Agriculture

galcon

GSI PRO

Comprehensive Operation and Maintenance Manual

TOTAL CONTROL

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A. Introduction & General

This document is a Comprehensive Operation and Maintenance manual for Galcon's GSI PRO Cloud System.

The GSI PRO Controller is a total irrigation and fertigation controller, that provides unique control capabilities from anywhere at any time with precision and simplicity.

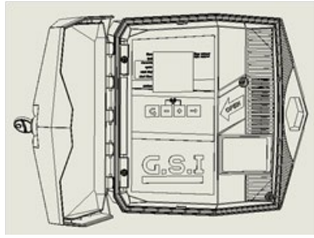
The GSI PRO controller is available in the following:

- GSI-PRO AC – 24VAC 50/60Hz
- GSI-PRO DC – Lithium batteries
- GSI-PRO DC – Solar panel with rechargeable batteries

The GSI PRO Cloud is a cloud based, bi-directional central control system, that allows its operators to remotely command and control theirs GSI PRO controllers.

The GSI PRO users may operate and monitor the system via the following interfaces:

- User friendly cloud-based web site (https://gsi.galcon-smart.com) that can be accessed from a PC, Tablet, or Smart-phone's web browser.
- Cellular Application – (Galcon GSI (2020)) that can be acquired and installed from the Android and Apple Apps Stores.
- Local LCD panel and keyboard, located behind the external door of the GSI PRO controller is used only for basic operations and information (see the following Figure). A sticker on the inner side of the door explains the operation procedures of the panel and explanation on the local faults-log. We recommend to use the local panel for emergency or for non-regular operations only.
- The controller can operate as a "standalone unit" without Internet connection.



This manual describes the GSI PRO Cloud site screens, and provides the users with detailed configuration, operation, monitoring, and maintenance instructions.

The figure on the next page depicts the GSI PRO system layout:

GSI PRO

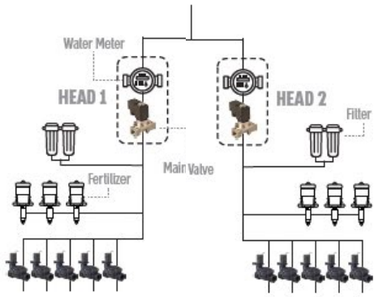
Irrigation & Fertigation Management

Total Irrigation and Fertigation Control
Unique control capabilities from anywhere and at anytime with precision and simplicity.

Agriculture Greenhouse

Control of 2 Irrigation Heads

Full control of 2 irrigation heads including water meters, fertigation, filters flush at each head.



Cloud Based

Unit or project monitoring and controlling.
From anywhere, any time with app or on PC desktop

24 Start Times per Irrigation Program

Operating up to 24 valves + 1 master valve.
DC Latch or 24 VAC

Filters Flushing

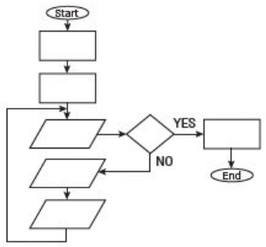
Dedicated control module for automatic filter arrays control.

Analog Inputs for Sensors

Up to 5 analog inputs 4-20 mA or 0-10 VDC.
For any sensor such as pressure, temperature, tensiometers, etc.
3 free inputs for choosing between Analog or Digital.

8 Fertigation Programs with EC & pH Control

Full control over Galcon Fertijet fertigation machine.
3 fertilizers channels + 1 acid channel with complete EC/pH close loop control.
Or up to 3 local fertilizers for each irrigation head.



Conditional Input Table for Easy Setup

Advanced options for integrating logical conditions into irrigation programs.

TOTAL CONTROL

The major components of the GSI PRO Cloud system are:

- The GSI PRO Controller – the heart of the system, executes all the irrigations.
- Local I/Os – local Inputs and outputs of the GSI PRO controller.
- Remote Units Control - A RF one-way remote extension of the Controller's I/Os.
- Cloud based smart sensors – remote sensors that transmit data to the system.
- Smart fertigation – Fertilizer's dosing machines, controlled by the GSI PRO Controller.
- Filtration systems – controlled by the GSI PRO Controller.
- Communication systems – various communication systems that connect the GSI PRO Controller to its RTUs, the Smart sensors, and to the GSI PRO Cloud servers (see the following paragraph).
- The GSI PRO Web Site – Cloud servers at the highest hierarchy of the system that enables the user to command and control the whole system from PC computers, Tablets, and mobile phones.
- Control of two irrigation heads, as depicted in the previous page.
- Logic conditions system, as depicted in the previous page.

The GSI PRO uses the following communication methods:

- Cellular communication – based on a Data SIM card installed inside the controller and enables communication trough 3G and 4G modem to the GSI PRO Cloud.
- LAN communication to a local internet router via a RJ-45 Port.

B. Safety First

Without derogating from and in addition to the terms of the LIMITED WARRANTY AND TERMS OF SERVICE of GALCON, that fully control the use of GALCON's products (including the GSI PRO system/products), the following safety instructions shall apply on the use of GALCON's GSI PRO system/products.

General Safety Instructions:

Prior to installation, operation, maintenance, or any other type of action carried out on the GSI PRO system, read the safety, installation and operation instructions carefully.

- Installation, operation or maintenance of the GSI PRO system should be done only by qualified workers, technicians, electricians, and/or contractors using only good engineering practices, complying with and observing all conventional safety instructions in order to minimize risk and/or danger and/or hazard to workers, the public or to property in the vicinity in accordance with all relevant local standards.
- GSI PRO products operate in larger agricultural systems; it is essential for system designers, installers and operators to comply with all the relevant safety instructions and standards.
- Use the system only for its intended purpose as designed by GALCON Kfar Blum, Israel 1215000, any misuse of the system may lead to undesired damage and may affect your warranty coverage. Please consult with GALCON prior to any other use of this equipment.
- No change or modification to the equipment is permitted without a written notification provided in advance by the manufacturer or by its representative, on the manufacturer's behalf.
- Use only appropriate standard tools and equipment operated by qualified operators when installing, operating and maintaining the GSI PRO system.

Safety in Shipping and Handling:

- Shipping and transporting the GSI PRO system components must be done in a safe and stable manner and in accordance with the relevant standards and regulations.
- For shipping, lifting and installing the GSI PRO system components, use only approved lifting equipment operated by authorized employees and contractors.
- Storage should be in the original delivery crates, cases or packages. Storage prior to the system installation should be off the ground in a clean, dry, indoor area.
- Prior to the installation verify visually that the system components were not damaged during shipment to the installation site.
- Do not leave equipment lifted when not necessary. Avoid working below lifted equipment.
- Safety During Installation:
- Install the GSI PRO system according to the detailed Installation Instructions provided with it by GALCON and according to the description shown in this manual.
- At all installation sites, make sure users have good visibility, good clearance for easy access, and verify that the work and auxiliary equipment used are in accordance with the relevant local authorized standards.
- Electric wiring should be performed by an authorized electrician only, using only standard and approved components.
- Install a Main Power Cut-off Switch close to the GSI PRO panel.
- Installation of the system should be performed so as to avoid direct water splashing on the electrical and the electronic components and panels.
- Safety during Commissioning and Operation:
- Read the operation instructions carefully prior to any attempt at operating the GSI PRO system.
- In order to achieve maximum performance and smooth operation of the system, it is crucial to perform the startup and first operation procedures exactly as described in this manual.
- In cases where a formal commissioning procedure is required, it should be done by an authorized Galcon technician or authorized specialist prior to operating the system for the first time.
- Never use the system for anything other than its original intended purpose.

Safety During Maintenance:

- Servicing the GSI PRO system should be done only by people qualified for this type of work.
- Disconnect the system from power supply before performing any maintenance or a non-regular operation action.
- Avoid splashing and water leaking so as to minimize slipping, electrifying or damage to people and the equipment, caused by moisture.
- Before returning to regular operation follow the First-time Start-up Operation instructions as detailed in your user manual.

C. The Control Philosophy

This chapter is brought here for broadening the user's knowledge on the control philosophy behind the GSI PRO System, it describes the major logical components of the system together with each component's role and relations with the other components of the system.

In the physical dimension, the GSI PRO System consists of: Micro-processors, PCS cards, (I/Os), Communication Cards, Power supply, and other such elements; please refer to the installation documentation provided by Galcon for further information on these physical components.

The following list describes the GSI PRO software components and their assigned tasks:

Please note that the system's components are organized in a hierarchal order, e.g., a User may have several Projects and a Project may have several Controllers.

User:

This is the software entity that represents the human being who controls the system. The system recognizes several types of users, where each one of them has different authorization for performing tasks within the system. Typical

users may be: Project Viewer User, Project User, Project Admin, Multi Projects Admin, Production Manager, Payment.

Project:

A project is a software entity that groups together several controllers, that may also refer to different types of GSI controllers.

Unit:

This is the software entity that represents a specific GSI PRO controller which is installed within a project. The Unit's software entity controls the operation of the GSI PRO controller.

The Control Elements:

Irrigation

The Irrigation Control section of the GSI PRO controller includes the following hardware/software entities:

- Valve - This software entity represents a real-world physical valve, which its operation is controlled by the GSI PRO system. The valve's software includes the parameters required for the system to operate the valve, e.g., the water meter used for measuring the water used by the valve, the flow rate of the valve, the irrigated area by this valve, the crop, and other such parameters.
- Co-valve – A valve can be also defined as a Co-valve, to be used as a secondary entity of an irrigation valve that is opened and closed together with its designated Irrigation Valve.
- Irrigation Head – This is the real-world physical single pipeline, that is used to irrigate and fertigate specific valves. The Irrigation Head Software entity of the GSI PRO controls the system's water and fertilizer supply, by taking into account the structure of the system, in order to avoid fertigation malfunctions. The irrigation head's software includes the parameters required for the system to operate the physical components of the irrigation head and it is responsible for the opening and closing order of the irrigation valves.
- Master Valve - This software entity controls a main valve, which is installed in the entry point of an irrigation head and controls the flow of water into it.
- Water meter - This software entity reads the real-world water meters and provides these readings to other components of the system (such as Valves), the system also records the flow-rate of the water meters and present the reading for further analysis and chart drawing.
- Irrigation Programs and methods - The Irrigation programs are the core of the GSI PRO System operation. Each irrigation head can operate up to 8 irrigation programs where each irrigation program can control a sequence of up to 24 irrigation valves, that are opened one after the other. The irrigation program controls the operation schedule, the water amount to be irrigated, and the fertilization operation of its valves:
  The Scheduling of the program includes parameters such as timing methods, start time, interval days, irrigation by the days of a week, number of cycles per day and end time. The scheduling section includes also parameters that control the conditions for scheduling the next irrigation cycles. As described in the Fertigation section, the fertilizing section of the irrigation program enables the user to select the fertilization method for the program (by local fertilizer pump or via a fertilizer center), the amount of fertilizer, water before, and after and other such parameters.

Fertigation

- Fertilizer pump - This software entity controls a real-world fertilizer injector (digital or analog) that is assigned to a specific Fertilizer Center and operates under it.
- Fertilizer Center - Fertilizer center is the software entity that controls up to 4 fertilizer injectors grouped together to apply a unique combination of fertilizers to a specific irrigation head. The system can control up to 2 fertilizer centers, one per each irrigation head. For each fertilizer center and participating pumps, the user can define all the operation parameters and restrictions required for the operating the fertigation of the irrigation programs. Fertilizer centers may be operated according to several fertigation methods including operation according to the required levels of EC and pH sensors readings. The fertilizer center applies fertilizers to fert programs. The user can define the parameters required for assigning and configuring the fertilizers injection to be used by that irrigation program. This includes parameters such as the number of the physical fertilizer pump, the fertilizer units, amount, water before and water after.
- Fert Programs – The operation of the fertilizer centers and fertilizer pumps is caried out by the fert programs. Each irrigation head has up to 10 available fertigation programs. For each fertigation program the user defines the required fertigation method, the number of pumps, the quantity (volume or time), the EC and pH levels, and all the other required parameters for the fert program to operate. For the Fert programs to operate they need to be assigned to irrigation programs.

Filtration

- Filtration system - This software entity controls the real-world filtration system that filters the raw water of the irrigation system. Under the filtration system central software, the user can define the numbers of filters participating in the filtration program, and the back-flushing parameters of the program, e.g., timings, delays, D.P switch, fault statuses, etc. The GSI PRO system controls filter units where each such unit can be assigned to a specific irrigation head. The operation of the filtration system is done via the Flushing Programs.
- Flushing Programs – the operation of the filters is controlled by the Flushing Programs that are assigned to the irrigation heads. The user defines the required operation parameters of the flushing programs, parameters such as the flushing time, the delay between filters, the number of filter valves, and all the other parameters required for the Flushing programs to operate.

General Elements

The GSI PRO Controller includes the following general hardware/software entities:

- Sensors - These are the software elements that read real world physical sensors and control system actions accordingly. This may include Meteorology sensors, such as Temperature, Humidity, Radiation, Wind speed, Wind Direction, and Rain meter, that affect the irrigation operation according to conditions set in the system. The system also logs the readings of the sensors for further analysis and charts drawing.
- Logical Conditions - These features of the GSI PRO system enables the user to set "What If" conditions to the system. Each such condition can monitor a specific parameter, at one of the system controllers, that once it changes to a predefined logic or numeric value, the system performs a predefined action in one of its controllers or issues a predefined message to the users.
- Condition Inputs - These are system inputs that can be defined to perform special tasks once they are activated, tasks such as pausing an irrigation program, ending a running program, sending an alarm message, opening an output, and any other such tasks. Some of the condition inputs are defined as water, or fert meters. For AC unit the maximal number is 7 inputs, while for DC unit the maximal number of inputs is 5. The names of the condition inputs are: CS, FS, WS, RS, D1, D2, D3, however they are not significant for the actual type of device connected to the inputs.
- Auxiliary Outputs - These outputs can be assigned to auxiliary components such as: lighting, doors, fans, etc. According to the settings, these outputs may be opened and closed on specific timings.
- Alarms - The GSI PRO system includes alarms generating feature. The system has special Alarm interface that is operated according to a user setting. In general, the settings define what to monitor, when to monitor, and to whom the system sends a push notification or an e-mail message.

D. The Hardware – Controller

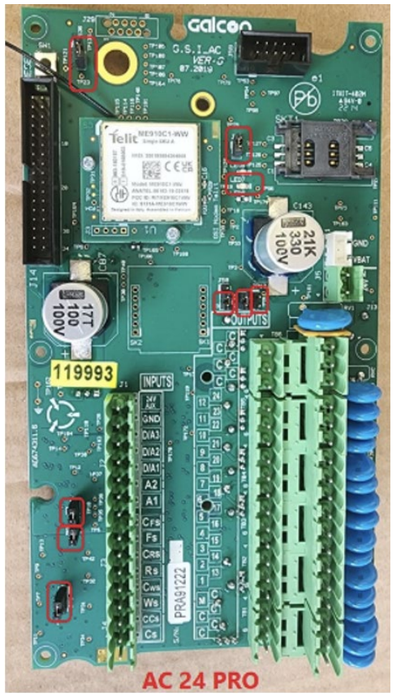
GSI PRO controllers are well known, and well established, in the world-wide agricultural and horticulture industries. GSI PRO is the latest addition of Galcon's central control and command system.

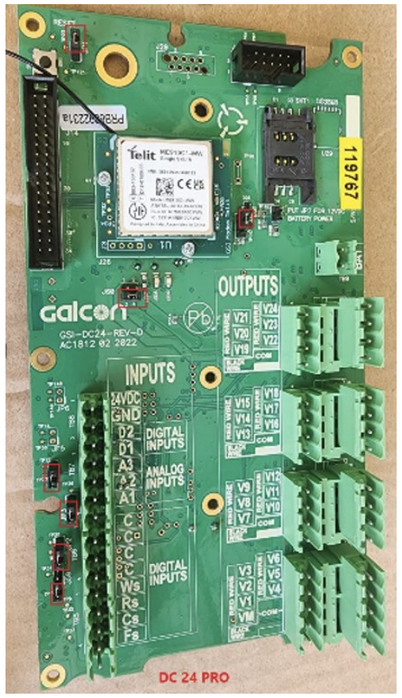
The features are:

- User friendly Cloud based web site, and local keyboard & display for basic operations.
- SIM based Cellular Modem or LAN.
- Analog sensors that collect and displays filed data.
- Up to, 24 Outputs (+ Master) and 7 Condition Inputs, including a single high speed water meter.

The PCB LEDs:

The PCBs of the AC and the DC GSI PRO Units have 2 red color LEDs.





LED #7

- When power is first applied to the GSI PRO unit, LED #7 rapidly blinks for about 10 seconds and stops when the unit's control software is successfully initiated and the LCD screen lit.
- During the software update process LED #7 blinks slowly (5 seconds ON and 5 seconds OFF).
- During regular operation of the GSI PRO unit LED #7 constantly lit.
  LED #8 is reserved for Galcon technicians.
- Connectors and Jumpers:
- At the upper side of the PCBs pictures above, there are special connector sockets, using a special cable and adaptor, that connects the unit to a PC computer, Galcon's technicians can configure specific features of the unit.
- The jumpers on the PCB are used for configuring specific features of the unit. The following list depicts the default settings of the jumpers.
- The controller's PCB has 8 jumper sockets on it; the following 7 jumpers should be kept connected as the default setting of the PCB:
  - JP1
  - JP2
  - JP3
  - JP6
  - JP9
  - JP11
  - JP58

Analog Inputs in GSI Controllers

GSI DC - New hardware, only in the Pro version

A1 - Fixed analog. Can be changed via a jumper between 0-10V and 4-20mA (bridged jumper 4-20) (non-bridged jumper 0-10)

A2 - Fixed analog. Can be changed via a jumper between 0-10V and 4-20mA (bridged jumper 4-20) (non-bridged jumper 0-10)

A3 - Fixed analog. Can be changed via a jumper between 0-10V and 4-20mA (bridged jumper 4-20) (non-bridged jumper 0-10)

It is possible to jointly operate up to two 4-20mA type sensors directly from the controller (if three sensors are required, then external voltage must be supplied to the third one).

- Three 0-10V sensors can be read by the GSI. Power to the sensors need to be external.

DA/1 - Digital only

DA/2 - Digital only

GSI AC - New hardware, only in the Pro version

A1 - Fixed analog. Can be changed via a jumper between 0-10V and 4-20mA (bridged jumper 4-20) (non-bridged jumper 0-10)

A2 - Fixed analog. Can be changed via a jumper between 0-10V and 4-20mA (bridged jumper 4-20) (non-bridged jumper 0-10)

DA/1 - You can choose in the software either analog or digital. Defined together with DA/2, DA/3

DA/2 - You can choose in the software either analog or digital. Defined together with DA/1, DA/3

DA/3 - You can choose in the software either analog or digital. Defined together with DA/2, DA/1

- The operating type selection is for all 3 options together. Cannot be separated (DA/1 – DA/2 – DA/3)
- All three sensors type must be 0-10V

E. The GSI PRO Center

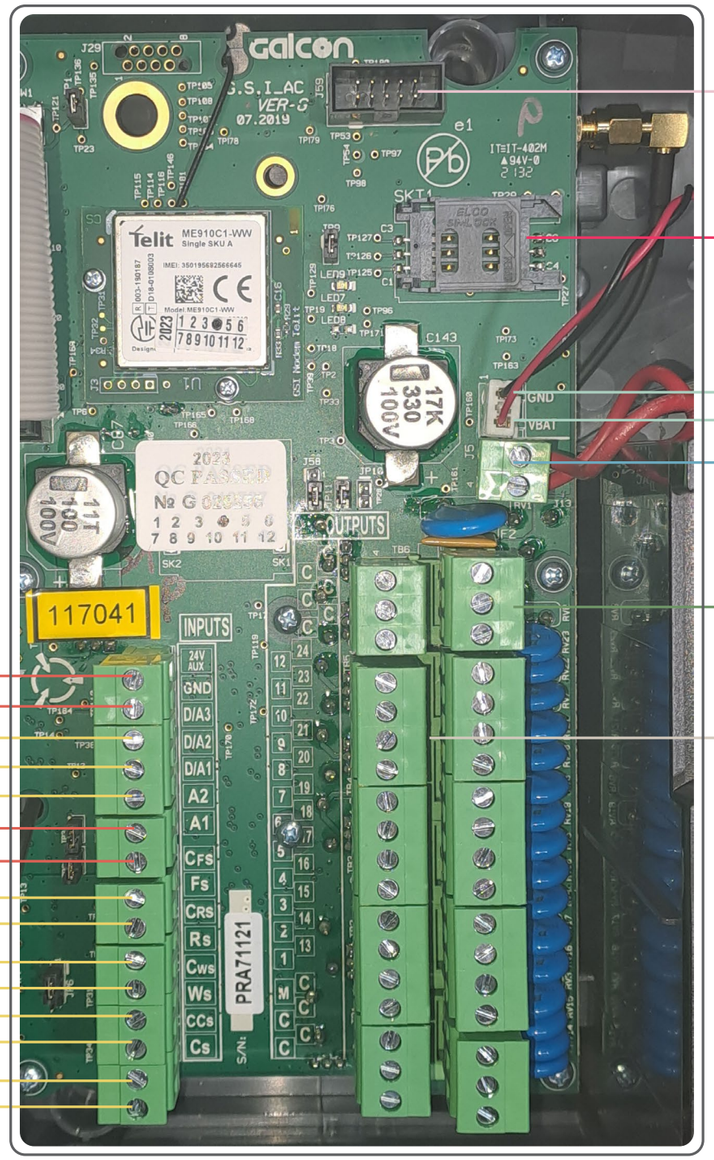
E.1. Accessing the GSI PRO Center:

Using your web browser please navigate to the following URL:

https://gsi.galcon-smart.com/#/login

The following screen appears:

GSI PRO AC- General Input/output connection schema



Serial Port

SIM CARD slot

To the backup battery housing

Prewired to internal transformer 220vac in / 24vac out

C is COMMON it closes circuit for any 24vac output

M-24
ALL REMAINING OUTPUT FOR FILTRATION IRRIGATION VALVES OR AUXILIARY OUTPUT

4-20 mA or 0-10V
Sensor **GND** close circuit
24 VDC aux
in case of passive sensor

Digital or Analog inputs

A1 Analog input
A2 Analog input

Cfs - Fs
Acid counter

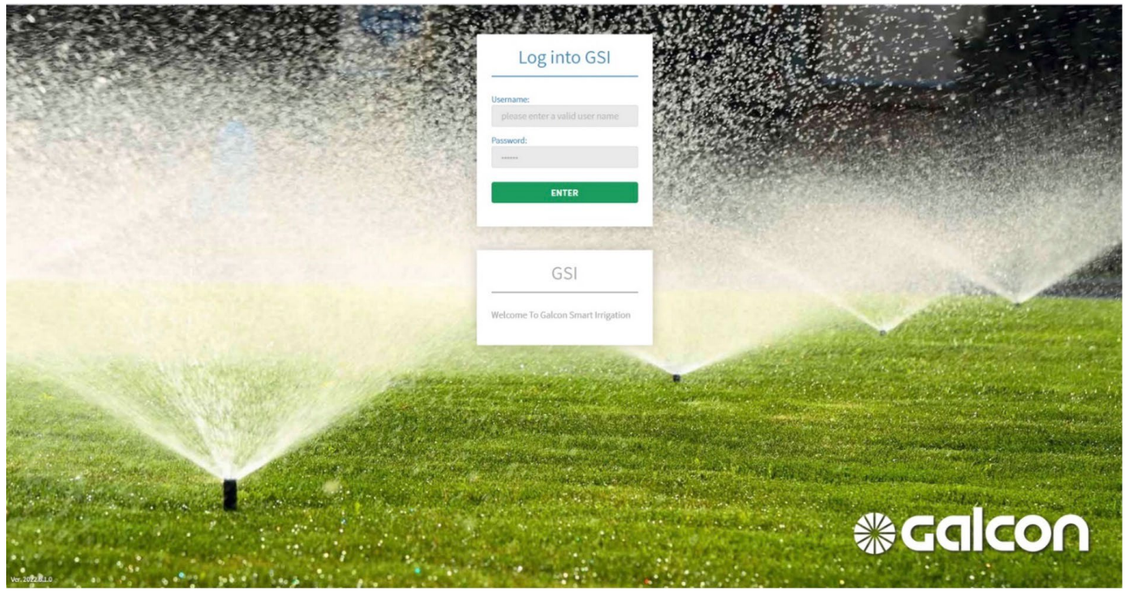
Crs - Rs
General stop

Cws - Ws Water
Counter mainline

Ccs - Cs Water
Condition input

Legenda

- 4-20 mAor 0-10V analog sensor active or passive 2 or 3 wires
  Input D/A1-D/A2-D/A3 if not in use as digital can be converted to analog at your convinience
- Digital dry contact sensor or counter
- Output 24VAC 50Hz max 500mA on inrush
- All C contacts are interconnected they close circuit for every 24Vac-50Hz output
- Internal transformer to 220 vac-50Hz **UPS Recommended**
- 4 cells 1.5Vdc type AA
- Standard SIM CARD PIN unlocked
- For APN settings connect special cable and download the tool **cityconfig** from galconag.com



For logging to GSI PRO Center, a user name and a password is required; Please obtain your user-name and password from your Galcon dealer.

All users must be authorized by Galcon's marketing department.

Accessing screens, configuring the system's components, and operating the system, depend on the authorization level of the user; Galcon can grant its end-users customers the following users' levels types:

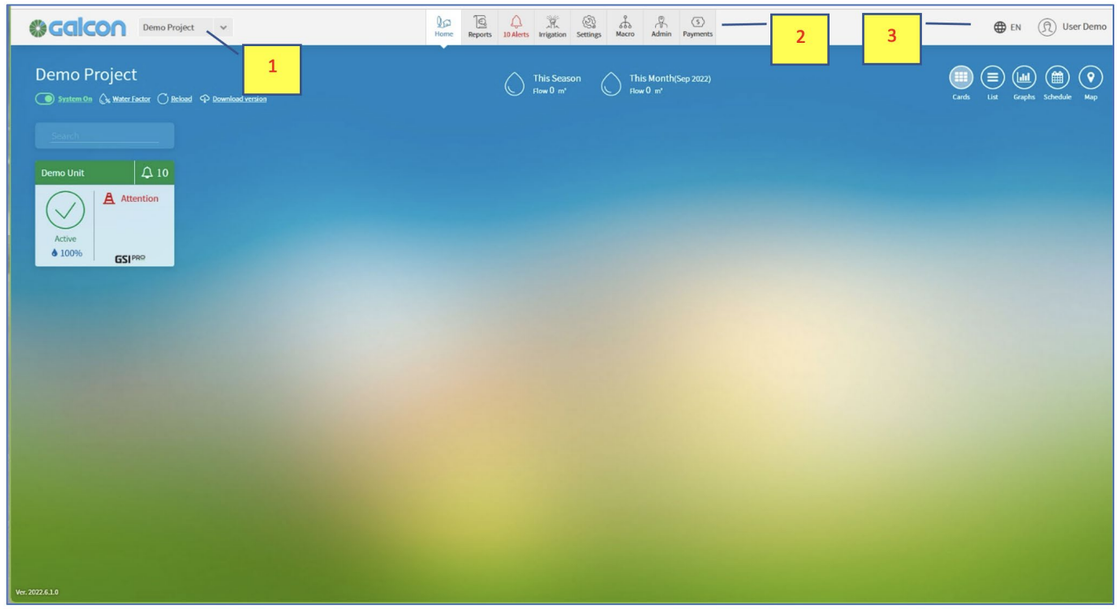
- Payment – An administrative account – can only pay for purchased controllers.
- Project viewer user – Can only see the project's screens but cannot change anything.
- Project user – This is the most common role; this user can see and change most of the parameters on the project's screens.
- Project Admin – This user can see and change all the parameters on the project's screens.
- Multi Project Admin – This user can see and change all the parameters on all his designated projects screens.

Since using the GSI PRO system requires an appropriate license, it is important to understand the following notes:

- Upon the first entry to the GSI PRO system, all new users are requested to read and accept the "Terms of Usage" document, which is displayed on the first GSI PRO 's system screen. Please Read this document and accept it by clicking on the appropriate button at its end.
- The user can log-in to the GSI PRO system from his GSI PRO Smart phone or Tablet application, while he is already logged-in from his PC computer.

E.2. The GSI PRO Center User Interface Description:

Once the user's name and password are confirmed by the system and the user enters the system, the following screen appears:



Note: For the following description please see the numbers on the picture above.

This screen is the system's home screen; it provides the user with the most important monitoring features of the system so upon entry the current status of the whole system can be seen.

Upon entry to the system the screen displays a small window (a Card) per each GSI unit of the projects that the current user has an access to; the card displays the current status of the unit and it is used as the entry point to the unit's specific program, status, and monitoring screens.

The very top line of the screen:

This permanent line appears on all the system's screens, it allows the user to navigate between the major sections of the system.

At the left side of this line (1), a selection box displays the name of the current project and allows the user to:

- Navigate directly to a specific project as listed in the box's dropdown list.

In the middle of the very top line on the project's level, 6 main tabs appear (2):

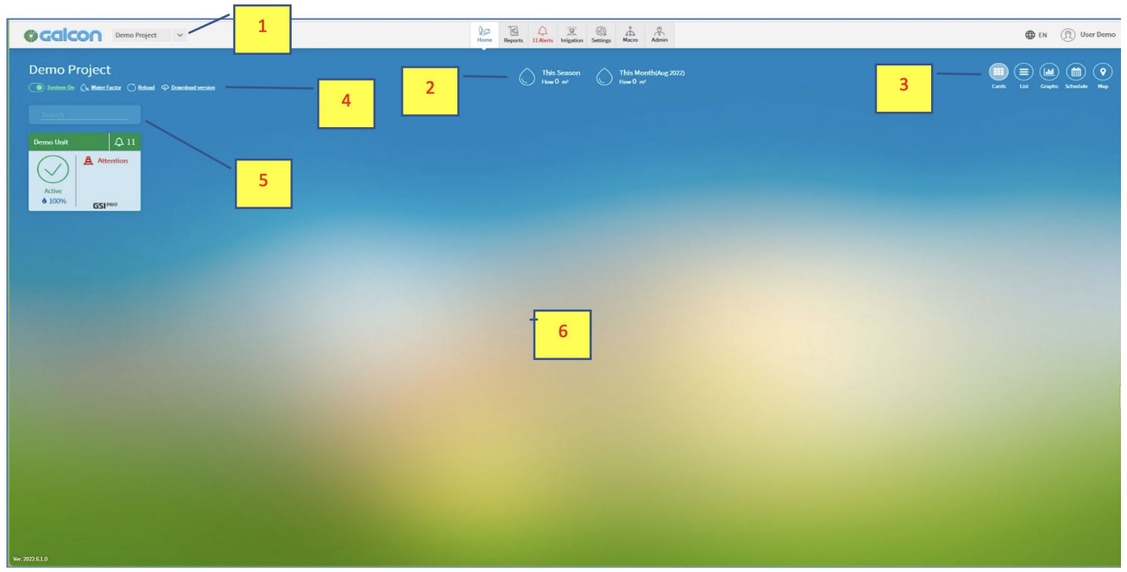
- Home – this is the home screen that appears upon entry to the system, and whenever selected by the user.
- Reports – the entry point to the system's reports section.
- Alerts – the entry point to the system's last alerts and alerts history section screens. Displays the total number of the "not yet acknowledged" alerts logged at the current project.
- Irrigation – the entry point to the whole system's current and historical irrigation status.
- Macro - the entry point to the system's macro screens that summarize in single screens the status and action of the system's Units, Programs, and Valves.
- Payment – the entry point to the current system users' payment status and for payments execution.

At the right side of the screen (3) the language selection icon, the name of the logged-in user, and the system messages icon appear.

- The user may select the required user interface language from the drop-down list and the language changes on the fly.
- Clicking of the user's mane enables the user to logout of the system or to access his profile details screen.

The home tab of the GSI screen:

Upon entry to the system or whenever the home tab is selected from any GSI's screen, the following screen appears:



Note: For the following description please see the numbers on the picture above.

This screen is the home screen of the system; it displays the current status of the project and is used as the entry point to the screens of each specific unit within the project.

The top most line of this screen displays the following:

At the upper left corner, the project mane appears (1).

In the middle of the upper line (2), the system displays the Season's and the current Month's water accumulation of the whole project.

At the upper right corner of the screen (3) five round icons serve as the entry points to the following home screen tabs:

- Cards – press this icon to display the home screen with all the unit's cards of the current project (see the picture above).
- List – press this icon to display the home screen with a detailed table that lists the units of this project with their detailed status parameters.
- Graphs – press this icon to display the home screen with various data summary of the project in predefined graph charts.
- Schedule – press this icon to display the home screen with a Gantt Chart of the project's irrigation schedule.
- Map – press this icon to display the project's units on a map within the home screen.

At the left upper corner of the screen, under the project's name, the system displays the following operation options (4):

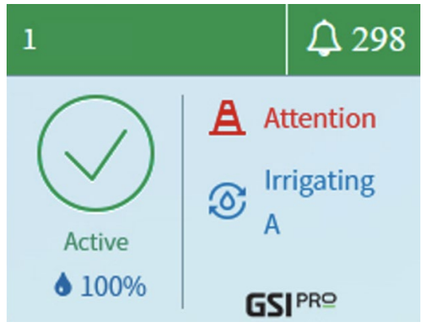
- Main system operation status – System On, or System Off of all the unites in the project.
- Water Factor – an option to change the planed water amount of a specific unit or of all the units of the project, by a percentage factor (useful for seasonal or temporary change in weather conditions).
- Reload – press this icon to reload the screen.
- When applicable, the Download New Version icon appears to the right of the Reload icon, so the user can update the system to its newest version.

At the upper left corner of the screen, below the operation icons a search box appears (5); using this box the user can search for a specific unit within the project.

In the middle section of the screen (6) the system displays the cards of the various units of the project.

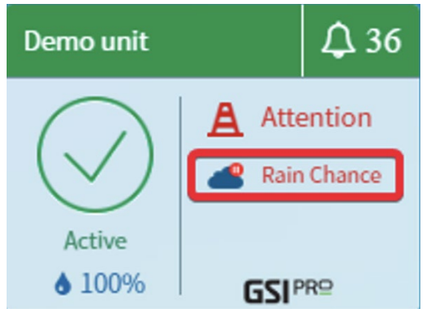
The cards of the home screen:

When the cards tab of the home screen is displayed the system display a card for each unit of the project:

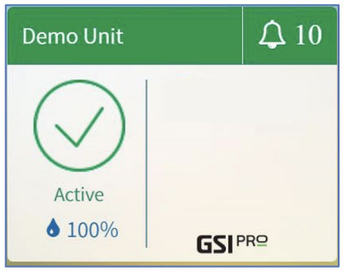


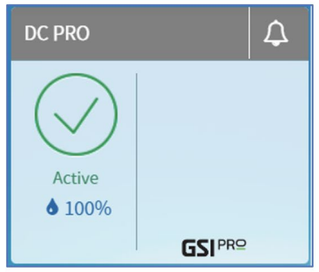
The card shows the following parameters:

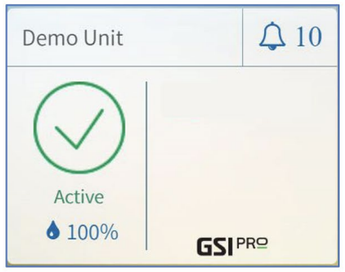
- The name of the unit (at the upper left corner of the card).
- The number of unread alert messages (on the upper right corner of the card).
- The current status of the unit (in an Icon and text) – at the left side of the card: Active, Not Active,
- The current water factor of the unit (as a percentage at the lower left side of the card).
- The Attention status (if exists) on the (upper right side of the card).
- The currently irrigating / fertilizing head and its corresponding icon (at the right side of the card).
- The type of the GSI unit (at the lower right side of the card).
- Rain Icon – The irrigation is paused due to a signal received from the rain sensor.
- Rain Chance – The unit is paused due to the percentage of rain chance, that is received from the weather station; the user can set the percentage level that above it the unit enters to pause due to the high possibility of rain.



The color of the card's headline depicts the communication status of the unit; Green – the unit is connected, Gray – the unit is disconnected, Transparent – the unit is set to offline mode (disconnected).

