

# NETBEAT™

## USER MANUAL



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### **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.

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# 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.

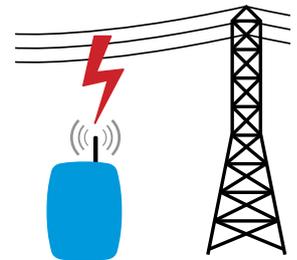
## Overhead Power Lines



### 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

## 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.

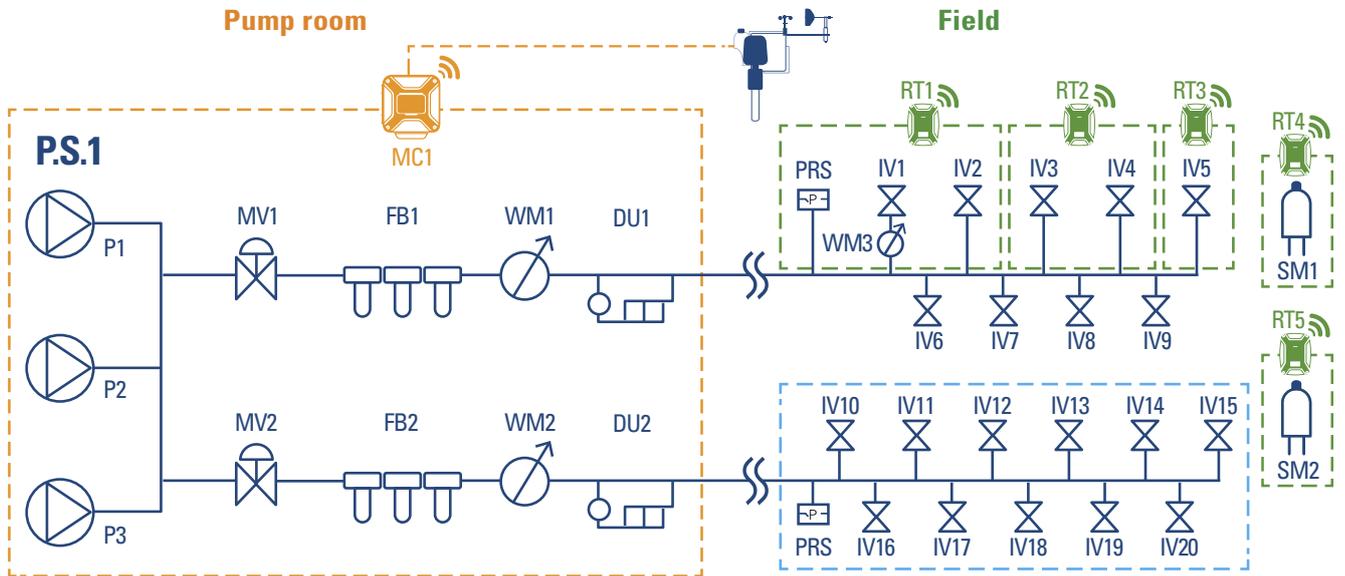
Standard	CE	FCC/CSA	UL	ROHS	EMC
Compliance	√	√	√	√	√

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

<b>MC</b>	NetMCU
<b>RT</b>	NetRTU
<b>PS</b>	Pump Station
<b>MV</b>	Main Valve

<b>FB</b>	Filter Battery
<b>DU</b>	Dosing Unit
<b>IV</b>	Irrigation Valve
<b>SM</b>	Soil Moisture Sensor

<b>WM</b>	Water Meter
<b>TM</b>	Tensiometer
<b>WS</b>	Weather Station
<b>PRS</b>	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

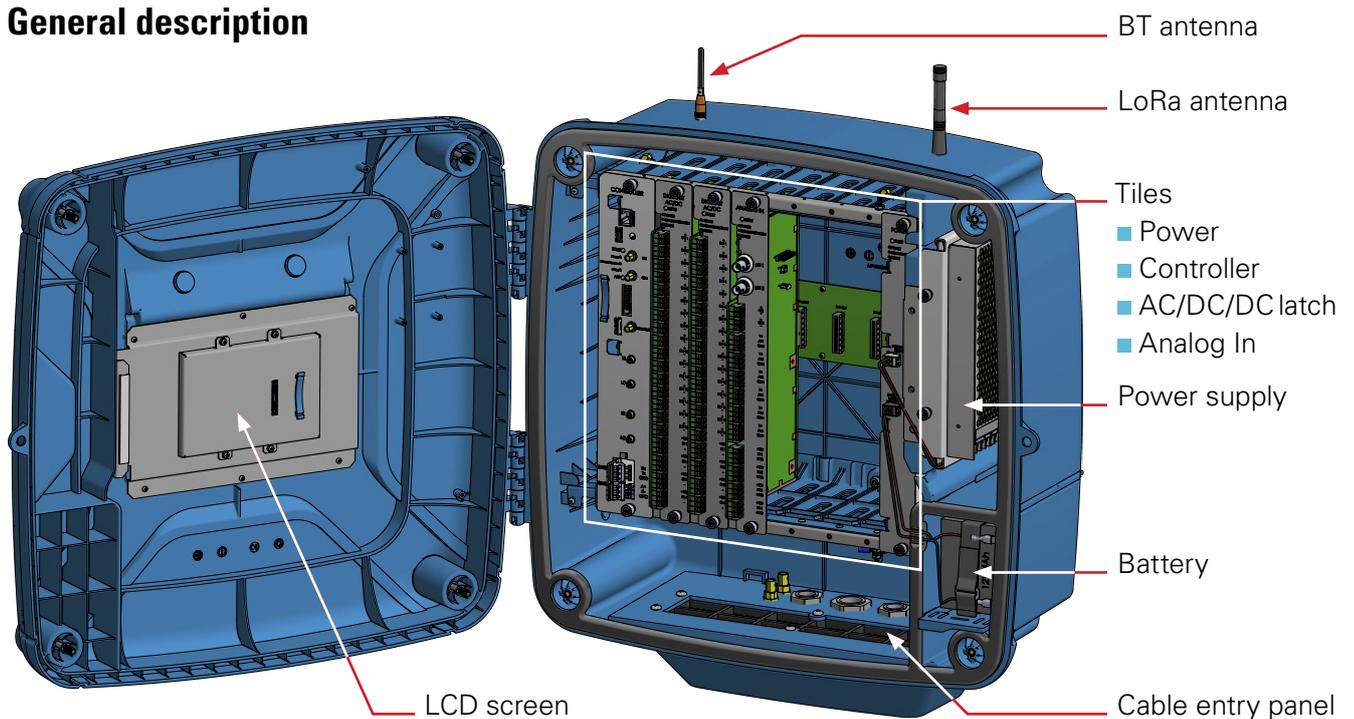
## NetBeat Main Control Unit (NetMCU)

### Features & benefits

- 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

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

<b>Operation temperature</b>	With touch screen: -20°C - 55°C / -4°F - 131°F
	Without touch screen: -20°C - 65°C / -4°F - 149°F
<b>Dimensions</b>	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.

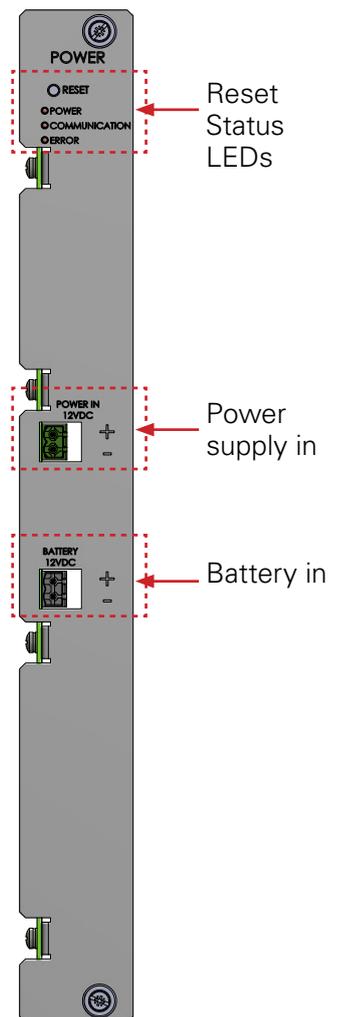
MCU max power is 100W at 45°C (113°F)

### MCU power supply

Parameter	Rating
<b>Input</b>	
Voltage range	90 ~ 132VAC / 180 ~ 264VAC, by switch
Frequency range	47 ~ 63Hz
AC current	4A/115VAC 2.2A/230VAC
<b>Output</b>	
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

