VISION 2
PC Console
USER GUIDE

[End User Version]

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VISION 2

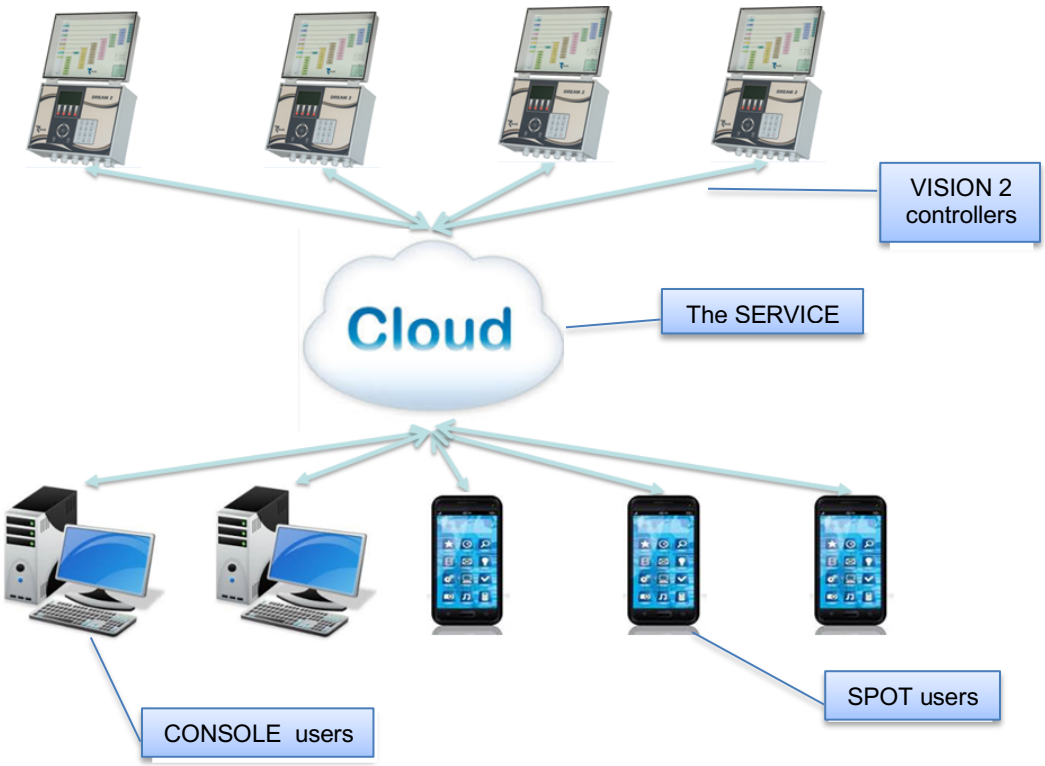
CONSOLE GUIDE

1. General description

The **VISION 2** irrigation control system is a modern distributed control system based on the powerful **VISION 2** irrigation controllers that can be communicated through the Internet from everywhere, anytime.

The same **CONSOLE** version is used for the **VISION 2** and **DREAM 2** systems. As such some features appearing in the **COLSOLE** may not be available on the **VISION 2** system options.

The drawing below demonstrates the physical layout of the communication between users and targets (controllers) in the **VISION 2** system.
Users have two options for accessing the system: one option is the software package called **CONSOLE** which is loaded and used on **PC**s, the other is just an internet site called **SPOT** which does not need any loading and is meant to be used by **CELLULAR PHONES** and **TABLETS**. The **CONSOLE** which is the subject of this document will be discussed widely below.
Both options enable the users to login to the **SERVICE** which is a sophisticated software package located somewhere in the cloud acting like a mediator between users and their controllers. Additionally the service contains a large **DATA BASE** that stores all the information about all the controllers and the **ADMINISTRATION** software that takes care about who is permitted to access which controller.
On the other end the controllers after power up also login to the **SERVICE** and stay online. The **SERVICE** will interrogate all the online controllers repeatedly in order to keep the **DATA BASE** up to date, so that users interested in some information about some controllers, can find it in the **DATA BASE**.



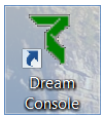
2. About the CONSOLE

The purpose of the following document is to describe to the potential user the various options offered by the **CONSOLE** for defining programs, obtaining information, analyzing data, generating reports and interfere with the ongoing activities.

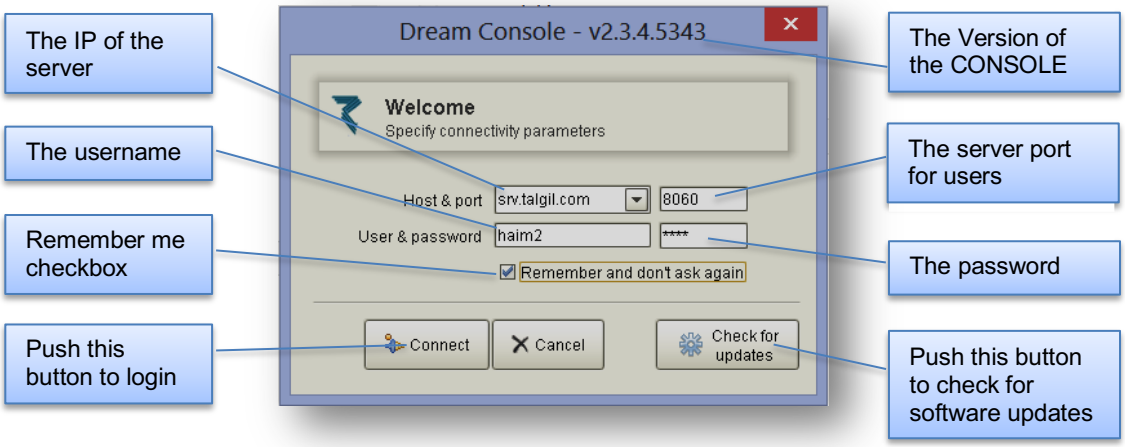
For accessing the **SERVICE** each user must have a **Username** and a **Password** recognized by the **ADMINISTRATION** software. Some users have **Usernames** with permission to access through the **SPOT** only, but those that have access through the **CONSOLE** can also use the **SPOT** with the same **Username**. One thing must be pointed out: the **ADMINISTRATION** will not let a second user enter the system with a **Username** which is already logged in.

There is no limitation to install the **CONSOLE** at the office and at the user's home and the user will be able to use both sites, but not at the same time, the user shall have to logout from the office **CONSOLE** in order to being able to use a home **CONSOLE**.

2.1 Logging in

Double clicking the DREAM CONSOLE's icon 

on the computer's desktop will bring up the following window:



Before trying to login, the **IP address** of the server and the **port** for users need to be defined.

- **IP address of the server** – srv.talgil.com
- **The port** – 8060

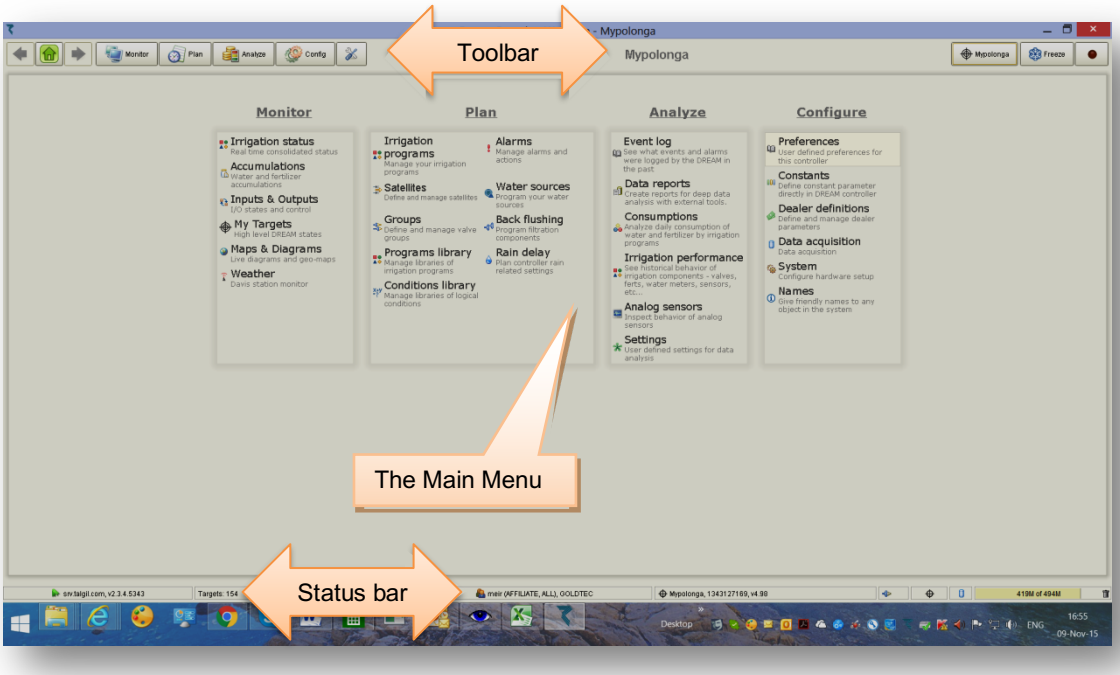
The username and password should be entered in small letters. If we wish the username and password be remembered, we have to click the **Remember me** checkbox.

At this stage we can hit the **Check for updates** button to check if there are new software versions for updating the **CONSOLE**,

For logging in we now have to hit the **Connect** button.

2.2 The Homepage

In general, the **Homepage** 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, but let's have a closer look and see what else is there.

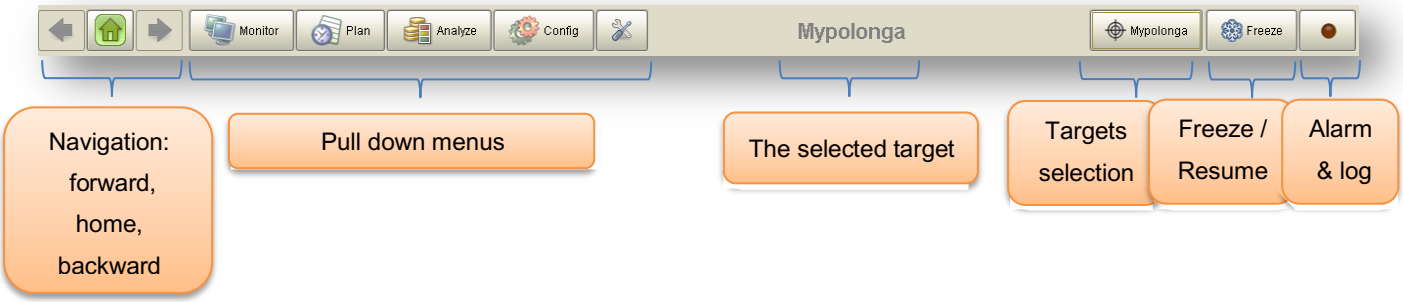


The Main Menu - The subjects of the **Main Menu** are grouped into meaningful groups, each group containing the relevant subjects. There are four groups:

- **Monitor** – deals with monitoring the current activities
- **Plan** – deals with all the planning that users may have to do.
- **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 Toolbar - The **Tool bar** contains the following functions:

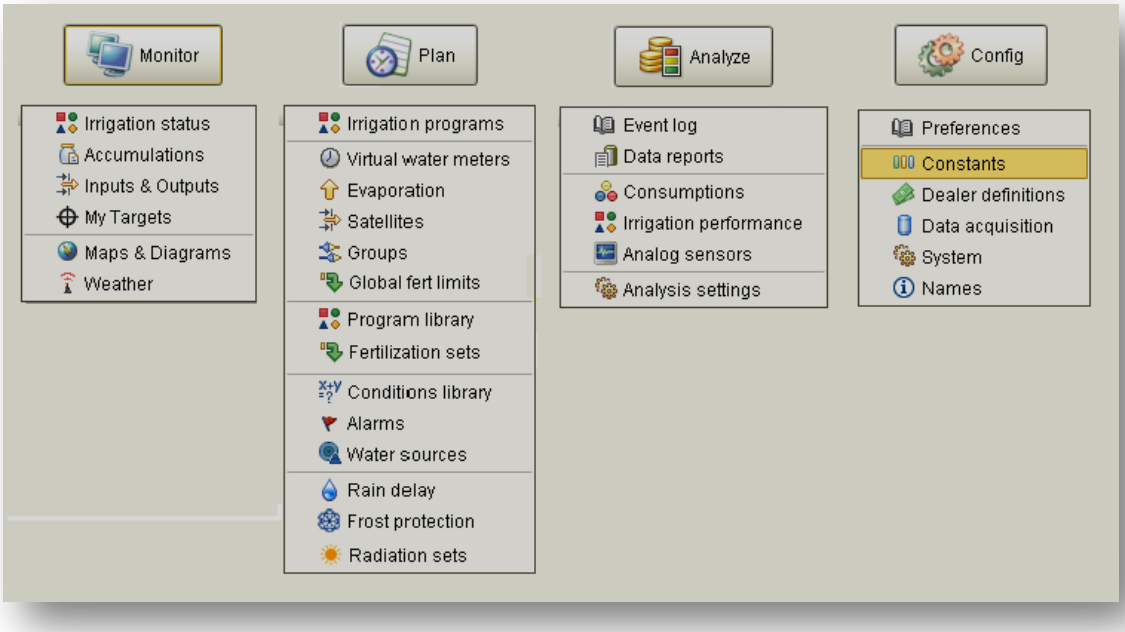


The **Toolbar** appears in all the perspectives of all the subjects giving the user the ability to navigate forward and backward, to select subjects from the **Pull down menus**, to select other target, to execute a **Freeze** command or to go to the **Alarm & log** perspective.