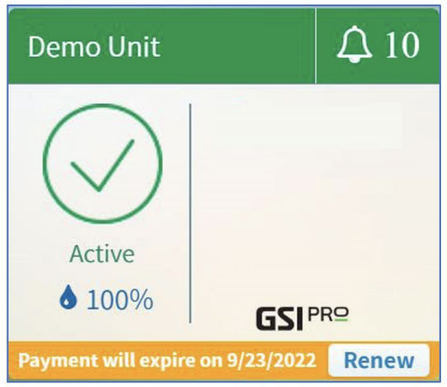


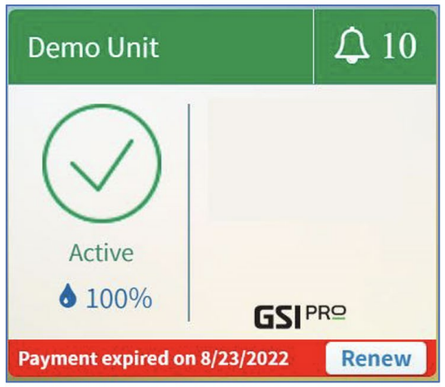




The unit's battery status is displayed on the card by a colored battery icon; Orange – the battery level is low, Red – the battery level is critical

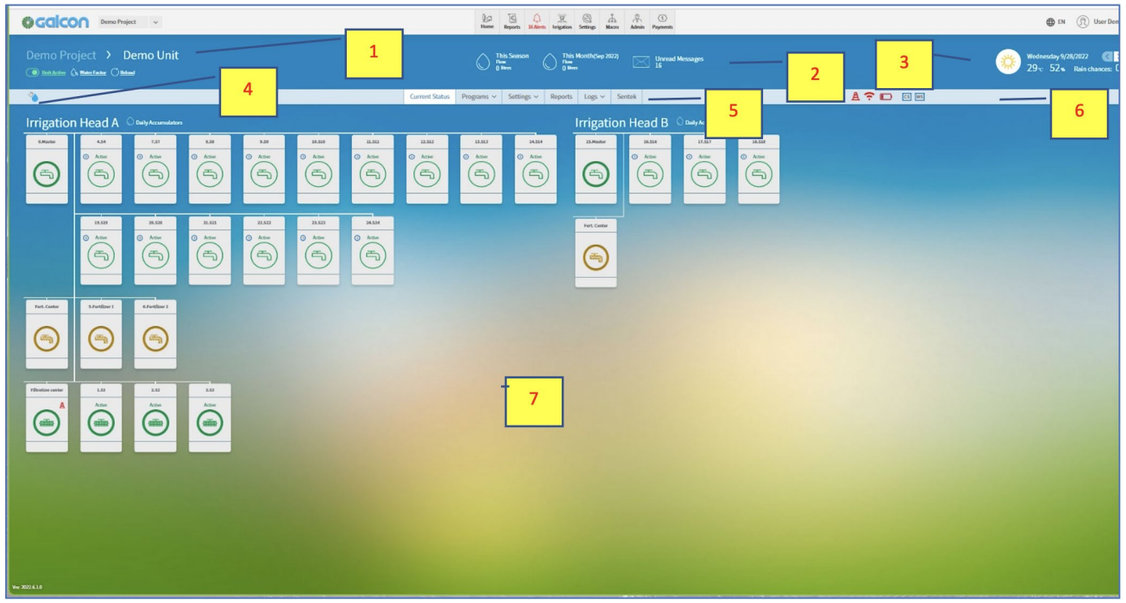
When the system usage license of the current user is about to expire, the lower line of the card displays a Payment Required message in orange color that depicts the expected expiration date and a Renew button. When the license is expired the message turns red.





Upon pressing on the unit's card, the system moves to the main screen of that unit:

The status screen of the GSI PRO unit:



Note: For the following description please see the numbers on the picture above.

This screen is the main screen of a GSI PRO unit within a project, the following is a description of the elements shown on this screen:

At the upper left corner of the screen (1) the system displays:

- The project's name followed by the current unit's name.
- Below the project's name the following operations icons appear:
  - The unit's operation status – Unit Active, or Unit Not Active
  - Water Factor – an option to change the planed water amount of the whole unit's irrigation valves by a percentage factor (useful for seasonal or temporary change in weather conditions).
  - Reload – press this icon to reload the screen.

In the middle of the upper line of the screen (2) the system displays:

- The Season's and the current Month's water accumulation of the Unit; note that the engineering unit of the accumulation (m^3, liters, etc.) is as defined in the system configuration screens.
- The Number of the unread messages.

In the right side of the upper line (3) the system displays the weather forecast: a weather icon, time and date together with an option to switch to the coming days forecast, temperature, humidity, and rain chance percentage.

The line below the top line of the screen displays the following elements:

- At the left side of this line the system depicts the next irrigation details icon (4). Moving the cursor over this icon displays the next irrigation time for the two irrigation heads.
- In the middle of this line the system displays the entry points to the five tabs of the unit's main screen (5):
  - The Current status tab – see the picture above.
  - The programs tab – a dropdown menu for entering the Irrigation Programs, Fert Programs, and Flushing Program screens of the current unit.
  - The Settings tab – a dropdown menu for entering the Unit Settings, Alert Settings, and the Valves Setting

screens of the current unit.

- o Reports – an entry point to the reports tab of this unit.
- o Logs – a dropdown menu for entering the Unit's Irrigation Logs, Alert Logs, General Loges, and Sensor Logs of this unit.
- o Sentek – an entry point to the Sentek Probe interface on the GSI PRO.

- At the right side of this line, the system displays several status icons (6). When moving the cursor above each one of these icons the system displays the icon's status in a floating text window. Among others this line includes icons such as:
  - o Attention Icon.
  - o Connection status icon.
  - o Battery level status.
  - o Sensor 1 … 5 Real-time readings.
  - o Sensor 2 readings.
  - o Logic conditions status.
  - o Real-time reading of up to 7 hardware inputs:
    - ■ Condition Sensor
    - ■ FS - Fertilizer Sensor
    - ■ WS – Water Sensor
    - ■ RS – Rain Sensor
    - ■ * AD1 – Analog / Digital free input
    - ■ * AD2 – Analog / Digital free input
    - ■ * AD3 – Analog / Digital free input

* For AC units - AC – AD1, 2, 3 can be analog or digital

* For DC units - DC – AD1 – only digital. AD2, 3 – only analog

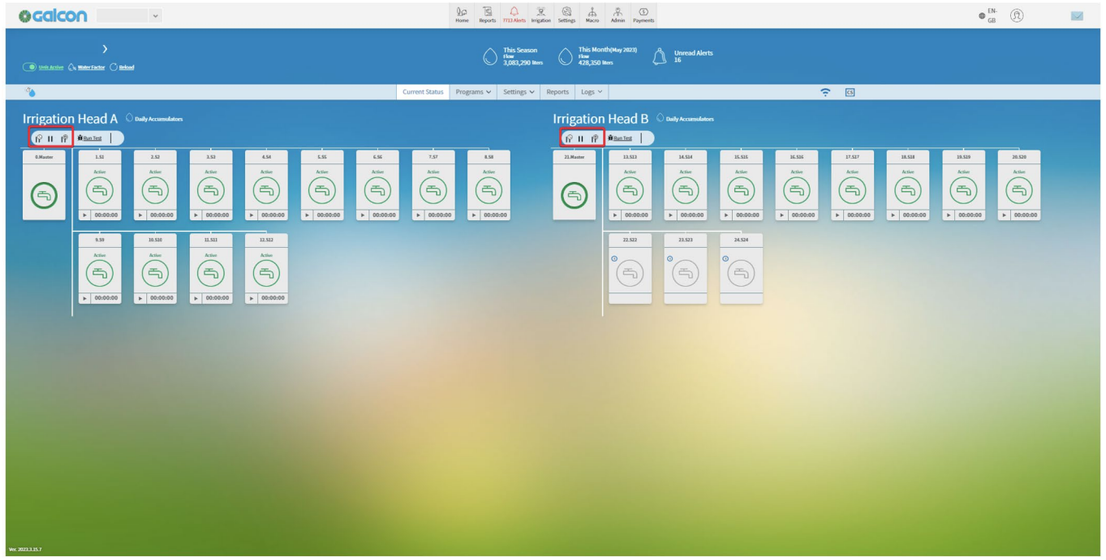
- In the middle area of the screen (7), the system displays the two irrigation heads of the unit. To the right of the irrigation head name, the system displays the daily water accumulation of this irrigation head. Pressing the Daily Accumulation icon opens a floating window with the daily water and fertilizer accumulation of this irrigation head.

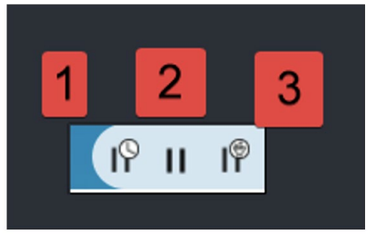
For each head, the system displays a layout of elements in small boxes; each element's box displays the status of a single physical element, e.g., Master Valve, Irrigation Valve, Fertilizer Center, Fertilizer Pump, Filter, etc.

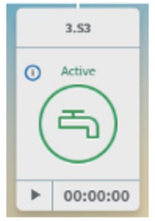
Each such element box can be divided to up to 3 sections:

- o In the middle of the box the status of the element is presented in text, color, and icon.
- o In the upper line of the box the mane of the element appears; clicking on the element name opens the element's setting screen.
- o The lower line of the box (mostly for valves) an option to manually start or stop this valve operation appears.

- Above the element-boxes layout drawing, the system displays action icons that allows the user to perform the following operations:
  - o Pause the irrigation head (by time or unlimited), to pause the fertigation, and to run valves test.
  - o 1 – Pause by time; the user can define how long the unit will be paused
  - o 2 – Pause – permanent pause! (Until the option is released).
  - o 3 – Fert pause - permanent pause! (Until the option is released).







F. The GSI PRO Unit – Quick Start

The following flow-chart displays the order of the actions needed to be performed for configuring and starting the operation of an irrigation program on a new GSI PRO unit.

Prior to setting an irrigation program, go to the main unit's status screen [Page 20] and verify the following:

- The unit is Active – check the status of the green switch at the upper left corner of the screen.
- The Unit is connected – Check the Blue Antea icon at the right side of the upper line of the status screen.
- The Water factor value is OK – Check the water factor icon at the left side of the upper line of the screen.
- The Power source is ok according to the unit's type (AC or DC) - Check the battery icon at the right side of the upper line of the screen.
- Check the Alarm icon at the right side of the upper line of the screen and make sure that no alarm prevents the irrigation program from starting.

Also verify that the Water and Fertilizer meters are physically connected.

For setting an Irrigation Program, please follow the order of the next steps:

1. Settings -> unit settings -> general -> General settings [Page 56].
2. Settings -> valve settings -> set irrigation head output [Page 74]
3. Settings -> unit settings -> irrigation settings -> water irrigation head [Page 61].

4. Settings -> unit settings -> irrigation settings -> water meter [Page 75].
5. Settings -> unit settings -> fertilization settings -> fert center [Page 76].
6. Settings -> unit settings -> fertilization settings -> fertilizer settings [Page 76].
7. Settings -> valve settings [Page 128].
8. Programs -> fert programs -> select a fert program and set it [Page 58].
9. Programs -> irrigation programs -> select a program and set it [Page 52].
10. Programs -> irrigation programs -> assign fert program [Page 59].
11. Current status -> Visually make sure the system is designed correctly [Page 23].
12. Current status -> run test [Page 86].

G. Monitoring & Operations of the GSI PRO

G.1. Monitoring:

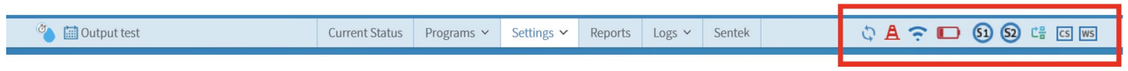
Monitoring the GSI PRO System operation by the user can be done via several screens that the system provides.

Upon entry to the system the main projects screen is presented (see chapter E2 of this document), once the user selects a unit, the system displays that unit's main screen that among other features such as Programs, or Settings, enables the user to monitor the unit's operations.

Monitoring the unit's operation can be done via the following system features:

- The Status Icons on the right side of the main menu bar
- The Status Icons on the Left side of the main menu bar
- The valves status boxes in the Current Status Screen (all the possible types such as irrigation valves, fertilizers. Filters, etc.)
- The Daily Accumulation button on the right side of the Irrigation Head headline.

The Status icons at the right side of the menu bar:



Each one of the icons on the Status line appears only when the status it represents exists as detailed in the following paragraphs:

Important notes:

- The order of the icons' appearance in the icons line, depends on the current real time status of the GSI PRO unit.
- The appearance of the icons depends on the communication system refresh rate, therefore in some cases we can expect few seconds delay between the real unit-status in the field and the icon appearance on the screen.

The Signal icon - this icon presents the status of the communication between the Unit and the Server:

- Icon is blue - there is communication between the unit and the server.
- Icon is red - there is no communication between the unit and the server.

The Battery icon – this icon presents the status of the battery and can be in red, orange, or green color; hovering the mouse cursor above the battery icon displays the current battery voltage level. This icon appears on DC and AC units, however for AC unit it is possible to set a backup battery or not for the unit in the system settings screen, so if it is do not exists the battery status icon does not appear.

- Red color indicates a critical battery level (DC unit's operation is paused during the red status).
- Orange color indicates an alarm state of the battery.
- Green color indicates a sufficient level of the battery.

Note that the refresh rate of the battery status is set in the system settings screen; in case the Battery Data Cycle is set to zero in the system settings screen, the battery status icon will appear only when the battery status changes.

The pause icon – this icon appears when the unit is in pause state. This state means that programs will not be executed and activation of the valves is not possible. Entering this state can occur due to the following reasons:

- Battery level is critical so all the unit's outputs were closed and the system operation is ceased.
- Due to manual command.
- During firmware update. In this case the percentage of the firmware update appears beside this icon.

- In case of fertilizer leakage.
- In case of capacitor charge alert.

The Sensors Icons – these icons present the status of the sensors that are defined in the unit; hovering the mouse cursor above a sensor icon displays the current sensor status and the current sensor reading value. Up to 5 sensor icons may appear in the status line (5 for AC unit and 3 for DC unit). The possible statuses that can appear for the sensor status icon are:

- Type Def. – error in the sensor definition, Limit setting – the minimum value is greater or equal to the maximum value.
- Sensor Deviation – the sensor's current reading is above the maximum or below the minimum in more than 20% (the wrong value is presented, but the unit cannot operate accordingly).
- Active – the sensor operation is correct.
- Low Sensor Alarm – the sensor's reading is below the level that the user set for receiving alarm.
- High Sensor Alarm – the sensor's reading is above the level that the user set for receiving alarm.

The Logic Conditions icon – this icon presents the status of the unit's defined logic conditions; hovering the mouse cursor above a sensor icon displays a small table that each row of it contains the logic condition number, name, value (1 or 0 for digital elements such as inputs or valves, and number for water flow-rates and sensors), and the logic condition status that displays one of the following options:

- Off – the logic condition status is off.
- On – the logic condition status is on.
- Not in time – the logic condition is outside its operation time range.
- Element Setting Error – wrong definition of the element used by the logic condition. The options are:
  - o Choosing an analog value for a discrete element.
  - o Choosing a discrete value for an analog element.
- Secondary Element Setting Error – in case the main logic condition is chained to other secondary logic conditions, this status appear when an element error occurs in one of the secondary logic conditions. Note that in such case the faulty logic condition of the chain displays the reason of its fault, while the main logic condition displays a "Secondary Element Setting Error".
- Timing Setting Failed – there is an error in the logic condition time range definition.
- Element Type Setting Error – the element type chosen for the logic condition in its setting screen is invalid.
- Analog Condition Error – the Start Value or the End Value of an analog logic condition are not correct, such as:
  - o When there is a Start Value but the End Value is zero.
  - o When for "Above" logic condition the Stop value is greater than the Start value.
  - o When for "Below" logic condition the Stop value is smaller than the Start value.

The Condition Inputs icons - these icons present the status of the existing discrete condition inputs of the unit. For AC unit the maximal number is 7 inputs, while for DC unit the maximal number of inputs is 5. The names of the condition inputs are: CS, FS, WS, RS, D1, D2, D3, however they are not significant for the actual type of device connected to the inputs. Important **Note:** each one of these icons appears only when the input is in its ON (1) state, therefore, for example in case of a water meter connected to the CS hardware input, the icon will appear on screen only when there is a pulse coming from the water meter.

The Alerts Icon – when there are active alerts in the unit, this icon presents a list of the active alerts; hovering the mouse cursor above the icon displays a list that contains the alerts, at the end of the list there is a button that allows the user to "Dismiss all the alerts" or "Dismiss all the alerts and continue the stopped irrigation program". The type of button depends on the definition entered in the alerts' settings screen.

The optional alerts that may appear in the list are the following:

- Low flow – the water flow is below the normal flow as defined in the valve settings.
- High flow – the water flow is above the normal flow as defined in the valve settings.
- No Water Flow – the irrigation has started but no pulses are received from the water meter.
- Leak Water – uncontrolled water flow is detected.
- No Fert Pulse – the fertigation has started but no pulses are received from the fertilizer pump.
- Leak Fert – uncontrolled fertilizer flow is detected, the system stopes immediately.
- Filter Flush Alarm – the filtration system is in fault state.
- Low Battery – the battery voltage level is low.
- Low Battery Paused – the battery voltage level is critical; all the outputs are closed and the system operation is paused.
- Capacitor Load Failure – the hardware's capacitor loading process is faulty (DC units only).
- Capacitor Discharge Alarm – a problem in the capacitor discharge (DC units only).
- Short Output Alarm – there is a short-circuit on the output (AC units only).
- Missing AC Power – the AC power to the unit is absent.
- Memory Alarm – there is a problem at the controller's memory.
- Fert Center Alarm – a fault state is detected at the fertilizer center.
- Sensor Alarm – one of the unit's sensors is faulty.
- Valve Setting Error – the settings of one of the unit's valves is incorrect.
- Program Setting Error – the settings of one of the unit's programs is incorrect.
- Flush Fail – writing to the flush memory failed.
- Logic Condition Setting Error – there is an error in the settings of one of the unit's logic conditions.
- Fert Not Finished – an irrigation program was ended without applying the whole programed fertilizer amount.
- Alert EC – the EC reading is lower or higher than the programed range.
- Alert pH – the pH reading is lower or higher than the programed range.
- Extreme EC Alert – the EC reading is in its extreme low or high level based on the programed parameters; the irrigation is stopped and the controller enters to a pause state.
- Extreme pH Alert – the pH reading is in its extreme low or high level based on the programmed parameters; the irrigation is stopped and the controller enters to a pause state.
- Alert by Logic Condition – Alert in the system was caused by a logic condition.

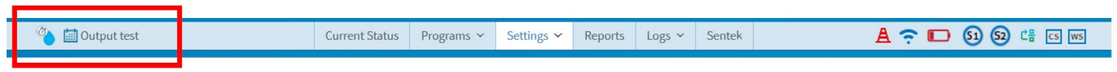
The Sync Icon – this icon appears when the process of synchronizing the unit with the server is active.

The Firmware Icon - during a process of controller's version update, this icon appears together with the Pause icon and the real time percentage of the version update.

The Rain Icon – this icon appears when the Rain Condition Input is active and indicates that it is currently raining – the irrigation is in pause.

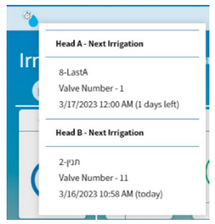
The Rain Chance Icon – this icon appears when there is a chance of rain as defined in the unit settings. In this state, the unit enters to Pause. By clicking on the icon, a dialog pop-up screen appears that allows the user to cancel the Rain chance state.

The Status icons at the left side of the menu bar:

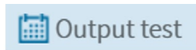


The following are the icons that may appear in the left side of the menu bar:

The Next Irrigation Icon – this icon is permanently appearing on the menu bar. When hovering the mouse cursor over it, a small window appears with the next irrigation details of Head A and Head B. for each head the window details the following:



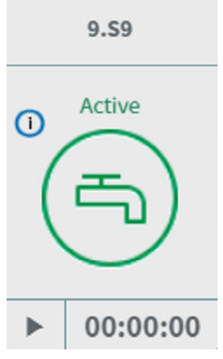
- The number of the next irrigation program.
- The name of the next irrigation program.
- The number of the valve to be irrigated in the next irrigation program.
- The name of the valve to be irrigated in the next irrigation program.
- The date and time of the next irrigation
- The number of days left to the next irrigation.



The Output test Icon – this icon appears during the process of outputs test (technical verification of the unit's outputs operation).

The valves status boxes in the Current Status Screen

Each one of the unit's valves appears in the Current Status Screen Chart of the system in a status box:



Note that: this chapter describes the various types of the system valves such as irrigation valves, main valves, fertilizers, filters, etc.

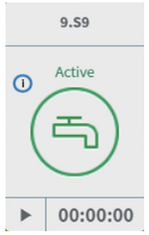
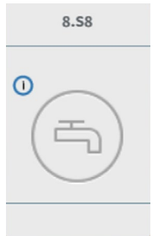
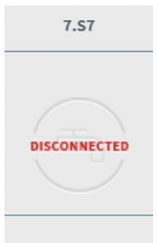
The valve box contains the following elements:

- On the very top of the box, the number and the name of the output are indicated.

- In the middle of the box, the status of the valve is presented in colored icon.
- On top of the valve's colored- icon the valve's status appears in text.
- In case of a fault or alarm an Alert Icon appears in the upper right side of the valve's colored- icon.
- An information icon in the shape of "I" appears in the upper left side of the box.
- In the lower line of the box an option to manually start or stop this valve operation appears.

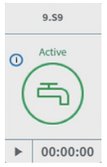
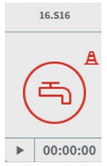
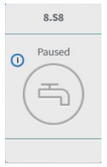
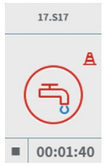
The following list displays the optional statuses of the elements in the valve status box.

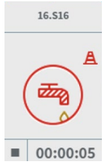
1. Colored icons derived from the valve's definition as set in the valves setting screen:

No.	Icon	Details
A		The valve is active
B		The valve is Off
C		The valve is disconnected

2. Colored icons derived from the valve's real time status:

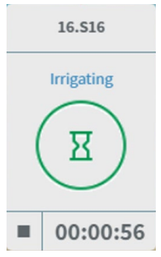
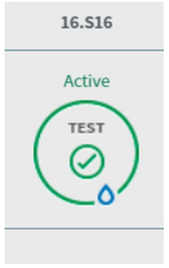
<u>Very Important note:</u> the real-time icons are scanned in 10 seconds interval, therefore some delay in status changes may be noticed.

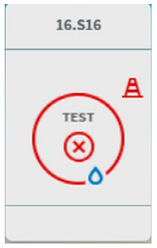
No.	Icon	Details	Remarks
A		The valve's icon is green - The valve is active	Important note: The valve icon remains green even though in some cases the status of the valve is different, (such as in Settings Failure, Valve Without Timing, and other such statuses). In these cases, the relevant information appears above the green valve icon.
B		The valve's icon is red – the valve is in Fault state, or in Alarm state.	Important note: In Fault state, the valve itself is in fault and the Alert icon is not shown near the red icon. In the Alarm state the Alert icon near the valve's icon specifies the nature of the alarm.
C		The valve's icon is dark gray – the valve is in pause state.	The whole unit or the irrigation head are in pause.
D		The valve's icon is blue with droplets-flowing animation – the valve is irrigating.	
E		The valve's icon is red with blue droplets-flowing animation – the valve is irrigating with alert.	The Alert icon displays the nature of the alert.
F		The valve's icon is yellow inside a blue circle with yellow droplets-flowing animation – the valve is irrigating and fertilizing.	Note that when a valve is fertilizing, the Fertilizer Center icon and the Main Fertilizer Valve icon turn yellow with droplets-flowing animation.

G		The Valve's icon is red with yellow droplets-flowing animation – the valve is irrigating with alert and fertigating.	In the Alarm state the Alert icon near the valve's icon specifies the nature of the alarm. Irrigating with Alert and Fertilizing.
H		The valve's icon is red and a lightning symbol appears over it – the valve output has a short circuit in AC units or connection error in DC units.	Important: this icon may appear for any output of the system (such as fertilizers or filters).

3. Icons that appear during Run Test Mode:

By clicking on the Run Test button, located above the irrigation head valves chart, the system starts a test run on this irrigation head valves.
During the test the number of the tested valve appears near the Run Test button, and the Run test button turns into Stop test button.

No.	Icon	Details	Remarks
A		The valve's icon is a green circle with a spinning "Hourglass" icon inside it. The current valve is opened for test	Note that during a "Run Test Mode" the controller opens and closes the irrigation head outputs one after the other for the duration entered in the valve's box. The default duration is 60 seconds..
B		The valve's icon is a green circle with a "V" inside it. The user set the irrigation head to "Run Test" mode. This icon indicates that the current valve test was successfully ended.	Note that the "Run Test Mode" works only for connected irrigation valves.

C		The valve's icon is a red circle with a "X" inside it. The user set the irrigation head to "Run Test" mode. This icon indicates that the test ended in one of the following faults: • No Water Pulses • Output short circuit (AC) • Connection fault (DC) Therefore, the test was not successfully complete.	TPlease note the in case on unsuccessful test result, the nature of the fault appears at the Alert Icon near the valve icon at the valve box.

At the end of the test, a "Clear Test Results"

The results of the tests (icons B or C above) remain until the user clicks on the "Clear Test Results "button.
Note that an irrigation program that starts before the clearing of the test results, will operate normally.

4. The Information Icon "I" that may appear next to the valve icon in the valve status box.

Hovering the mouse cursor over the "I" icon displays a tooltip with the message text.
Important: In case of more than a single information item the "I" icon displays only the last occurred message.

The following are the optional messages that can be appeared in the "I" icon:

- Irrigation Head Setting Error – there is an error in the irrigation head setting.
- Water Meter Not Exist – the water meter number that is set for the current valve is not configured in the system.
- Water Meter Setting Error - the water meter number that is set for the current valve has an error in its definition.
- Valve Without Timing – the current valve is not assigned in any irrigation program.
- Discharge – hardware error in the capacitor discharge (only for DC units).

5. The Alert Icon that may appear next to the valve icon in the valve status box.

Hovering the mouse cursor over the Alert icon displays a tooltip with the existing messages text.

Important: In case of more than a single information item the Alert icon displays a list with a line per each message.

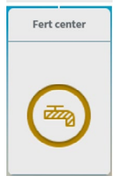
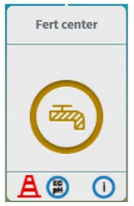
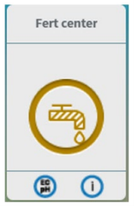
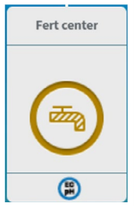
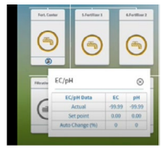
The following are the optional messages that can be appeared in the Alert icon:

- Low Flow Alarm – the valve has a low flow-rate alarm.
- High flow Alarm - the valve has a high flow-rate alarm.
- No Water Flow – the valve started irrigating but no pulses are received from its designated water meter.
- No Fertilizer Flow - the valve started fertilizing but no pulses are received from its designated fertilizer meter.
- Fert Not Finished – the irrigation of the current valve was finished but not all its planned fertilizer amount was delivered.
- Discharge – there was no capacitor discharge operation, such as where a wire is disconnected (DC units only).
- Output Short Circuit Output – there is a short circuit on this valve output (AC unit only).

6. Icons that appear in the Main Valve of the irrigation head:

No.	Icon	Details	Remarks
A		The Main Valve's icon is green. The valve is active and closed.	
B		The Main Valve's icon is Blue with droplets-flowing animation. The valve is opened.	Note that when there is a water meter assigned to the irrigation head, the current flow rate appears also in the main valve box (liter/hour or M³/hour or Gal/hour). Important: in case of two valves, each irrigating with a different water meter, two separated rows indicating the flow will appear in the box (WM1 & WM2 for irrigation head A, and WM3 & WM4 for irrigation head B).
C		The Main Valve's icon is gray. The system is I pause state.	
D		The box has a red circle with "X" inside it – This irrigation head has no main valve assigned.	Note that in an irrigation head with no main valve the flow rate will appear during irrigation in this box (provided that a water meter is assigned to this head).
E		The output icon is red and a lightning symbol appears over its circle – the output has a short circuit in AC units or connection error in DC units.	Important: this icon may appear for any output of the system (such as fertilizers or filters).

7. Icons that appear in the Fertilizer Center of the irrigation head:

No.	Icon	Details	Remarks
A		The Fertilizer Center icon appears in golden color. The fertilizer center is active and closed.	The current status of the Fert Center appears in text next to the icon in the fertilizer center box. The options are: • Fert Center Def Error - there is a definition error in the fertilizer center setup. • Fert Center Fertilizing – the fert center is operating. • Fert Center Alarm - the fertilizer center has an alarm state. • Fert Center Pause - the fertilizer center is in pause state.
B		The Fertilizer Center icon appears with red Alert icon that indicates the current alerts of the fertilizer center.	Note that the various alert messages appear in the paragraph below this table.
C		The Fertilizer Center icon appears in golden color with droplets-flowing animation. The Fertilizer Center is fertilizing.	Note that the information displayed in the "I" icon appears in the paragraph below this table.
D		The Fertilizer Center icon appears with the EC/pH icon below it. The system has EC/pH sensors that are used for the fertigation process.	Clicking on the EC/pH icon opens a table that displays the following:  • The current readings of the EC/pH sensors. • The set points for the EC/pH operation (the required levels during fertigation). • The percentage of the auto change operation of the EC/pH control during fertigation (plus or minus in %).
E		The output icon is red and a lightning symbol appears over its circle – the output has a short circuit in AC units or connection error in DC units.	Important: this icon may appear for any output of the system (such as fertilizers or filters).

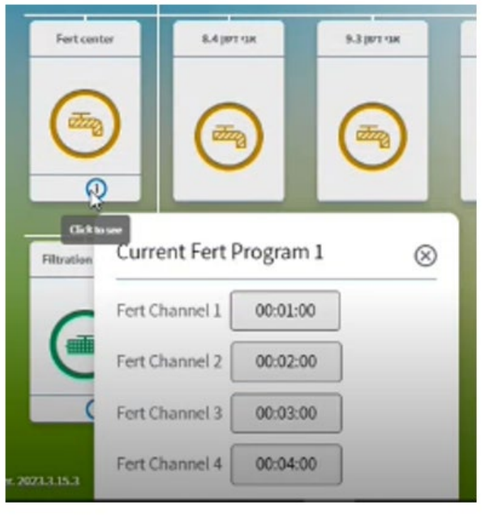
8. The Alert Icon that may appear next to the Fertilizer Center icon.

Hovering the mouse cursor over the Alert icon displays a tooltip with the existing messages text. In case of more than a single information item the Alert icon displays a list with a line per each message. The following are the optional messages that can be appeared in the Alert icon:

- Fert Set Error – one of the fertilizer center's pumps has a definition error.
- EC Set Error – the EC sensor of this fertilizer center has a definition error.
- pH Set Error – the pH sensor of this fertilizer center has a definition error.
- Main Fert Set Error – the Main Fert valve has a definition error.
- Fert Program Set Error – the fertigation program has a definition error.
- Condition Set Error – there is a definition error in a logic condition configured for this fertilizer center.
- EC Alarm – the reading of the EC sensor is above or below its alarm setting.
- pH Alarm – the reading of the pH sensor is above or below its alarm setting.
- EC Critical – the reading of the EC sensor is above or below its critical alarm setting, the fertigation stops.
- pH Critical – the reading of the pH sensor is above or below its critical alarm setting, the fertigation stops.
- Fert Not Execute – the fertilization started but no pulses are received from one of the fertilizer pumps.
- Fert Leakage – there is an uncontrolled fertilizer flow from one of the fertilizer pumps, the system stopped with Alarm.
- Fert Program Alert – the fertigation program is in alarm state.
- Fert Output Error – one of the fertilizer pumps has a hardware output fault (connection fault or short circuit).
- Main Fert Output Error – the main fert valve has a hardware output fault (connection fault or short circuit).

9. The Information Icon "I" that may appear next to the Fertilizer Center box.

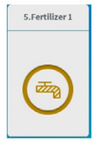
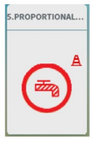
Clicking on the "I" icon opens a table that displays the following:



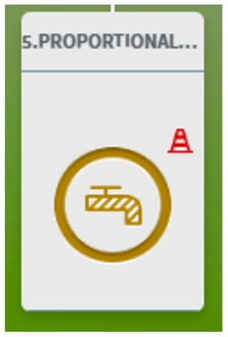
All the relevant fertilizer pumps that ar e assigned to this fertilizer center, for each pump the table displays the:

- Name and number of the pump.
- For a pump that fertigates by duration – the table's row displays the fertilization time setup parameter.
- For a pump that fertigates by quantity – the table's row displays the fertilization quantity setup parameter.

10. Icons that appear in a Fertilizer Pump of the irrigation head:

No.	Icon	Details	Remarks
A		The Fertilizer Pump icon appears in golden color. The fertilizer pump is active and closed	
B		The Fertilizer Pump icon appears with red Alert icon that indicates the current alerts of the fertilizer Pump..	Note that the various alert messages appear in the paragraph below this table.
C		The Fertilizer Pump icon appears in golden color with droplets-flowing animation. The Fertilizer Pump is fertilizing.	

11. The Alert Icon that may appear next to the Fertilizer Pump icon.



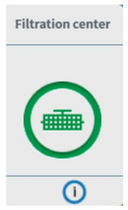
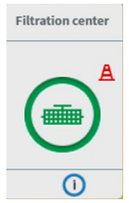
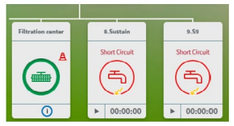
Hovering the mouse cursor over the Alert icon displays a tooltip with the existing messages text.

Important: In case of more than a single information item the Alert icon displays a list with a line per each message.

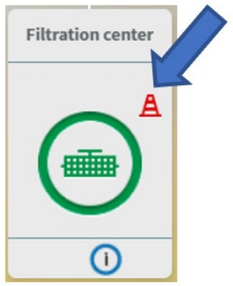
The following are the optional messages that can be appeared in the Alert icon:

- Fert Type Setting Error – an error in the fertilizer pump type definition.
- Fert Output Setting Error – an error in the fertilizer pump hardware output definition.
- Fert Num Counter Error – an error in the fertilizer pump meter definition.
- Pulse size Set Error – an error in the fertilizer meter pulse size definition.
- Flow Set Error – an error in the fertilizer pump flow-rate definition (e.g., missing flow rate definition for a pump that operates according to flow).
- Pulse Time Set Def Error – an error in the pump's pulse length definition.
- Water Meter Num Error – an error in the pump's water meter number.
- Water Meter Def Error – an error in the pump's water meter definition.
- No Fert. Pulse – the fertigation was started but no pulses are received from the fertilizer pump.
- Fertilizer Leakage – uncontrolled fertilizer flow is detected from the fertilizer pump. the system stopes with alarm.
- Fertigation output Error – a fault occurred in the pump's hardware output (connection fault or short circuit).

12. Icons that appear in the Filtration Center of the irrigation head:

No.	Icon	Details	Remarks
A		The Filtration Center icon appears in green color. The filtration center is active and currently it is not flushing.	The current status of the Filtration Center appears in text next to its icon. The options are the following: • Flush Without Condition – the definition of the trigger that can start a flush cycle is missing. In this case the flushing process can be started only by manual start command. • Active - the filtration center is active and currently it is not flushing. • Sustaining – currently the filtration center controls the pressure by commanding the pressure sustain valve.
B		The Filtration Center icon appears with red Alert icon that indicates the current alerts of the filtration center.	Note that the various alert messages appear in the paragraph below this table.
C		The Filtration Center icon appears in blue with droplets-flowing animation. The Filtration Center is flushing.	Note that the information displayed in the "I" icon appears in the paragraph below this table.
D		The Filtration Center icon is gray. The system is in pause state.	
E		The output icon is red and a lightning symbol appears over its circle – the output has a short circuit in AC units or connection error in DC units.	**Important:** this icon may appear for any output of the system (such as fertilizers or filters).

13. The Alert Icon that may appear next to the Filtration Center icon.



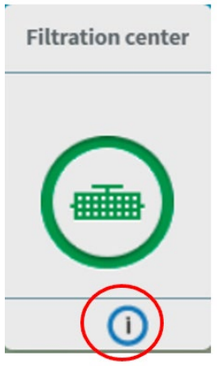
Hovering the mouse cursor over the Alert icon displays a tooltip with the existing messages text.

Important: In case of more than a single information item the Alert icon displays a list with a line per each message.

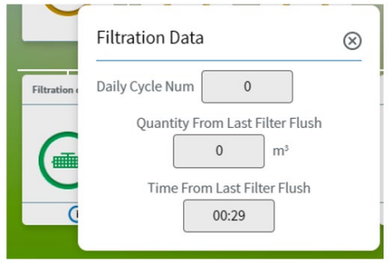
The following are the optional messages that can be appeared in the Alert icon:

- Flush Alert – the filtration center is in continuous flushing fault.
- Flush Sequence Define – there is an error in the flush sequence definition.
- DP Def Error – there is an error in the DP definition.
- Flush Condition Num Error – the number of the logic condition that affects this flushing center is incorrect.
- Condition Def Error - the definition of the logic condition that affects this flushing center is incorrect.

14. The Information Icon "I" that may appear next to the Fertilizer Center box.

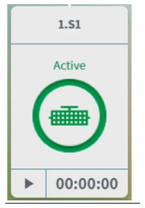
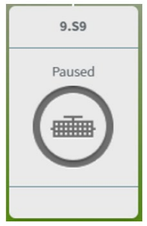
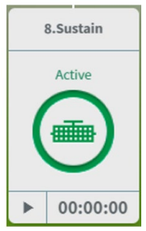
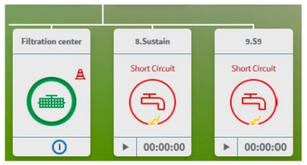


Clicking on the "I" icon opens a table that displays the following last 24 hours filtration center data:



- The number of flush cycles performed in the last 24 hours.
- The quantity of water that passed through the filtration head since the last flush cycle.
- The time that passed since the last flush cycle.