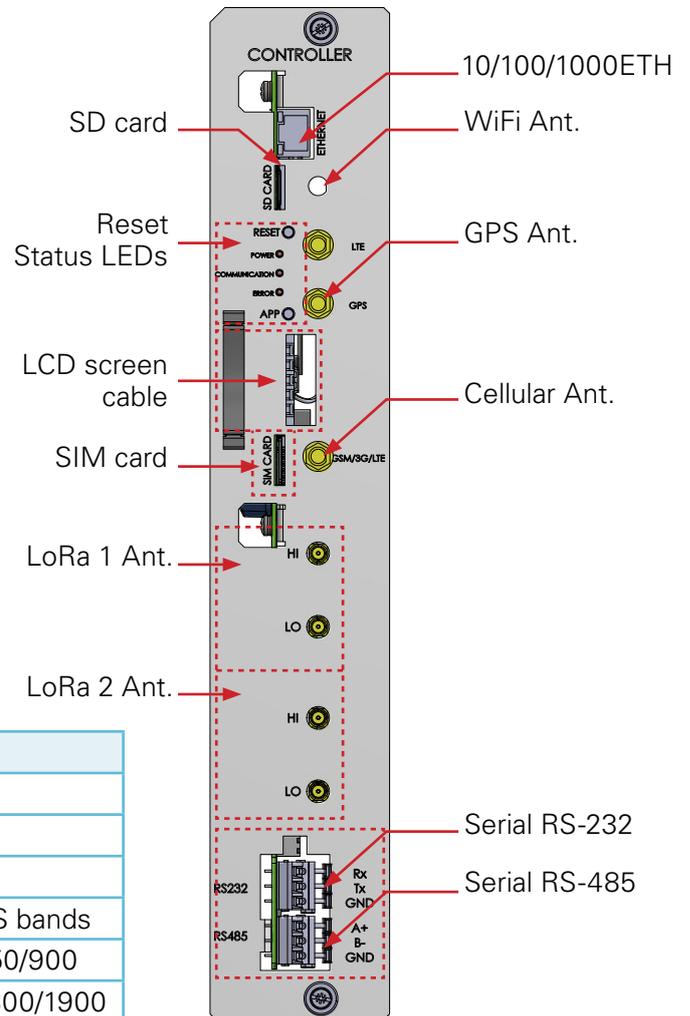
Parameter	Rating
Model	Samtech SX1726
Frequency	868/915/433 MHz
Output Power	14/20 dBm
BW	125,250,500 kHz
Spreading Factor	7 - 10

### 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

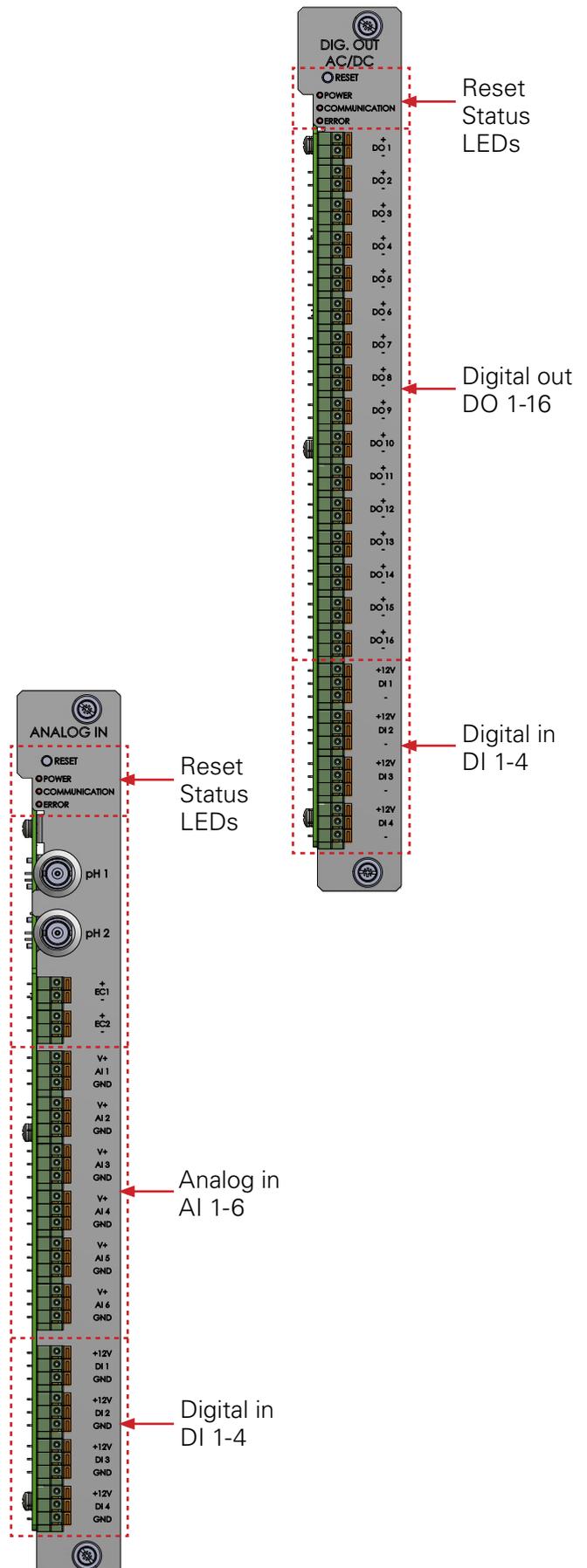
Parameter	Rating
Number of inputs	4
Nominal voltage of inputs	12 V
Signal voltage "0"	<0.8 V
Signal voltage "1"	>2.1 V

### EC Channel

Number of inputs	2
------------------	---

### pH Channel

Number of inputs	2
------------------	---



# SYSTEM DESCRIPTION

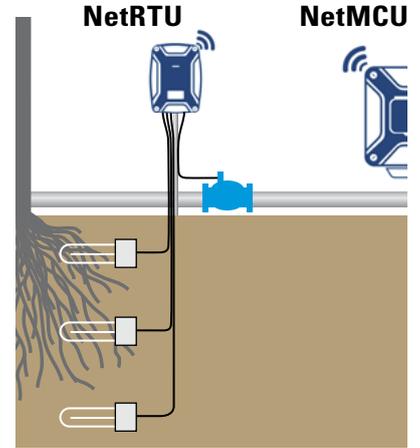
## NetBeat Remote Terminal Unit (NetRTU)

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 & benefits

- 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

Battery In/input from solar panel (5VDC)

Battery compartment

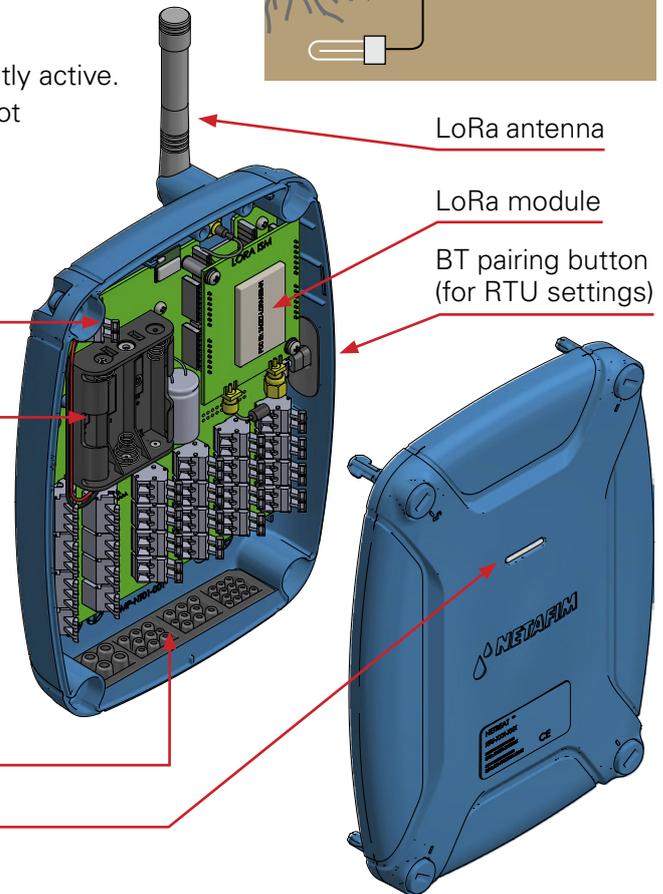
Cable entry panel

Status LED

LoRa antenna

LoRa module

BT pairing button (for RTU settings)



### Specifications

<b>Power</b>	Battery operated - 3 x L92 (1.5V@1.2AH)
<b>Inputs and outputs</b>	Up to 8 outputs for DC Latch valves
Integrates digital, analog and serial inputs, with digital outputs	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)
<b>LED indicator</b>	Bluetooth operation status
<b>Enclosure</b>	Robust UV stabilised enclosure rated to IP65
<b>Operation temperature</b>	-20°C - 65°C / -4°F - 149°F
<b>Dimensions</b>	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*
<b>Soil sensors</b>	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
<b>Plant sensors</b>	Trunk dendrometer	RTU - Analog In
<b>Environmental sensors</b>	Weather station	MCU - RS232 or RS485 RTU - RS232
	Temperature and humidity sensor	RTU/MCU - Analog In
	Rain gauge (udometer)	RTU/MCU - Digital In
<b>Hydraulic sensors</b>	Water meter	RTU/MCU - Digital In
	Fertilizer meter	RTU/MCU - Digital In
	Pressure sensor	RTU/MCU - Analog In
<b>General sensors</b>	General purpose sensor	RTU/MCU - Analog In
	General purpose switch/counter	RTU/MCU - Digital In