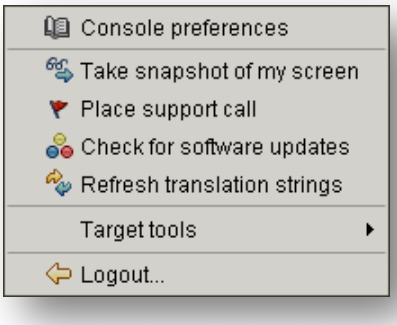
The Pull down menus - You may have probably noticed already that the buttons of the **Pull down menus** have the same names as the **Main Menu** groups: **Monitor, Plan, Analyze** and

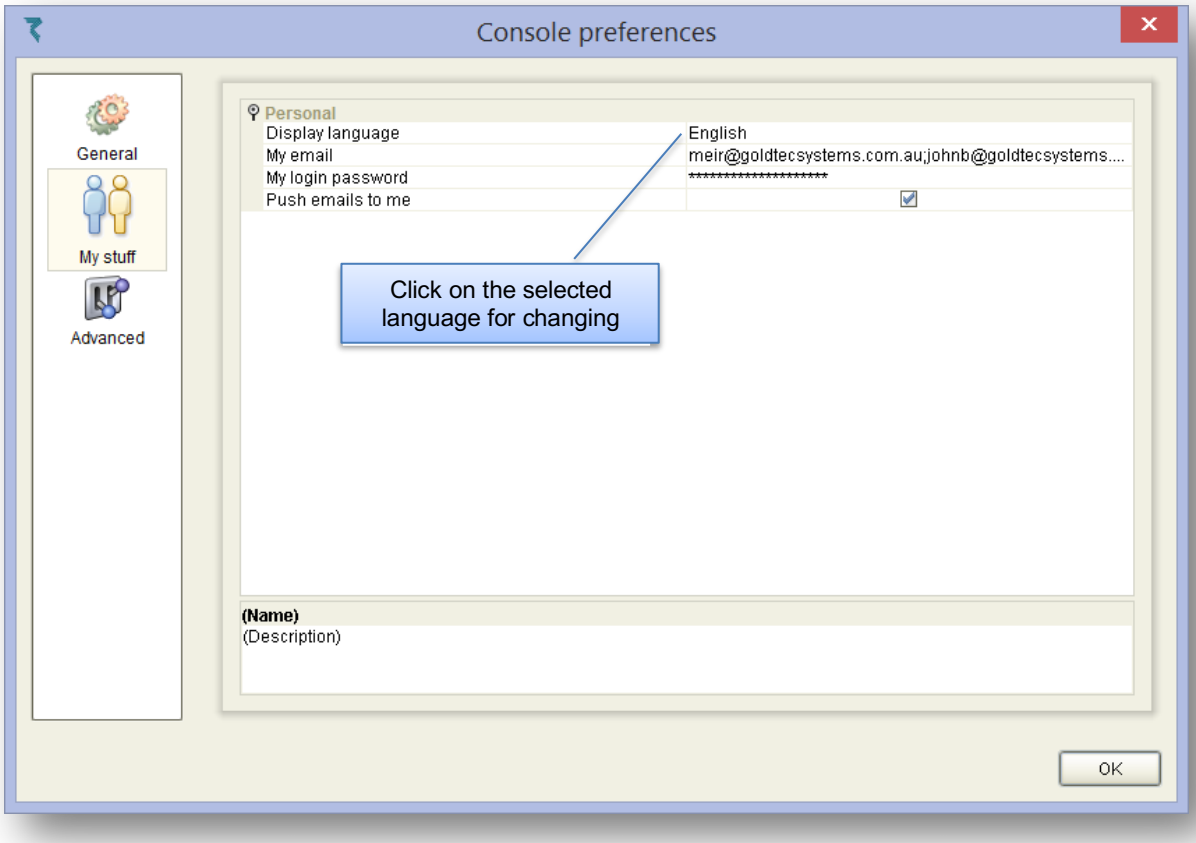
Config. That is because the **Pull down menus** actually fulfill the same function as the **Main Menu** and that is giving access to the various subjects, so since the **Toolbar** appears in all the perspectives, the included **Pull down menus** serve as shortcuts to all the subjects.

The following picture shows how the **Pull down menus** looks like**.**



The Tools menu - The following key included in the toolbar  is called **Tools**. This key opens a menu that supplies some useful tools; especially it gives us access to the **Console preferences** (see below) which some users will have to use for changing the language of the **CONSOLE**.



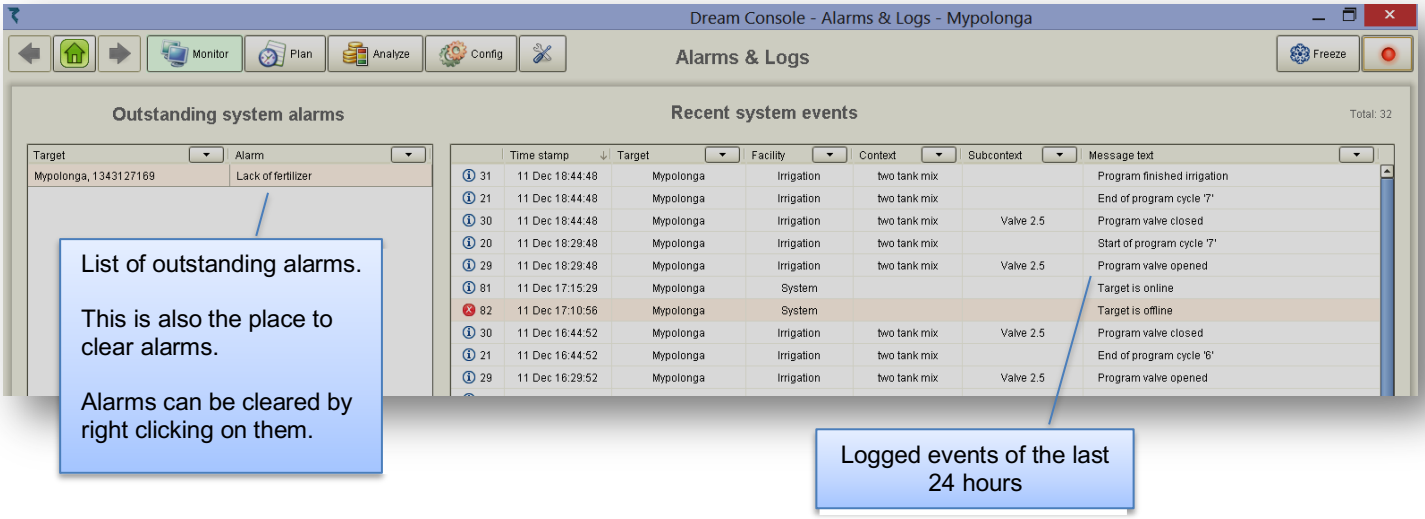


The Targets selection key – some users may need to have access to several targets (controllers), most perspectives of the **CONSOLE** deal with a single target, the **selected target** whose name appears in the middle of the **Toolbar**. To be able to change the selected target, the **Targets selection key** should be clicked, the list of targets permitted for the user will be displayed and the user will be able to select the unit he desires.

The Freeze/ Resume command key– sometimes users may need to have the ability to halt all activities of a selected target, for this purpose the **Freeze** command key - can be used. After confirming the command, it will be executed, stopping all the active programs, shutting down all the outputs and waiting until the **Resume** command is issued using the same key, the user is then given the option whether to continue or to stop the interrupted programs.

The Alarm & log key– the **Alarm & log** key may have two faces, when there are no alarms in the system it will look like this otherwise it will have the following look with the red light blinking.

In any case, hitting the **Alarm & log** key will bring us to the **Alarm & log perspective** that looks as follows:



Navigation– the two arrow keys next to the home key, when they are green, they can be used for navigating backward and forward through the last visited perspectives.

The Status bar– the **Status bar** contains information about the current version of the **CONSOLE,** the currently logged in user and their role in the system, the selected target, its ID and its software version, an Object Tracker and some memory usage information that are mostly for use by the programmers.

3. Planning activities

In the following chapter we intend to describe the various planning tools offered by the **CONSOLE.**

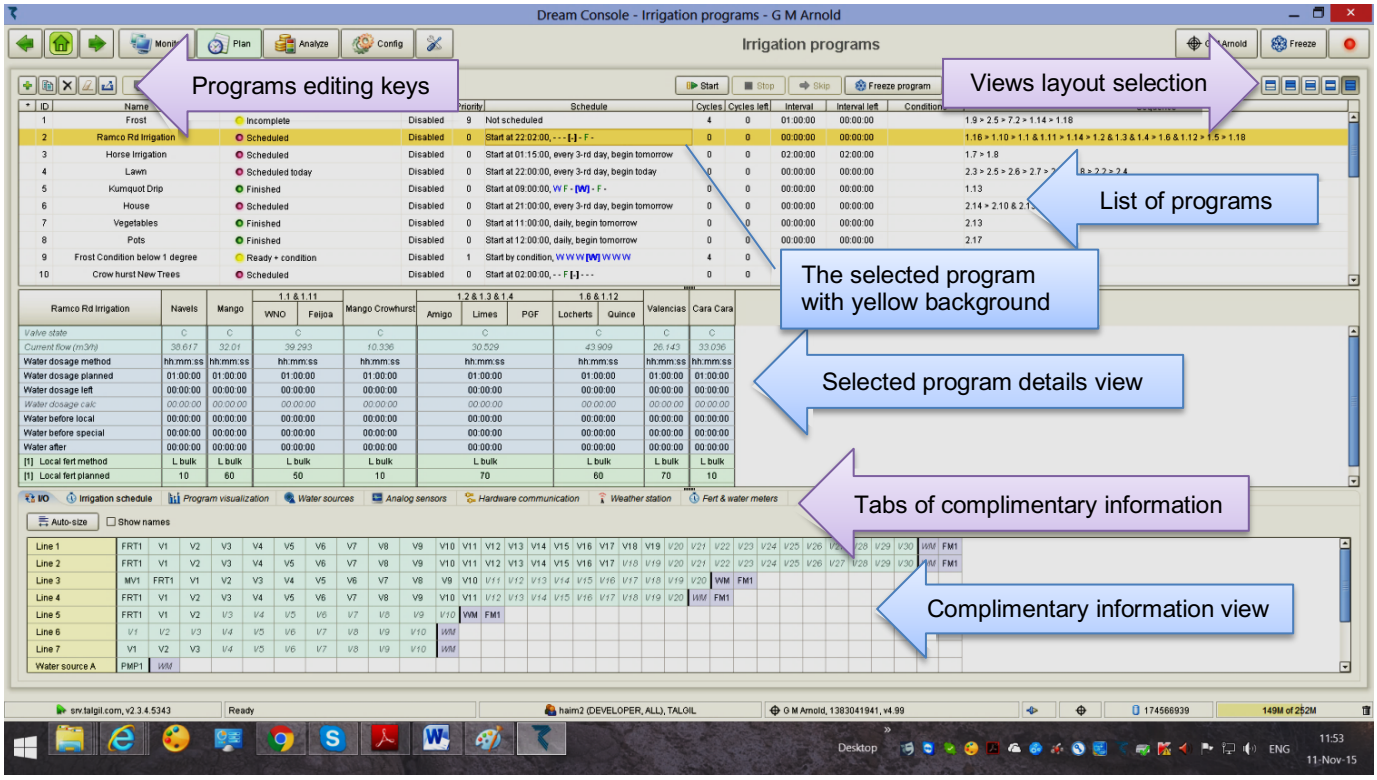
By selecting the **Plan** section of the **Main Menu** or the **Pull down menus** all the planning tools can be reached. We shall start by describing the perspective of the **Irrigation programs** planning.

3.1 Planning – Irrigation programs

The **Irrigation programs** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Irrigation programs**.

The design of the perspective took into consideration the needs of the users so that they would be able to get as much related information as they may need, without having to jump back and forth between perspectives and yet not to overload the screen with too much information.

The perspective was divided into three mandatory views and the user can decide which views will be displayed and which will be hidden- at the **Upper part** there is the view of the list of programs, in the **middle** there are the details of a selected program, at the **bottom** there are various tabs with complimentary information.



3.1.1 Creating a new irrigation program

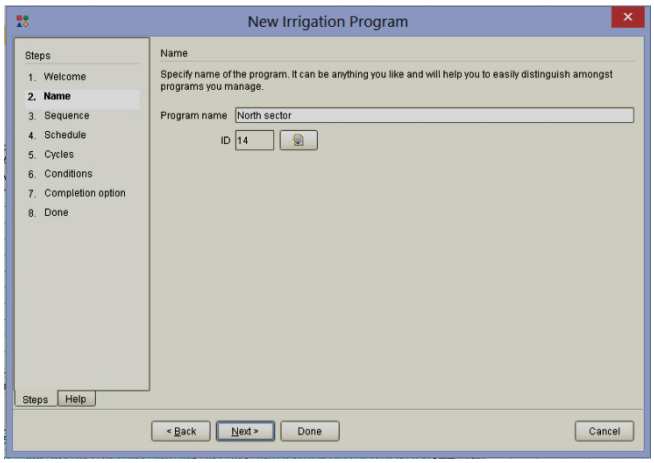
Creation of new irrigation programs is done by means of a wizard.

To run the wizard, the new program key has to be clicked.

The wizard is divided into 8 steps that lead the user through the definition process. Some of the steps may be irrelevant to a particular program and can therefore be skipped. At the end the key has to be clicked.

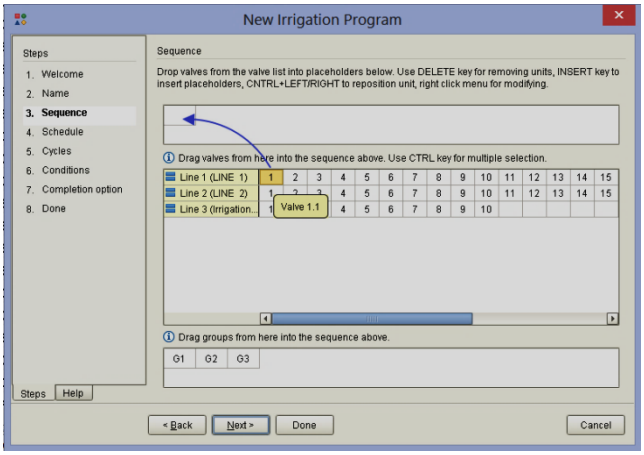
Done

Programs will be identified by a name and by an ID number, both have default values, but can also be defined by the user.