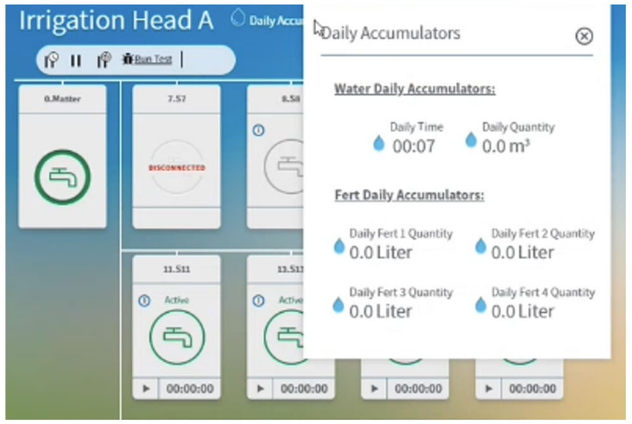
15. Icons that appear in a filter box:

No.	Icon	Details	Remarks
A		The Filter icon appears in green color. The filter is active and is not flushing.	
B		The Filter icon appears in blue with droplets-flowing animation. The Filter is flushing.	
C		The Filter icon is gray. The system is in pause state.	
D		This is the icon of the filtration system pressure sustaining valve.	The statuses of the pressure sustaining valve are the same as of a regular filter.
E		The output icon is red and a lightning symbol appears over its circle – the output has a short circuit in AC units or connection error in DC units.	Important – this icon may appear for any output of the system (such as fertilizers or filters).

The Daily Accumulation button in the Current Status Screen

This button appears to the right side of the Irrigation Head headline at the system's current status screen.

Clicking on this button opens a window with the following information:



- The daily water accumulation by time for all the valves that irrigates by time.
- The daily water accumulation by quantity for all the valves that irrigates by water quantity.
- The Fertilizer daily accumulation (by time or by quantity) for each one of the fertilizer pumps assigned to the current irrigation head's fertilizer center (up to 4 fertilizer pumps per head).

G.2. Manual Operations:

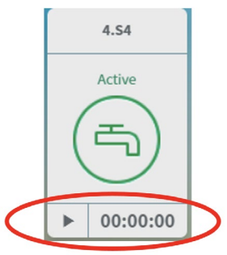
The user of the GSI PRO can perform various manual operation via several screens that the system provides.

Upon entry to the system the main projects screen is presented (see chapter E2 of this document), once the user selects a unit, the system displays that unit's main screen that among other features such as Programs, or Settings, enables the user to perform operations on the unit.

The operation can be done via the main screen are the following:

- Real time operations on a valve
- Real time operations on a filter
- Real time operations on an auxiliary output
- Real time operations on an irrigation program

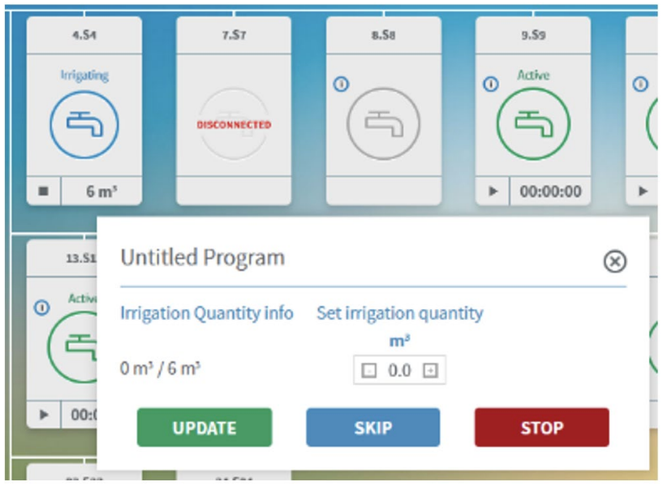
Operations on a valve that can be execute while the valve is irrigating in an irrigation program:



During irrigation, the bottom line of the Valve's Box displays in real time the quantity or time left for this valve irrigation.

1. Changing the valve operation during irrigation

Clicking on the bottom line of the valve box during irrigation opens the following window.



On its left side, this window displays the current irrigated water (quantity or time) out of the programmed water. On the right side of the window, the user can change the water amount.

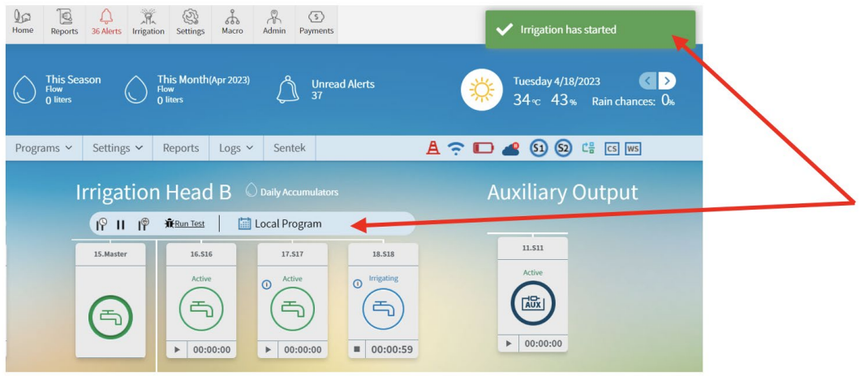
The buttons on the bottom of this window allow the user to update the water amount, skip this valve irrigation and move to the next valve in the program (if exists), and stop the valve.

Local Program - Operations on a valve to be executed while the valve is not irrigating in an irrigation program:

1. Starting a valve:

While the valve is not irrigating, clicking on the "Play" icon at the left side of the line automatically opens the valve for 60 seconds.

At the upper right side of the screen the message "Irrigation has started" appears, and below the irrigation head headline the message "Local Program" appears as well



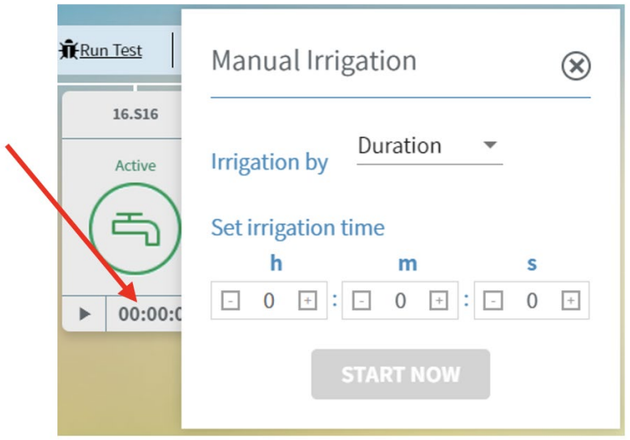
If in the valve's setting screen, the valve is set to open the main valve during operation, the main valve will be opened as well.

The "Play" button changes to "Stop" button and the timer displays the time left for this valve to close.

Important:

- Opening a valve by a "Local Program" while another program in the same irrigation head is running, the other program will be paused and it will wait in queue until the "Local Program" ends.
- It is possible to open more than a single valve as "Local Program" (up to 5 valves in AC unit without relays), however these valves operation is independent from each other.

Clicking on the timer while the valve is not opened, opens the following setting window:



This window allows the user to:

Set the operation base of the valve; by Duration or by Quantity.

Important Notes:

- The option Quantity is available only for valves that contain a water meter defined in their settings.
- Auxiliary valves and Filters can operate only by Duration.
- Filters can only be set to Minutes and Seconds, while irrigation valves and auxiliary outputs can be set to Hours, Minutes, and Seconds.
- Set the required operation time or quantity according to the limits described in the previous point.
- Once the operation time/duration is set, pressing the "Start Now" button starts the valve's operation.

While the valve is running, pressing on the timer line opens the following window:

This window displays the time/quantity passed out of the set time duration/quantity, and allows the user to update these settings or to stop the valve's operation. Note that on the valve's box the lower line displays the duration/ quantity left till the end of the valve's operation.

Important limitation for manually opening valves:

Time based limitations (Duration):

Due to the controller's limitations, the duration values that can be changed during the valve operation, depends on the initial duration set at the beginning of this valve's manual operation.

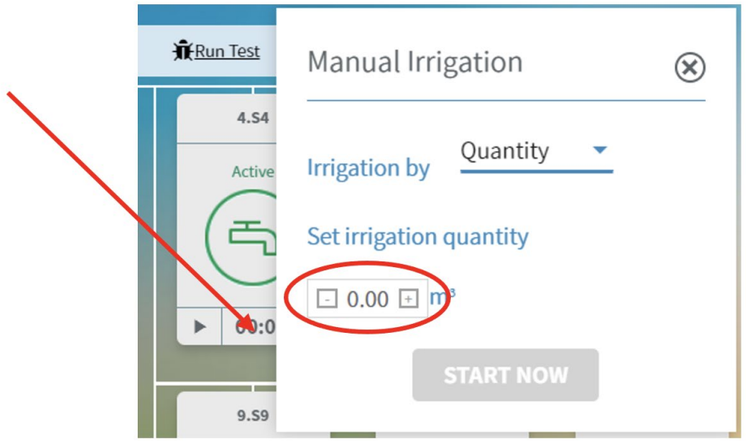
The basic setting for valve operation duration is 23:59:59

For valves, that their initial duration was up to 18 hours and 12 minutes, it is possible to update their operation duration not more than 18 hours and 12 minutes maximum.

For valves, that their initial duration was above 18 and 12 minutes, the limit of updating these numbers during the valve's operation is 23:59:59.

Quantity based limitations:

Due to the controller's limitations, the quantity values that can be changed during the valve operation, depends on the initial quantity set at the beginning of this valve's manual operation and on the pulse size of the valve's water meter. (Clicking on the time line opens the following information window)



The number of decimal digits at the quantity parameter depends on the pulse size of the water meter:

- For Gallons water meter - no decimal digit.
- For 1 liter water meter - no decimal digit.
- For 10 liters water meter – two decimal digits.
- For 100 liters water meter – one decimal digit.
- For 1 M^3 water meter - no decimal digit.
- For 10 M^3 water meter - no decimal digit.

Note that for all the liters or the cubic meters water meters types (except of 1 liter meter), the water quantity to be entered is in M^3, therefore the user has to carefully calculate the required quantity according to the valve's water meter type.

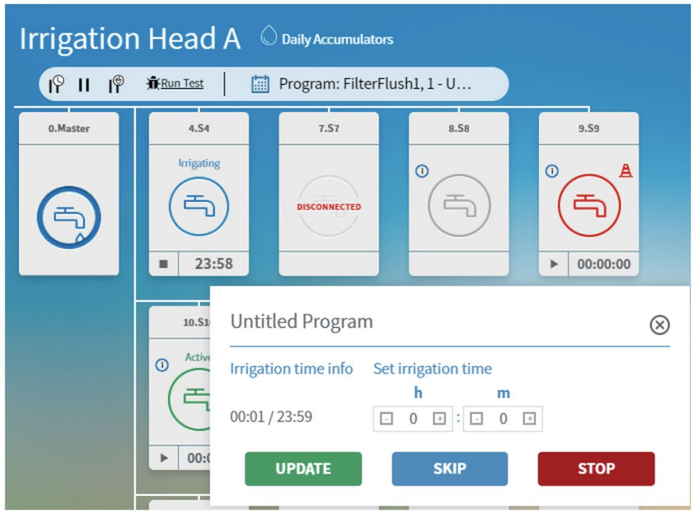
The maximal initial quantity for manually opening a valve is 65.5 M^3, and it is not possible to exceed these numbers while changing them during the valve's operation.

Filters limitations:

The maximal initial duration value for a filter is 4 minutes and this cannot be exceeded during the filter operation.

Manual Operations on a program:

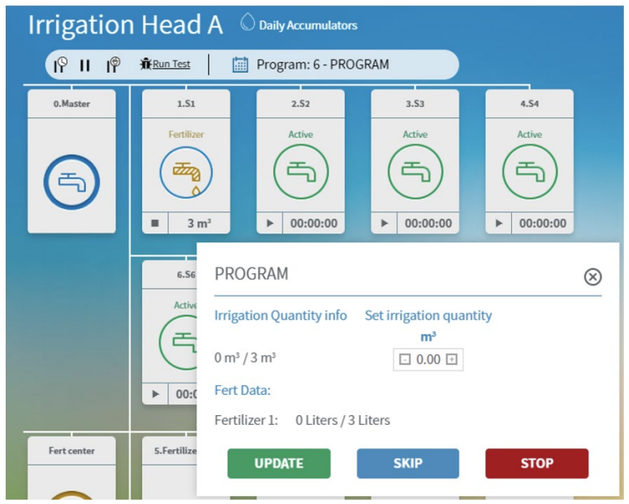
Once a program is running, the lower line at the irrigating valve box displays the time/quantity left till the end of that valve irrigation. Clicking on this line opens the following information window:



On this information window left side, the current irrigated water (quantity or time) out of the programmed water is displayed. In the right side of the window, the user can change the water amount.

The buttons of the information window allow the user to update the water amount, skip this valve irrigation, and move to the next valve in the program (if exists), or stop the program.

When the program is also fertigating the information window displays also the fertigation details, as depicted in the following picture.



In this information window, below the water details, the fertilizing data is presented. This includes the number of the operating fertilizer pump (up to 4 pumps, each one in a separated row), and the fertilizer amount delivered out of the fertilizer amount programmed.

Important Notes:

- The fertilizer data cannot be updated through this information window.
- The fertilizer data appears in the information window only if the parameter "Fertigation data update interval" is set in the irrigation head settings screen.
- In case that the fertilizer program is set as liter per M³ of water, the "programmed amount" of the fertilizer data item in the information window, is the calculated fertilizer amount that should be delivers during the whole irrigation of the relevant valve.
- The data on the information window appears only when the valve is operating.

Important limitation for manually updating an irrigation program during its operation:

Time based limitations (Duration):

Due to the controller's limitations, the duration values that can be changed during a valve operation in the program, depends on the duration set for this valve in the irrigation program setup screen.

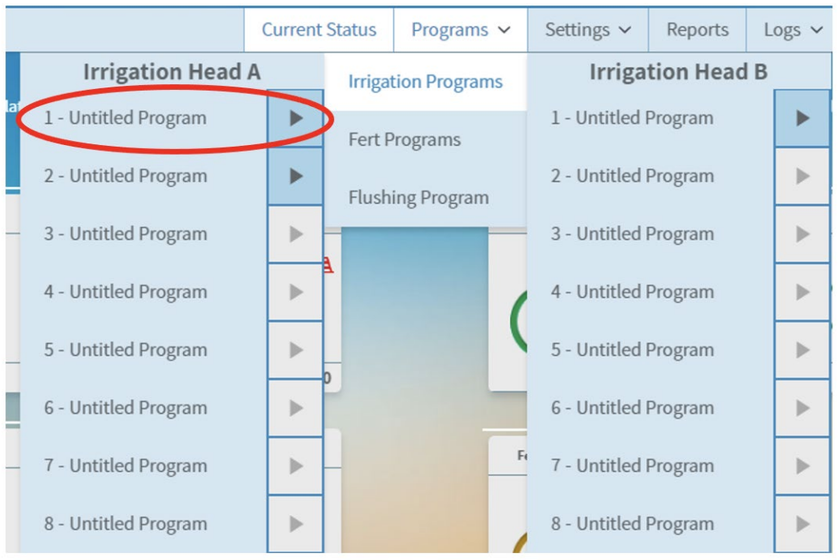
If the duration, set for the valve, is up to 18 hours and 12 minutes, it is not possible to update these numbers while changing them in the information window during the valve's operation in the irrigation program. However, if the duration was above 18 and 12 minutes, the limit of updating these numbers during the valve's operation is 23:59:59.

Quantity based limitations:

Due to the controller's limitations, the quantity values that can be changed during a valve operation in the program, depends on the quantity set for this valve in the irrigation program setup screen.

If the quantity, set for the valve, is up to 65.5 M³, it is not possible to exceed these numbers while updating them during the valve's operation in the program's information window. However, if the quantity set for the valve in the irrigation program is higher than 65.5 M³, it is possible to exceed these numbers while updating them during the valve's operation in the program's information window.

Manual operations of a program:

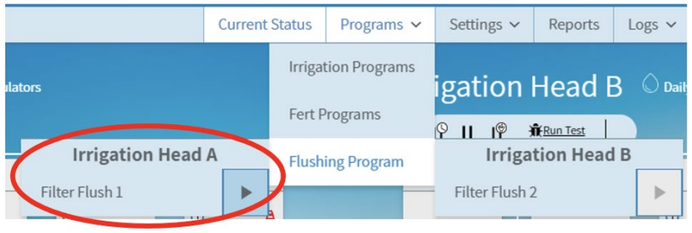


Manually opening a program is done via the Programs --> Irrigation Programs menu. Clicking on the "Play" icon starts the program. Once the program is running the "Play" icon changes to "Stop" icon.

Important Notes:

- For a not defined program its "Play" icon is gray and disabled.
- When the unit or the irrigation head are in pause mode all the programs play icons are disabled and gray.
- Depends on the nature of the alert, programs with Alert icon may be started.

Manual operations of filtration program:

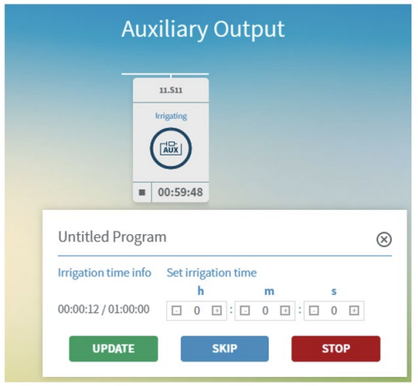


Manually opening a filtration program is done via the Programs --> Flushing Programs menu. Clicking on the "Play" icon starts the program. Once the program is running the "Play" icon changes to "Stop" icon.

Manual operations of Auxiliarry Outputs:

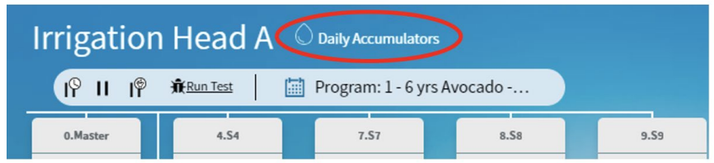
The information window of an auxiliary output allows the user to:

- Change the operation timing
- Update, skip and stop the operation



Important notes for manually starting programs:

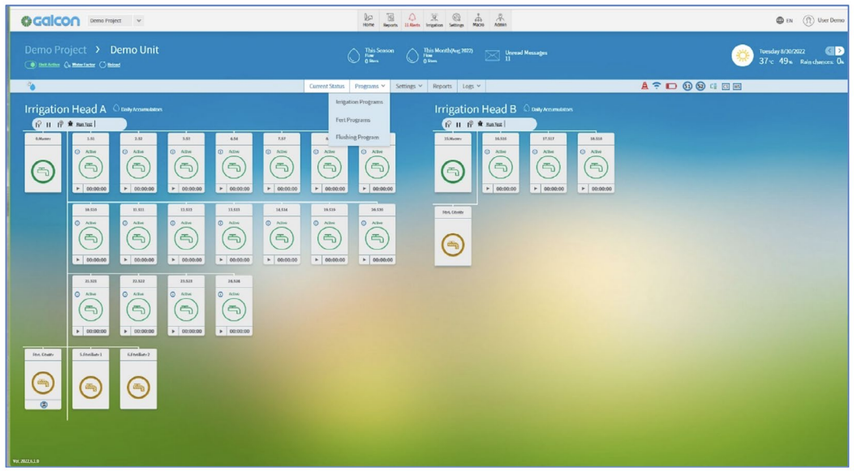
- Once a program is manually starts, a relevant green message appears on the upper right side of the screen.
- A manually started local program is in higher priority than a scheduled program. Only in case of a certain limitation, the scheduled program is paused and waits in queue till the local program ends.
- When a fertigation program is running and if the fertigation method is not proportional - other programs cannot be started.
- The user can also manually start a program through:
  - o The upper line of its settings screen. Programs -> Irrigation Programs -> select specific irrigation program.
  - o The programs list screen.
- Once a program is started, its name and number appear under the headline of the relevant irrigation head line. If few programs are running at the same time, only their numbers appear near the irrigation head headline.



H. Programming the GSI PRO Operation

H.1. Entering the programs section of a GSI PRO unit:

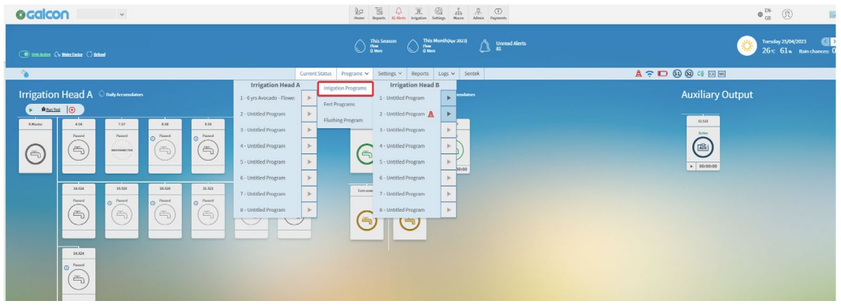
From the main screen of the system press on the card of the required unit and select the Programs tab.



The drop-down list enables the user to program the Irrigation, the Fertigation, and the Flushing programs of the unit .

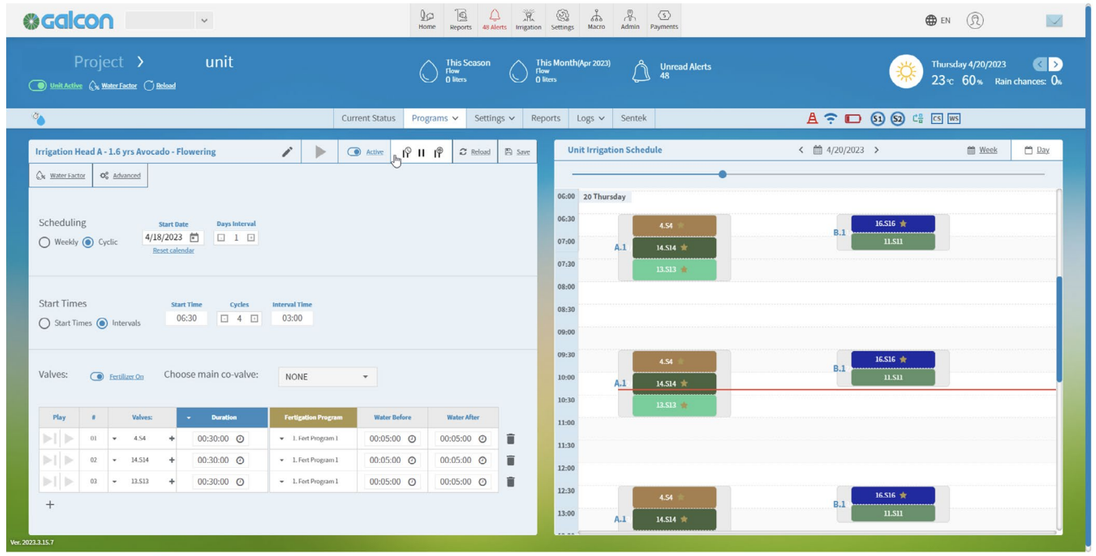
H.2. The Irrigation Programs:

Move the mouse cursor to the Irrigation Programs options; the system displays the two irrigation heads of the unit, together with up to 8 available programs per irrigation head. In case of attention needed for a program, an attention icon appears next to its name; hovering the cursor above the icon displays the type of the problem in a small floating window. Next to the program's name a "Play" icon enables the user to manually start the program; once the program starts the play icon turns into a "Stop" icon that allows the user to stop the program.

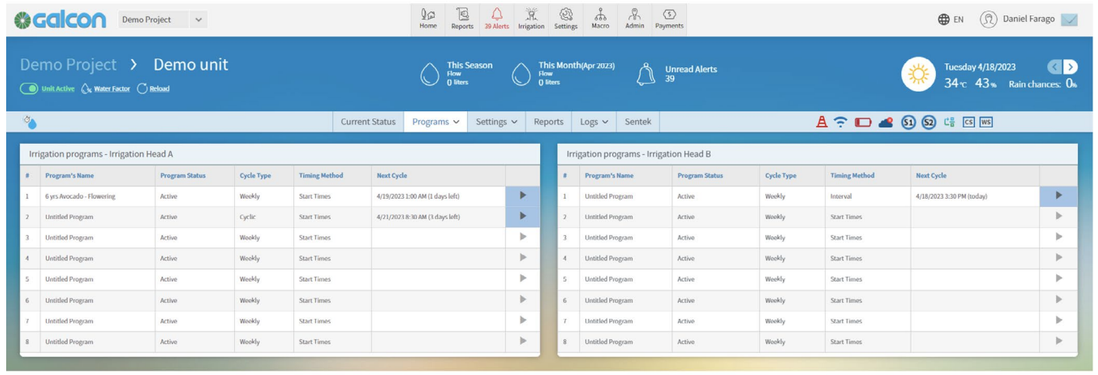


At this point the user has two options:

A. Selecting the number of the required program at the required irrigation head – the following screen appears:



B. Clicking on the" Irrigation Programs" entry of the Programs dropdown list – the following screen appears:

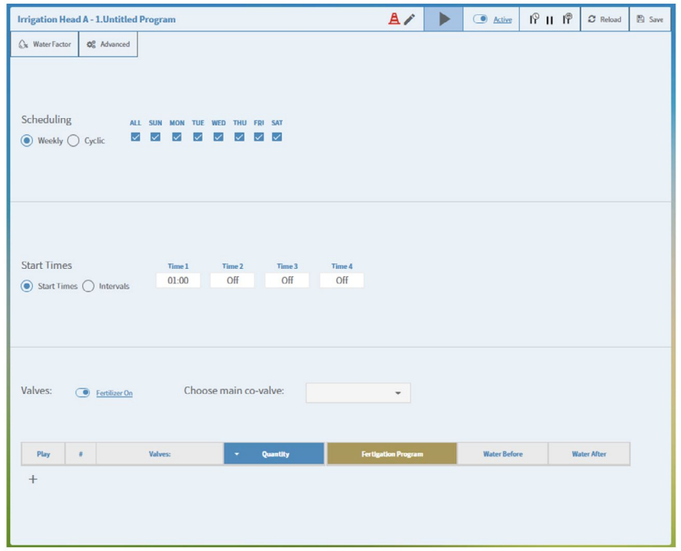


Clicking on any specific program at the above screen table opens the programing screen of the selected program (the same screen as at the direct selecting of the program; see option A above).

The programing screen of the selected irrigation program has two panes: the left pane shows the irrigation program details, while the right pane displays a Gantt Chart of the program's operation schedule.

Please note that in case the GSI's web site is displayed on a small screen, the Gantt pane appears below the irrigation program pane.

The Left Pane:

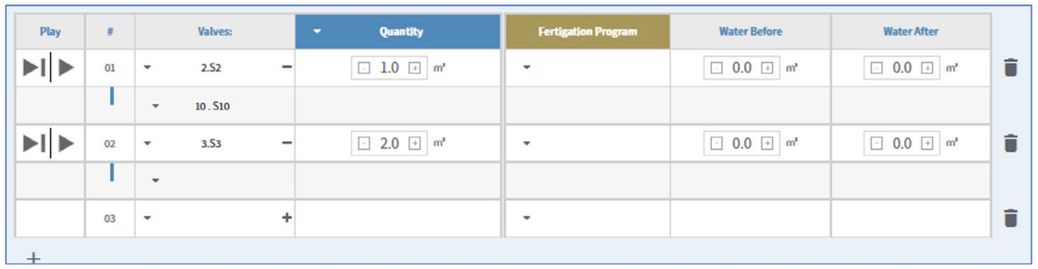


The left pane enables the user to program the selected irrigation program; it contains the following elements:

- The upper line – displays the irrigation head name (A or B), the program name, and depicts the following icons:
  - o Attention Icon – when applicable; hover the cursor over the icon for the attention message details.
  - o Edit – enables the user to edit the program's name.
  - o Run program – an option to start the program manually. The "Play" icon enables the user to manually start the program; once the program starts the play icon turns into a "Stop" icon that allows the user to stop the program.
  - o Activation – enables the user to switch the program to Active or Not Active.
  - o Pause by time – enables the user to pause this program operation for a predefined time span.
  - o Unlimited Pause – enables the user to pause this program operation for an unlimited time span (until the program is re-activated by clicking again on the pause icon).
  - o Pause Fertilization – enables the user to pause the fertigation of this program (the irrigation continues).
  - o Reload – reloads the screen.
  - o Save - save the changes done to the program to the unit's memory.
- The second line – enables the user to change the water amount of all the valves of the program by a percentage factor due to seasonal or weather requirements, and to enter to the advanced setting of this program (see a description of the advanced setting screen at the end of this chapter).
- Scheduling – select the type of the required irrigation schedule, either by the days of the week or by days cycle.
  - o In case of a cyclic schedule, enter the required start date by selecting it from the calendar and set the days interval.
  - o In case of a weekly schedule, select the required days of the week.
- Start Times - when selecting operation by start times, the system allows the user to set up to 4 different start times per each irrigation day. When selecting intervals, set the start time for the irrigation day, the number of cycles per day, and the interval time between the daily cycles.
- Valves – Select whether the program has a fertigation program, choose if this program has a main co-valve, and then fill the valves table as explained in the next bullet.
- A main Co-valve is a hardware output (only an auxiliary output) that opens and closes together with the irrigation head main valve; for example, it can be used for switching on and off a water pump that operates together with the main valve.

- Valves Table – set the valves operated by this program, add a line to the table for each valve by clicking on the "+" button, the system allows up to 24 valves per program. (Note that only valves that are already configured in the system appears in the valves table.)

Per each line select the parameters as displayed in the following picture:

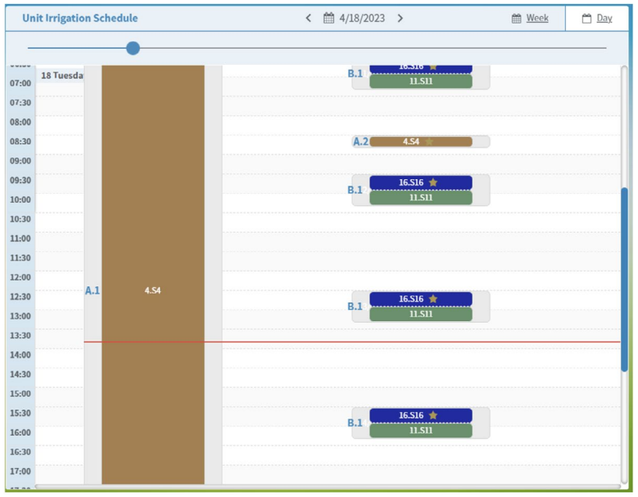


- o The # column displays the number of the valve in the program's operation sequence (1-24).
- o The name of the valve; select the required valve from the dropdown valves list.
- o The water amount for the valve in the irrigation method column.

Note that: The program can irrigate according to one of four irrigation methods, select the required method at the headline of the irrigation method column:

- Duration – each one of the program's valves irrigates by its predefined irrigation time (hh:mm:ss).
- Quantity – each one of the program's valves irrigates by its predefined quantity.
- Water amount per area – each one of the program's valves irrigates by its predefined amount of water per each one of its area units, e.g., liter per m^2.
- mm – each one of the program's valves irrigates by its irrigation rate in mm; the system calculates the required irrigation time needed for delivering the number of millimeters entered by the user.
  - o A co-valve for the selected valve - if required select a co-valve for the irrigation valve.
  - o **Note that**: Depends on the configuration of the unit, the system distinguishes between free valves that are used as co-valves and regular valves. The free valves are just dummy valves without any water flow-rate settings, while the regular valves have water flow rate settings. In case of a free valve used as a co-valve, it opens and closes together with the irrigation valve. However, in case of a regular valve, that acts as co-valve for an irrigation valve, the water amount will be divided between the two valves according to their settings.
  - o In case the valve has a fertigation program, select the fertilization program from the predefined up to 10 fertigation programs and set the water before and water after parameters.
- The first column of the table (the Play column) has two play icons; the first (the left one) icon is the start step icon – it allows the user to manually start only a single program step as designated in this table row, the second icon (the right one) enables the user to start the program from this program step and on till its last step. Both icons turn into a "stop" icon after being clicked on.

The Right Pane:



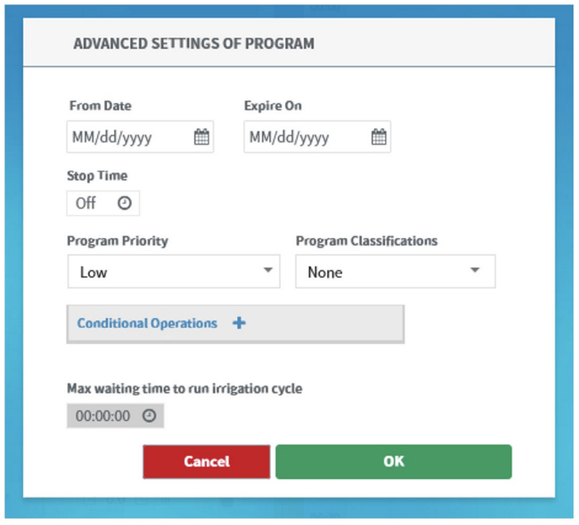
This pane displays a Gantt Chart of the program's schedules. The upper line of the pane enables the user to select the span of the Gantt from the calendar, and to select the presentation mode (by day or by week). A scroll bar enables the movement of the Gantt along the timeline.

The structure of a program name on the Gantt is the following:

- A program with a star indicates that it has a fertilization program
- A/B – the irrigation head of the program
- The number 1-8 following the A/B is the program number
- The next characters string displays the valve name
- The number with the dot (e.g., 3.) is the output number

The Advanced Settings Window

Enter to this window by clicking on the advanced icon in the upper left corner of the left irrigation program pane:

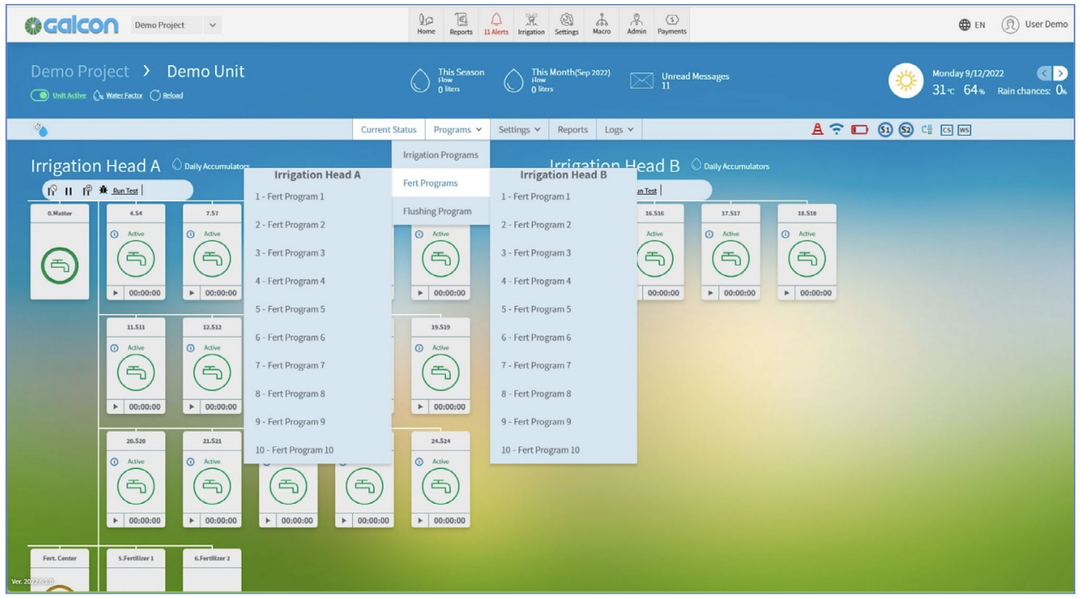


- The upper part of this window enables the user to set a start and end dates for the program operations – the program will be active only within this time frame.

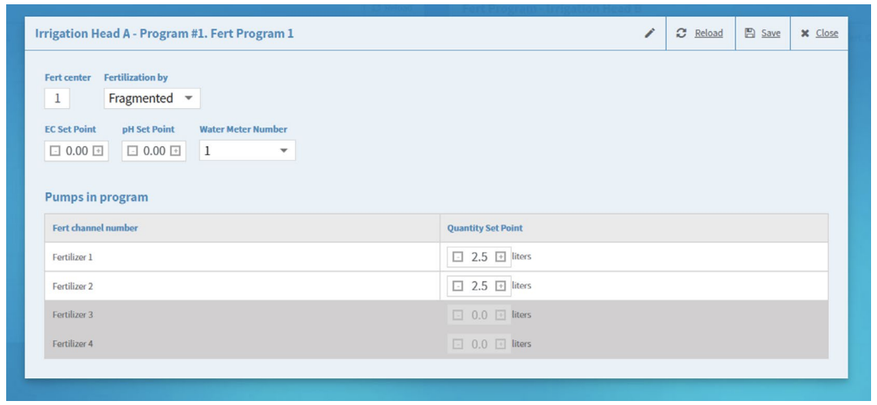
- Stop Time – enter the daily stop time for the program – on each irrigation day the program will not be active beyond this time.
- Program Priority – set the program priority (Low, Medium, or High), the program will be paused whenever a higher priority program will be started when this program is irrigating. The priority setting is active only when the programs cannot irrigate at the same time due to their settings or due to valves limitations).
- Program Classification – An option to connect the program to a personal macro that enables operations according to these settings.
- Conditional Operation – Select the logic condition that affects this program. There is a limit of 4 conditional operations per program.
- Max waiting time to run irrigation cycle – set the maximal time for the program to wait for a start signal from the logic condition; this parameter is used to make sure that the crop will not be damaged if the logic condition start command is not received.

