SAPIR 2

User Manual

GOLDTEC
CONTROL SYSTEMS

Goldtec Control Systems Pty Ltd
Email: info@goldtecsystems.com.au
Web: www.goldtecsystems.com.au

Document version 1.01

Contents

1. Introduction

The SAPIR 2 is the next generation of central control irrigation systems. It allows combining various technologies to suit each project specific needs. It is an Internet enabled controller that gives the user the ability to control and monitor everything from everywhere at any time, using his PC or Smartphone.

The SAPIR 2 is the perfect solution for small to medium irrigation projects with a single irrigation head, suitable for both simple and most demanding applications.

SAPIR 2 – Irrigation Network
Max 32 Outputs

- Main valve -1
- Irrigation valves -32
- Fertilization valves -4
- Fertilization Booster -1
- Filters-31
- Downstream valve -1
- Sattellites-16

Sapir 2 Configuration	
Sites	**Max Quantity**
Irrigation line	1
Local Fertilization site	1
Local Filtration site	1
Outputs	
Main valve	1
Irrigation valves	32
Injectors	4
Booster	1
Agitators	4
Filters	31
Downstream valve	1
Satellites	16
Maximum Total number of outputs	32

SAPIR 2 – Irrigation Network
Max 30 Digital and 48 Analog inputs

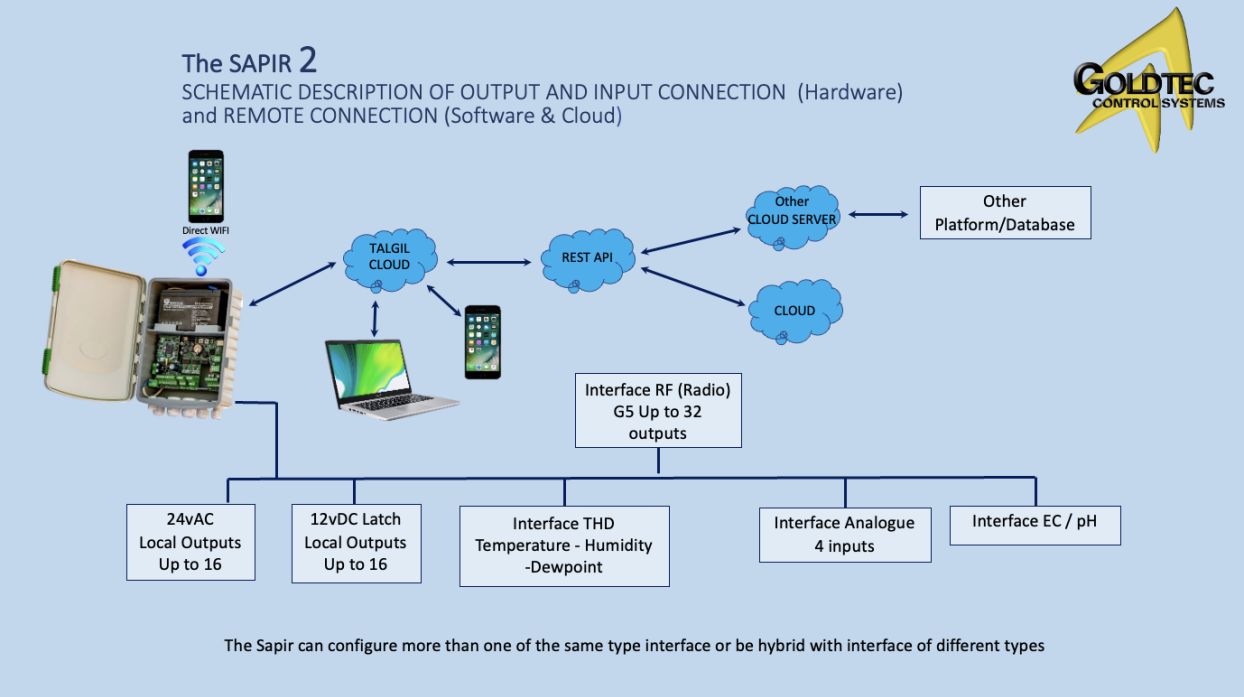
- Water meter -1
- Free water meters -8
- Pressostat -1
- Fertilization meters -4
- DP-1
- Contacts-16
- Analog inputs -48

Sapir 2 Configuration	
Sites	**Max Quantity**
Irrigation line	1
Local Fertilization site	1
Local Filtration site	1
Digital Inputs	
Line Water meter	1
Free water meters	8 *
*** 1 Line water meter + 7 free water meters Or 8 free water meters.**	
Fertilization meters	4
Pressure meter	1
DP	1
Contacts	16
Maximum Total number of digital inputs	30
Analog inputs	48

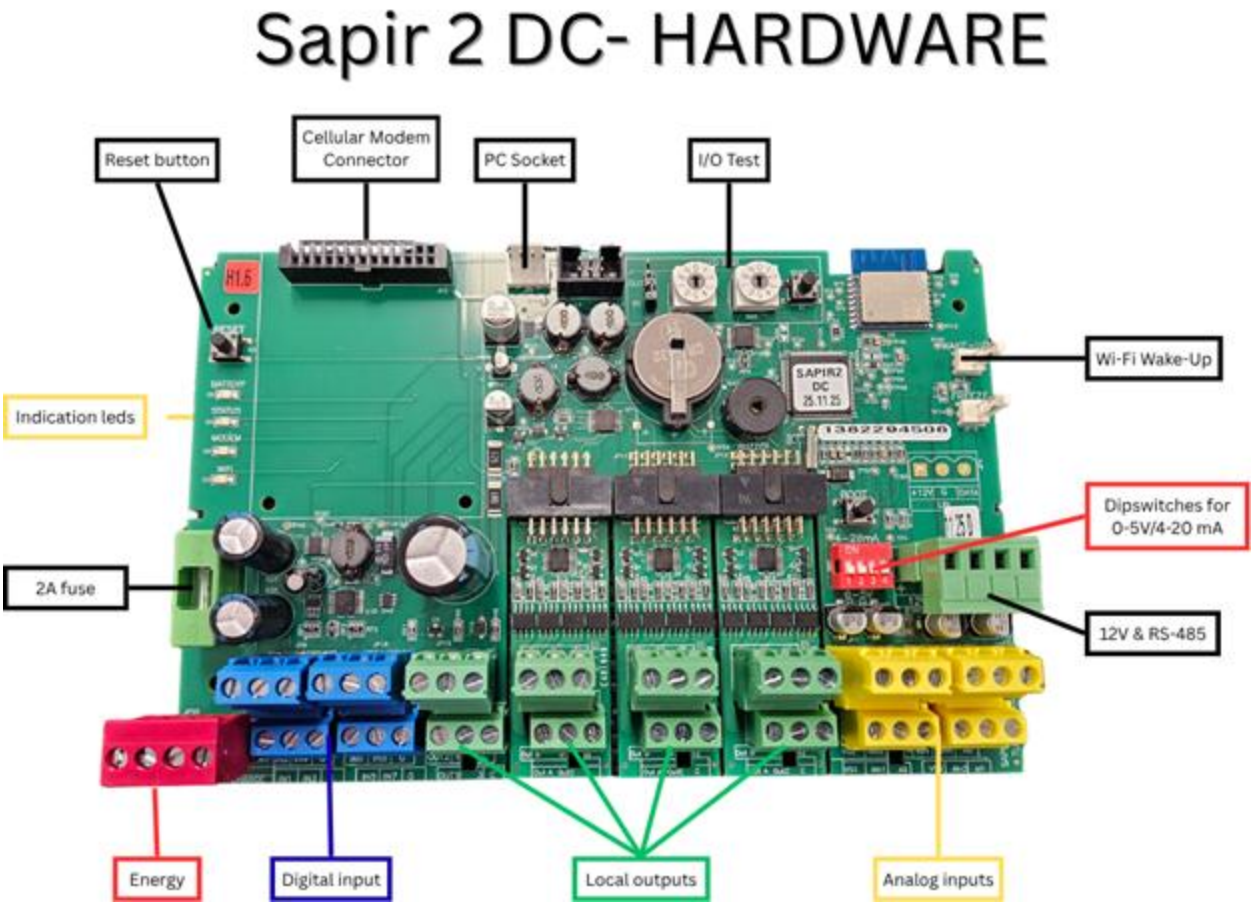
3

2. The system structure

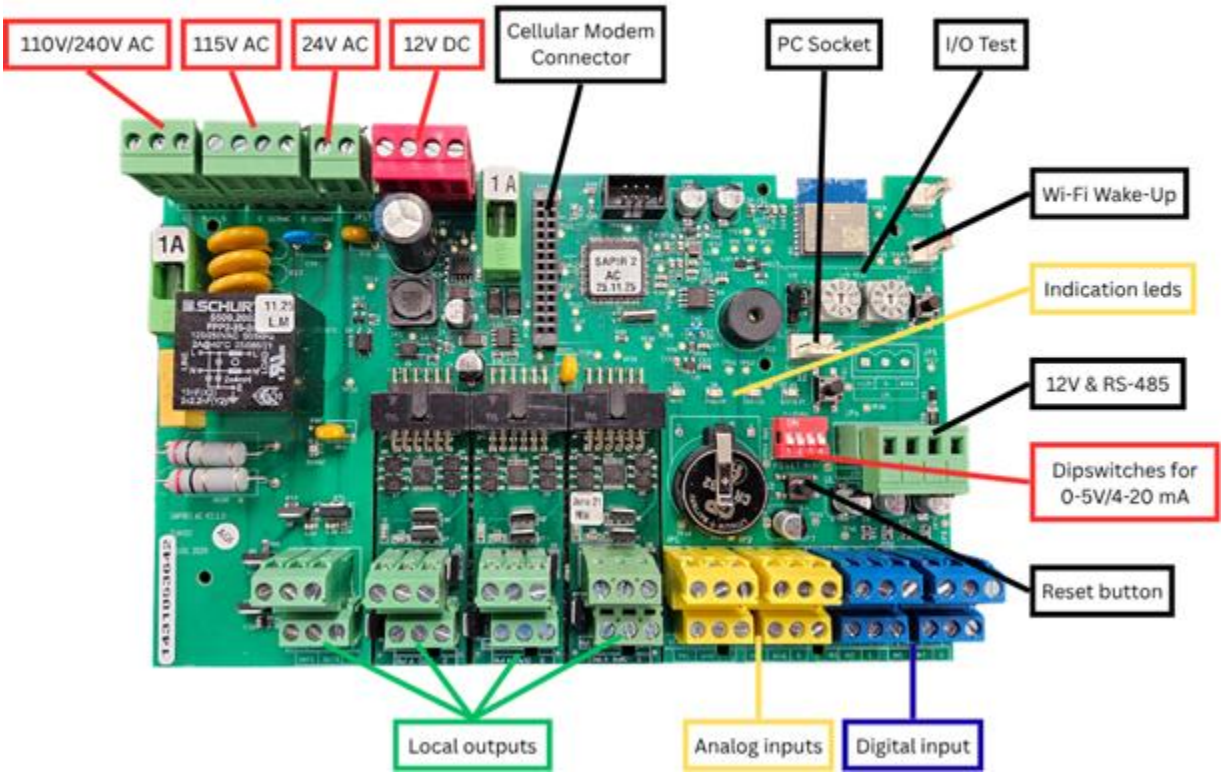
The following chapter contains a short explanation of the system structure.



2.1 Hardware


Sapir 2 DC- HARDWARE
Reset button
Cellular Modem Connector
PC Socket
I/O Test
Wi-Fi Wake-Up
Indication leds
Dipswitches for 0-5V/4-20 mA
2A fuse
12V & RS-485
Energy
Digital input
Local outputs
Analog inputs

Sapir 2 AC- HARDWARE



2.2 Interfaces - The following schema describes the principal structure of the SAPIR 2 interfaces system.

The interfaces function is to communicate between the external I/O devices such as – RTU's, analog sensors, weather station…. and the CPU.

Note – the on board local I/O's doesn't have an external interface, it's included in the SAPIR 2 board hardware and software.

For example – the steps of an opening command to valve number 3, which is connected to RTU RF number 2 in output 1:

1. The CPU will send the opening command to the interface / master RF.
2. The interface / master RF will send the command to RTU number 2.
3. RTU number 2 will open output 1.

When use digital or analog sensor, the same logic works but the other way around, meaning that the sensor is connected to an input in the RTU and when the sensor send a signal to the RTU, it sends it to the interface and the interface to the CPU.

Communication with the physically connected external interfaces is done by RS-485 communication protocol.

3. Communication

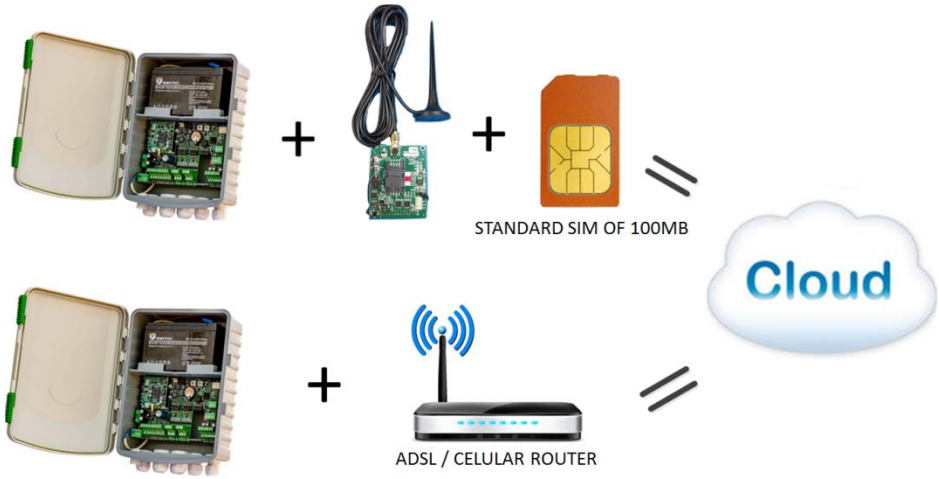
The following chapter contains explanation of the system communication with the server.

3.1 Connection to the server

Connecting the controller to the server allows the user to program and monitor the controller from everywhere at any time, moreover, it allows to multiples users access to a certain controller and / or access with a certain user name to multiples controllers.

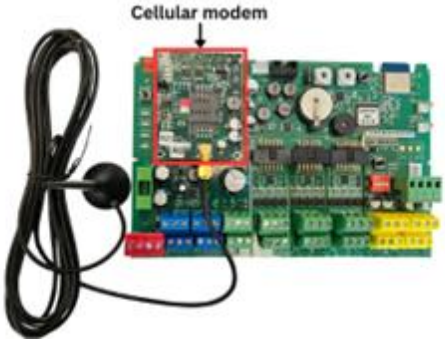
All the communication between the users pc / smartphone and the controller is happening in the server (except while using WIFI direct), for example, if a user changes a certain irrigation program from his computer using the CONSOLE, the changes are done in the server, and the information passes to the controller.
In addition, all the information from the controller (online controller) is saved in TALGIL's server (cloud).

There are 2 ways to connect the SAPIR 2 to TALGIL server, first one is by cellular modem and a sim card with data package (at least 100Mb), and the second one is by connecting to the local Wi-Fi net.



3.2 Cellular modem

In order to connect the controller to TALGIL's server, disconnect it from the power supply and rechargeable battery, open carefully the SIM card holder place it the right position and close the holder, to continue go to paragraph 6.



3.3 WI-FI

The Wi-fi modem connection will be ready in Q2 of 2019.

4. Communication with the controller

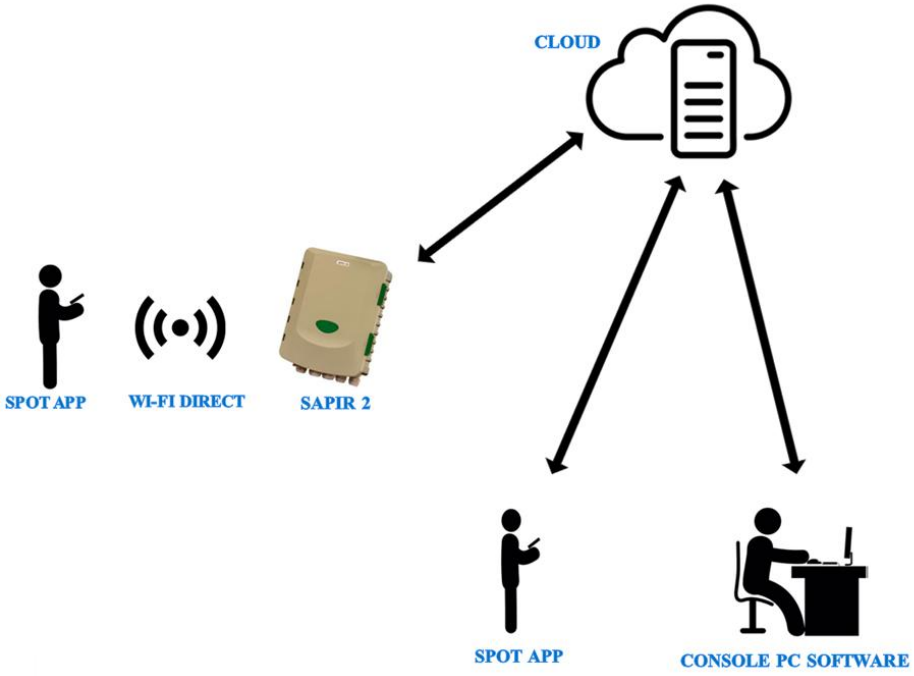
Communication with the controller is made by using 2 platforms, the first platform is the DREAM CONSOLE PC software (computers, laptops), and the second one is the SPOT app (smartphone, tablet).

4.1 Available internet connection

When there is a solid internet connection both options (Console and Spot) are available, the installer MUST connect the controller to the internet in order to create the system configuration.

4.2 No internet connection

In case of no internet connection, only the SPOT app is available and will work only while the user is standing near the controller and the internal WIFI component is turned on.



Note – there is no physical connection between the controller and the computer

Indication LED's status

A. **Battery LED status:**
   1. **Off:**
      I. **Dead battery.**
      II. **There is no power source connected.**

   2. **Blinking:**
      I. **Slow –** normal operation, without battery charging.
      II. **Long + 2 shorts –** Low battery.
      III. **Fast –** Battery charging problem.

   3. **On -** Normal operation, with battery charging.

B. **Status:**
   1. **Off -** Not active.

   2. **Blinking –** Slow, normal operation.

C. **Modem:**
   1. **Off –** Not active / connected.

   2. **Blinking –** connecting.

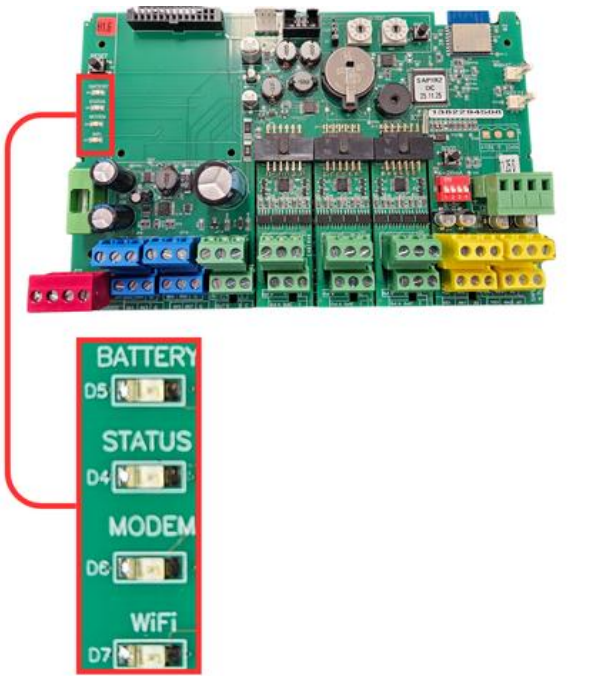
   3. **On –** connected.

D. **Wi-Fi:**
   1. **Off –** Not active.

   2. **Blinking –** Wi-Fi is active.

   3. **On –** Connected.
      .

LED'S LOCATION ON THE SAPIR2 BOARD



5. First introduction with the console

5.1 What is CONSOLE?

The DREAM CONSOLE pc software is a platform that allows programming and monitoring the SAPIR 2 from any pc or laptop, the only requirements are internet connection of the controller and the user's computer, user name, password and downloading the software.

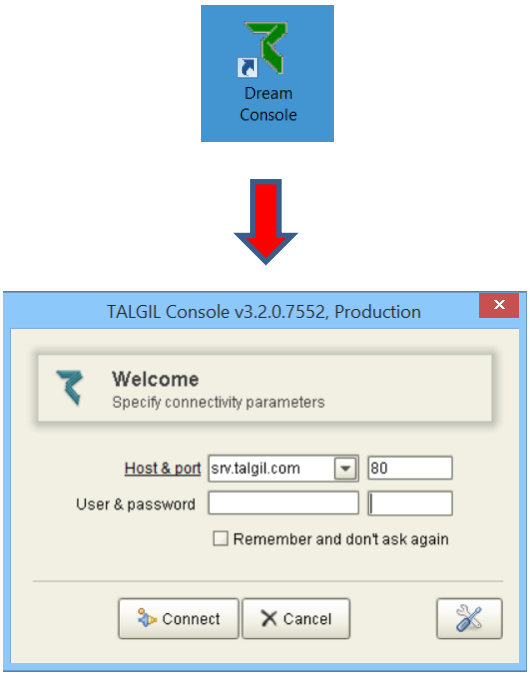
The software allows the user creating and editing irrigation programs, monitoring irrigation performance, graphical analysis of inputs (sensors water meters…), creating maps and so much more…..

5.2 Downloading

For downloading the CONSOLE software click here,
or enter our website **www.talgil.com**, after reaching to the home page, select:
Software ➡ **Console** ➡ **Download Console 64 bit** ➡ **and follow the installation instructions**.

5.3 logging in

After the downloading process,
a shortcut with the icon of TALGIL Should appear on the computer desktop, Double click on the short cut will Bring you to the user name and Password window, insert your user name and Password in the Designated spots and click "connect".

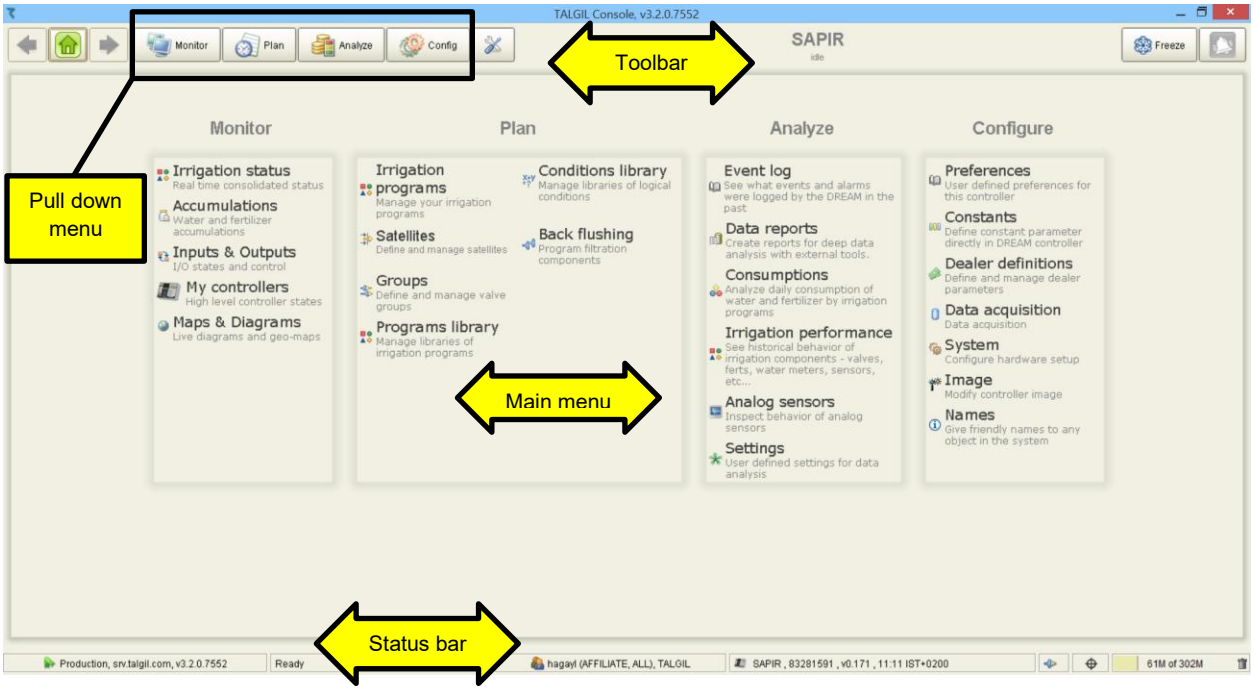


Note – before logging in make sure "Host" and "Port" are correct.

- **Host –** srv.talgil.com
- **Port –** 80

5.4 Home page

the homepage is the first screen you'll see, it contains the menu of all the subjects covered by the **CONSOLE**, it is the place from where the user can reach all of those subjects, let's have a closer look and see what else is there.



The Main Menu - The subjects of the **Main Menu** are grouped into meaningful groups, each group containing the relevant subjects. There are four groups:

Monitor – deals with monitoring the current activities
Plan – deals with the users irrigation planning.
Analyze – deals with analyzing accumulated historical information.
Configure – deals with all the information related with the system setup.

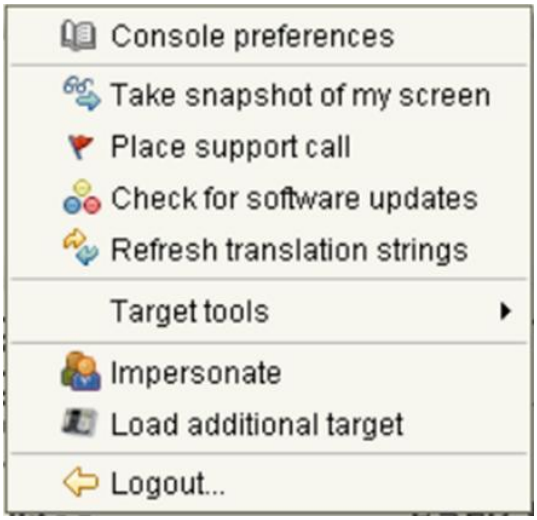
Depending on the configuration of the various targets there may be some differences in the list of subjects included in the menu.

The **pool down** menu contains the same parameters as the main menu, and it's available all the time in all the screens.

6. System Configuration - Advanced tool menu

In this chapter we will define the CONSOLE preference and create the system configuration, to enter the advanced tool menu click on  in the upper center of the home page screen.

After clicking the icon, a small tools table will appear:

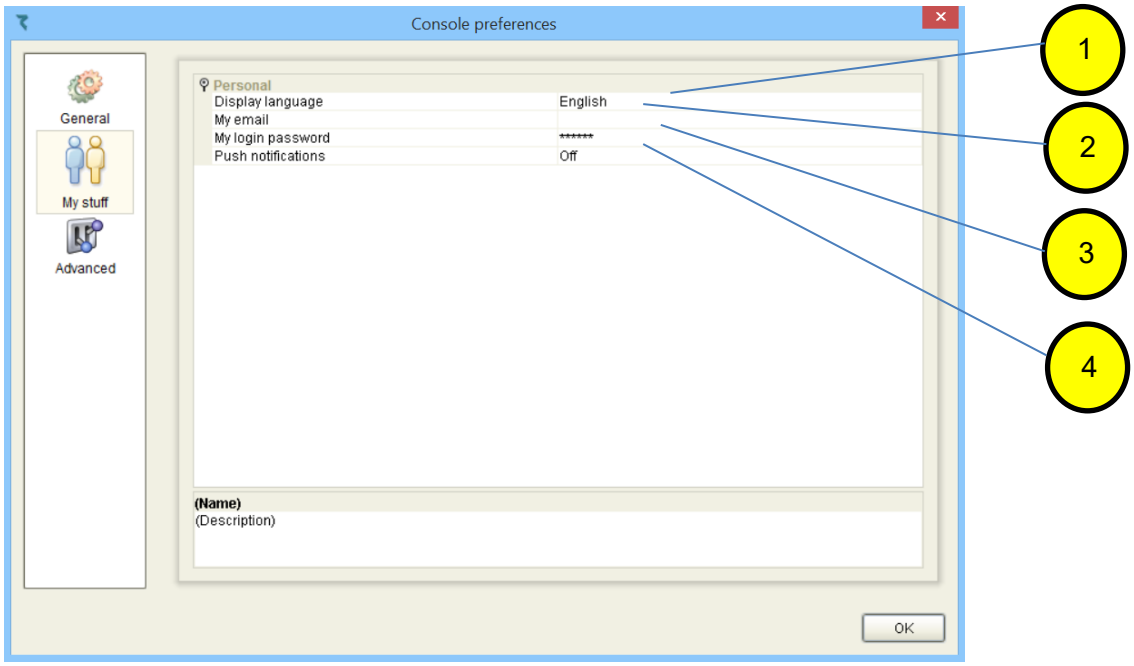


6.1 Console preferences

The **Console Preferences** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Console preferences**.