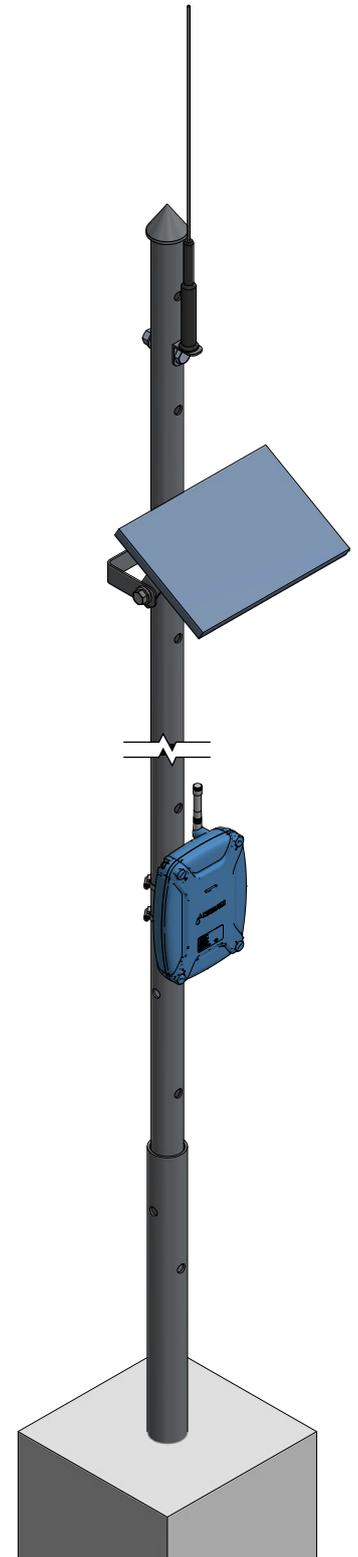
\*See the NetMCU tiles on the NetBeat user manual, [pages 11-13](#)

### 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

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

Login to Netafim NetBeat

Enter your details below

Email Address:  
mr.farmer@gmail.com

Password    Forgot Password?  
.....

Remember me

Login

### 1.2 General Overview

Menu Bar

Information and settings

Dashboard

NETAFIM

FARM OVERVIEW   PROGRAMS   CALENDAR   MAP   INFRASTRUCTURE   ANALYSIS

GHP Open Field   0   Itzik

RUNNING PROGRAMS (0)

there are no running programs

TECHNICAL ALERTS

0

WIDGETS

last 7 days

No Data

last 7 days

15-22°	15-24°	16-26°	15-25°	15-24°
☁	☀	☀	☁	☁
30%	10%	0%	0%	20%
0.31mm	0mm	0mm	0mm	0mm
Tue   Nov 06	Wed   Nov 07	Thu   Nov 08	Fri   Nov 09	Sat   Nov 10

last 7 days

90

40

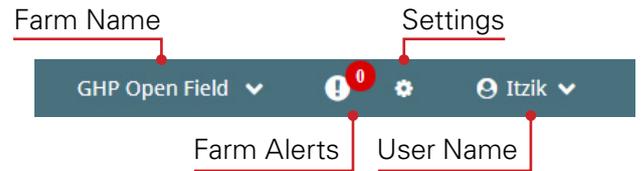
20

Jul 12   Jul 13   Jul 14   Jul 15   Jul 16   Jul 17

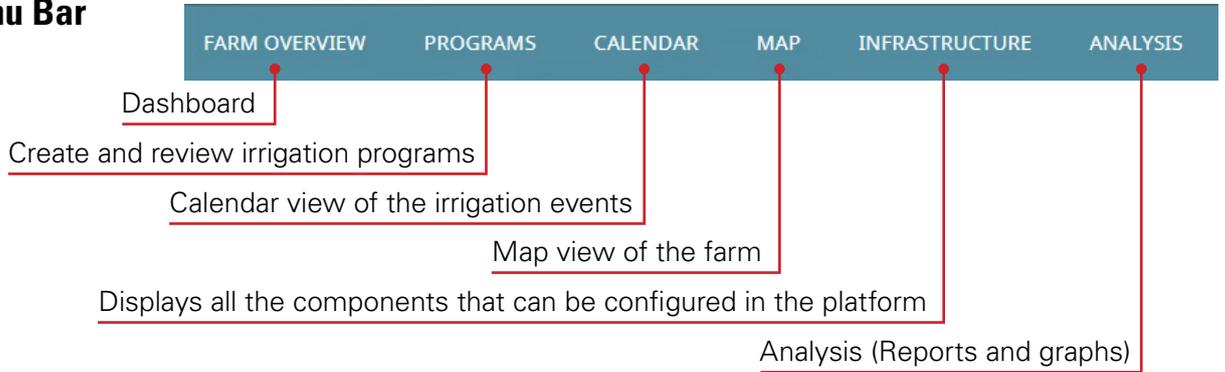
130a: SM150 25cm   130b: SM150 50cm   rNet Analog Sensor 130a: 1   130b: SM150 25cm