H.3. The Fert Programs:

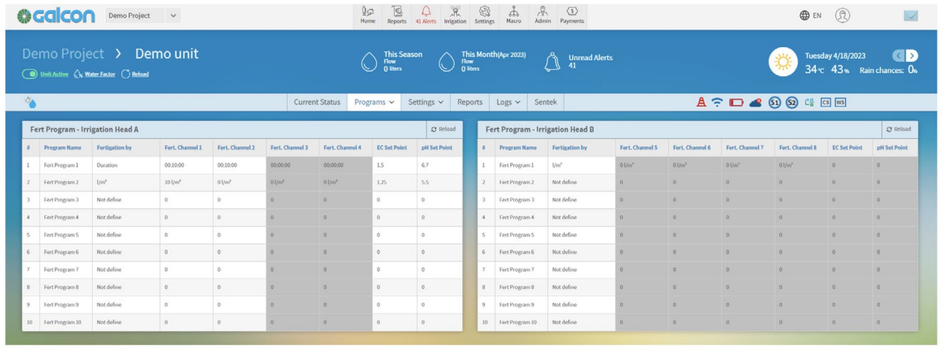
Move the mouse cursor to the Fert Programs options; the system displays the two irrigation heads of the unit, together with up to 10 available Fertigation Programs per irrigation head.



Select the required program – the following window appears:



Please note that once clicking on the blue area outside this window the system displays a table with all the possible fertigation programs of the two irrigation heads.



Clicking on a program line at this table opens again the fertigation program window.

- The headline of the program window – displays the irrigation head name (A or B), the program name, and depicts the following icons:
  - o Attention Icon – when applicable; hover the cursor over the icon for the attention message details.
  - o Edit – enables the user to edit the program's name.
  - o Reload – reloads the screen.
  - o Save - save the changes done to the program to the unit's memory.
  - o Close - closes the window and return to the fertigation programs table.
- The first line of the window – displays the number of the Fert Center, and enables the user to change the fertigation method, the options are:
  - o Not Defined – the program is not defined.
  - o Liter – the program applies the fertilizers as measured in liters. The quantity is set in the Quantity Set Point column of the Pumps in Program table at the lower section of the window.
  - o Duration - the program applies the fertilizers as measured in time duration (HH:MM:SS). The required duration is set in the Duration Set Point column of the Pumps in Program table at the lower section of the window.
  - o l/m³ or Gal/THG - the program applies the fertilizers relative to the volume of water applied to the irrigation valve; per each volume of water applied the program applies the volume of fertilizer set in the Quantity Set Point column of the Pumps in Program table at the lower section of the window.
  - o Fragmented – in this fertigation mode the system calculates the fertigation ratio from the total amount of fertilizer set in the Quantity Set Point column, and the fertilizer is applied evenly along the irrigated water. In this mode the system makes sure that all the fertilizer amount is applied as the user defined.

Please note that the headline and the entry parameters of the Amount of Fertilizer column (X set Point), of the Pumps in Program table, change according to the selection done at the Fertilization By parameter at the upper section of this window.

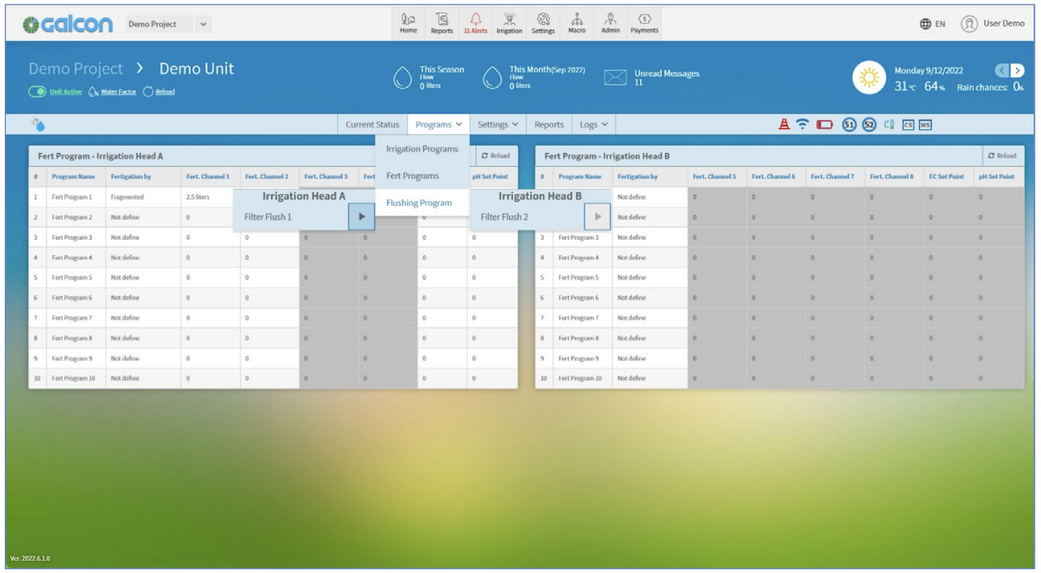
- The second line of the window – displays the EC and pH Set Points and the number of the water meter used by this fertigation program. When EC and/or pH parameters are set, the system increases or decreases the injection rate in order to stay at the required EC and pH levels.

The Pumps in program table:

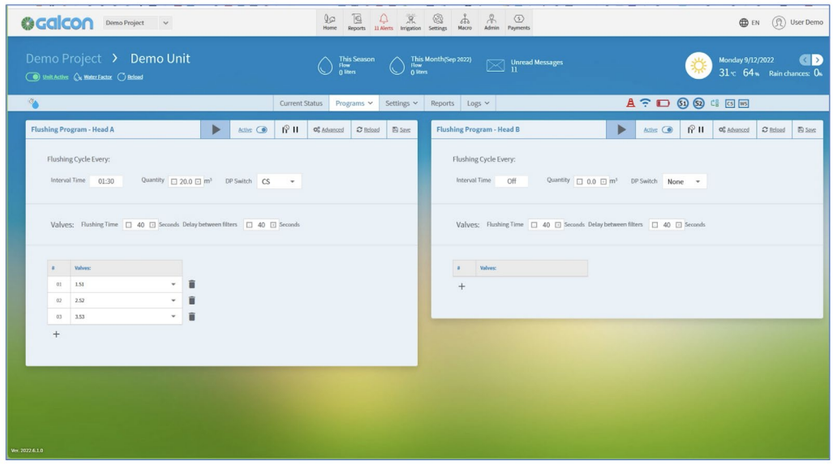
This table, at the lower section of the fertilizing program window, displays up to 4 active Fert Channels. Each such channel is a specific fertilizer pump configured for this channel. Each such available channel allows the user to set the required quantity for this program while not-configured channels are grayed.

H.4. The Flushing Programs:

Move the mouse cursor to the Flushing Programs options; the system displays the two irrigation heads of the unit, together with their flushing programs. The arrow next to the name of the flushing program enables the user to manually start a flush cycle. When started this icon changes to Stop Icon.



Click on the required flush program to display the following screen.



Each window of this screen relates to irrigation head A or B accordingly.

The flushing program window:

- The window's headline – displays the irrigation head name (A or B), and depicts the following icons:
  - o Run program – an option to start a flush cycle manually. The "Play" icon enables the user to manually start the cycle; once the cycle starts the play icon turns into a "Stop" icon that allows the user to stop the cycle.
  - o Activation – enables the user to switch the flushing program to Active or Not Active.
  - o Pause by time – enables the user to pause this program operation for a predefined time span.
  - o Unlimited Pause – enables the user to pause this program operation for an unlimited time span (until the program is re-activated by clicking again on the pause icon). Note that after clicking the pause icon, it turns into a green play icon.
  - o Advanced – enables the user to set the advanced parameters (see explanation below).
  - o Reload – reloads the screen.
  - o Save - save the changes done to the program to the unit's memory.
- The first line of the window – displays the flushing cycle parameters:
  - o The interval time – the time between flush cycles (applicable only when the irrigation is taking place.
  - o Quantity – starting the cycle according to the amount of water passes through the irrigation head.
  - o DP Switch – select the digital sensor input that is used as a DP switch for starting a flush cycle accordingly.

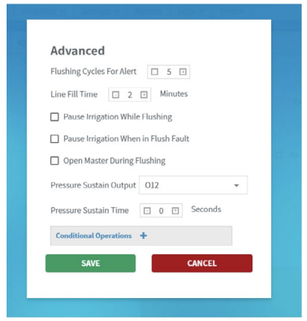
Note that:

The flushing can be triggered by each one of these parameters; the beginning of a flush cycle resets the counters of the triggers.

In cases when the irrigation stops while the interval-time and the quantity counters are still counting, the counters continue their counting from the point they stopped, at the beginning of the next irrigation cycle.

- The Valve line of the window – displays the filters parameters:
  - o Flushing time – the time for flushing each filter in the battery.
  - o Seconds delay between filters – the delay between the end of flushing a filter and the beginning of the next filter flushing.
- The Valves table – displays the filters valves (outputs); select the filters participating in this flushing program (up to 24 filters).

The Advanced flushing program window:

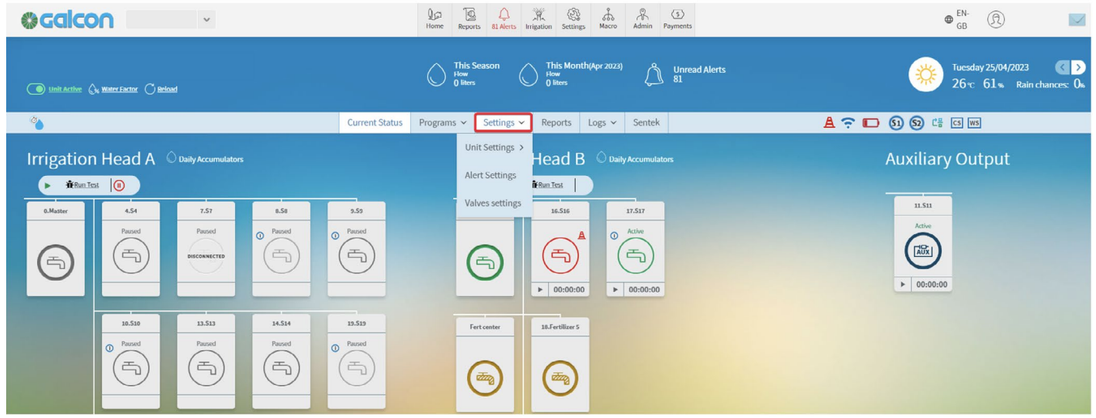


- Flushing Cycles For Alert – set the number of consecutive flushing cycles that causes the system to issue an alert.
- Line fill Time – a delay in the beginning of the irrigation when slushing cycle cannot be started (due to not enough line pressure during the pipeline filling process.
- Pause Irrigation While Flushing – stop irrigation when the flushing cycle is operating. Usually, to be used when there is not enough pressure to flush the filters during irrigation.
- Pause Irrigation When in Flush Fault – stop the irrigation in case the filtration battery is in fault.
- Open Master During Flushing – keeps the master valve opened during flushing in order to supply flushing water even if the irrigation is paused.
- Pressure sustain Output – select the output that is connected to a pressure sustain valve which is used to maintain enough upstream pressure during flushing.
- Pressure sustain Time – enter the time required to stabilize the pressure after the sustain valve is activated before the actual flushing starts.
- Conditional Operation – select a logic condition that once activated affects this flushing program. Limited to 2 conditions only.

I. Setting the GSI PRO

I.1. Entering the settings section of a GSI PRO unit:

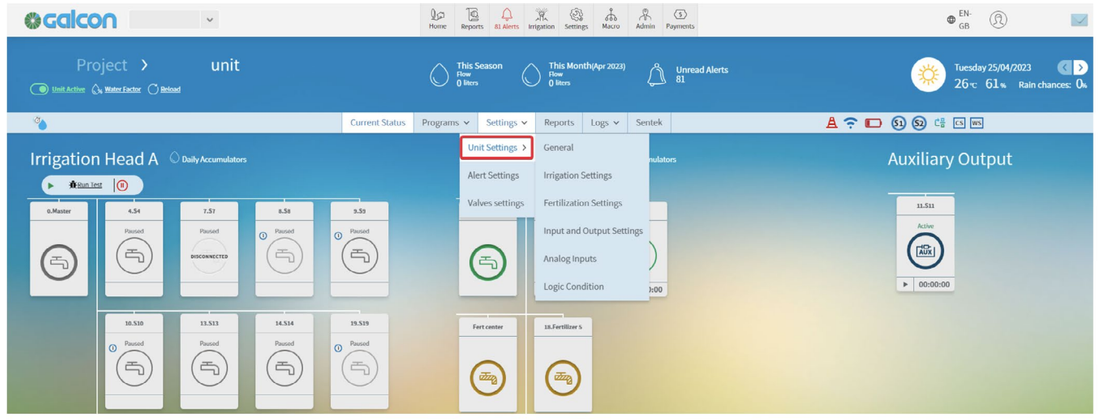
From the main screen of the system press on the card of the required unit and select the Settings tab.



The drop-down list enables the user to set the Units Settings, the Alert Settings, and the Valves Settings.

I.2. The Unit Settings:

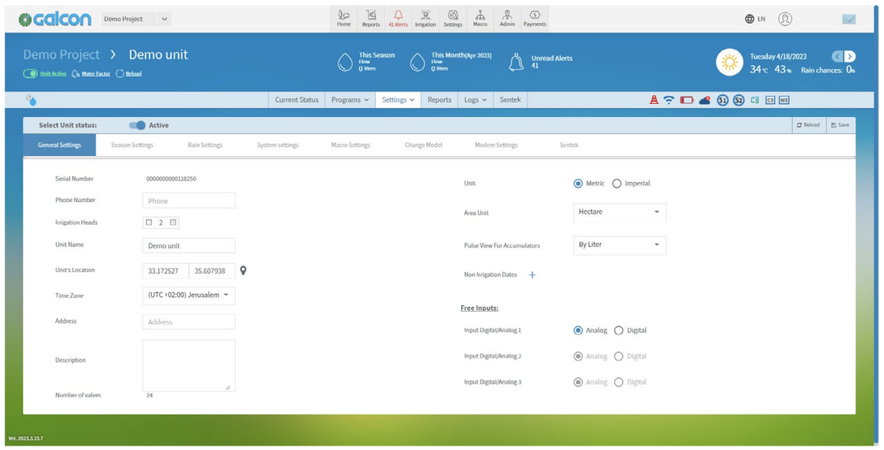
Move the mouse cursor to the Unit Settings option; the system displays a drop-down list that is used as the entry points to the following setting tabs:



- o General
- o Irrigation Settings
- o Fert Settings
- o Input and Output Settings
- o Analog Inputs
- o Logic condition

The General entry of the drop-down list:

Clicking on the General entry of the drop-down list opens the following screen:



The top line of the screen enables the user to set the unit's status to Active or Not Active, to Reload the screen, and to Save the settings entered.

The General screen of the drop-down list contains 6 tabs:

- o General Settings
- o Season Settings
- o Weather Settings
- o System Settings
- o Macro Settings
- o Change Model
- o Sentek

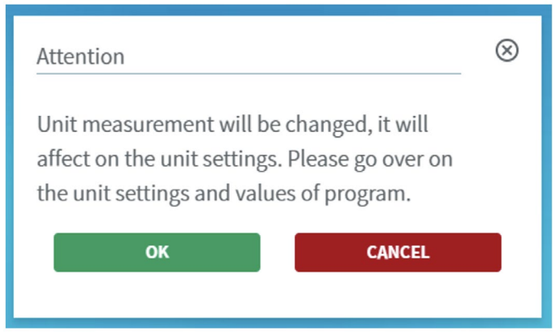
The General Settings screen (see the above picture) displays the following parameters:

- Serial Number – the Serial Number of the unit as set by the factory.
- Phone Number – the user's phone number – note that this number is not used by the unit's software.
- Irrigation Heads – the number of the unit's irrigation heads (1 or 2) as set by the factory according to the user's purchase order.
- Unit Name – the name of the unit.
- Unit's Location – the unit's location coordinates; the coordinates can be entered as string of numbers or by opening the world map by clicking on the icon to the right of the coordinate's boxes.

Use the Search box of the map to locate the required location and move the unit's pointer to the exact location; the coordinates appear on the left side of the map.

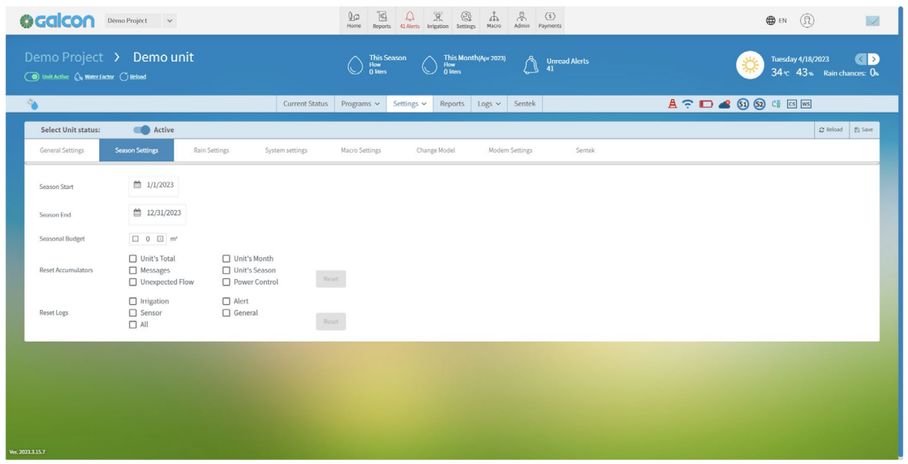
The list at the left side of the map enables the user to add a secondary location on the unit's map, that is used for indicating the location of the weather station that its data is used to affect the operation of this unit, e.g., pausing the unit due to chance of rain.

- Time Zone - select the unit's location time zone from the list.
- Address – set the unit's address - note that this parameter is not used by the unit's software.
- Description – an option for entering free text related to the unit.
- Number of valves – the number of the enabled valves (outputs) of the unit as set by the factory according to the user's purchase order.
- Unit – set the unit's engineering units; Metric or Imperial. Important: it is not recommended to change this parameter in an operational unit. In such case the system issues the following hazard message:



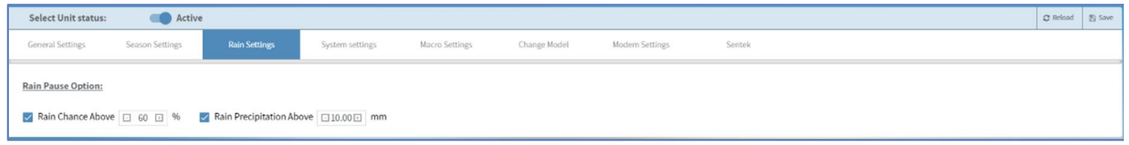
- Area Unit – set the set the engineering unit of the unit's valve areas, the options are: m², Dunam, or Hectare, note that for units with imperial engineering units these options are changed accordingly: ft², Acres.
- Pulse View For Accumulators – set the engineering units for the system's water accumulation counters, the options are By liter, or By m³, note that for units with imperial engineering units these options are changed accordingly: Gallons.
- Non-Irrigation Dates – set up to 10 specific calendar days in which the unit is prevented from operating any irrigation; usually used for especial events.
- Free Inputs: set the type of the 3 unit's free inputs to Analog or Digital. Please note that for AC units the free inputs AD1, 2, 3 can be analog or digital, and for DC units the free input AD1 is only digital and inputs AD2, 3 are only analog.

The Season Settings tab displays the following parameters:



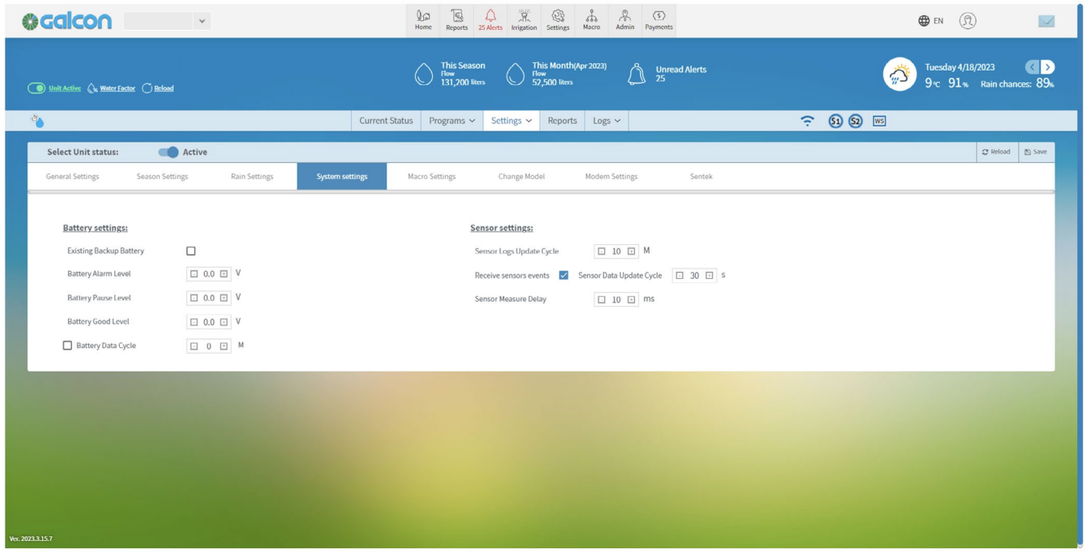
- Season Start – set the beginning date of the season.
- Season End – set the end date of the season.
- Seasonal Budget – set the seasonal water quota, once the quota ends the system issues an alarm message.
- Note that the dates and the quota are used for the season water accumulation only.
- Reset Accumulation – select the required parameters to be reset to zero and then press the Reset button. (Requires an Admin authentication level).
- Reset Logs – select the required logs to be cleared from the unit's internal memory and then press the Reset button (requires an Admin authentication level).

The Rain Settings tab displays the following parameters:



- Rain Pause Options
  - Rain Chance Above – set the daily rain chance percentage, as received from the weather station, for switching the unit to rain chance pause. The system checks the expected rain chance of the next day every day at 18:30 and the result affects the next day irrigation.
- Rain Precipitation Above – Set the daily precipitation as received from the weather station to switch the unit to pause due to rain accumulation. The system responds to the last reading received from the weather station on the previous day.
- Note that when the unit is in rain pause, a rain pause icon appears on the status screen. Clicking on this icon can release the system from the pause status. The system adds a record to the logs upon entry or exit from rain pause status.

The System Settings tab displays the following parameters:

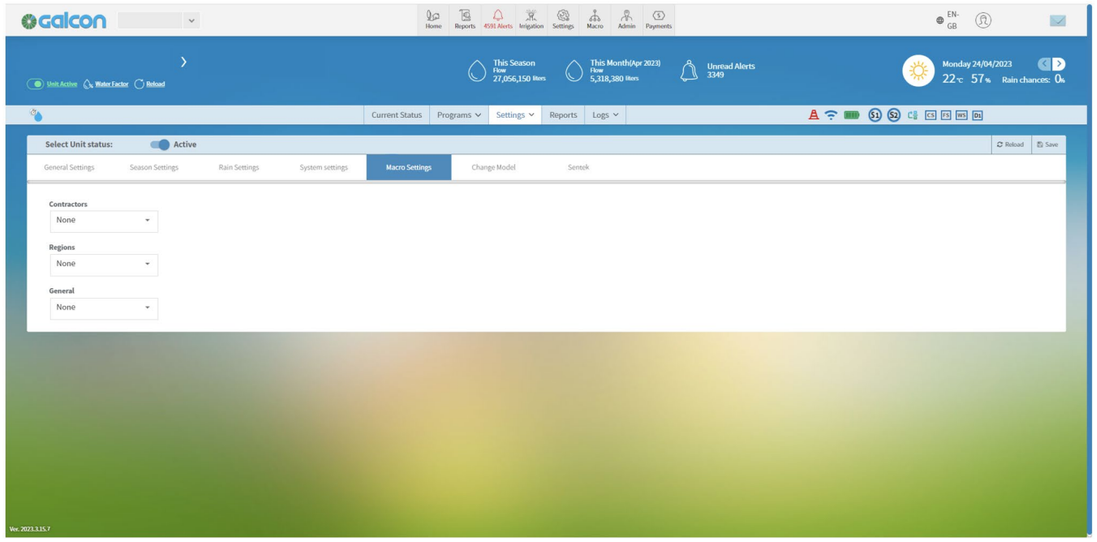


- Battery Settings:
  - Existing Backup Battery – set whether this unit has a backup battery (applicable only for AC units).
  - Battery Alarm Level (Volts) – enter the battery's level for issuing a battery level alarm.

- o Battery Pause Level (Volts) – enter the battery's level for pausing the unit due to low battery level.
- o Battery Good Level (Volts) – enter the battery's optimal operation level.
- o Battery Data Cycle (Minutes) – set the interval of the battery level checking.

- Sensor Settings:
  - o Sensor logs Update Cycle – set the interval of logging the sensors reading to the system logs.
  - o Receive sensor events – set the option for the system to display the sensor reading in real time.
  - o Sensor Data Update Cycle – set the update interval of the sensor reading display.
  - o Sensor measure Delay – set the wakeup time delay (in milliseconds) for achieving a stable reading of the sensor (due to energy consumption, the sensors are not constantly energized, therefore a wakeup time is needed).

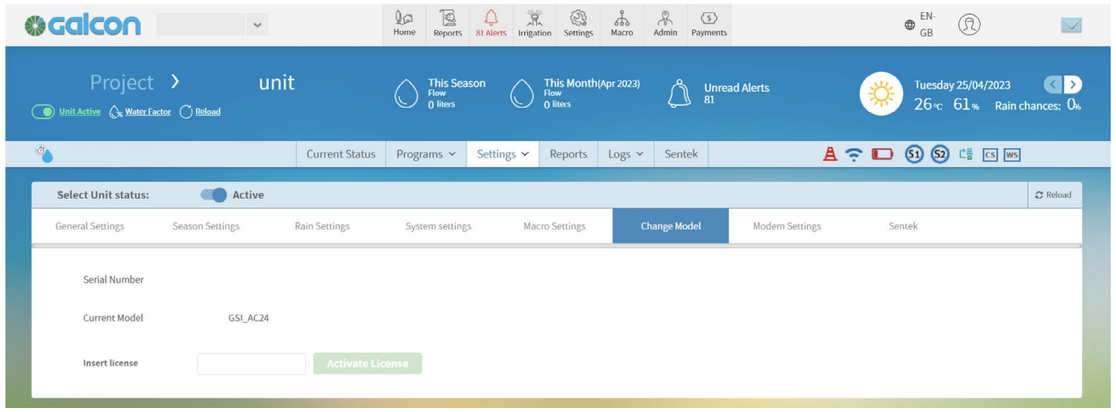
The Macro Settings tab displays the following parameters:



- Contractors
- Regions
- General

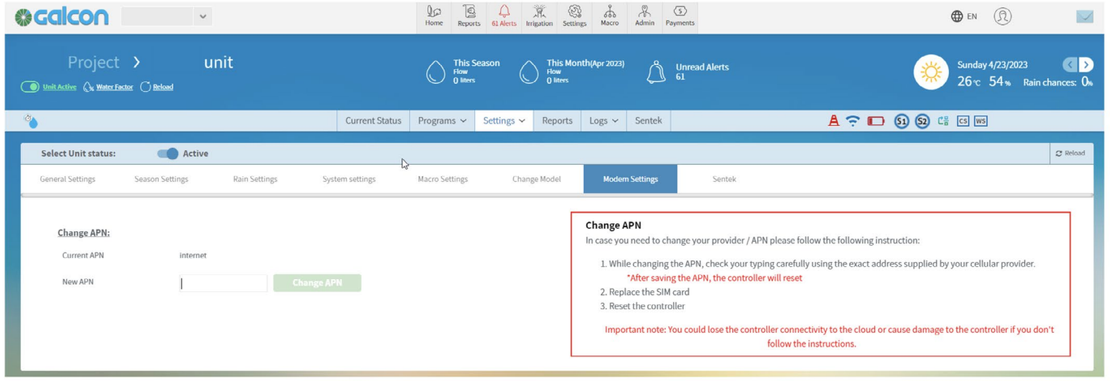
Please refer to the Macro Chapter for details – "Chapter L." of this document

The Change Model Settings tab displays the following parameters: (requires Admin authentication)



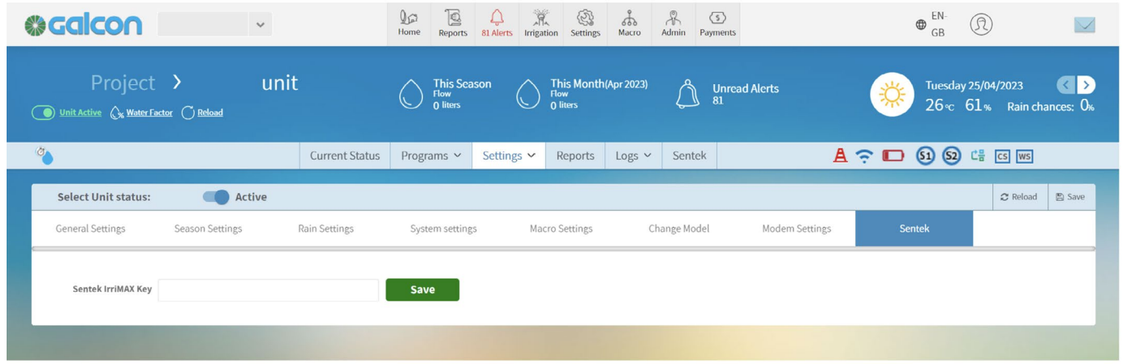
- Serial Number – the current serial number of the unit.
- Current Model – the model of the current unit.
- Insert license – in order to change the model, e.g., adding outputs to the unit, enter the new purchased license in order to change the current model to the new model.

The Modem Settings tab displays the following parameters: (requires Admin authentication)



- Change APN:
  - o Current APN – the currently communication APN of the unit.
  - o New APN – enter the new APN (after replacing the SIM card to the new cellular communication supplier SIM card).

The Sentek Settings tab displays the following parameters:

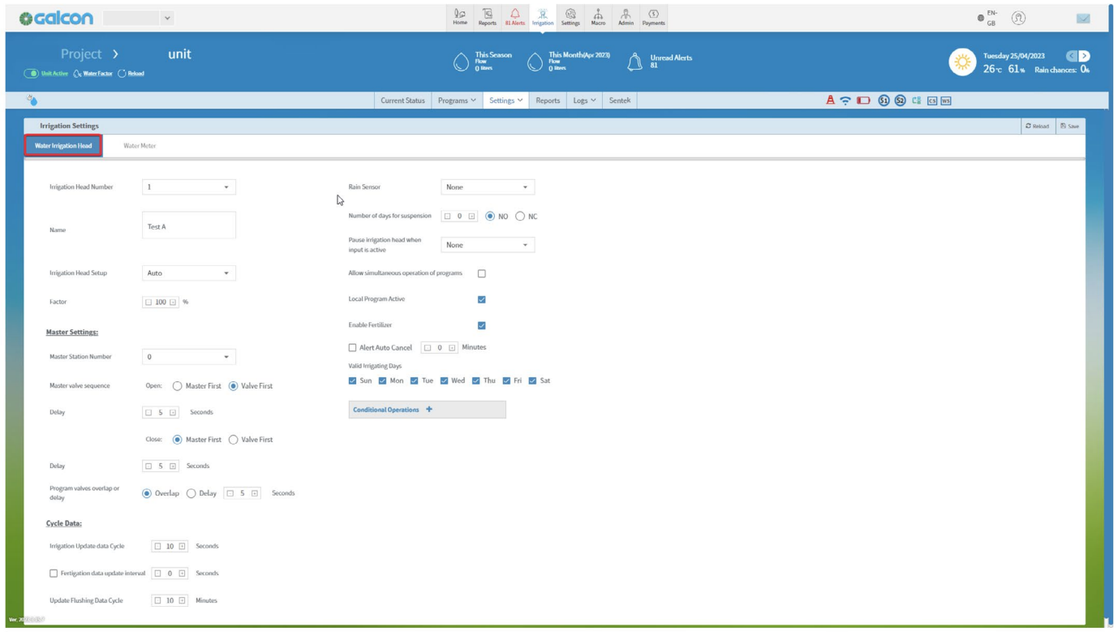


- Sentek IrrMAX Key – enter the Sentek license key for connecting the unit to Sentek system. Note that the "Sentek" tab appears on the unit's main screen only after providing a valid IrrMAX key.

<u>The Irrigation Settings entry of the drop-down list:</u>

Clicking on the Irrigation Settings entry of the drop-down list opens the following screen, that has 2 tabs:

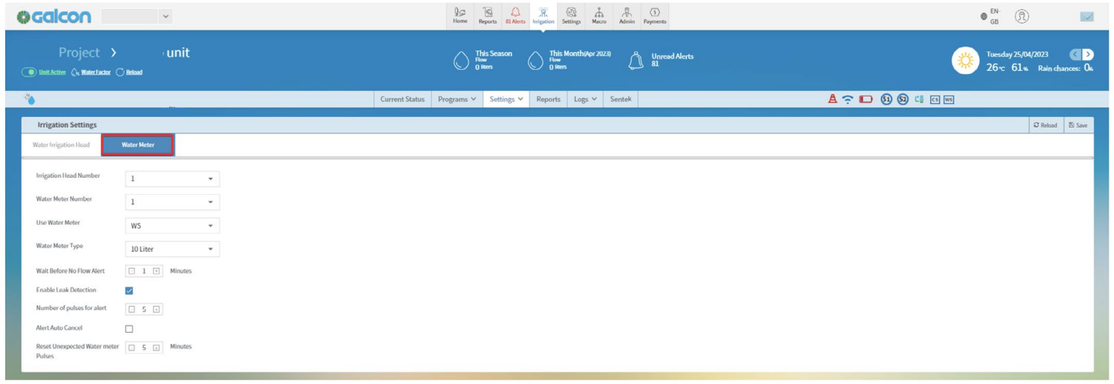
- o Water Irrigation Head
- o Water Meter



The Water Irrigation tab has the following parameters:

- Irrigation Head Number – select the number of the irrigation head for this screen parameters.
- Name - set a name for this irrigation head.
- Irrigation Head Setup – Select the operation method of this irrigation head, the options are:
  - o Reset – selecting this option clears all the in-queue programs of this irrigation head and stopes all its running programs. **Important note:** While the head operation method is set to Reset, no irrigation program can start, therefore, it is essential to return the method to Auto after the reset operation is completed.
  - o Auto – this is the default operation method of the irrigation head; the controller operates the programs automatically.
  - o Pause – select this method for pausing the operation of this irrigation head.
  - o Always open – In this operation mode, the main valve of this irrigation head remains opened. The main valve closes only during faults or when closed by a logic condition.
- Factor – multiply the water amount of all this irrigation head valves by the percentage entered to this parameter (between 10 -200%).
- Master Settings:
  - o Master ST. Number – the number of the master valve output for this irrigation head. Note that for irrigation head A the output number of the master valve is always output number 0; for irrigation head B the user can set other output to serve as a master valve.
  - o Master valve sequence - Open – set the opening order of the master valve and the irrigation valves, the options are: Master First, or Valve first.
  - o Delay – the delay between the opening operations of the master and the valves, the default is 5 seconds.
  - o Master valve sequence - Close – set the closing order of the master valve and the irrigation valves, the options are: Master First, or Valve first.
  - o Delay – the delay between the closing operations of the master and the valves, the default is 5 seconds.
  - o Program valves overlap or delay – select the transit method between valves in a program; in overlap method the first valve remains open once the next valve opens, and the first valve closes only after the delay is passed. In Delay method the first valve closes while the next valve opens only after the delay is passed.
- Cycle Data:
  - o Irrigation Update data Cycle – set the on-line refresh cycle of the Irrigation data presented on screen, in Seconds.
  - o Fertigation data update interval – if required (click the selection box to the left of this parameter), set the on-line refresh cycle of the Fertigation data presented on screen, in Seconds.
  - o Update Flushing Data Cycle - set the on-line refresh cycle of the Flushing data presented on screen, in Minutes.
- Rain Sensor – set the physical digital input number to which a rain sensor is connected, the presented inputs depend on the available digital inputs of the unit.
- Number of days for suspension – set the number of days the irrigation should be paused once a rain signal is received from the rein sensor.
- Connection type – the type of the rain sensor hardware; NO or NC. (NO = normally open, a rain signal is received when the sensor's hardware input switches from 0 to 1 state. NC = normally close, a rain signal is received when the sensor's hardware input switches from 1 to 0 state.
- Pause Irrigation Head When Active – set the physical digital input number that is used to pause the irrigation head when this input is active, the presented inputs depend on the available digital inputs of the unit.
- Allow simultaneous operation of programs – select whether it is possible for irrigation programs to irrigate together in this irrigation head.
- Local Program Active – select whether irrigation programs that are set by the user from the local keyboard of the unit will be executed. **Note that:** this parameter doesn't prevent the user from manually starting programs from the unit's keyboard.
- Enable Fertilizer – set whether this irrigation head can use the system's fertilizer pumps. If this parameter is disabled the Fertigation programs will not appear for this irrigation head.
- Alert Auto Cancel – set whether active alarms will be automatically reset after the time span in minutes set in this parameter. **Note that:** uncontrolled fertilizer alarms cannot be automatically reset even if this parameter is set to cancel alarms automatically.
- Valid Irrigation Days – this irrigation head may irrigate only in the days of the week selected in this parameter.
- Conditional Operations – the user can set up to 3 operation conditions to affect this irrigation head.