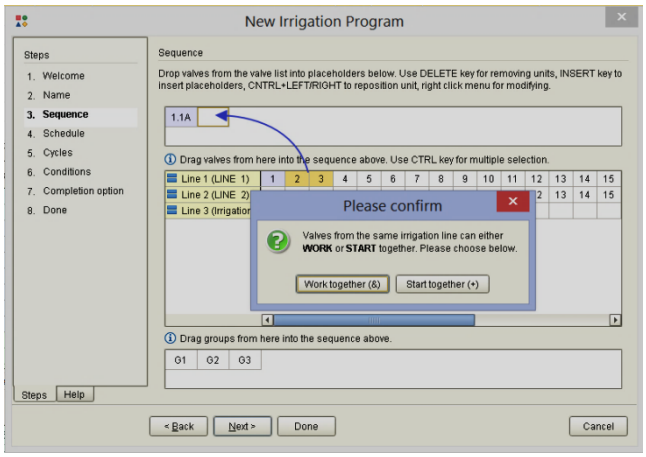
Defining the sequence - Each program must have a definition of the sequence of valves included in the program, so step 3 is essential and cannot be skipped.

For a single valve to be included in the sequence, the user has to click on the selected valve (it will become yellow) and then it has to be dragged and dropped inside the placeholder as demonstrated at the screenshot to the right.
As a result the valve will be included in the sequence and a new placeholder will be generated. Any valve/valves that will be placed in the new placeholder will irrigate **after** the valve in the first place.



When two (or more) valves of the same line need to be included in the sequence, the **Ctrl** key of the keyboard has to be held down and then the desired valves have to be marked by clicking and then they have to be dragged into the free placeholder.

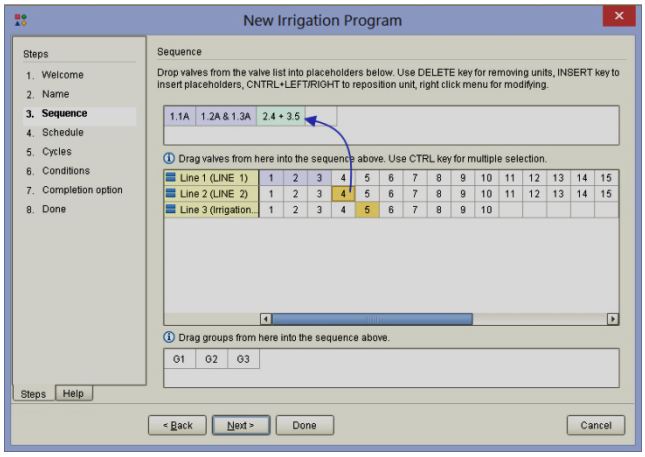
As a result the user will be asked whether they want the valves to work together (**&**) as a group with the same water and fertilizer dosage for the whole group, or just start together (**+**) and each valve will have its own dosage.

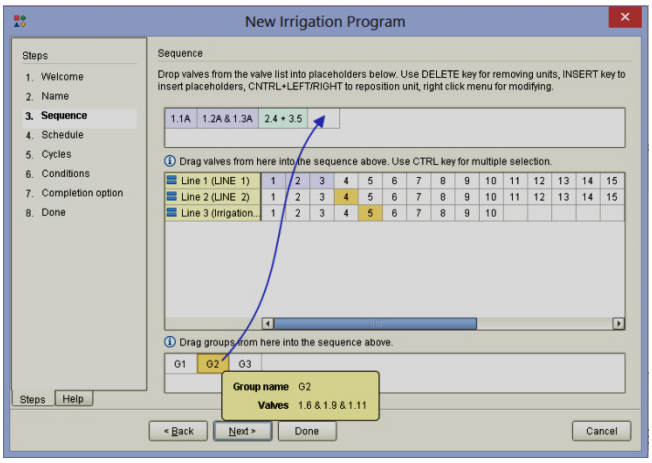


When the valves to be combined are of different Irrigation lines, the only option is to have them start together (**+**) but with separate water dosage per each valve.

Using of the start together (**+**) option needs to be enabled at the **Dealers definition**.

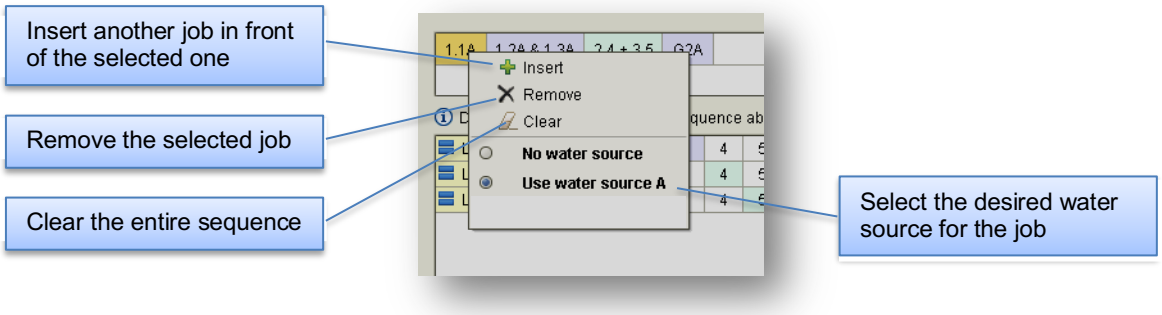
If these valves will have to fertilize from a common fertilizer site, they will need to share a common fertilizer dosage.





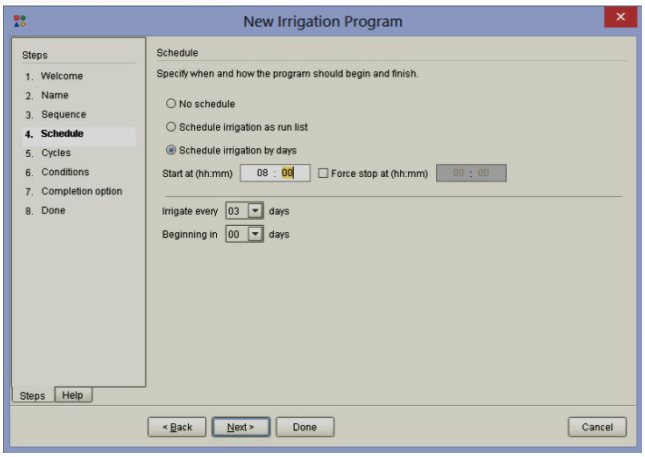
Predefined groups can also be included in the sequence the same way as individual valves.

Additional options with the sequence definition - notice that at each stage of the sequence editing you can right click on any of the included valves and get the following options:

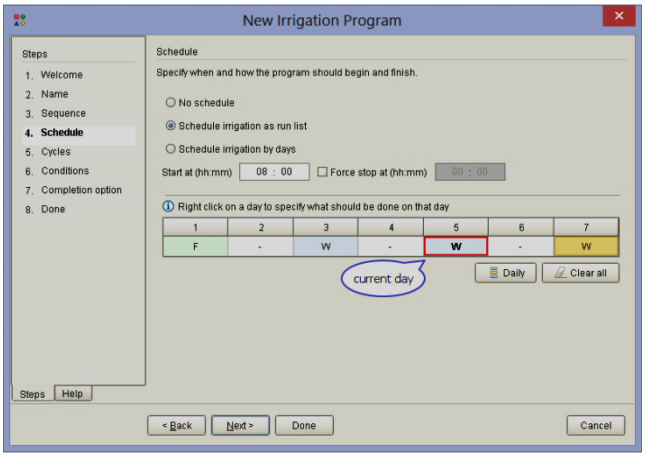


Scheduling the program – there can be two ways to schedule irrigation programs, either by using a **Cycle of days** or by defining a **Run-list.**

If the **Cycle of days** is selected, the user needs to define the number of days he needs the irrigation repeated: 1 means every day, 2 means every second days, etc…

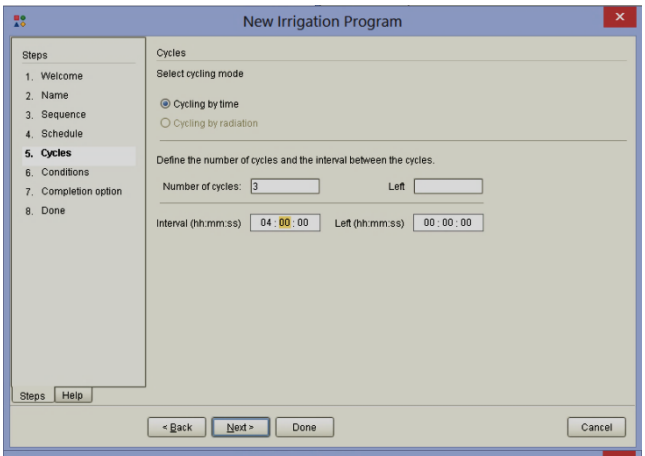


When using the **Run-list option**, each day of the list can be marked as an irrigation day (**W**), as a fertigation day (**F**), or left free (**-**).



Defining repetition cycles – If the program has to be repeated several times a day, the number of repetition cycles and the interval between the cycles has to be defined.

As a special case, when **Irrigation by accumulated light** is enabled, the triggering of the next cycle will depend on the accumulated light and the user defined parameters.

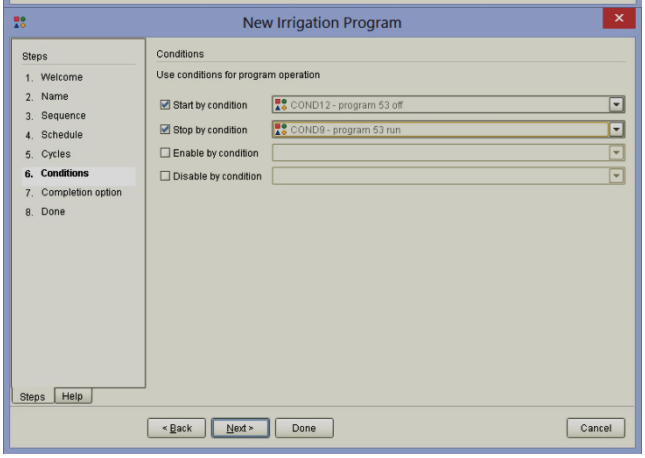


Using conditions - Programs can be influenced by conditions in four ways:

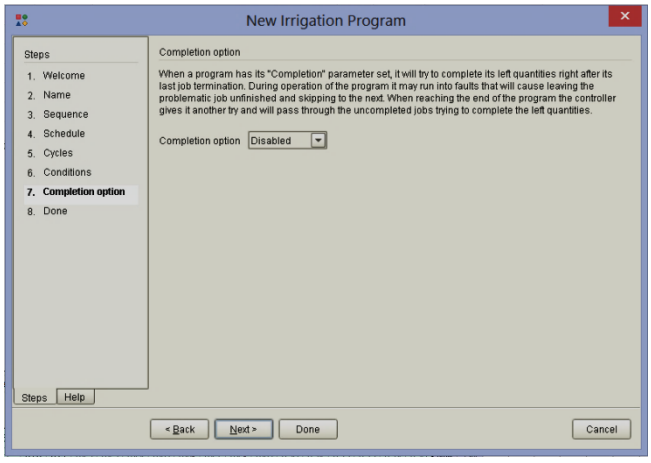
Started by condition, **Stopped** by condition, **Enabled** by condition and **Disabled** by condition

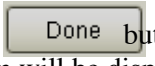
The user can define which condition will make the program **start**, or **stop**, or make it **enabled** or **disabled**.

How to define conditions is explained below at the paragraph dealing with **Conditions library**.

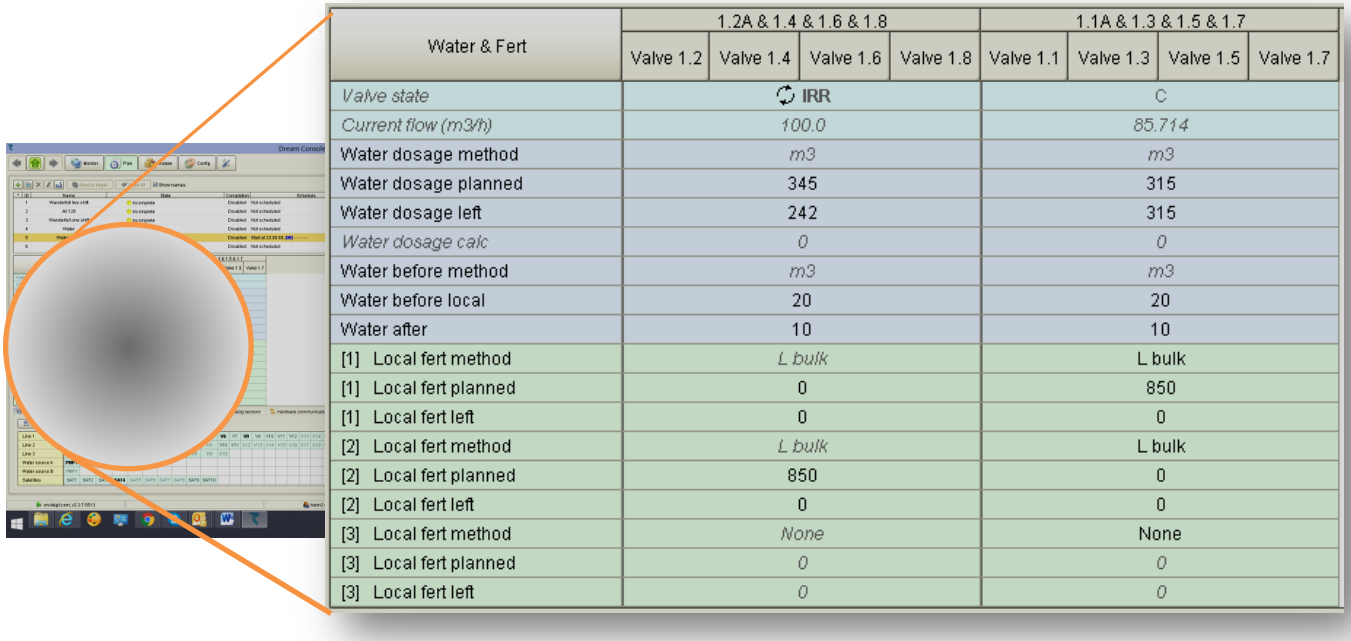


Completion option – When the completion option is enabled, then at the termination of the last job of the program, the system will make another pass through the jobs of the program trying to complete all those jobs that got some leftovers due to some interruption.