# OPERATION

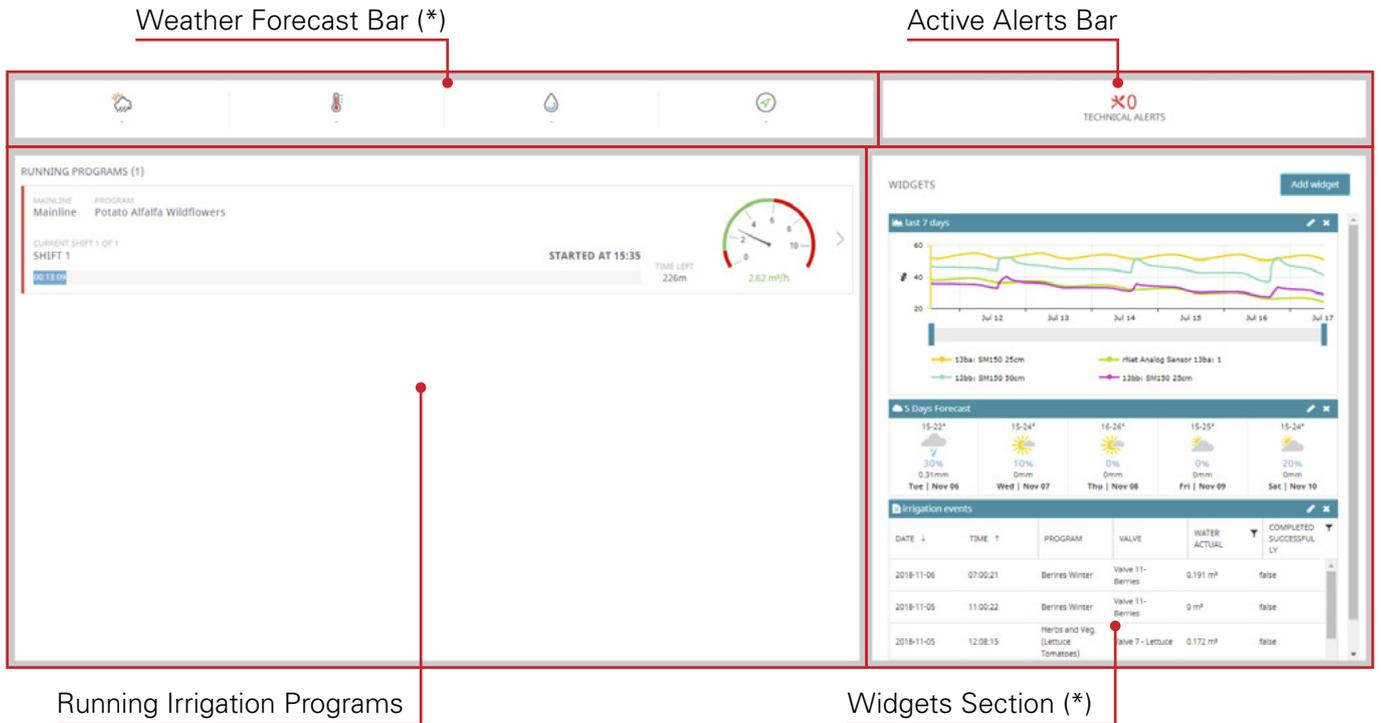
## 1.3 Information & Settings Bar



## 1.4 Menu Bar



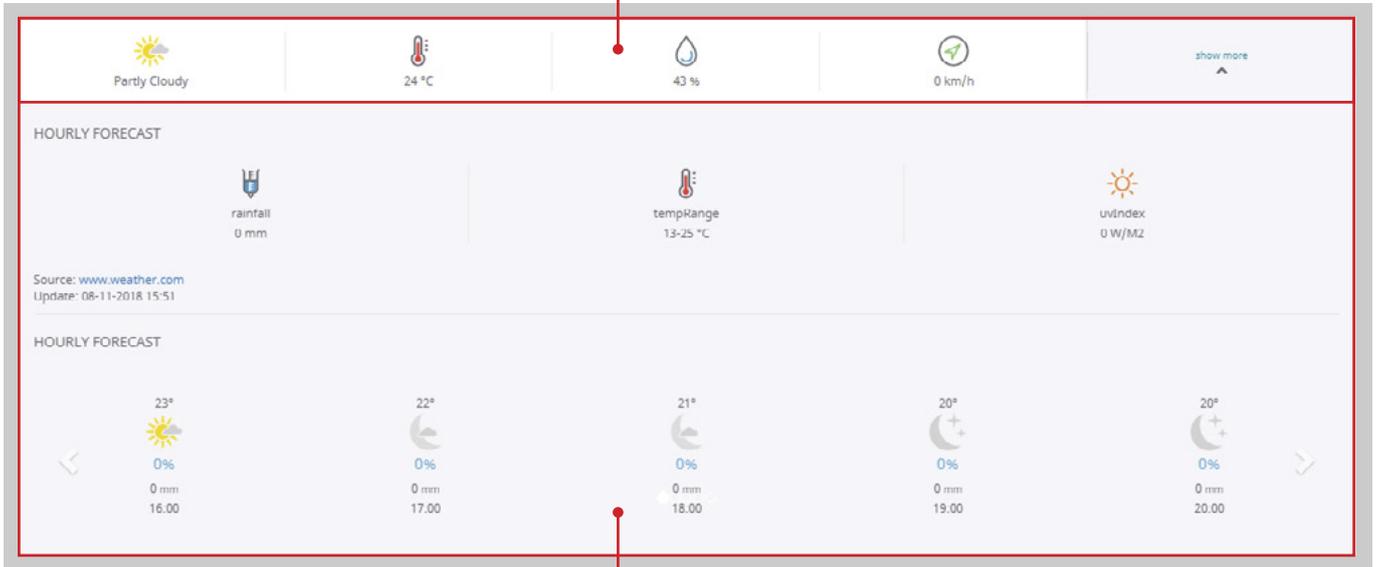
## 1.5 Dashboard



# OPERATION

## Weather Service Bar (extended)

Current conditions



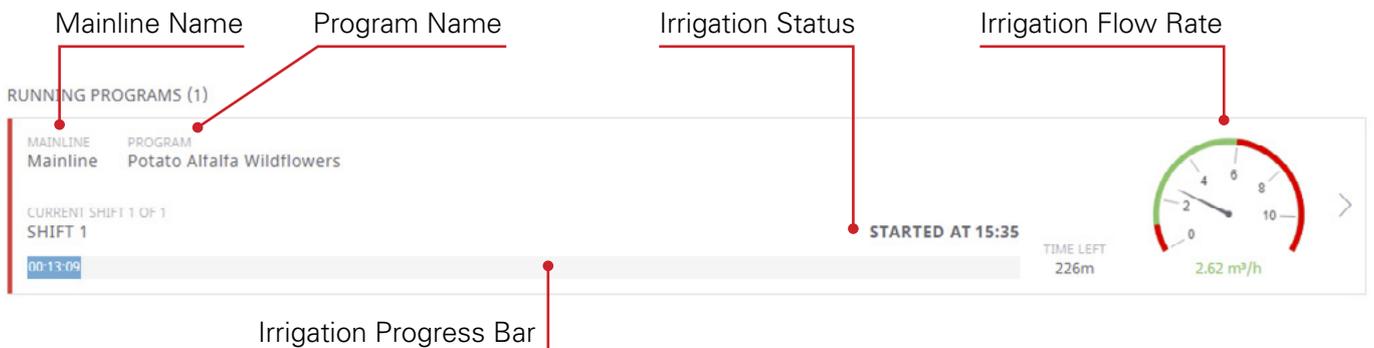
Hourly Forecast



### Alerts

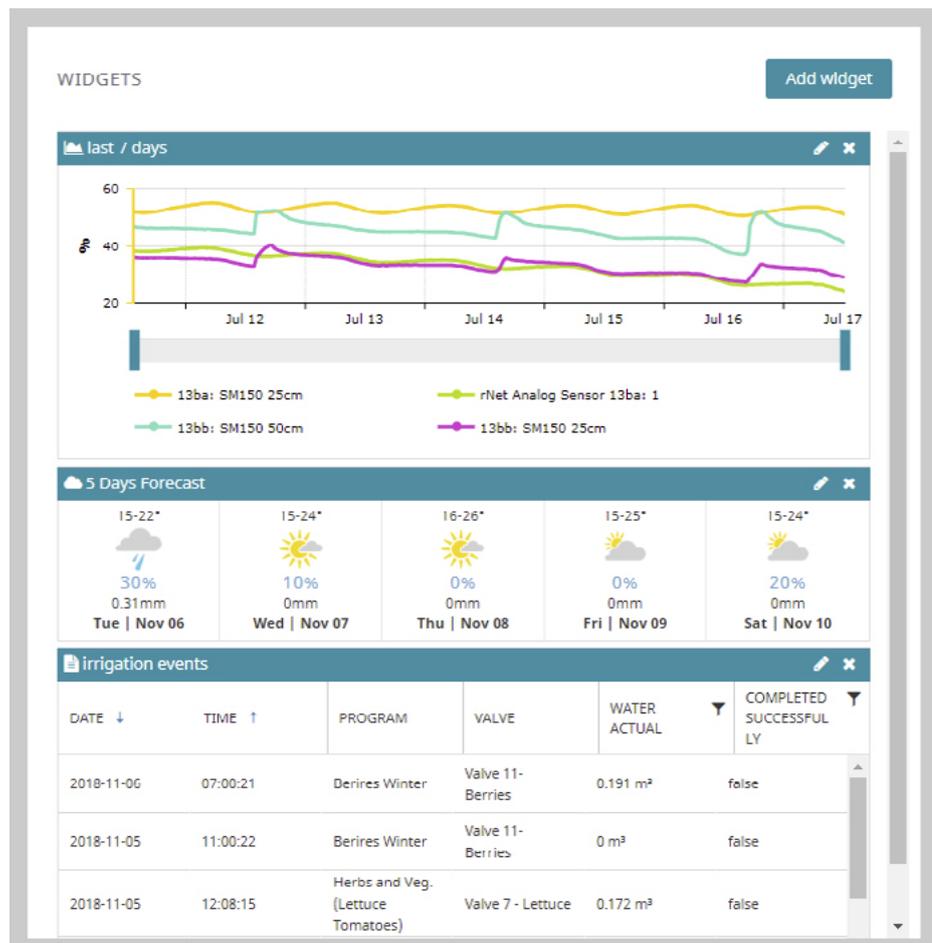
Alerts related to a technical malfunction or warning, such as: Low battery, no communication with a remote unit, etc.

## Running Programs



# OPERATION

## Widgets



**Edit Widget**

Reports widget (points to Report icon)

Forecast widget (points to Weather icon)

Gauge widget (points to Gauge icon)

Graph widget (points to Graph icon)

The Report widget allows you to select any of your system reports or any reports you created manually and saved. The report will be presented as a table on the widget card.

Select Report

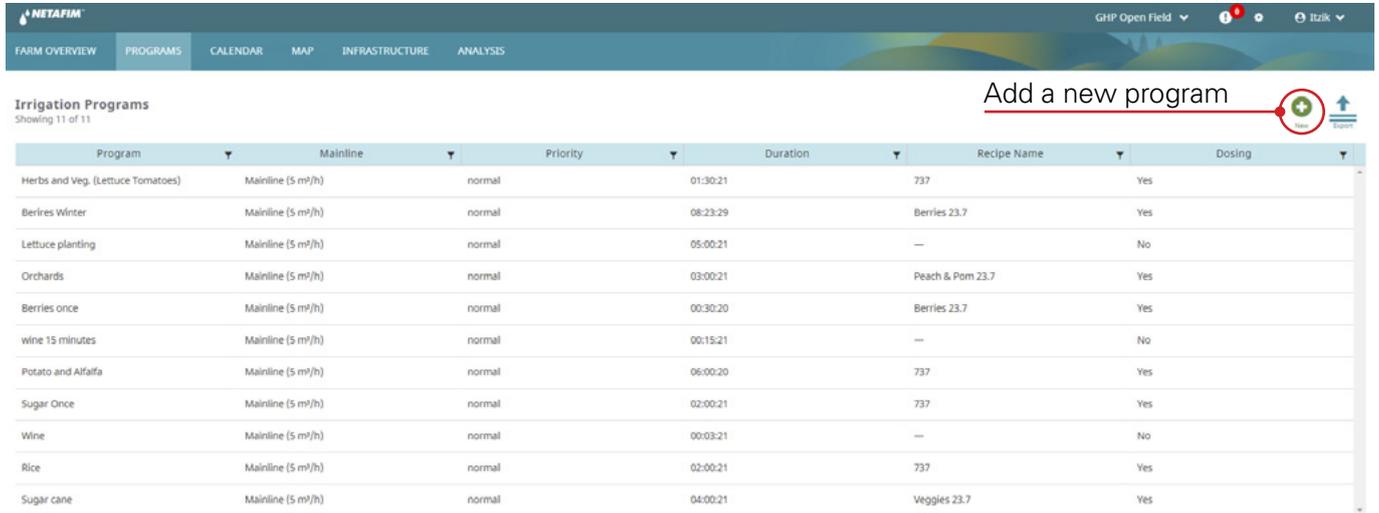
- irrigation events
- uncompleted irrigations
- skipped irrigation cycles
- daily irrigation
- radiation vpd sum
- pump station history
- pump station accumulation
- Dosing Event
- filter station history
- water meter accumulation
- 10 Day Weather Forecast
- Historical Daily Weather
- Average Daily Weather

Buttons: Cancel, Apply

# OPERATION

## 2. Building Irrigation Program

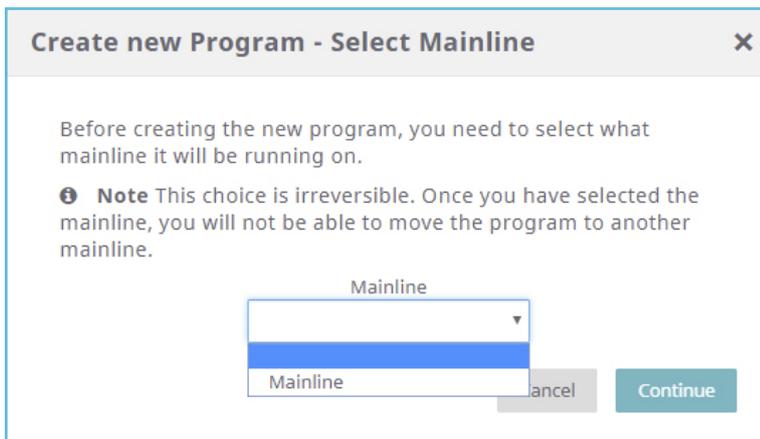
### Step 1 - Add a new program



The screenshot shows the METAFIM software interface. At the top, there is a navigation bar with tabs for FARM OVERVIEW, PROGRAMS, CALENDAR, MAP, INFRASTRUCTURE, and ANALYSIS. The 'PROGRAMS' tab is active. Below the navigation bar, there is a header for 'Irrigation Programs' with a sub-header 'Showing 11 of 11'. To the right of the header, there is a button labeled 'Add a new program' with a green plus icon. Below the header is a table with the following columns: Program, Mainline, Priority, Duration, Recipe Name, and Dosing. The table contains 11 rows of data.