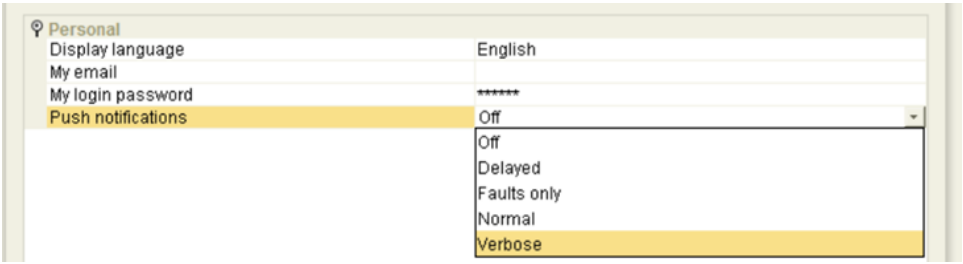
Obviously this section deals with setting some parameters that will affect the appearance and the behavior of the **Console.**

6.2 Console preference – my stuff



Pointers

1. Click to select the Console language.
2. Set your Email address, for receiving system reports and notifications.
3. Set your login password.
4. Enable / disable push notifications



Off – Push notifications will not be sent to this user, he will receive only emails according to the "**system events subscription**" list (paragraph 10.2).

Delayed – Push notifications will be sent to the user in bulks aggregate every 1 hour.

Faults only – Faults will be sent instantly as push notifications, other events are ignored.

Normal – Faults will be sent instantly; other events will be aggregated and sent every 5 minutes, all the notification will be sent as push notifications.

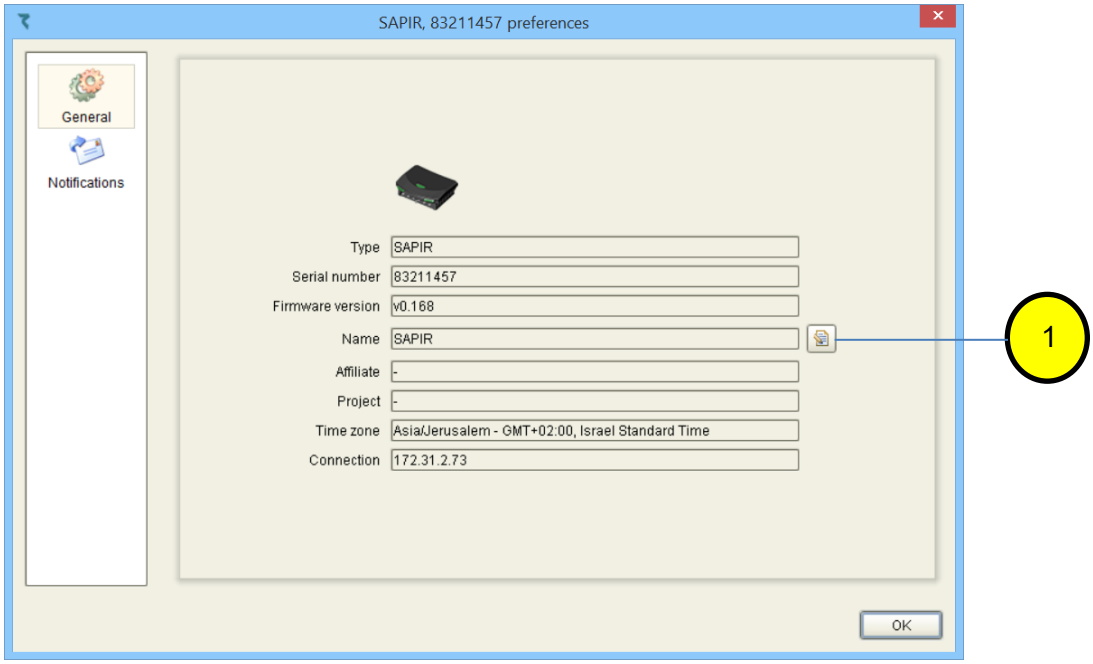
Verbose – Everything is sent instantly (developers and affiliates o**nly)**

7. Characteristics of the irrigation system – Configure

The following chapter focuses on the data involved with the Configuration of the controller and with the process of adapting it to the specific application. This is the place to look for information about the system structure, the hardware in use, the connections list of all the accessories, the constant parameters, the user preferences and more.

7.1 Configure – preferences – General

The General preference screen demonstrates general information of the controller.

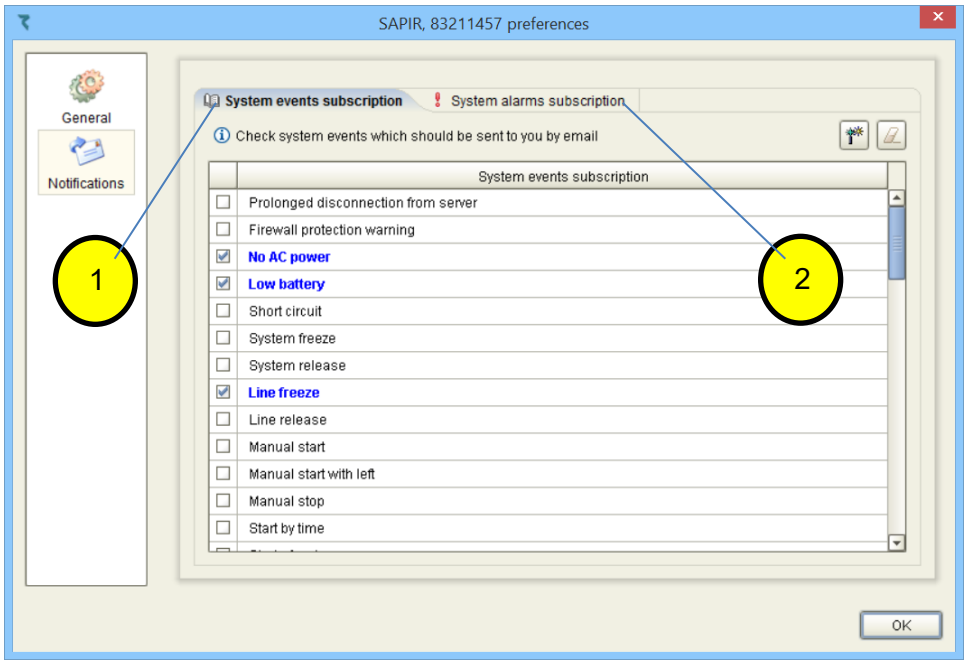


Pointers

1. Click on the icon to edit the controller name.

7.2 Configure – preferences – Notifications

The screen below is dedicated for selecting the Notifications the user would like to receive, there are two options of notifications the user may request.



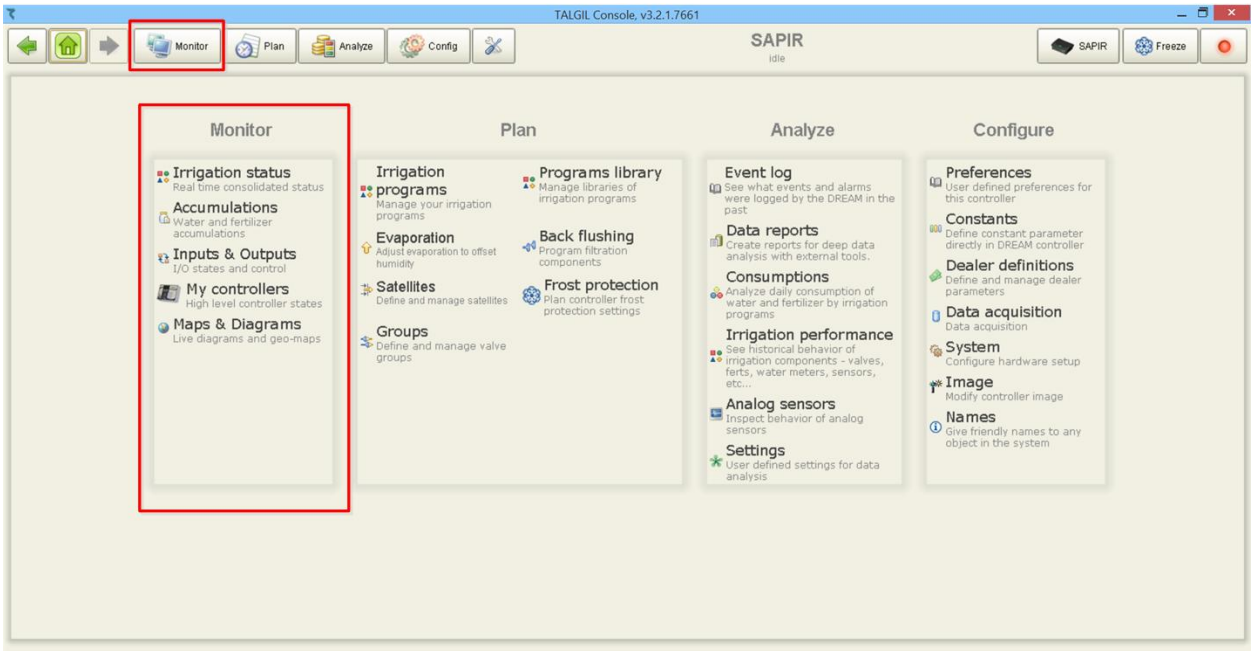
Pointers

1. **System events subscription -** Notifications by Emails or push notifications to the user smartphone, the user must have the “SPOT” app to receive push notifications.
2. **System alarms subscription -** Notifications by popup window will appear on the user computer screen while the CONSOLE software is open.

Note – the notifications are for each user of the controller, in case there is more than one user, each one of them can select the notifications that he would like to receive.

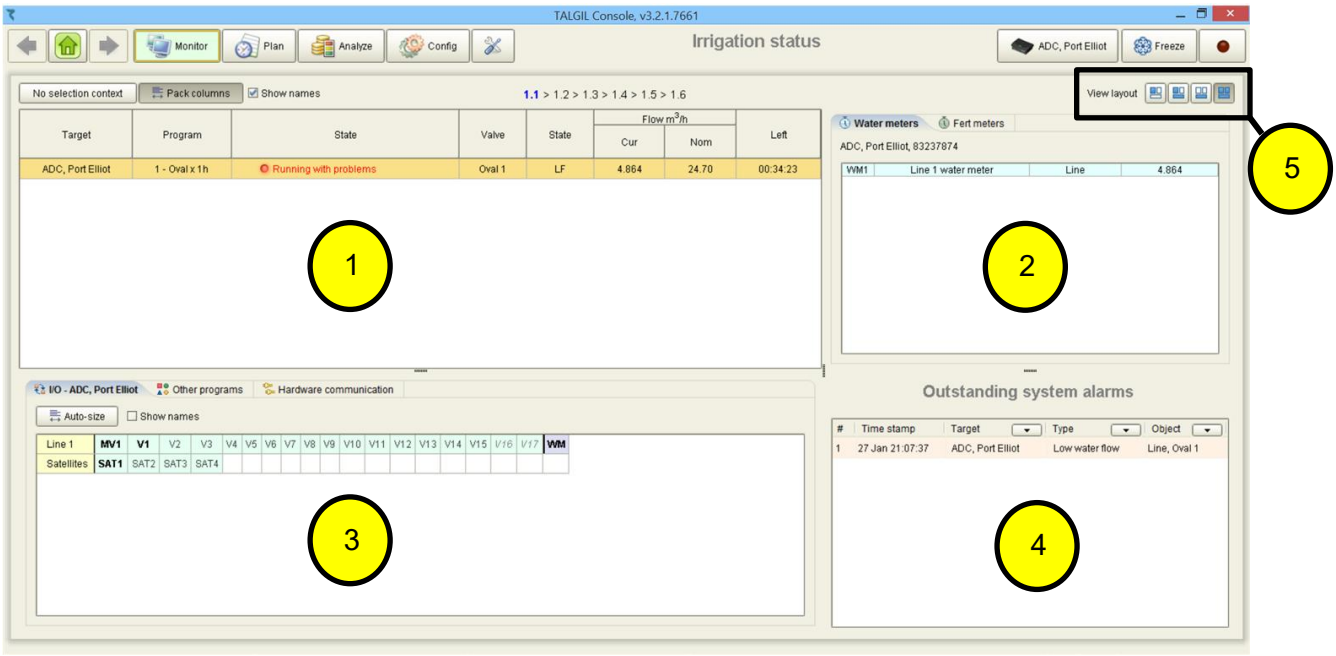
8. Irrigation monitoring - Monitor

The following chapter deals with the Monitoring tools supplied by the System, you can find the monitor list of content in the main menu or in the pull down bar.



8.1 **Irrigation status** (monitor / irrigation status)

The irrigation status screen supplies real time information on all the current activities of the controller.

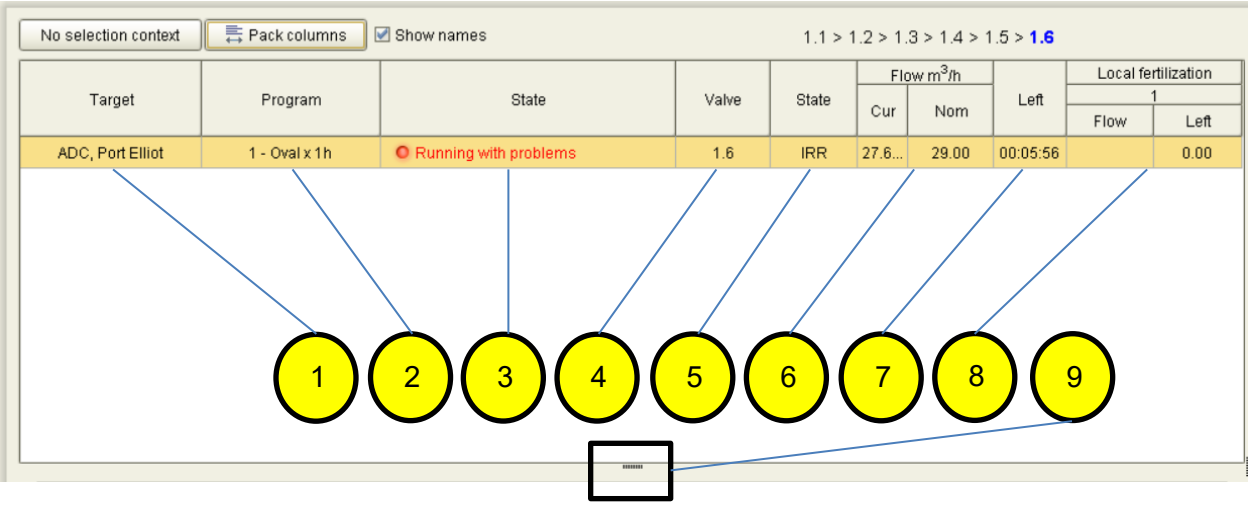


Pointers

1. Running irrigation programs window.
2. Water and Fertilizer flow meters window.
3. Window of **complimentary tabs**:
   - Inputs and Outputs status
   - Irrigation programs status.
   - Hardware communication.
   - Filters.
   - Analog sensors.
4. Outstanding system alarms.
5. Screen view layout.

Note – the type and quantity of **complimentary tabs** can change according to the system definitions, for example if you have analog sensor or filters you will see additional tabs.

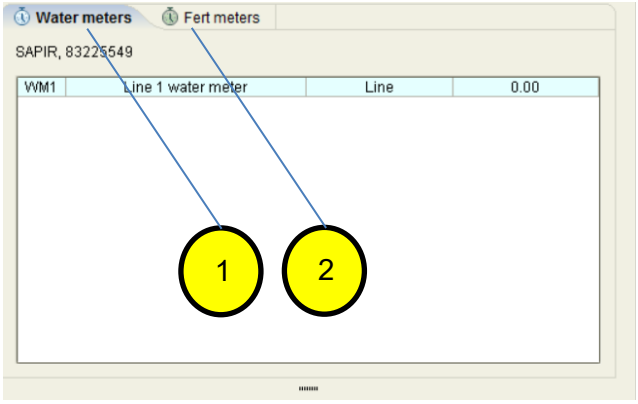
8.1.1 **Running irrigation programs window** (monitor / irrigation status)



Pointers

1. Name of the controller / target.
2. Name of the program.
3. Program state.
4. Valve / group number.
5. Valve / group state.
6. Valve / group current and nominal flow.
7. Volume or time left to finish the irrigation program.
8. Current fertilizer flow, and time / volume left to finish the fertilization program.
9. Changing the screen size by click and dragging.

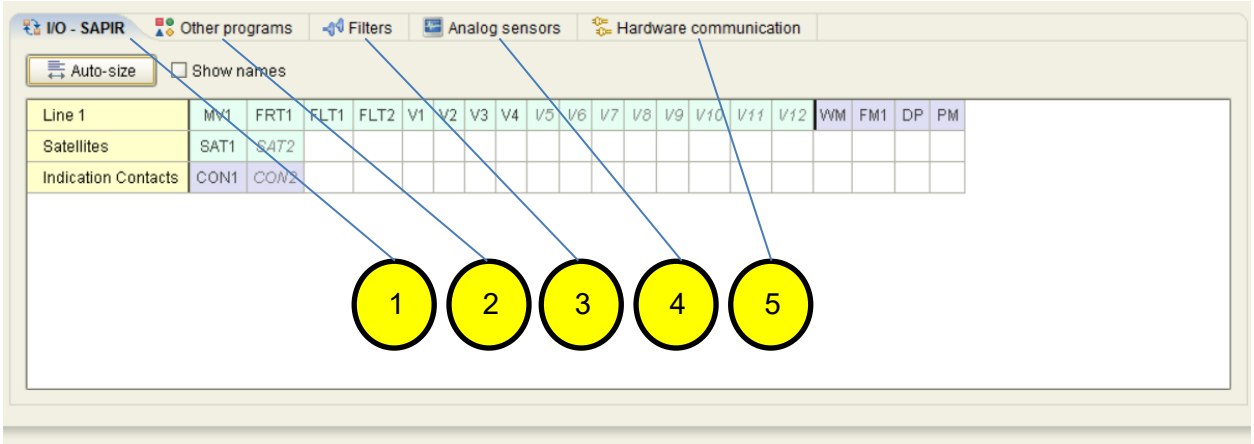
8.1.2 **Water and Fertilizer meters window** (monitor / irrigation status)



Pointers

1. Current water meter flow.
2. Current fertilizer meter flow.

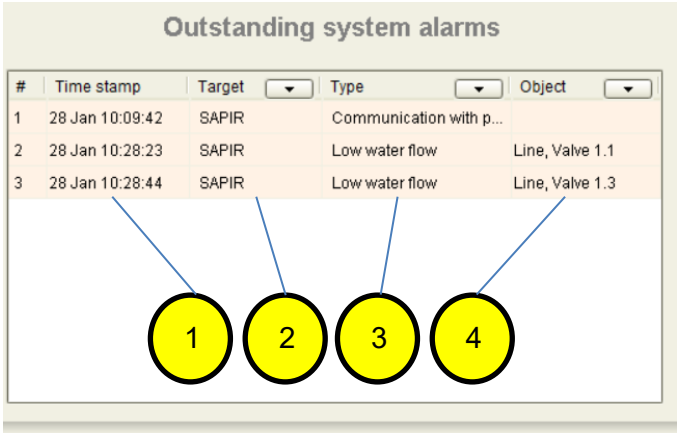
8.1.3 **Window of complimentary tabs** (monitor / irrigation status)



Pointers

1. **Inputs and outputs status tab –** demonstrate the current status of the outputs and digital inputs, clicking the right button of the mouse on one of the I/O will open a small list that contain options such as : open / close outputs manually, go to constants, etc. Open or close manually will only open/close the selected output.
2. **Other programs tab –** viewing programs status: Finished, scheduled, Frozen or incomplete.
3. **Filters –** viewing the filters program configuration and execute manual operation by clicking on the right button of the mouse on the filter site and select **Start flushing**.
4. **Analog sensors –** this tab is for viewing the current analog sensors values.
5. **Hardware communication –** shows the communication between the SAPIR 2 its interfaces and RTU's, when a communication problem occurs the interface or / and RTU will be colored in red and an alarm message will pop.

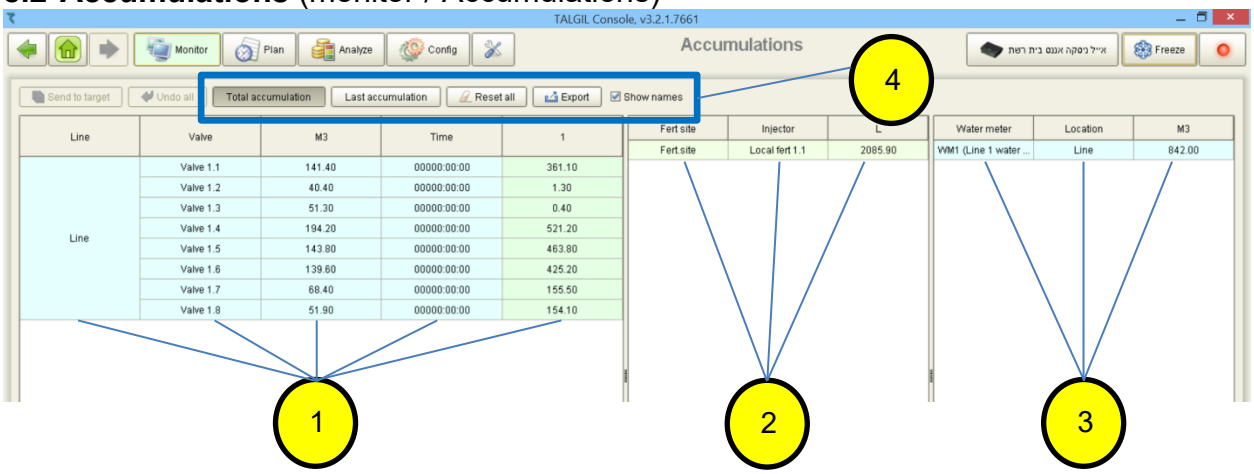
8.1.4 **Outstanding system alarms** (monitor / irrigation status)



Pointers

1. Time of the alarm.
2. Which target (in case the user have more than one controller).
3. Type of the alarm.
4. The object that indicates the problem.

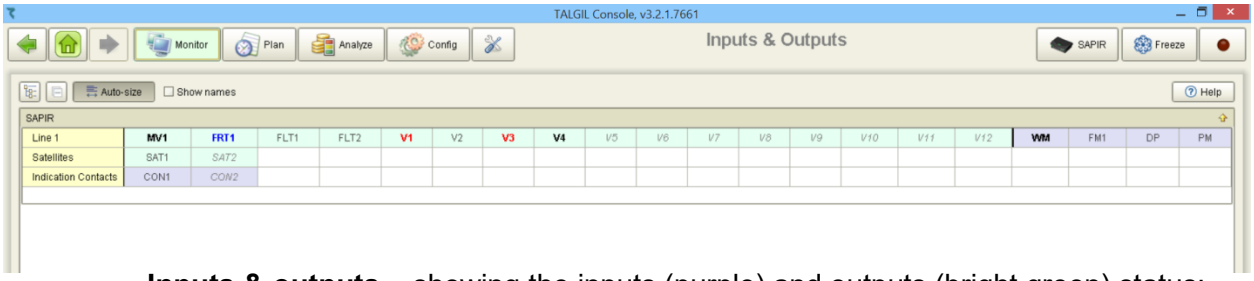
8.2 **Accumulations** (monitor / Accumulations)



Pointers

1. Water and fertilizers Accumulations by volume and time.
2. Fertilizer meters accumulations.
3. Water meter accumulation.
4. The tab bar contains several options such as: Total or Last accumulations, Reset all (delete all accumulations), Export all the accumulations to an Excel file.

8.3 **Inputs & Outputs** (monitor / Inputs & Outputs)

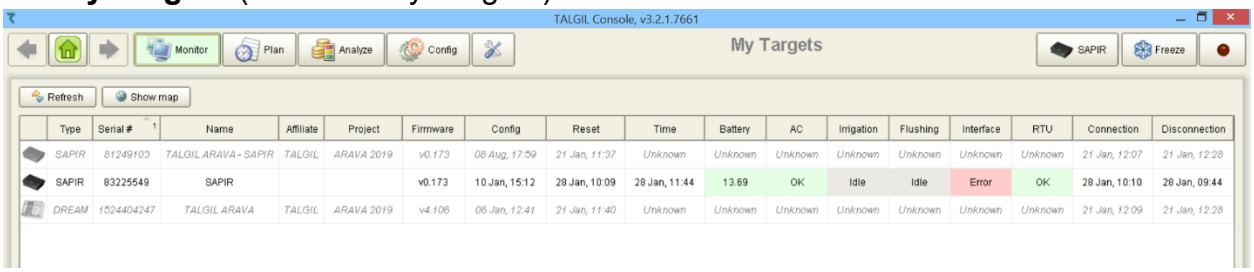


- **Inputs & outputs –** showing the inputs (purple) and outputs (bright green) status:

Black – opened by program.
Blue – opened manually.
Red – problem.

- Clicking the right button of the mouse on one of the I/O will open a small list that contains options such as: open / close outputs manually, go to constants, etc.

8.4 **My Targets** (monitor / My Targets)



- This screen shows general information of the controllers related to the user name.

8.5 **Maps & diagrams** (monitor / Maps & diagrams)

- To create map please look in the maps and diagrams appendix.

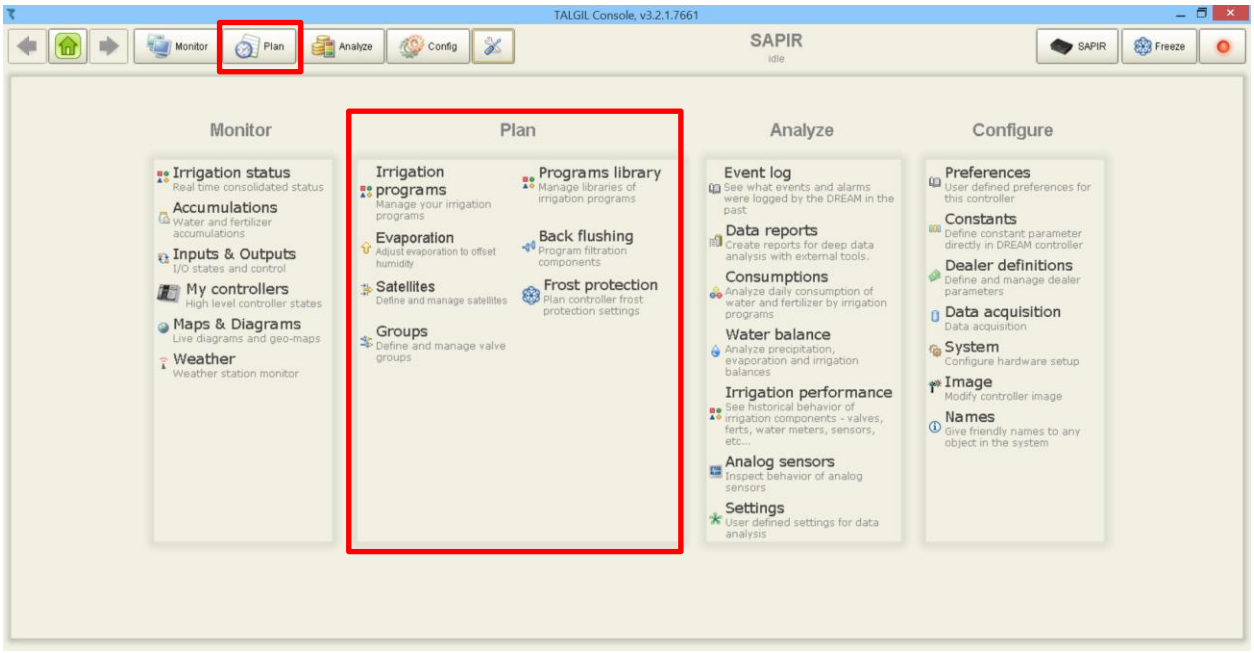
8.6 **Weather** (monitor / Weather)

Pointers

1. In case it's a **PESSL** weather station this icon will appear, clicking on it will open **PESSL "Filed climate"** web page.
2. Clicking on the **Location** icon will open a map with the location of the weather station (only if it's PESSL).
3. Weather station current values (can be watched also in **"irrigation status"**).

