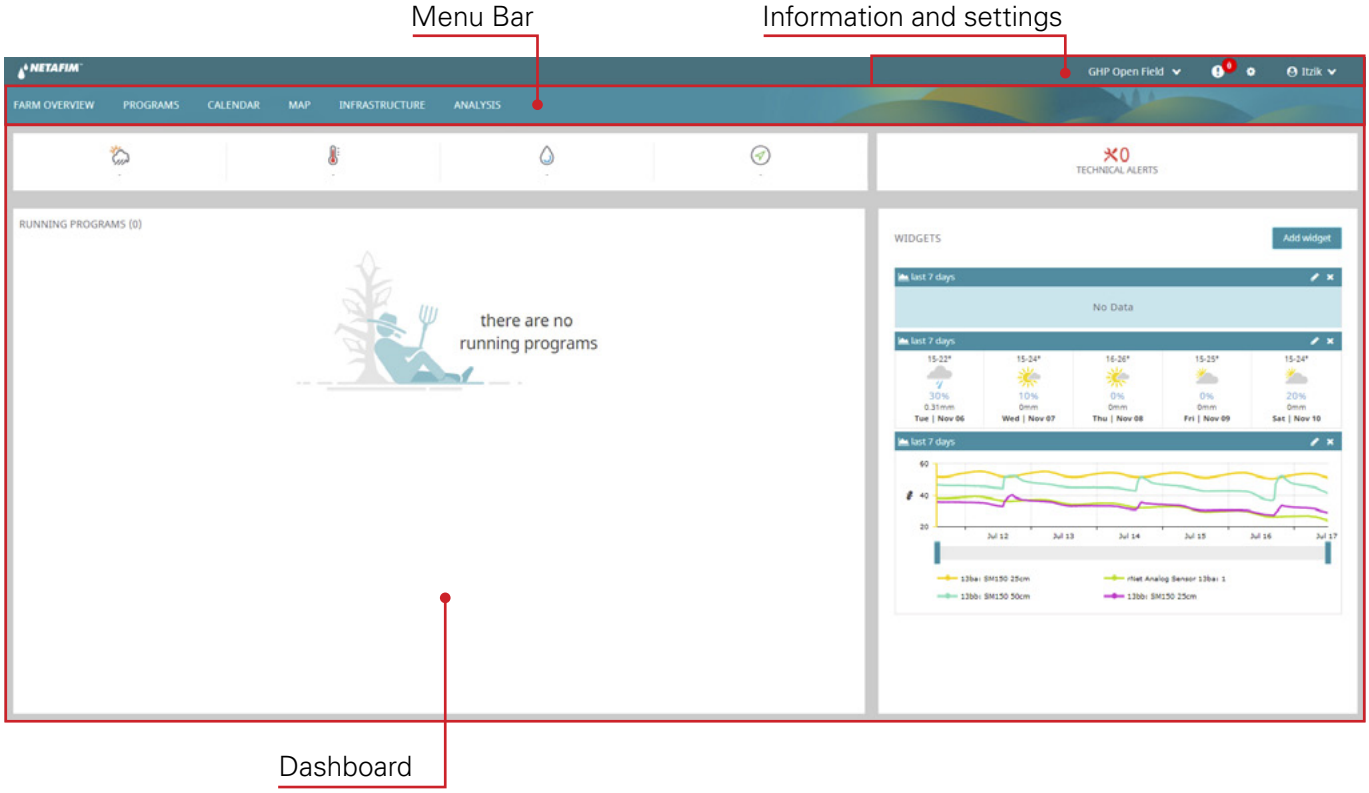
1.1 System Login

Use the next link to access NetBeat:
http://netbeat.netafim.com/

In order to login you must have a pre defined Email address and password in the system. If you don't have them contact the installer / your sales manager / Netafim support team.

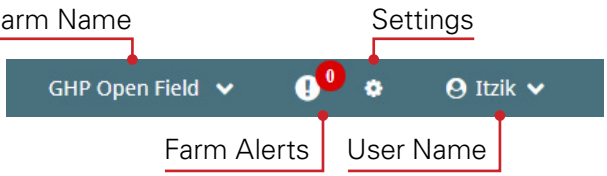


1.2 General Overview

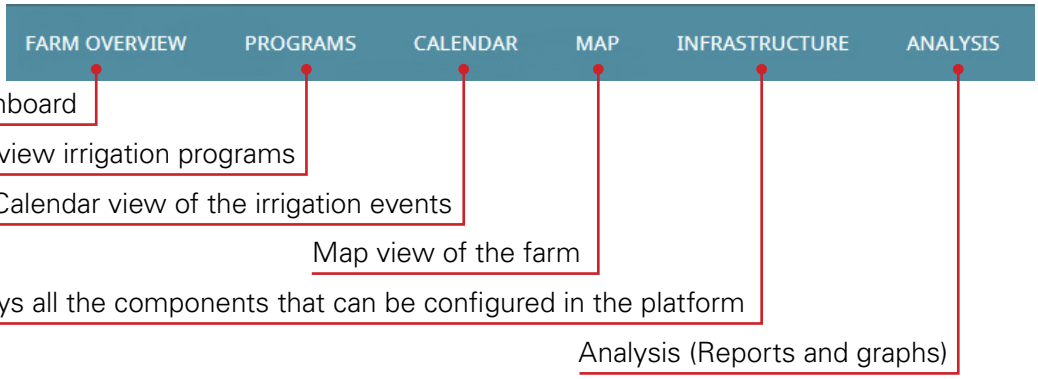


OPERATION

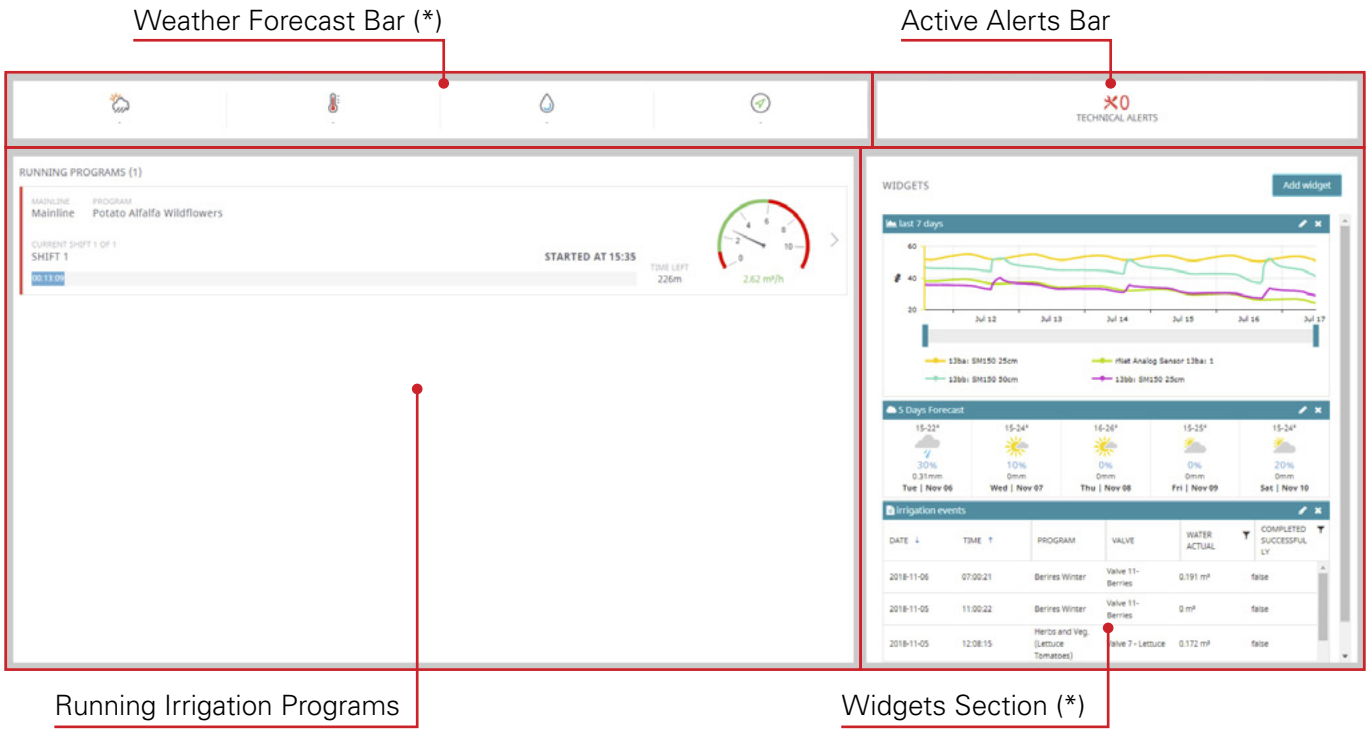
1.3 Information & Settings Bar



1.4 Menu Bar

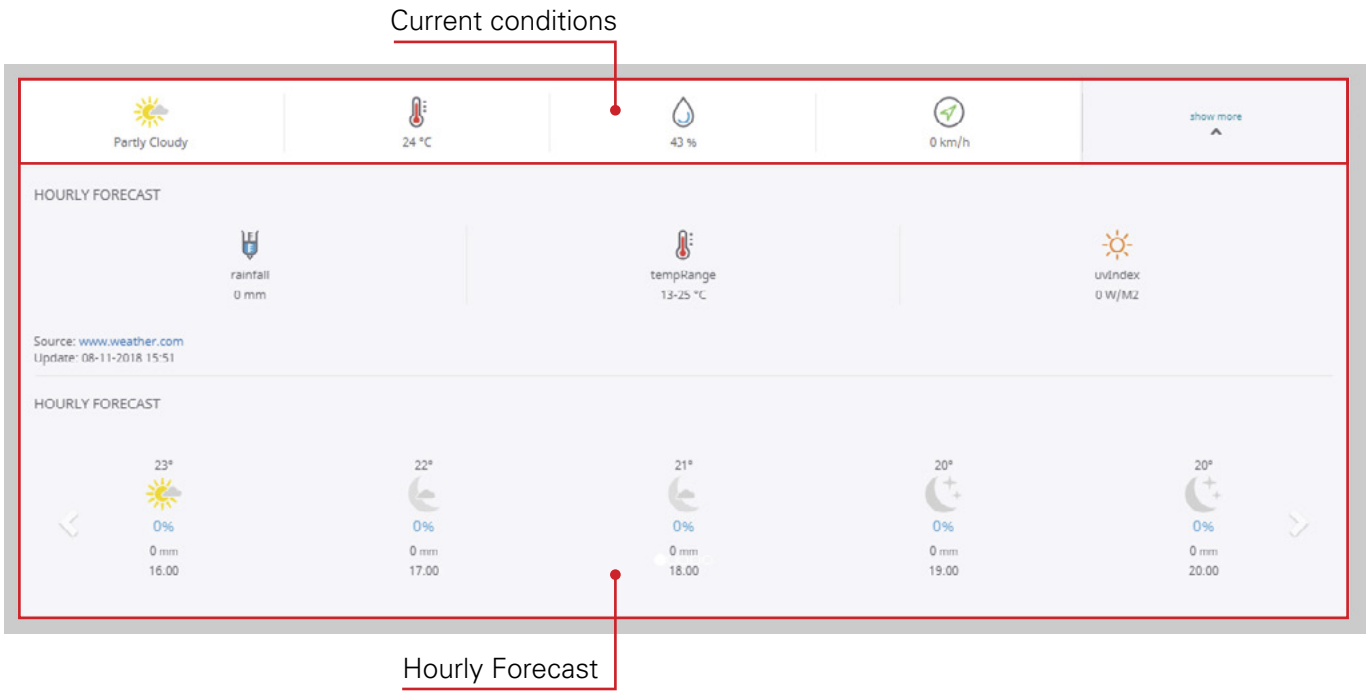


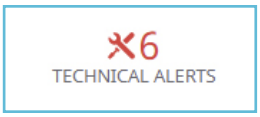
1.5 Dashboard



OPERATION

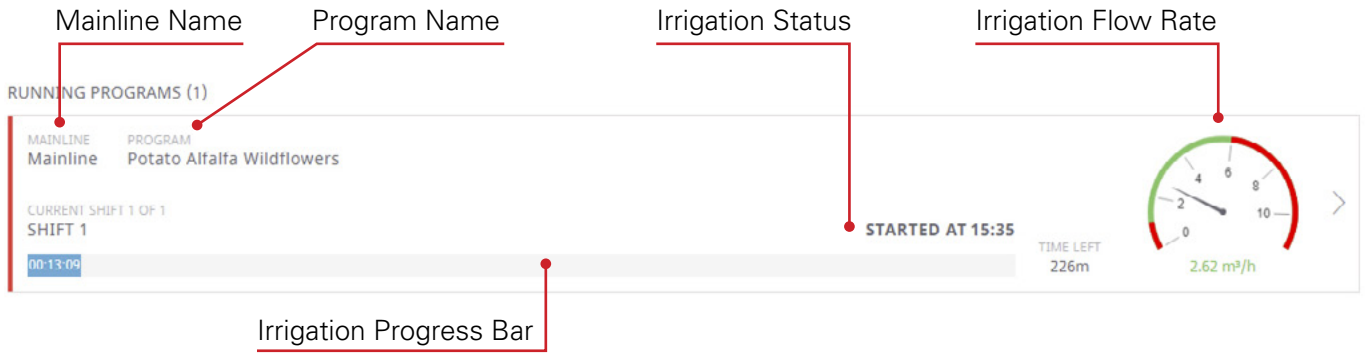
Weather Service Bar (extended)