Program	Mainline	Priority	Duration	Recipe Name	Dosing
Herbs and Veg. (Lettuce Tomatoes)	Mainline (5 m <sup>3</sup> /h)	normal	01:30:21	737	Yes
Berries Winter	Mainline (5 m <sup>3</sup> /h)	normal	08:23:29	Berries 23.7	Yes
Lettuce planting	Mainline (5 m <sup>3</sup> /h)	normal	05:00:21	—	No
Orchards	Mainline (5 m <sup>3</sup> /h)	normal	03:00:21	Peach & Pom 23.7	Yes
Berries once	Mainline (5 m <sup>3</sup> /h)	normal	00:30:20	Berries 23.7	Yes
wine 15 minutes	Mainline (5 m <sup>3</sup> /h)	normal	00:15:21	—	No
Potato and Alfalfa	Mainline (5 m <sup>3</sup> /h)	normal	06:00:20	737	Yes
Sugar Once	Mainline (5 m <sup>3</sup> /h)	normal	02:00:21	737	Yes
Wine	Mainline (5 m <sup>3</sup> /h)	normal	00:03:21	—	No
Rice	Mainline (5 m <sup>3</sup> /h)	normal	02:00:21	737	Yes
Sugar cane	Mainline (5 m <sup>3</sup> /h)	normal	04:00:21	Veggies 23.7	Yes

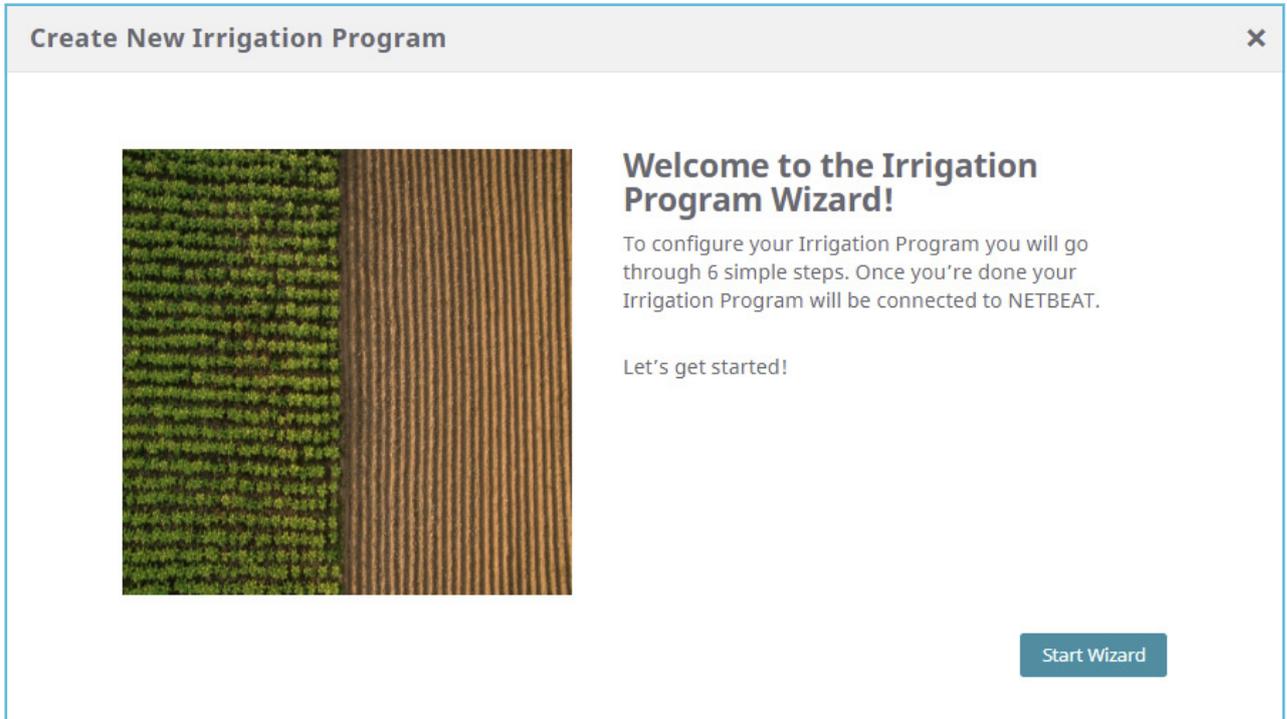
### Step 2 - Choose a Mainline that the irrigation program is related to



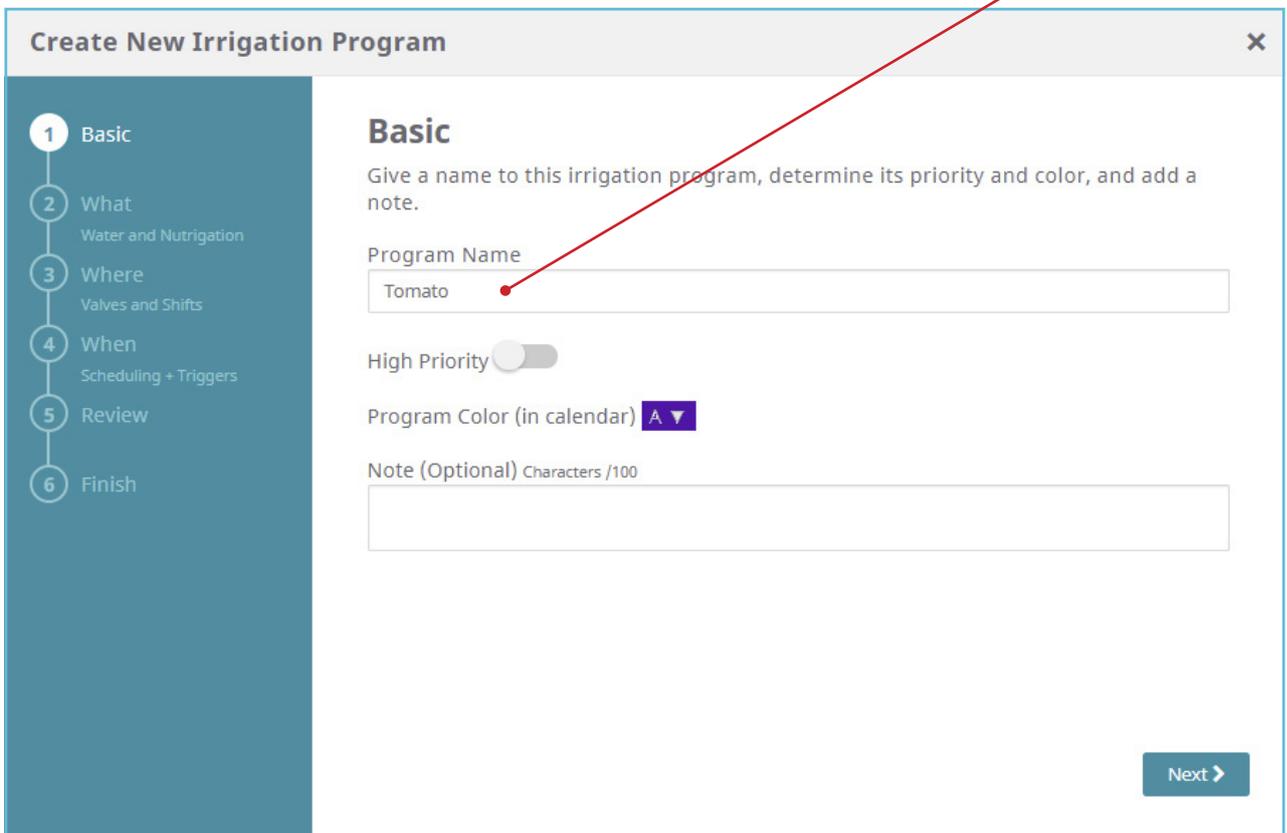
The screenshot shows a dialog box titled 'Create new Program - Select Mainline'. The dialog box contains the following text: 'Before creating the new program, you need to select what mainline it will be running on.' Below this text is a note: 'Note This choice is irreversible. Once you have selected the mainline, you will not be able to move the program to another mainline.' At the bottom of the dialog box, there is a dropdown menu labeled 'Mainline' with a blue bar over it, and two buttons: 'Cancel' and 'Continue'.