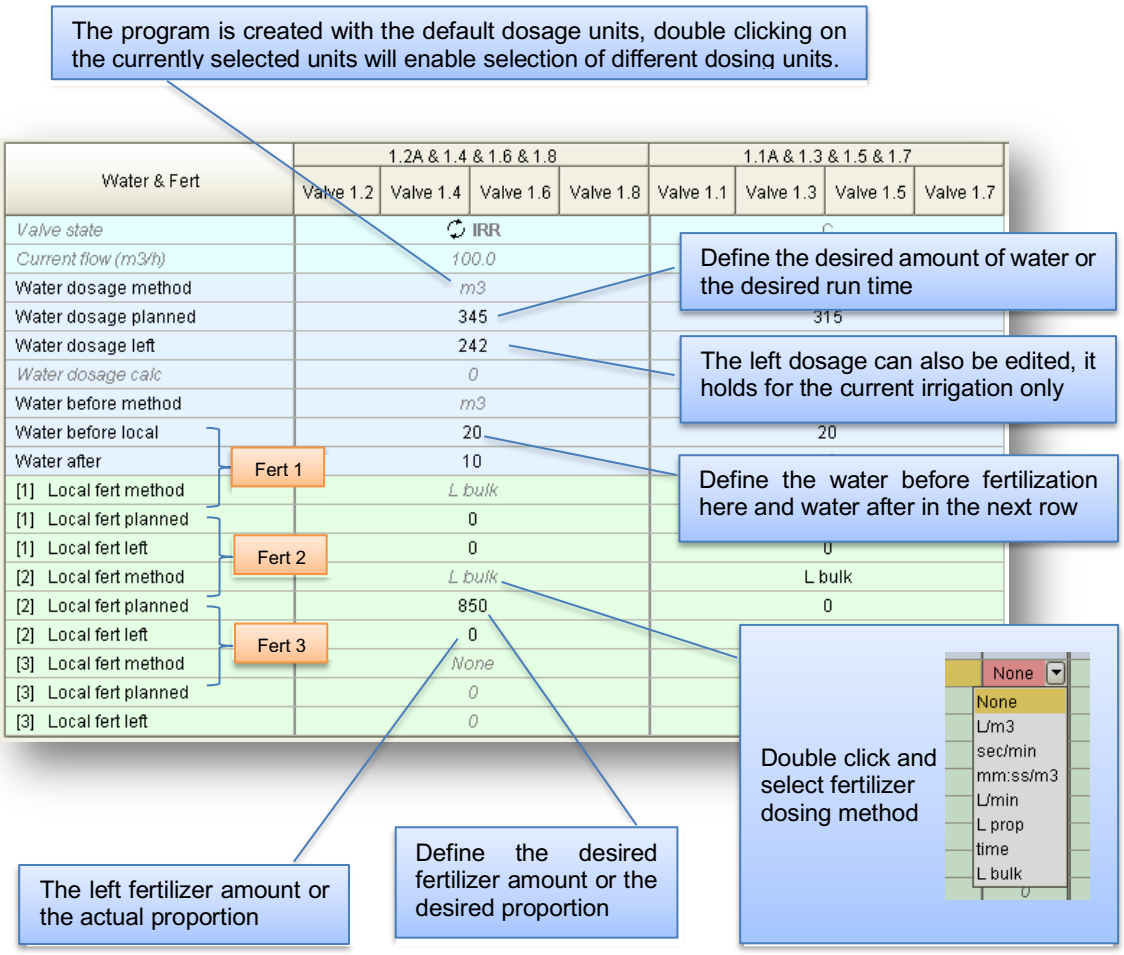
When the 

button is clicked the new program will be displayed at the **Selected program view** of the **Irrigation programs** perspective as follows:



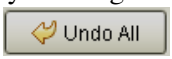
Water & Fert	1.2A & 1.4 & 1.6 & 1.8				1.1A & 1.3 & 1.5 & 1.7			
	Valve 1.2	Valve 1.4	Valve 1.6	Valve 1.8	Valve 1.1	Valve 1.3	Valve 1.5	Valve 1.7
Valve state	IRR				C			
Current flow (m3/h)	*100.0*				*85.714*			
Water dosage method	*m3*				*m3*			
Water dosage planned	345				315			
Water dosage left	242				315			
Water dosage calc	*0*				*0*			
Water before method	*m3*				*m3*			
Water before local	20				20			
Water after	10				10			
[1] Local fert method	*L bulk*				L bulk			
[1] Local fert planned	0				850			
[1] Local fert left	0				0			
[2] Local fert method	*L bulk*				L bulk			
[2] Local fert planned	850				0			
[2] Local fert left	0				0			
[3] Local fert method	*None*				None			
[3] Local fert planned	*0*				*0*			
[3] Local fert left	*0*				*0*			

3.1.2 Defining water and fertilizer dosages



Notice that –

- When finished defining all the information in the **Irrigation program view** the information has to be transmitted to the target by clicking the 

key, or if we wish to cancel, we shall click 

- The same view that is used for planning the irrigation program is also used for watching the progress while the program is running.

- The view of the irrigation program shows also the statuses of the included jobs and their last flow rates.

- There are two irrigation modes in which the user does not define a **planned water dosage**, instead there is a **calculated water dosage** which will dictate the amount to be irrigated, these modes are the **Irrigation by volume per area**, and **Irrigation by** Evaporation (see below).

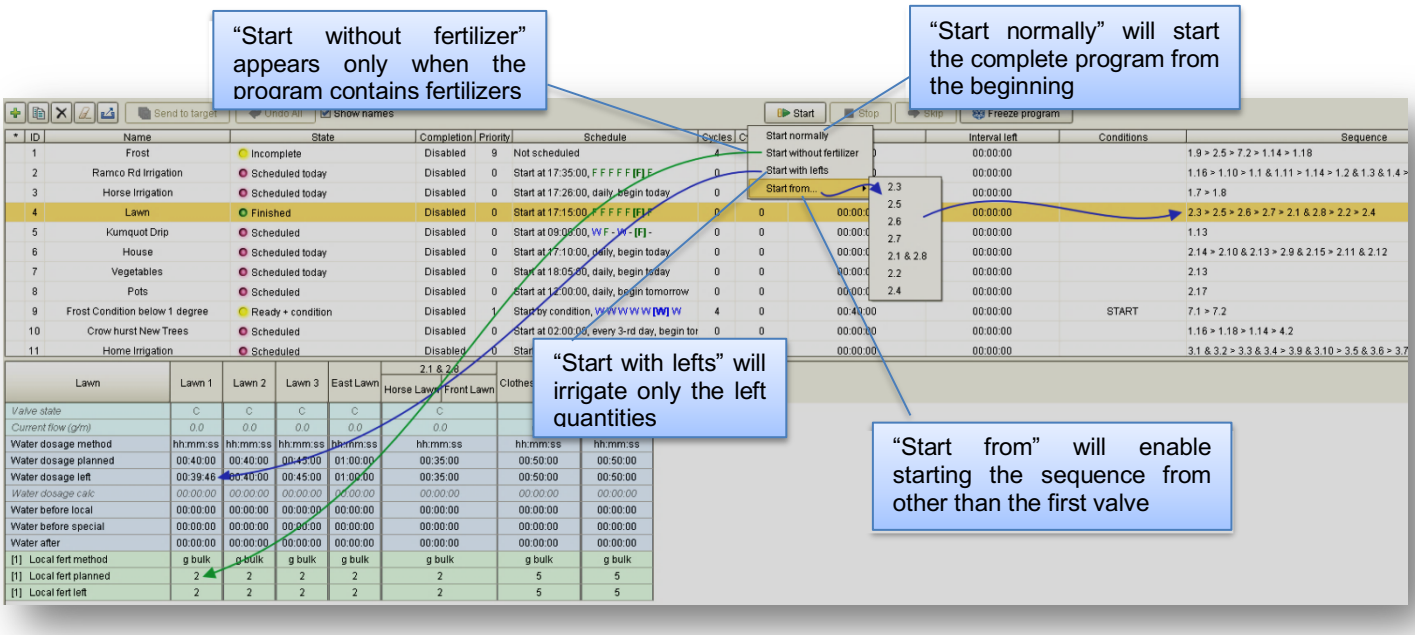
- When the **Water dosage left** is nonzero the program can be started with left quantities instead of the planned quantities.

- The **VISION 2** system recognizes **Local fertilizer sites** that belong to particular irrigation lines only and **Central fertilizer sites** that may be shared by several irrigation lines. Any site can have up to 6 fertilizer injectors. Views of irrigation programs will change according to the existing fert sites and injectors on the particular irrigation lines.

- In those cases in which the **VISION 2** is planned to fertilize by **EC/pH control**, the irrigation program view will contain additional information related with the **EC/pH control**.

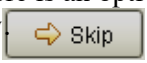
3.1.3 Manually starting/stopping and freezing irrigation programs

- When the user wants to manually start a program they first have to click on the program at the List of programs view, the row of the programs gets yellow to indicate that this is the selected program. Now if we click the **Start** key we may get several options depending on the status and the type of the program as demonstrated below:



Notice that –

- When the program is already running, we shall be able to stop it manually by the 

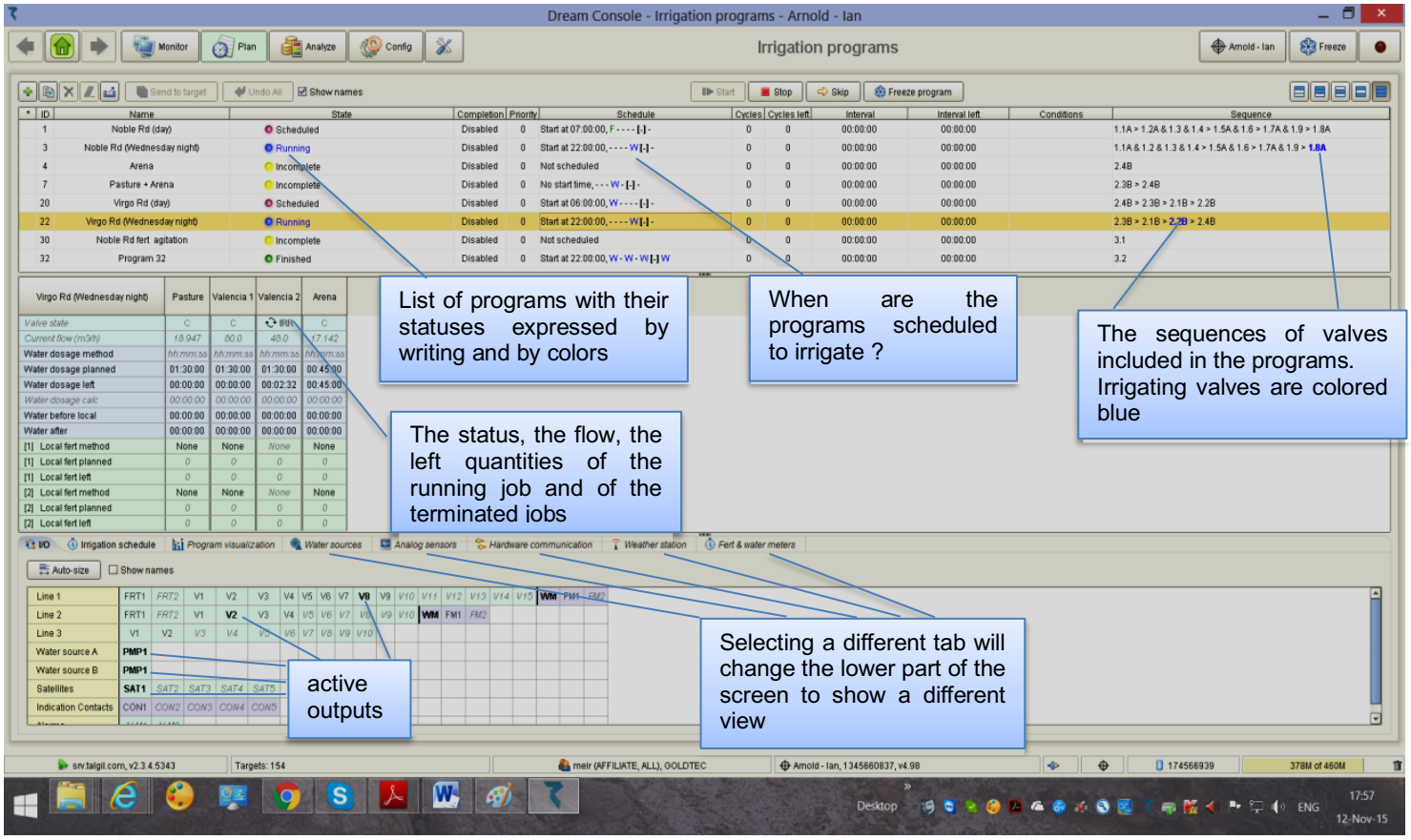
key.
- There is an option to make the program skip to the next valve in the sequence by the key 

- Programs can be commanded to Freeze by the 

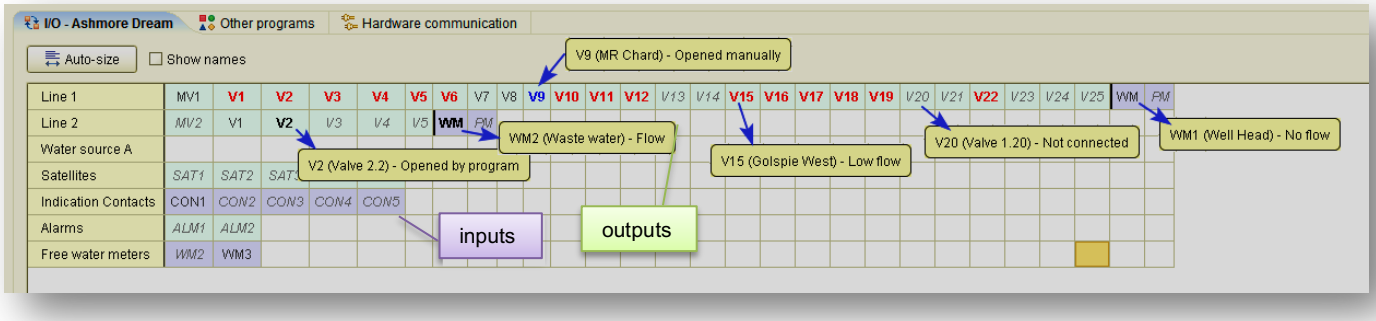
key. The program will be halted until the resume command is issued.