The Water Meter tab has the following parameters:



- Irrigation Head Number – select the number of the irrigation head for this screen parameters.
- Water Meter Number – select the number of the water meter for this irrigation head.
- Use Water Meter – select the physical digital input the is used for the water meter selected in the previous parameter. The presented inputs depend on the available digital inputs of the unit.
- Water Meter Type – select the pulse size of this water meter, the options presented depend on the general

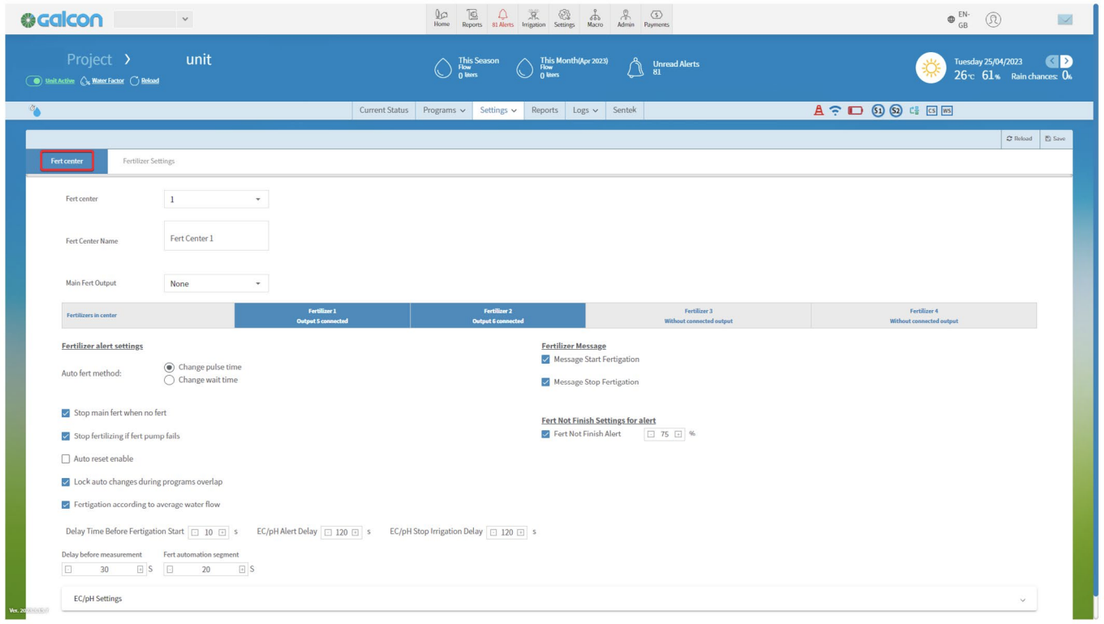
engineering units of the system (Metric or Imperial).

- Wait Before No Flow Alert – set the delay time that by the beginning of an irrigation cycle, the system waits for receiving pulses from the water meter, before issuing a No Flow Alert.
- Enable Leak Detection – set whether the system detects leaks counted by this water meter.
- Number of pulses for alert – in case the system is set to detect leaks counted by this water meter, set the number of uncontrolled pulses after which the system issues an alert.
- Alert Auto Cancel – set whether this water meter participates in the automatic alerts canceling feature.
- Reset Unexpected Water Meter Pulses – set the maximal time between two uncontrolled water pulses counting. Once the time passes without receiving another uncontrolled water pulse, the counter of the uncontrolled pulses is reset to zero.

The Fert Settings entry of the drop-down list:

Clicking on the Fert Settings entry of the drop-down list opens the following screen, that has 2 tabs:

- Fert Center
- Fertilizer Settings



The Fert Center tab has the following parameters:

- Fert Center – select the number of the Fert Center number for this screen parameters (1 or 2 according to the irrigation head number).
- Fert Center Name – set a name for this Fert Center.
- Main Fert Output – select the number of the output that is used as the main fertilizer output (valve or booster, etc.) for this Fert Center.
- Fertilizers in center – this line displays the connected fertilizer pumps of this Fert Center, up to four pumps per irrigation head; 1-4 per Fert Center 1 and 5-8 per Fert Center 2. The headline specifies the hardware's output number of each such fertilizer pump.
- Auto Fert method – select whether the fertilizing automation changes the injection rate by changing the pulse length of the pumps or by changing the wait time length between the pulses.

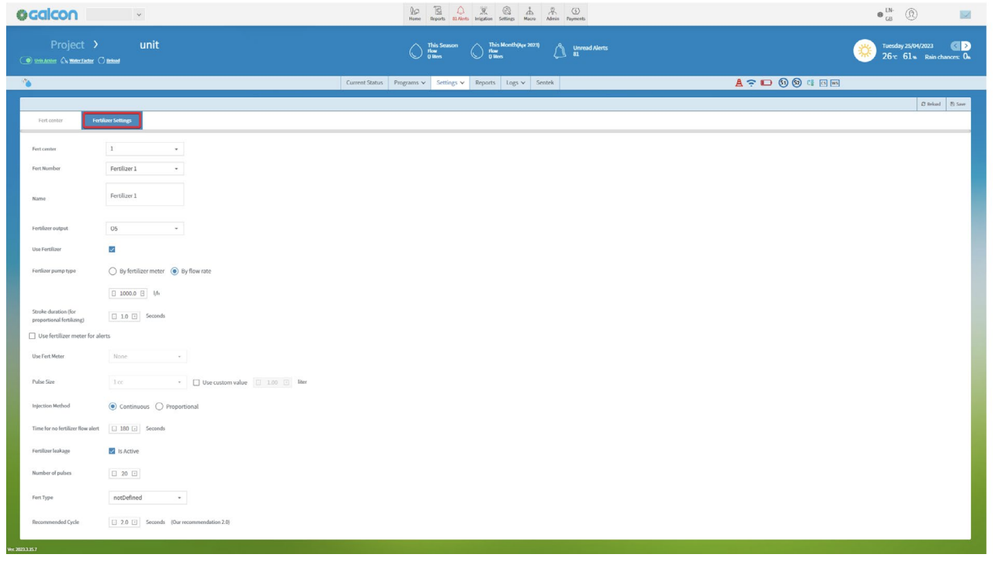
- Stop main fert when no fert - select the behavior of the Main Fert Output during an irrigation cycle which has a fertigation program. If "stop" is selected, the Main Fert Output remains closed during the irrigation operation when no fertilizing is taking place (such as during water before fertigation). If "stop" is not selected, the Main Fert Output remains opened during the whole irrigation operation. **Please note:** the Main Fert Output doesn't relate to the existents of EC and pH sensors in the system. Therefore, if the system includes EC and pH sensors, and if for a proper reading of them along the system operation, the Main Fert Output should remain opened, the parameter of Stop Main Fert When no fert, should be deselected.
- Stop fertilizing if fert pump fails – select whether to stop the whole fertigation program when one of the participating pumps enters to fault mode.
- Auto reset enable - select whether to automatically reset Fert Center alerts and faults according to the Auto Reset Interval Time of the system; the recommendation NO. Please note the uncontrolled fertilizer fault cannot be automatically reset!
- Lock Auto changes during program overlap – when the system works on EC/pH automation mode, and during the transition between irrigation programs the water flow-rate changes momentarily so the EC/pH reading change. During this overlap time select whether to lock the automatic fertigation operation settings, so the system will not enter to unnecessary and temporary fertigation operation changes (recommended).
- Fertigation according to average water flow – select whether to apply the fertilizers according to the average of the last few pulses of the water flow (recommended). If not selected, the fertilizers are applied according to the time between the last two water pulses (not recommended).
- Message Start Fertigation – select whether to send messages of "fertilizing started" to the system logs.
- Message Stop Fertigation – select whether to send messages of "fertilizing ended" to the system logs.
- Fert Not Finish Alert – select whether to issue an Fert Not Finished alert when the programmed fertilizer amount is not completed by the end of the irrigation program. If selected, set also the percentage of the applied fertilizer that below it this alert is issued. (It is recommended to use this protection alert).
- Delay Time Before Fertigation Start – set the time for the water pressure stabilization before starting the fertigation.
- EC/pH Alert Delay – set the delay time for the system to issue an EC/pH alert when the reading is incorrect (Low or high EC/pH alert); this prevents unnecessary alert in momentarily abnormal reading.
- EC/pH Stop Irrigation Delay – set the delay time for the system to stop the irrigation due to EC/pH stop alert (Low or high EC/pH Stop); this prevents unnecessary stop of the irrigation due to momentarily abnormal reading.
- Delay before measurement – when in automation fertigation mode, when the irrigation starts, set the delay time in which the system does not change the fertigation dosing from the previous irrigation dosing; this prevents unnecessary major dosing change, the system starts the automation process once this delay ends.
- Fert automation interval – set the interval of the automation fertigation calculation; the recommended value is every 20 seconds. In these intervals the system calculates the required automation settings according to the average of the last 3 seconds readings and accordingly decides if any operation change is required. The following describes a method of calculating the correct value for the fert automation interval, a value that ensures a smooth operation of the fertigation automation process.
    - Stand near the controller and start an irrigation without fertigation.
    - Wait for the water flow-rate to stabilize.
    - Look at the real-time readings of the EC/pH sensors, manually start the fertigation and measure the time it takes the system to reach a stabilized EC/pH reading.
    - Enter the measured time to the "Fert automation interval" parameter.
- EC Sensor – select the hardware input for the EC sensor.
- Max Fert EC Increase – The system tries to reach the required EC level by increasing or decreasing the injection rate. This parameter sets the maximal injection increase rate by percentage. The recommended value is 30-50%
    - For each fertilizer pump to be calibrated and for each fertigation program, fill 10 liters of water to a bucket and add the relative fertilizer amount to the water, e.g., for a program of 1 liter of fertilizer for each 1 m^3 of water, mix 10 cc of fertilizer in the 10-liter bucket. Stir thoroughly and check if you reached the required EC level.
    - If you reached the required EC level in the bucket, start an irrigation program without setting the required

EC level parameter for the fertilizing automation and check if the system can reach the required level. If the system cannot reach the required level, check the settings of the fertilizer pump.

- o If the system reaches the required level, enter the required value to the fertilizing automation parameters and let the system to start the automation process. The automation process starts to increase and decrease the injection rate in order to maintain the required EC level.
- o For a new system set the injection flow-rate of the fertilizer pumps as per the required fertigation programs. Set the pump's mechanical calibration features as a result of the following initiation procedure:
  - For a regular program with water flow-rate of 10m³, where 5 liter of fertilizer is required to be injected by the first fertilizer pump per each 1m³, the fertilizer pump flow rate should be: the water flow-rate multiply by 5 liters per 1m³, multiplied by 2.
  - Example: for a 1-hour irrigation the water amount delivered in this example is 10 m³. if we need to apply 5 liters of fertilizer for each 1m³ of water of the applied 10 m³, then the fertilizer pump's flow rate should be 50 liter per hour.
  - In such case a 50 liter/h fertilizer pump should work the whole hour in order to deliver the required fertilizer.
  - Therefore, in order to be able to change the injection rate by the fertigation automation, we need to increase the basic injection rate of the pump so we multiply the 50 liter/h by two and the fertilizer pump should be able to supply a fertilizer flow-rate of 100 liter/h. in such case the pump works half of the time and this enable the automation process to have sufficient operation margins.

- Max Fert EC Decrease – The system tries to reach the required EC level by increasing or decreasing the injection rate. This parameter sets the maximal injection decrease rate by percentage. The recommended value is 80%
- PID process constants – kp, ki, and kd – set the required constants for the EC automation PID process; proportional, integral, and derivative; the default values are: kp-0.15, ki-0.05, kd-1.00.
- EC difference from required
  - o Low EC Alert – set the EC level that under it the system issues a Low EC Alert
  - o High EC Alert – set the EC level that over it the system issues a High EC Alert
  - o Low EC Stop – set the EC level that under it the system stopes the irrigation due to Low EC.
  - o High EC Stop - set the EC level that over it the system stopes the irrigation due to High EC.
- **Important** - As per the EC sensor parameters repeat the same process for the pH sensor.

The Fertilizer Settings tab has the following parameters:

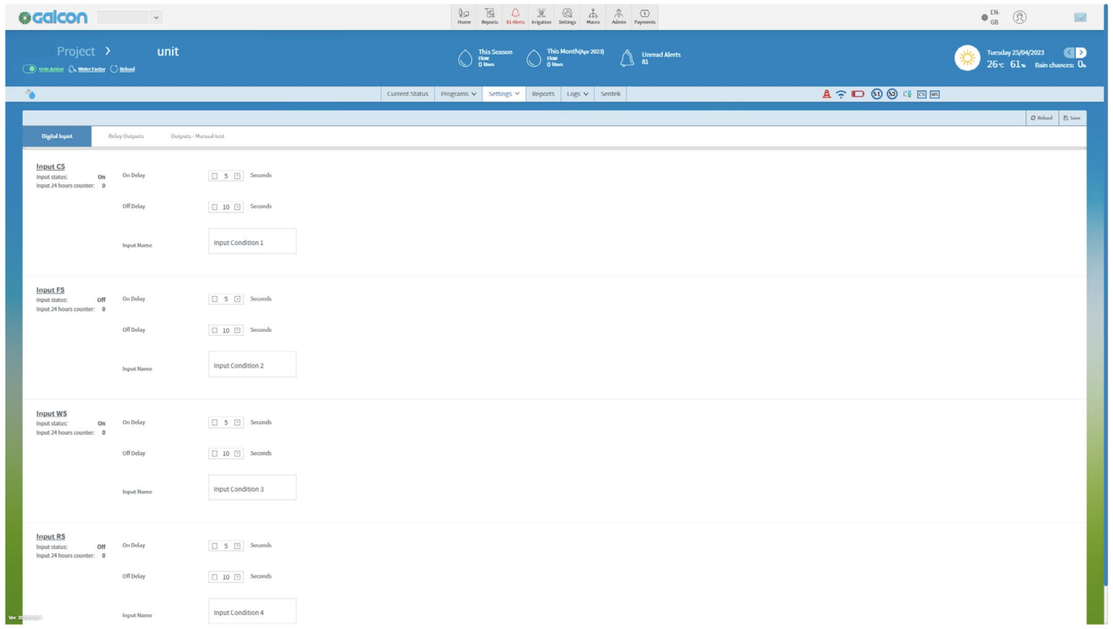


- Fert center – select the number of the fert center (1 or 2) for which the user can configure the fertilizer pumps.
- Fert number – select the required fertilizer pump to be configured in this screen; the drop-down lists the up to four available pumps for this fert center.
- Name – set a name for the selected fertilizer pump.
- Fertilizer Pump Active – set whether this fertilizer pump is active or not. Note that when this fertilizer pump is already used by fertilizing programs and the user would like to switch it to "Not Active", the system issues a warning message.
- Fertilizer Output – set the controller's output that this fertilizer pump is connected to.
- Fertilizer Pump type – select the type of the fertilizer pump, the options are: By fertilizer meter – this fertilizer pump delivers and counts the fertilizer according to its set fertilizer meter, By flow rate – this fertilizer pump operates only according to the flow-rate and the following parameters. Please note that the screen displays the next parameters according to the selection of the pump type.
- When the pump type is set to "By Flow Rate" the user has to set the pump's flow rate in liters per hour.
- Stroke duration (for proportional fertilizing) – when the pump operates according to flow rate, its stroke duration parameter is used by the system to evenly disperse the fertilizer in the water. This is a technical parameter that depends on the pump's type; when setting this parameter make sure that the time set is sufficient for the pump to fully complete a single stroke.
- Use fertilizer meter for alerts – set for a fertilizer pump that operates by flow rate, if it still using a fertilizer meter for issuing alerts.
- Use fertilizer meter – for fertilizer pump that operates according to fertilizer meter it is mandatory to select the required meter in this parameter. For fertilizer pump that operates by flow rate and needs a meter for issuing alert, set the required meter number in this parameter.
- Pulse Size – when using a fertilizer meter is required, select the pulse size of the meter from the drop-down list, or set the pulse size at the Use Custom Value parameter (can be used for calibration the exact pulse size in case of deviation between the meter reading and the actual pulse volume.).
- Injection Method – set the type of the fertilizer injection method, the options are: Continuous – the system calculates the number of fertilizer pulses to be injected between two water pulses, and when a water pulse is received the pump injects the required fertilizer pulses continuously (this method may save the battery consumption in DC controllers), Proportional – the system calculates the number of fertilizer pulses to be injected between two water pulses and then divides the required fertilizer pulses to be injected, evenly between the two water meter pulses.
- Time for no fertilizer flow alert – set the delay time for the system to issue a no fertilizer alert message.
- Number of pulses – set the number of uncontrolled fertilizer pulses before the system issues an uncontrolled fertilizer leakage alert.
- Fert Type – select the type of the fertilizer that is applied by the current fertilizer pump, the options are Not Defined (general type fertilizer), EC, pH, or OH. This parameter is essential for correct fertilizing according to EC/pH.
- Recommended Cycle – Set the minimal duration of the fertilizer pump pulses cycle, for a fertilizer pump that operates by flow-rate. For the best results it is recommended that the system receives a fertilizer pulse every 2 seconds. For example, when the fertilizer pump's pulse duration is plus/minus 1.0 second, it is recommended to set the cycle to 2 seconds, however if a complete stroke of the pump is longer, the cycle should be extended accordingly.

The Input and output settings entry of the drop-down list:

Clicking on the input and output Settings entry of the drop-down list opens the following screen, that has 3 tabs:

- o Digital Inputs
- o Relay Outputs
- o Outputs Manual Test



The Digital Inputs tab:

The controller has 4 predefined digital inputs: CS, FS, WS, and RS.

In addition to the predefined digital inputs, the controller has 3 floating inputs:

In an AC controller the user can define if these additional inputs are of Digital or Analog type:

If they are set as digital input type, they are added to the digital inputs list as AD1, AD2 and AD3.

If they are set as analog input type, the controller then has 4 digital and 3 analog inputs.

In a DC controller these additional inputs are predefined as two additional digital inputs and one analog input so the controller has 6 digital inputs and a single analog input.

For each Digital Input the controller displays the following parameters:

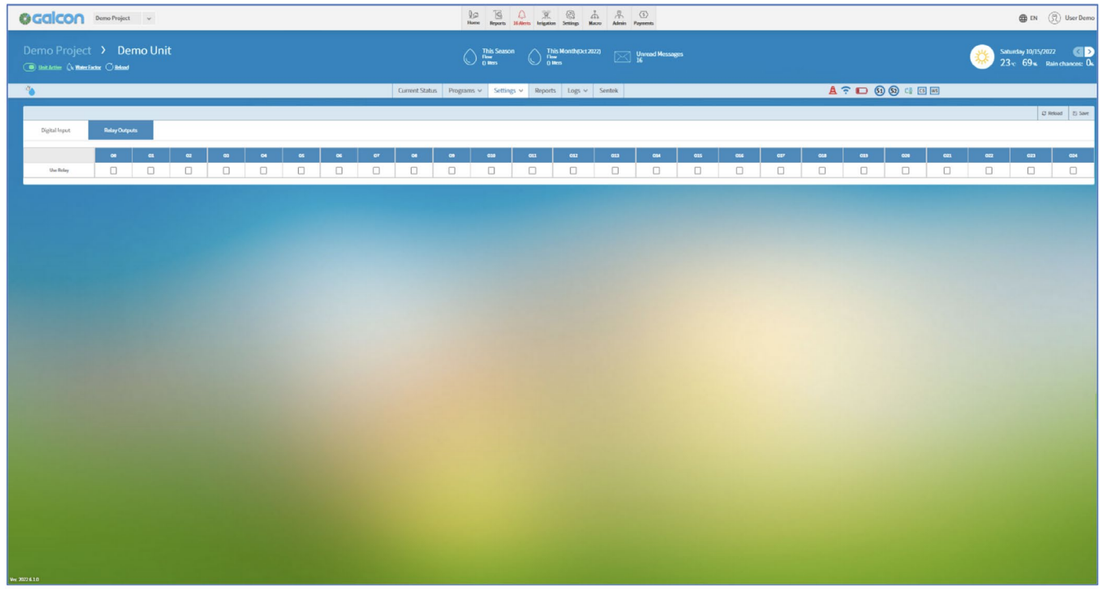
Note: these parameters are not applicable for any counters (water meters, etc.) only for condition inputs.

- Input Status – the current status of the input – On, or Off.
- Input 24 hours counter – the number of times that this input was switched ON in the last 24 hours.
- On Delay – the delay in seconds from the time the hardware input switched to ON until the controller's software reads it as ON.
- Off Delay – the delay in seconds from the time the hardware input switched to Off until the controller's software reads it as OFF.
- Input Name – the name that the user assigned to this input; this name appears in the system logs.

The Relay Outputs tab:

The outputs operation of the controller depends on its type; AC or DC.

AC Controller:



The outputs of an AC type controllers are of continuous relay operation, the controller continuously energizes the output as long as the output is switched ON. The number of outputs available in a controller depends on the purchase order of each specific AC controller (up to 24 outputs).

Due to the AC Current Consumption limitation of the hardware, the maximal number of devices that can be energized at the same time is restricted to 5 for solenoids and is not restricted for relays. This is why the user has to set, in the outputs table, the type of the device connected to each one of the controller's outputs: Relay or solenoid.

Very Important Note: in any case (solenoids or relays) the controller is restricted to maximum 200 milliamperes of power consumption per output, and to no more than 5 outputs at the same time; the rating of the controller's Resettable Fuse is 1.6 Ampere.

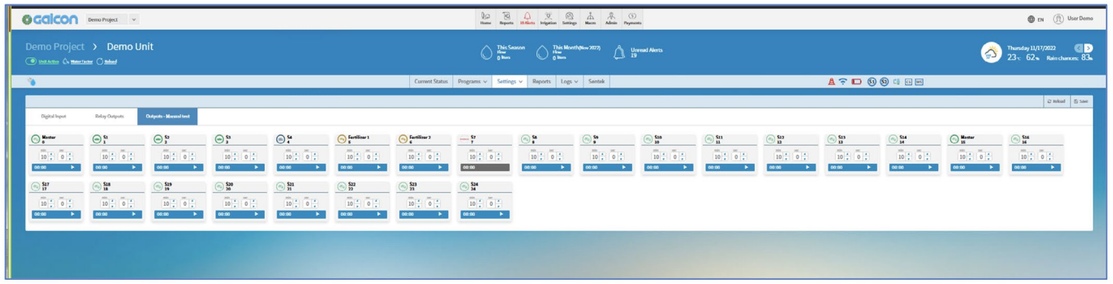
DC Controller:

The outputs of DC controllers are of latch-type solenoids or latch-type relays (two-wire connection only), the controller sends an open pulse for opening the latch and another pulse for closing the latch. The number of outputs available in a controller depends on its specific purchase order (up to 24 outputs).

Outputs command duration – in order to ensure proper opening/closing operation of the latch solenoids or relays, the user can define the pulse length in milliseconds (Galcon's recommendation is 200 milliseconds).

The Outputs Manual Test tab:

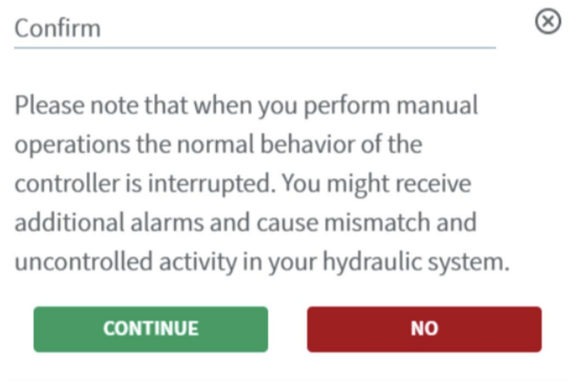
This screen is used mostly by technicians during installation or maintenance operations; it allows the opening of outputs by a manual command entered in the following screen:



On this screen each one of the controller's outputs appears in its own box. In the box the user can set the opening duration of the output in minutes (the default is 10 minutes and the maximum is 1.5 hours). Pressing the arrow at the lower line of the box switches the output to ON and the counter displays the time left till the closing of the output. Pressing the Arrow while the output is manually open, closes it.

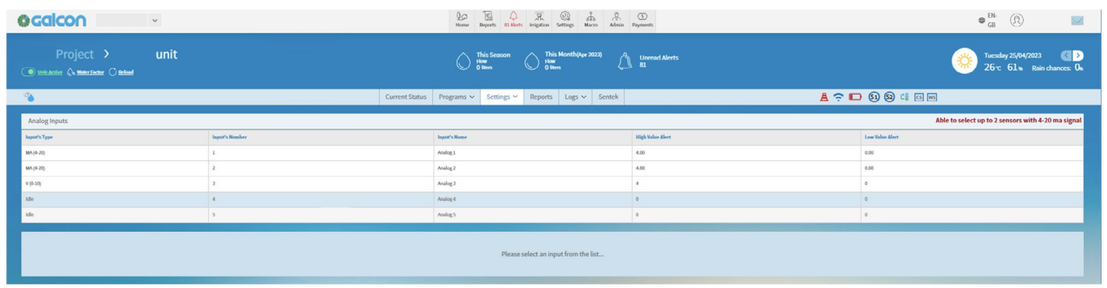
Very Important Note: The manual operation of outputs is a very dangerous action; it should not be performed carelessly and especially it is not recommended to manually open outputs while the controller is in normal operation. GALCON shall not bear any responsibility for any damage caused by opened manually outputs! Also note that exiting the manual operations screen doesn't close the manually opened outputs!

The following pop-up appears before the "Test Mode" is executed:



The Analog Inputs settings entry of the drop-down list:

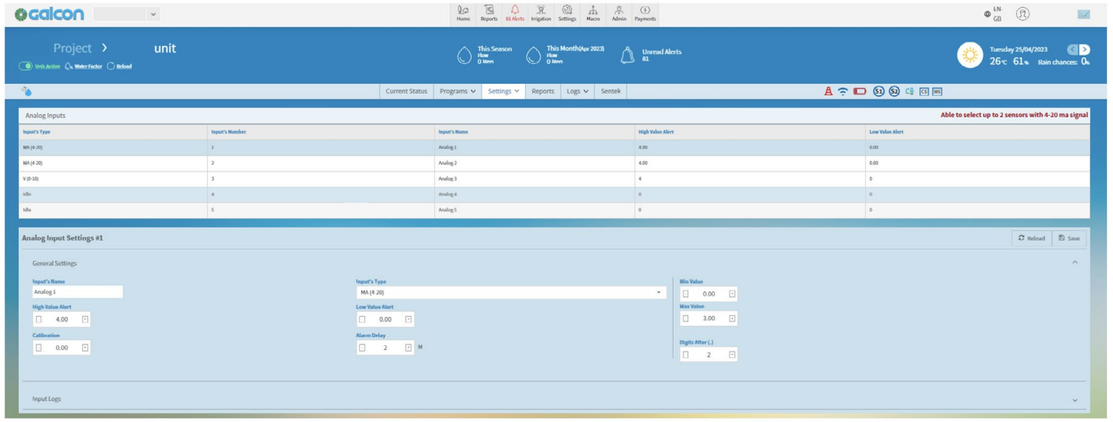
Clicking on analog inputs entry of the drop-down list opens the following screen:



Important Notes:

- The number of analog inputs (lines) of this screen's table depends on the type and the configuration of the controller. In an AC controller the maximal number is 5 while in a DC controller the maximal number is 3.
- Due to the hardware limitations of the controller the maximal number of 4-20 milliampere type analog inputs per controller is two.

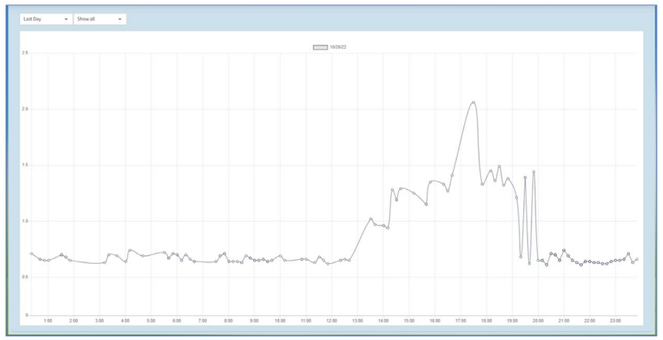
Select a line to open the configuration screen of the selected input:



For the selected Input the controller displays the following parameters:

- Input Name – Set a name for this input.
- Input type – Select the hardware type of the input, the options are: Idle -not defined, V (0-10) – Zero to 10 volts type, MA (4-20) – 4 to 20 milliamperes type. Note that all the sensors connected to the input should be of a linear type.
- Min Value – Set the minimal reading value of the sensor connected to this input.
- Max Value – Set the maximal reading value of the sensor connected to this input.
- Digits after (.) – Set the number of digits after the decimal point of the input (0-3 digits).
- High Value Alert – Set the reading that above it the controller issues an alert.
- Low Value Alert – Set the reading that below it the controller issues an alert.
- Alarm Delay – Set the delay time after which the controller issues a high or low reading alert.
- Calibration – In case the controller's reading of the sensor deviates from a calibrated manual sensor, set the calibration compensation deviation value (Plus or Minus) for the sensor.

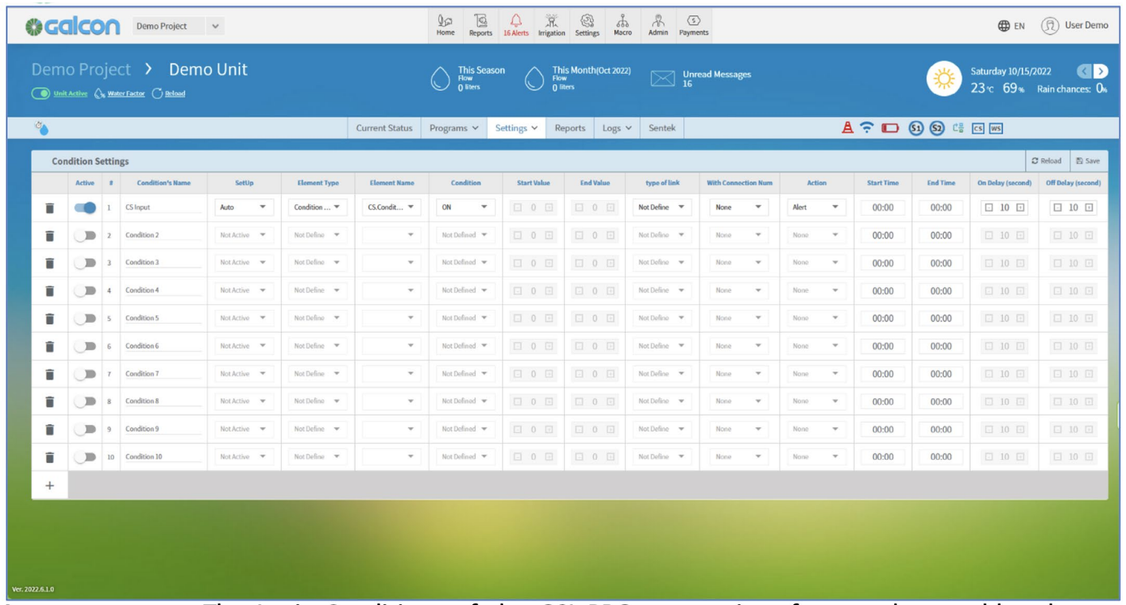
Once the configuration table is open, the user can press the Input Logs button at the lower corner of the screen in order to open the chart log of this sensor:



This screen displays a graph chart of the logged readings of the sensor connected to this analog input (last day or last week).

The Logic Conditions entry of the drop-down list:

Clicking on Logic Conditions entry of the drop-down list opens the following screen:



Important Note: The Logic Conditions of the GSI PRO system is a feature that enables the user to automatically perform predefined actions on specific system elements according to a predefined status of other system's elements; the conditions operate in an IF -> Then manner. For each controller there are up to 20 Logic Conditions.

The structure of the screen is divided into 3 major sections; the "General Data" of the logic condition; the "If" section of the logic condition; and the "Then" section of the logic condition and its operation timings.

For the General Data section follow the order of the following list:

- The delete icon – for deleting the condition
- Active – Set the condition to active or not active mode.
- Set a name for the logic condition.
- Setup - Select the required operation mode of the logic condition, the options are:
  - o Not active – the logic condition is not active.
  - o Auto – the logic condition is operational.
  - o By Time – in this mode the system ignores the "If" section of the logic condition and operates the "Then" section according to the logic condition timing settings.
  - o Manual – this mode is used for testing the logic condition operation immediately.
  - o **Important**: once the logic condition manual operation mode is checked, the user should remember to change the operation mode to another mode, otherwise the "Then" section of the logic condition will stay ON.

Setting the "If" section of the logic condition:

- Element Type - Select the required Element Type of the "If" section – the system opens a dropdown list containing the types of all the possible system elements that may be used in the "If" section of the logic condition. Note that the next parameters and fields are relevant to the selected element. Selecting another element for the "If" section changes the next fields accordingly.
- Element Name - Select the Element name of the "If" section – according to the selected element type, the system displays a window with all the existing elements of the type selected.
- Condition - Select the required condition type at the Element Status column.

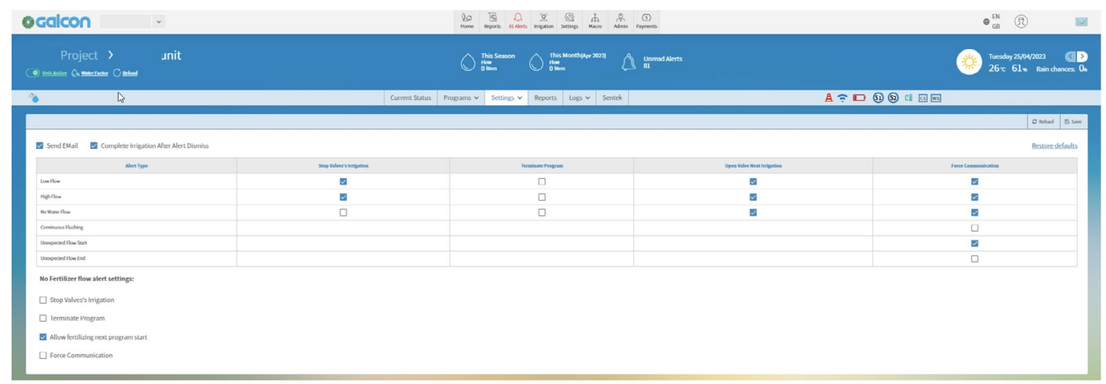
The following are examples of the options for elements:

- o Discreet elements such as logic inputs, or valves can be set for the following discreet conditions: Off, On, On to Off, and Off to On.
- o Analog elements such as sensors, or flow rates of meters can be set for the following analog conditions: Below, Above, In range, and Out of range.
- o OFF - the system checks the real time status of the "If" element and sets the logic condition to ON when the "If" element is in its OFF status.
- o Note that when using the analog condition of "Below", make sure that the stop value is greater than the start value.
- o Note that when using the analog condition of "Above", make sure that the stop value is smaller than the start value.

- Start Value - In case of an analog element, and according to the selection of the Element Status, set the required Start and the Stop values in their designated columns.
- Type of Link – Set another condition that is linked to the current logic condition. The system allows the user to chain an existing logic condition to this logic condition. In such case, first select the type of the link. The options are: Not defined – no one of the other logic conditions is chained to this logic condition, OR – for the system to set this logic condition to ON, only one of the two conditions should be in ON status, AND – both conditions should be ON, for the system to set this logic condition to its ON state.
- With Connection Num – Select the number of the logic condition to be chained to this logic condition.

I.3. The Alerts Settings entry of the drop-down list:

Clicking on Alerts Settings entry of the drop-down list opens the following screen:



The upper line of the screen:

- Send Email – this parameter enables the user to set whether to receive an e-mail message when alert accurse. Note that for receiving e-mails the correct e-mail address should be configured first in the user configuration screen of the system.
- Complete Irrigation After Alert Dismiss – select whether to continue the irrigation of a program that was stopped due to an alert when the user resets the alert.

The table in the center of this screen contains only alerts that the user can configure their behavior. For each one of the four alerts listed in the first rows of the table, the user can select up to four behavior options that take place once this alert accrues:

- Stop Valve's Irrigation – stop the currently irrigating valve during this alert.
- Terminate Program – terminate the program operation once this alert accurses.
- Open Valve Next Irrigation – select whether to open this valve in its next scheduled irrigation when the alert is not cleared yet.
- Force Communication – For a DC controller that is set at Offline status, this parameter ensures that the controller will initiate communication when Alert happens.

For the last two rows of the table the user can select only the "Force Communication" option.