# OPERATION

## 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.

# OPERATION

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

### Create New Irrigation Program

- Basic
- 2 What**  
Water and Nutrigation
- 3 Where  
Valves and Shifts
- 4 When  
Scheduling + Triggers
- 5 Review
- 6 Finish

## Nutrigation Management

Determine how much water and what kind of dosing will be applied in this program.

**1 Watering** **2** **3**

By duration (h)  By water depth(mm)  By Water Quantity(m<sup>3</sup>)

Water Volume  m<sup>3</sup>

## Dosing

Dosing  Off

**Note** If this program is currently irrigating, the changes you make here will take effect only from the next recurrence of the program.

[Back](#) [Next](#)

### 1 - Watering by duration

Define the irrigation time duration.

## Nutrigation Management

Determine how much water and what kind of dosing will be applied in this program.

### Watering

By duration (h)  By water depth(mm)  By Water Quantity(m<sup>3</sup>)

Duration Hours:  Minutes:  Seconds:

### 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.

## Nutrigation Management

Determine how much water and what kind of dosing will be applied in this program.

### Watering

By duration (h)  By water depth(mm)  By Water Quantity(m<sup>3</sup>)

Water depth  mm (Valid only when irrigated area is known)

### 3 - Watering by water volume

Define the required water volume.

## Nutrigation Management

Determine how much water and what kind of dosing will be applied in this program.

### Watering

By duration (h)  By water depth(mm)  By Water Quantity(m<sup>3</sup>)

Water Volume  m<sup>3</sup>

# OPERATION

## Step 5 (not mandatory) – Configure the dosing

1 - Enable the dosing option.

2 - Select recipe or create new one.

**Create New Irrigation Program**

Quantity(m<sup>2</sup>)

Water Volume  m<sup>3</sup>

**Dosing**

Dosing  On  
Dosing None

Select Recipe

**Fertilizer Application**

Water Before Dosing  m<sup>3</sup>      Water After Dosing  m<sup>3</sup>

**Note** If this program is currently irrigating, the changes you make here will take effect only from the next recurrence of the program.

**Assign Dosing Recipe to Program**

Assign a dosing recipe from dosing unit Dosing Unit

Assign an Existing Recipe     Create a New Recipe and assign it

Select a recipe from dosing unit

Search for...

- Berries 23.7
- qa
- Veggies 23.7
- Gony
- Lemon
- Corn (&Herbs) 23.7
- 25 minutes bulk by time

**Assign Dosing Recipe to Program**

Assign a dosing recipe from dosing unit Dosing Unit

Assign an Existing Recipe     Create a New Recipe and assign it

Recipe Name  Enabled  On

Description Characters /100

**Fertilizers**

Dosing Channel 1 Tank Tank 1(Fertilizer) Participate  On

Method  Quantity  L

Dosing Channel 2 Tank Tank 2(Fertilizer) Participate  On

Method  Quantity  L

Add Tank Acid(Acid) Participate  On

Method  Quantity  L

# OPERATION

## 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.

**Assign Dosing Recipe to Program**

Assign a dosing recipe from dosing unit Dosing Unit

Assign an Existing Recipe
  Create a New Recipe and assign it

---

Recipe Name Enabled  On

Tomato Fert

Description Characters /100

Fertilizers

Dosing Channel 1 Participate  On

Tank Tank 1(Fertilizer)

Method ▼

- Bulk By Time
- Bulk By Quantity
- Spread By Time
- Spread By Quantity
- Proportional Quantity

Dosing Tank Tar Participate  Off

Acid Tank Acid(Acid) Participate  Off

### Dosing

Dosing  On  
 Dosing Berries 23.7 ⓘ

Select Recipe

### Fertilizer Application

Water Before Dosing

Hours:  Minutes:  Seconds:

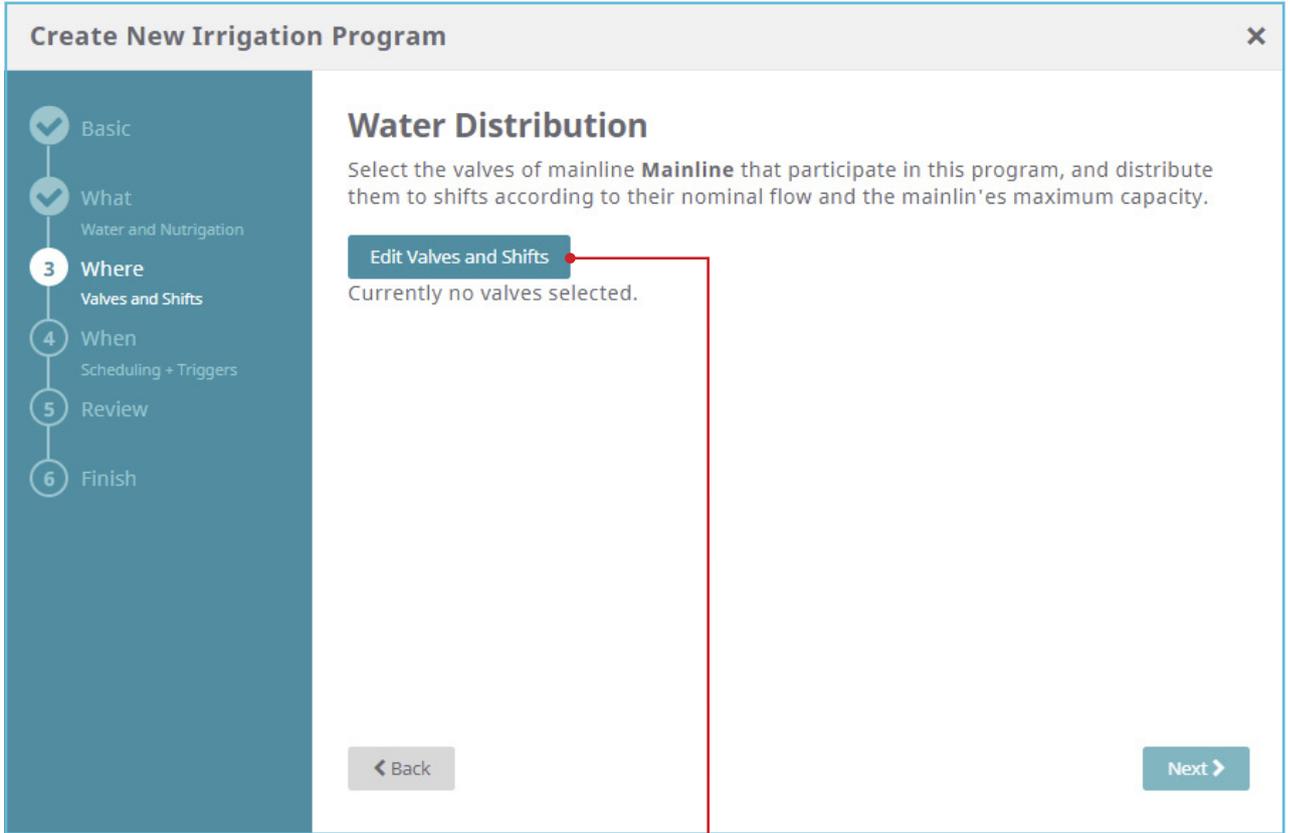
Water After Dosing

Hours:  Minutes:  Seconds:

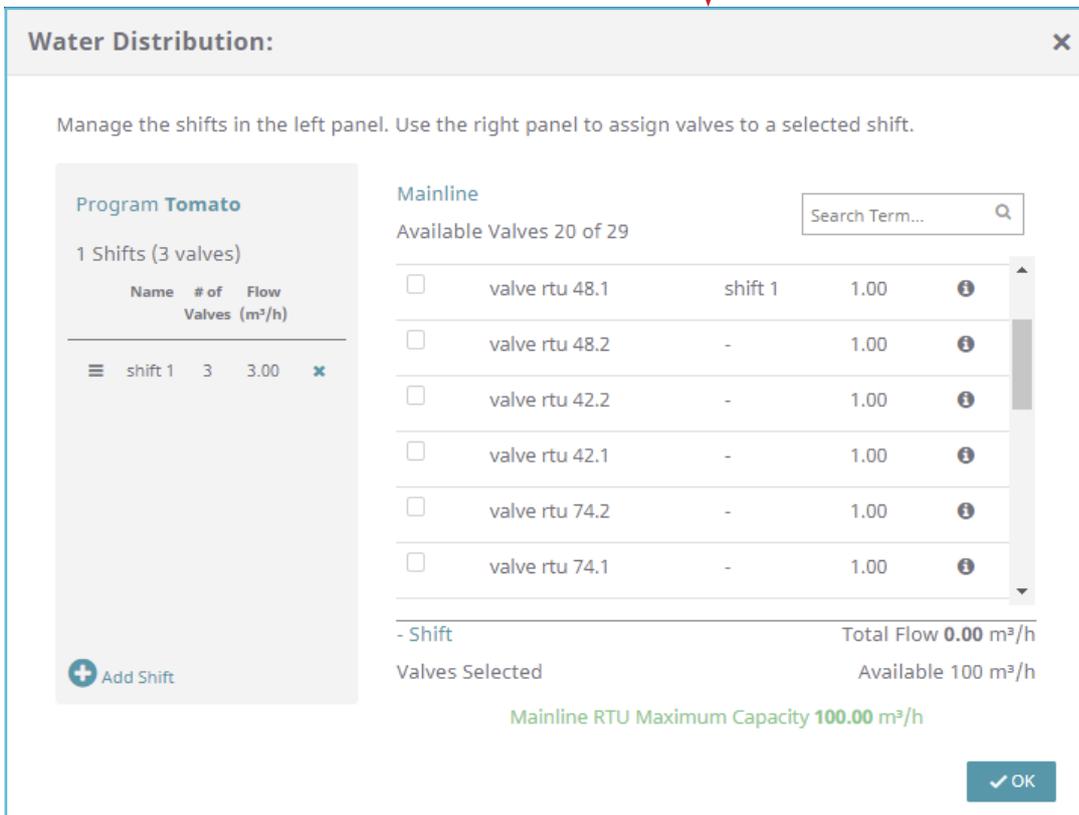
After choosing/creating recipe it is possible to configure the duration of time/quantity water will go through the system before the dosing and after.