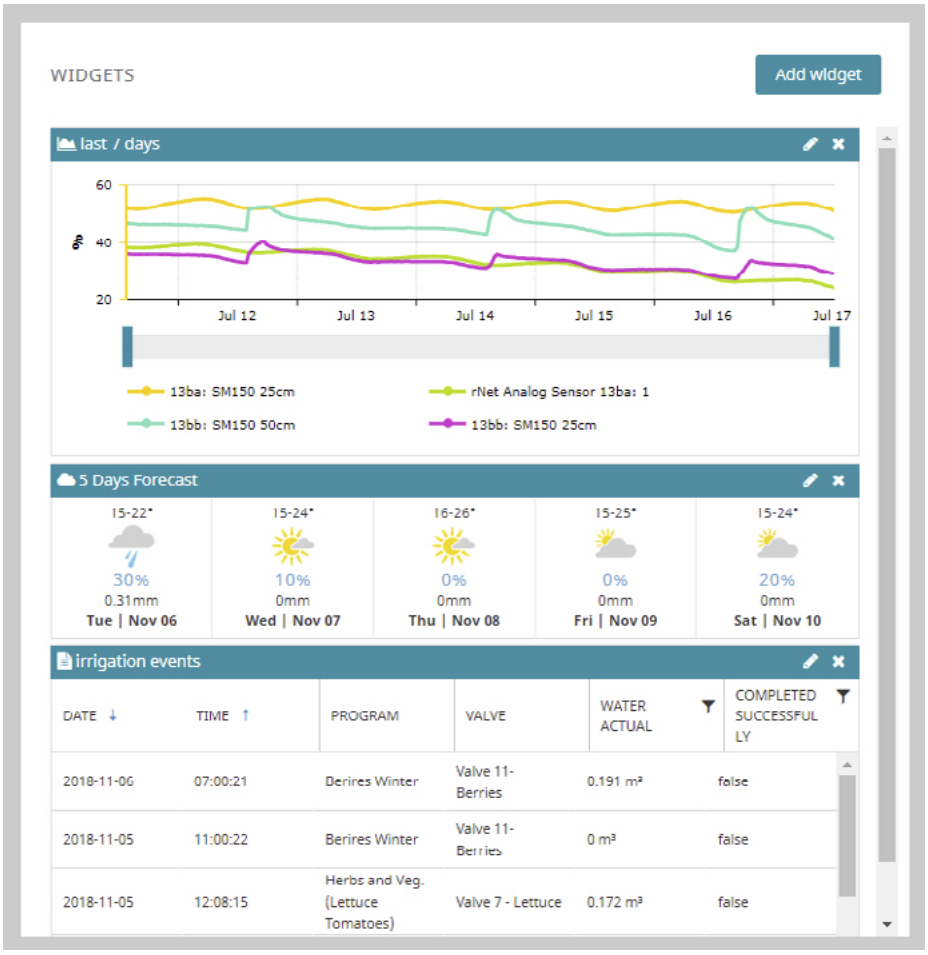
Alerts
Alerts related to a technical malfunction or warning, such as:
Low battery, no communication with a remote unit, etc.