3.1.4 Added values of the Irrigation programs perspective

The **Irrigation programs** perspective is not just for planning your irrigation programs; it is a very useful workspace that supplies a lot of information and enables the users to get a good picture about the happenings in his system and enables him to interfere.



The I/O view - when the I/O view is selected the status of the **I**nputs and **O**utputs is displayed.



The I/O list is arranged in rows, each row dealing with a different irrigation line or a different site. The row begins with the outputs indicated by light green background and ends with the inputs colored by light purple background. Pointing at the I/O device will display its name and status. The type of characters used for displaying the outputs and the inputs and the color of the characters indicate their statuses as follows:

Closed outputs will appear in black---------- V1

Outputs activated by programs will be in **bold** black------ V2

Manually opened output will be **bold** blue---------- V9

Not connected output will be in italic gray---------- V4

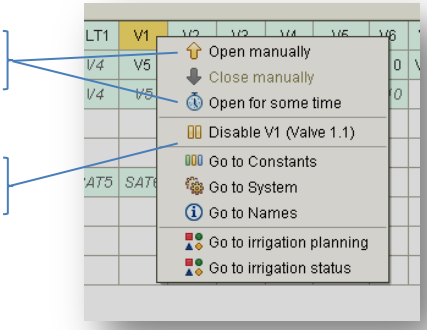
Output with problem will be in **bold** red---------- V3

Water meter with flow or a closed contact input will appear in **bold** black ---------- WM

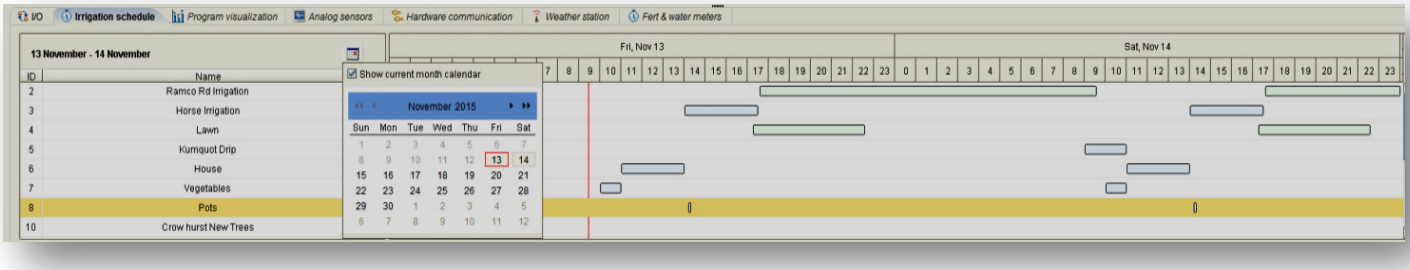
Water meter without flow or open contact input will appear in black ---------- WM3

Right clicking on any output will enable executing manual opening of the output, with/without time limit. Manual opening has lower priority than opening by program.

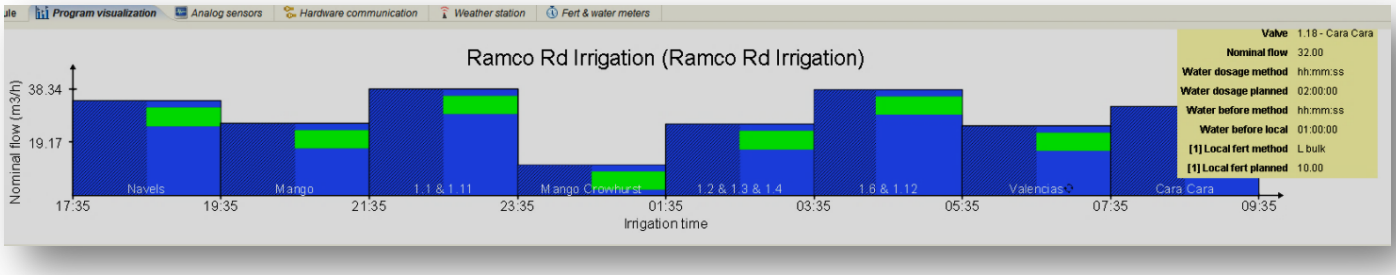
Valves can temporarily be **disabled** so that even if they participate in an irrigation program as individual valves or included in some groups, they will stay closed as long as they remain **disabled**.



The Irrigation schedule view – supplies a graphic picture of the expected irrigation timetable, helps designing the irrigation in the most efficient way.



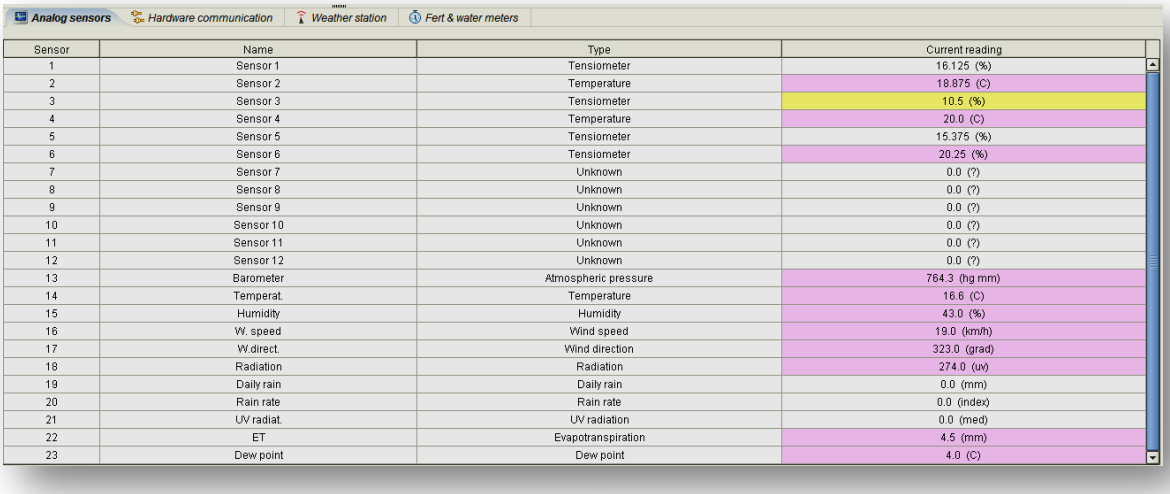
Program visualization – supplies a graphic picture of the stages of a particular program



Water sources view – supplies information about the activity of the water sources.

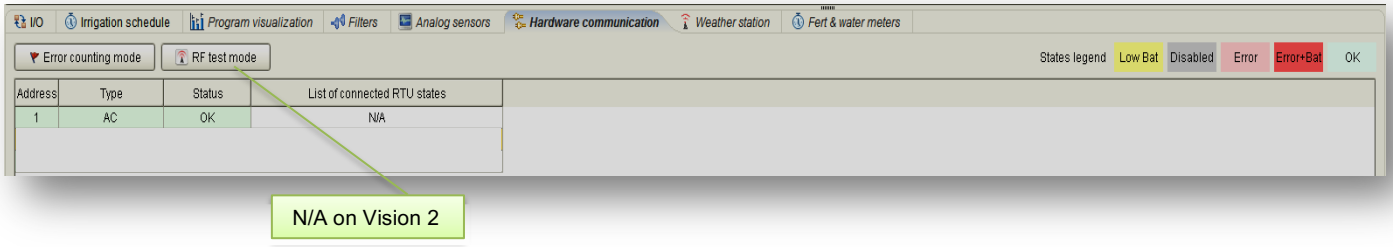
Source	Pump	State	Overload	Alarm	OnOff	Pressure	Flow	Total flow	Valves
A	1 (W.Pump 1)	Opened						0.00	1.4, 3.4
	2 (W.Pump 2)	Opened							
B	1 (W.Pump 3)	Closed	Opened (W.Pump 3)		Opened (W.Pump 3)		0.00	0.00	
C	1 (W.Pump 4)	Closed	Opened (W.Pump 4)		Opened (W.Pump 4)		226.41	226.41	
	2 (W.Pump 5)	Closed	Opened (W.Pump 5)		Opened (W.Pump 5)				
D	1 (W.Pump 6)	Closed	Opened (W.Pump 6)		**Closed (W.Pump 6)**		0.00	0.00	
	2 (W.Pump 7)	Closed			**Closed (W.Pump 7)**				
E	1 (W.Pump 8)	Closed			Opened (W.Pump 8)		209.17	209.17	
	2 (W.Pump 9)	Closed			Opened (W.Pump 9)				
	3 (W.Pump 10)	Closed			**Closed (W.Pump 10)**				
	4 (W.Pump 11)	Closed			**Closed (W.Pump 11)**				

Analog sensors view – supplies real time information about all analog sensors.

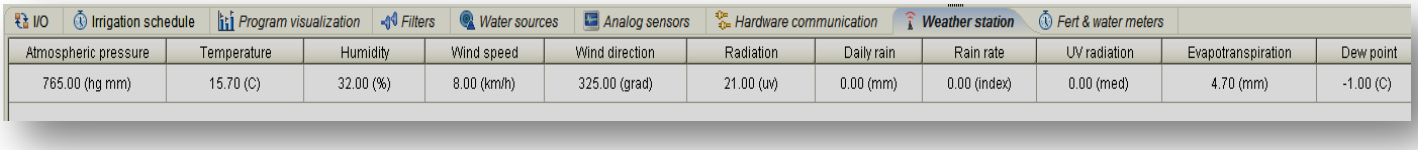


Sensor	Name	Type	Current reading
1	Sensor 1	Tensiometer	16.125 (%)
2	Sensor 2	Temperature	18.875 (C)
3	Sensor 3	Tensiometer	10.5 (%)
4	Sensor 4	Temperature	20.0 (C)
5	Sensor 5	Tensiometer	15.375 (%)
6	Sensor 6	Tensiometer	20.25 (%)
7	Sensor 7	Unknown	0.0 (?)
8	Sensor 8	Unknown	0.0 (?)
9	Sensor 9	Unknown	0.0 (?)
10	Sensor 10	Unknown	0.0 (?)
11	Sensor 11	Unknown	0.0 (?)
12	Sensor 12	Unknown	0.0 (?)
13	Barometer	Atmospheric pressure	764.3 (hg mm)
14	Temperat.	Temperature	16.6 (C)
15	Humidity	Humidity	43.0 (%)
16	W. speed	Wind speed	19.0 (km/h)
17	W.direct.	Wind direction	323.0 (grad)
18	Radiation	Radiation	274.0 (uv)
19	Daily rain	Daily rain	0.0 (mm)
20	Rain rate	Rain rate	0.0 (index)
21	UV radiat.	UV radiation	0.0 (med)
22	ET	Evapotranspiration	4.5 (mm)
23	Dew point	Dew point	4.0 (C)

Hardware communication view – shows the status of the communication with all the peripheral interfaces.

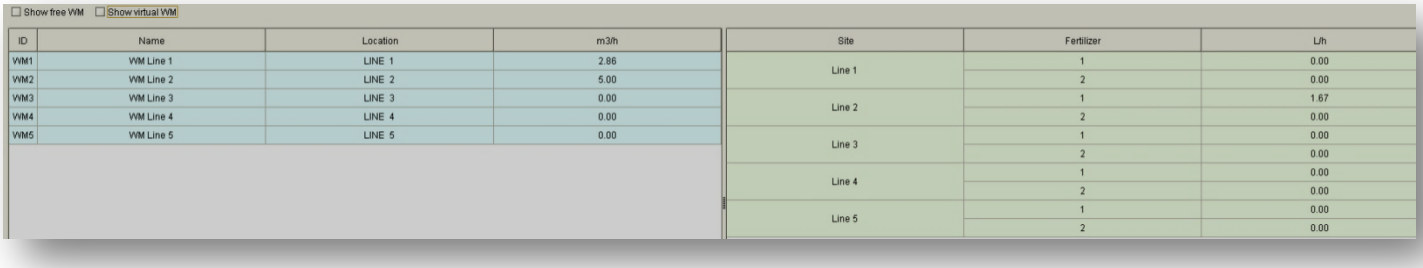


Weather Station view – When a weather station is connected to the **VISION 2** controller, 11 analog values are reported on line to the controller.



Atmospheric pressure	Temperature	Humidity	Wind speed	Wind direction	Radiation	Daily rain	Rain rate	UV radiation	Evapotranspiration	Dew point
765.00 (hg mm)	15.70 (C)	32.00 (%)	8.00 (km/h)	325.00 (grad)	21.00 (uv)	0.00 (mm)	0.00 (index)	0.00 (med)	4.70 (mm)	-1.00 (C)

Water and fertilizer flow view – shows the flow of all water meters and fertilizer meters, optionally it will show the flow of **free water meters** and **virtual water meters** as well.