No Fertilizer flow alert settings:

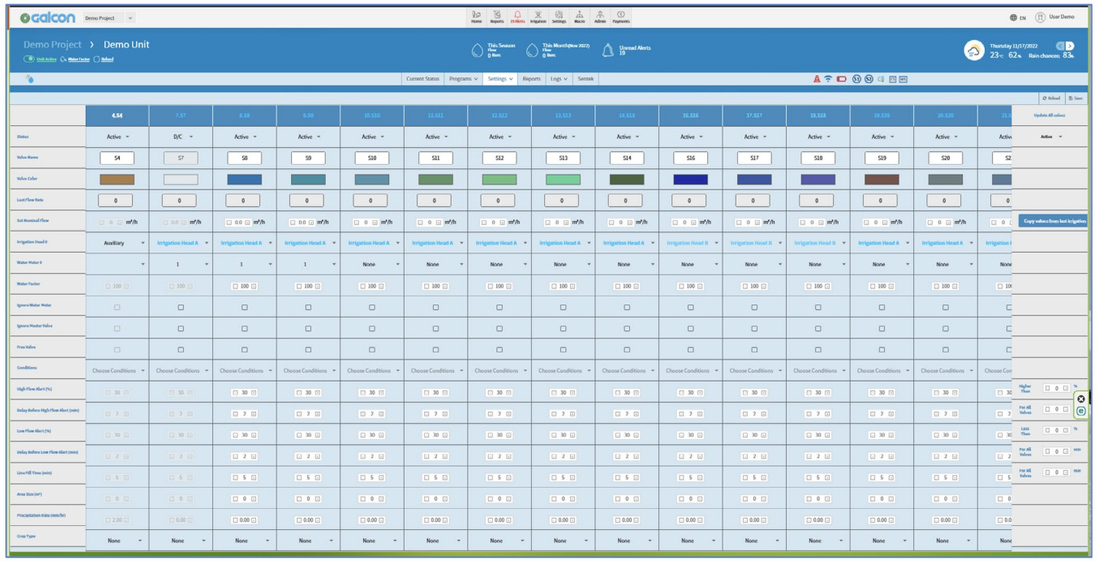
These parameters are valid only for setting the system behavior for the No Fertilizer Flow alert, the user cannot change other fertilizer malfunctions alerts!

- Stop Valve's Irrigation – stop the currently irrigating valve during this alert.
- Terminate Program – terminate the program operation once this alert accurses.
- Open Valve Next Irrigation – select whether to open this valve in its next scheduled irrigation when the alert is not cleared yet.
- Force Communication – For a DC controller that is set at Offline status, this parameter ensures that the controller will initiate communication when Alert happens.

Restore Defaults button – Pressing this button on the upper right side of the screen, restores this screen's parameters to their factory default settings.

I.4. The Valves Settings entry of the drop-down list:

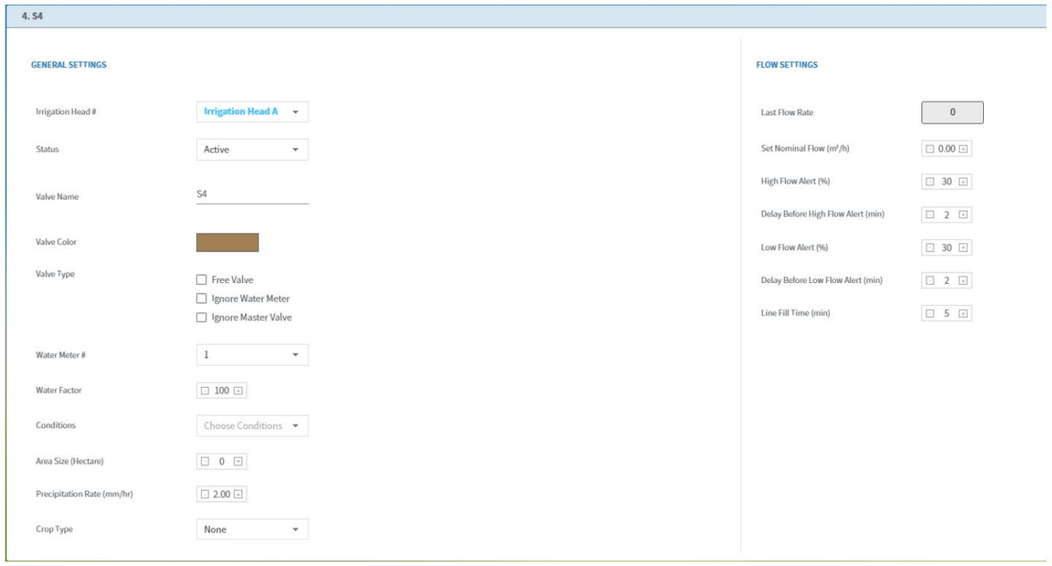
Clicking on Valves Settings entry of the drop-down list opens the following screen:



This table contains all the system outputs that are configured as irrigation valves (up to 24 valves); note that due to your screen size not all the valves are displayed; in such case you can scroll the screen right, left, up, and down in order to display the required valves and all their parameters.

The upper line of the table displays the names of the valves; the default names are the hardware outputs numbers.

The user can change the name of a valve in the second row of this table. Clicking on any valve's name in this line opens a window that contains the setting of the selected valve only, e.g., valve 7.S7.



The rows of the main table contain the following parameters:

- Status – set the status of the valve, the options are:
  - o Active – the valve is active (Connected and Active).
  - o Off – the valve is connected but it is set to Off.
  - o D/C – the valve is disconnected.

Please note that in the main "Current Status" screen of the system the following colors appear: Not Connected valve appears with a "Disconnected" label, Active valve appears in Green, OFF valve appears in Gray.

- Valve Color for scheduler – select a color for displaying the valve in the system's irrigation scheduler.
- Last Flow Rate – the flow-rate of the last time the valve was irrigating.
- Set Nominal Flow – set the valve's nominal flow-rate, the user can set the nominal flow rate for all the valves by pressing the Copy Values from Last Irrigation button at the right side of this row.
- Irrigation Head # - assign this valve to an irrigation head, the options are:
  - o Irrigation Head A.
  - o Irrigation Head B.
  - o Auxiliary.

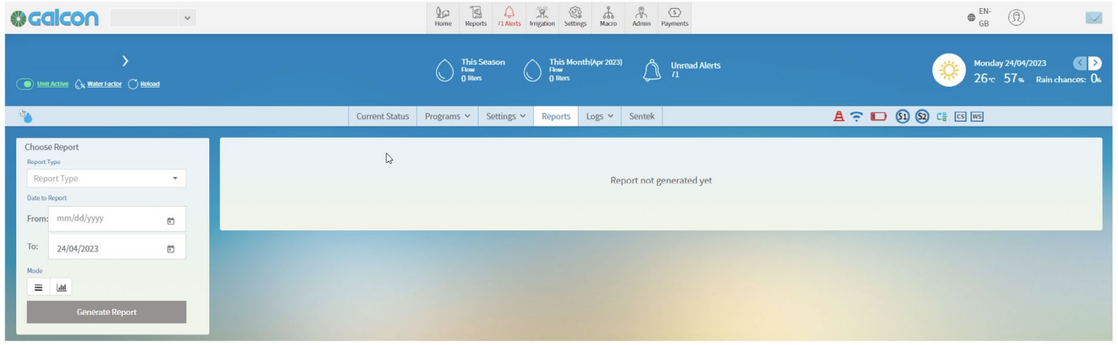
Important Note: in order to operate a valve that is set as auxiliary valve, the user should program it in one of the irrigation programs of one of the irrigation heads; in such case the auxiliary valve doesn't open the program main valve and does not read a water meter.

- Water Meter # - set a water meter for this valve; each irrigation head has two water meters, so if the valve is set to Irrigation head A the water meter number options are 1 or 2. If the valve is assigned at irrigation head B the water meter options are 3 or 4.
- Water Factor – set the required water factor in percentage for the valve, this may be used for adapting the water amounts to seasonal conditions, the options are 20-200%.
- Ignore Water Meter – when this parameter is selected, the valve ignores the water meter readings; no water meter alerts are received for this valve and no flow-rate is shown for the valve. Note that the only way to operate this valve in a program is by time.

- Ignore Master Valve – when this parameter is selected, the valve, when operating, does not operate the main valve. Therefore, whenever this valve operates, the master valve is closed.
- Free Valve – when this valve is set as Free Valve, it can be operated only as a co-valve. This valve ignores water meter readings.
- Condition – each valve can be affected by up to two logic conditions; select the required conditions from the drop-down list that contains all the configured logic conditions of the system.
- High Flow Alert [%] – set the excessive flow percentage above the nominal flow rate of the valve, that above it the valve enters to high flow-rate alert. Use the Higher Than button at the right side of this row to set the high flow alert percentage for all the controller's valves.
- Delay Before High Flow Alert (min) – set the delay in minutes before the valve enters to High Flow Alert; this is used to prevent unnecessary alert due to momentary increase of the regular flow-rate. Use the For All Valves button at the right side of this row to set this parameter for all the controller's valves.
- Low Flow Alert [%] – set the flow percentage below the nominal flow rate of the valve, that below it the valve enters to low flow-rate alert. Use the Less Than button at the right side of this row to set the low flow alert percentage for all the controller's valves.
- Delay Before Low Flow Alert (min) – set the delay in minutes before the valve enters to Low Flow Alert; this is used to prevent unnecessary alert due to momentary decrease of the regular flow-rate. Use the For All Valves button at the right side of this row to set this parameter for all the controller's valves.
- Line Fill Time (min) – set the time it takes the valve to fill the lines controlled by it. During this time the valve cannot enter to low or high flow rate alerts. Use the For All Valves button at the right side of this row to set this parameter for all the controller's valves.
- Area size – set the area irrigated by this valve.
- Irrigation Rate (mm/hr) – set the irrigation rate of this valve.
- Crop type – select the crop that is irrigated by this valve.

J. Reports

From the main screen of the system press on the card of the required unit and select the Reports tab.



Important Notes:

A. The GSI PRO has two levels of reports:

- Reports that are related to a specific unit
- Reports that are related to a specific project.

B. Each report can be exported to a PDF or Excel file.

C. Each report can be displayed as a graph chart or as a table.

D. A Day where all the valves did not irrigate, and there was no uncontrolled water in that day, the day will not appear in the report tables.

The following are the reports provided by the GSI PRO:

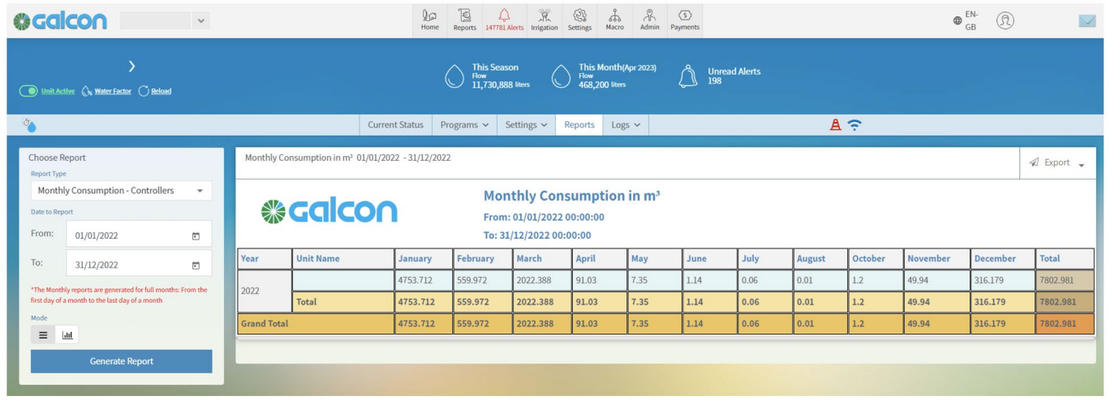
- Monthly Reports
  - Monthly Consumption - Controllers
  - Monthly Consumption - Valves
  - Monthly Consumption - Programs
- Daily Reports
  - Daily Consumption - Controllers
  - Daily Consumption - Valves
  - Daily Consumption - Programs
- Fertigation Reports
  - Monthly Consumption with Fertilizer – Controllers
  - Daily Consumption with Fertilizer – Controllers
  - Daily Fertigation – Valves
  - Monthly Fertigation - Valves
- Input Reports
  - Input daily accumulators
  - Inputs monthly accumulators

In order to display a report, select its name from the "Choose Report" window at the left side of the screen, select the required dates span from the calendar entry, select the display mode (table or chart), then press the Generate Report button.

Note that the monthly reports are generated for full months; from the first day of a month to the last day of a month, and the engineering units of all the reports are displayed according to the unit configuration (M3, Gallon, etc.).

J.1. Monthly Reports

Monthly Consumption – Controllers:



As depicted in the table's headline, this report displays the monthly water consumption of the unit along the years and months selected at the Report Choosing window.

The top row displays the unit's name and the months while the first column displays the years.

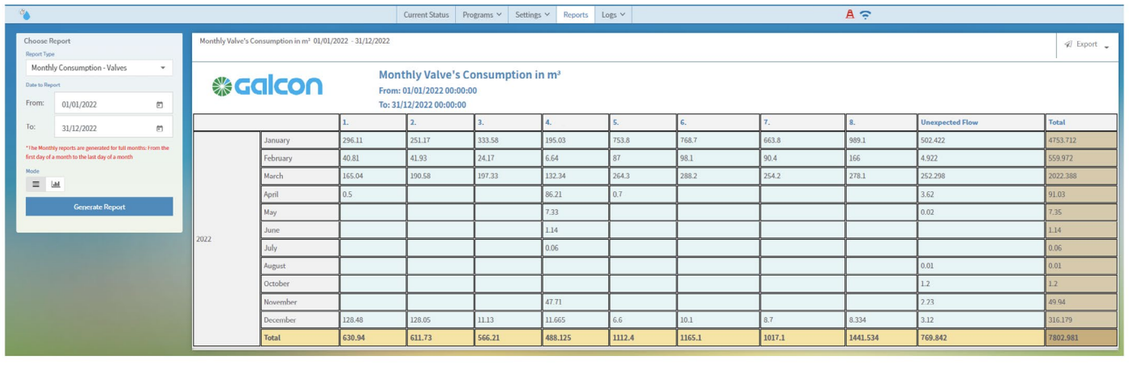
Per each month of a year there is a Total row (mainly is useful at Project's report) for all the project's units

The Total column (the right most column) displays the yearly total of each displayed unit, and the yearly total of all

the project's units.

The lower row of the table displays the monthly Grand Total of all the units, while the table's lower left number is the grand total of all the units at all the years.

Monthly Consumption – Valves:



		1.	2.	3.	4.	5.	6.	7.	8.	Unexpected Flow	Total
2022	January	296.11	251.17	333.58	195.03	753.8	768.7	663.8	989.1	502.422	4753.712
	February	40.81	41.93	24.17	6.64	87	98.1	90.4	166	4.922	559.972
	March	165.04	190.58	197.33	132.34	264.3	288.2	254.2	278.1	252.298	2022.388
	April	0.5			86.21	0.7				3.62	91.03
	May				7.33					0.02	7.35
	June				1.14						1.14
	July				0.06						0.06
	August									0.01	0.01
	October									1.2	1.2
	November				47.71					2.23	49.94
	December	128.48	128.05	11.13	11.665	6.6	10.1	8.7	8.334	3.12	316.179
	Total	630.94	611.73	566.21	488.125	1112.4	1165.1	1017.1	1441.534	769.842	7802.981

As depicted in the table's headline, this report displays the monthly water consumption of all the valves of the current unit, along the years and months selected at the "Choose Report" window.

The top row displays the unit's name and all its valves (valve's output number and assigned name).

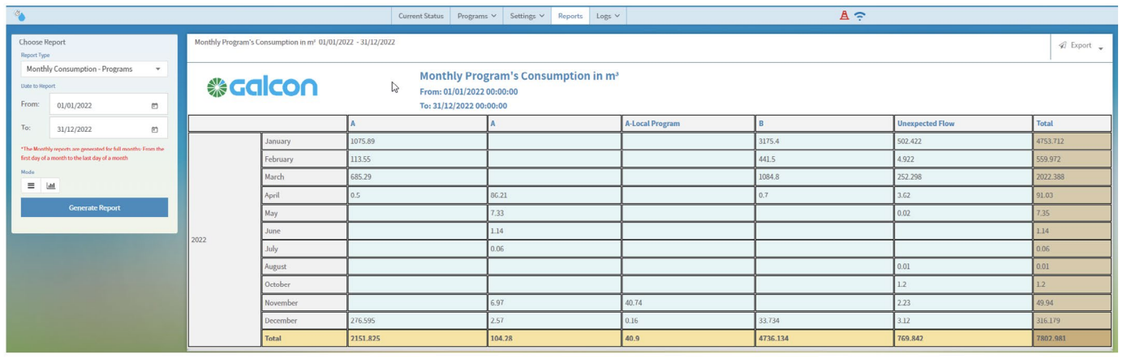
The first two columns display the years and the months. Per each valve there is a Total row with the consumption total of each year, while the lower row of the table displays the Grand Total.

The Total column (the right most column) displays the total consumption of all the valves at each displayed month.

A special column (second column from right) displays the unexpected water of each month.

Note: Depends on the unit, the table maybe larger than the screen; in such case use the scroll bars along the edges of the screen.

Monthly Consumption – Programs:



		A	A	A-Local Program	B	Unexpected Flow	Total
2022	January	1075.89			3175.4	502.422	4753.712
	February	113.55			441.5	4.922	559.972
	March	685.29			1084.8	252.298	2022.388
	April	0.5	86.21		0.7	3.62	91.03
	May		7.33			0.02	7.35
	June		1.14				1.14
	July		0.06				0.06
	August					0.01	0.01
	October					1.2	1.2
	November		6.97	40.74		2.23	49.94
	December	276.595	2.57	0.16	33.734	3.12	316.179
	Total	2151.825	104.28	40.9	4736.134	769.842	7802.981

As depicted in the table's headline, this report displays the monthly water consumption of all the irrigation programs of the current unit, along the years and months selected at the "Choose report" window.

The top row displays the unit's name and all its irrigation programs (Irrigation head number, the program number, and its assigned name).

The first two columns display the years and the months. Per each program there is a Total row with the consumption total of each year, while the lower row of the table displays the Grand Total.

The Total column (the right most column) displays the total consumption of all the programs of each displayed month.

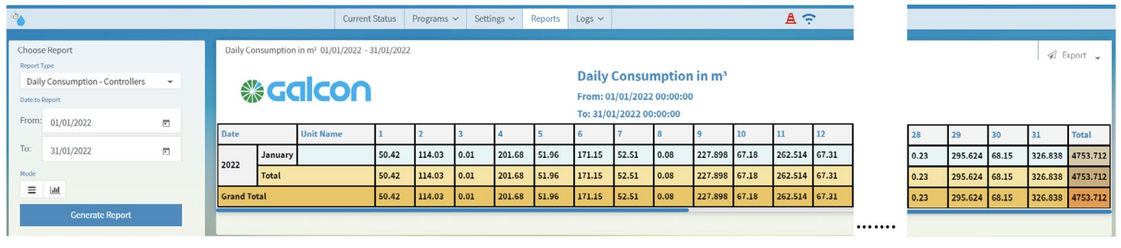
A special column (second column from right) displays the unexpected water of each month.

Another special column (third column from right) displays the consumption of the head's Local Program; local program is a manual opening of a valve without allocating it to an irrigation program.

Note: Depends on the unit, the table maybe larger than the screen; in such case use the scroll bars along the edges of the screen.

J.2. Daily Reports

Daily Consumption – Controllers:



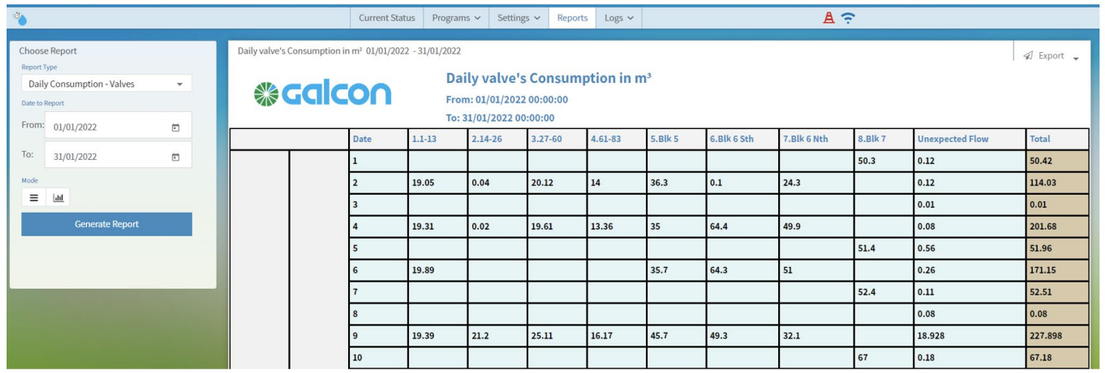
Date	Unit Name	1	2	3	4	5	6	7	8	9	10	11	12	28	29	30	31	Total
2022 January		50.42	114.03	0.01	201.68	51.96	171.15	52.51	0.08	227.898	67.18	262.514	67.31	0.23	295.624	68.15	326.838	4753.712
2022 Total		50.42	114.03	0.01	201.68	51.96	171.15	52.51	0.08	227.898	67.18	262.514	67.31	0.23	295.624	68.15	326.838	4753.712
Grand Total		50.42	114.03	0.01	201.68	51.96	171.15	52.51	0.08	227.898	67.18	262.514	67.31	0.23	295.624	68.15	326.838	4753.712

As depicted in the table's headline, this report displays the daily water consumption of the unit along the years, months, and day selected at the "Choose Report" window.

The top row displays the unit's name and the days of the month while the first two columns display the years and the months. Per each month of a year there is a Total row (mainly is useful at system report), while the lower row of the table displays the Grand Total.

The Total column (the right most column) displays the monthly total of each displayed month, and this includes also the unexpected water.

Daily Consumption – Valves:



Date	1.1-13	2.14-26	3.27-60	4.61-83	5.Blk 5	6.Blk 6 Sth	7.Blk 6 Nth	8.Blk 7	Unexpected Flow	Total
1								50.3	0.12	50.42
2	19.05	0.04	20.12	14	36.3	0.1	24.3		0.12	114.03
3									0.01	0.01
4	19.31	0.02	19.61	13.36	35	64.4	49.9		0.08	201.68
5								51.4	0.56	51.96
6	19.89				35.7	64.3	51		0.26	171.15
7								52.4	0.11	52.51
8									0.08	0.08
9	19.39	21.2	25.11	16.17	45.7	49.3	32.1		18.928	227.898
10								67	0.18	67.18
25	18.88	20.31	24.08	16.08	58.4	50.3	45.3		44.464	277.814
26								66	0.39	66.39
27	20.97	21.22	24.37	7.96	54.6	63	56.4	96	43.392	387.912
28									0.23	0.23
29	20.75	21.06	24.44	7.91	56.9	62.7	57.4		44.464	295.624
30								68	0.15	68.15
31	21	20.94	24.63	7.94	57.6	63.6	56.2	66	8.928	326.838
Total	296.11	251.17	333.58	195.03	753.8	768.7	663.8	989.1	502.422	4753.712
Grand Total	296.11	251.17	333.58	195.03	753.8	768.7	663.8	989.1	502.422	4753.712

As depicted in the table's headline, this report displays the daily water consumption of all the valves of the current unit, along the years, months, and days selected at the" Choose Report" window.

The top row displays the unit's name, the day in the month, and all the unit's valves (valve's output number and assigned name).

The first three columns display the years, the months and the day in the month. Per each day there is a Total row with the consumption total of all the valves in that day, while the lower row of the table (colored Yellow) displays the Grand Total.

The Total column (the right most column) displays the total consumption of all the valves at each displayed day of the month.

A special column (second column from right) displays the unexpected water of each day.

Notes:

A Day where all the valves did not irrigate and there was no uncontrolled water in that day, the day will not appear in the report table.

Depends on the unit, the table maybe larger than the screen; in such case use the scroll bars along the edges of the screen.

Daily Consumption – Programs:

		2	53.21	60.7	0.12
		3			0.01
		4	52.3	149.3	0.08
		5		51.4	0.56
		6	19.89	151	0.26
		7		52.4	0.11
		8			0.08
		9	81.87	127.1	18.928
		10		67	0.18

	January	16		70	0.05
		17	80.24	128.4	54.464
		18		67	0.11
		19	80.93	152.9	14.464
		20		68	0.22
		21	80.36	151.1	54.464
		22		66	0.2
		23	82.32	152.4	54.464
		24		66	0.13
		25	79.35	154	44.464
		26		66	0.39

As depicted in the table's headline, this report displays the daily water consumption of all the irrigation programs of the current unit, along the years, months, and day selected at the "Choose Report" window.

The top row displays the unit's name, the day of the month, and all its irrigation programs (Irrigation head number, the program number, and its assigned name).

The first three columns display the years, the months and the day of the month. Per each program there is a Total row with the consumption total of each day, while the lower row of the table (Colored Yellow) displays the Grand Total.

The Total column (the right most column) displays the total consumption of all the programs of each displayed day.

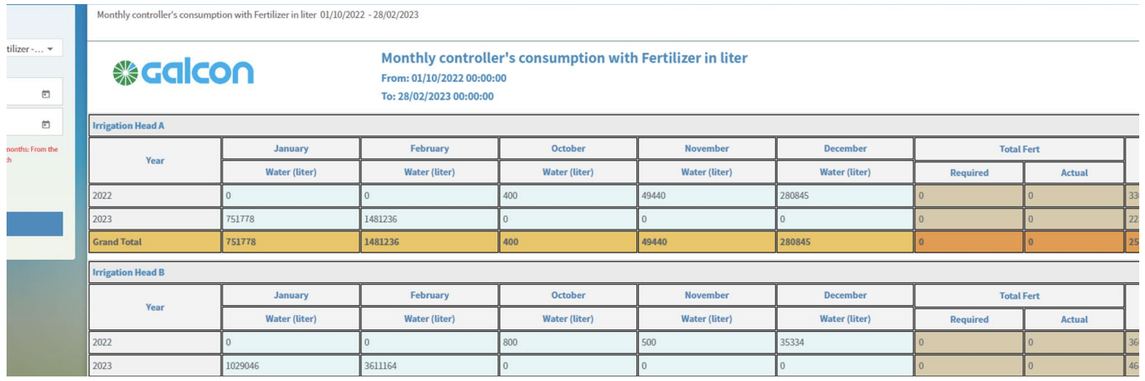
A special column (second column from right) displays the unexpected water of each day.

Another special column (third column from right) displays the consumption of the head's Local Program; local program is a manual opening of a valve without allocating it to an irrigation program.

Note: Depends on the unit, the table maybe larger than the screen; in such case use the scroll bars along the edges of the screen.

J.3. Fertigation Reports

Monthly Consumption with Fertilizer – Controllers:



As depicted in the table's headline, this report displays the monthly fertilizer and water consumption, of the unit along the years and months selected at the Report Choosing window.

The upper line of the table displays the irrigation head number; in case of a unit with two irrigation heads, a second table for the second irrigation head appears under this table.

Note that the maximal number of fertilizer pumps in an irrigation head is four.

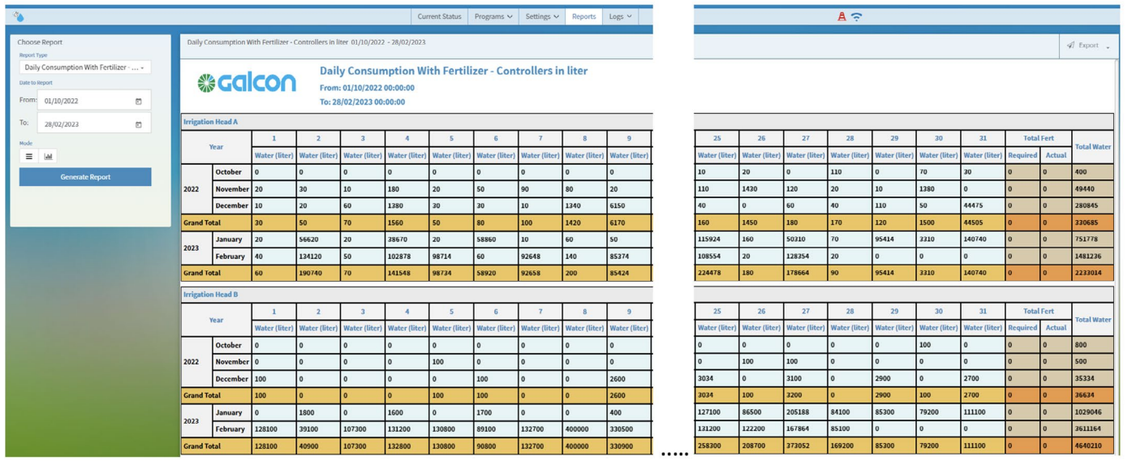
The second row of the table displays the months of the selected year while each such month is divided to water consumption column and Fert consumption column that depicts the fertilizer pump name, the required fertigation and the actual applied fertigation for the selected month.

The first column of the table displays the years and the grand total.

The last two columns of the table display the total required fertilizer, the total applied fertilizer and the total water consumption per each year.

Note: Depends on the unit, the table maybe larger than the screen; in such case use the scroll bars along the edges of the screen.

Daily Consumption with Fertilizer – Controllers:



As depicted in the table's headline, this report displays the daily fertilizer and water consumption, of the unit along the years, months, and day selected at the "Choose Report" window.

The upper line of the table displays the irrigation head number; in case of a unit with two irrigation heads, a second table for the second irrigation head appears under this table.

Note that the maximal number of fertilizer pumps in an irrigation head is four.

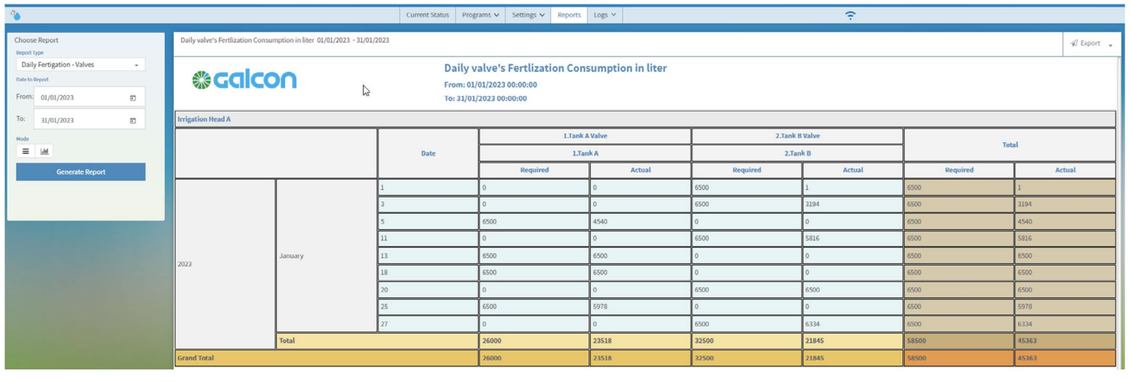
The second row of the table displays the days of the selected month while each such day is divided to water consumption column and Fert consumption column that depicts the fertilizer pump name, the required fertigation and the actual applied fertigation for the selected day.

The first two columns of the table display the year and the month.

The last two columns of the table display the total required fertilizer, the total applied fertilizer and the total water consumption per each month (uncontrolled water is also included).

Note: Depends on the unit, the table maybe larger than the screen; in such case use the scroll bars along the edges of the screen.

Daily Fertigation – Valves:



As depicted in the table's headline, this report displays the daily fertilizer consumption, of the unit's valves along the years, months, and day selected at the "Choose Report" window.

The upper line of the table displays the irrigation head number; in case of a unit with two irrigation heads, a second table for the second irrigation head appears under this table.

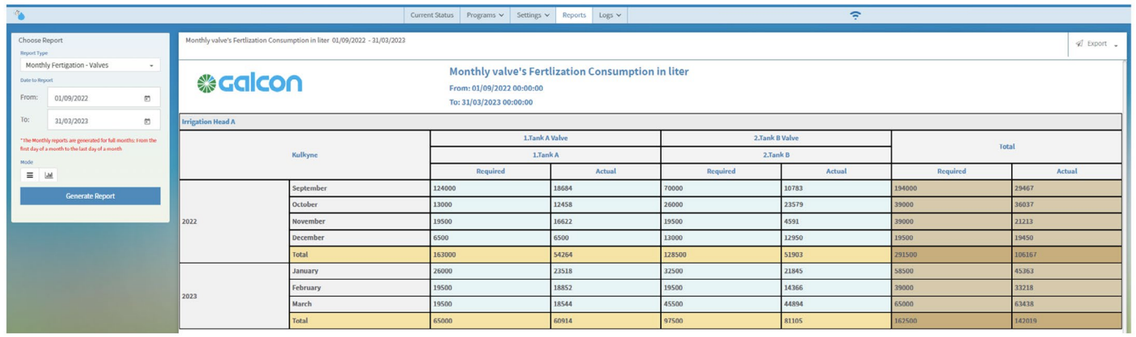
Note that the maximal number of fertilizer pumps in an irrigation head is four.

The upper row of the table displays the irrigation head valves (number of output and valve name), where each valve is divided to fertilizer pumps (up to four pumps).

The first three columns display the years, the months and the day of the month, while the lower row (Colored Yellow) of the table displays the Grand Total.

Per each day for each valve and up to four pumps, the table displays the required fertilizer of that day together with the actual amount of fertilizer delivered.

Monthly Fertigation – Valves:



As depicted in the table's headline, this report displays the monthly fertilizer consumption, of the unit's valves along the years and months selected at the "Choose Report" window.

The upper line of the table displays the irrigation head number; in case of a unit with two irrigation heads, a second table for the second irrigation head appears under this table.

Note that the maximal number of fertilizer pumps in an irrigation head is four.

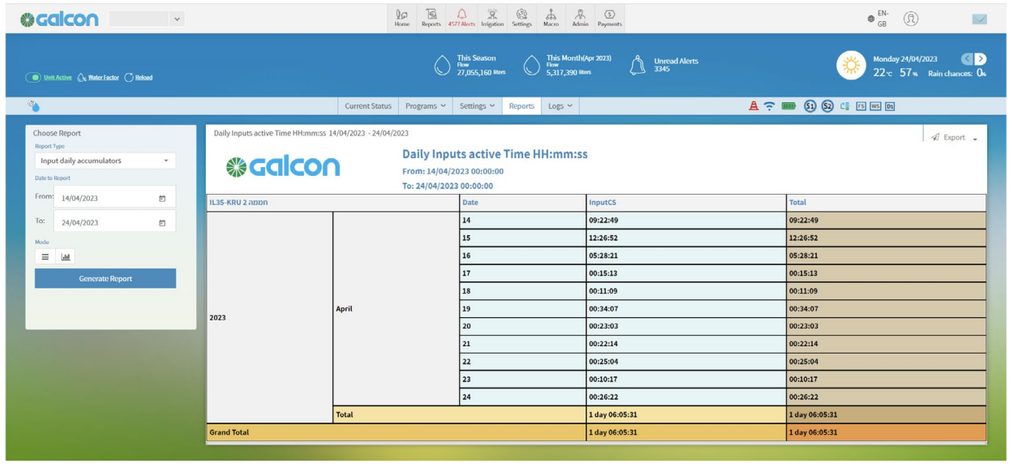
The upper row of the table displays the irrigation head valves (number of output and valve name), where each valve is divided to fertilizer pumps (up to four pumps).

The first two columns display the years, and the months, while the lower row of the table displays the Grand Total.

Per each month for each valve and up to four pumps, the table displays the required fertilizer of that month together with the actual amount of fertilizer delivered.

J.4. Inputs Reports

Inputs Daily Accumulations:



Important Note: the inputs reports are available only for inputs that are defined in the system as condition inputs and not defined as water or fertilizer meters.

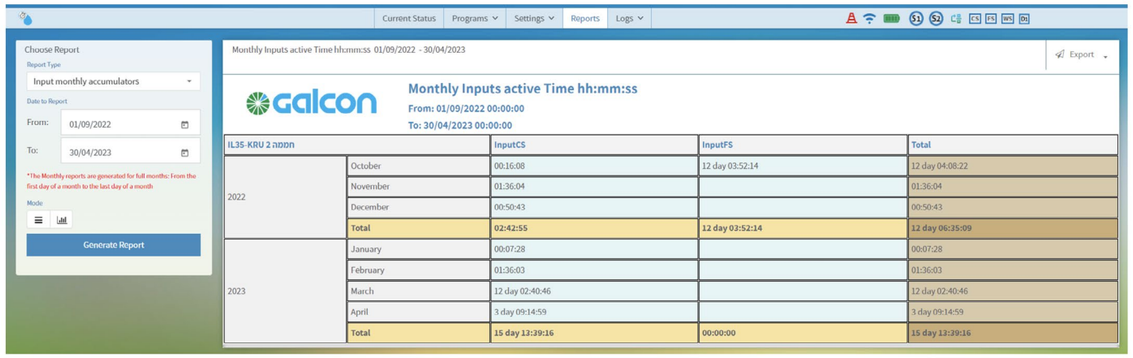
As depicted in the table's headline, this report displays the daily accumulation of the inputs' operation along the years, months, and day selected at the "Choose Report" window.

The upper row of the table displays the day of the month, input name, and the total.

The first three columns display the years, the months and the day of the month, while the lower row of the table displays the Grand Total.

For each input per each day the table displays the time accumulation where this input was in ON state.

Inputs Monthly Accumulations:



Important Note: the inputs reports are available only for inputs that are defined in the system as condition inputs and not defined as water or fertilizer meters.

As depicted in the table's headline, this report displays the monthly accumulation of the inputs' operation along the years and months selected at the "Choose Report" window.

The upper row of the table displays the name of the unit, the input name, and the total.