# OPERATION

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



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



# OPERATION

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

2 - Add a shift and name it:

Water Distribution: Manage the shifts in the left panel. Use the right panel to assign valves to a selected shift.

Program **Tomato**

1 Shifts (3 valves)

Name	# of Valves	Flow Valves (m <sup>3</sup> /h)
shift 1	3	3.00

**+ Add Shift**

Mainline Available Valves 20 of 29

Valve	Shift	Flow
<input type="checkbox"/> valve rtu 48.1	shift 1	1.00
<input type="checkbox"/> valve rtu 48.2	-	1.00
<input type="checkbox"/> valve rtu 42.2	-	1.00
<input type="checkbox"/> valve rtu 42.1	-	1.00
<input type="checkbox"/> valve rtu 74.2	-	1.00
<input type="checkbox"/> valve rtu 74.1	-	1.00

- Shift Total Flow **0.00** m<sup>3</sup>/h

Valves Selected Available 100 m<sup>3</sup>/h

Mainline RTU Maximum Capacity **100.00** m<sup>3</sup>/h

**OK**

3 - Define the relevant valves.

**Notice not to exceed the available capacity of the mainline.**

Water Distribution: Manage the shifts in the left panel. Use the right panel to assign valves to a selected shift.

Program **Tomato**

1 Shifts (6 valves)

Name	# of Valves	Flow Valves (m <sup>3</sup> /h)
shift 1	6	6.00

**+ Add Shift**

Mainline Available Valves 20 of 29

Valve	Shift	Flow
<input checked="" type="checkbox"/> valve rtu 48.1	shift 1	1.00
<input checked="" type="checkbox"/> valve rtu 48.2	shift 1	1.00
<input checked="" type="checkbox"/> valve rtu 42.2	shift 1	1.00
<input checked="" type="checkbox"/> valve rtu 42.1	shift 1	1.00
<input type="checkbox"/> valve rtu 74.2	-	1.00
<input type="checkbox"/> valve rtu 74.1	-	1.00

- Shift **shift 1** Total Flow **6.00** m<sup>3</sup>/h

6 Valves Selected Available 94 m<sup>3</sup>/h

Mainline RTU Maximum Capacity **100.00** m<sup>3</sup>/h

**OK**

4 - Click "OK".

# OPERATION

## 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

### Daily Scheduling

Runs every:  1  days

Each time, run  1  cycles of the program

Interval (start to start) Hours:  0  Minutes:  0  Seconds:  0

**2 - Weekly irrigation**  
Define the weekly irrigation parameters

### Weekly Scheduling

Runs every:  1  weeks

Runs on:  Sun  Mon  Tue  Wed  Thu  Fri  Sat

Each time, run  1  cycles of the program

Interval (start to start) Hours:  0  Minutes:  0  Seconds:  0

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

### Start Triggers

Select Switch

Seconds:  0   0

# OPERATION

## 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):

The screenshot shows the 'Create New Irrigation Program' dialog with the 'Scheduling Management' step selected. The left sidebar shows a progress indicator with steps 1-6, where step 4 'When' is active. The main content area is titled 'Scheduling Management' and includes a 'Start Program' button and an 'End Program' button. A note states: 'Note Program ending triggers cannot be applied to programs with more than one shift.' Below this, the 'End trigger' toggle is turned 'On'. The 'Select Switch' dropdown is set to 'DP Switch'. The 'Condition' section has 'On' selected. A final note says: 'Note: If this program is currently irrigating, the changes you make here will not be applied until the program ends.' Navigation buttons for 'Back' and 'Next' are at the bottom.

## Step 8 – Review the program and Finish

The screenshot shows the 'Create New Irrigation Program' dialog with the 'Review' step selected. The left sidebar shows step 5 'Review' as active. The main content area is titled 'Review' and includes a paragraph: 'Review the details of the irrigation program you created. If you want to make any changes, go back to the relevant step and edit it. Once you click on the Create button, it will be saved and added to the system.' Below this are two sections: 'General' and 'Watering and Nutrigation'. The 'General' section lists: Name (Tomato), Priority (Normal priority), Color (a small purple square), and Note. The 'Watering and Nutrigation' section lists: Measurement Method (by water amount), Watering (50 cM), and Dosing (New Recipe). Navigation buttons for 'Back' and 'Create Program' are at the bottom.

# OPERATION

## 3. Editing the program

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

The screenshot shows the 'Irrigation Programs' interface with a table of 11 programs. The 'Orchards' program is highlighted with a red box. The table columns are Program, Mainline, Priority, Duration, Recipe Name, and Dosing.

Program	Mainline	Priority	Duration	Recipe Name	Dosing
Herbs and Veg. (Lettuce Tomatoes)	Mainline (5 m <sup>3</sup> /h)	normal	01:30:21	737	Yes
Berries Winter	Mainline (5 m <sup>3</sup> /h)	normal	08:23:29	Berries 23.7	Yes
Lettuce planting	Mainline (5 m <sup>3</sup> /h)	normal	05:00:21	—	No
<b>Orchards</b>	Mainline (5 m <sup>3</sup> /h)	normal	03:00:21	Peach & Pom 23.7	Yes
Berries once	Mainline (5 m <sup>3</sup> /h)	normal	00:30:20	Berries 23.7	Yes
wine 15 minutes	Mainline (5 m <sup>3</sup> /h)	normal	00:15:21	—	No
Potato and Alfalfa	Mainline (5 m <sup>3</sup> /h)	normal	06:00:20	737	Yes
Sugar Once	Mainline (5 m <sup>3</sup> /h)	normal	02:00:21	737	Yes
Wine	Mainline (5 m <sup>3</sup> /h)	normal	00:03:21	—	No
Rice	Mainline (5 m <sup>3</sup> /h)	normal	02:00:21	737	Yes
Sugar cane	Mainline (5 m <sup>3</sup> /h)	normal	04:00:21	Veggies 23.7	Yes

### 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

The screenshot shows the 'Orchards' program edit window. It has three main sections: 'What' (Water and nutrition), 'When' (Trigger by time - weekly), and 'Where' (1 Shifts | 2 Valves). Each section has an 'Edit' button. A 'Remove' button is also visible in the top right corner. Red arrows point from the text labels to these buttons.

**What**  
Water and nutrition  
Watering by duration h  
Dosing Peach & Pom 23.7  
Fertilizer Application  
00:30:00h 02:00:01h 00:30:00h  
Before Dosing After  
Crop Model Recommendations

**When**  
Trigger by time - weekly  
Starts on 08/10/2018  
• Forever  
• Runs every 1 weeks  
• On Sun, Wed  
• 1 cycles per recurrence  
• Starts on 02:00

**Where**  
1 Shifts | 2 Valves  
Name # of Valves Flow (m<sup>3</sup>/h) Duration (h)  
shift 1 2 0.77 03:00:01

# OPERATION

## 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 m <sup>2</sup> /h)	normal	01:30:21	737	Yes
Berries Winter	Mainline (5 m <sup>2</sup> /h)	normal	08:23:29	Berries 23.7	Yes
Lettuce planting	Mainline (5 m <sup>2</sup> /h)	normal	05:00:21	—	No
Potato Alfalfa Wildflowers	Mainline (5 m <sup>2</sup> /h)	high	04:00:21	—	No
Orchards	Mainline (5 m <sup>2</sup> /h)	normal	03:00:21	Peach & Pom 23.7	Yes
Berries once	Mainline (5 m <sup>2</sup> /h)	normal	00:30:20	Berries 23.7	Yes
wine 15 minutes	Mainline (5 m <sup>2</sup> /h)	normal	00:15:21	—	No
Potato and Alfalfa	Mainline (5 m <sup>2</sup> /h)	normal	06:00:20	737	Yes
Sugar Once	Mainline (5 m <sup>2</sup> /h)	normal	02:00:21	737	Yes
Wine	Mainline (5 m <sup>2</sup> /h)	normal	00:03:21	—	No
SDI POTATO	Mainline (5 m <sup>2</sup> /h)	normal	01:21:20	—	No
Rice	Mainline (5 m <sup>2</sup> /h)	normal	02:00:21	737	Yes
Herbs and Rice	Mainline (5 m <sup>2</sup> /h)	high	03:50:20	737	Yes
Sugar cane	Mainline (5 m <sup>2</sup> /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.