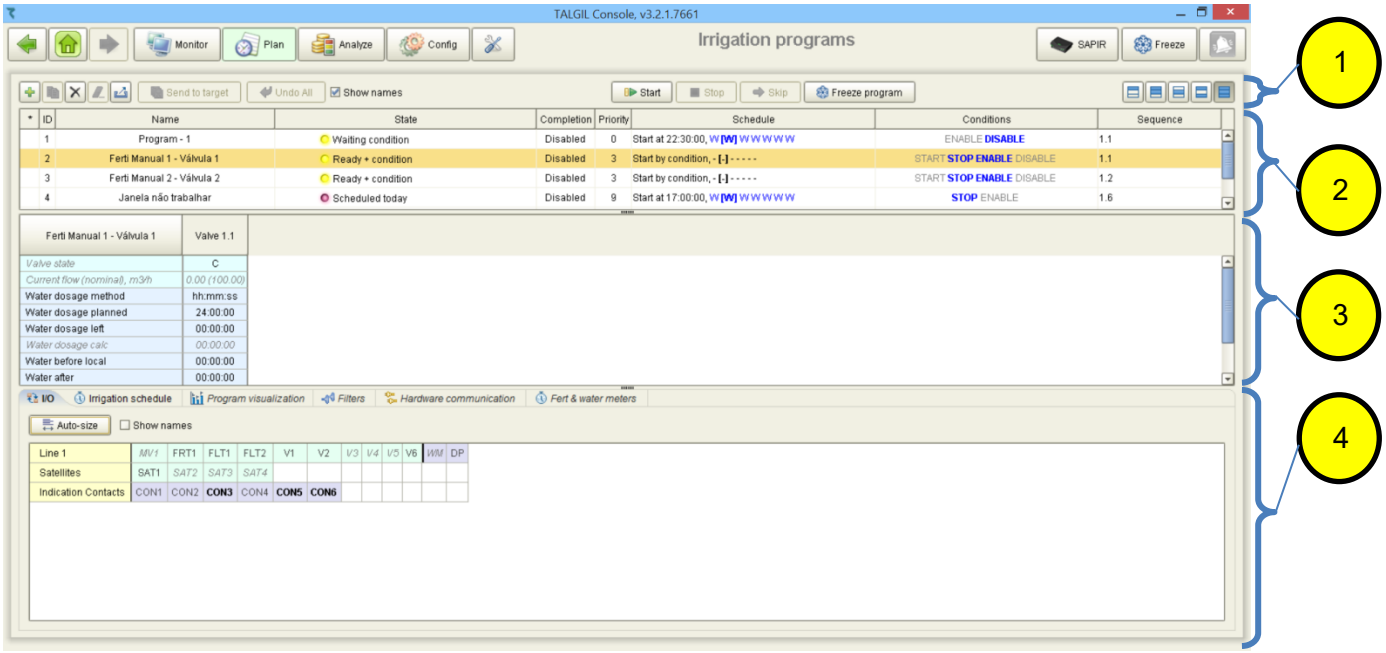
9. Irrigation planning - Plan

The following chapter deals with planning irrigation programs and other activities, it can be reached from the main menu or from the pull down bar.



9.1 **Irrigation programs** (plan / irrigation programs)

In the irrigation programs screen the user can create, edit or view his programs, it's the most used screen in the system.



Pointers

1. Irrigation programs toolbar.
2. Programs List and status.
3. Water and fertilization settings of a selected program.
4. Complimentary information view.

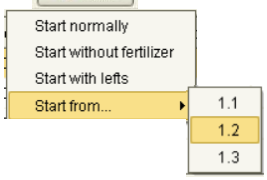
9.1.1 Irrigation programs toolbar

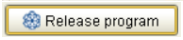
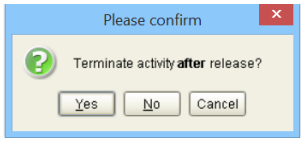
Pointers

1.  - Create new program, will open the programs wizard.
   - Not in use.
   - Delete selected program.
   - Delete all programs.
   - Export program to library.

2.  – after making changes in the **CONSOLE** click on **Send to target** in order to confirme the changes, it's possible to make several changes in the same screen before clicking on **Send to target**.
    - if you would like to cancel all the changes before clicking on **Send to target**, click on **Undo All**.

3.  - The **Start** icon contains several options to start a program.



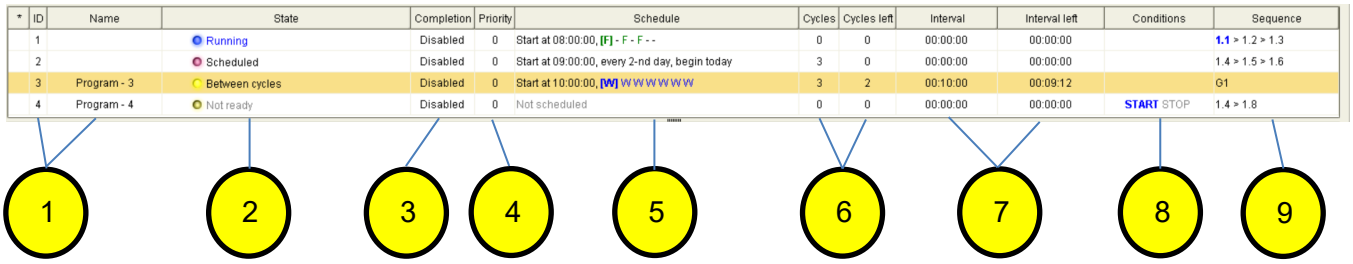
 - Stop runing program.
 - Skip the runing valve or group and go to the next one in the sequence.
 - pause program.
 - release program.


- after selecting Realese program you can choose to terminate the program activity or continue from the pausing point.

4.  - These 5 icons are used to select the display of the screen.

9.1.2 Programs List and status

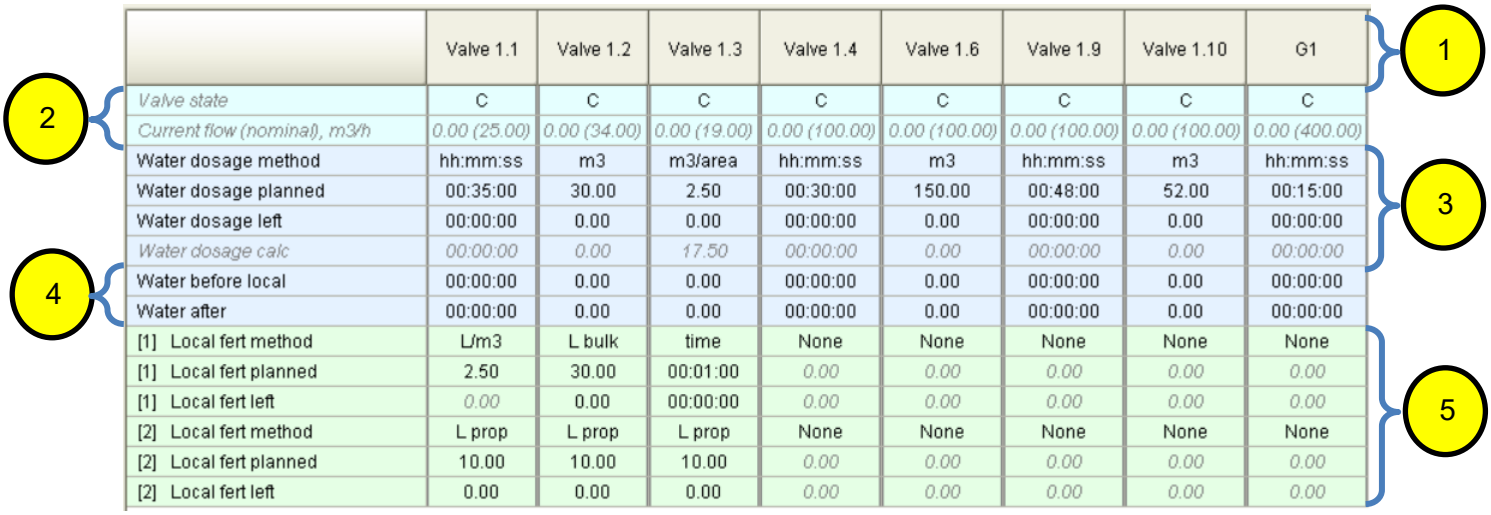
In the following window you can see all the programs and their status, double clicking on one of the programs under the selected column will allow you to change the program definitions by opening the programs wizard or inserting numbers directly.



Pointers

1. Program name and ID.
2. **Program status –** Running, Scheduled between cycles and etc.
3. **Completion –** Disabled or enabled automatic completion of an unfinished program.
4. **Priority –** giving priority to a certain program over other programs in case of a conflict between them, 9=high priority, 1=low priority.
5. **Programs schedule –** in which day, time and / or interval the program will start.
6. **Cycles –** how many cycles of irrigation for a day.
   Cycles left – how many cycles are left.
7. **Interval –** time between cycles.
   Interval left – time left for the next cycle.
8. **Conditions –** for start, stop, enable or disable a program.
9. **Sequence –** which valves or / and groups are participating in the program.

9.1.3 Water and fertilization settings of a selected program



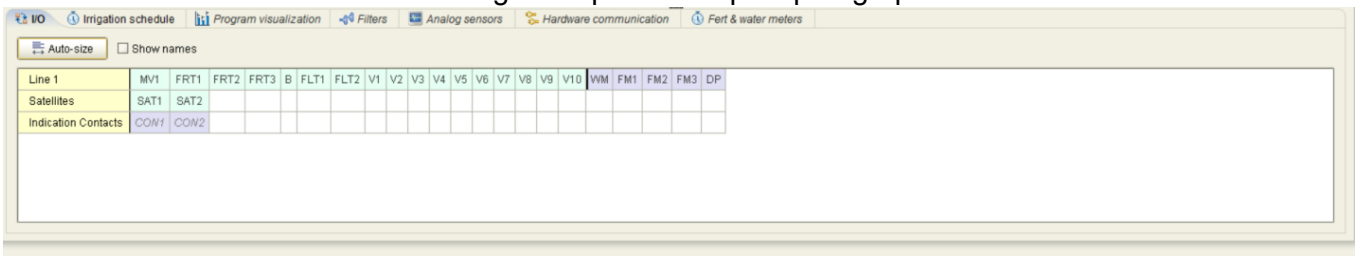
	Valve 1.1	Valve 1.2	Valve 1.3	Valve 1.4	Valve 1.6	Valve 1.9	Valve 1.10	G1
Valve state	C	C	C	C	C	C	C	C
Current flow (nominal), m3/h	*0.00 (25.00)*	*0.00 (34.00)*	*0.00 (19.00)*	*0.00 (100.00)*	*0.00 (100.00)*	*0.00 (100.00)*	*0.00 (100.00)*	*0.00 (400.00)*
Water dosage method	hh:mm:ss	m3	m3/area	hh:mm:ss	m3	hh:mm:ss	m3	hh:mm:ss
Water dosage planned	00:35:00	30.00	2.50	00:30:00	150.00	00:48:00	52.00	00:15:00
Water dosage left	00:00:00	0.00	0.00	00:00:00	0.00	00:00:00	0.00	00:00:00
Water dosage calc	*00:00:00*	*0.00*	*17.50*	*00:00:00*	*0.00*	*00:00:00*	*0.00*	*00:00:00*
Water before local	00:00:00	0.00	0.00	00:00:00	0.00	00:00:00	0.00	00:00:00
Water after	00:00:00	0.00	0.00	00:00:00	0.00	00:00:00	0.00	00:00:00
[1] Local fert method	L/m3	L bulk	time	None	None	None	None	None
[1] Local fert planned	2.50	30.00	00:01:00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
[1] Local fert left	*0.00*	0.00	00:00:00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
[2] Local fert method	L prop	L prop	L prop	None	None	None	None	None
[2] Local fert planned	10.00	10.00	10.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
[2] Local fert left	0.00	0.00	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

Pointers

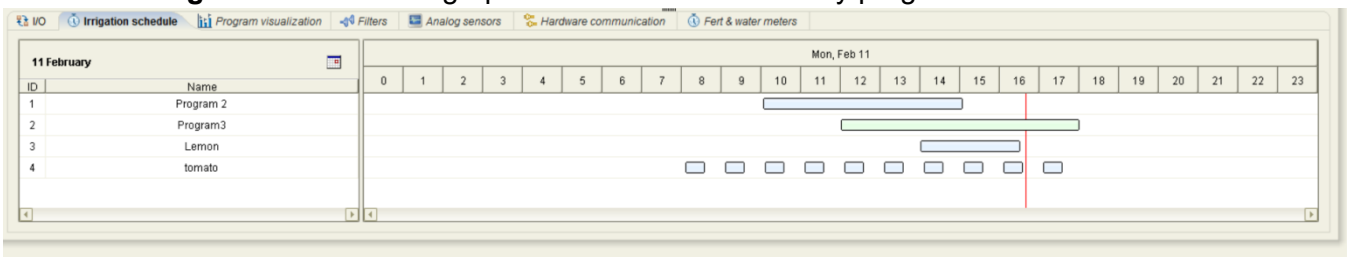
1. Valves or groups that participating in the program and their opening order from left to right, meaning that the first to open will be valve 1.1 when it will finish valve 1.2 will open and etc.
2. **Valve state –** the letters describes the valve status (for example C = Closed), pointing on the letter/s with the mouse will open a small window with the full description of the valve status.
   Current flow (nominal), m3/h – describes the nominal flow of the valve or group (inside Parenthesis), and the current flow (outside Parenthesis).
3. **Water dosage method –** irrigating by hh:mm:ss (time), m3 (volume), m3/area (volume for area), evaporation. Double clicking on the box under the valve will open the list of dosage methods; in case the wanted dosage doesn't appear please check the parameters in **Configure / Dealer definitions**.
   Water dosage planned – the planned water quantity, time and etc. for each valve or group.
   Water dosage calc – the total quantity of water when irrigating by m3/area (for example – look at valve 1.3 in the image above, the dosage is 2.5 m3/area and the valve area is 7, 2.5*7=17.5m3 (the valves area are defined in **configure / constants / valves**).
4. **Water before local –** the amount of water / time taken from the **water dosage planned** to irrigate before starting fertilization**.**
   Water after – the amount of water / time taken from the **water dosage planned** to irrigate after finishing fertilization.
5. **Local fert method –** by double clicking on the fert method box under the selected valve or group a list of fertilization methods will open, select the required method. to get an explanation or changing parameters of the fertilization methods go to **Configure / Dealer definitions** and select **Fertilization** tab.**Local fert planned –** select the quantity of fertilizer that you would like to inject, the quantity can be time, L/M3, L bulk……
   Note – the numbers in prentices (1), (2), (3) or (4) describing the fertilizer injectors numbers.

9.1.4 Complimentary information view

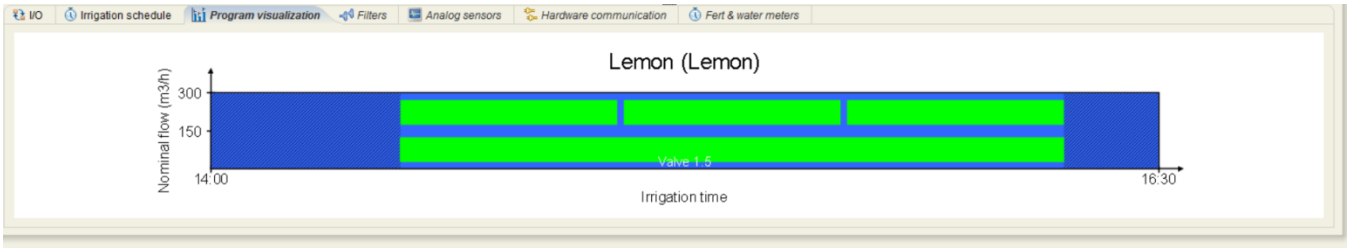
1. **I/O –** for more information go to Inputs & Outputs paragraph 8.3



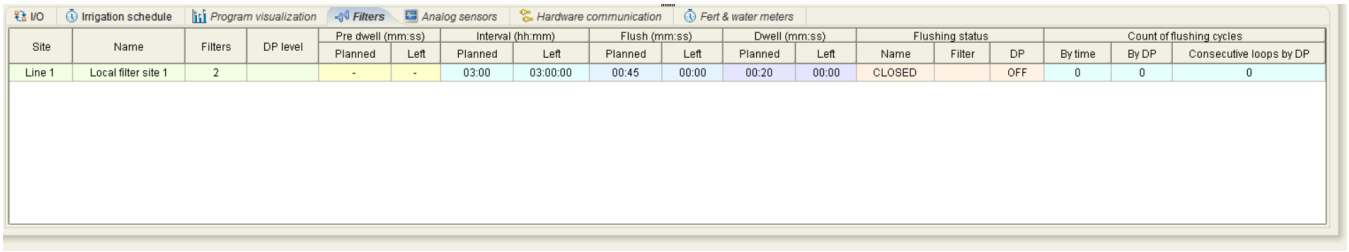
2. **Irrigation schedule –** graphic view on the current day programs schedule.



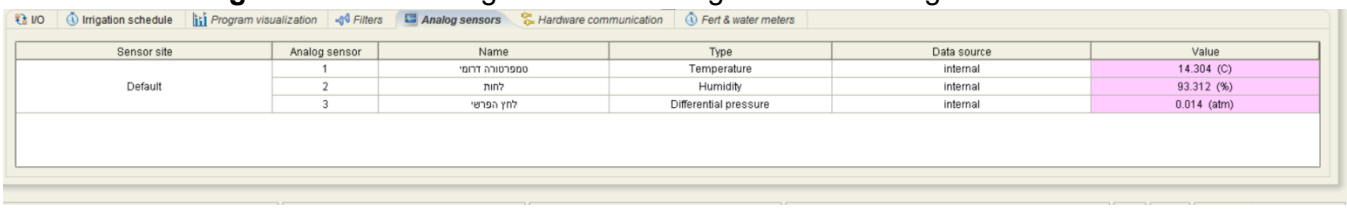
3. **Program visualization -** graphic view of a selected program.



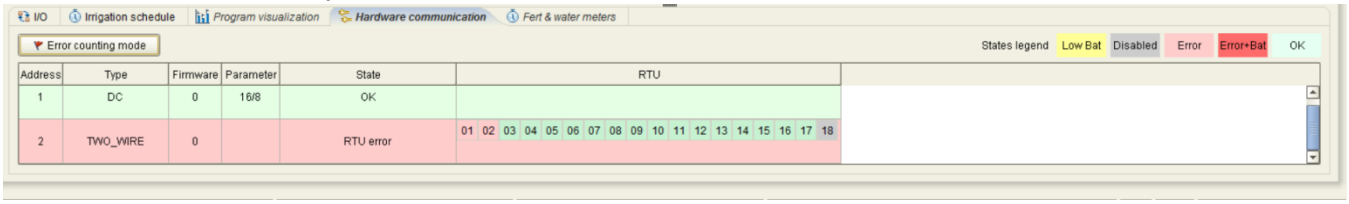
4. **Filters –** a tab for viewing the filters backflush program, and manual operation by clicking on the right button of the mouse on the filter site and select Start flushing.



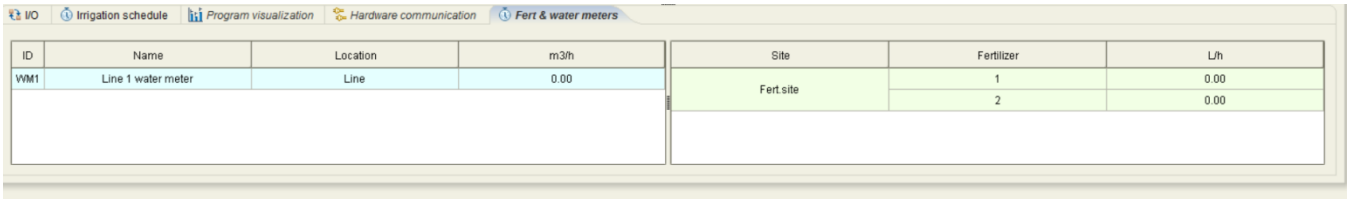
5. **Analog sensors –** viewing tab of the analog sensors readings.



6. **Hardware communication –** a tab for checking interfaces and RTU status, pointing on one of the RTU's will open a window with the elements connected to it, in the right side of the screen you can see an explanation for each one of the RTU colors.



7. **Fert & water meters –** the following tab demonstrate the current flow of the water meters and fertilizers meters.

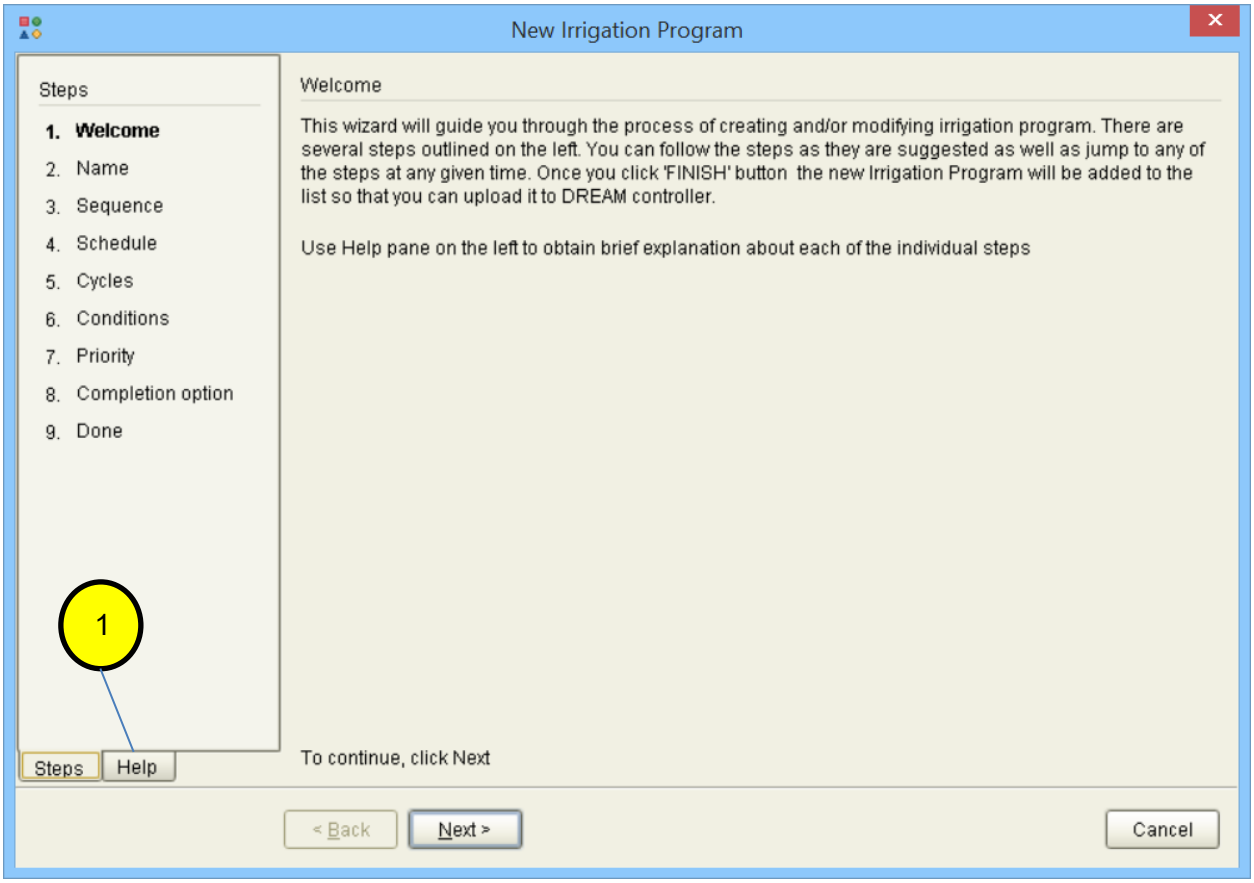


9.2 **Creating new irrigation program** (plan / irrigation programs)

To create a new irrigation program click on the  icon in upper left side of the **irrigation programs** screen, it will open the irrigation program Wizard.

The Wizard contains 9 steps:

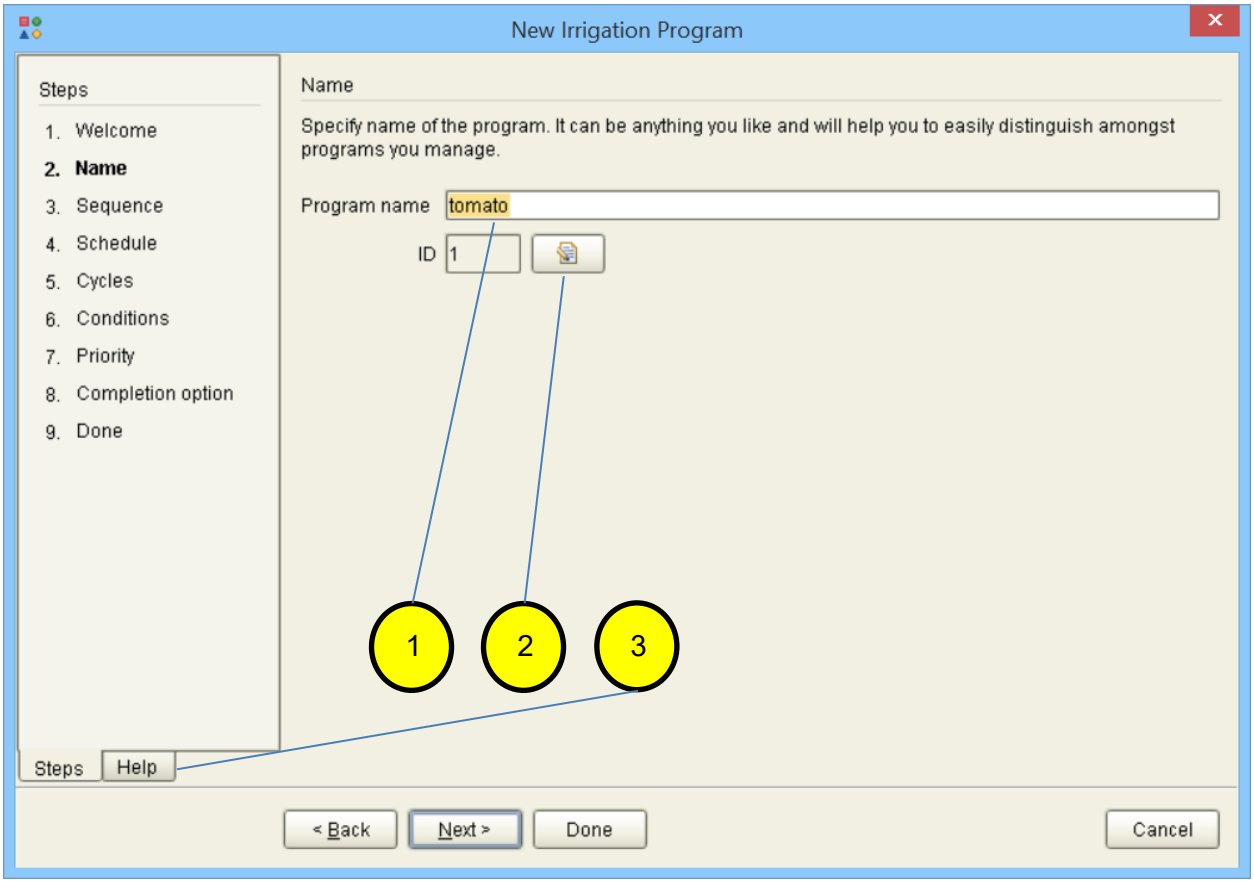
Step 1 - Welcome: in the first step you can find relevant information of how to use the Wizard. After reading it once you can skip it the future.



Pointers

1. In the **Help** tab you can find information of each step.

Step 2 - Name: giving a name for the program.