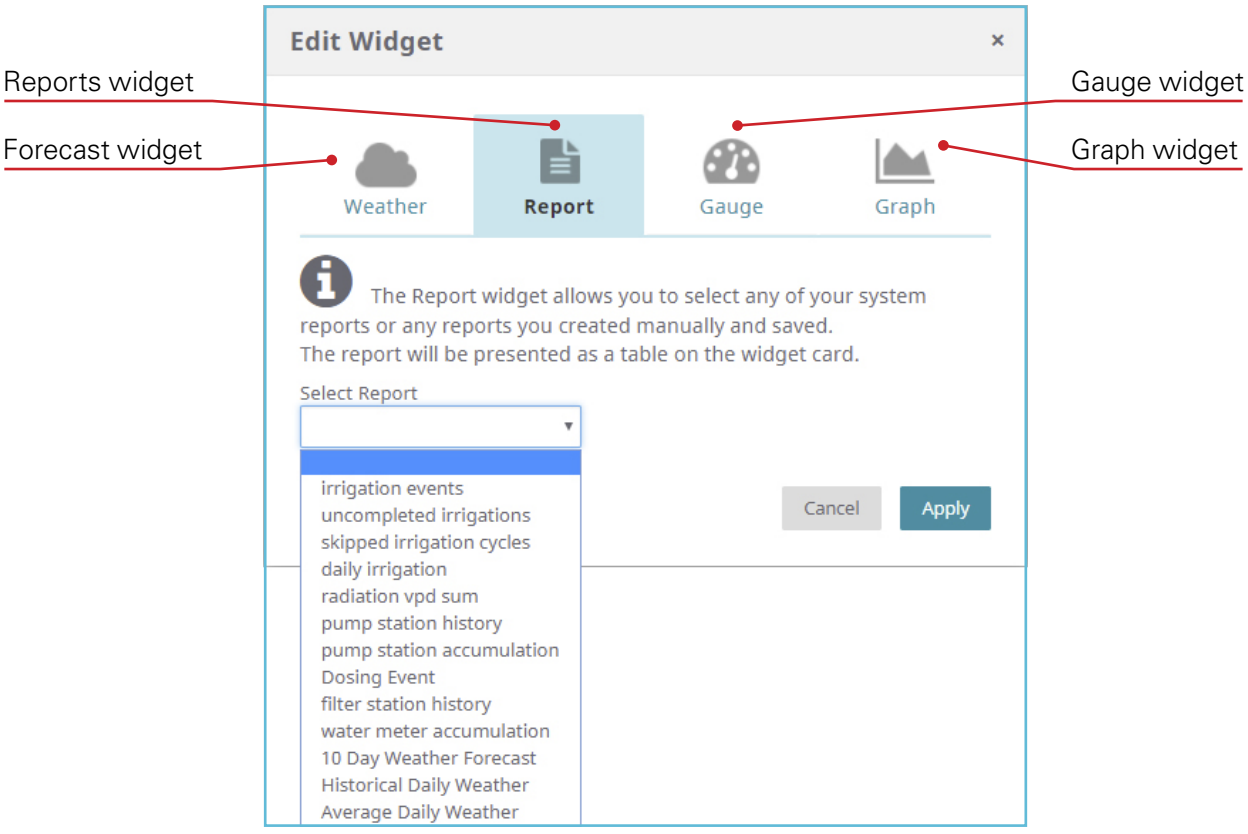
Running Programs



OPERATION

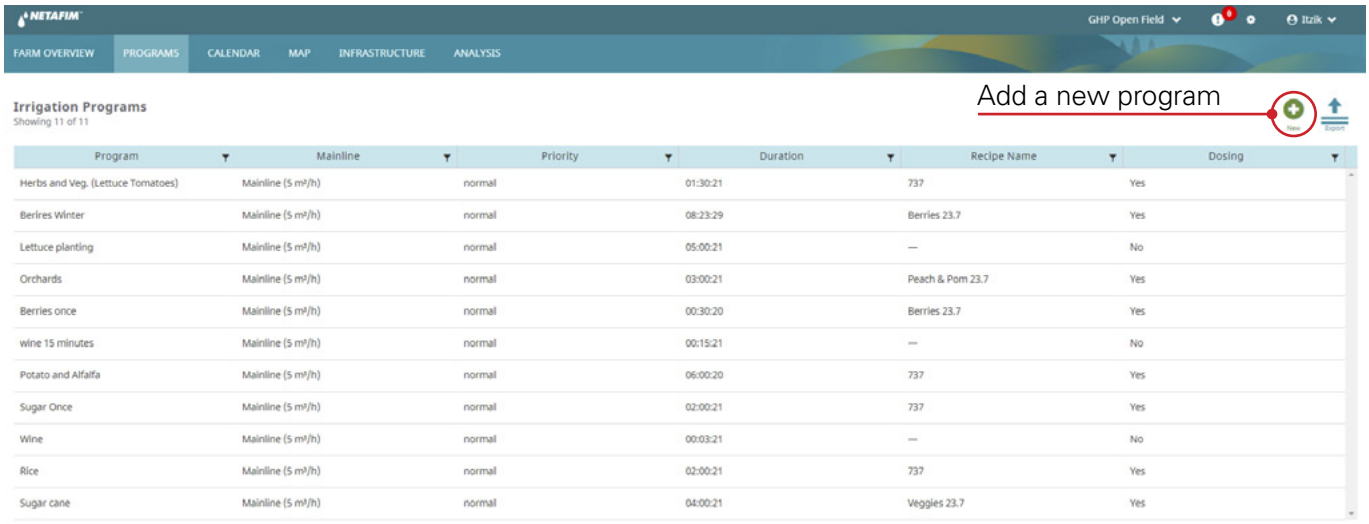
Widgets



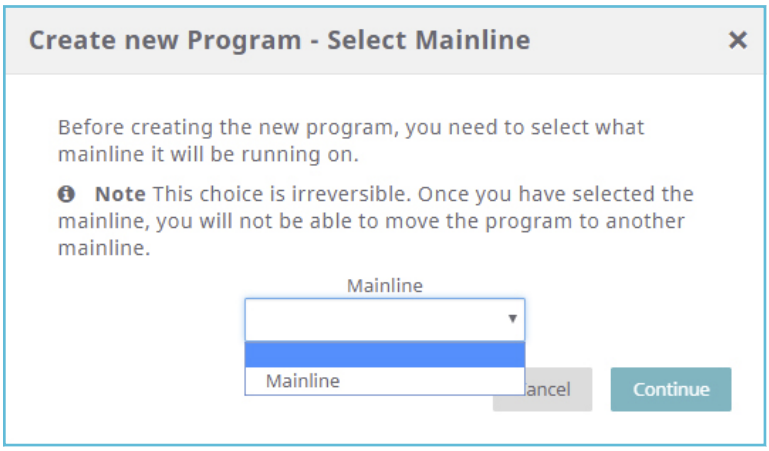


2. Building Irrigation Program

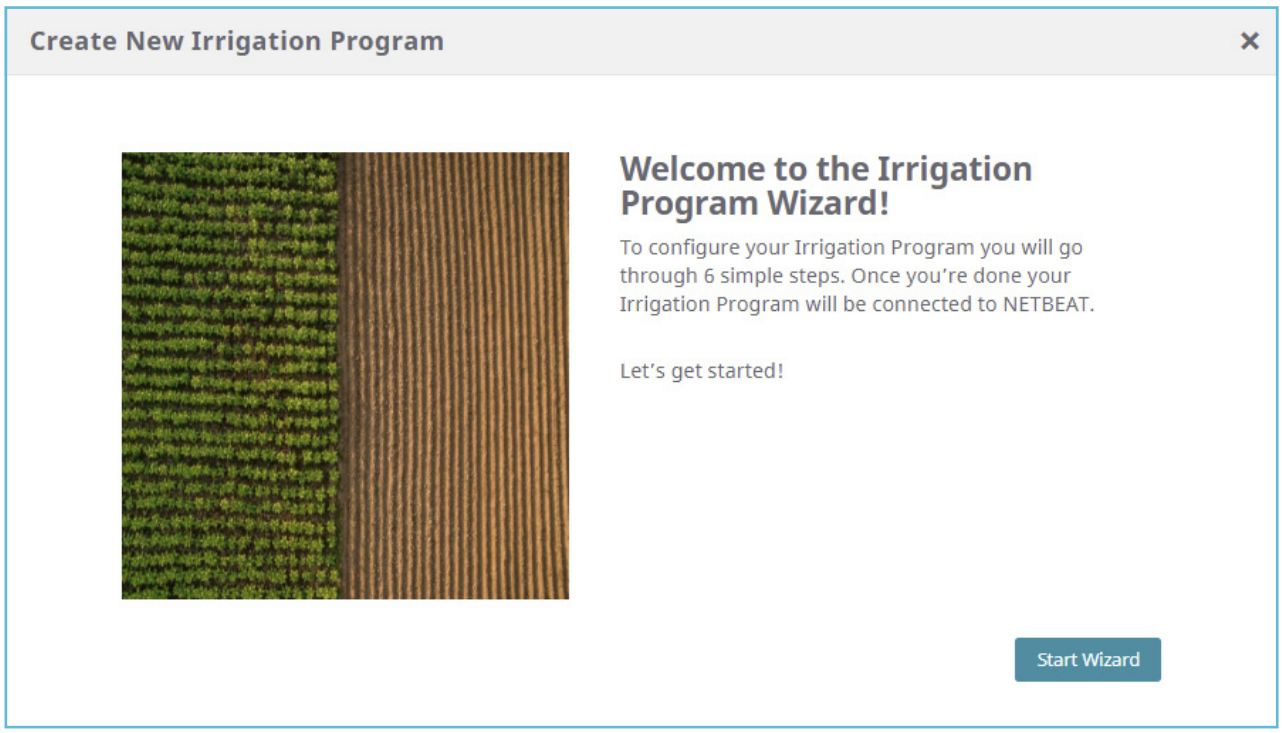
Step 1 - Add a new program



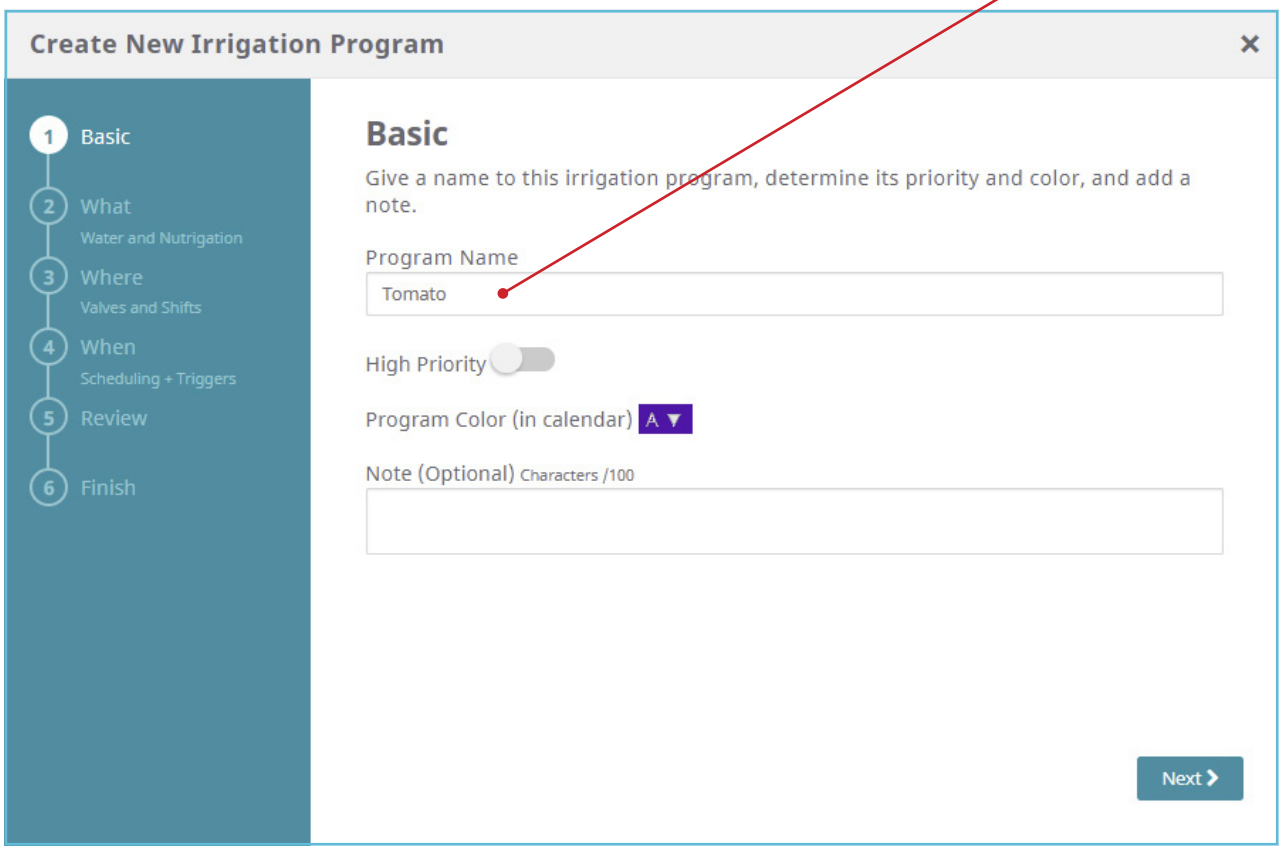
Step 2 - Choose a Mainline that the irrigation program is related to



Step 3 - Start the wizard, name the program and define its priority

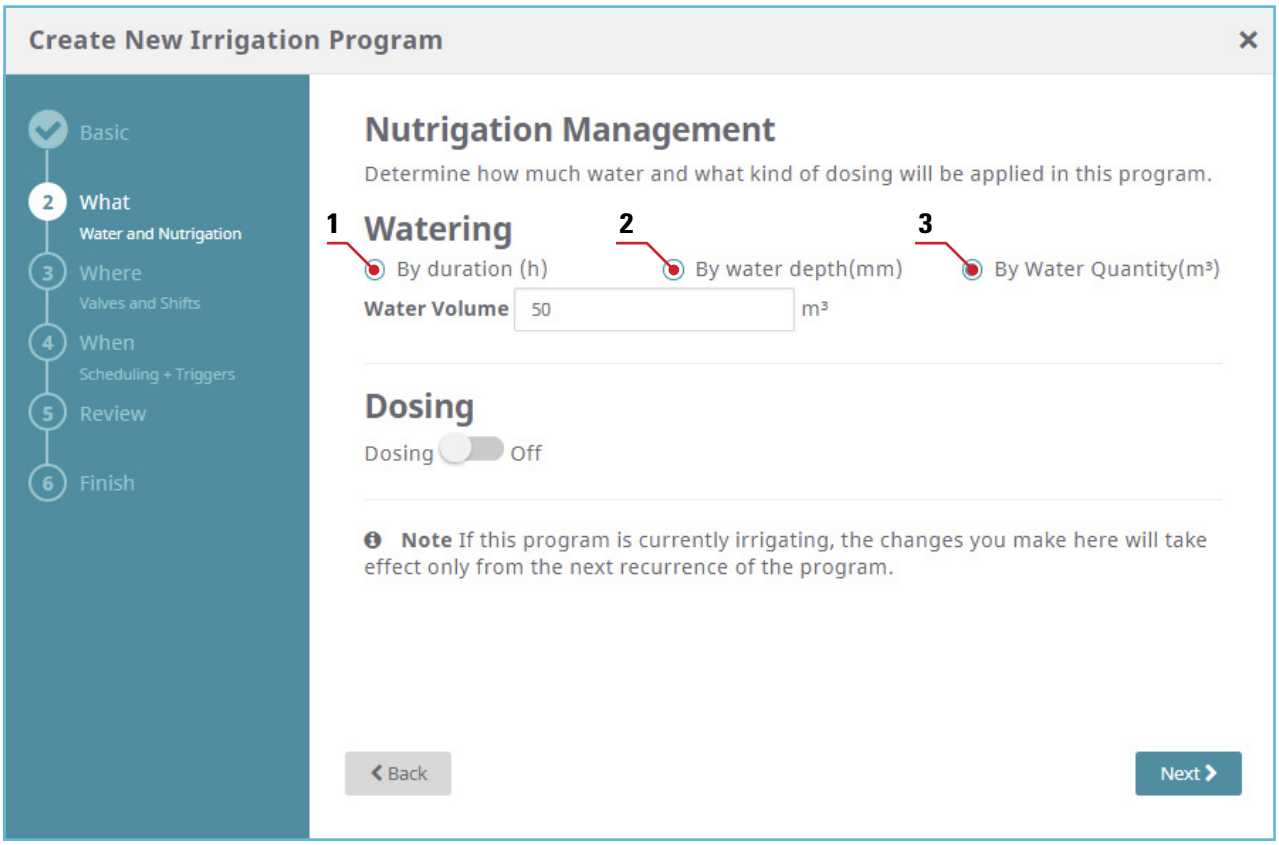


Name the program



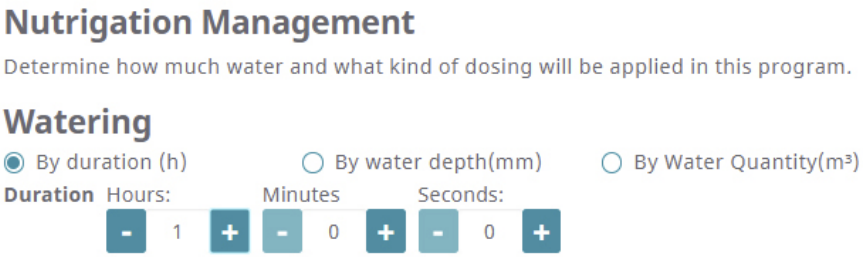
*High priority means that the program has a priority over the other programs and in case of a clash the high priority program will take place and stop another program, if needed.

Step 4 – Choose the irrigation method from the 3 options:



1 - Watering by duration

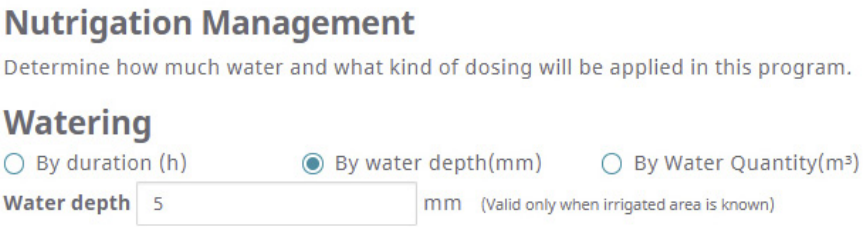
Define the irrigation time duration.



2 - Watering by water depth

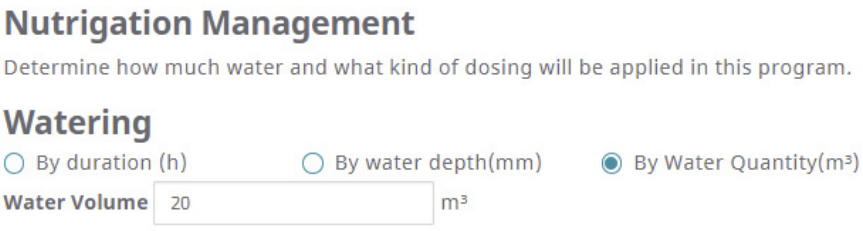
Define the irrigation quantity by the mm or Inch units.

For this option, the irrigated area should be known and set.