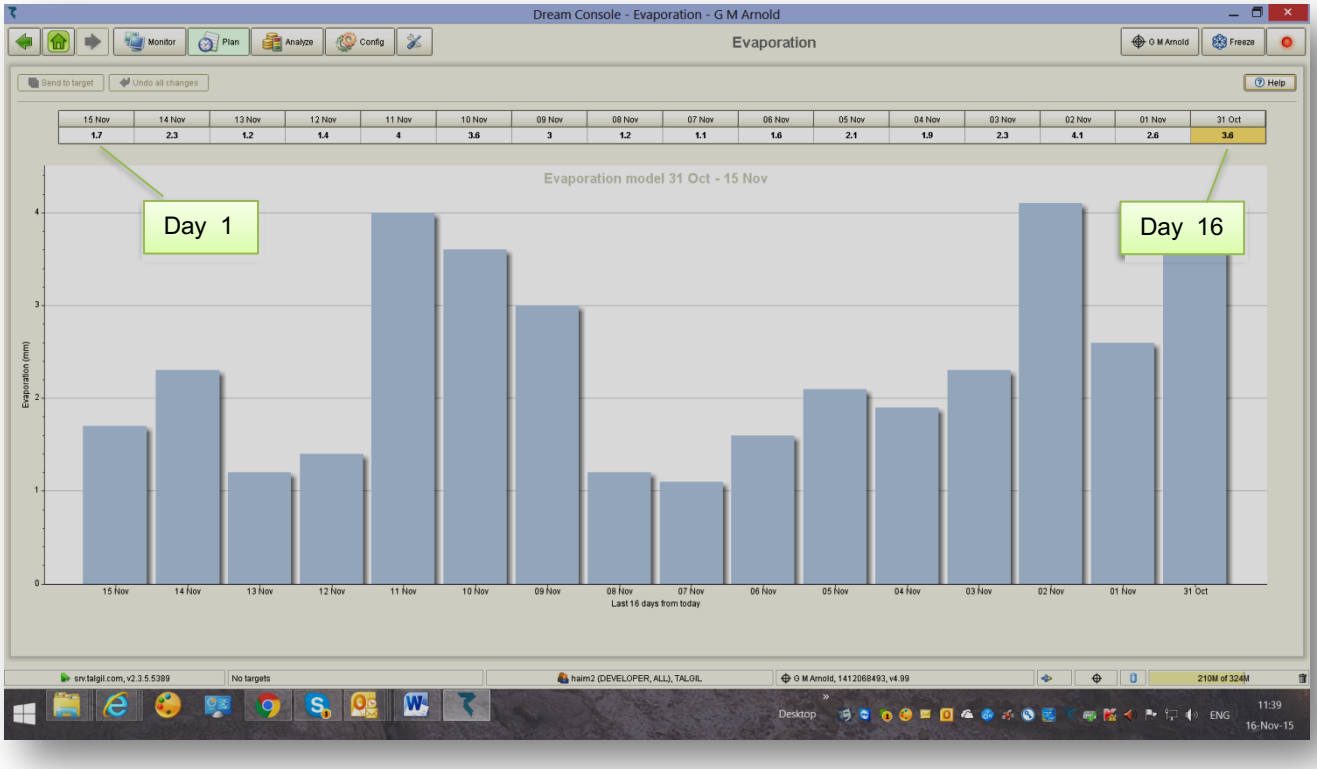
ID	Name	Location	m3/h
WM1	WM Line 1	LINE 1	2.86
WM2	WM Line 2	LINE 2	5.00
WM3	WM Line 3	LINE 3	0.00
WM4	WM Line 4	LINE 4	0.00
WM5	WM Line 5	LINE 5	0.00

Site	Fertilizer	L/h
Line 1	1	0.00
	2	0.00
Line 2	1	1.67
	2	0.00
Line 3	1	0.00
	2	0.00
Line 4	1	0.00
	2	0.00
Line 5	1	0.00
	2	0.00

3.2 Evaporation

The **Evaporation** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Evaporation**. The subject will be included in the menus only when enabled at **Config/Dealers definitions.**

When Irrigation by **Evaporation** is enabled, instead of the user defining how much water to irrigate, the system will calculate the water dosage based on the **Evaporation** data stored in the controller's memory for the last 16 days.



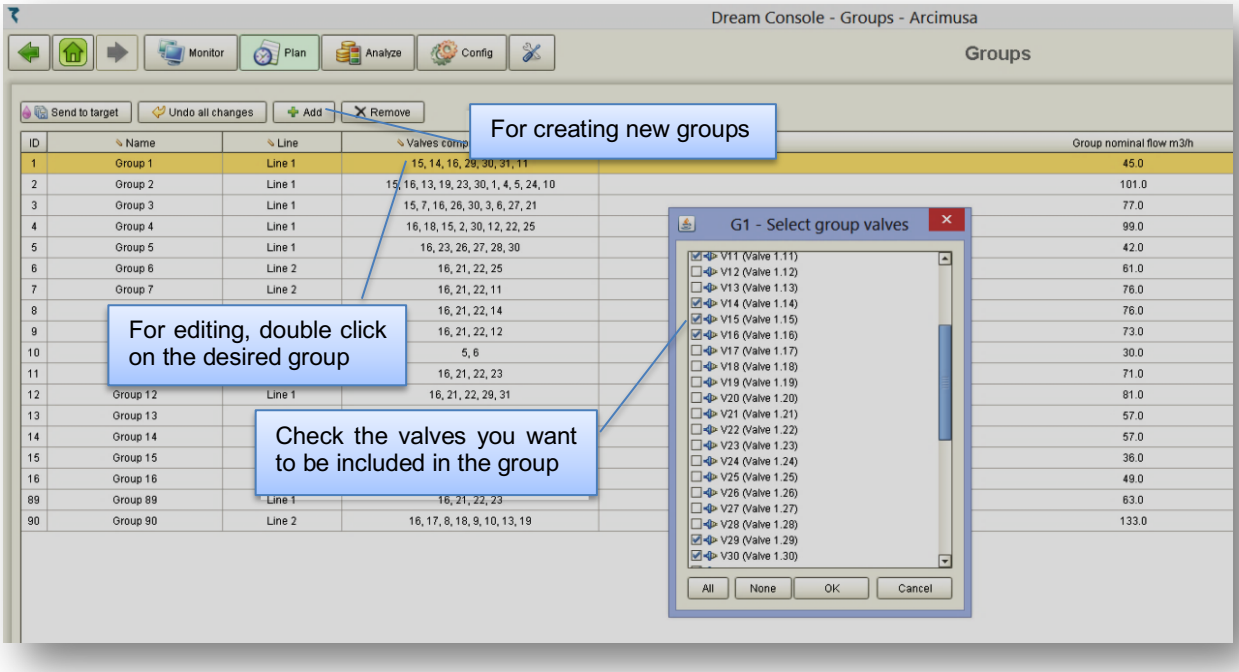
Notice that –

- The **Evaporation** per each of the last 16 days can be inserted **manually** by the user, or received automatically from a **Weather station**. Each midnight the information of the **Evaporation table** is shifted in such a way that the information of 16 days ago is overrun by day 15 and that of day 15 is overrun by day 14, etc. The information of day 1 will assumed to be equal to the day before, until updated automatically from the weather station or manually by the user.
- The calculated **Water dosage** takes into consideration the accumulated **Evaporation** since last irrigation, multiplied by the **Area** covered by the valve to be irrigated and multiplied by a **Crop factor** that can be set per each valve.
- If the program contains several cycles, the water dosage per cycle will be calculated by dividing the calculated **Water dosage** by the number of cycles.
- There is an option to have the calculated **Water dosage** converted to time by dividing the calculated **Water dosage** by the nominal flow of the valve to be irrigated.

3.3 Planning – Groups

The **Groups** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Groups**. The subject will be included in the **Menus** only when the **Named Groups** were enabled at **Config./Dealers definitions.**

Named Groups are useful when the same groups of valves are used in various programs, then instead of repeating each time all the valves of the group we only select the name of the group and place it in the **Irrigation sequence**.



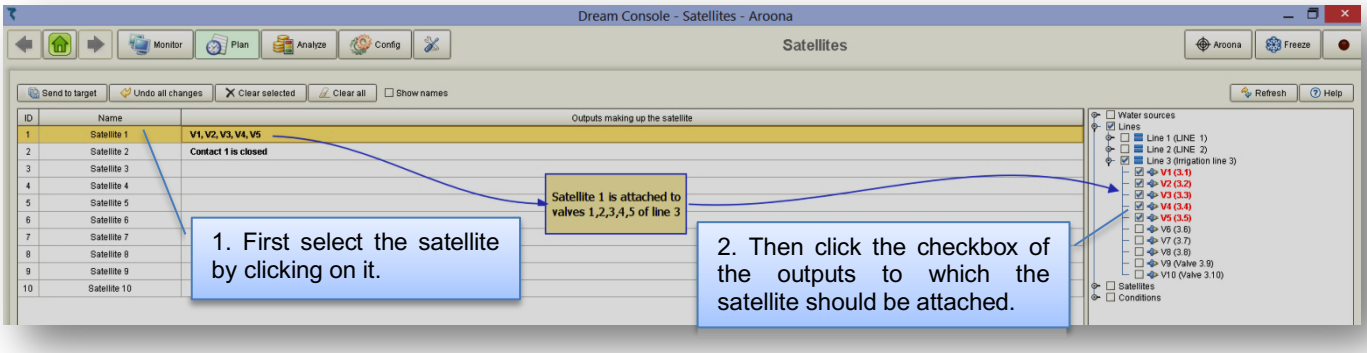
Notice that –

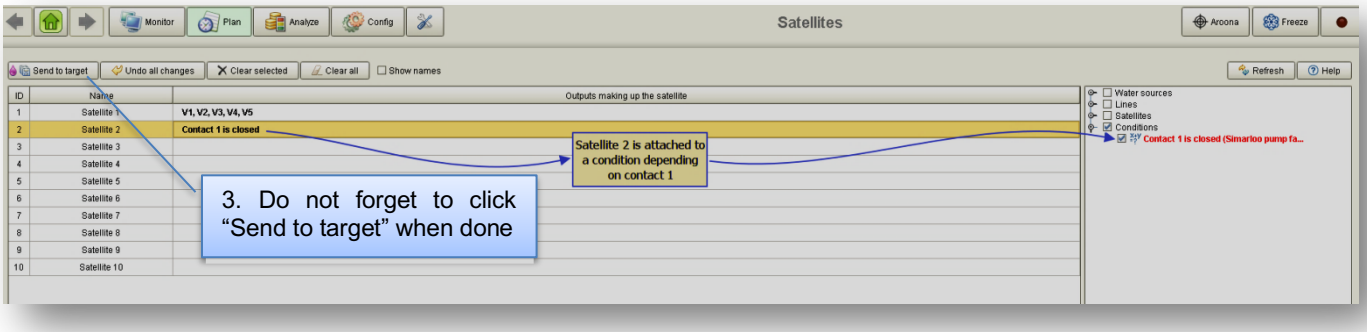
- **Groups** may contain valves of the same irrigation line only.
- When a **Group** is included in a program, there will be only one water dosage defined for the whole **Group**, all the valves included will open together and get closed together (unless **Gradual Opening** was selected).
- If for some reason some valves must temporarily be left out and not open together with the other valves of the **Group** they can be disabled (see paragraph 3.1.4 above (Added values of the Irrigation programs perspective).

3.4 Planning – Satellites operation

The **Satellites** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Satellites**. The subject will be included in the **Menus** only when the image of the controller contains **Satellites.**

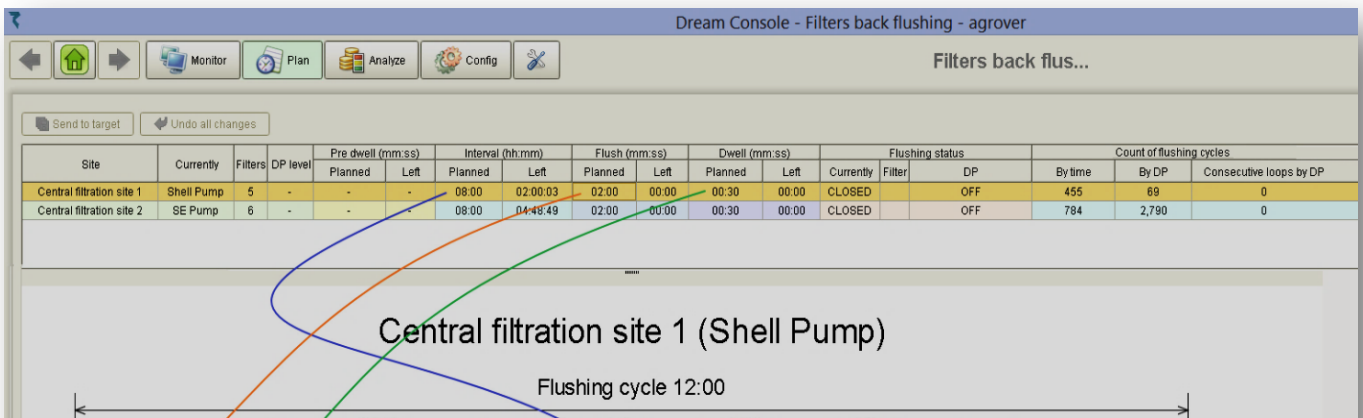
Satellites are outputs that can be attached to other outputs in order to work with them together. As long as any of the outputs to which the satellite is attached is open, the **Satellite** will remain open as well. Additionally, **Satellites** can be attached to **conditions** so that as long as the **condition** is true, the **Satellite** will stay open. The following drawings demonstrate how to attach **Satellites** to outputs and to **conditions**.

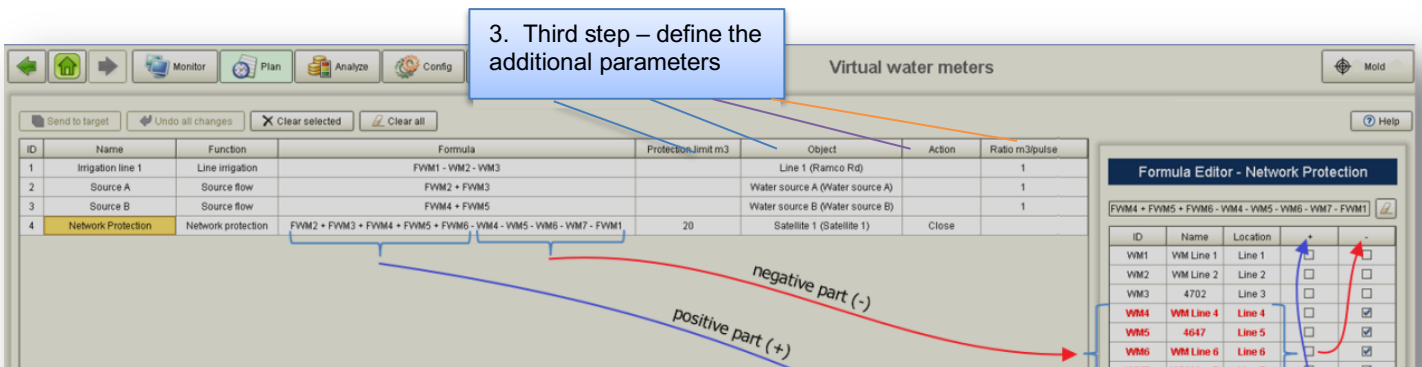




3.5 Planning – Filters backflushing

The **Filters Back-flushing** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Filters Back flushing**. The subject will be included in the **Menus** only when filters are included in the target's image.