Pointers

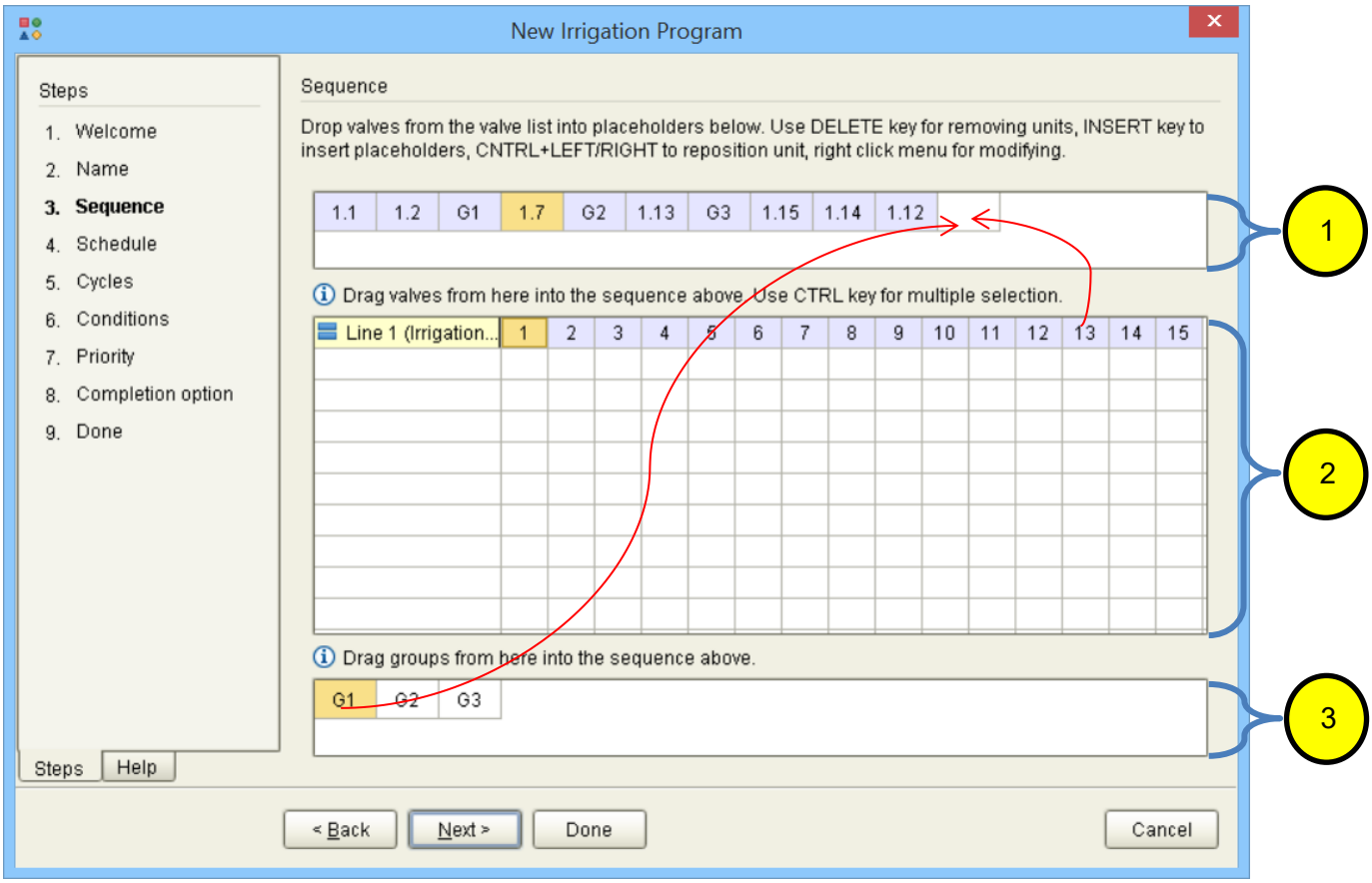
1. Write the desired name of the program.
2. Select ID (only in case you want to change it)
3. Help tab – for more information.

Note – for moving between the steps you can use the **Back** and **Next**, or click directly on the desired step from the list.

Done – is for finish and save the irrigation program (even when it's not completed).

Cancel – for exiting the Wizard.

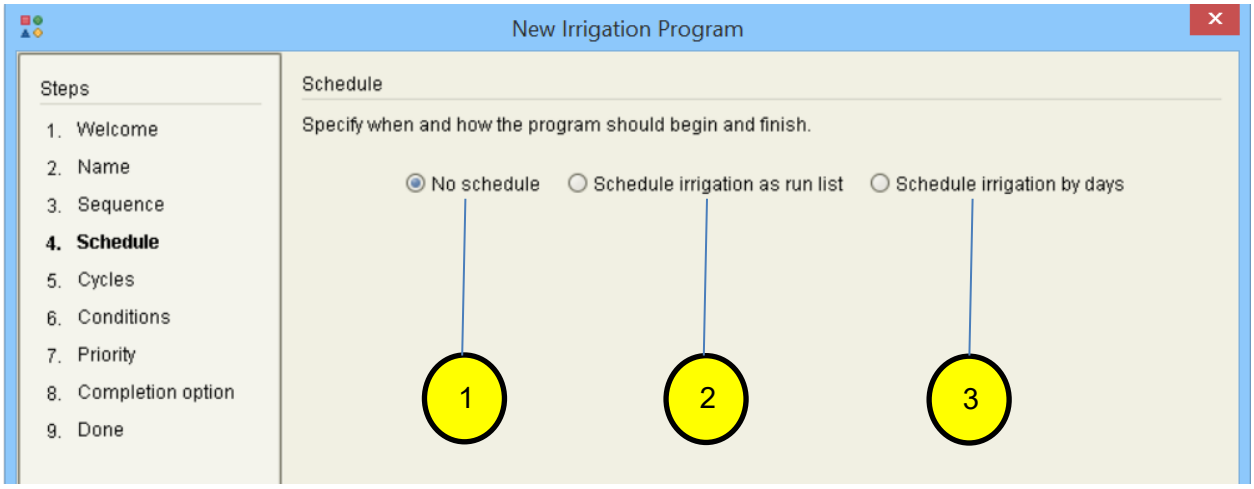
Step 3 - Sequence: selecting the valves and / or groups that will participate in the irrigation program.



Pointers

1. The valves or groups that appear in the irrigation sequence window are the ones that will participate in the irrigation program, by click and drag you can change the order of the valves. Removing valves is done by using the right click of the mouse on the selected valve or group.
   When the program starts normally it will irrigate valve number 1.1 first, after it will finish, valve number 1.2 will open, after it will finish group number G1 and etc.
2. Adding valves to the irrigation sequence, click on one of the valves and drag it to the placeholder, as demonstrate with the red arrow.
3. Adding groups to the irrigation sequence, click on one of the groups and drag it to the placeholder, as demonstrate with the red arrow (the groups should be made before adding them to the program, please see **paragraph 9.4 Groups**).

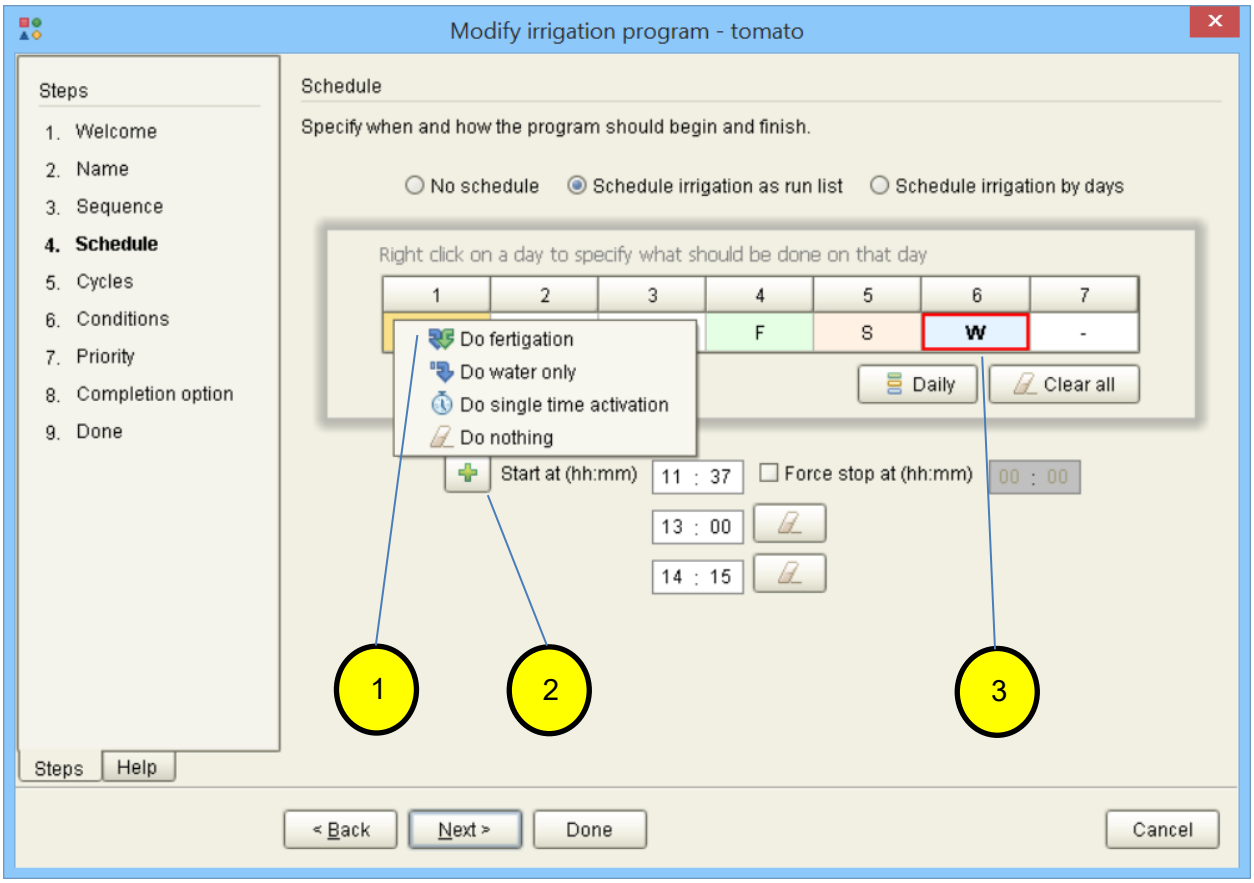
Step 4 - Schedule: select in which day and time the program will start.



Pointers

1. **No schedule –** starting the program will be by manual activation.
2. **Schedule irrigation as run list –** selecting the day from the run list. (See below paragraph A)
3. **Schedule irrigation by days –** selecting the day's interval. (See below paragraph B)

Paragraph A

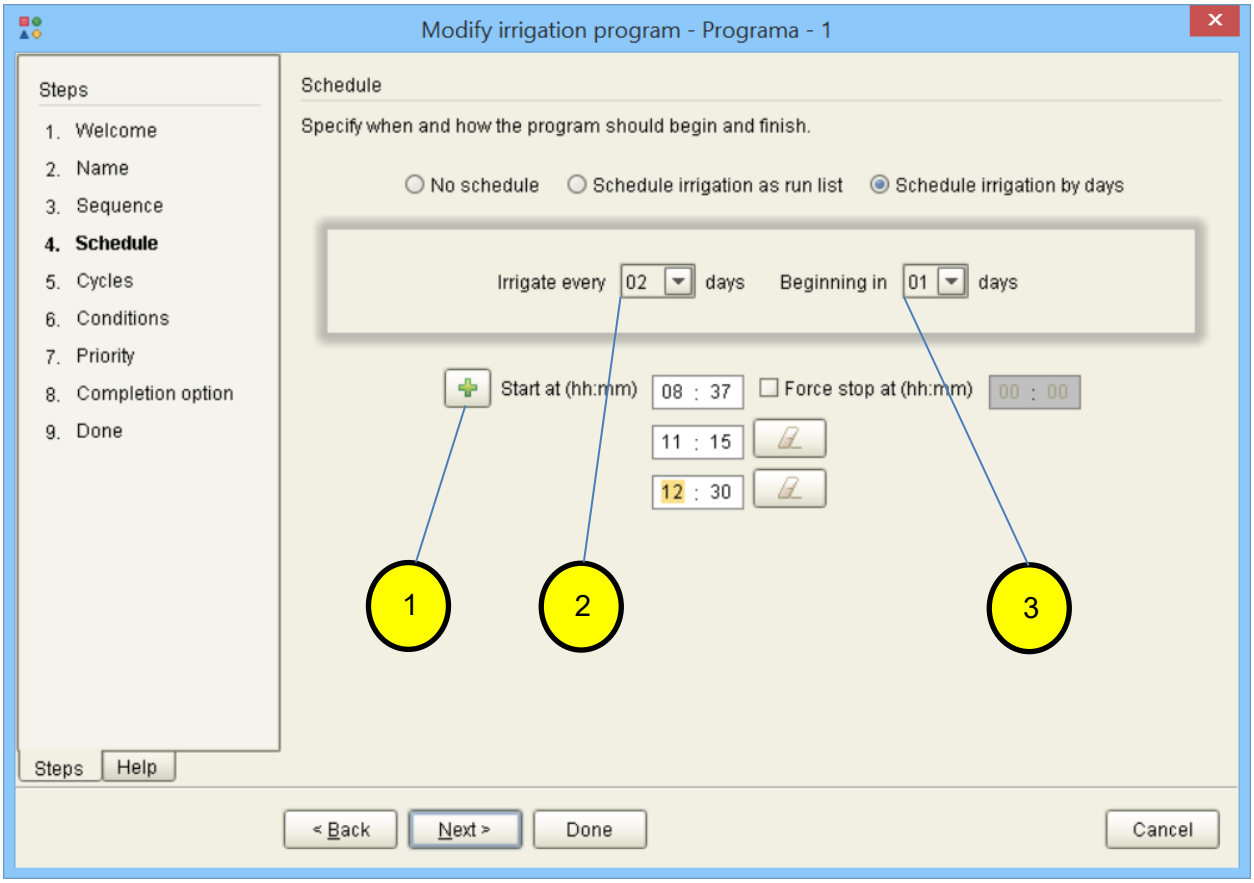


The run list is a list of days that allows to choose if and how to irrigate in each day, the run list works like a cycle (after day 7 comes day 1) and can be modified from 1 day up to 16 (the run list length can be modified in **Constants** screen under **General** tab).

Pointers

1. Right click on the box (-) under the day number will open a list of options:
   - **Do fertigation –** the program will irrigate and give fertilizer according to the program dosage**.**
   - **Do water only –** the program will only irrigate, even if there is dosage of fertilizers.
   - **Do single time activation -** the program will irrigate and give fertilizers according to the program dosage, but only in this 7 days cycle, after this cycle will finish and the next one will begin it will not irrigate.
   - **Do nothing –** no irrigation in this specific day.
2. Start time of the program, each program can have up to 6 different start time for each day.
3. The box marked in red represents the current day.

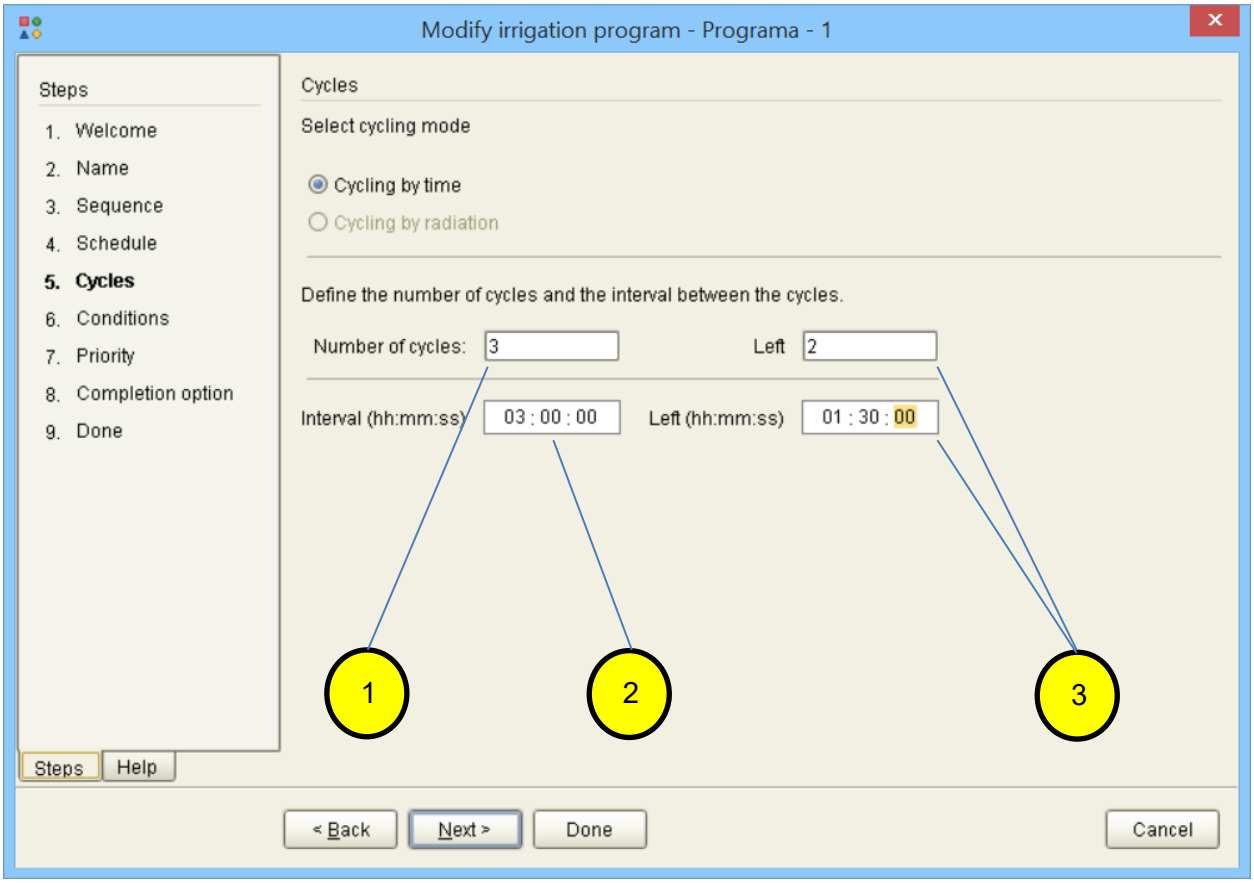
Paragraph B



Pointers

1. Start time of the program, each program can have up to 6 different start time for each day.
2. The number 02 (for example) represents the interval between irrigation days; in this case the program will work one day yes and one day no.
3. The number 01 (for example) represents the starting day of the program, in this case, the program will start tomorrow at 08:37 and will open again in the same day at 11:15, and again at 12:30,
   After the last irrigation time, it will wait one day (because of the 2 days interval) without working, and will start again in the next day.

Step 5 - Cycles: selection of the number of cycles and the interval between them, in case it's needed to irrigate several times in each day.

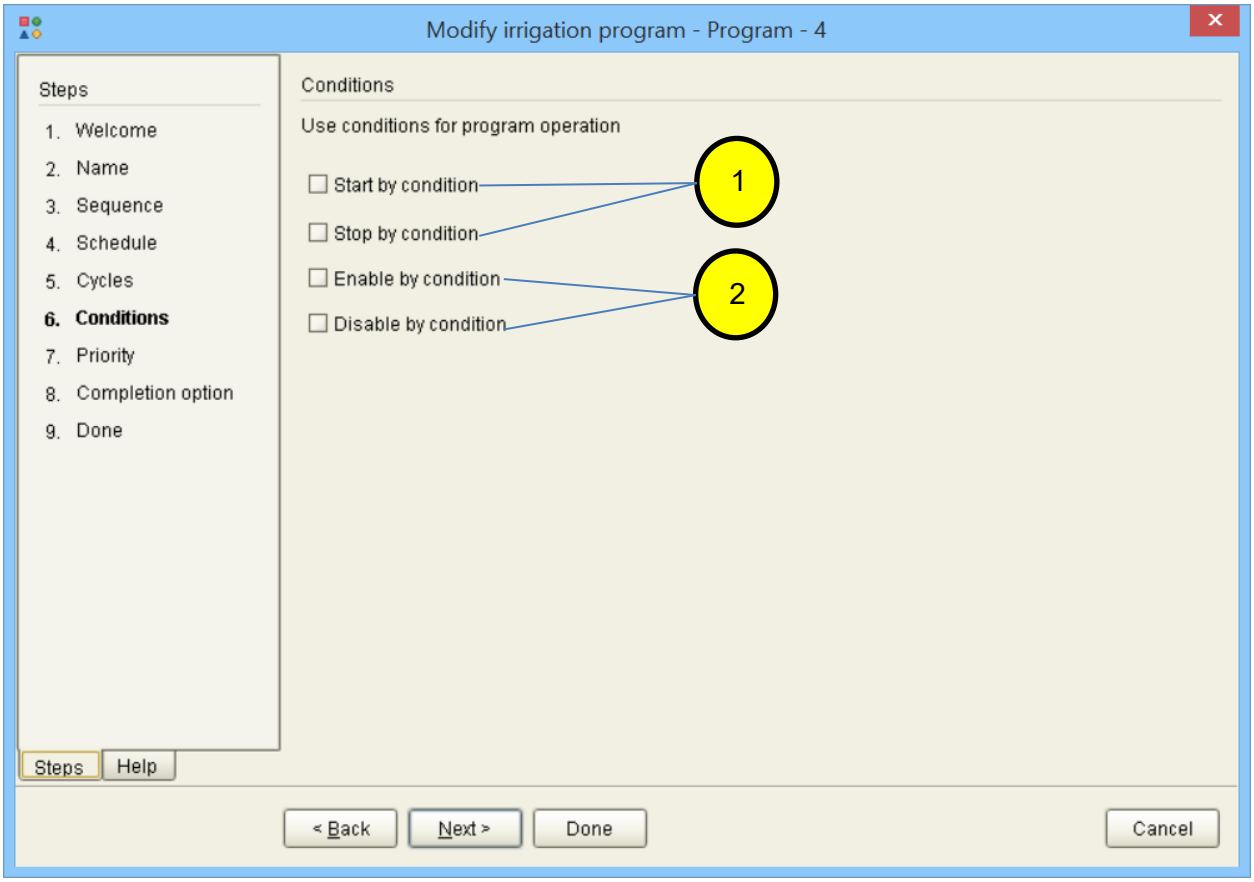


Pointers

1. The number 3 (for example) represent the number of wanted irrigation cycles.
2. The interval is the time between each cycle, the interval time is from start to start, meaning that if the program starts at 8:00 the next cycle will start at 11:00 and the next one at 14:00.
3. **Left –** cycles lefts to finish the program.
   Left (hh:mm:ss) – time left for the next cycle.

Step 6 - Conditions:

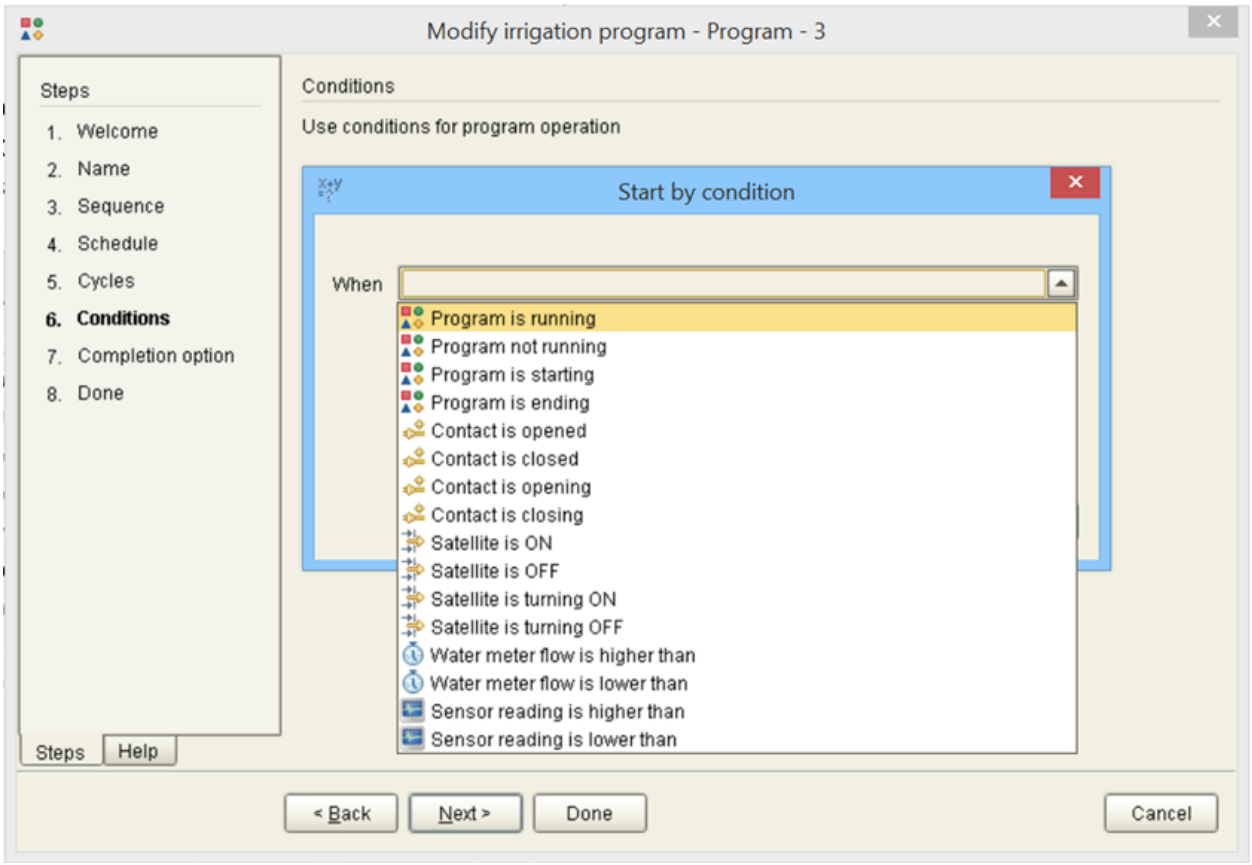
A) Selecting one of the following options allow starting / stopping / enabling / disabling the irrigation program, the conditions are being use in special cases when normal programing (start time and day, dosing by time volume….) is not enough.



Pointers

1. **Start by condition –** start the program when the condition is active.
   Stop by condition – stop the program when the condition is active.
2. **Enable by condition –** give permission to run the program according to its schedule, when the condition is active.
   Disable by condition – deny the permission to run the program according to its schedule, when the condition is active.

B) After selecting to start, stop, enable or disable the program, a selection window will open (for example: **Start by condition**), press on **When** and select from the list, afterwards click on **program**, **Contact**, **Satellite**, **Water meter** or **sensor reading** and select according to your needs.



Note –

Program is/not running – the condition will be active while the program is or not running.

Program is starting / ending – the condition will be active in the starting or ending time of the program.

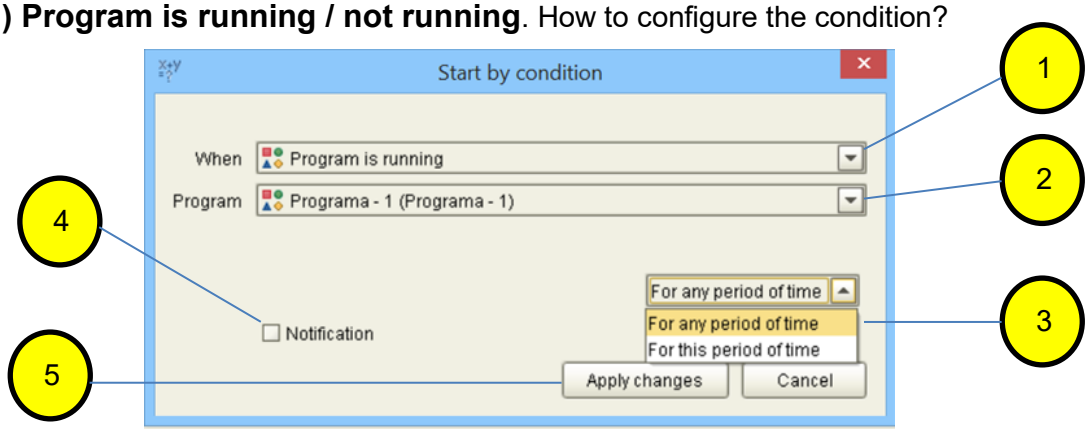
Contact is opened / closed - the condition will be active while the contact is opened or closed.

Contact is opening / closing - the condition will be active in the contact opening or closing time.

Satellite is ON / OFF – the condition will be active while the satellite is ON or OFF

Satellite is turning ON / OFF - the condition will be active in the moment the satellite is turning ON or OFF.

B.1) Program is running / not running. How to configure the condition?