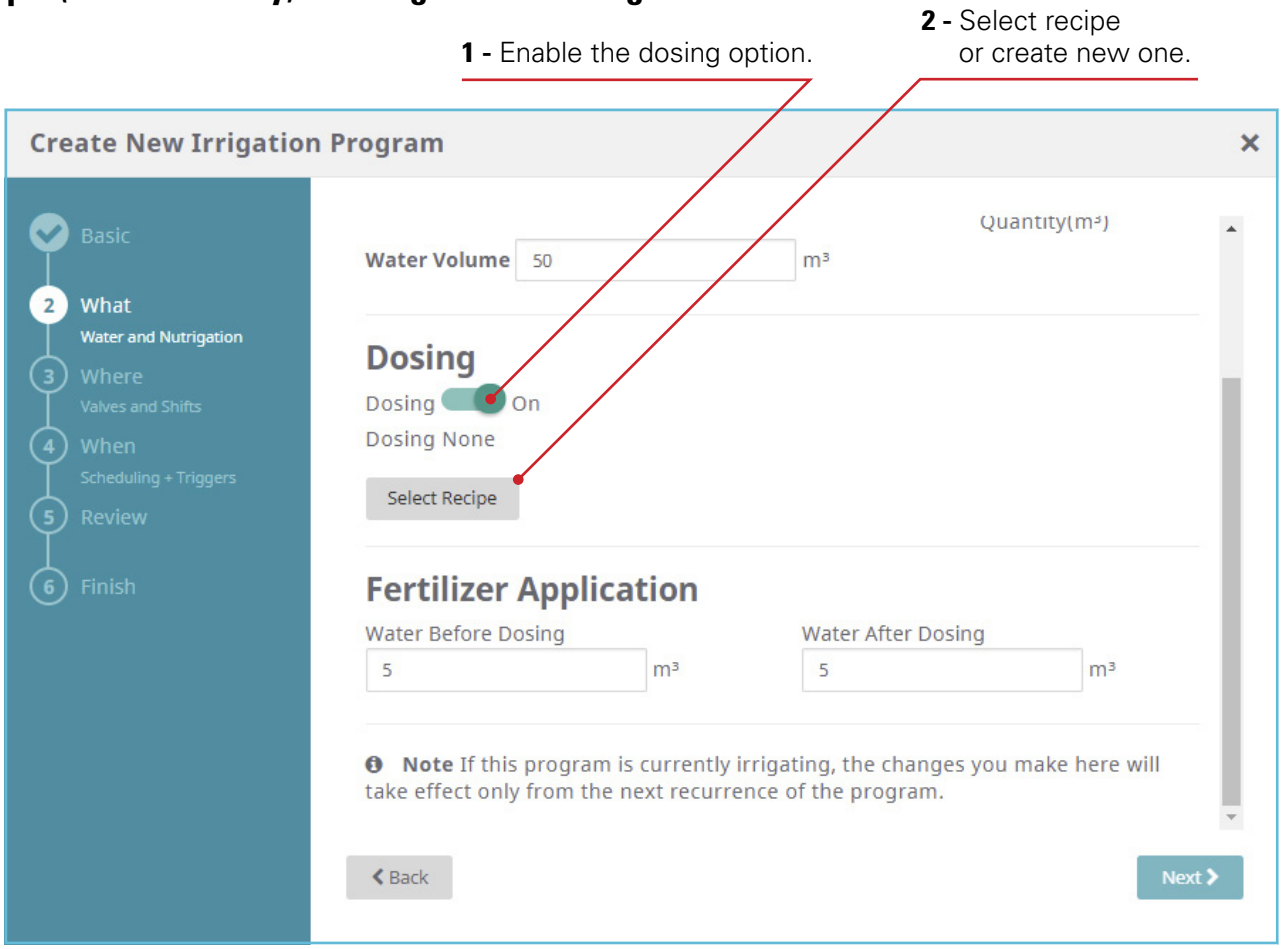


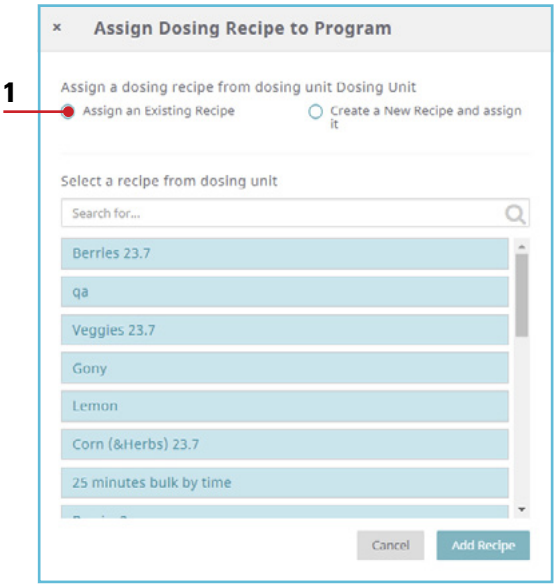
3 - Watering by water volume

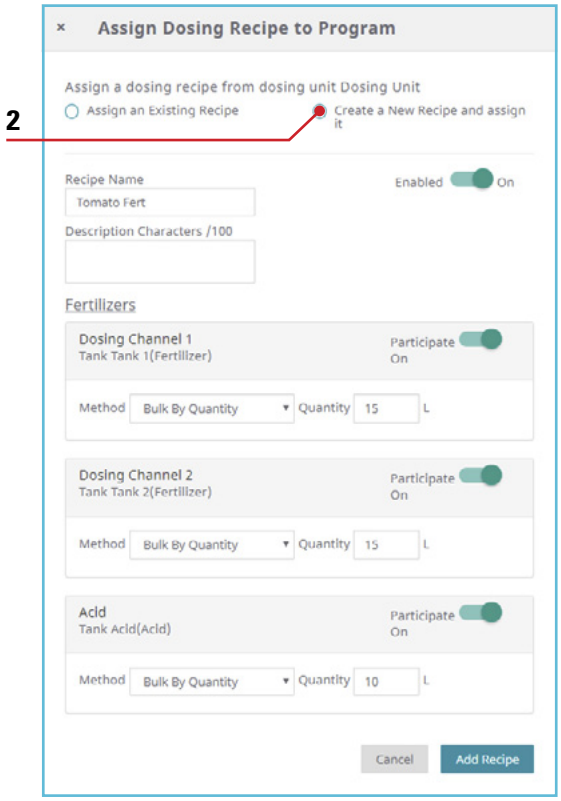
Define the required water volume.



Step 5 (not mandatory) – Configure the dosing



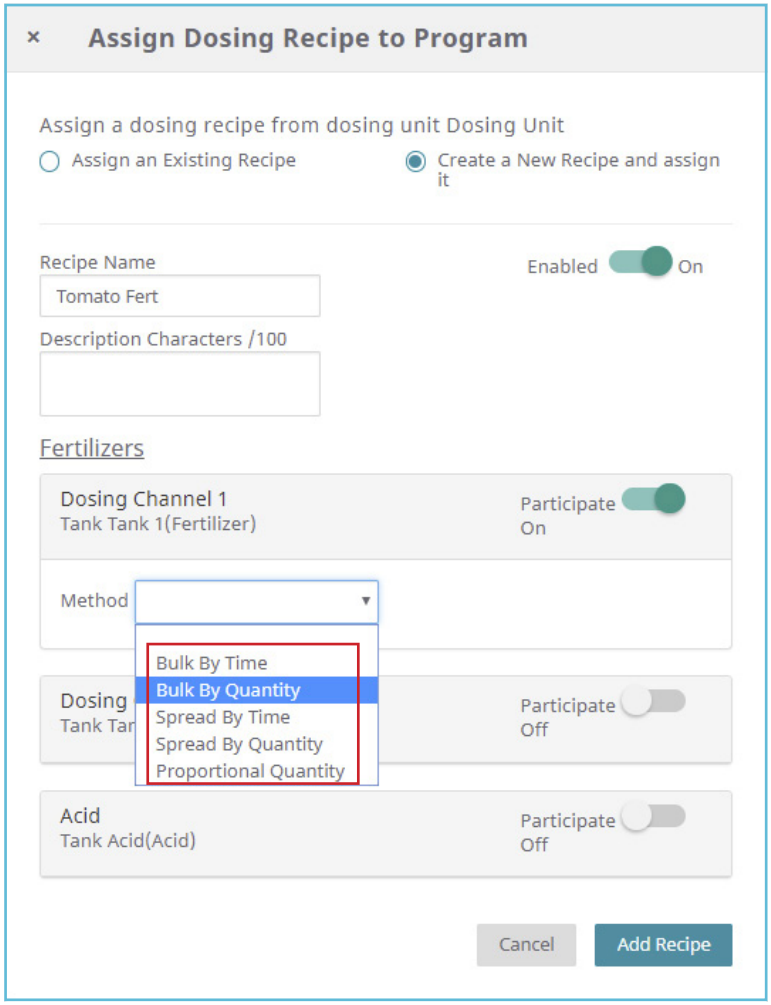


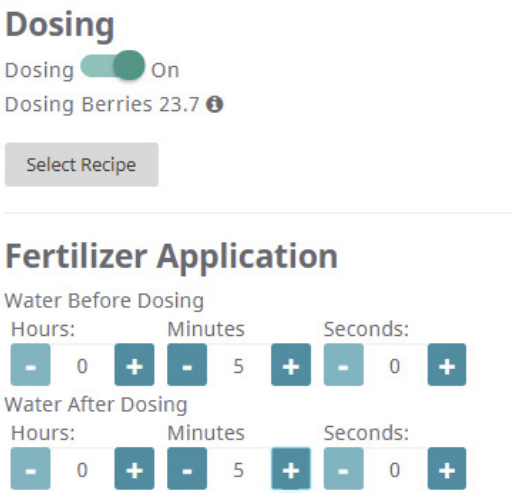


Step 5 (not mandatory) – Configure the dosing (cont')

When creating a new recipe there are several methods:

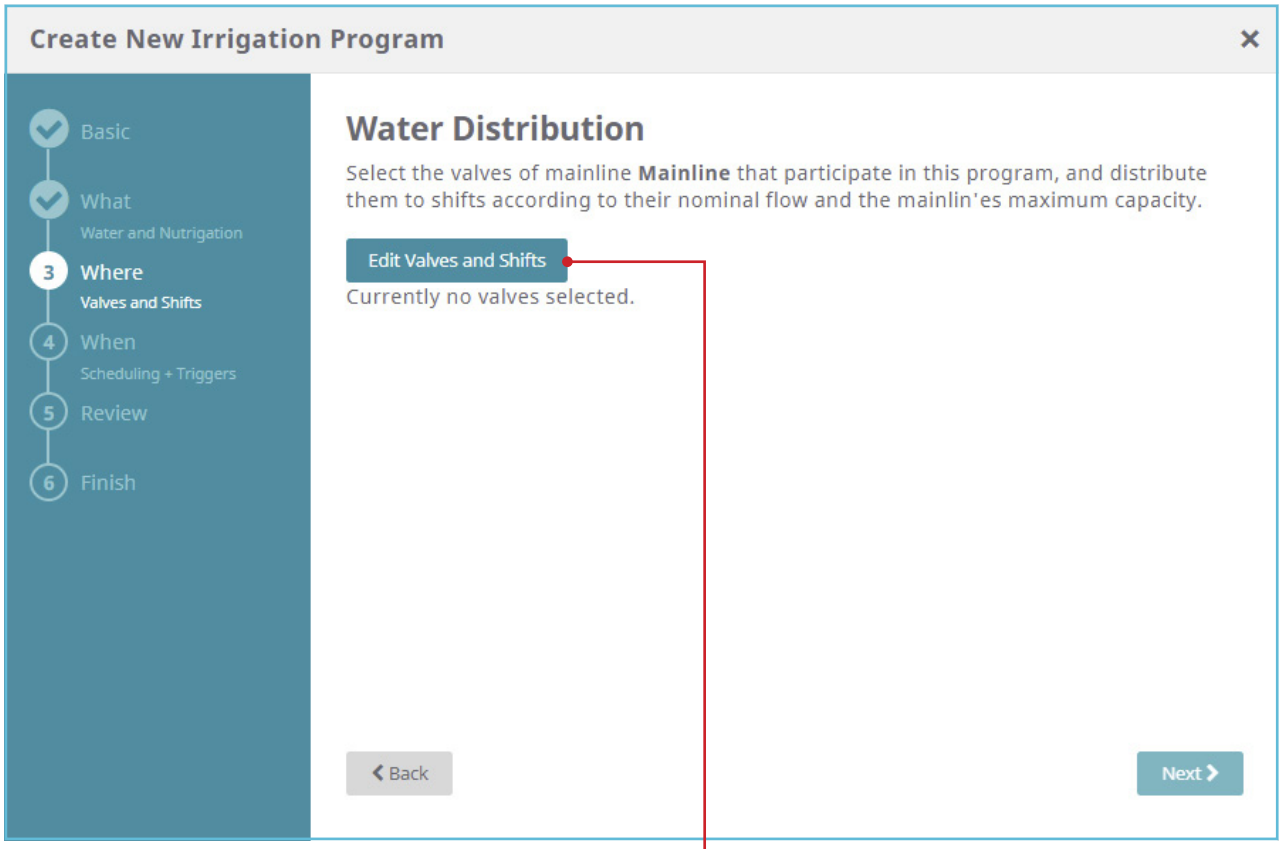
Bulk By Time	Dosing system applies the fertilizers in one shot, according to the time defined by the user.
Bulk By Quantity	Dosing system applies the fertilizers in one shot, according to the quantity defined by the user.
Spread By Time	Dosing system applies the fertilizers in pulses during the irrigation, according to the time defined by the user.
Spread By Quantity	Dosing system applies the fertilizers in pulses during the irrigation, according to the quantity defined by the user.
Proportional Quantity	Dosing system applies the fertilizers in pulses during the irrigation, according to the ratio of fertilizer per water defined by the user.