Notice that –

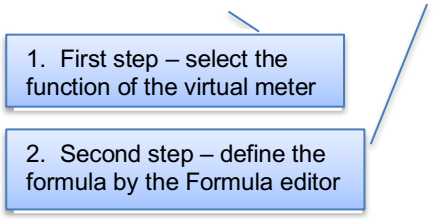
- The countdown of the **Left interval** to the next flushing cycle stops while there is no irrigation in progress, at the same time the DP status is ignored. That's because **Backflushing** is only needed during irrigation.
- The filter that will be the first to be flushed when a flushing cycle starts, depends on the selection made at the **Config/Dealers definition**.
- Again at **Config/Dealers definition** users may decide whether the DP will be in effect or will be ignored during the line filling delay.
- What will be the status of the irrigation programs while flushing, can be decided while defining the filters constants at **Config/Constants/Filters**.

3.6 Planning – Virtual water meters

The **Virtual water meters** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Virtual water meters**. The subject will be included in the **Menus** only when the image of the controller contains **Virtual water meters.**

Virtual water meters are calculated water meters, that are defined by a formula based on real water meters. The **Virtual water meters** can be used for three purposes:

- For measuring the water supplied to an **Irrigation line** for irrigation.
- For measuring the water supplied by a **Water source**.
- For **Network protection**. A **Network protection** meter is supposed to sum up the water meters supplying water into the network and subtract the water meters that are using the water of the network. Under normal conditions the result should be zero, because the water coming in should be equal to the water going out of the network.



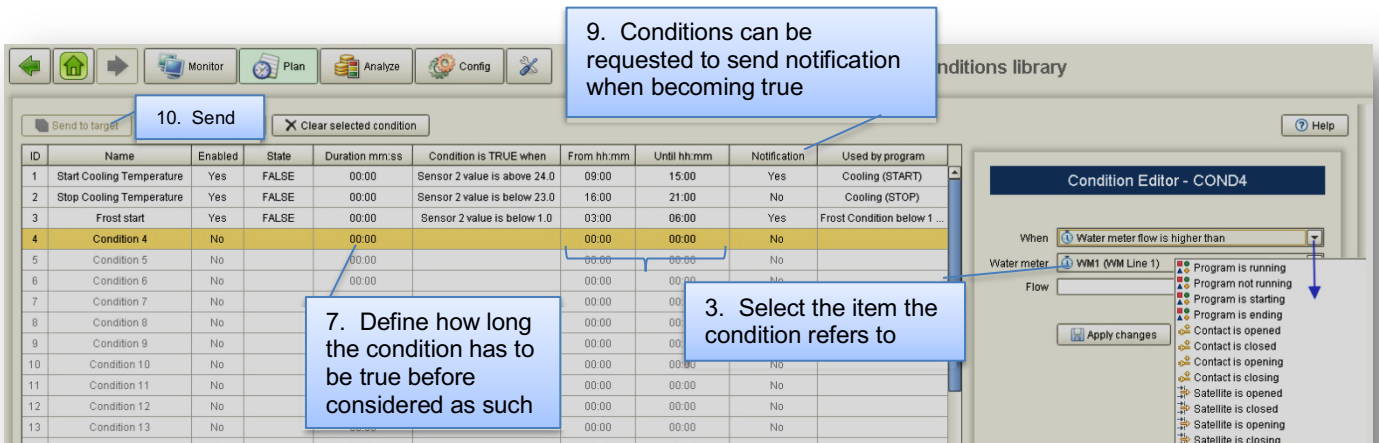
Notice that –

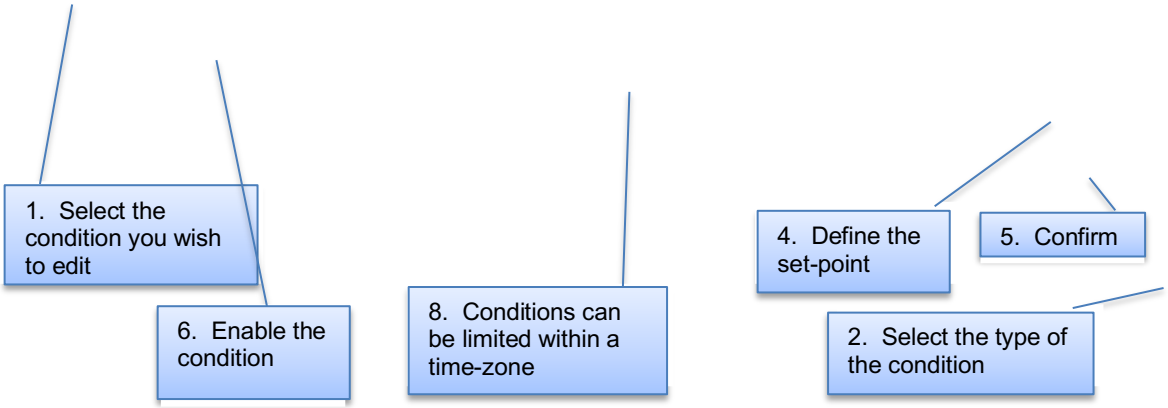
- The formula consists of **Free water meters** (FWMi) and **Irrigation line water meters** (WMi), some can be on the positive side of the formula (+) and others on the negative side (-).
- The **Object** column serves different functions for different types of **Virtual water meters**. When the **Virtual water meter** is used for **Irrigation line,** the **Object** column will contain the name of the Irrigation line that uses the **Virtual meter**. In **Source flow** type it will contain the name of the **Water source** using the meter and in **Network protection** type it will contain an output that has to be Closed/ Opened when the **Network protection** event occurs.
- In case of **Network protection** type there are two more parameters to define- the **Protection limit** that defines the volume of water accumulated by the **Virtual water meter** that will indicate a leakage in the network. Remember that under normal conditions the accumulation should stay on zero. The second parameter will define the action, whether to close or to open the selected output.
- In case of **Line Irrigation** type and **Source flow** type virtual meters, the **Ratio** of the **Virtual water meter** has to be defined. Here we actually mean the amount of water calculated by the virtual water meter that will be considered as 1 pulse.

3.7 Planning – Conditions

The **Conditions** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Conditions library**. The subject will be included in the **Menus** only when the **Conditions** were enabled at **Config./Dealers definitions.**

Conditions can be set for identifying various types of events in the system. When a condition becomes true it may influence the operation of **Irrigation programs** or **Satellites**. An **Irrigation program** may **Start/ Stop/** be **Enabled/** be **Disabled** by conditions. A **Satellite** attached to a **Condition** will remain activated as long as the **Condition** remains true.




1. Select the condition you wish to edit
6. Enable the condition
8. Conditions can be limited within a time-zone
4. Define the set-point
5. Confirm
2. Select the type of the condition

Notice that –

- It is very helpful to give the **Condition** a descriptive name that describes its function.
- **Conditions** that are not enabled will not be able to influence the operations of the programs or the satellites attached to them.
- **Conditions** can be combined by a **logic expression** in order to create a **Combined condition** for example the expression (1+2)&(3+4) means that the **Combined condition** will be true when either condition 1 or 2 are true and at the same time condition 3 or 4 must also be true. So the symbol (+) means logical "or" and the symbol (&) means logical "and".
- In order for receiving a notification when the condition becomes true, the appropriate checkbox at the notifications list must be checked. You can read about notifications at paragraph 6.1 - Configure Preferences - Notifications below.

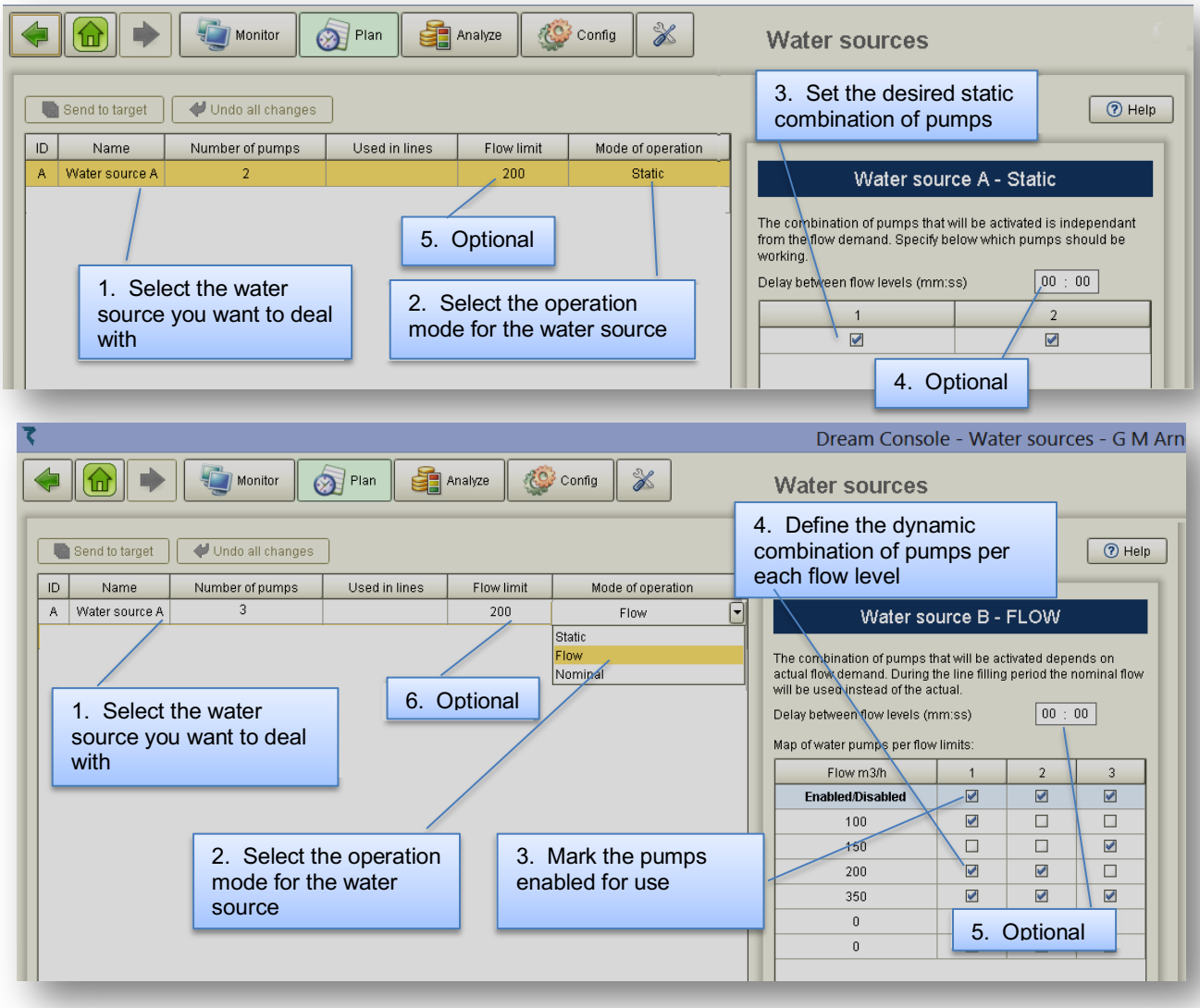
3.8 Planning – Water sources

The **Water sources** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Water sources**. The subject will be included in the **Menus** only when the image of the controller contains **Water sources.**

When the **Water sources** contain several water pumps the **Water sources** can be set to work in three different modes:

- **In static mode** – the same combination of pumps will be activated each time.
- **By Actual Flow** – The combination of pumps that will be activated depends on the **Actual flow** of the valves that are irrigating from the water source at any moment. During the line filling time of the valves the **Nominal flow** will be considered.
- **By Nominal flow** – The combination of pumps that will be activated depends on the **Nominal flow** of the valves that are irrigating from the water source at any moment.

In the following example **Water source A** is set to work in the **Static mode** and Water source B by **Actual Flow.**



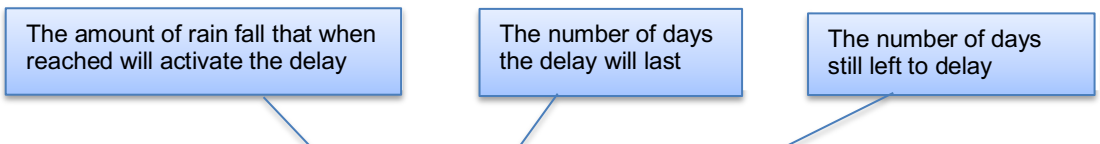
Notice that –

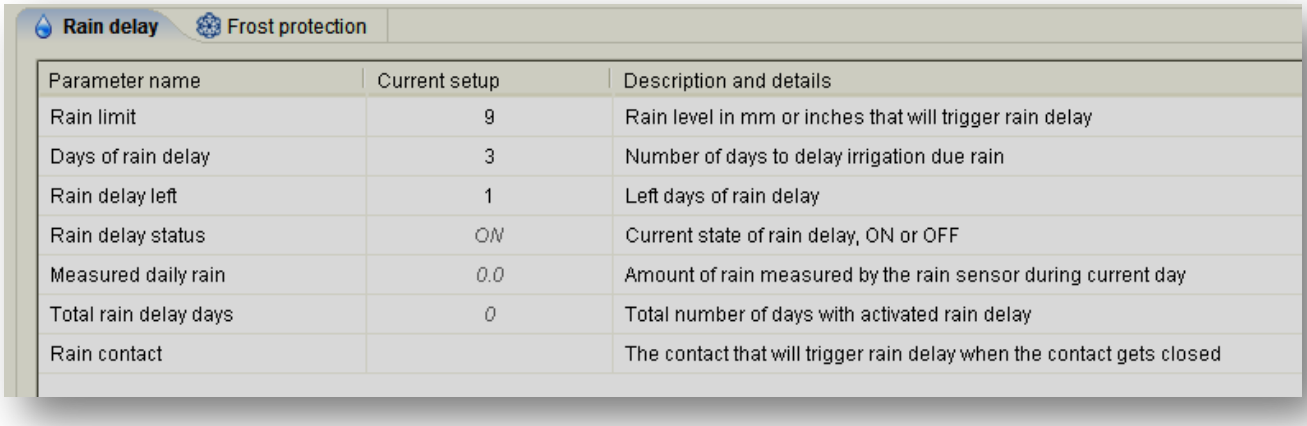
- Optionally a **Delay** can be defined that in **Static mode** it becomes effective when the water source shuts down and in the other modes the **Delay** will be in effect each time that the combination of valves must change due to change in the flow.
- Optionally a **Flow limit** can be set per each water source that defines the maximal flow that can be obtained from that source. If a program needs to be started, but the flow demand of the valve to be opened added to the flow of the valves already running under that **Water source**, exceeds the limit, it will cause the program to wait.