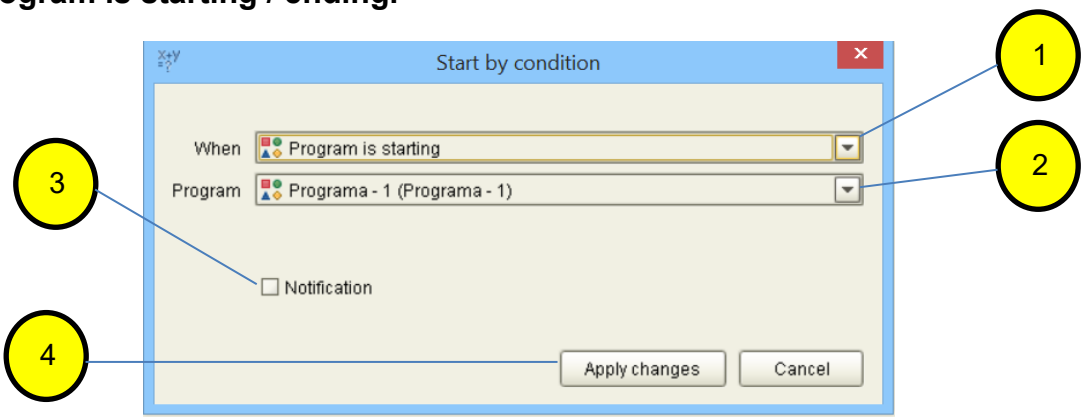


Pointers

1. Set **When** the condition will be active, for example: “program is running”.
2. Set which running **Program** will activate the condition, for example: “program - 1” (name of the program).
3. **For any period of time**: if “program – 1” is running the condition will be active, and the program will start.
   For this period of time: the condition will be active only if “program – 1” will runs more than the selected time, for example: 

   , so in this case The irrigation program will start when “programa-1” will run more than 30 minutes.
4. Mark If you want to get **notification** when the condition is active.
5. Click on **Apply changes** to finish the condition setup.

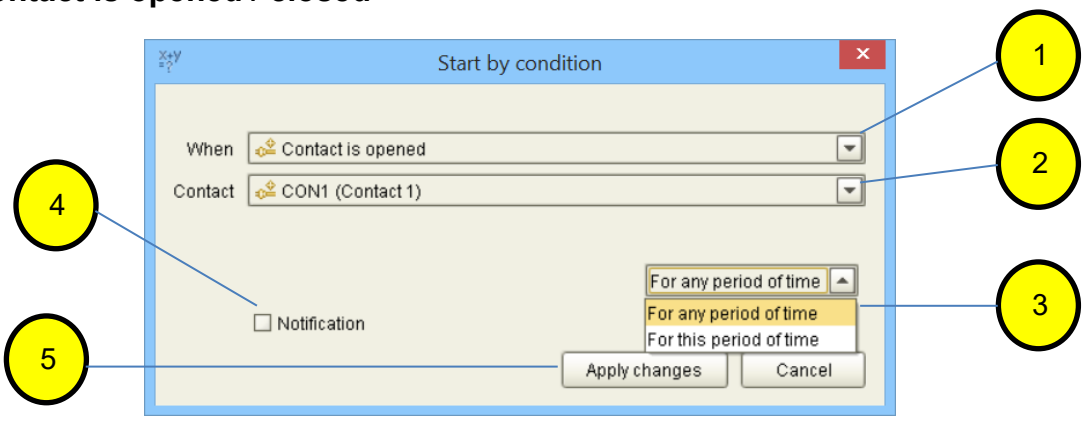
B.2) Program is starting / ending.



Pointers

1. Set **When** the condition will be active, for example: “program is starting”.
2. Set which running **Program** will activate the condition, for example: “program - 1” (name of the program).
   In this case, the irrigation program will start when “program – 1” is starting.
3. Mark If you want to get **notification** when the condition is active.
4. Click on **Apply changes** to finish the condition setup.

B.3) Contact is opened / closed

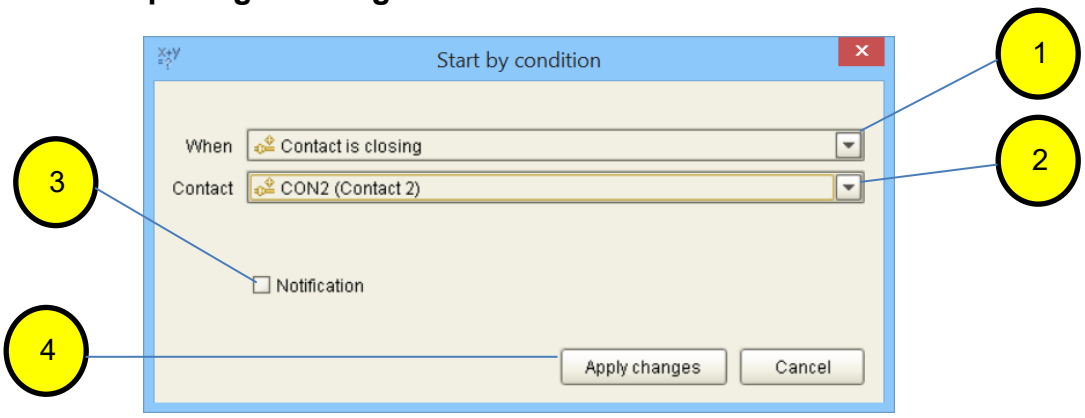


Pointers

1. Set **When** the condition will be active, for example: “Contact is opened”.
2. Set which **Contact** will activate the condition, for example: “Contact 1” (name of the Contact).
3. **For any period of time**: if “Contact 1” is open the condition will be active, and the program will start.
   For this period of time: the condition will be active only if “Contact 1” will be open more than the selected time, for example: 

   , so in this case The irrigation program will start when “Contact 1” be open more than 30 minutes.
4. Mark If you want to get **notification** when the condition is active.
5. Click on **Apply changes** to finish the condition setup.

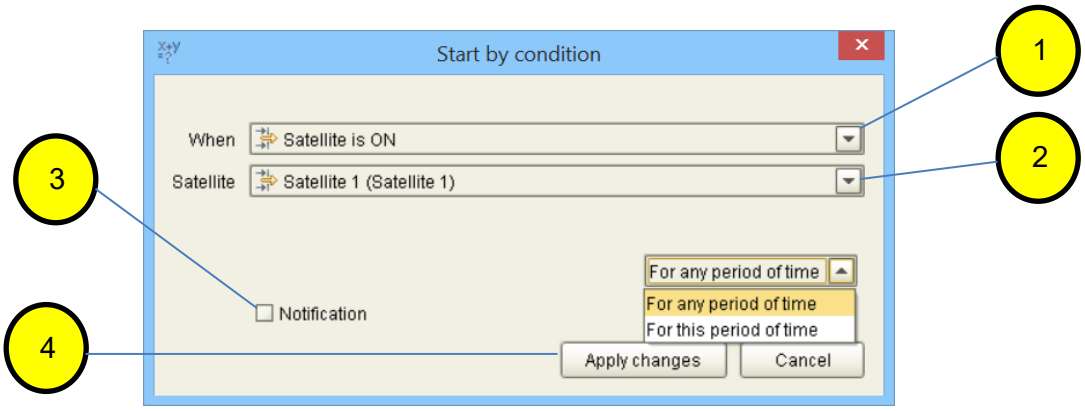
B.4) Contact is opening / closing



Pointers

1. Set **When** the condition will be active, for example: “Contact is opened”.
2. Set which **Contact** will activate the condition, for example: “Contact 2” (name of the Contact).
   In this case, the irrigation program will start when “Contact 2” is closing.
3. Mark If you want to get **notification** when the condition is active.
4. Click on **Apply changes** to finish the condition setup.

B.5) Satellite is ON / OFF

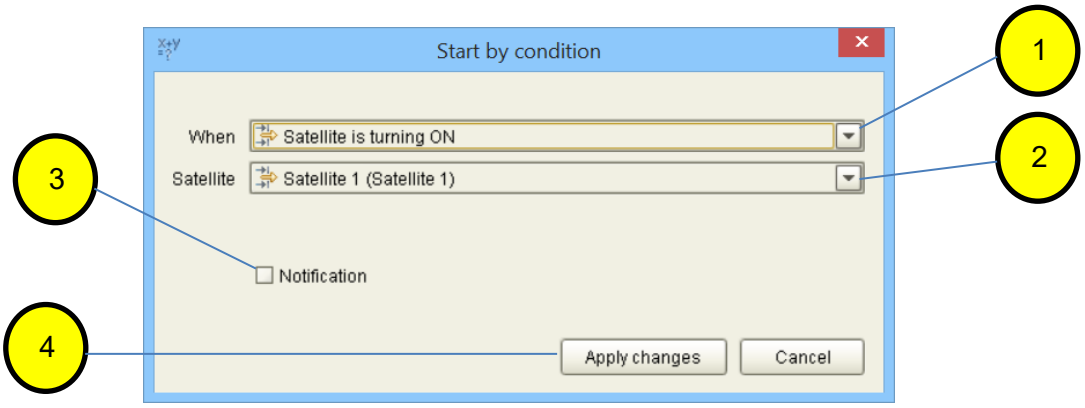


Pointers

1. Set **When** the condition will be active, for example: “Satellite is ON”.
2. Set which **Contact** will activate the condition, for example: “Satellite 1” (name of the Contact).
3. **For any period of time**: if “Satellite 1” is open the condition will be active, and the program will start.
   For this period of time: the condition will be active only if “Satellite 1” will be open more than the selected time, for example: 

   , so in this case The irrigation program will start when “Satellite 1” be open more than 30 minutes.
4. Mark If you want to get **notification** when the condition is active.
5. Click on **Apply changes** to finish the condition setup.

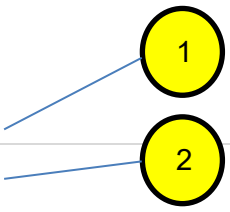
B.6) Satellite is turning ON / OFF

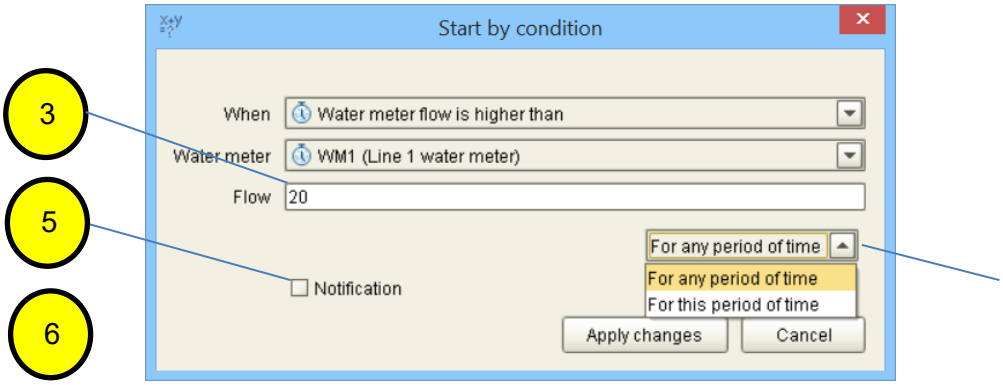


Pointers

1. Set **When** the condition will be active, for example: “Satellite is turning ON”.
2. Set which **Contact** will activate the condition, for example: “Satellite 1” (name of the Contact).
   In this case, the irrigation program will start when “Satellite 1” is closing.
3. Mark If you want to get **notification** when the condition is active.
4. Click on **Apply changes** to finish the condition setup.

B.7) Water meter flow is higher / lower than

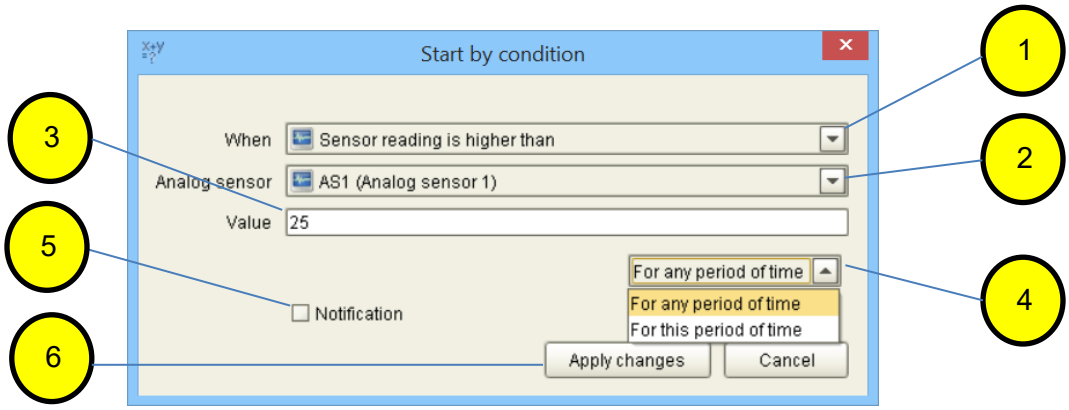




Pointers

1. Set **When** the condition will be active, for example: “Water meter flow is higher than”.
2. Set which **Water meter** will activate the condition, for example: “Line 1 water meter” (name of the Water meter).
3. Set the flow in m3/h or g/m.
4. **For any period of time**: if the flow of “WM1” is higher than 20 the condition will be active, and the program will start.
   For this period of time: the condition will be active only if the flow of “WM1” will be higher than the selected time, for example: For this period of time 00 : 30 : 00, in this case The irrigation program will start when the flow of “WM1” will be higher than 20 during 30 minutes.
5. Mark If you want to get **notification** when the condition is active.
6. Click on **Apply changes** to finish the condition setup.

B.8) Sensor reading is higher / lower than

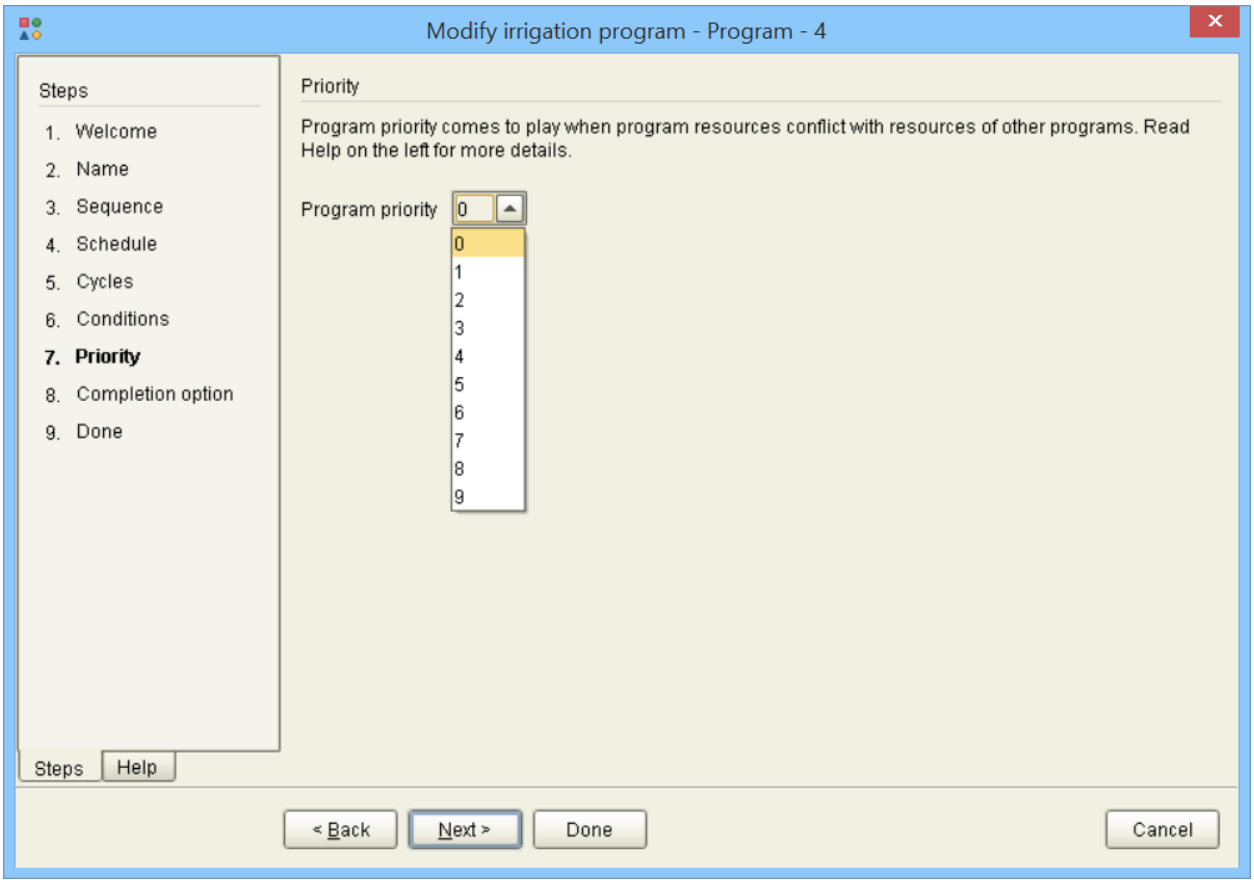


Pointers

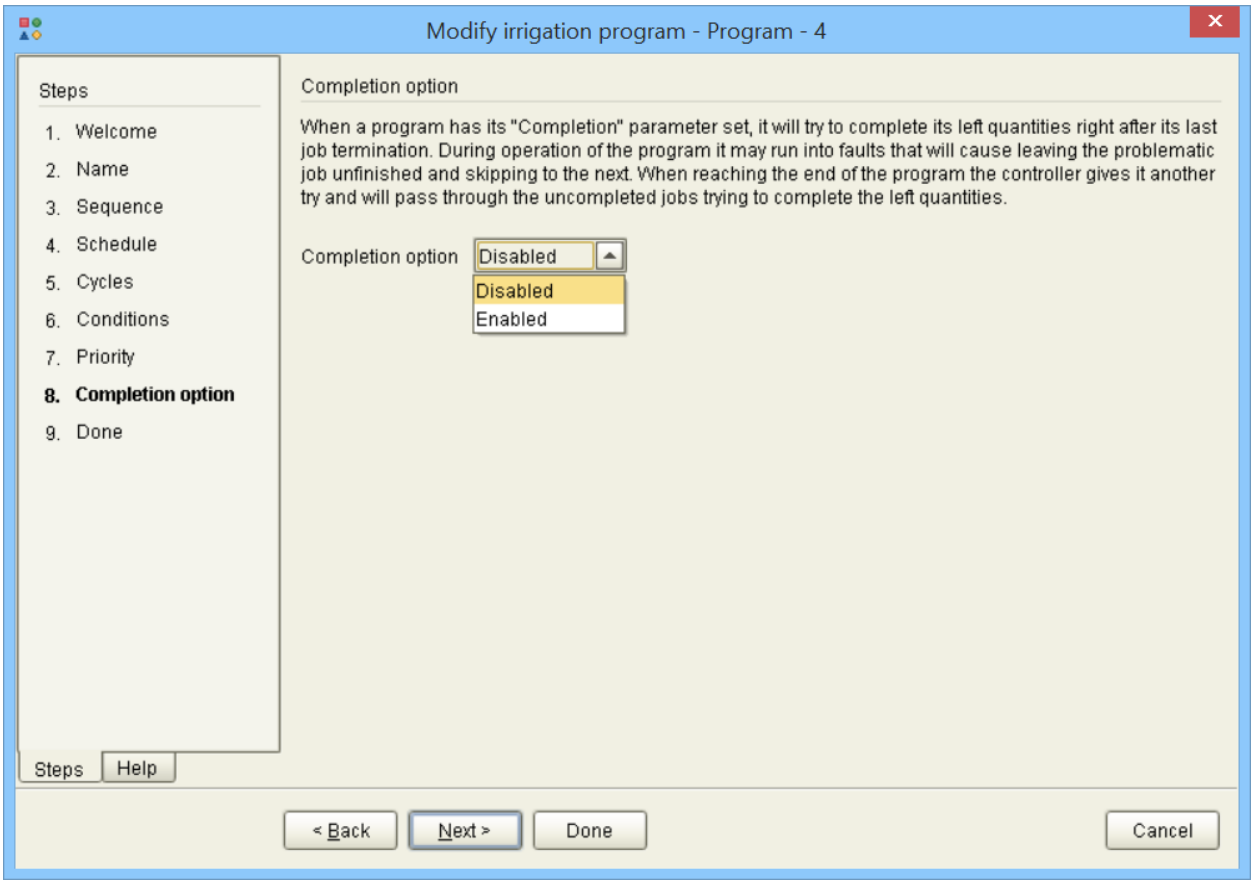
1. Set **When** the condition will be active, for example: “Sensor reading is higher than”.
2. Set which **Analog sensor** will activate the condition, for example: “Analog sensor 1” (name of the analog sensor).
3. Set the Value of the sensor, the units are according to the sensor type and definition.
4. **For any period of time -** means that if sensor reading is higher than 25 the condition will take place.
   For this period of time - means that the condition will take place only if sensor reading is higher than 25, and more than the selected time, for example: 

   in this case the irrigation program will start when the reading of “AS1” will be higher than 25 during 45 seconds.
5. Mark If you want to get **notification** when the condition takes place.
6. Click on **Apply changes** to finish the condition setup.

Step 7 - Priority: In case of a conflict between programs it will give a priority to the program with the higher priority number.



Step 8 – completion option: enable the completion option will give automatically another try to complete the left quantity of a program that from some reason couldn't finish its water/time dosage.

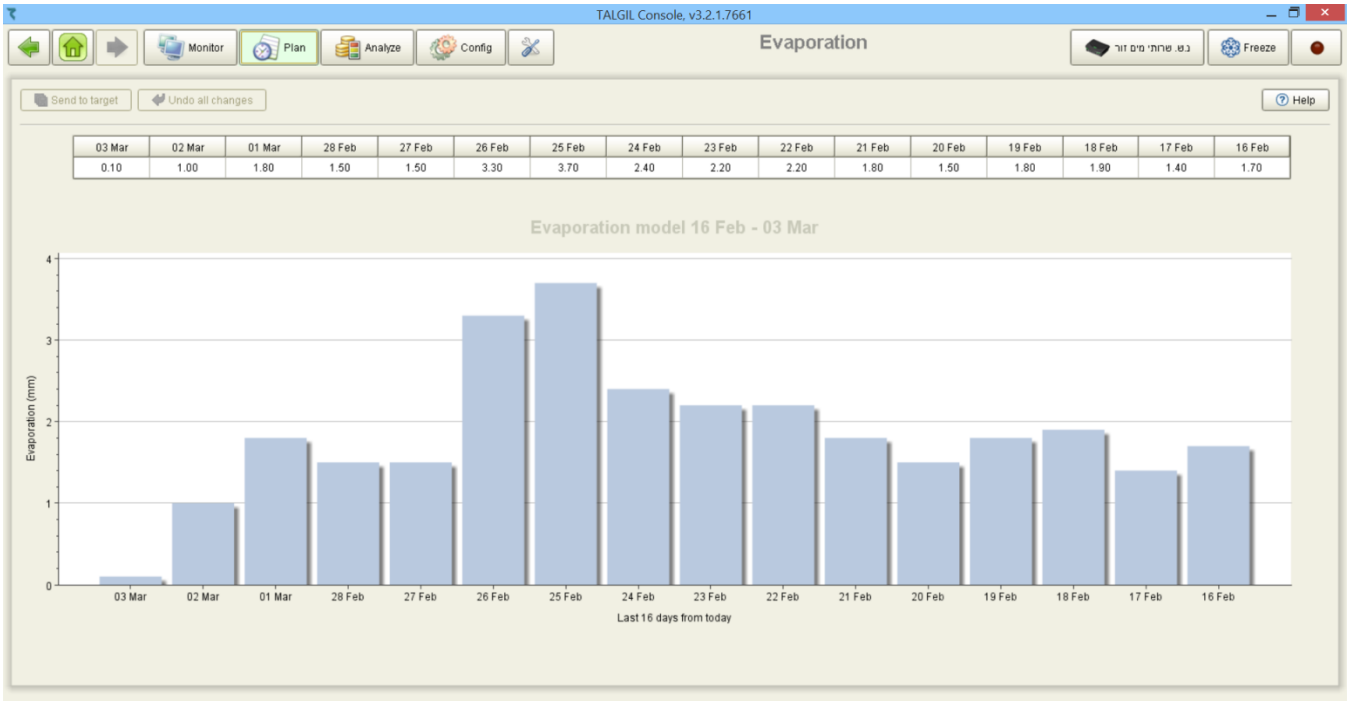


Step 9 – Done: select **Done** to save changes or **Cancel** to exit the wizard and discard changes.

Note – for water and fertilizers dosing go to paragraph **9.1.3 "Selected program water and fertilization status"**

9.3 **Evaporation** (plan / Evaporation)

This screen demonstrates the evaporation of the last 16 days, the evaporation values can be inserted automatically if there is a weather station connected or manually by clicking on the dates and typing the evaporation of each day.



Irrigating according to the evaporation:

1. Select **evapo(m3)** or **evapo(time)** in the program **water dosage method.**

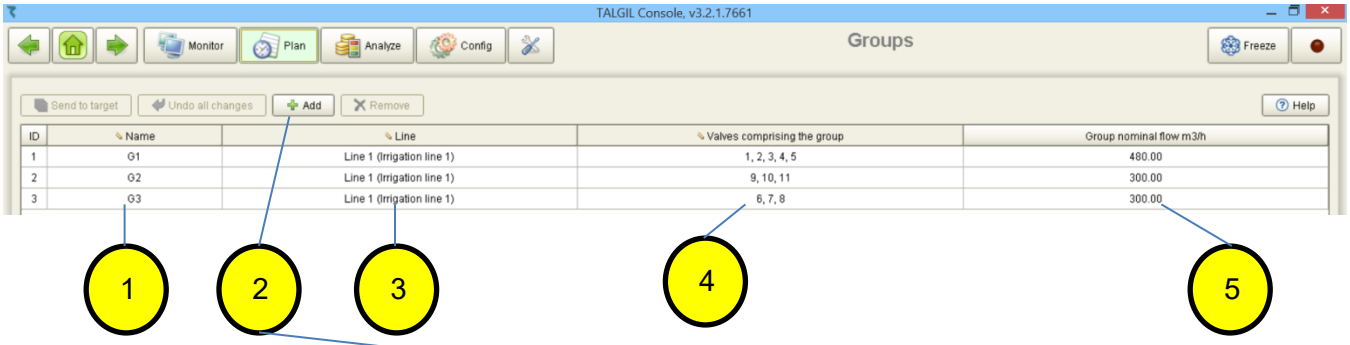
Valve state	C
Current flow (nominal), m3/h	*0.00 (80.00)*
Water dosage method	evapo(m3)
Water dosage planned	
Water dosage left	0.00
Water dosage calc	*44.29*

Valve state	C
Current flow (nominal), m3/h	*0.00 (80.00)*
Water dosage method	evapo(time)
Water dosage planned	
Water dosage left	00:00:00
Water dosage calc	*00:33:45*

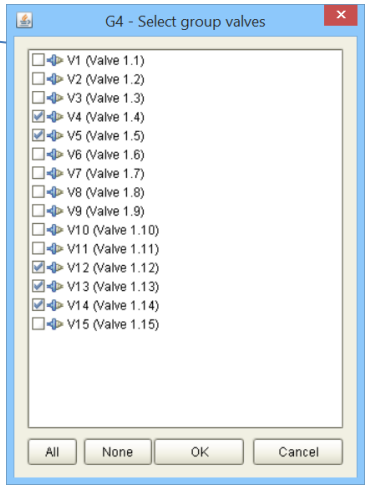
2. The controller will multiplay yesterday evaporation value with the valves area and the crop factor (as defined in **Constans/valves)**.
3. If the program contains several cycles, the water dosage per cycle will be calculated by dividing the daily calculated Water dosage by the number of cycles.

9.4 **Groups** (plan / Groups)

The groups screen allows creating groups of valves that will irrigate together.



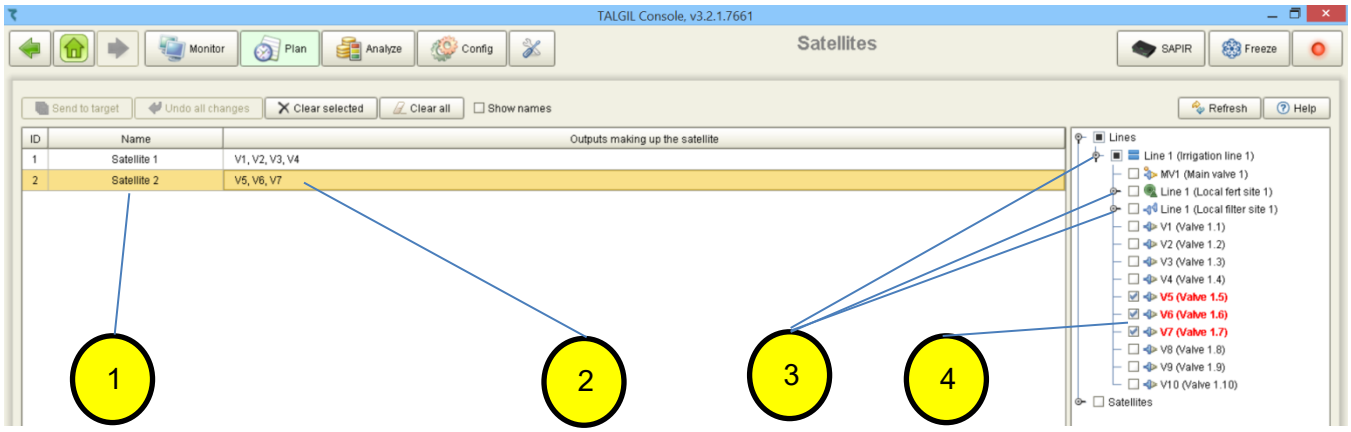
Pointers



1. Name of the program.
2. Add new group, after clicking on the Add icon, a Selection window with all the valves will open, mark the Valves you want to add to the group.
3. Line number (the SAPIR 2 have only one)
4. The valves that participating in the group, to edit an Existing group double click on the valves box and the Valves selection window will open.
5. The group calculated flow rate.