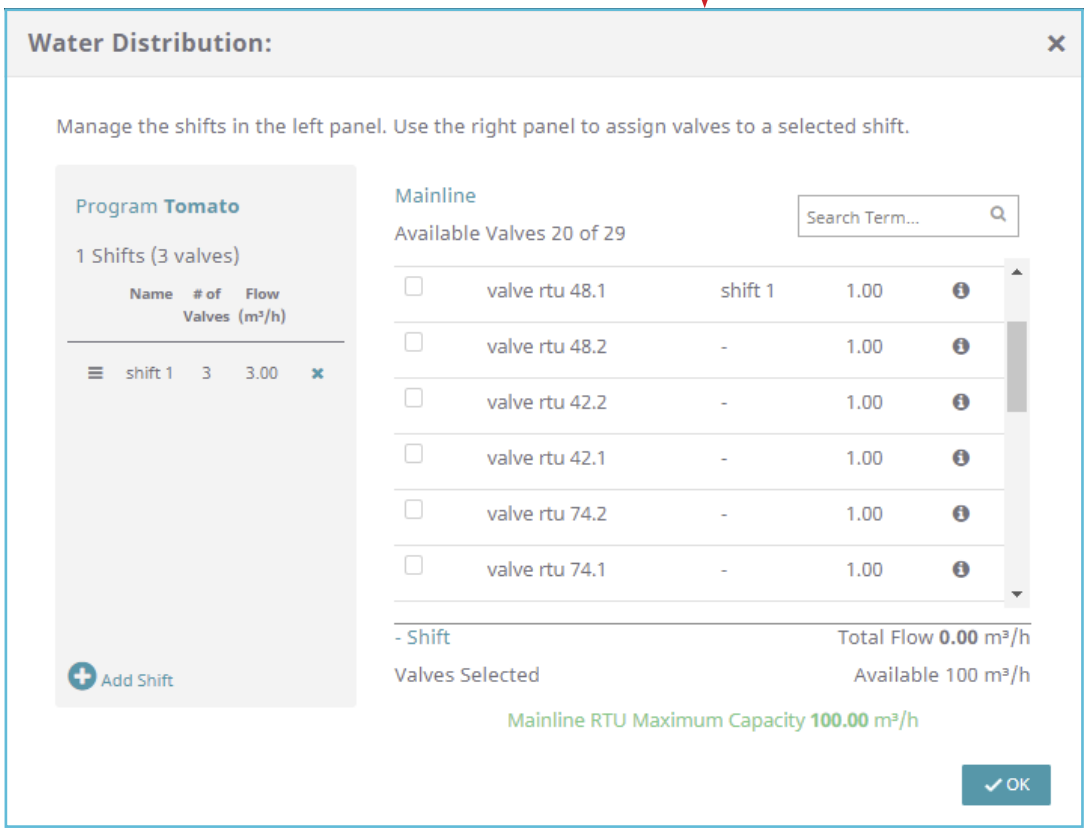


After choosing/creating recipe it is possible to configure the duration of time/quantity water will go through the system before the dosing and after.

Step 6 – Configure the water distribution (Where to irrigate)

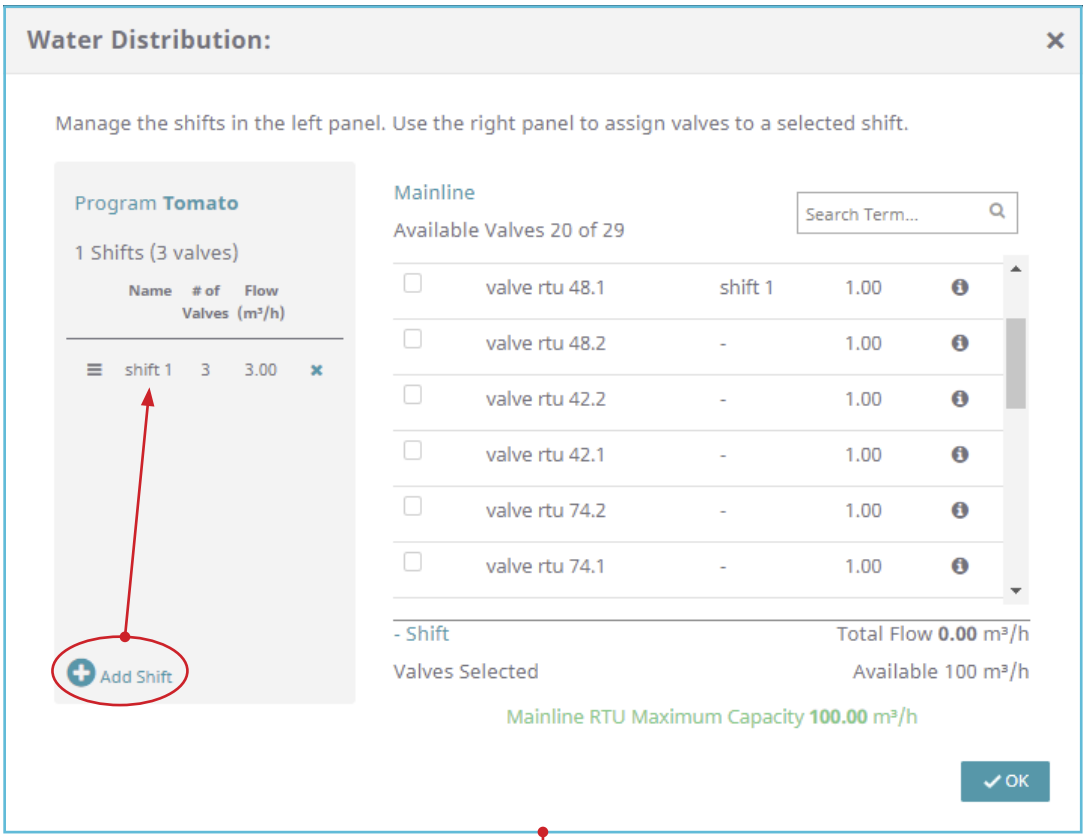


1 - Define the valves that are taking part in the program:



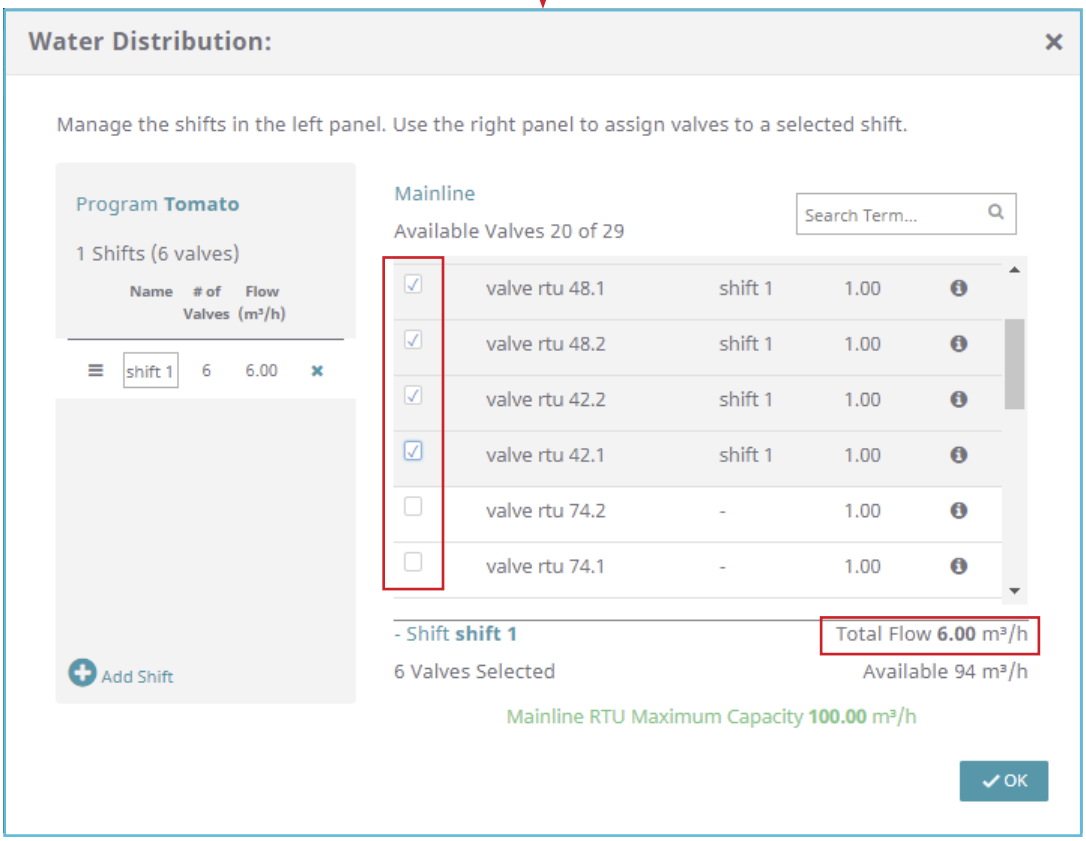
Step 6 – Configure the water distribution (Where to irrigate) (cont')

2 - Add a shift and name it:



3 - Define the relevant valves.

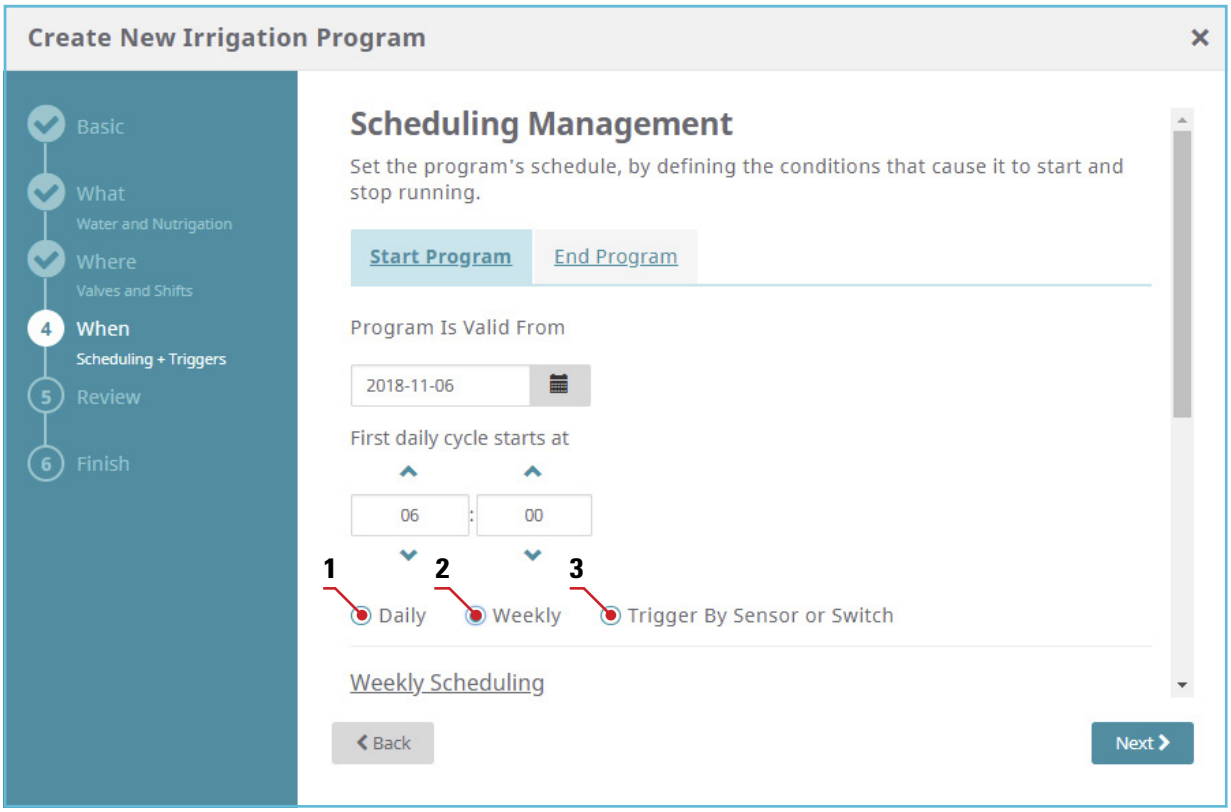
Notice not to exceed the available capacity of the mainline.



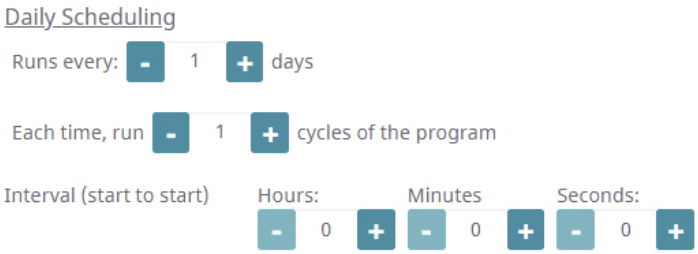
4 - Click "OK".