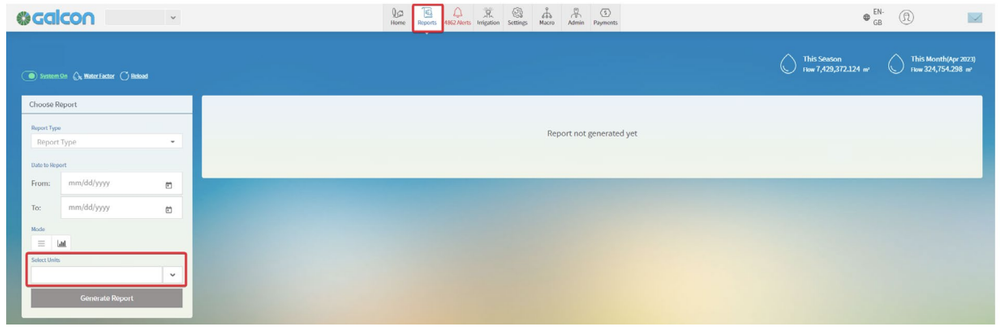
The first two columns display the years, and the months, while the lower row of the table displays the Grand Total.

For each input per each month the table displays the time accumulation where this input was in ON state.

J.5. Project Reports

As mentioned above the GSI PRO has two types of reports: Reports that are related to a specific unit, and reports that are related to the whole project. The unit's reports are accessed from the unit's main menu, and the project reports are accessed from the top most menu of the GSI web site. The differences between the project and the unit's reports are minor and generally all the reports are almost the same for both levels of reports. The major difference is in the "Choose Report" window.

The window for the project report contains an additional selection parameter box; it displays a list of all the units of the system and allows the user to select the units to be included in the report (see the following picture).



Note that system reports are not divided to irrigation heads; therefore, the relevant reports are not divided into two tables (for Irrigation head A and Irrigation Head B). In the same manner, in fertilizers reports there is no division to fertilizer pumps.

K. Logs

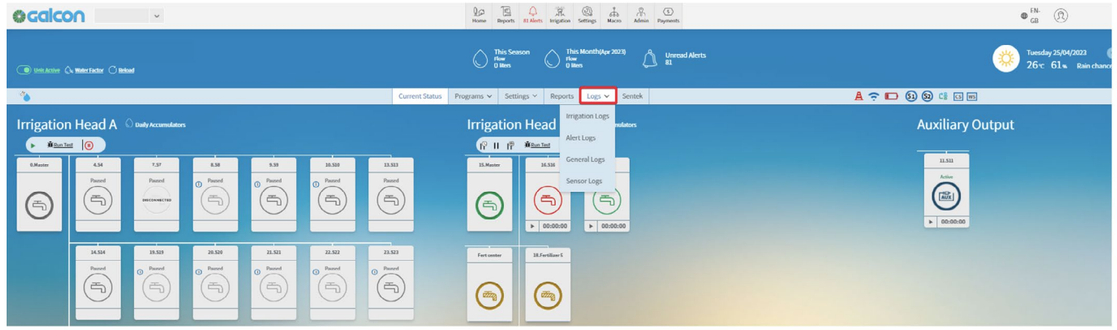
Important Notes:

The GSI PRO has two levels of Logs:

- Logs that are related to a specific unit and display the last two weeks of the unit's logs.
- Logs that are related to a specific project:
  - The user can select the required units to be displayed
  - In the log's history tab, the user can set the required time span to be displayed.
  - The project logs can be exported to a PDF or Excel file

The Unit's Logs:

From the main screen of the system press on the card of the required unit and select the Logs tab



The logs section of the GSI PRO unit contains the following logs:

- Irrigation logs
- Alert Logs
- General Logs
- Sensor Logs

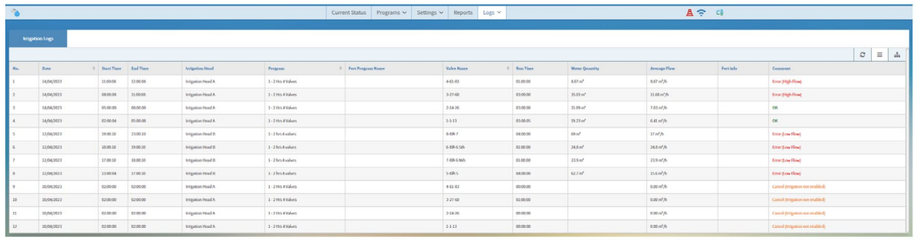
K.1. Irrigation Logs

The Irrigation log screen can be displayed in one of two options (according to the icon selected in the upper right side of the screen:

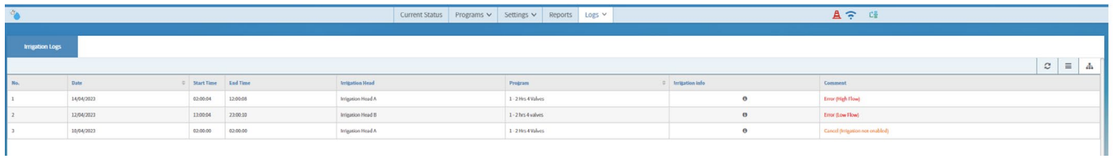
= By Valves

= By Program

By valves – this is the most detailed table – it displays a row per each valve irrigated in the program:



By Program – this option displays only the programs; clicking on the (i) icon under the Irrigation Info column, opens a window with information on the valves irrigated in this program.



Each record of the Irrigation Log table displays information on a specific irrigation operation.

The records are numbered in descending order and contain the following data:

- Date – the date of the irrigation record.
- Start Time – the start time of the irrigation.
- End Time – the end time of the irrigation.
- Irrigation Head – the number of the Irrigation Head in which the irrigation took place.
- Program – the number and the name of the Irrigation Program (up to 8 irrigation programs, a Flushing Program, and a Local Program (a manual operation of a valve without assigning it to a program).
- Fert Program Name – the number and the name of the fertilization program of this irrigation (up to 10 fertilization programs per each irrigation head).
- Valve Name – the number and name of the valve that was operating during this irrigation.
- Run Time – if the valve operated in this program, irrigates by time, this parameter shows the time irrigated out of the total required time. Therefore, when a program finish irrigating successfully, these two numbers should be the same or almost the same, unless the user updates the valve run time during the irrigation.
- Water Quantity - if the valve operated in this program, irrigates by quantity, this parameter shows the total water quantity delivered in this program out of the required amount. Therefore, when a program finish irrigating successfully, these two numbers should be the same or almost the same, unless the user updates the valve water quantity during the irrigation. Note that if a program irrigates according to time, but the system includes a water meter, this parameter shows only the amount of water passed through the water-meter during the irrigation by time.
- Average Flow – The average flow-rate of the valve during this irrigation.
- Fert Info – in case a fertilization program was performed in this irrigation, press the (i) button to open a window that displays the Fert info:

Irrigation info ✖ Close

No.	Unit Name	Date	Start Time	End Time	Program	Valve Name	Run Time	Water Quantity	Average Flow	Fert info	Comment
1	117629	04/23/23	02:20:52	02:27:26	1 - Untitled Program	5 - S5	23:59:00	635 m³	26 m³/h		OK
2	117629	04/22/23	02:14:13	02:20:52	1 - Untitled Program	5 - S5	23:59:00	622 m³	25 m³/h		OK

  - This window displays the fertilization information:
    - Date
    - The Fert Program number and Name
    - The valve number and name
    - The fertilizer pumps numbers operated in this program; for each such pump this parameter displays the amount or time of fertilizer applied, out of the required amount, or the required time.
    - EC – the momentary average of the EC level at the end of the fertilization process.
    - pH – the momentary average of the pH level at the end of the fertilization process.
- Comment – this parameter displays specific information regarding the irrigation session, e.g., the reason for this irrigation session starting or ending. See the following table for the options that may appear in this parameter.

Important Note: the system can divide the text of the comment into two parts; the first part is the main comment and the second part that appears in parentheses, is the reason that causes the comment to appear, or the explanation of the main comment, e.g., Error (Fert not finished).

The real-time behavior of the irrigation log:

- In case the user enters the log while a program is running, the log record of this program shows the current partial information, i.e., the end time is not presented and the water accumulation parameter shows the water delivered up to the moment of the table entry by the user. Once the irrigation ends the system completes the missing details.
- In case of internal system fault that causes a logging error, a record of a program that was in the middle of irrigation may not be completed. This is a very rare situation that almost never happen; in such case the system issues a "missing data log" message.
- In case an irrigation is paused, the log displays the details known at the moment of the program's entry to the pause state; in such case the water accumulation parameter shows the delivered amount to that moment, out of the total required water quantity. Once the pause state ends, a new record is added to the log; in this record the water accumulation parameter shows the delivered amount to that moment, out of the quantity required to complete the planned water quantity of the program.

The Possible comments table

Comment's text	Comment's Meaning	Remarks
OK	The Irrigation (and fertigation) ended successfully	
Finished Irrigation by Condition	The irrigation was finished due to a logic condition operation.	
Finished Irrigation by duration	The irrigation was finished due to a predefined stop timing that not allows the continuation of the irrigation.	
Irrigation Canceled	The irrigation was canceled by the system's software.	See the following "Irrigation Canceled Table" for the reasons that may appear in this comment in parentheses
Irrigation ended manually	The irrigation was ended by a manual operation of the operator.	
Irrigation paused due to waiting condition	The irrigation entered to a pause state by the system software waiting state, (such as due to a higher priority program start).	
Note that once the pause ends the program continues its operation.	See the following "Irrigation Paused Table" for the reasons that may appear in this comment in parentheses	
Program Temporary Paused	The irrigation program was temporarily paused, and will continue irrigation once the pause state ends.	See the following "Program Temporarily Paused Table" for the reasons that may appear in this comment in parentheses

Irrigation ended due to error	The irrigation ended, but one of its components (valve, fertilizer...) entered to faulty state during the program operation. The system reaction to such situation (ending the program or continuing to the next step) depends on the Alerts settings as entered by the user.	See the following "Irrigation Ended with Fault Table" for the reasons that may appear in this comment in parentheses
Continue unfinished irrigation	The irrigation resumes its operation after being paused.	
Valve Paused	The valve was paused during the operation of the irrigation program.	See the following "Valve Paused Table" for the reasons that may appear in this comment in parentheses
Program Paused	The Program was paused during operation.	See the following "Program Paused Table" for the reasons that may appear in this comment in parentheses

Irrigation Canceled Table

The following table displays the possible reasons for the "Irrigation Canceled" message of the log.

Comment's Text (in parentheses)	Meaning of the reason
Valve Canceled due to error	Valve Canceled due to error
Manual Irrigation cancelation	The program was manually canceled
Irrigation not enabled	• For a program that works in cycles, and its "Completed irrigation after alert dismiss" parameter is "checked", upon alert dismiss the system cancels the current cycle and resumes the operation of the next cycle. • When a program that works in cycles enters for any reason to pause-state, and the time to start the next cycle arrives, the current cycle is canceled and the next cycle starts.
Program not active	The user switched the program to "Not Active" state while it was operating
Valve not active	The valve of the program was switched to "Not Active" state while the program was operating.
Capacitor charging fault	The valve could not be opened due to a two consecutive Capacitor charging faults.
Program Canceled today	To Be Completed
Chance of rain or rain mm yesterday	Currently there is a chance of rain, or the amount of yesterday's rain exceeded the settings for canceling irrigation due to rain.
Continues pause	When a program is in pause for more than an hour and the day ends, the program will be canceled at midnight. **Note that** this reason is not valid for GSI PRO controllers that are defined as agricultural controllers.
Valve not enabled	The program was canceled because all its assigned valves are in "Not Enabled" state.
Sequence canceled because setup changed	The program was canceled because the user changed its setup while it was operating.

The following reasons may appear when the irrigation log is displayed in its "By Valves" mode Note that in a program that contains more than a single valve, the program may continue its operation when one of its valves is canceled due to the following reasons.	
Valve paused	One of the program's valves was paused.
Valve not active	One of the program's valves switched to "Not Active" state while the program was operating.
Valve canceled manually	One of the program's valves was canceled manually (or skipped) while the program was operating.
Valve canceled today	To Be Completed
Valve canceled due to error	One of the program's valves was canceled due to error.
Valve not available	One of the program's valves is not available.
Irrigation waiting canceled	One of the program's valves was canceled while the program was in the "waiting to irrigation" queue.
Valve irrigation canceled due to exceeding irrigation time	One of the program's valves operations exceeded its maximal allowed irrigation time (1440 minutes for irrigation valve, 5 minutes for flush valve, 12 hours for local valve, and 20 minutes for valve test); this valve operation is canceled and the program continues to its next valve.

Irrigation Paused Table

The following table displays the possible reasons for the "Irrigation Paused" message of the log.

Comment's Text (in parentheses)	Meaning of the reason
Paused by condition	A Pause logic condition entered the program to a "pause" state.
Ended by condition	When a program is about to start irrigation but a Stop logic condition is in ON state, the program is entered to a "pause" state.
Program paused due to valve fault	The program entered to a "pause" state due to a fault in its valve and it will resume its operation once the fault is cleared. In case of a program with more than a single valve the program first completes the irrigation of the valves that are not in fault, and once the fault is cleared it will complete the faulty valve irrigation.
Program suspended by local program	The program entered to a "pause" state due to the operation of a test program on one of the valves.
Temporary pause	The program entered to a "pause" state due to "pause by time" or "pause program" commands entered in its programing screen.
Program paused by filter flushing	The program entered to a "pause" state due to a filter flushing fault.

Program Temporarily Paused Table

The following table displays the possible reasons for the "Program Temporarily Paused" message of the log.

Comment's Text (in parentheses)	Meaning of the reason
Program not valid	The program cannot start due to a pause or fault state in some of its components, such as: the irrigation head is paused, all the valves are faulty or not active, the filter flush is faulty, a pause logic condition paused the program, rain condition, the program is not active permanently, and other such reasons.
Valve not valid	One of the program's valves cannot start; it is irrigating in another program, it is in fault, it is paused by pause logic condition, or it is not active.

Fertigation not valid	One of the program's fertilizer pumps cannot start; it is irrigating in another program, it is in fault, or it is not active.
Water meter not valid	The program's water meter is in fault, not defined, or used by another program. Note that when the water meter is used by a valve that has a flow-rate definition, this water meter cannot be available at the same time to another valve that has no flow-rate definition.
Manual pause	To Be Completed
Outputs number limit	In AC unit, the number of operating outputs exceeded the maximal allowed number (5).
Valves irrigating in another program	Some of the program's valves are irrigating in another program.
Low priority program	The program was paused by another high priority program.
Program out of irrigation hours	The program was paused since it was out of the allowed irrigation hours. Note that in such case the irrigation program will end and an additional Program Ended record will appear in the irrigation log.
Pause irrigation while flushing	The program was paused due to the flushing of the filtration system.
Master Paused	The irrigation head was paused during the program's operation.
Continuous flushing	The filtration system entered to a continuous flushing fault.
Program paused	The program was manually paused during its operation.
Program settings	Some of the program settings (such as fertigation) are changed during its operation and therefore the program entered to a temporary pause state.
Valve not available	All of the program's valves cannot start; they are irrigating in another program, they are in fault, they are paused by pause logic condition, or they are not active.
Head fault	The irrigation head is in fault state, such as due to uncontrolled fertilizer leak, filtration system fault, battery fault, or capacitor fault.
Paused Cond	The program was paused due to a Pause Logic Condition.
Rain Cond	The program was paused due to a Rain Sensor signal.
Initiated Pause	The system was entered to a permanent (Fixed) pause.
Temporary Pause	The system is in the process of software update (OTA), there is no AC power, or the irrigation head is paused by time.

Program Ended with Fault Table

The following table displays the possible reasons for the "Program Ended with Fault" message of the log.

Comment's Text (in parentheses)	Meaning of the reason
Low Flow Alarm	One of the program's valves ended in fault due to a Low Flow state.
High Flow Alarm	One of the program's valves ended in fault due to a High Flow state.
No Water Flow	One of the program's valves ended in fault due to a No Water Flow state.
No Fertilizer Flow	One of the program's valves ended in fault due to a No Fertilizer Flow state.
Fert not Finished	One of the program's valves ended in fault due to a Fert Not Finished state.
Discharge	One of the program's valves ended in fault due to its hardware capacitor fault.
Short Circuit	One of the program's valves ended in fault due to a short circuit on its output.

Valve Paused Table

The following table displays the possible reasons for the "Valve Paused" message of the log.

Comment's Text (in parentheses)	Meaning of the reason
Paused by condition	The valve was paused due to pause reasons such as: Logic Condition, valve not active (in its setup), while software is updating, low DC power level, no AC power, capacitor charge fault, uncontrolled fertilizer.
Ended by condition	The valve was paused by stop logic condition.
Program paused due to valve fault	The valve is in fault and therefore it is paused

Program Paused Table

The following table displays the possible reasons for the "Program Paused" message of the log.

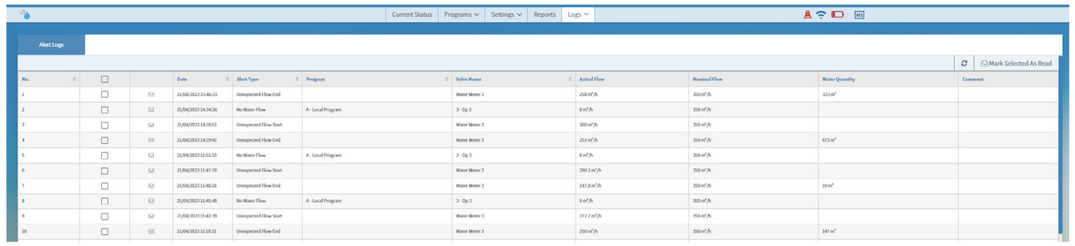
Comment's Text (in parentheses)	Meaning of the reason
Manual Pause	The program was paused by manual pause command.
Paused by condition	The program was paused by pause logic condition.
Ended by condition	The program was paused by stop logic condition.
Program paused due to valve fault	The program was paused due to a fault in one of its valves.
Program suspended by local program	The program was paused due to the start of a local program (or Test).
Temporary paused	The program entered by the user to a Pause by Time mode, or to Unlimited Pause mode.
Program paused by filter flushing	The program was paused due to a fault in its filter flushing process.

K.2. Alert Log

The GSI PRO system displays two types of alert tables; unit alerts, and project's alerts, the structure of these two screens is identical, however the unit alerts table shows only alerts related to the current unit, while the project's alerts table displays the alerts of all the project's units.

In the project's alert screen, there are two tabs; Last Alerts that displays the alerts of the last 14 days for the selected units of the project, and the Alerts History tab that allows the user to filter the records according to units, and dates span.

The Project's alert screen has an Export option that allows the user to export the selected data to an Excel file.
The unit's log screen displays the following data items:



The upper right line of the table contains two icons, the refresh icon, and the "Mark Selected As Read" icon, that is used for deleting selected records from the table.
The records are numbered in descending order and contain the following data:

- Number – the number of the alert record.
- Selection box – used for selecting all or specific alert records.
- Envelop icon – used for adding a free text comment to the record by the user.
- Date – the date and time of the alert record.
- Alert type – the type of the alert; please refer to the following table for all the possible alerts.
- Program – in case the alert record is related to a program, the irrigation head number, the program number, and the program name are displayed in this column.
- Valve number – in case the alert is related to a valve, the valve number and the valve name are displayed in the column. In case the alert is related to fertilizer center or to filtration center, their irrigation head number, their numbers, and names, are displayed in this column.
- Actual Flow – appears only for alerts related to a water meter, (such in case of uncontrolled water).
- Nominal flow – the average of the last two flow readings of the related valve.
- Water Quantity – in case the record is related to a valve, the valve's water quantity appears in this column.
- Comment – this column has two functions: the user may use this column to add a free text comment to the record, or the system may display a comment related to the type of the alert record, (such as the number of a condition input for an alert that displays an Input Switched to ON message).

The Possible Alerts Table

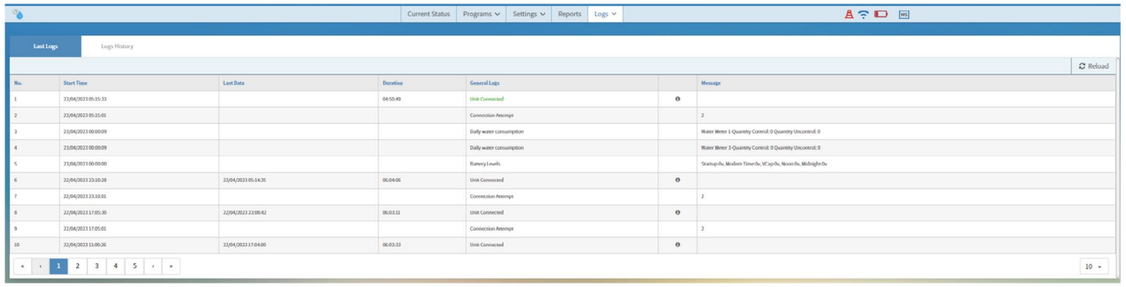
Alerts' text	Alerts' Meaning	Remarks
Low Flow	Low water flow.	
High Flow	High water flow.	
No water flow	Water pulses are not received.	
No Fert Pulse	Fert fault – Fert pulses are not received.	
Unexpected Flow Start	Uncontrolled water is detected.	
Unexpected Fertilizer Flow – Unit suspended	Uncontrolled fertilizer flow is detected and therefore the unit is entered to suspended mode.	
Continuous Flushing	The filtration center is in continuous flushing fault.	
Low Battery Voltage	The battery voltage dropped to the low battery alert level.	
Empty Batteries	The battery voltage dropped to the level that pauses the unit operations (DC units only).	
Capacitor Charging	The charging of the capacitor failed.	
Solenoid/Wiring	Problem with the capacitor operation; may indicate that the solenoid or its wiring are faulty.	
Short Circuit	Short circuit fault on the hardware output.	
No AC Power	The AC power supply is disconnected.	
Controller Memory	Faulty controller's memory.	
Unit Valve OK	An output that was reported faulty returned to normal operation.	
AC Power Resumed	Ac power is resumed after being disconnected.	
Unexpected Flow End	Water leakage ended.	
Communication alert – Code 17	The communication of the unit to the server is faulty.	
Communication resumed	The communication of the unit with the server is resumed.	
Fert center alarm	The Fert center is faulty, the system also displays the number of the faulty Fert center irrigation head (A or B).	
Sensor alarm	One of the system's sensors is faulty (the system displays the number of the faulty sensor).	
Input switched to off	One of the system inputs was switched from on to off (only for inputs that are not used as counters such as water meters and Fert meters).	
The system also displays the number and the name (if assigned) of the input.		
Input switched to on	One of the system inputs was switched from off to on (only for inputs that are not used as counters such as water meters and Fert meters).	
The system also displays the number and the name (if assigned) of the input.		
Failure to write loges and alerts	The system failed to write the logs – the system cannot recognize whether the message was successfully written to the log.	

Alert EC	The EC sensor is in alarm mode, the reading is outside the High or the Low boundary settings as entered by the user, the system also displays the number of the relevant Fert center.	
Alert pH	The pH sensor is in alarm mode, the reading is outside the High or the Low boundary settings as entered by the user, the system also displays the number of the relevant Fert center.	
Extreme EC Alert	The EC sensor reading is in its critical value; the fertigation and the irrigation are stopped. The system also displays the number of the relevant Fert center.	
Extreme pH Alert	The pH sensor reading is in its critical value; the fertigation and the irrigation are stopped. The system also displays the number of the relevant Fert center.	
Fertigation Not Finished	The irrigation was ended but the fertigation process did not finish its programed amount.	
Alert by logic condition	A logic condition that is programmed to raise an alert was switched to ON mode.	
Unit paused due to rain chance	The unit was paused due to the programmed rain chance parameter.	
Unit active due to NO rain chance	The unit resumed its operation due to the end of the rain chance mode.	
Communication alert Server	The communication with the server is disconnected.	
Device Remote Firmware Failure	The system couldn't complete a new firmware version download.	
Program Definition Error	There is an error in the program definition.	
Valve Definition Error	There is an error in the valve definition.	

K.3. General Logs

The General logs of the GSI PRO system are displayed only at the unit's level.

The general log screen has two tabs: Last Logs that displays the last 14 days, and Loges History tab that allows the user to select the dates span of the records to be displayed:



The records are numbered in descending order and contain the following data:

- Number – the number of the alert record.
- Start Time – the date and time of the alert record beginning.
- Last Data – the date and time of the alert record end.
- Duration – this message appears only for the communication time length; the duration that the unit was connected to the server.
- General Logs – the type of the log; please refer to the following table for all the possible general logs.
- Info column – the "i" icon appears on this column in the following cases:
  - For the unit connection message, pressing on this icon opens a window that displays data such as the time and date of the unit connection or disconnection, and the time, date and number of configuration items (CNFs) that were downloaded to the unit.
  - For the Daily message, pressing on this icon opens a window that displays the midnight daily logs of the system. For example, for the Daily Flush Counter, the system displays the numbers of the various filter flushing operation done during the current day.
- Message – data that is displayed by the server and is related to the specific alert message. For example: for the General Output Close (test mode) the server displays the number of the output that was opened.

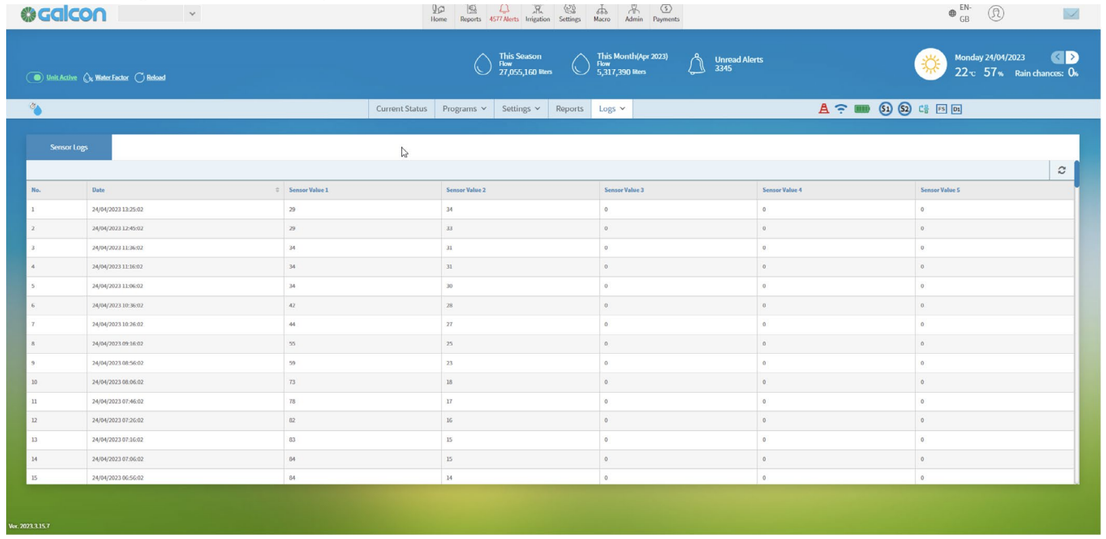
General Logs text	Logs' Meaning	Message
Flushing starts by DP	A filter flushing cycle started due to a DP signal.	
Flushing starts by quantity	A filter flushing cycle started due to the quantity of water passed through the system.	
Flushing starts by time	A filter flushing cycle started due to the time interval parameter.	
Manual flushing start	A filter flushing cycle started due to a manual start command issued by the user.	
Flushing finished	The flushing cycle ended	
Manual flushing finished	The flushing cycle was ended by a manual command issued by the user.	
Unit suspended due to error	The unit's irrigation was suspended due to an error in its irrigation head.	The message column displays the number of the faulty irrigation head.

Unit suspended due to condition	The unit irrigation was suspended due to a signal from its rain condition input.	
Permanent unit suspension	The irrigation head, or the controller are permanently suspended.	
Temp unit suspension	The irrigation head, or the controller are temporarily suspended due to No AC power, Setup Downloading, Manual suspension by time, or Unlimited time manual suspension.	
Manual Error Cancelation	The user manually reset the unit's faults.	
Auto Error Cancelation	The unit's faults were reset by the automatic faults cancelation mechanism of the system.	
Battery Levels	The midnight log of the battery levels	The message column displays four values: the battery voltage level at the last capacitor charging, the battery voltage level at the time of the modem starting, the battery voltage level at mid-day, and the battery voltage level at midnight.
Connection Attempt	The unit tried and established communication with the server.	
Connection Attempt Failed	The unit unsuccessfully tried to establish communication with the server.	
Daily water consumption	The midnight log of the water consumption	The message column displays the number of the water meter, the daily amount of water that passed through this meter during controlled operation, and the daily amount of water passed through this meter as uncontrolled water.
Controller reset	The controller operation was initiated	
Pause Main By Condition	The main irrigation head was paused due to a signal from the hardware pause condition input.	
Pause Main By Filter Flush	The main irrigation head was paused due to fault state in the filtration system.	
Condition Become Off	A logic condition configured in the unit turned to its OFF state.	The message column displays the name of the relevant logic condition.
Condition Become On	A logic condition configured in the unit turned to its ON state.	The message column displays the name of the relevant logic condition.
Logic Condition Pause	A logic condition configured in the unit turned it to pause state.	
Start Filter Program By Condition	The filtration program started due to a logic condition.	
End Filter Program By Condition	The filtration program ended due to a logic condition.	

Daily Flush Counter	The system issues a midnight log of the daily flush counters.	The "i" icon opens a window with the daily details of the filter-flushing various counters.
Fail write Diaries	The writing process to the logs failed.	
Erase Loggers	The user deleted the records of all the system logs.	
Pause Main By Condition	The main irrigation head was paused due to logic condition or condition input.	
General Output Open	A general output was opened.	The message column displays the number and name of the relevant output that can be an Auxiliary Output, Main Valve, Sustain Output, or Main Fert Output.
General Output Close	A general output was closed.	The message column displays the number and name of the relevant output that can be an Auxiliary Output, Main Valve, Sustain Output, or Main Fert Output.
Modem Data	When the unit operation is initiated, the system displays a message with data relevant to the communication modem.	The message column displays the signal level of the modem, the modem's communication generation (2, 3, or 4), the modem region (Global, USA, or AUS), and the modem's error rate (noise level 0-9 where lower number indicates better communication).
Unit Connected	The unit was connected to the server.	The duration column displays the connection time and the "i" icon opens a window that displays the connection and the disconnection dates and times, while the message column of this window displays the number of CNFs (configuration items) downloaded to the unit.
Remote Firmware Updated Successfully	The downloading process of a new firmware ended successfully.	The message column displays the numbers of the old and the new versions of the firmware.
Remote Firmware Update Failed	The downloading process of a new firmware failed.	

K.4. Sensor Logs

The Sensor logs of the GSI PRO system are displayed only at the unit's level.



This screen displays the last 200 records and the sensors history is not saved by the system.

This screen record's the readings of the system's analog sensors only, as configured by the unit type (AC or DC) and by the system setup screens.

The records are numbered in descending order and contain the following data:

- No. – the record number
- Date – the date and time of the record, the recording interval is as configured at the system's settings screens.
- Sensor Value 1 – the reading of the sensor
- Sensor Value 2 – the reading of the sensor
- Sensor Value 3 – the reading of the sensor
- Sensor Value 4 – the reading of the sensor
- Sensor Value 5 – the reading of the sensor

Important Note: for DC units sensor number 5 is reserved for logging the battery level.

L. Macro

The Macro Operations is a project-wide feature that allows authorized operators to perform centralized specific operations on the GSI units (PRO, AG, and GAR) of a specific project. The entry point to the Macro feature is found on the upper menu line of the project under the "Macro" icon.

The macro feature is a powerful management tool that eases the monitoring and the programing operations of an operator who manages large project that include many GSI PRO units.

In order to facilitate the projects' level actions, the participating units should be configured first for macro-operations. Once the system is correctly configured it allows three types of projects level actions:

- Project level actions according to unit definition
- Project level actions according to program definition
- Project level actions according to valve definition

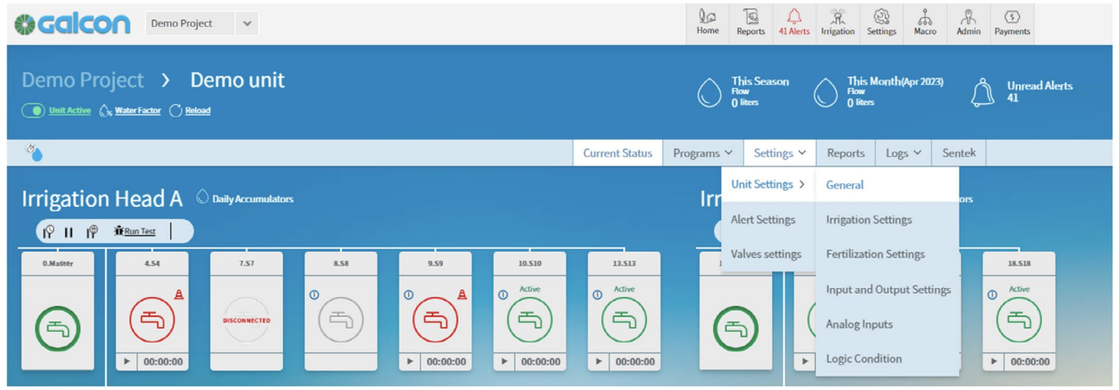
At this point it is important to understand that the macro-operations by the operator are very flexible, the operator may use the macro feature powerful filter menu that enables the operator to target specific units, programs, and valve of the project's macro configured GSI PRO units.

The setting process of the GSI PRO units for macro-operations include three types of settings to be done on the units' level:

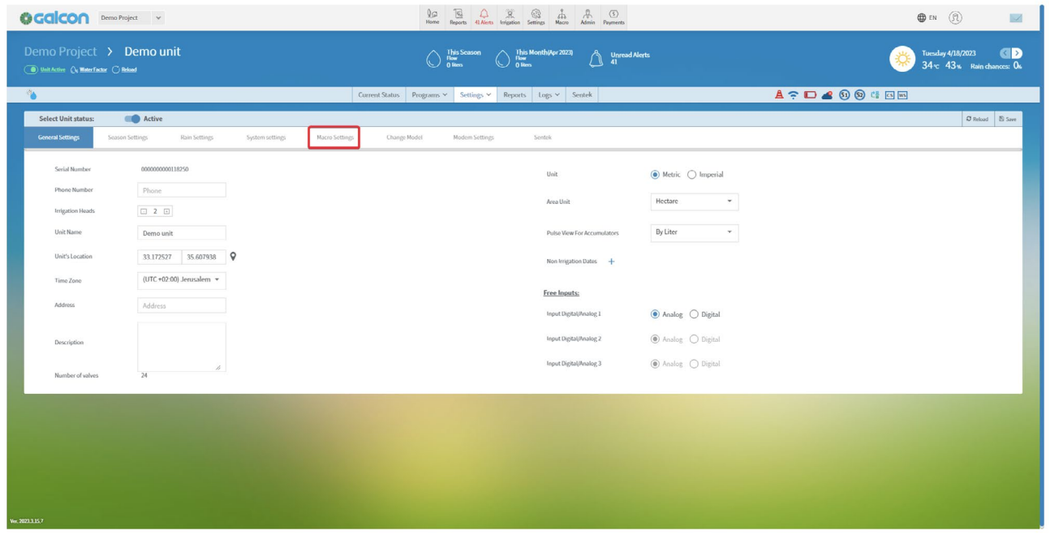
- Unit settings
- Valve settings
- Program settings

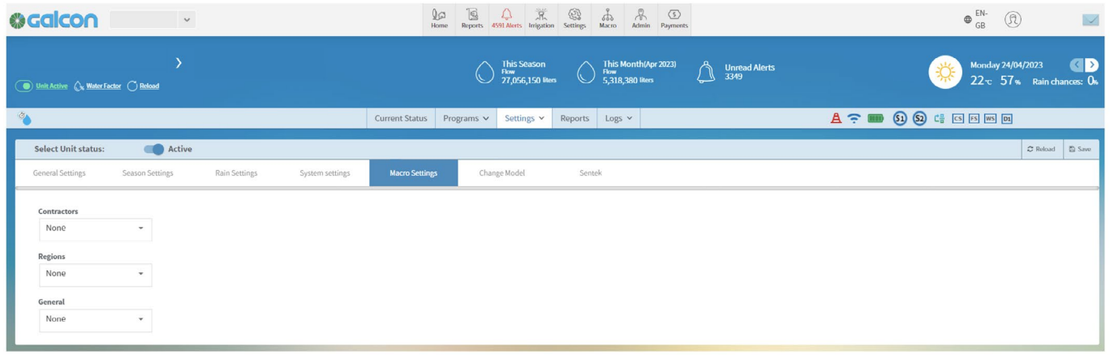
L.1. Unit setting

The settings of the unit for macro-operations is found under the "Settings" -> "Unit Settings" -> "General" screen as depicted in the following picture:



In the "General" screen there is a "Macro Settings" tab:





This screen depicts three categories to be configured for macro-operations:

Note that these categories are used by the filter menu of the macro-operations that allows the operator to perform actions according to the filtered categories.

Contractors – this category is used for setting names of contractors who are authorized to perform macro-operations on this unit. The user can select the required names from the drop-down list, and also can enter new names to the list by clicking on the "Add New" option.

Regions – this category is used for setting the geographical region of this specific unit. The user can select the required regions from the drop-down list, and also can enter new regions to the list by clicking on the "Add New" option.