9.5 **Satellites** (plan / Satellite)

Satellites are outputs that open simultaneously with other outputs.

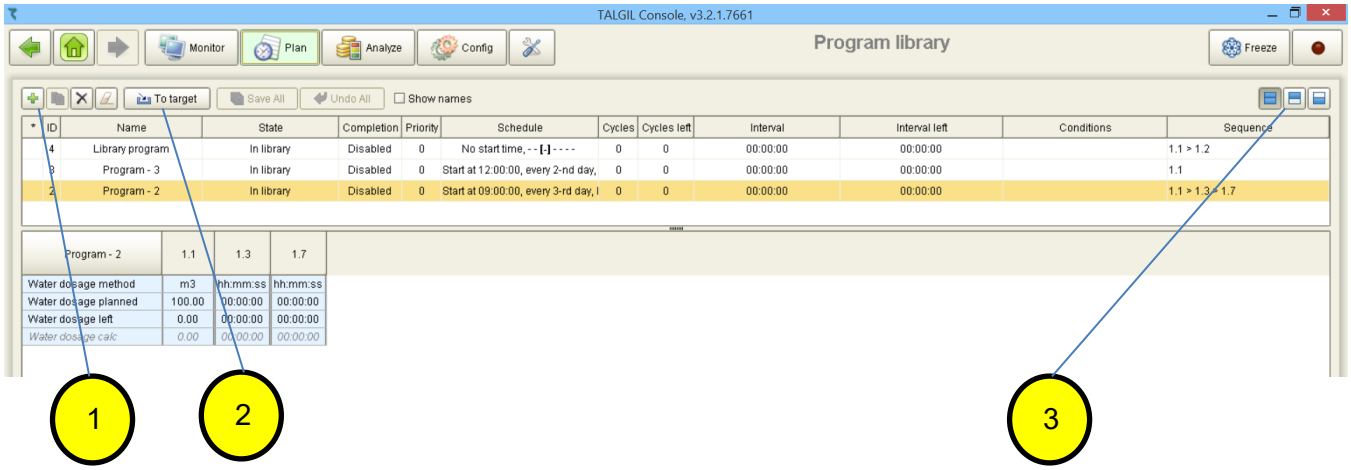


Pointers

1. Satellite name.
2. The selected outputs that will open the satellite, for example: every time that one of the following outputs V5, V6 or V7 opens, satellite 2 will open as well.
3. To be able to select specific items from each category click on the icon.
4. After opening the category, mark the desired outputs for the selected satellite.

9.6 **Program library** (plan / Program library)

The program library screen allows saving programs that are currently not in use, and when it's needed load them back to the controller. It is possible to create irrigation programs in the library or export them from the irrigation programs screen.

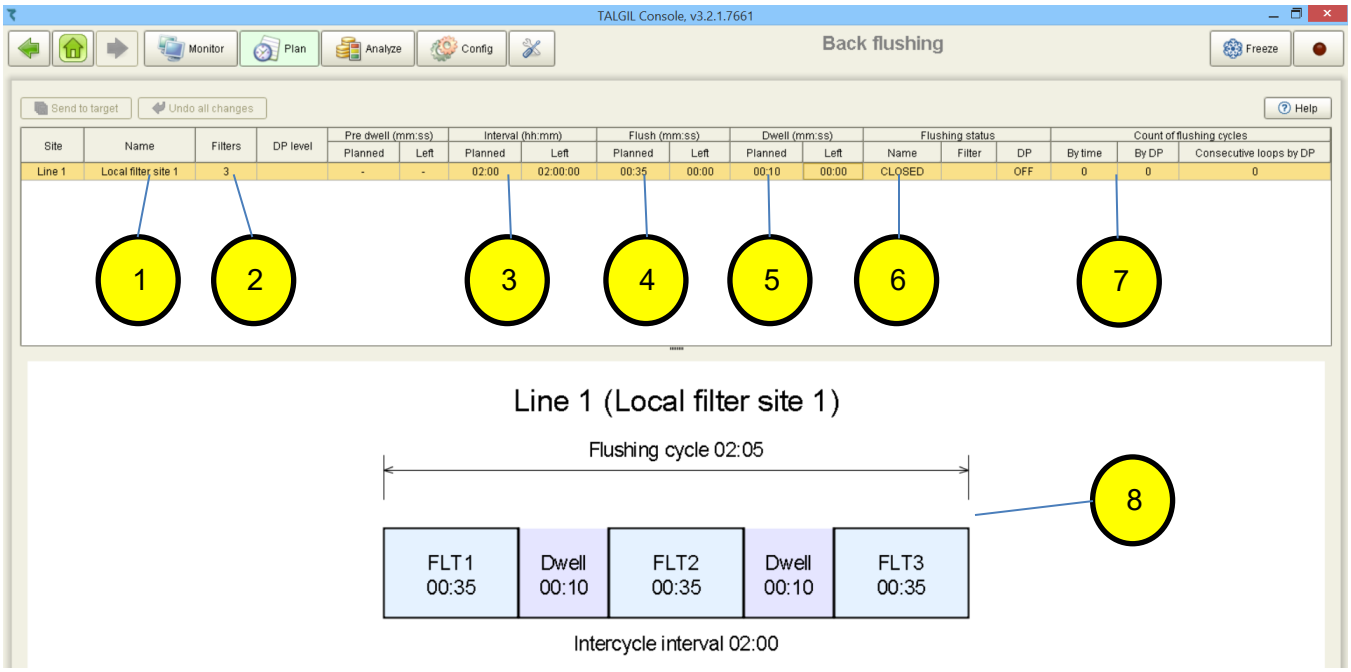


Pointers

1. Creating new program in the library, as long as it inside the library it won't be active.
2. **To target –** send the program to the irrigation programs screen, make it an active program.
3. Changing the screen display.

9.7 **Back flushing** (plan / Back flushing)

In case the filters are operated from the SAPIR 2, use this screen to program them. To set the Back flushing program insert the Planned Interval, Flush and Dwell.

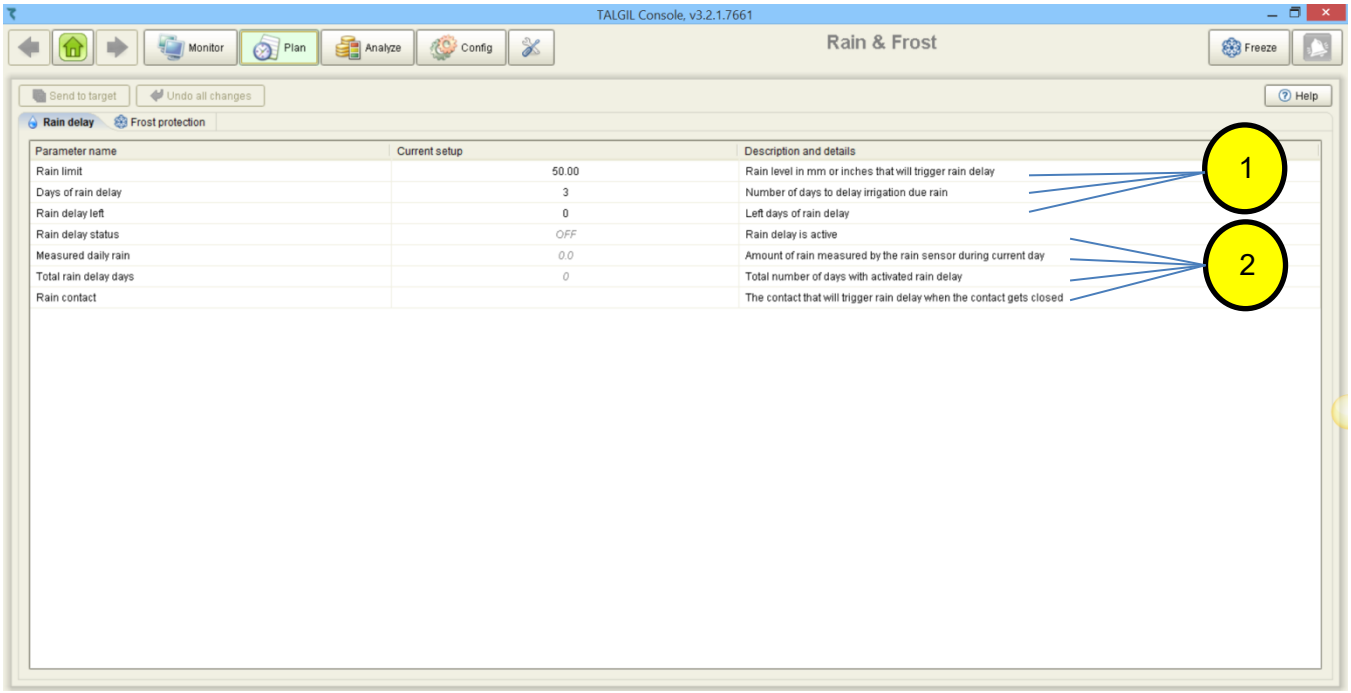


Pointers

1. Name of the local filter site.
2. The quantity of filters as defined in the configuration of the system (can't be changed in this screen).
3. Interval and left (time remaining to the next flush) time between flushes.
4. Flush and left (flush time remaining) time of each filter.
5. Dwell time, waiting time between the filters flushes.
6. The flushing status indicates:
   Name - status of the irrigation CLOSED, IRRIGATING or FLUSHING.
   Filter - indicates which filter is currently flushing when a flushing sequence take place.
   DP - indicates if the DP contact is ON or OFF.
7. Count of flushing cycles:
   By time - how many flushing cycles occurred by time
   By DP – how many flushing cycles occurred by DP.
   Consecutive loops by DP – how many continues flushing occurred by DP.
8. Graphical layout of the flushing sequence.

9.8 **Rain delay** (plan / Rain delay)

For using rain delay, the user most have weather station or analog rain sensor, in addition this option must be defined in **Dealer Definitions**. The Rain limit is count on a daily basis and resets back to zero once a day. This option allows to stop irrigation for a few days in case of rain event.

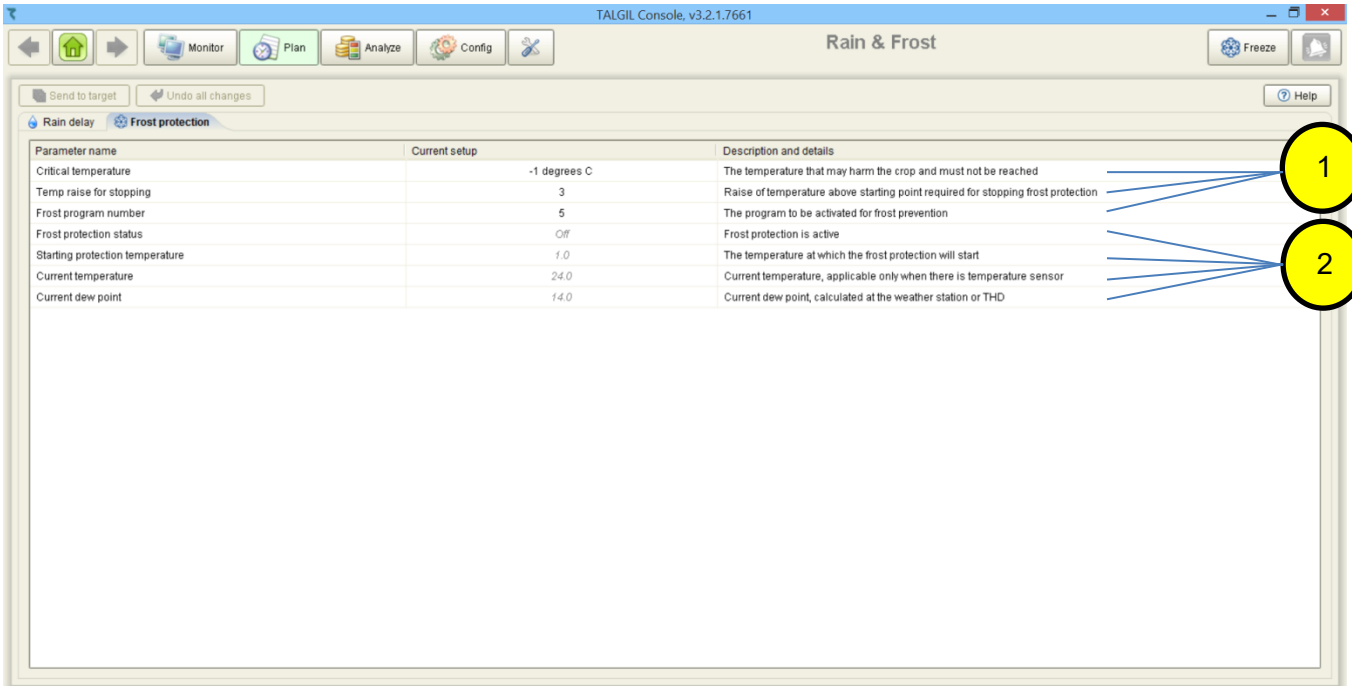


Pointers

1. **Rain limit –** the quantity of mm of daily rain to activate rain delay.
   Day of rain delay – to how many days should the controller delay the irrigation in case of rain delay activation.
   Rain delay left – how many days are left to finish the irrigation delay. In case you defined 3 day of delay and you had rain delay you can change this number to make the delay shorter or longer.
2. **Rain delay status –** Off not active, On active.
   Measured daily rain – how much rain (Daily) was measured.
   Total rain delay days – number of days with rain delay.
   Rain contact – not active.

9.9 **Frost protection** (plan / Frost protection)

For using Frost protection, the user most have weather station or THD interface, in addition this option must be defined in **Dealer Definitions**. This feature is based on an algorithm that allows the user to insert the critical temperature for the crop and the controller will calculate the opening temperature of the selected program.

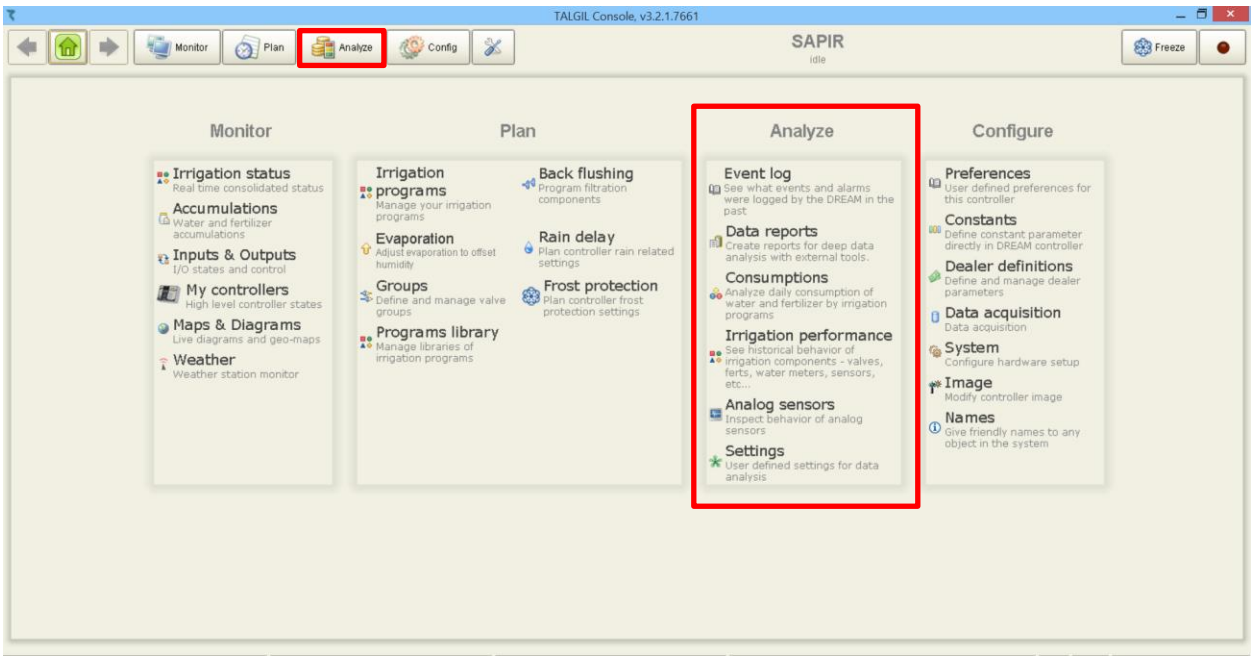


Pointers

1. **Critical temperature –** the temperature that may harm the crop.
   Temp raise for stopping – insert the temperature that will close the program.
   Frost program number – insert the frost protection program number.
2. **Frost protection status –** Off or On.
   Starting protection temperature – the calculated temperature to start the program.
   Current temperature – the reading of the Current temperature from the sensor.
   Current dew point – the calculated current dew point.

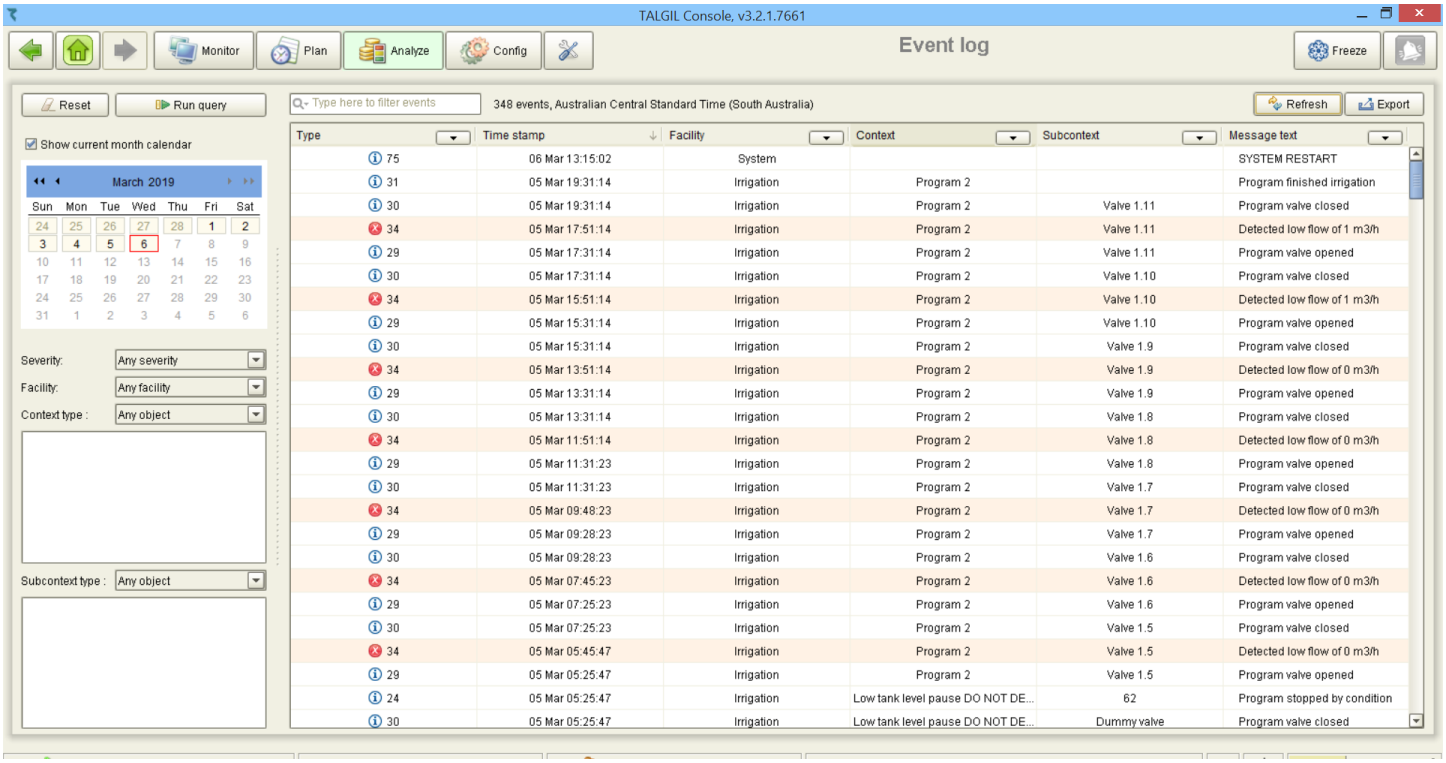
10. Analyze

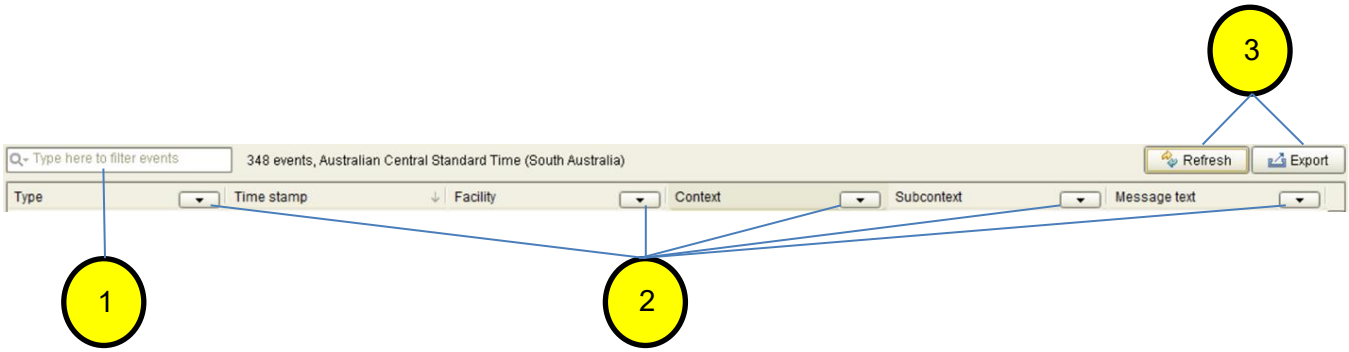
The following chapter deals with the tools to analyze the controller activities, consumptions, behavior and creating reports. it can be reached from the main menu or from the pull down bar.



10.1 **Event log** (Analyze / Event log)

The event log screen allows reviewing the controller activities and behavior, the screen consists of the activities list, calendar and filters to make the search of something specific easier.



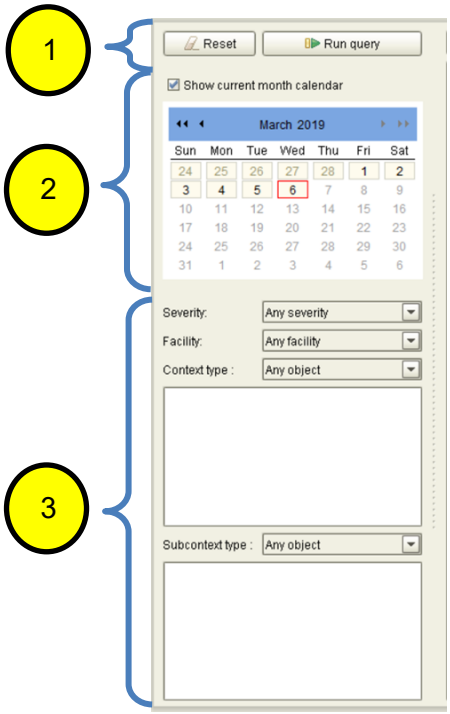


Pointers

1. Free text to filter events.
2. Colmns filters, press on the filters icon and select from the list.
3. Export the list to Excel file or Refresh.

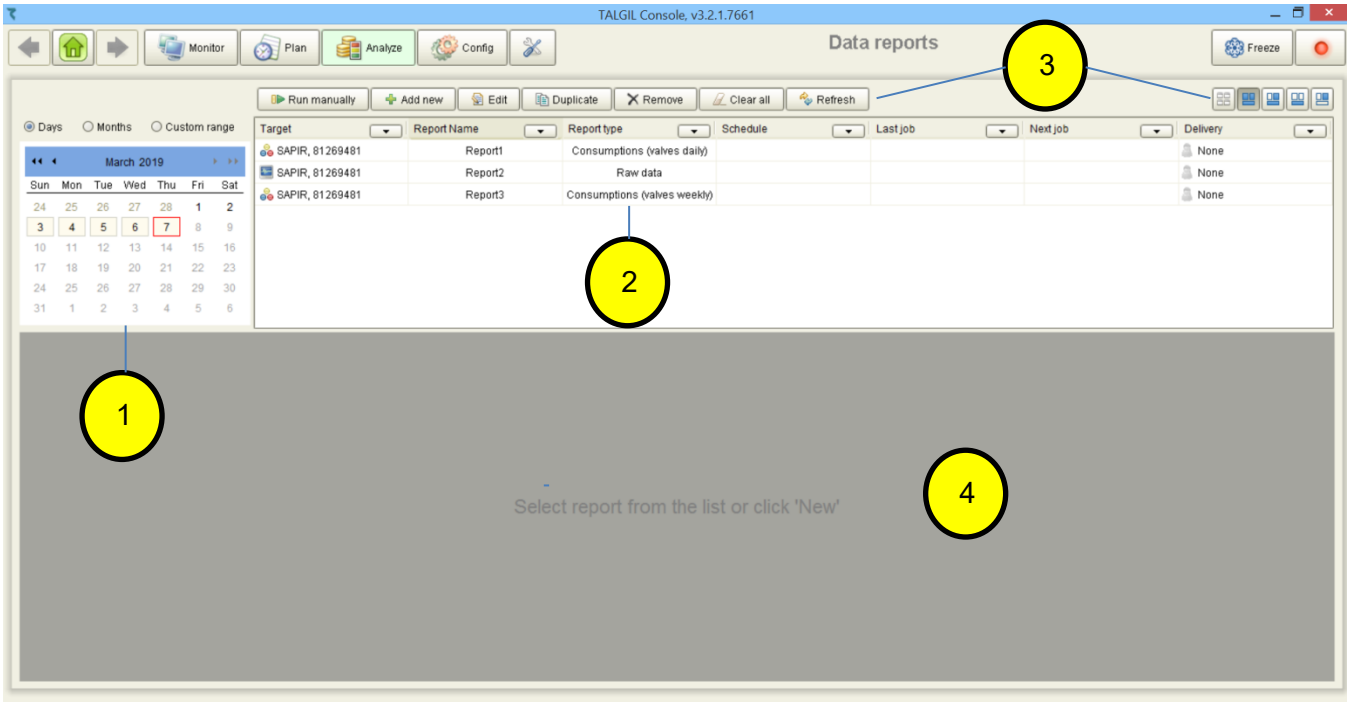
Pointers

1. **Run query –** after selecting the dates and filters (if needed), click on it to run the search.
2. Mark the daisered date on the calender, if you need several days click and drag.
   The red scuere represents the current day.
3. Search filters to find error or information,
   in specific program, device ,site…..



10.2 **Data reports** (Analyze / Data reports)

The Data reports perspective is the place where the user may define formatted documents by which various reports may be generated. There can be various types of reports: **Consumption** reports, **Raw data** reports or **Event log** reports.