Step 7 – Define the timing of the irrigation program (When to irrigate)

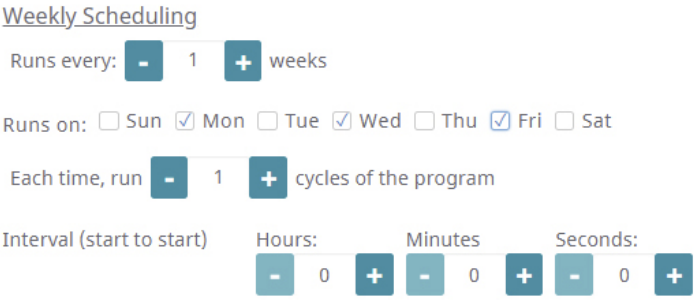
Define how to start the program – based on daily irrigation, weekly irrigation or by trigger:



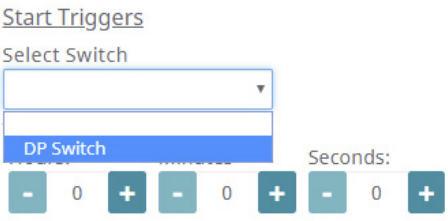
1 - Daily irrigation
Define the daily irrigation parameters



2 - Weekly irrigation
Define the weekly irrigation parameters

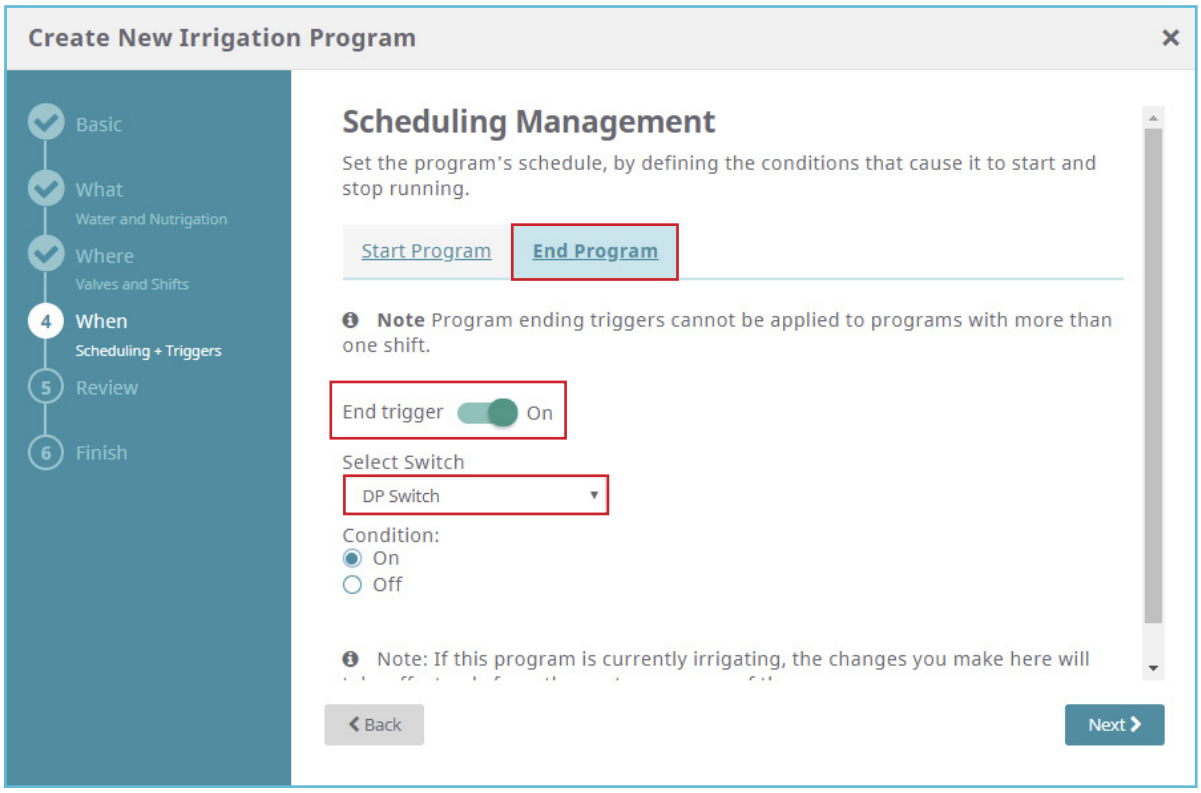


3 - Trigger (Sensor/Switch)
It is also possible to define the irrigation start by a trigger

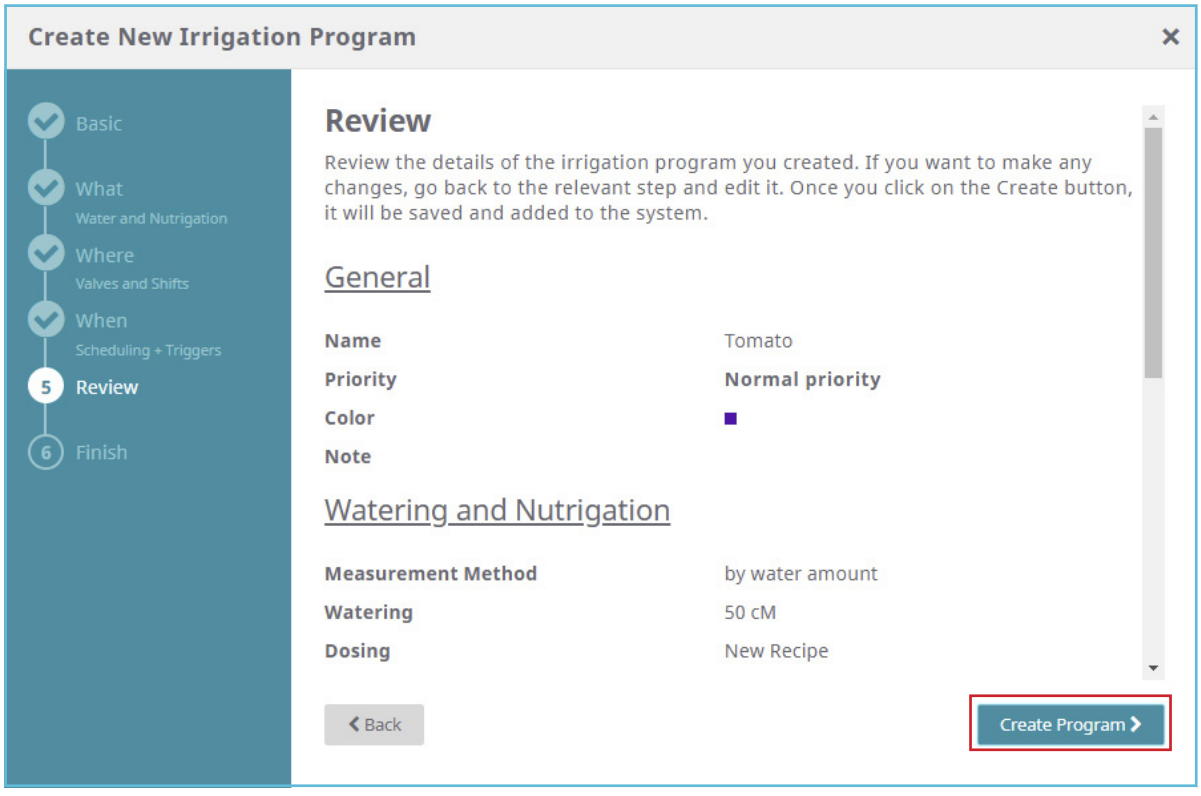


Step 7 – Define the timing of the irrigation program (When to irrigate) (cont')

When defined using time intervals the program will end according to time definitions.
Yet, there is an option to end program using a trigger (DP switch for example):

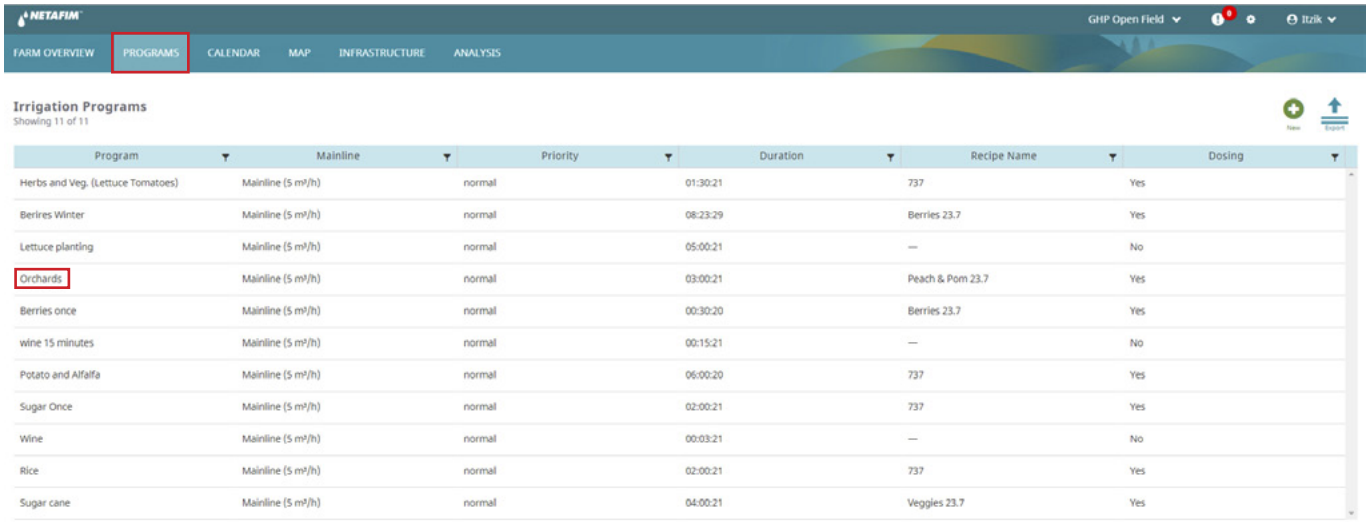


Step 8 – Review the program and Finish



3. Editing the program

Step 1 – Locate and select the program you want to edit

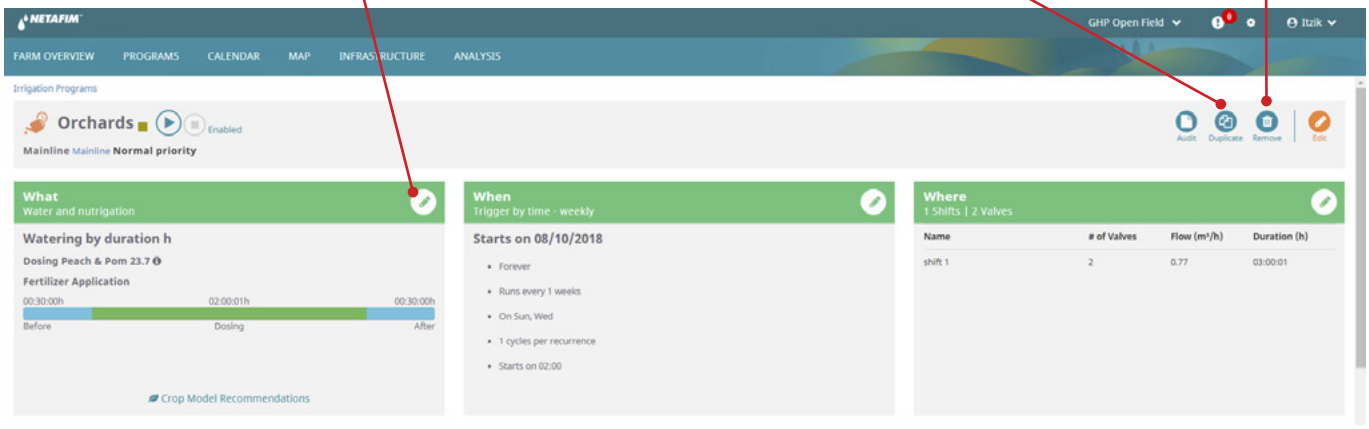


Step 2 – Choose the segment you want to edit (What/ When/Where) and click the Edit button

Opens edit window for the selected section only

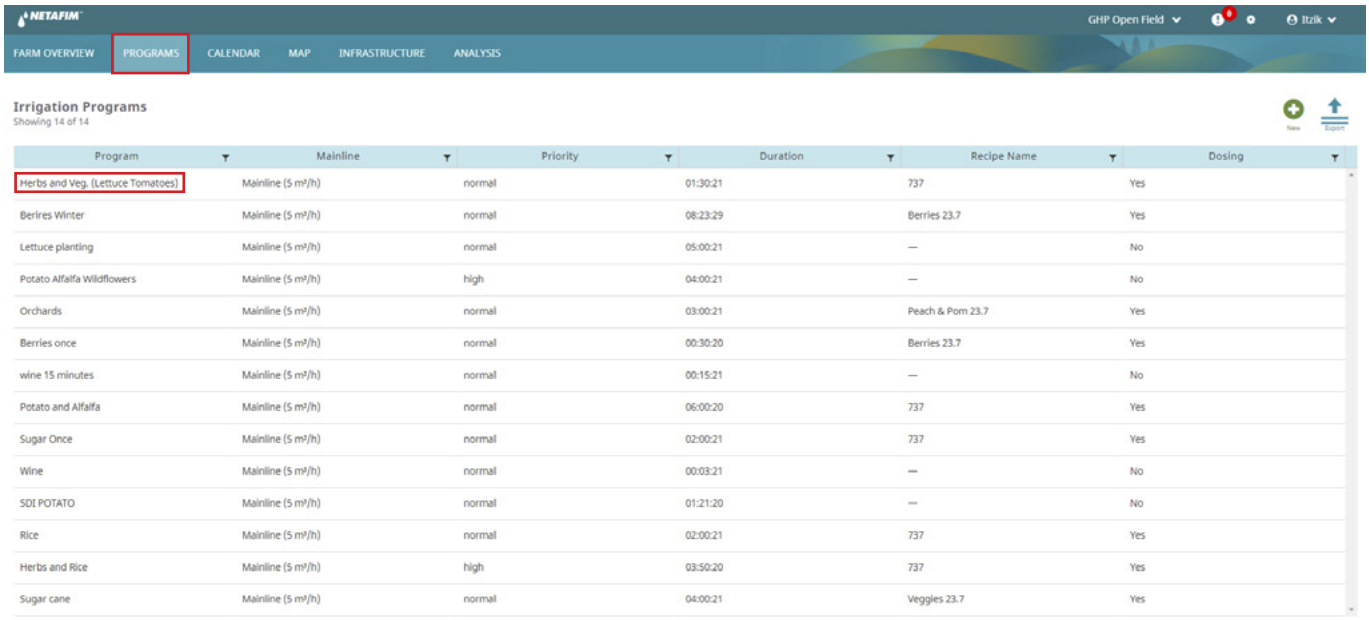
Opens a New Irrigation Program window, as a duplication of the selected program