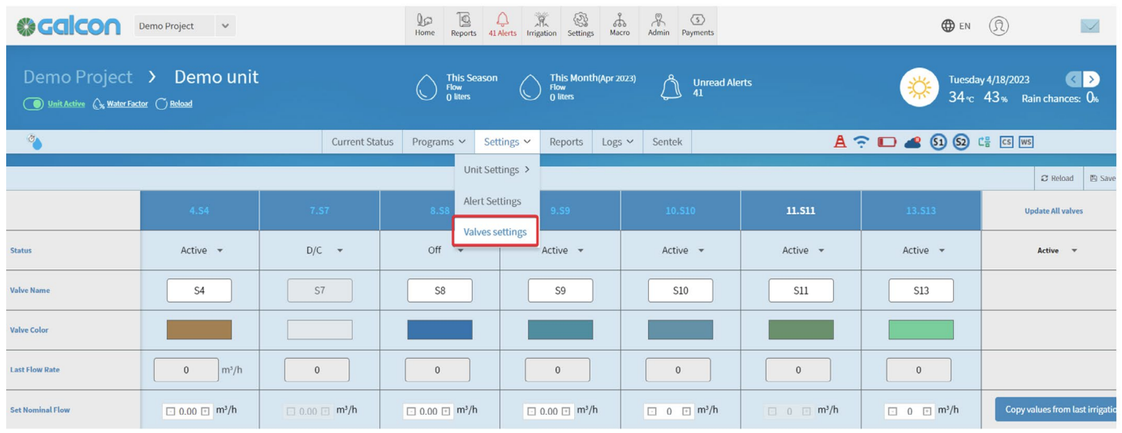
General - this category is used for setting additional general options to this specific unit to be later used by the filtering menu of the Macro-operation feature of the system. The user can select the required options from the drop-down list, and also can enter new options to the list by clicking on the "Add New" option.

Important Notes:

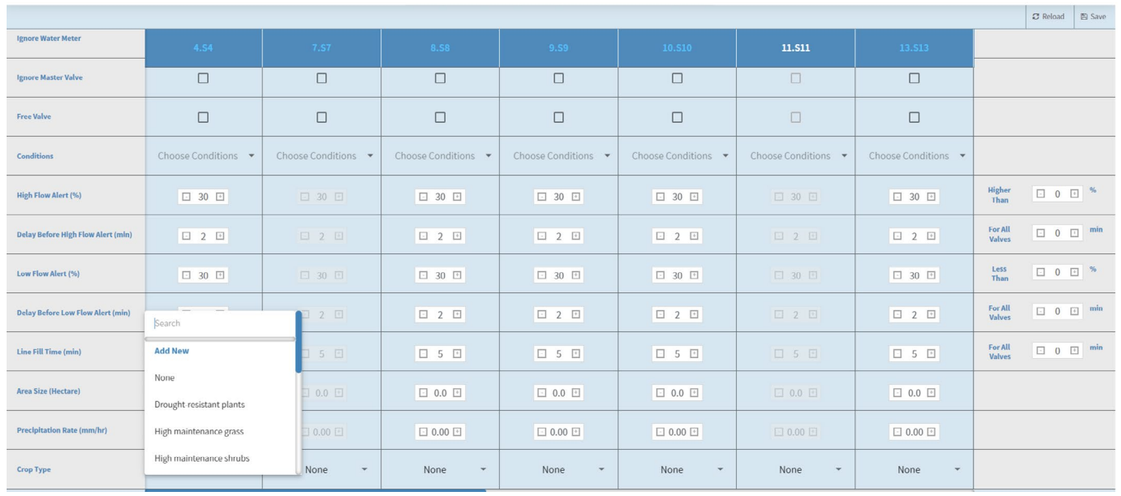
- The user can add new entries to the drop-down lists but he cannot delete entries from this screen; deleting entries can be done from the Macro Settings screen.
- In order to ease the setting operations, an entry added to the drop-down list of the above mentioned three categories is automatically added to the drop-down lists of all the other units of this project.

L.2. Valves setting

The settings of the Valves for macro-operations are found under the "Settings" -> "Valve Settings" screen as depicted in the following picture:



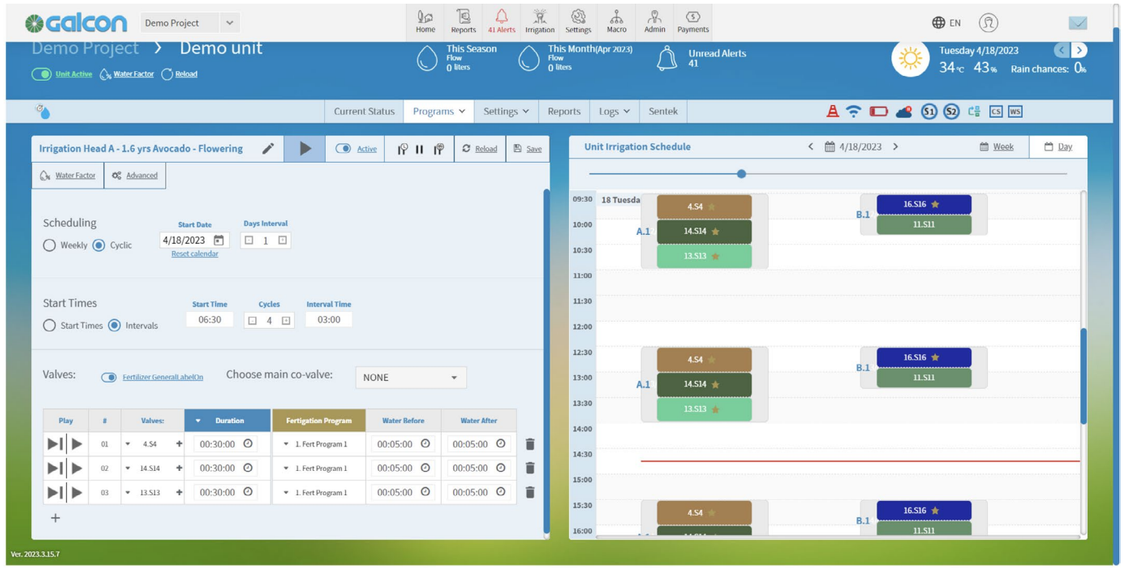
Each valve of the unit has a "Crop type" parameter in its settings screen; select the relevant crop type of this valve from the drop-down list. Note that the list contains pre-defined crops, however the user can add other types according to the actual crop type of the valve.



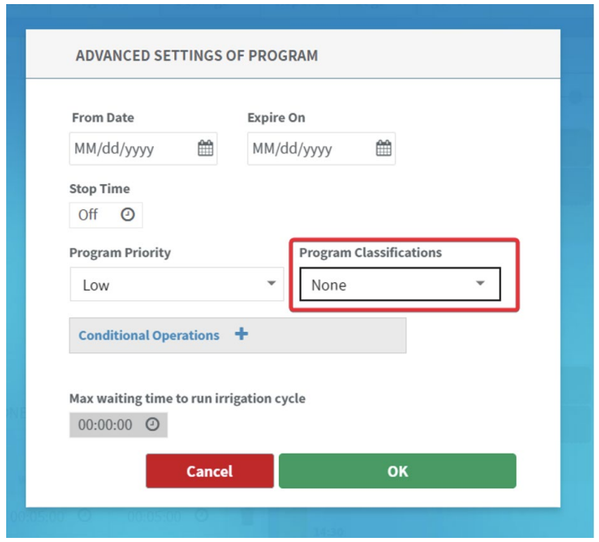
Repeat the crop type settings for all the valves to be configured for the Macro-actions in the current unit and the other units of the current project.

L.3. Irrigation Programs setting

The settings of the Irrigation Programs for macro-operations are found under the "Programs" -> "Irrigation Programs" screen as depicted in the following picture:



Each irrigation program has an Advanced tab on its settings screen, under the advanced tab there is a parameter named "Program Classifications" as depicted in the following picture:



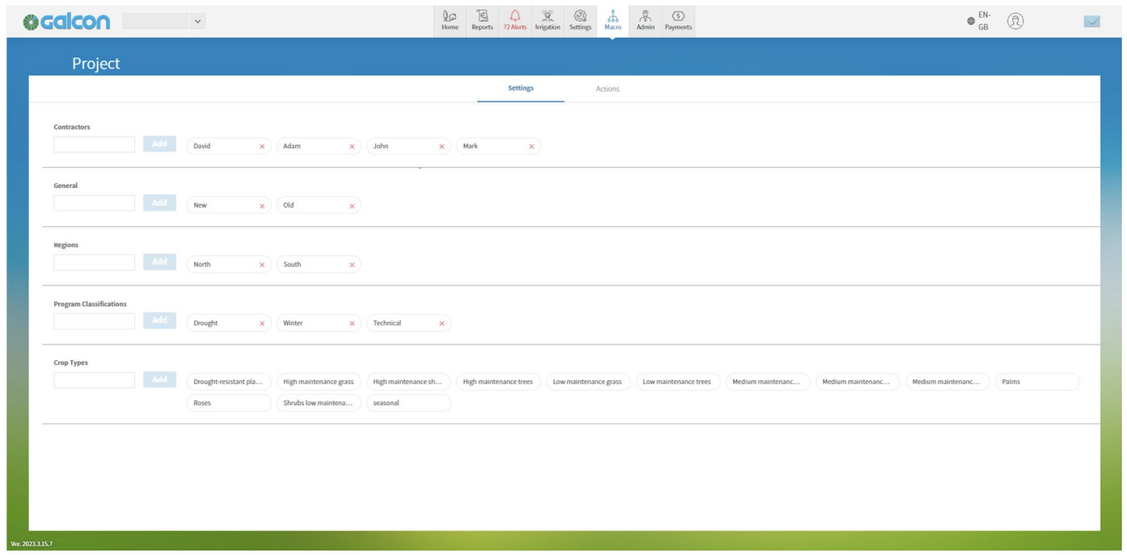
Select the relevant Classification of this program from the drop-down list. Once a classification is added to a program, the classification name is added to upper row of the program's screen.

Note that the user can add classifications to the list.

Repeat the programs' classifications settings for all the programs to be configured for the Macro-actions in the current unit and the other units of the current project.

L.4. The Macro Screen

The entry point to the macro feature is found on the upper menu line of the project under the "Macro" icon as depicted in the following picture:



The Macro screen has two tabs: Settings and Actions.

The Settings Tab:

This tab allows the user to set the details of the three types of settings to be done on the units' level from a centralized screen without the need to set each parameter on each unit separately.

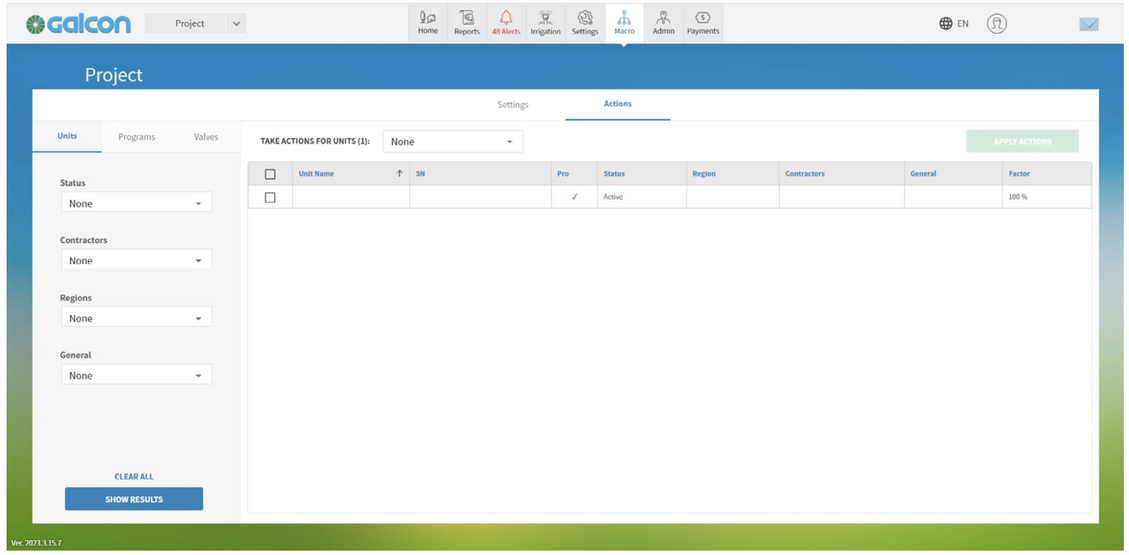
The screen is divided into five sections: Contractors, General, Regions, Program Classifications, and Crop Types. Each such section displays the already defined parameters and allows the user to add new entries to each section.

Note that:

- This screen allows the user to delete entries from each one of the sections, once an entry is deleted it is automatically deleted from all the units that contain that specific entry.
- Although a new entry is added to a section of this screen, the user still needs to select it in each applicable unit of the project.

The Actions Tab:

This tab allows the user to perform centralized actions on the configured for macro-actions units of the project.



This screen has two sections; the right side of the screen contains the selected elements for applying a macro upon divided by the Units, Program, and Valves categories, while the left side of the screen is the actions filtration mechanism.

When the Units tab is selected on the upper left side of the screen, the table shows all the project's units.

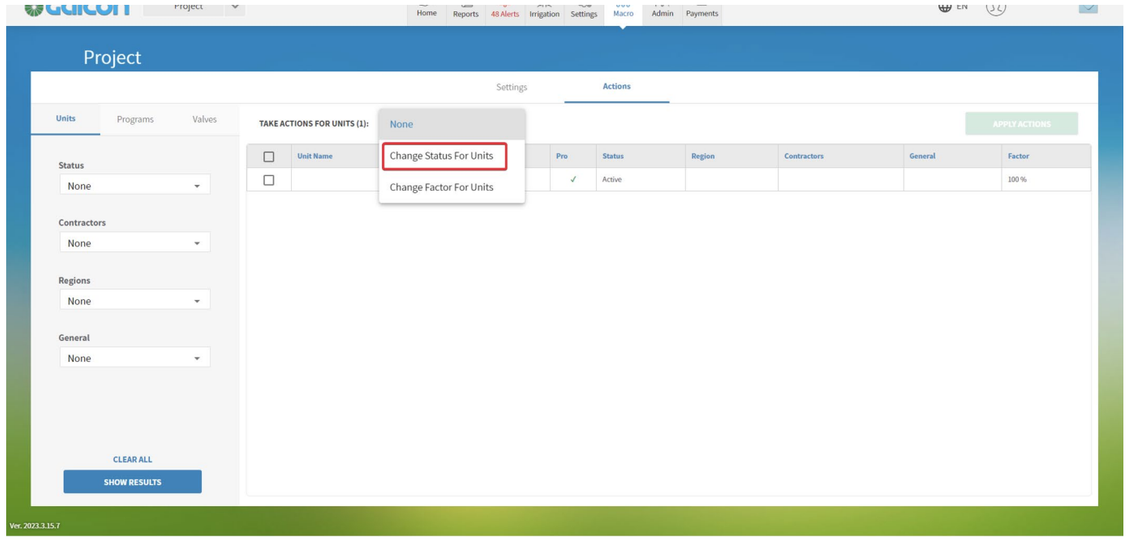
Per each unit the table displays the following data:

- Unit name – the mane of the unit
- S/N – the serial number of the unit
- PRO – the type of the unit, GSI or GSI PRO
- Region – the region set for this unit
- Contractors – the contractors set to this unit
- General – the general category set to this unit
- Factor – the current water factor (in percentage) set for all the unit's valves

Note that when no filters are selected, the table displays all the units.

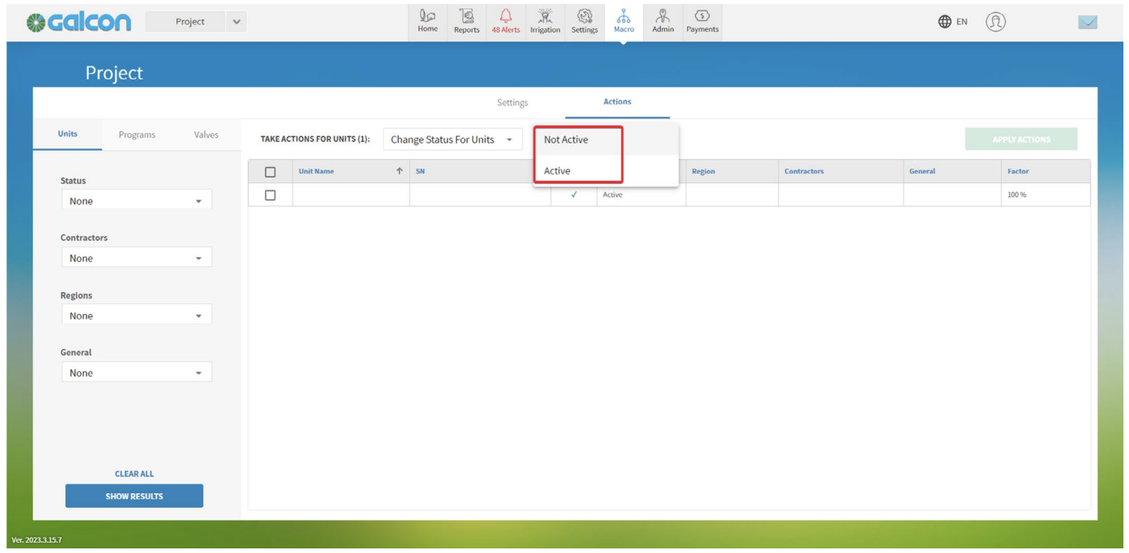
To the left of each unit a selection box allows the user to select the units on which the macro-action will be applied.

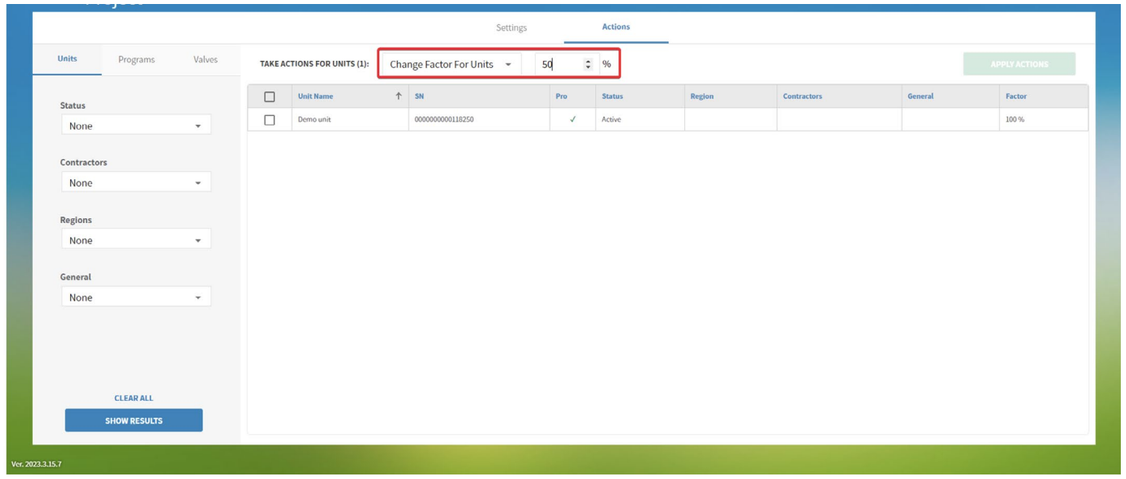
On the units' level the user can apply the following macro-action:



First mark the required units to apply the macro-action on.

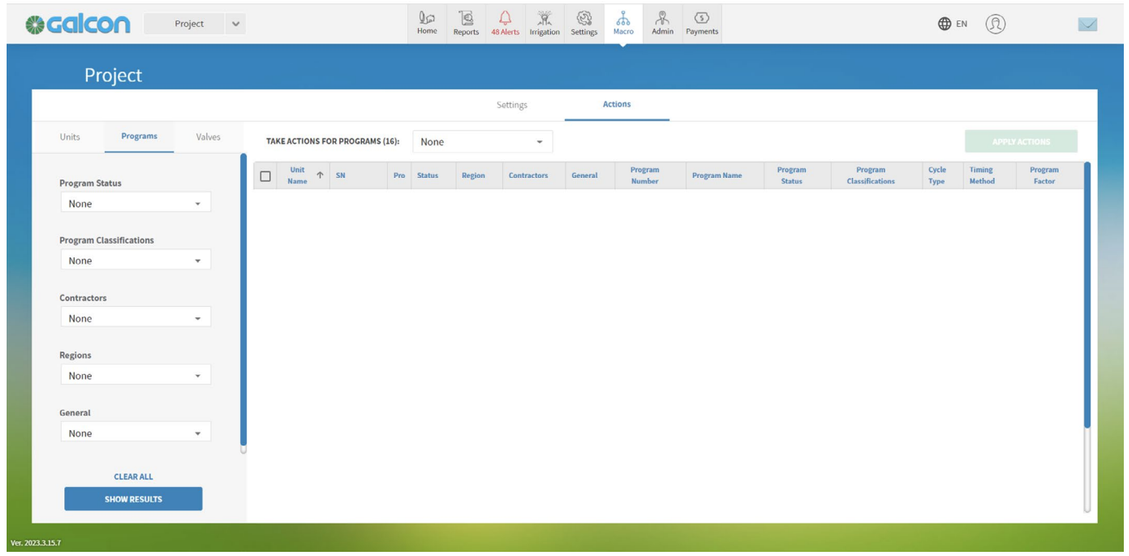
1. Change Status For Units – change the selected units from active to not active state and vice versa. Select the Change Status for Units, then select Not Active or Active from the second selection box.
2. Change Factor For Units – change the water factor percentage (10-200%) for the selected units. Select the Change Factor for Units, then set the required water amount percentage from the second selection box.





Once the units to apply the macro-action on are selected, the Apply Action button on the upper right side of the screen becomes active; press this button to apply the selected macro-action on the selected units.

The Programs' level:



When no filter is applied, the table displays all the programs of all the projects.

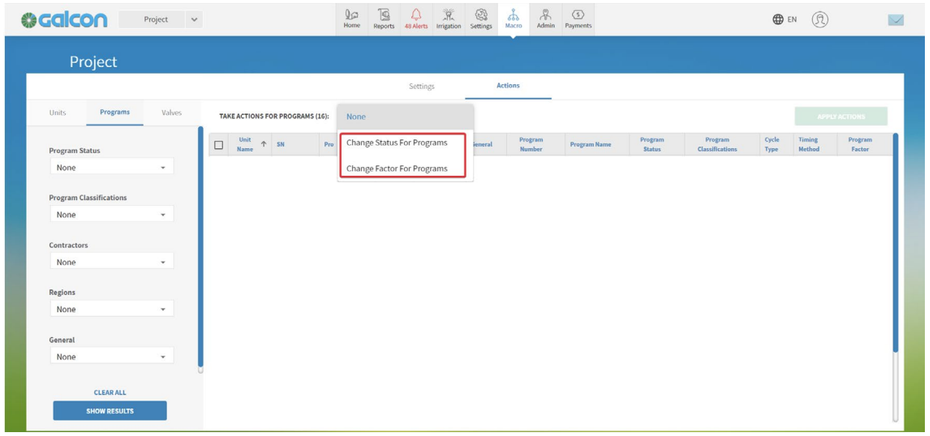
Per each program the table displays the following data:

- Unit name – the mane of the unit
- S/N – the serial number of the unit
- PRO – the type of the unit, GSI or GSI PRO
- Status – the current status of the unit
- Region – the region set for this unit
- Contractors – the contractors set to this program
- General – the general category set to this program

- Program number – the number of the program
- Program name – the name of the program
- Program status – the current status of the program
- Program classification – the set classification of the program
- Cycle type – the type of the program's operation method
- Timing method – the method of the timing settings of the program
- Program Factor – the water factor (10-200%) of the program's water amount

Note that when no filters are selected, the table displays all the programs of all the project's units that are set for macro-actions.

On the Programs' level the user can apply the following macro-action:

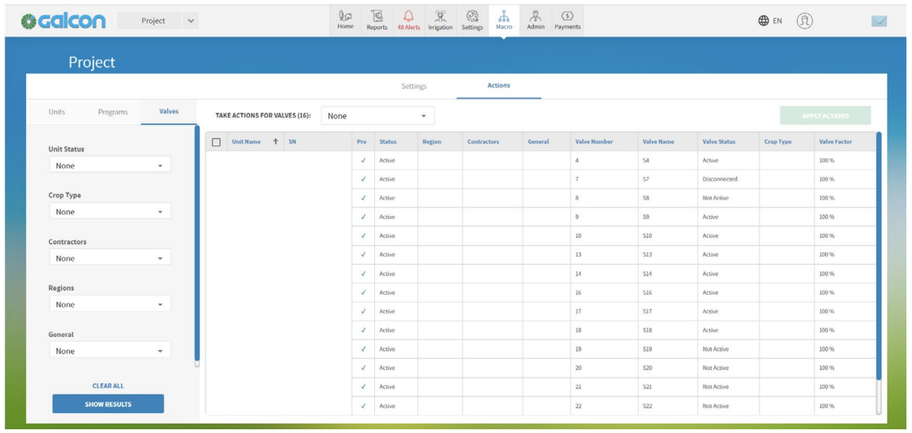


First mark the required programs to apply the macro-action on.

1. Change Status For Programs – change the selected program from active to not active state and vice versa. Select the Change Status for Programs, then select Not Active or Active from the second selection box.
2. Change Factor For Programs – change the water factor percentage (10-200%) for the selected programs. Select the Change Factor for Programs, then set the required water amount percentage from the second selection box.

Once the programs to apply the macro-action on are selected, the Apply Action button on the upper right side of the screen becomes active; press this button to apply the selected macro-action on the selected programs.

The Valves' level:



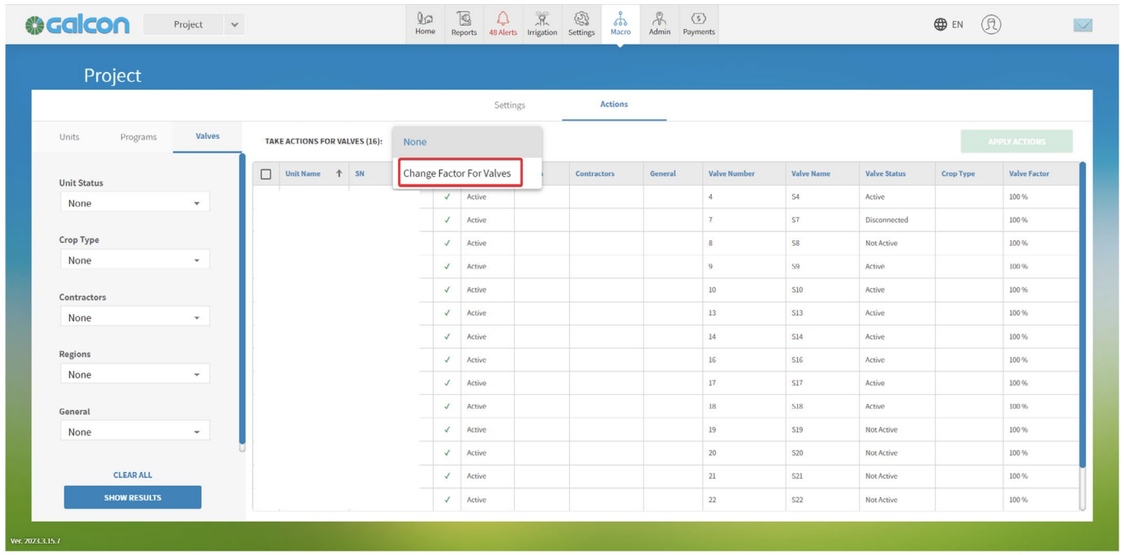
When no filter is applied, the table displays all the valves of all the project's units.

Per each valve the table displays the following data:

- Unit name – the mane of the unit
- S/N – the serial number of the unit
- PRO – the type of the unit, GSI or GSI PRO
- Status – the current status of the unit
- Region – the region set for this unit
- Contractors – the contractors set to this program
- General – the general category set to this program
- Valve number – the number of the valve
- Valve name – the name of the valve
- Valve status – the current status of the valve
- Crop Type – the set crop type of the valve
- Water Factor – the water factor (10-200%) of the valve's water amount

Note that when no filters are selected, the table displays all the valves of all the project's units that are set for macro-actions.

On the valves' level the user can apply the following macro-action:

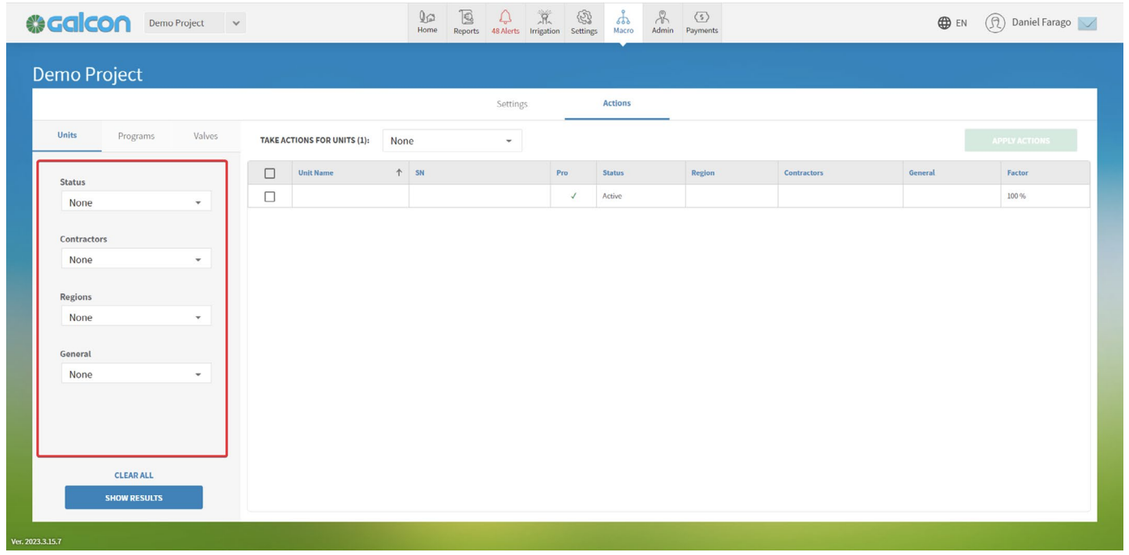


First mark the required valves to apply the macro-action on.

1. Change Factor For Programs – change the water factor percentage (10-200%) for the selected valves. Select the Change Factor for Valves, then set the required water amount percentage from the second selection box.

Once the valves to apply the macro-action on are selected, the Apply Action button on the upper right side of the screen becomes active; press this button to apply the selected macro-action on the selected valves.

Using the Macro Filters:



The Filters General operation method

The Macro Filters mechanism contains a series of selection boxes that operate in an "and" manner. This means that the selection made in a selection box retrieves only elements that comply with the selection made in the previous selection box.

For example, if the selection made in the first selection box is "Active" and the selection made in the second selection box is "David", the system retrieves only units that are Active and their contractor is David.

The selection boxes for the Units tab are:

- Status
- Contractors
- Regions
- General

The selection boxes for the programs tab are:

- Program status
- Program Classifications
- Contractors
- Regions
- General

The selection boxes for the valves tab are:

- Unit status
- Crop type
- Contractors
- Regions
- General

For each one of the three tabs, the system retrieves only table lines meeting the selected filters. Once the filtered table is displayed the user can select the required lines to apply the macro-action on.

The Show Results button is used to activate the filtered selections so the results are displayed in the table at the right side of the screen.

The Clear All button in the lower part of the filter screen clears all the selection, and set all the filters to None; so, the table displays all the elements.

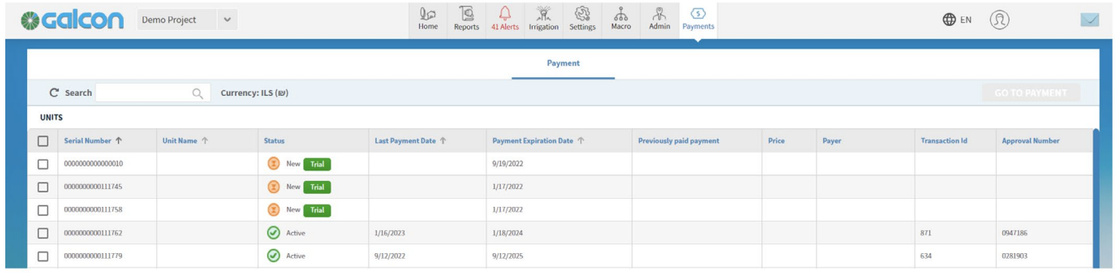
Important Notes:

- In case one or more of the project's units are not connected to the communication system once the macro-action is applied, the action waits in the database and sent to the units once they regain communication.
- Controllers that are configured as Offline DC Units cannot be assigned to the macro-actions' mechanism.
- The Logs of the system do not record the changes made by a macro-action.
- Deleting a project (or elements from the Macro Setting tab) deletes all the macro settings that belongs to the deleted item from all the relevant units.

M. Payment

The operation of the GSI PRO unit depends on a valid annual license that can be purchased at the payment section of the GSI PRO web site.

Entering the payment screen is via the "Payment" icon on the main menu line at the top of the web site.

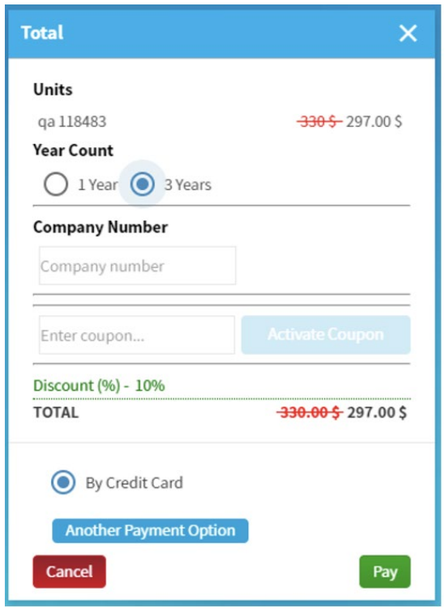


The payment page displays a list of all the units that are assigned to the current user from all his projects.

For each unit the table displays its serial number, name, status, and all the payments' details.

- The status column has the following options:
  - o New- a new unit that its license is not paid yet; the unit is not operational yet.
  - o Active – an operational unit which its license is valid.
  - o Expired – a unit that its license was expired, so it is not operational.
  - o Will be expired – the unit's license is about to expire. This status appears 30 days before the expiration date.
- The last payment date – the date of the last payment done for this unit license.
- Payment expiration date – the date where the license of the unit will be expired.
- Previously paid payment – the price that was paid at the last time the license was paid.
- Price – the price to be paid for the next license renewal. The price is displayed in USD or NIS, depends on the time zone of the unit installation location. The time zone parameter is set in the user profile screen.
- Payer - the name of the user who paid for the license.
- Transaction ID – the ID of the payment transaction.
- Approval Number – the transaction approval ID as received from the credit card company.

For paying mark the empty square at the left to the unit's (or units) serial number, and press the "Go to Payment" button at the upper right corner of the table. Note that the number of the units to be paid appears also on this button. The following screen appears:



At the Units section the names of the units to be paid are listed when the default price is a payment for 3 years; in this case the regular price and the 10% discount price are listed. The user can change the payment to a single year by clicking on the relevant radio button; the discounted price disappears.

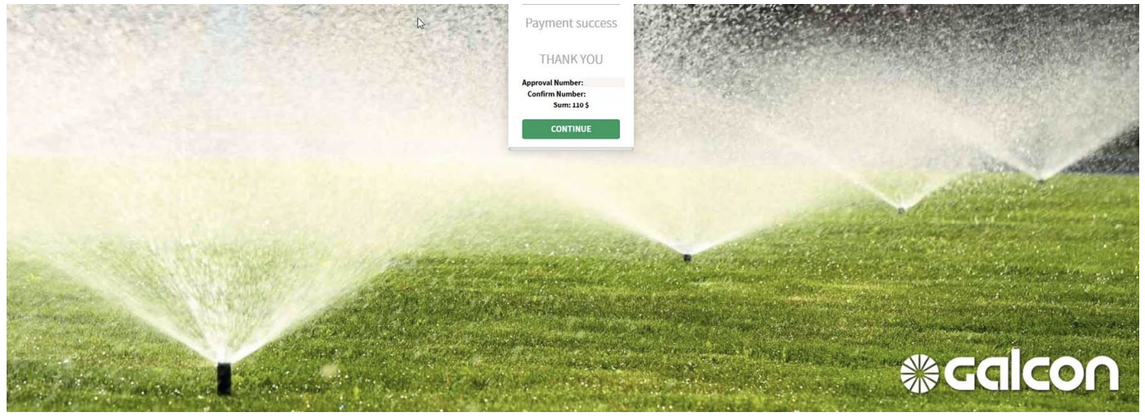
The company number section of the screen is used for entering the user's company ID number for receiving a formal receipt.

The Enter Coupon section can be used when the user has a discount coupon received from the distributer or from GALCON; enter the coupon ID number and press the Activate Coupon button.

The Total section displays to total amount to be paid; in case a valid coupon is used, the regular and the discounted price is displayed.

For paying in credit card press on the PAY button for moving to the formal credit card payment page. Once the payment transaction is successfully completed the user receives a receipt to the e-mail address entered during the payment process.

Once a success message appears on screen, press the continue button to update the status of the payment in the site's Payment and the Main Status screens.



Note that there is an option to pay in other payment option – contact your dealer for details.

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