Pointers

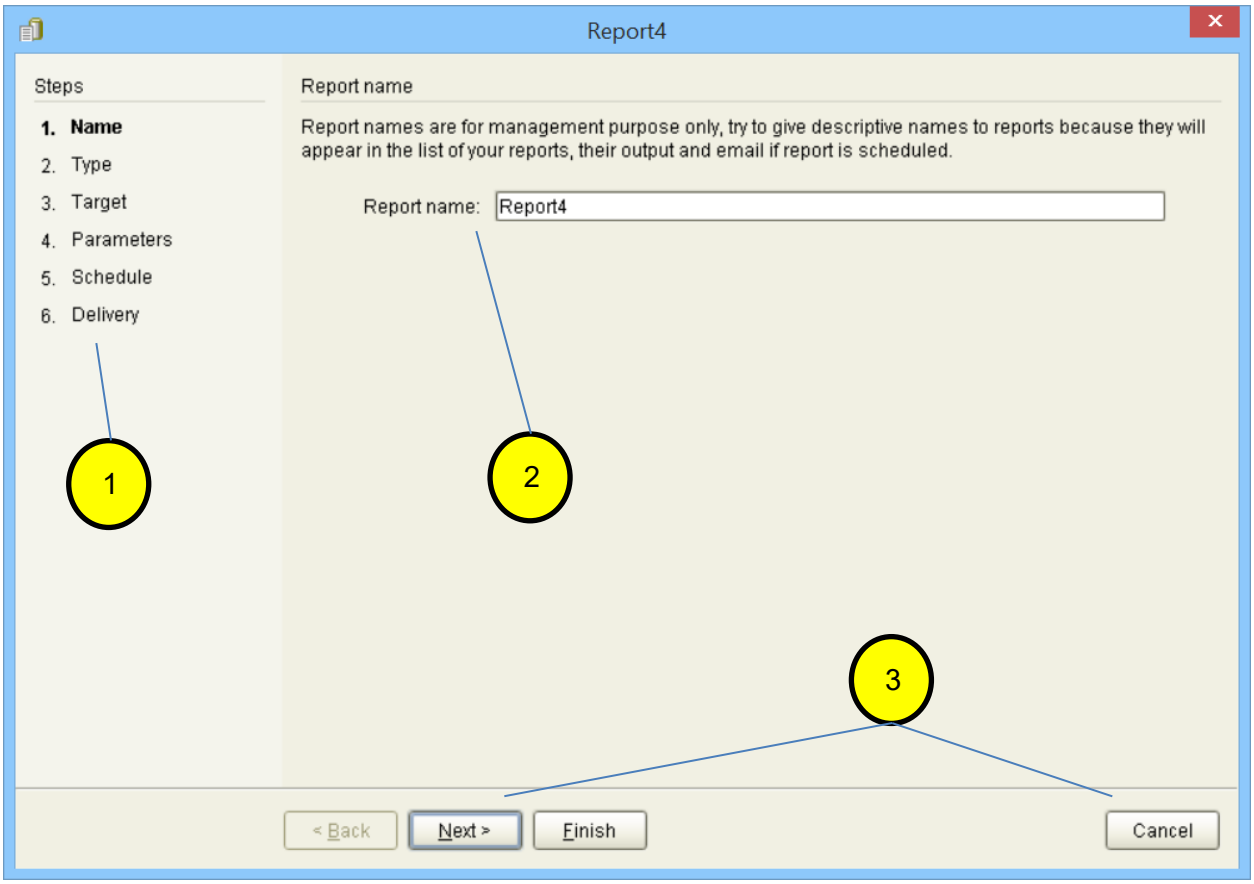
1. Range selection for manually generated reports.
2. List of defined reports.
3. Tool bar :
   - After selecting a report from the list and the required day/s click on - Run manually
   - To create a new report click on - Add new (explanation of the report wizard is in the next page).
   - To edit an existing report click on the report and then click on - Edit
   - To duplicate existing report click on – Duplicate
   - To delete report, mark it and click on – Remove
   - To delete all the reports click on – Clear all
   - To refresh the page click on - Refresh
   - To change the screen display click on -

10.2.1 Creating new report (Analyze / Data reports)

To create new report, click on Add new 

in order to open the report wizard.
The wizard contains 6 steps:

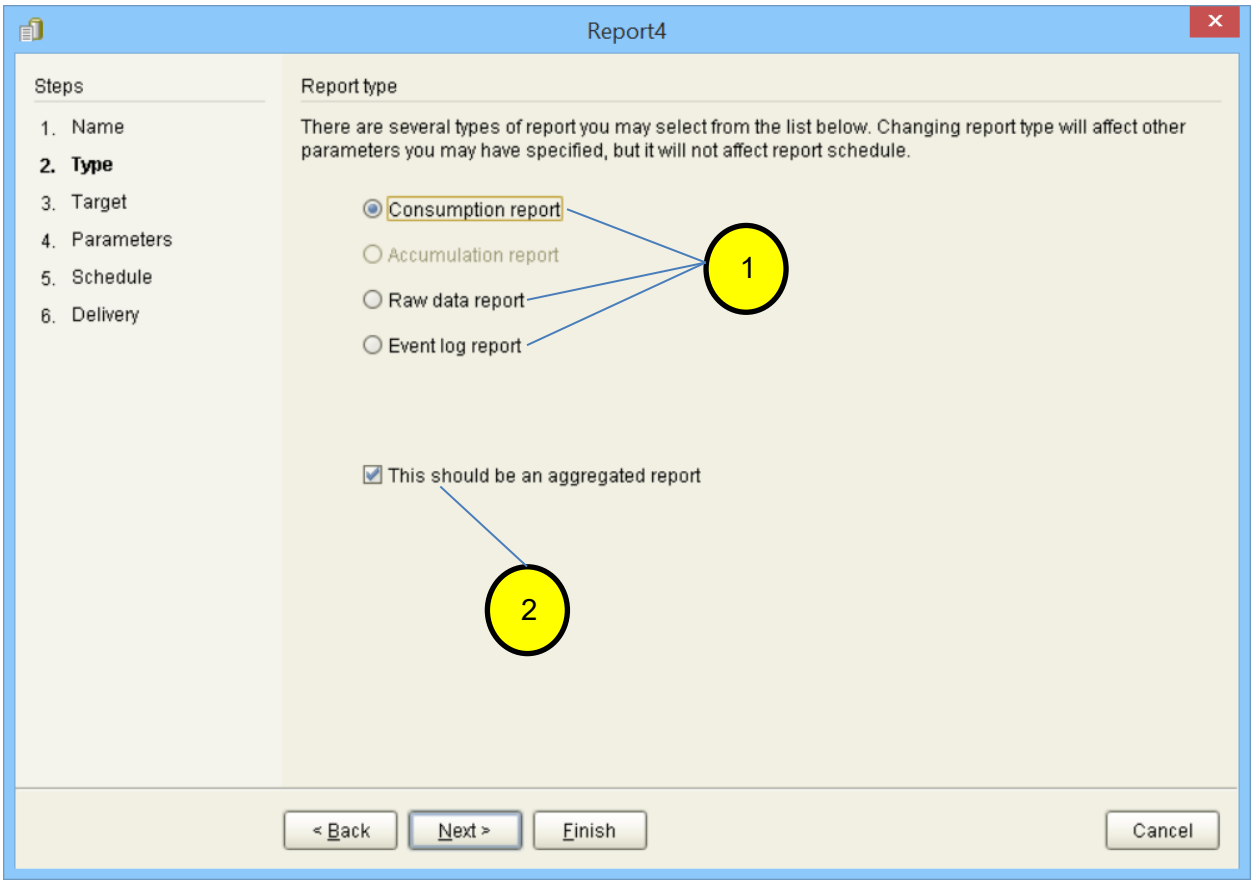
Step 1 – name: giving a name to the report.



Pointers:

1. The steps of the report wizard, click on the desired step to reach it directly.
2. Type the desired report name.
3. Move between the wizard steps, and finish or cancel the report configuration.

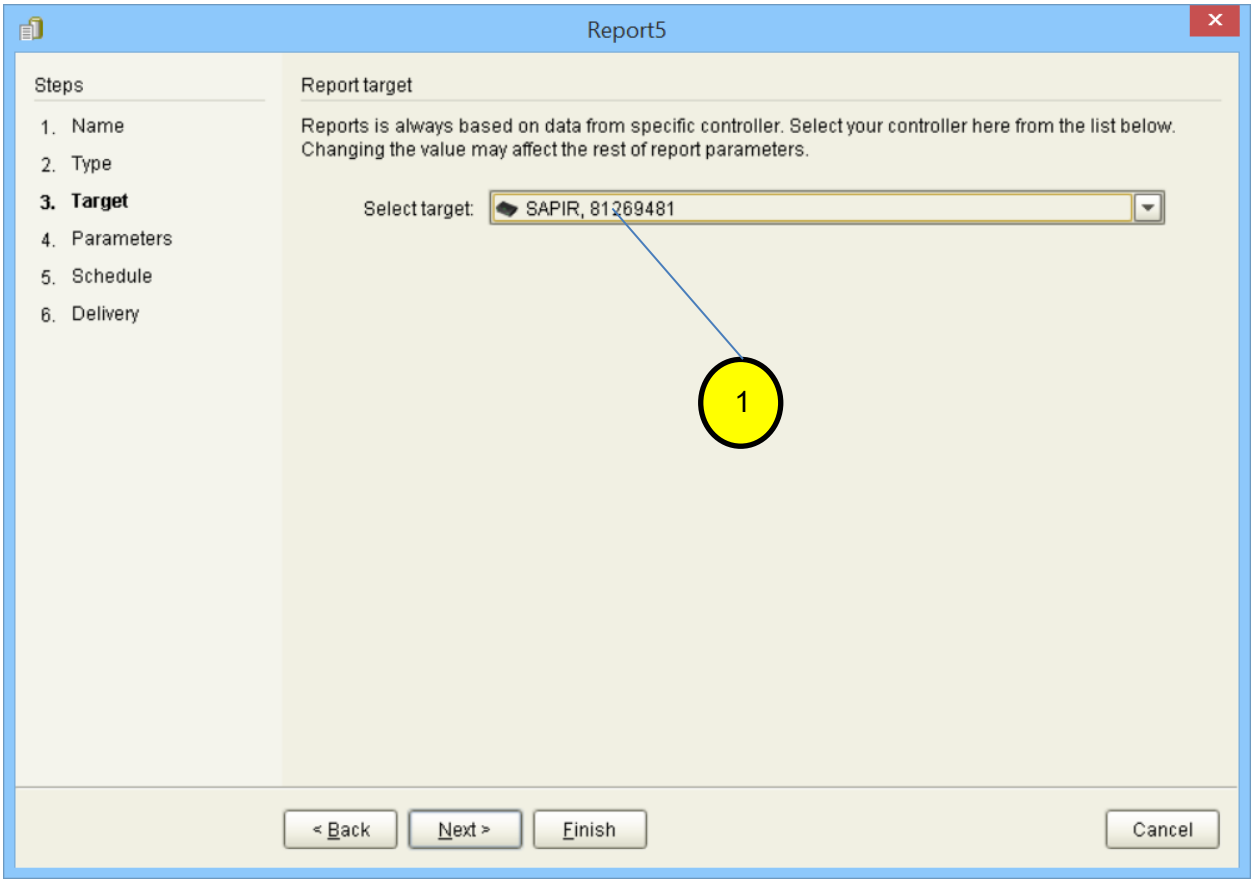
Step 2 – Type: selecting the report type, there are 3 types of reports: consumption, raw data and evet log. Each type of report has different parameters screen. (look in the Step 4 – parameters)



Pointers

1. Select the required report type:
   Consumption report – consumption of valves, groups and water meter
   Raw data report – creating reports from selected data.
   Event log report – creating reports of system events.
2. Selecting this option will allow creating mixed consumption report.

Step 3 – Target: this screen is for selecting the controller in case there is more than one.

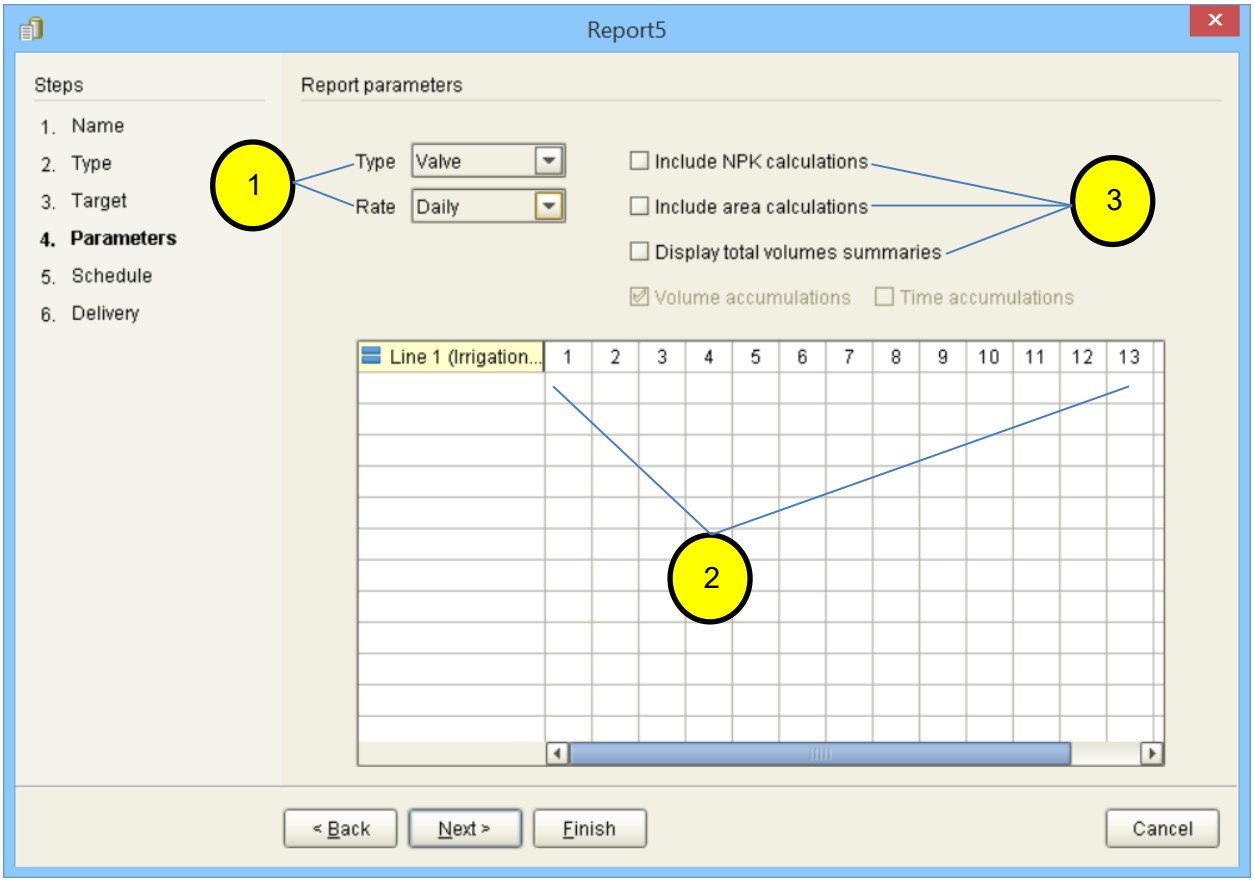


Pointers

1. Select the desired controller from the list.

Step 4 – Parameters: the parameters screen is for selecting what will appear in the report. There 3 types of reports (see step 2) each type has its own parameters screen.

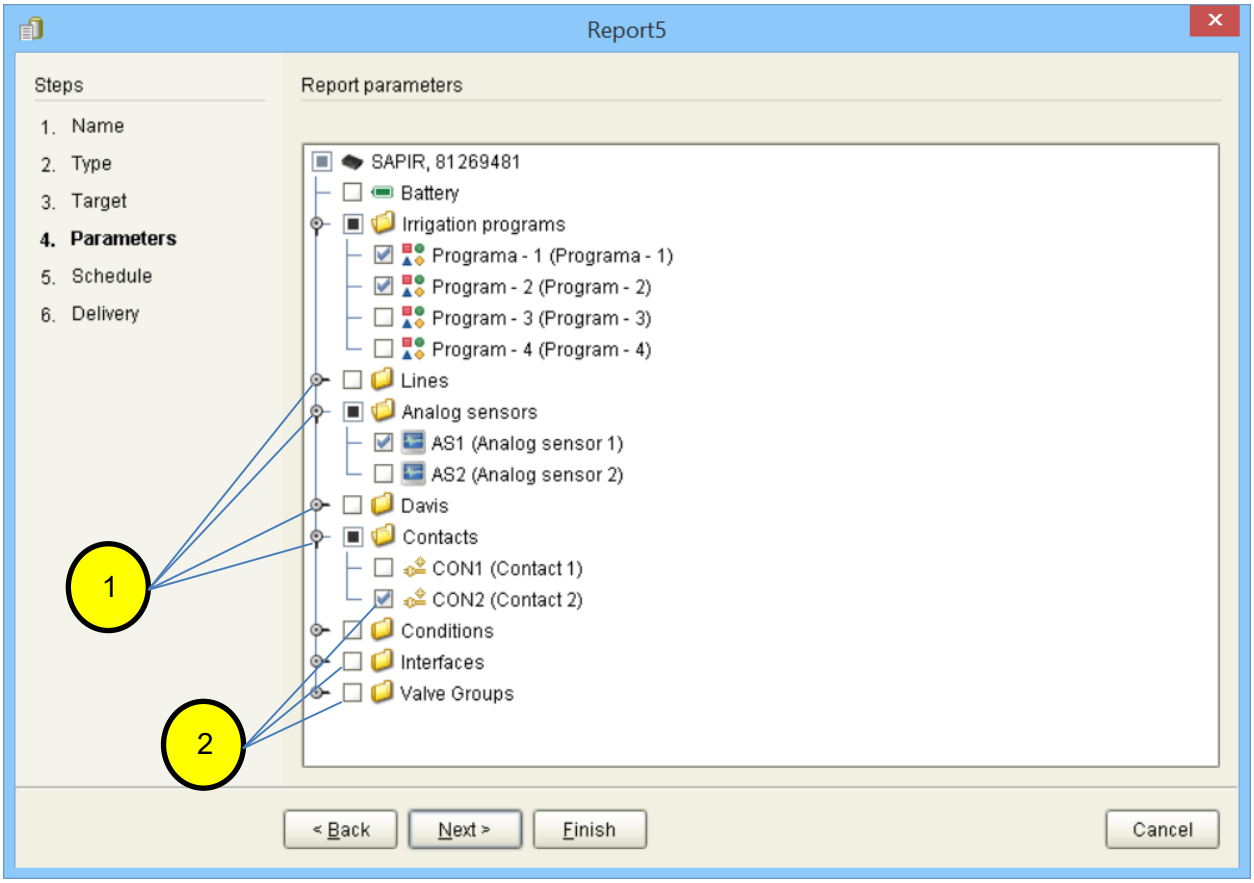
Consumption



Pointers

1. **Type –** select the parameter type from the list.
   Rate – select the time rate.
2. For example, if you chose **Type – Valves**, select the desired valves from the list.
   If you chose valves group, mark the desired group in the list.
   Do the same for Crops and Plots if nothing appears check again your configuration in **Analyze / Settings**.
3. Mark if it's necessary, make sure to define the valves area (in constants), and the **NPK** (in **Analyze / Settings**).

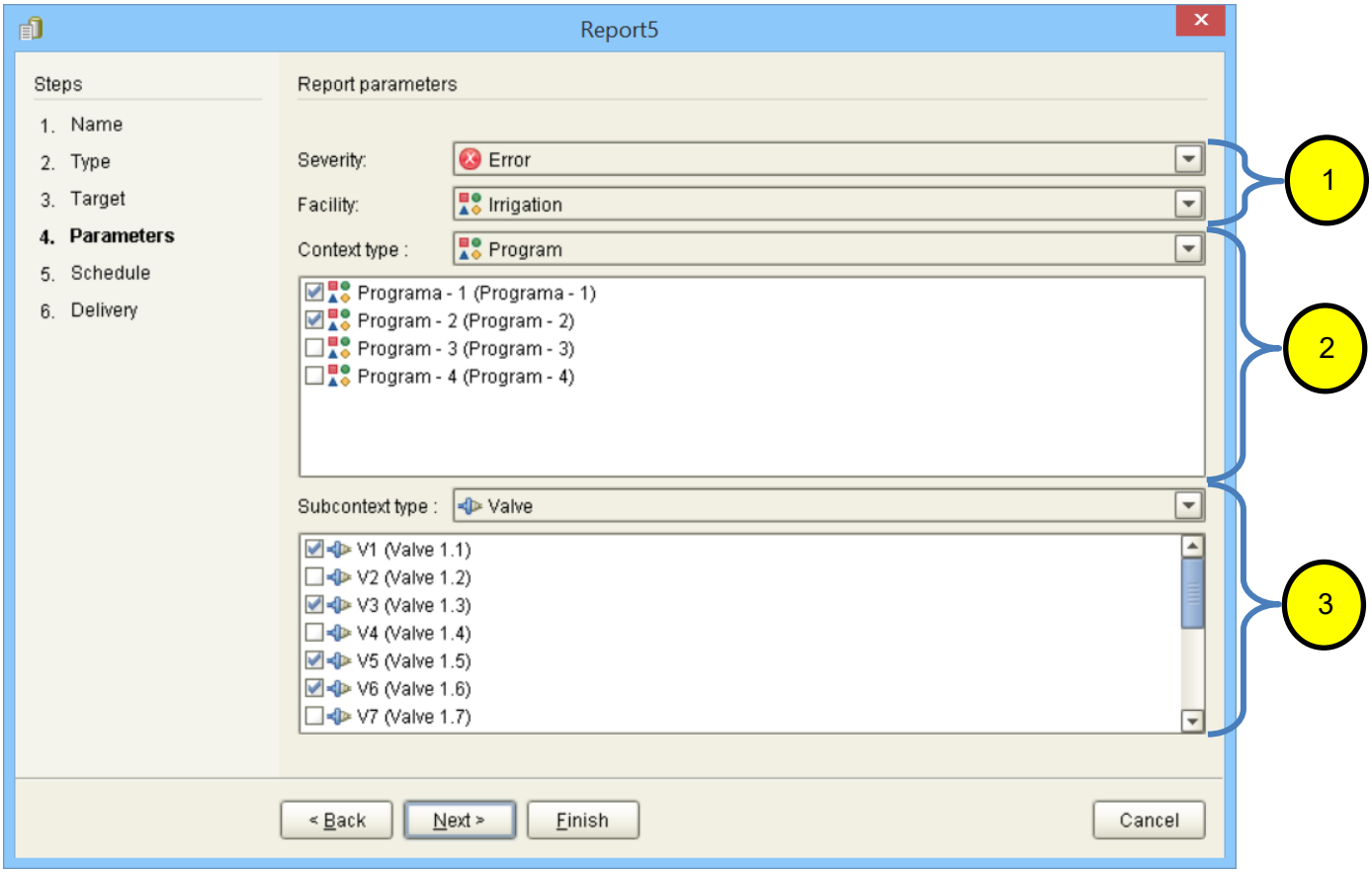
Raw data



Pointers

1. To be able to select specific items from each category click on the icon.
2. Select the parameters that will appear in the report.

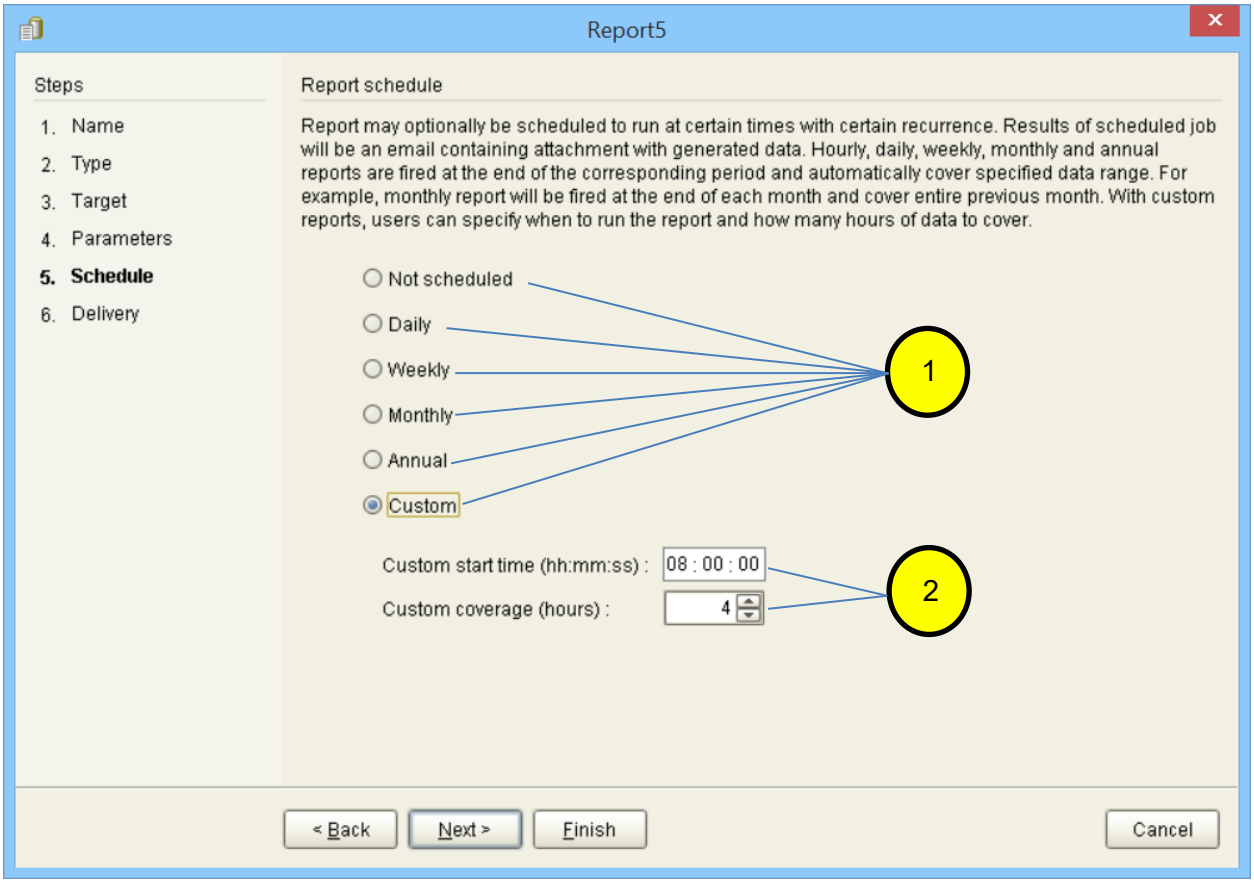
Event log



Pointers

1. **Severity –** select between Error, Info or any severity (Error and Info).
   Facility - select from the list the facility according the report you want to produce.
2. Select the context type and mark in the list below the required items for the report.
3. Select the Sub context type and mark in the list below the required items for the report.

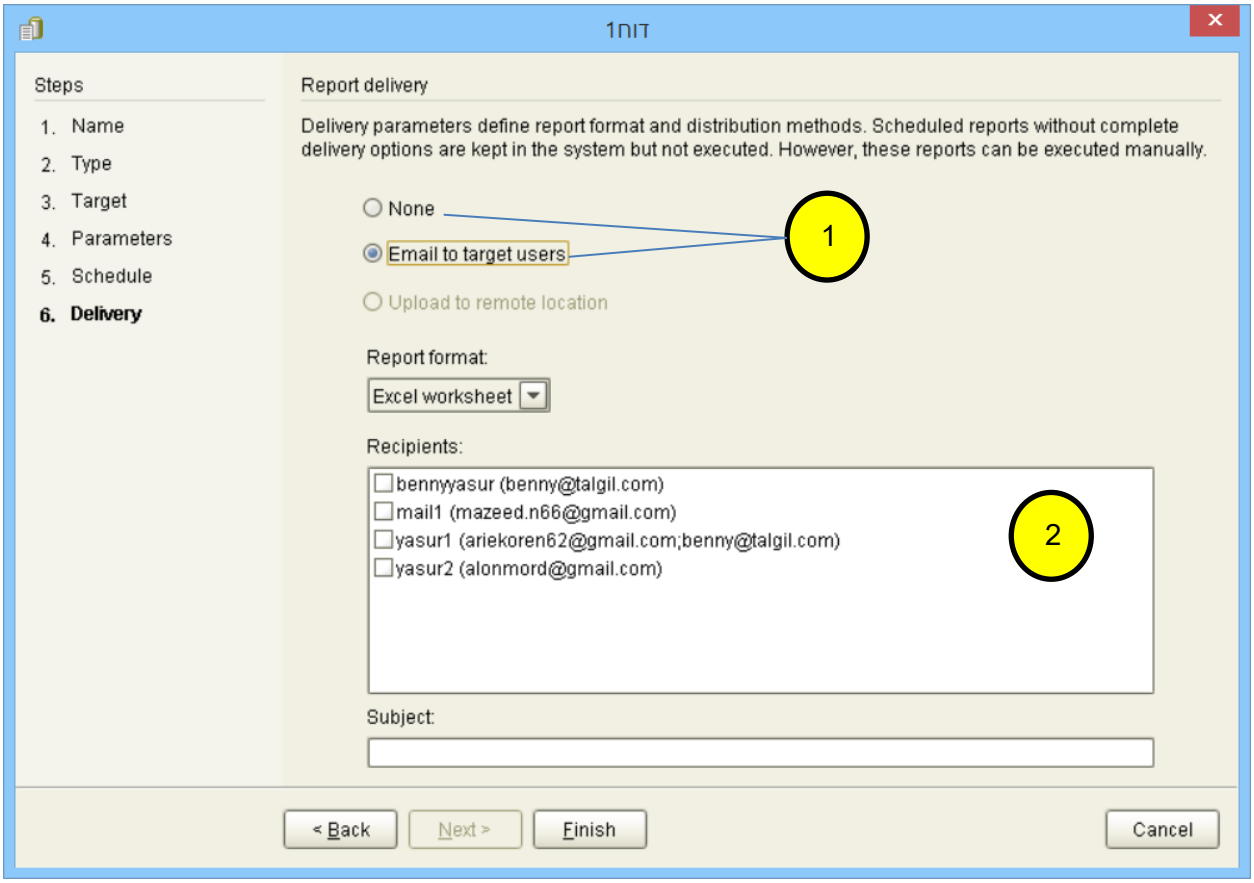
Step 5 – schedule: the schedule step allows defining when to send the automated reports.