#### Irrigation active at the moment

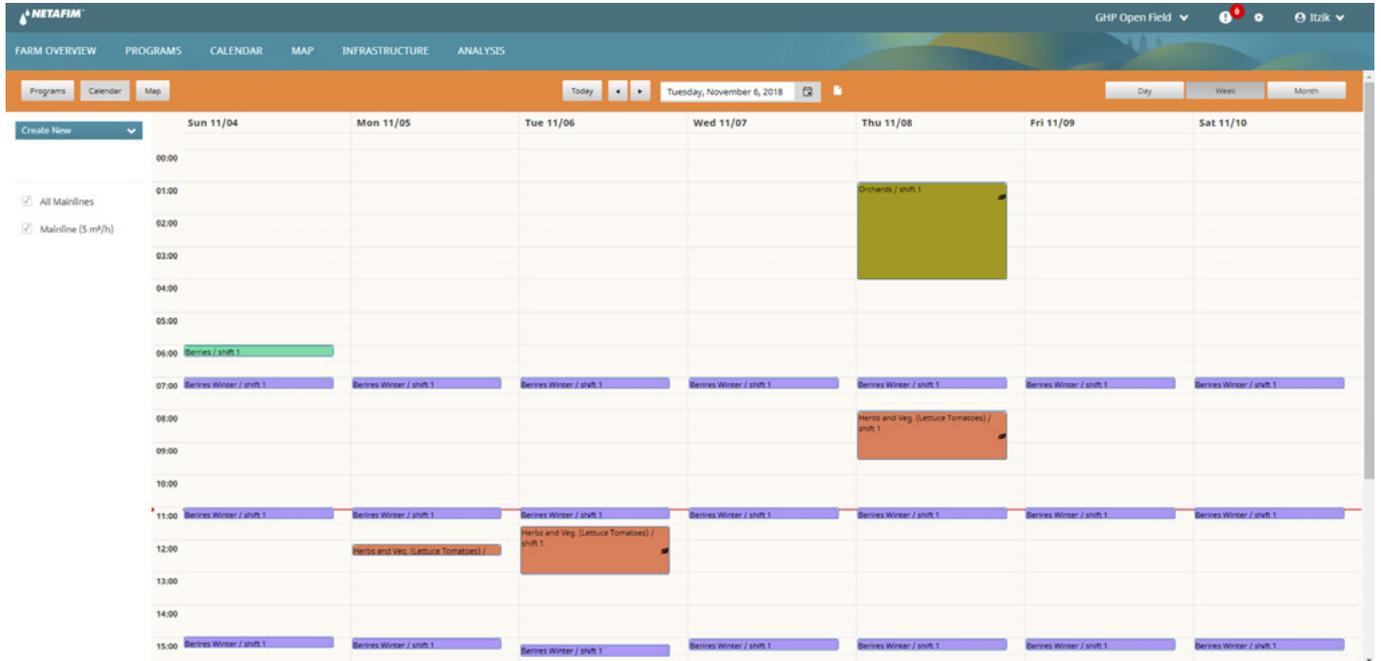


- To continue paused irrigation click

# 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

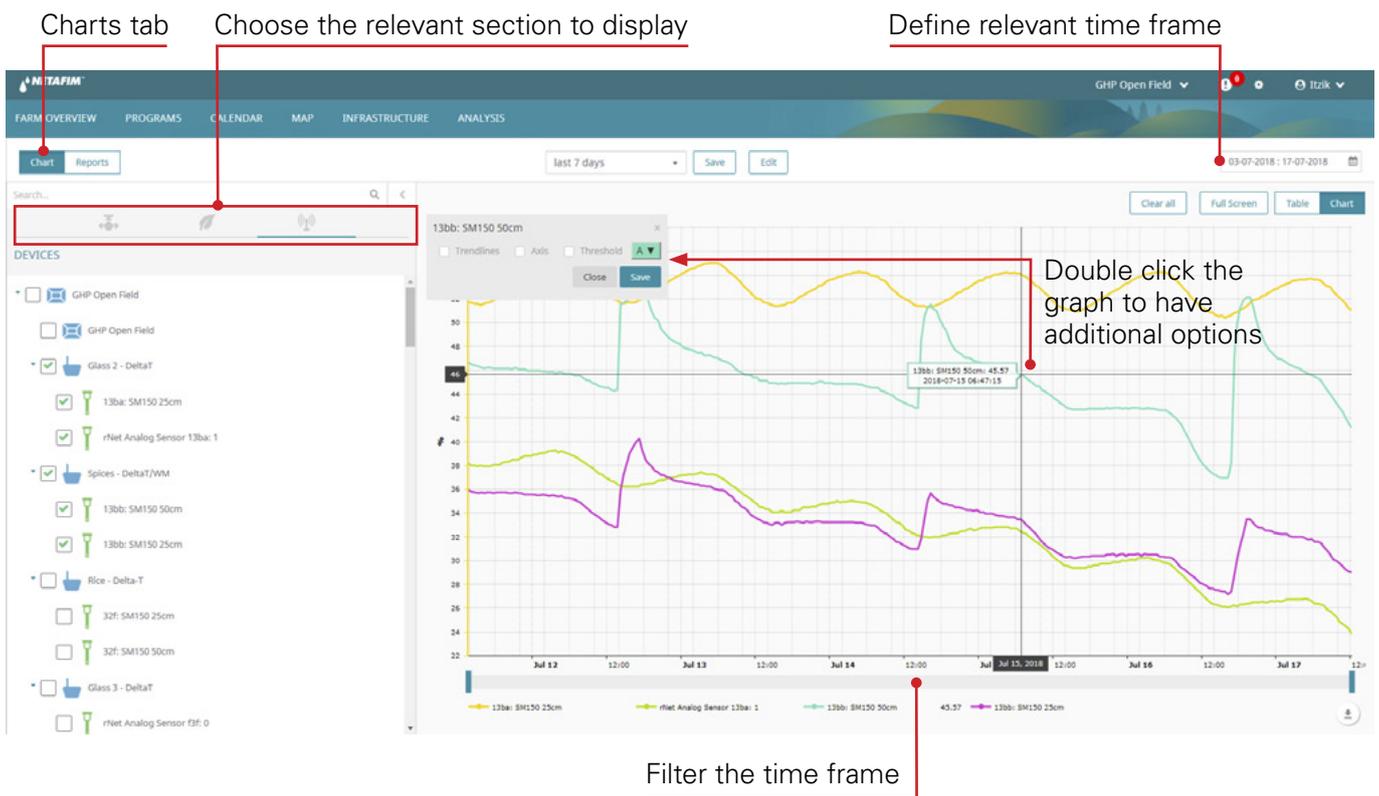
### Analysis Section



# 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.



# OPERATION

## 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

Parameters      Analysis Section      Generate Report

date	time	program	valve	Water Actual	Water Expected	Duration Actual	Duration Expected	Flow Actual	Flow Expected	Completed Successfully	Channel Dosing Channel 1	
											Expected	Actual
2018-11-06	07:00:21	Berries Winter	Valve 11- Berries	0.191 m³	0.15 m³	00:23:11	00:11:11	0.4943 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-06	11:00:21	Berries Winter	Valve 11- Berries	0.196 m³	0.15 m³	00:11:20	00:11:20	1.0376 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-05	07:00:20	Berries Winter	Main Valve	0 m³	0.15 m³	04:23:10	00:22:29	0 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-05	11:00:22	Berries Winter	Valve 11- Berries	0 m³	0.15 m³	00:22:28	00:22:30	0 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-05	12:08:15	Herbs and Veg. (Lettuce Tomatoes)	Valve 7 - Lettuce	0.172 m³	0.4957 m³	00:14:19	00:13:58	0.7208 m³/h	2.128 m³/h	false	1.25 L	0 L
2018-11-05	15:00:22	Berries Winter	Valve 11- Berries	0.193 m³	0.15 m³	00:10:26	00:10:26	1.1099 m³/h	0.4 m³/h	true	0.25 L	0 L
2018-11-05	15:57:20	Sugar cane	Main Valve	2.767 m³	2.0001 m³	04:00:41	04:00:01	0.6898 m³/h	0.5 m³/h	true	7 L	0 L
2018-11-05	20:00:20	Rice	Rice	0.91 m³	0.4001 m³	00:44:51	02:00:01	1.2174 m³/h	0.2 m³/h	false	1.25 L	0 L
2018-11-04	06:00:21	Berries	Main Valve	0.205 m³	0.2 m³	00:30:40	00:11:52	0.4011 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-04	07:00:21	Berries Winter	Main Valve	0.204 m³	0.15 m³	04:23:11	00:11:58	0.0465 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-04	11:00:21	Berries Winter	Valve 11- Berries	0.147 m³	0.15 m³	00:11:10	00:11:10	0.7899 m³/h	0.4 m³/h	false	0.25 L	0 L
2018-11-04	14:59:35	Berries Winter	Valve 11- Berries	0.196 m³	0.15 m³	00:11:18	00:11:19	1.0407 m³/h	0.4 m³/h	true	0.25 L	0 L

## 7. Alerts

- Alerts are sent in Real Time to mobile/e-mail/tablets etc.
- The alerts appear in:

- Upper navigation bar
- Farm overview screen

GHP Open Field      0      Itzik

✕0  
TECHNICAL ALERTS

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

# OPERATION

## 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.



### Add User

Add a user to your farm, by entering his email address and assigning him a role.

Email Address

Role

Viewer  
Irrigation manager  
Account manager  
Agronomist  
Technician

Cancel Add User

# 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 (1/4") 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 (1/4") 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.

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

## 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

# 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

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