Deletes the selected program



4. Manual operation

Step 1 – Locate and select the program you want to operate



Program	Mainline	Priority	Duration	Recipe Name	Dosing
Herbs and Veg. (Lettuce Tomatoes)	Mainline (5 m³/h)	normal	01:30:21	737	Yes
Berires Winter	Mainline (5 m³/h)	normal	08:23:29	Berries 23.7	Yes
Lettuce planting	Mainline (5 m³/h)	normal	05:00:21	—	No
Potato Alfalfa Wildflowers	Mainline (5 m³/h)	high	04:00:21	—	No
Orchards	Mainline (5 m³/h)	normal	03:00:21	Peach & Pom 23.7	Yes
Berries once	Mainline (5 m³/h)	normal	00:30:20	Berries 23.7	Yes
wine 15 minutes	Mainline (5 m³/h)	normal	00:15:21	—	No
Potato and Alfalfa	Mainline (5 m³/h)	normal	06:00:20	737	Yes
Sugar Once	Mainline (5 m³/h)	normal	02:00:21	737	Yes
Wine	Mainline (5 m³/h)	normal	00:03:21	—	No
SDI POTATO	Mainline (5 m³/h)	normal	01:21:20	—	No
Rice	Mainline (5 m³/h)	normal	02:00:21	737	Yes
Herbs and Rice	Mainline (5 m³/h)	high	03:50:20	737	Yes
Sugar cane	Mainline (5 m³/h)	normal	04:00:21	Veggies 23.7	Yes

Step 2 – Manual operation

- If irrigation is not active at the moment, click ▶ to activate irrigation.

Irrigation not active at the moment

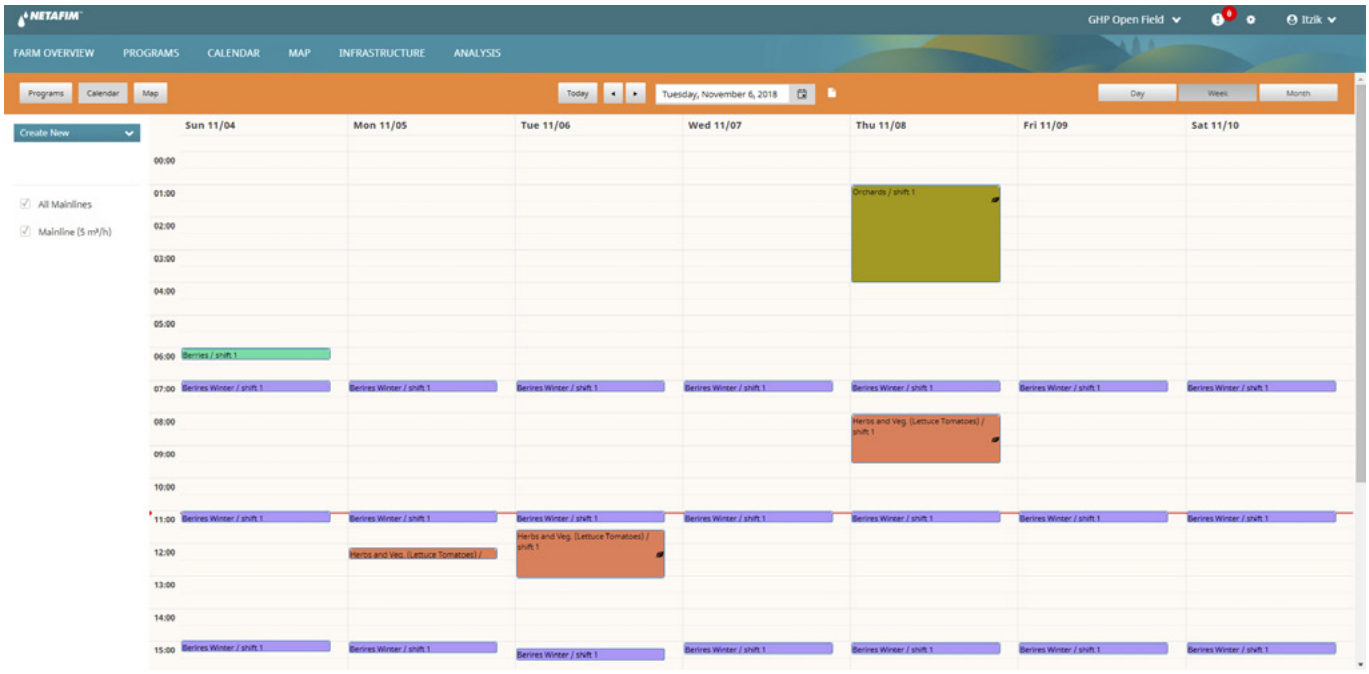
- If irrigation is active at the moment, you can click ■ to end ongoing irrigation, or ⏸ to pause ongoing irrigation.
- To continue paused irrigation click ▶

Irrigation active at the moment

OPERATION

5. Using the calendar

Enables to view Irrigation events and to schedule additional farm events.
The calendar is divided to columns, based on configured mainlines.



6. Analysis Overview

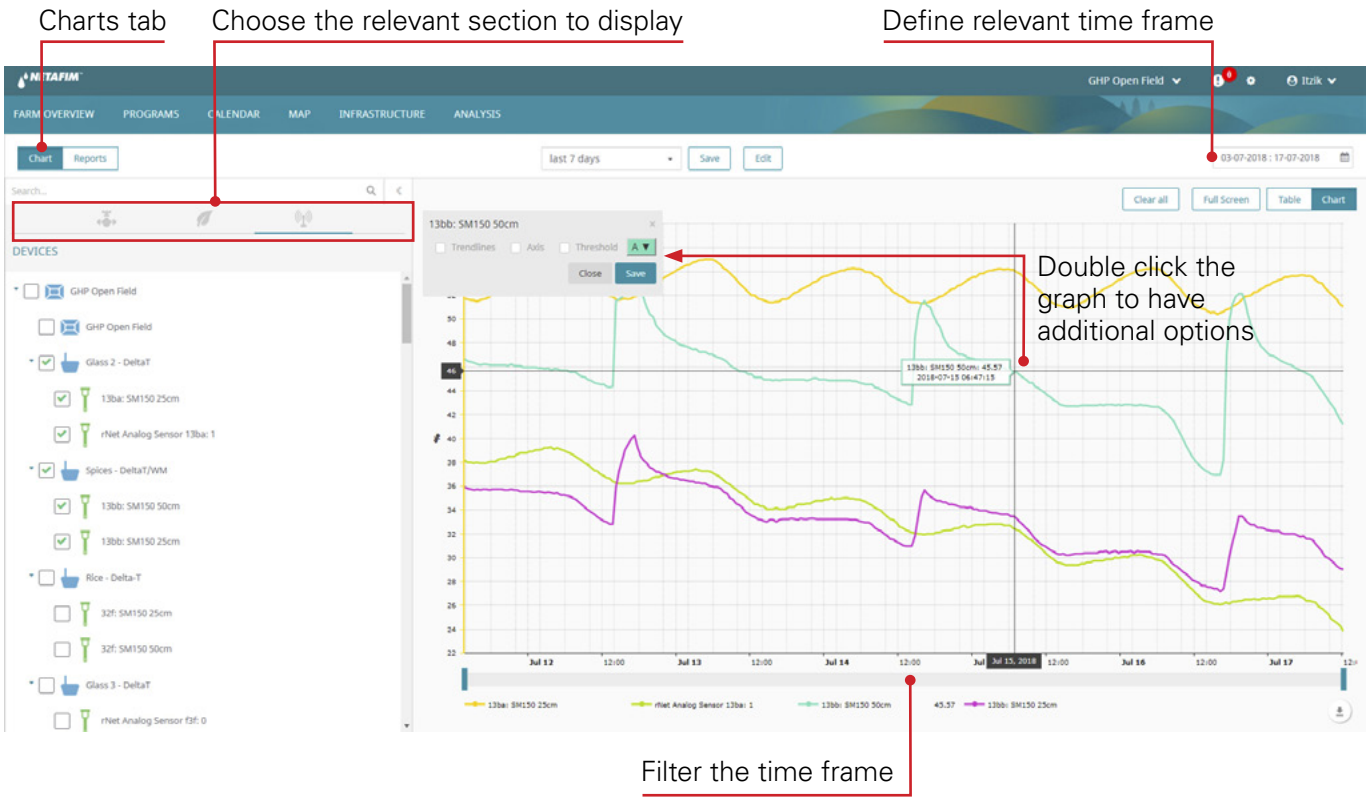
- Feedback from the field in real time
- Presents to the grower the field state at any given time
- Supports the grower in adjusting the irrigation and Fertigation strategy

Analysis Section

OPERATION

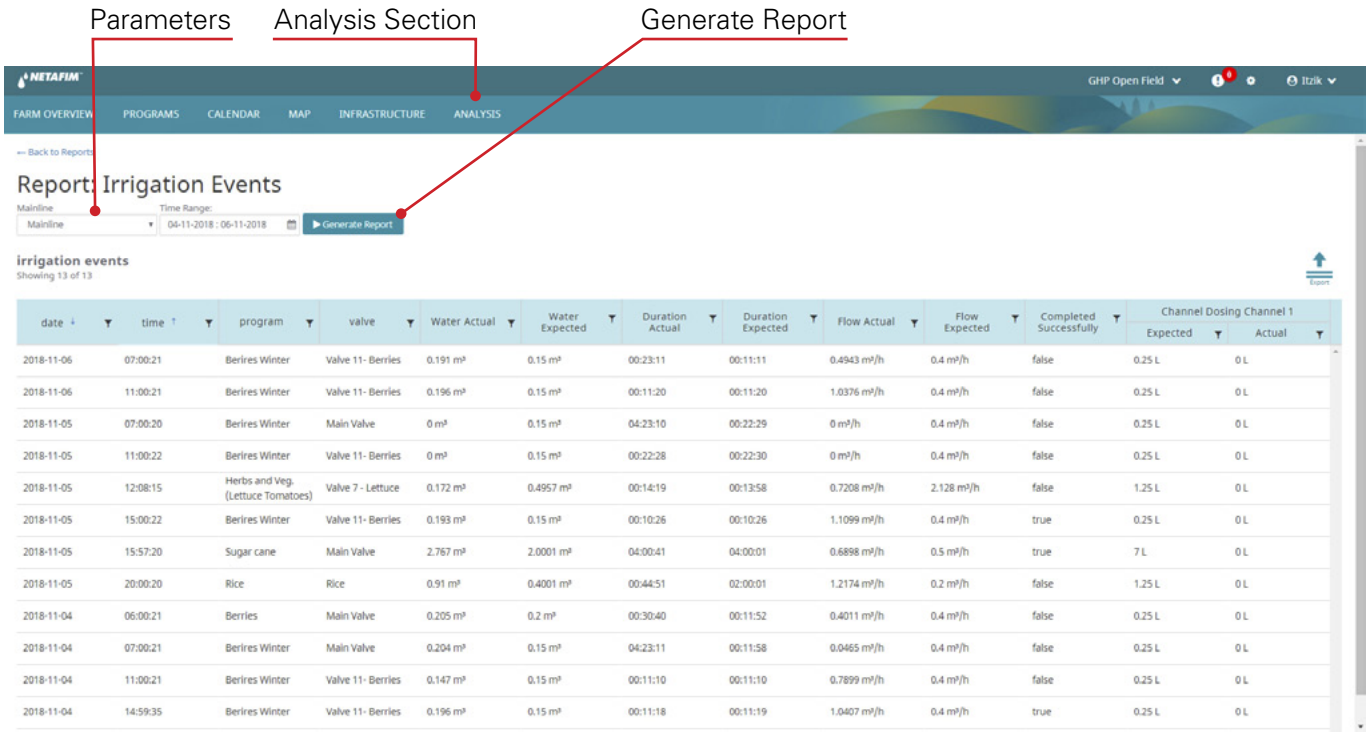
6.1 Charts

- The charts are a graphic expression to the field status.
- The user can choose the relevant data to be displayed on a chart.
- Charts enable the user to:
  - Review measurements results from the field
  - Analyze the data in order to make irrigation and Fertigation decisions
  - Monitor the field on a daily basis
- Enable the grower to choose from a variety of measurement parameters to be displayed one vs. the other.