Pointers

1. Select when do you want to receive the reports:
   Not scheduled – the report won't be sent automatically.
   Daily – the report will be sent every day, in the end of the day.
   Weekly – the report will be sent every week, select when the starting day of the week.
   Monthly - the report will be sent every end of month.
   Annual - the report will be sent every end of year.
   Custom – the report will be sent according to start time hour's coverage.
2. I you have selected Custom, define the start time, and the hour's coverage of the report.

Step 6 – Delivery: define the users who will receive the automated report.

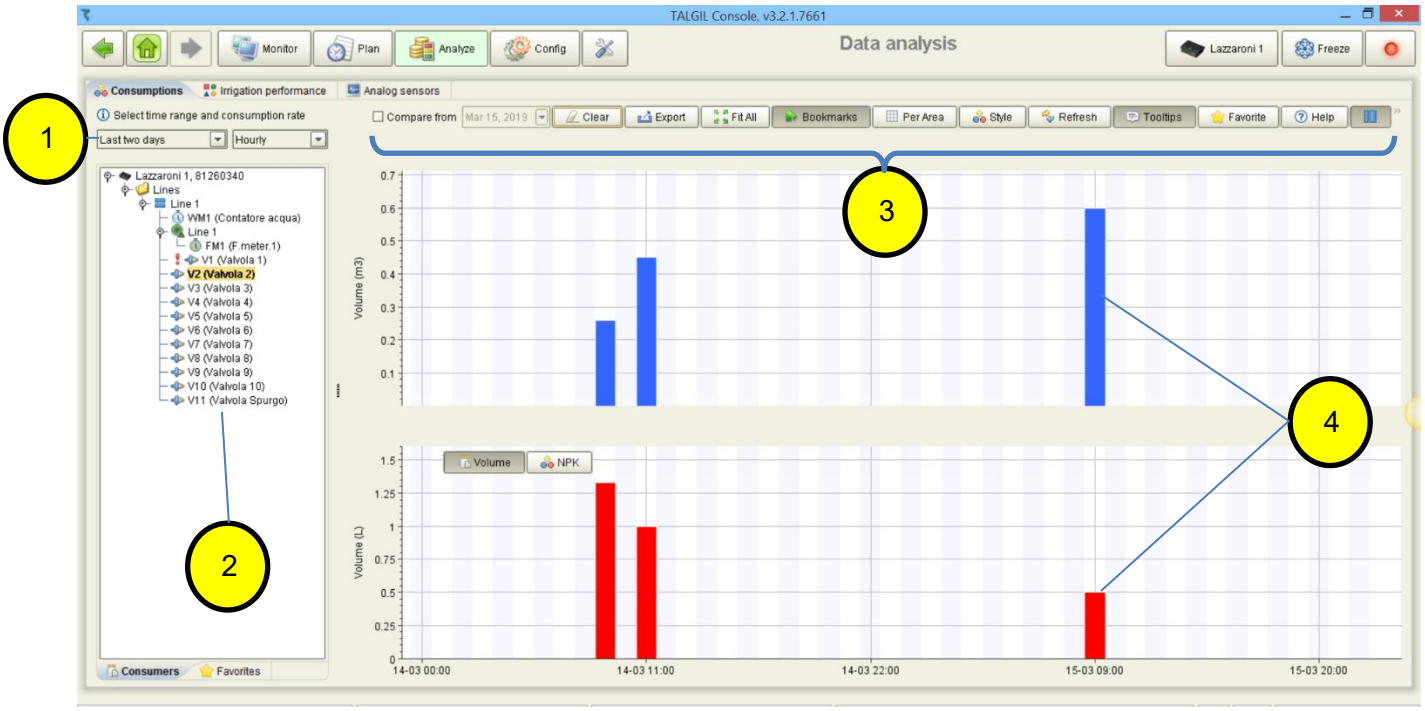


Pointers

1. **None –** the report won't be sent to anyone.
   Email to target users – the report will be sent to the selected controller users.
2. **Recipients -** Select from the email list who will receive the report.
   Subject – enter the subject of the email.

10.3 **Consumption** (Analyze / Consumption)

The Consumptions perspective supplies tools that help analyzing the information accumulated in the data base about the water and fertilizers consumed by the Valves, Crops and Plots in the system (**Crops** and **Plots** will be available only if wore configured in **Analyze** / **Settings**).



Pointers

1. Select the time range and consumption rate.
2. Select the items by drag and drop to the graphic view pane.
3. The Toolbar allows changing the screen display, exporting the data to an Excel sheet and seeing values per Area.
4. Graphic view pane, when placing the mouse on the consumptions columns a small information window will appear.

10.4 **Irrigation performance** (Analyze / Raw data)

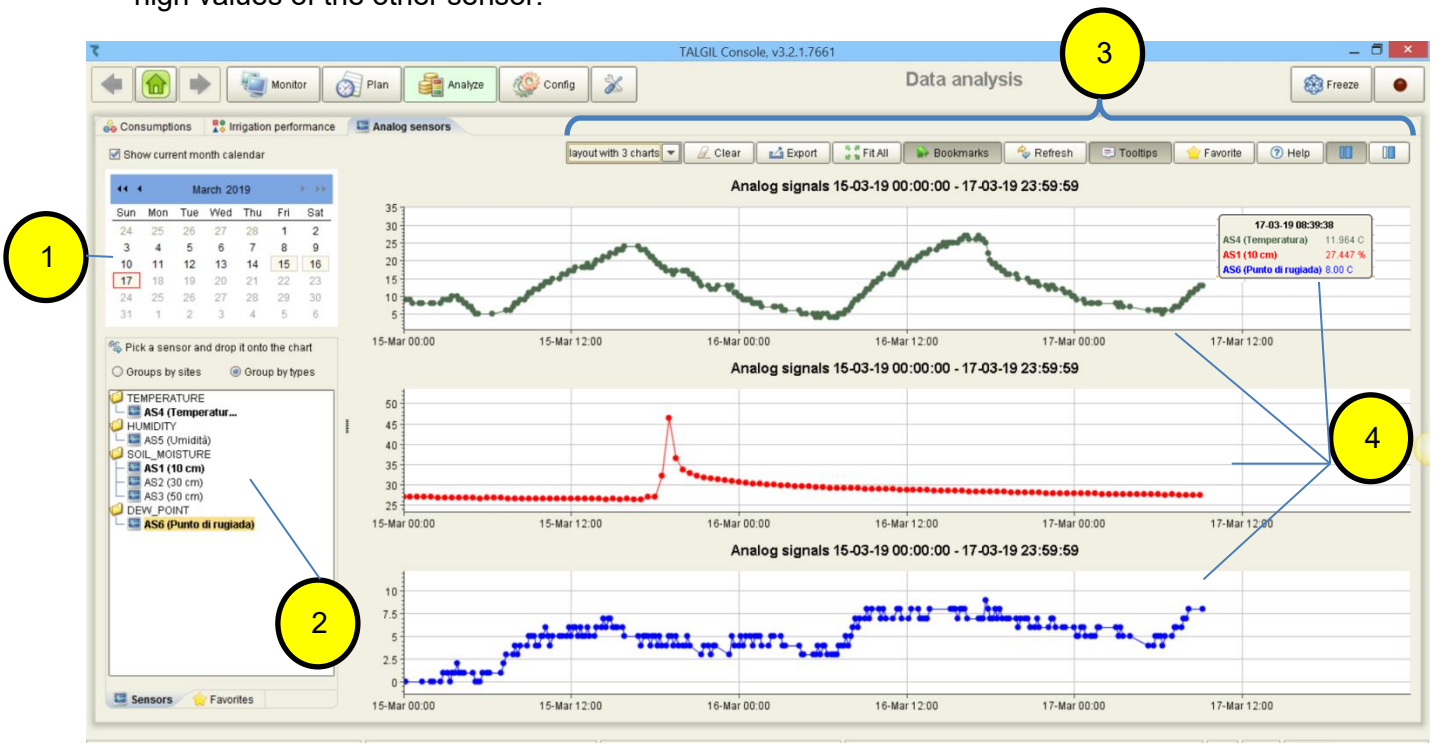
The Irrigation performance perspective supplies various tools for analyzing historical data of activities in the system. The selected items activities along the given time span, are presented in a graphical view, enabling to put one against the other for example the starting and stopping of irrigation programs, opening and closing of valves, starting and stopping of pumps, etc. Additionally statuses of digital inputs, statuses of defined conditions, statuses of RTUs and the status of the battery can also be presented in the graph. To complete the picture values of analog sensors or flow of water meters can also be included in the same graph.

Pointers

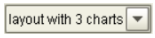
1. Select the date or range (click and drag).
2. Select the items by drag and drop to the graphic view pane.
3. The Toolbar allows changing the screen display and exporting the data to an Excel sheet.
4. Graphic view pane, when placing the mouse on the graphic pane a small information window will appear.

10.5 **Analog sensors** (Analyze / analog sensors)

The specialty of the Analog sensors perspective is that it can be divided into 1-5 charts, each chart with its own axes, this enables placing one against the other, sensors with highly different range of values without causing the lower values to become nearly flat line compared with the high values of the other sensor.



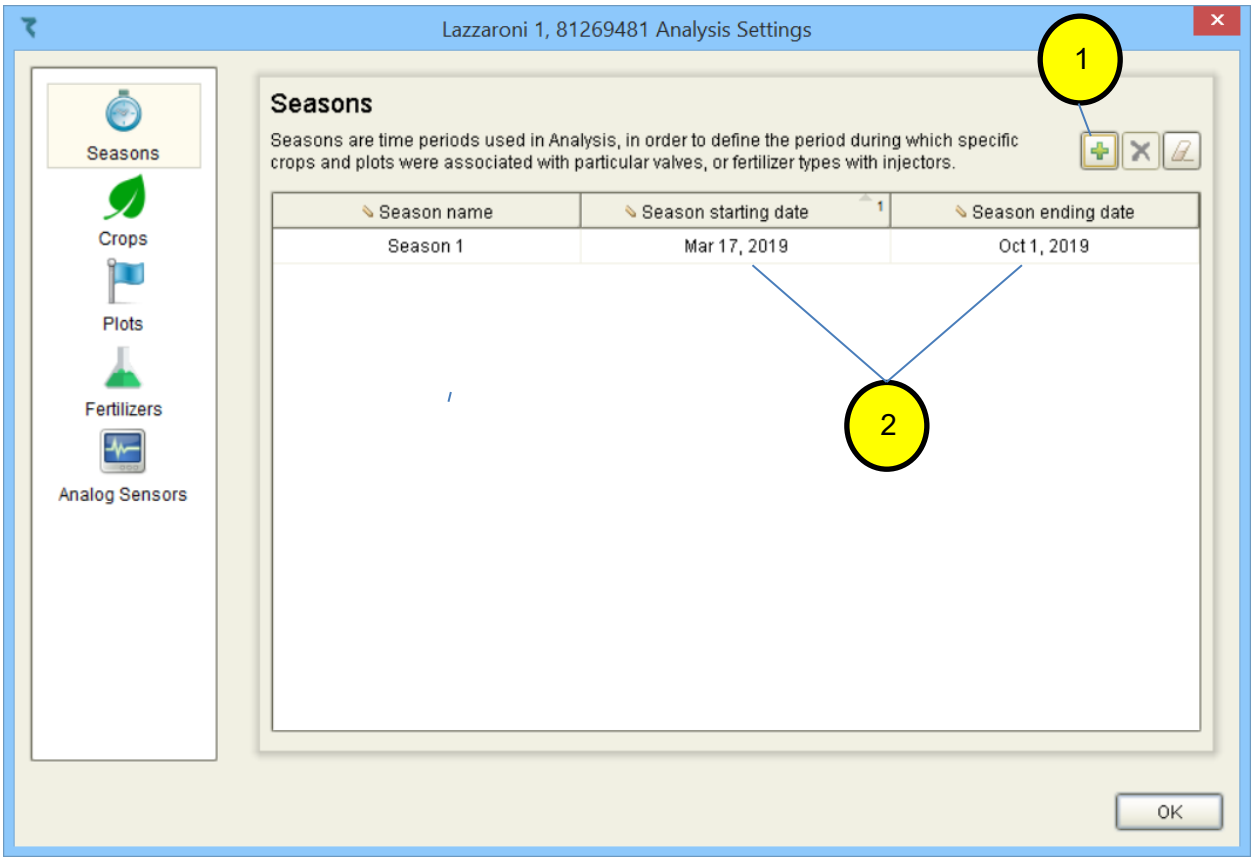
Pointers

1. Select the date or range (click and drag).
2. Select the items by drag and drop to the graphic view pane, you can sort the list by types or sites.
3. The Toolbar allows changing the screen display and exporting the data to an Excel sheet.
   In order to choose the quantity of charts use the list in the left side of the Toolbar  .
4. Graphic view pane.
   When placing the mouse on the graphic pane a list of the items, their values and the measuring time will appear.

10.6 analysis settings (Analyze / Analysis settings or Settings (main menu))

The Analysis settings are used to divide the valves by Crops and Plots, as well as determine the NPK values of the fertilizers to be able to know how much NPK was supplied to each Valve, Crop and Plot.

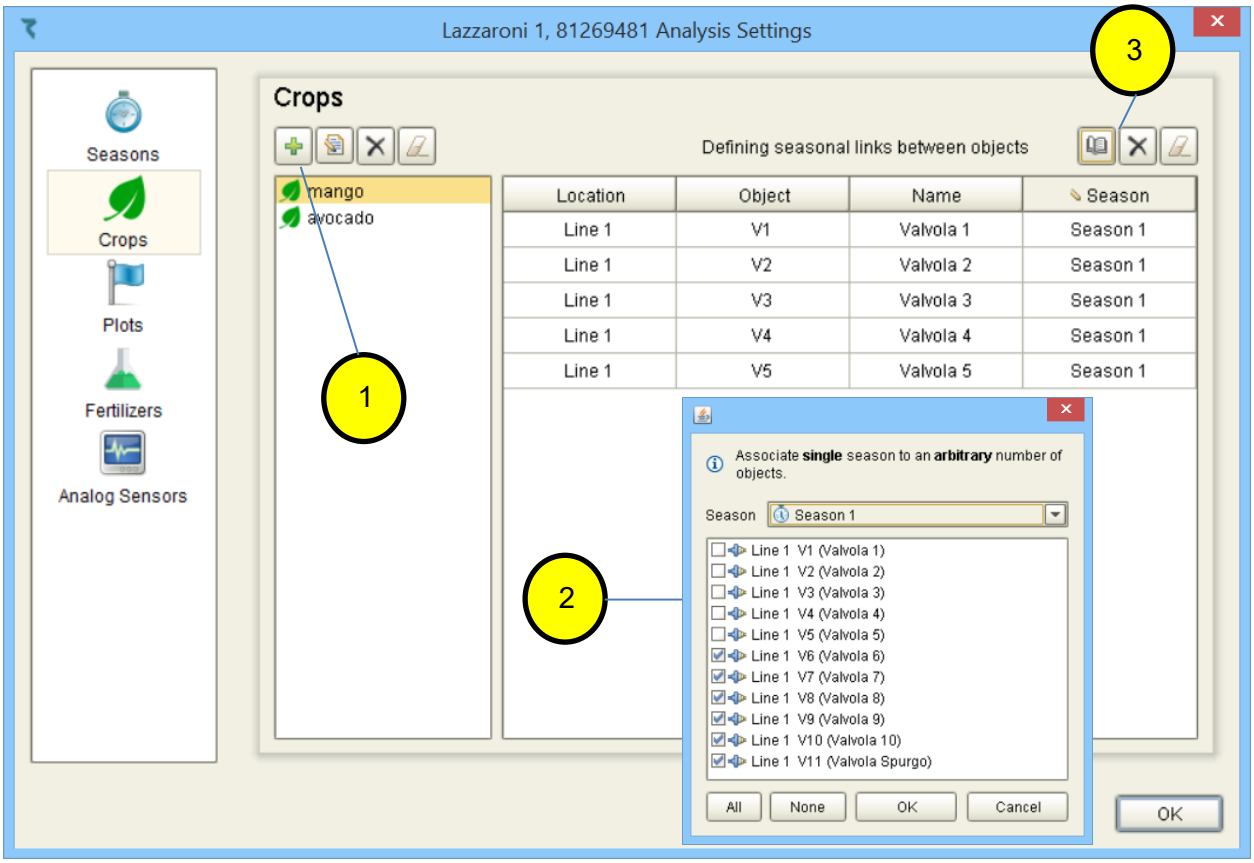
Seasons



Pointers

1. Click on the icon to add new season and insert the season name, the correlation between valves, crops and plots may be dynamic and can change from one season to another, that why we should make this definition.
2. Set the time range of the season.

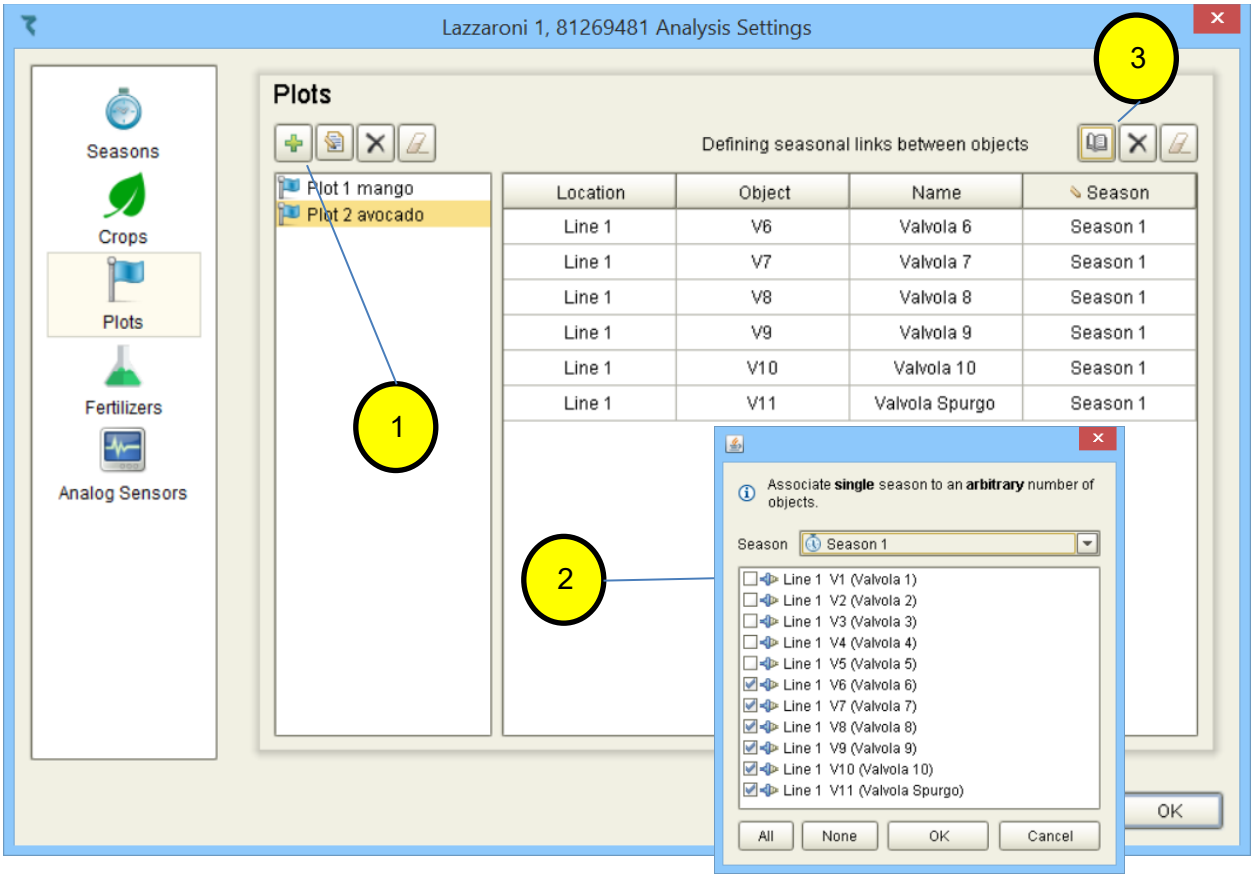
Crops



Pointers

1. Click on the icon to add new Crop and insert the Crop name.
   To edit the Crop name use the icon.
   To delete Crop click on
   To delete all click on
2. Select the season (according to what you defined in Seasons), and mark the relevant valves.
3. Edit, delete or delete all.

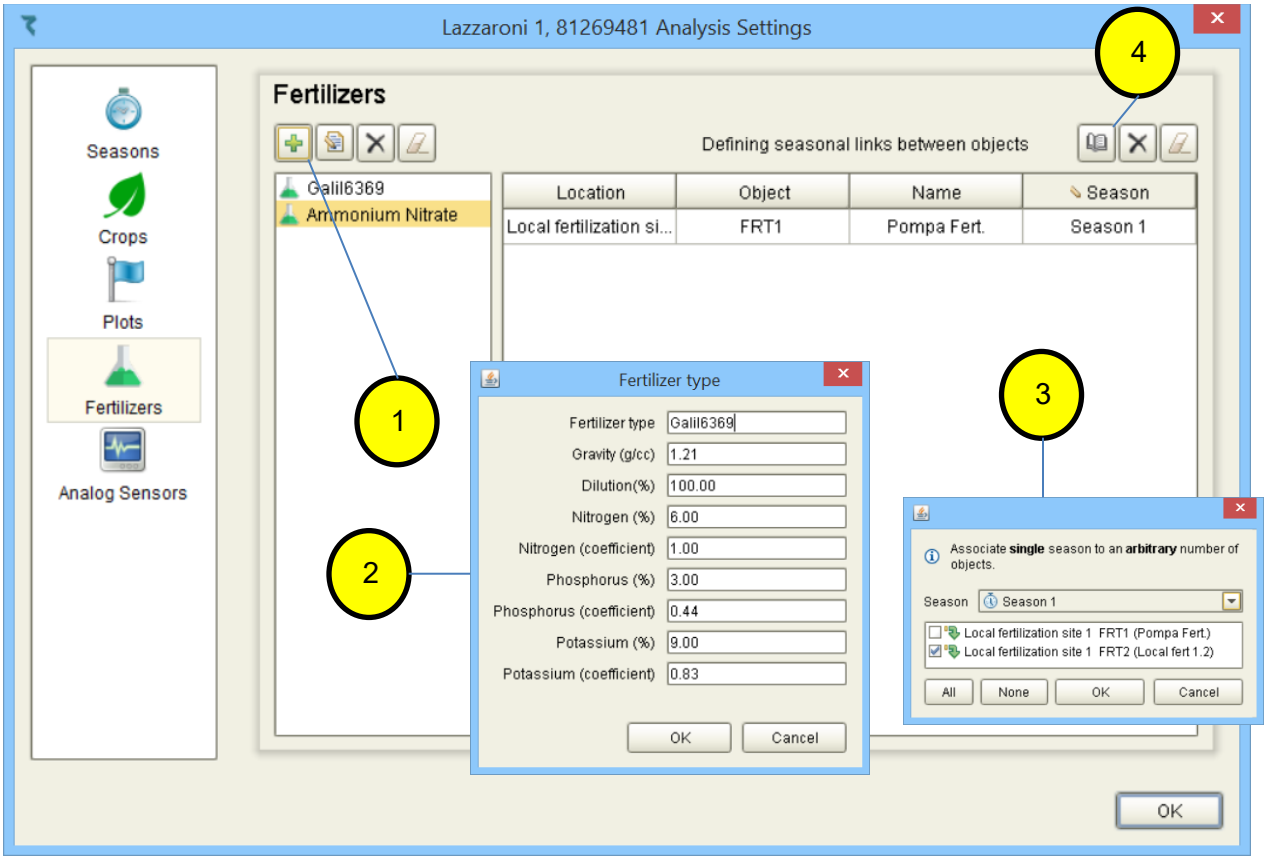
Plots



Pointers

1. Click on the icon to add new Plot and insert the Plot name.
   To edit the Plot name use the icon.
   To delete Plot click on
   To delete all click on
2. Select the season (according to what you defined in Seasons), and mark the relevant valves.
3. Edit, delete or delete all.

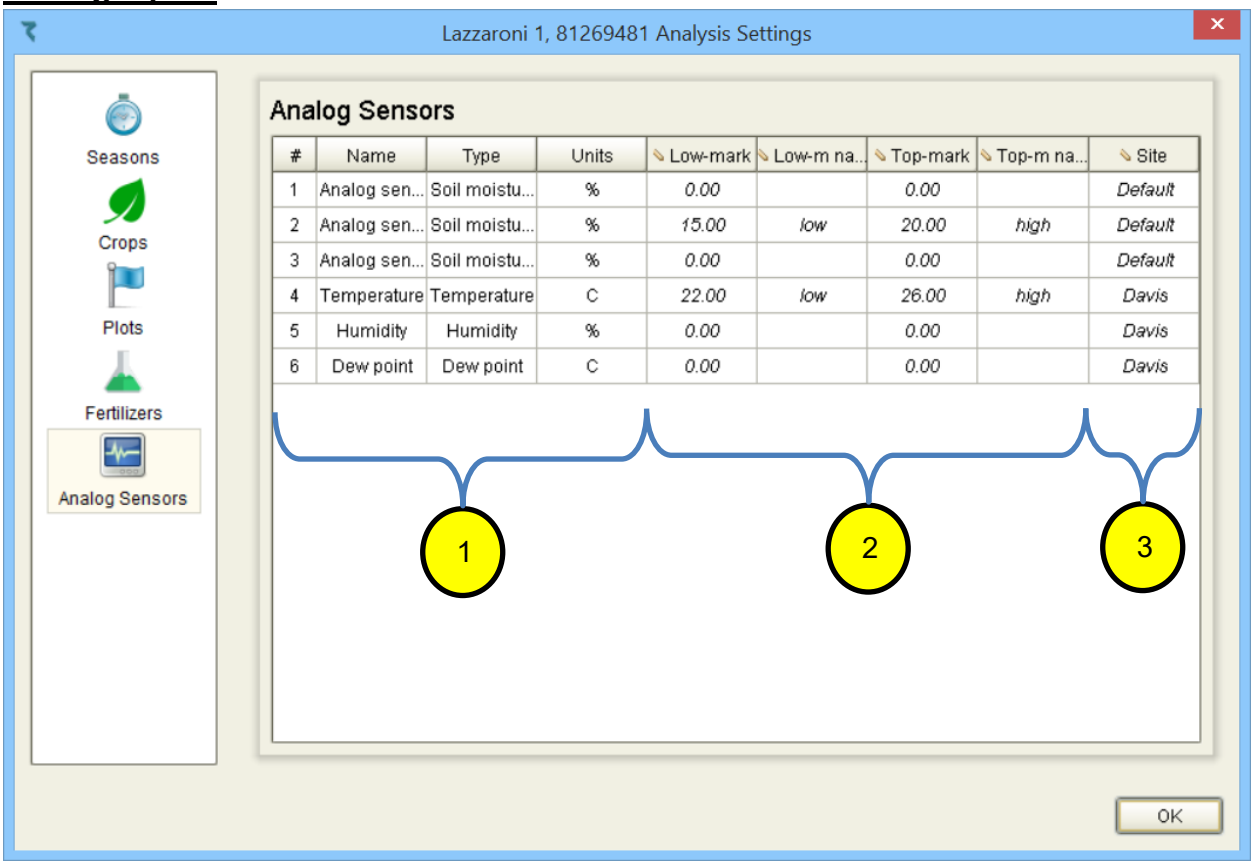
Fertilizers



Pointers

1. Click on the icon to add new Fertilizer.
   To edit the Fertilizer settings use the icon.
   To delete Plot click on
   To delete all click on
2. After adding new fertilizer, fill the following chart according the fertilizer characters, click on OK for the next step.
3. Select the season (according to what you defined in Seasons), and mark the relevant fertilizer injector, the reason for it is to associate between the fertilizer type and fertilizer injector.
4. Edit, delete or delete all.

Analog inputs



Pointers

1. Serial number, Type and Units of the analog sensor.
2. Insert Low / Top mark values, and give them names in order to have thresholds.
3. Site of the analog sensor.