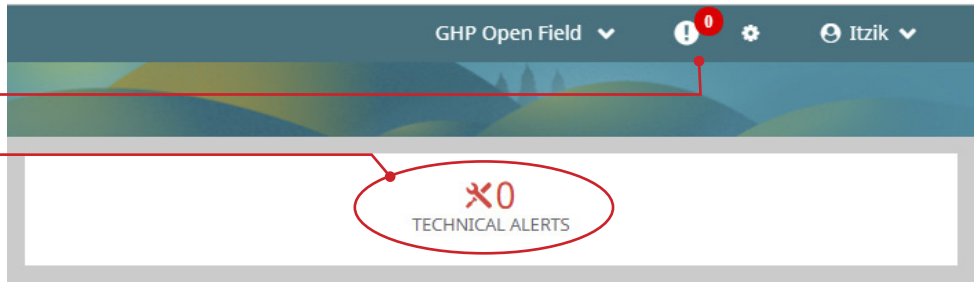
6.2 Reports

- There is a variety of pre defined reports:
  - Irrigation events
  - Uncompleted irrigations
  - Daily irrigation
  - And more…
- The reports display a review planned VS performed (actual)
- The reports enable to "locate" gaps and take care of them
- Reports are only available from the computer and the tablet



7. Alerts

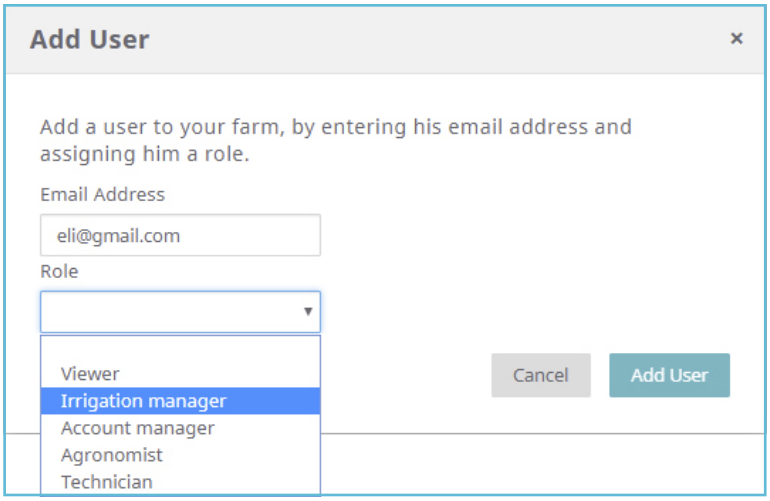
- Alerts are sent in Real Time to mobile/e-mail/tablets etc.
- The alerts appear in:
  - Upper navigation bar
  - Farm overview screen



- Each alert can be drilled down for more information:
  - Details on the alert
  - Exact location on map
  - Possible cause
  - Which irrigation is influenced

8. Quick tip – User creation

NetBeat service includes the option to create as many users as you need and grant them access according to their roles.



MAINTENANCE

User responsibility

The following requisites are to be assured by the user:

- Conducting monthly inspection and ensuing Preventive Maintenance procedures.
- Appropriate mains electricity supply.
- Cellular connectivity (if required).
- WiFi connectivity of suitable capacity.

Preventive Maintenance - monthly inspection

Visually inspect the NetMCU and the NetRTUs exterior for:

- Appropriate environmental conditions (see Environmental conditions, page 6).
- Physical integrity.
- Antennas integrity and connection.

Open the units

ATTENTION

Do not attempt to open the NetMCU or the NetRTU by hand or with inappropriate tools.

- Open the NetMCU with a flatbed screwdriver - Minimum 10mm (3/8"), or a coin.
- Open the NetMCU with a 8mm (¼") flatbed screwdriver.

Visually inspect the NetMCU and the NetRTUs interior for:

- Condensation
  - Light to medium condensation can be addressed using silica gel packets (consult the manufacturer).
  - Heavy condensation - contact your Netafim™ local representative for support.
- Insect penetration and settlement
  Can be addressed using insecticides (spray or pellets, depending on the type of insect).

WARNING

Do not spray directly onto electrical components and circuit boards.

- Exposed wires (First time inspection only)

RTU Battery Replacement

CAUTION

Before Proceeding, see Safety - Batteries, page 5

- Open the NetRTU with a 8mm (¼") flatbed screwdriver.

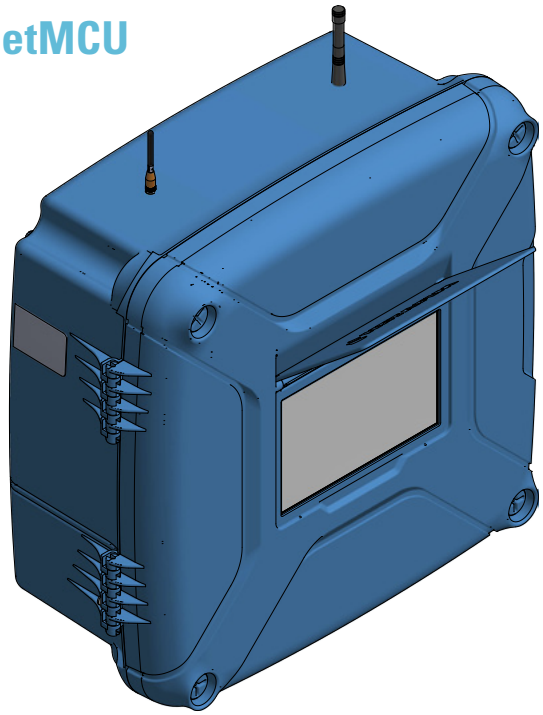
ATTENTION

Do not attempt to open the NetRTU by hand or with inappropriate tools.

- Insert 3 AA size batteries, type – *L91 Lithium batteries by Energizer*. Observe polarity.
  The NetRTU should turn on automatically.
- Make sure the cover gasket is in place.
- Close the NetRTU

ORDER DETAILS

NetMCU



Description	Cat. No.
With display, 220V	74700-000018
Without display, 220V	74700-000019
With display, 110V	74700-000020
Without display, 110V	74700-000021

When ordering a NetMCU, select and order the required IO/AI tiles, antenna kit and accessories.

NetMCU Tiles

Description	Cat. No.
AC/DC/DC latch tile	74720-000001
Analog IN tile	74720-000002

NetMCU LoRa antenna kit

Description	Cat. No.
433 MHz, 10m	74740-000125
868 MHz, 10m	74740-000130
915 MHz, 10m	74740-000135

NetMCU accessories

Description	Cat. No.
Aluminum stand for NetMCU standalone	74740-000200
Aluminum wall mount for NetMCU	74740-000201
Aluminum stand for NetMCU on Fertikit	Call your Netafim™ local representative.

NetRTU

Description	Cat. No.
RF433, 8DO	74710-000004
RF915, 8DO	74710-000005
RF868, 8DO	74710-000006
Repeater	74710-000008

NetRTU LoRa antenna kit

Description	Cat. No.
433 MHz, 5m	74740-000140
868 MHz, 5m	74740-000145
915 MHz, 5m	74740-000150

NetRTU accessories

Description	Cat. No.
Rod for NetRTU 1.8m (6ft)	74740-000100

For more details on the NetBeat system and its components visit Netafim™ Media Center at https://www.netafim.com/en/digital-farming/netbeat/

ORDER DETAILS

Spare parts

NetMCU spare parts

Description	Cat. No.
NetMCU bus card	74720-000100
NetMCU LoRa module	74720-000101
NetMCU display	74720-000102
NetMCU power tile	74740-000117
NetMCU controller tile	74740-000118
NetMCU display cable	74740-000101
NetMCU complete door	74740-000102
NetMCU complete door without display	74740-000103
NetMCU cable entry panel	74740-000104
NetMCU complete empty box with display	74740-000105
NetMCU complete empty box without display	74740-000106
NetMCU empty box without door	74740-000107
NetMCU cellular antenna	74740-000112
NetMCU power supply	74740-000115
NetMCU backup battery	74740-000116

NetRTU spare parts

Description	Cat. No.
NetRTU card	74720-000103
NetRTU empty box	74740-000113
NetBeat extension cable for SM150T, 25m (82ft)	74740-000300
NetBeat cable for SM150T 4 wires, 5m (15ft)	74740-000310

NetBeat LoRa antenna spare parts

Description	Cat. No.
NetBeat LoRa antenna 433 MHz	74740-000108
NetBeat LoRa antenna 868 MHz	74740-000109
NetBeat LoRa antenna 915 MHz	74740-000110
NetBeat LoRa antenna cable 10m (33ft) for NetMCU	74740-000111
NetBeat LoRa antenna cable 5m (15ft) for NetRTU	74740-000114

Sensors

Description	Cat. No.
NetBeat irrometer, MS, 30/12	74730-000001
NetBeat irrometer, MS, 60/24	74730-000002
NetBeat irrometer, MS, 90/36	74730-000003
NetBeat irrometer, SS, 30/12	74730-000004
NetBeat irrometer, SS, 60/24	74730-000005
NetBeat irrometer, SS, 90/36	74730-000006
NetBeat soil moisture sensor, SM150T kit	74730-000010
NetBeat NetaCap, soil moisture profile sensor	74730-000011
NetBeat weather station direct	74730-000050

Legend
MS = Most soils
SS = Sandy soils

Online services

Description	Cat. No.
NetBeat Pro Subscription Plan	74750-000100

WARRANTY

Netafim warrants that the Hardware will be free from defects in material and workmanship. The foregoing warranty is for Licensee's benefit and shall last for twelve months from the date delivery of the Hardware to Licensee ("Warranty Period"). The foregoing warranty relates solely to the Hardware in the System. Netafim warrants that it has the full legal right to license the System in accordance with this EULA. Netafim warrants that, to the best of its knowledge, the use and enjoyment by Licensee of the System (excluding Third Party Content) does not infringe, misappropriate or otherwise violate any third party intellectual property rights.

This warranty shall not apply to any defects that Netafim determines results from: (i) loss or damage in transit; (ii) external causes such as accident, abuse, misuse, or problems with electrical power; (iii) unreasonable or inadequate storage, installation or maintenance; (iv) any alterations or repairs (or attempts to make alterations or repairs) made by unauthorized representative of Netafim; (v) Licensee's acts or omissions which exposes the System to any environment not suitable for it, with the respective specifications, including without limitation, Licensee's use of toxic, corrosive, or caustic liquids and/or gases with the Hardware, exposure to severe weather conditions and water and to damage by animals; (vi) any defect or problems caused by any defect in any 3rd party Hardware or software used in combination with the System; (vii) any usage that is not in accordance with the Documentation or the provisions of section 4 herein. Netafim shall not be obligated to provide warranty for any System for which Netafim has not received all payments due.

EXCEPT FOR THE ABOVE EXPRESS WARRANTY, NETAFIM PROVIDES THE SYSTEM ON AN "AS IS" AND SUBJECT TO APPLICABLE LAW; NETAFIM DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE AND ANY WARRANTY IN EXCESS OF THE WARRANTY HEREIN, EVEN IF GRANTED BY THE AUTHORIZED DISTRIBUTOR. NETAFIM DOES NOT WARRANT THAT THE SYSTEM, ITS USE, OPERATION OR THE LICENSEE'S ABILITY TO USE THE SYSTEM WILL BE UNINTERRUPTED OR ERROR-FREE OR THAT ANY OR ALL SYSTEM ERRORS WILL BE CORRECTED. NETAFIM DOES NOT WARRANT OR MAKE ANY REPRESENTATION THAT CUSTOMER WILL ACHIEVE PARTICULAR RESULTS AND DOES NOT GUARANTEE ANY IMPROVEMENTS IN ANY AGRICULTURAL OR COMMERCIAL MEASUREMENTS OR CROP YIELDS. INFERENCES MADE BY INDIVIDUALS USING THE SYSTEM DO NOT REFLECT THOSE OF NETAFIM. NETAFIM DOES NOT WARRANT THAT THE SYSTEM'S SECURITY WILL BE FLAWLESS OR WITHOUT FAULT.

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