3.9 Planning – Rain Delay

The **Rain Delay** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/Rain Delay**. The subject will be included in the **Menus** only when enabled at **Config/Dealers definitions**.

The **Rain Delay** is meant to delay irrigation programs when the amount of the daily accumulated rain reaches the user defined limit. The Programs affected by the **Rain Delay** will be those with priority less than **5**.





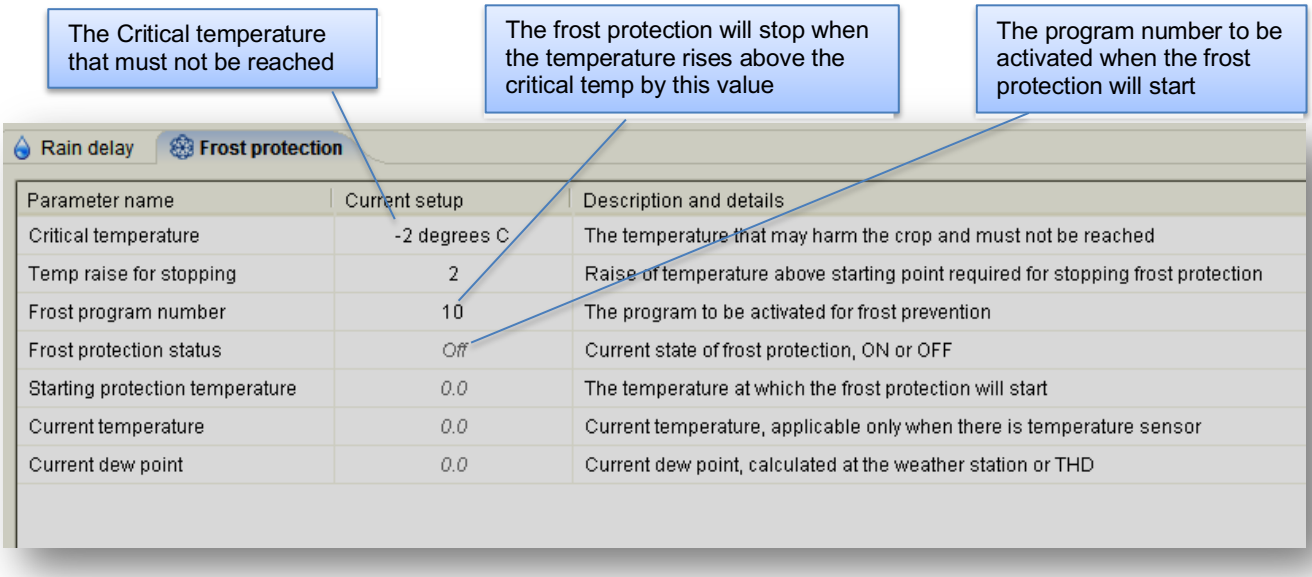
Notice that –

- When the **Rain Delay left** is manually set to a nonzero value, it will cause the rain delay to be started right away.

3.10 Planning – Frost protection

The **Frost protection** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Frost protection**. The subject will be included in the **Menus** only when enabled at **Config/ Dealers definitions.**

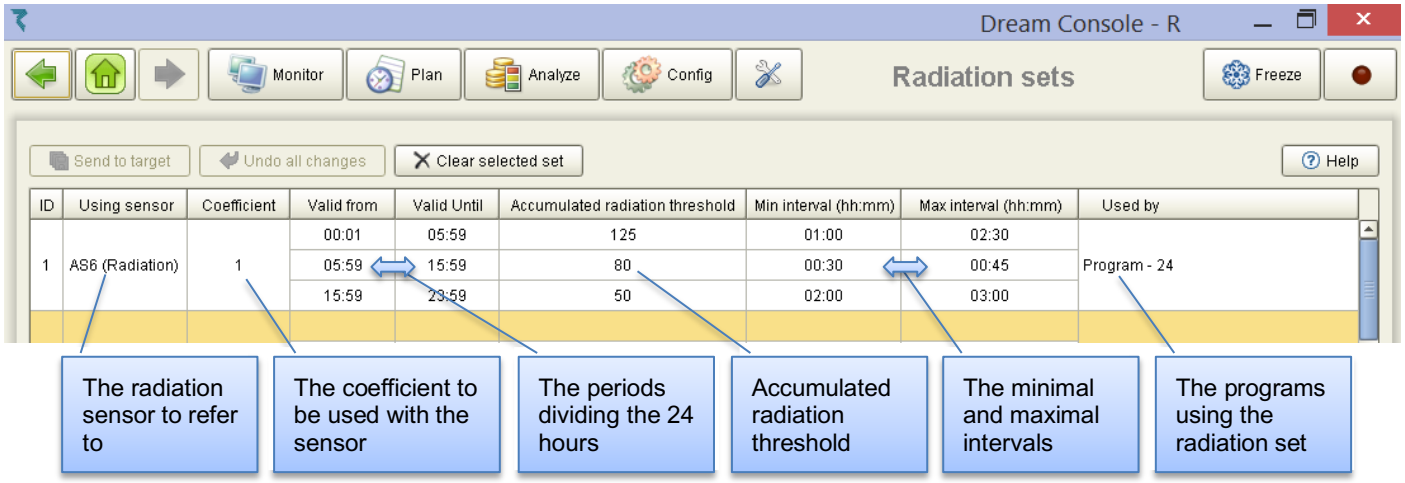
The **Frost protection** algorithm is taking into consideration the **Dew point** for calculating at which temperature the frost protection program should be started in order not to let the crop temperature drop to the **Critical temperature** defined by the user. The **Dew point** is calculated based on the ambient **temperature** and **humidity**. When the **Frost protection** program is activated, all irrigation programs with priority lower than **6** will be halted.



3.11 Planning – Radiation sets

The **Radiation sets** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Radiation sets**. The subject will be included in the **Menus** only when enabled at **Config/ Dealers definitions.**

The **Radiation sets** are used when defining the parameters needed for triggering irrigation cycles by accumulated light. This irrigation method is based on repeated cycles that are triggered by the accumulated light. Instead of the user defining the number of cycles and the interval between cycles he defines a threshold of accumulated light that whenever reached, an irrigation cycle is triggered. Additionally the user may define the minimal and maximal interval between the cycles as a protection against light sensor failures. For the sake of flexibility, the 24 hours of the day can be divided into three parts and each part may have its own definition of threshold and minimal/maximal intervals.



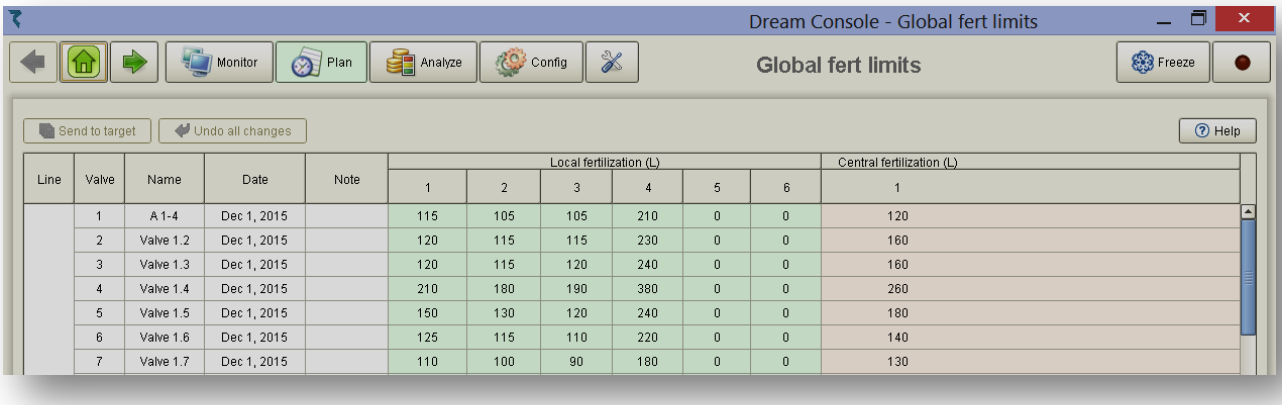
Notice that –

- The same **Radiation sensor** can be used by several **Radiation sets**. The **Coefficient** defines in % the part of the sensor's reading taken into consideration by the particular **Radiation set**. **Coefficient** = 0 means disabled set.
- The same **Radiation set** can be used by several irrigation programs.

3.12 Planning – Global fertilizer limits

The **Global fertilizer limits** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Global fert limits**. The subject will be included in the **Menus** only when enabled at the local MMI of the target, entering **Setup/ Dealers Definitions.**

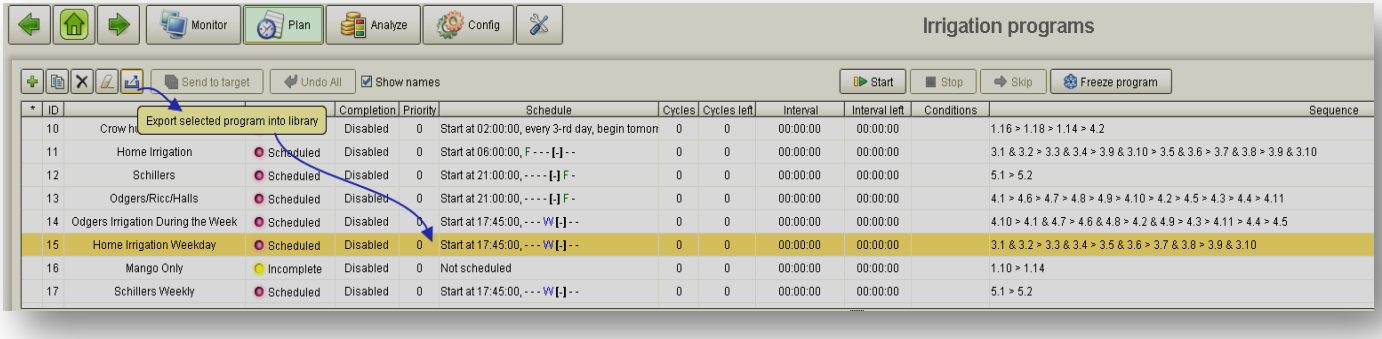
The purpose of the **Global fert limit** is to define the total amount of fertilizer of each type to be supplied to the valve per season. Each amount injected will be deducted from the global limit until no more is left and then the injection of that fertilizer will be blocked for that valve.



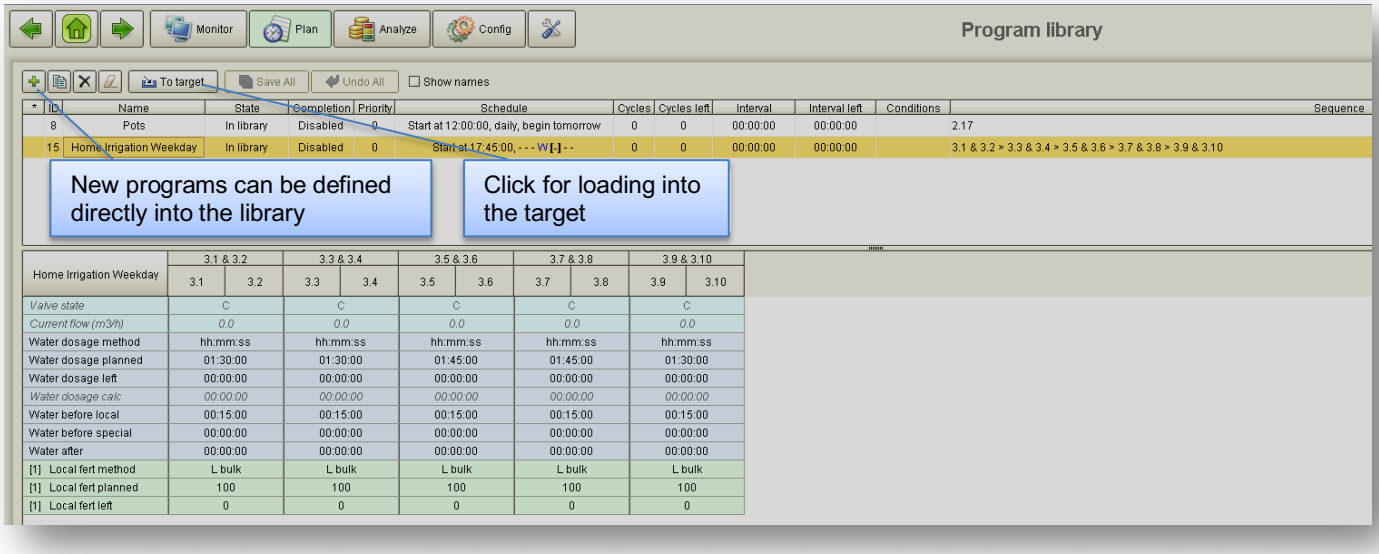
3.13 Program library

The **Program library** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Program library**.

The **Program library** enables storing selected programs for later use. Being at **Plan/ Irrigation programs** perspective, the user can export a selected program to the library as demonstrated below.



The exported program will be stored at the **Program library** from where it can be loaded into the target when desired. The **Program library** storage folder resides at the PC where the **CONSOLE** is running.



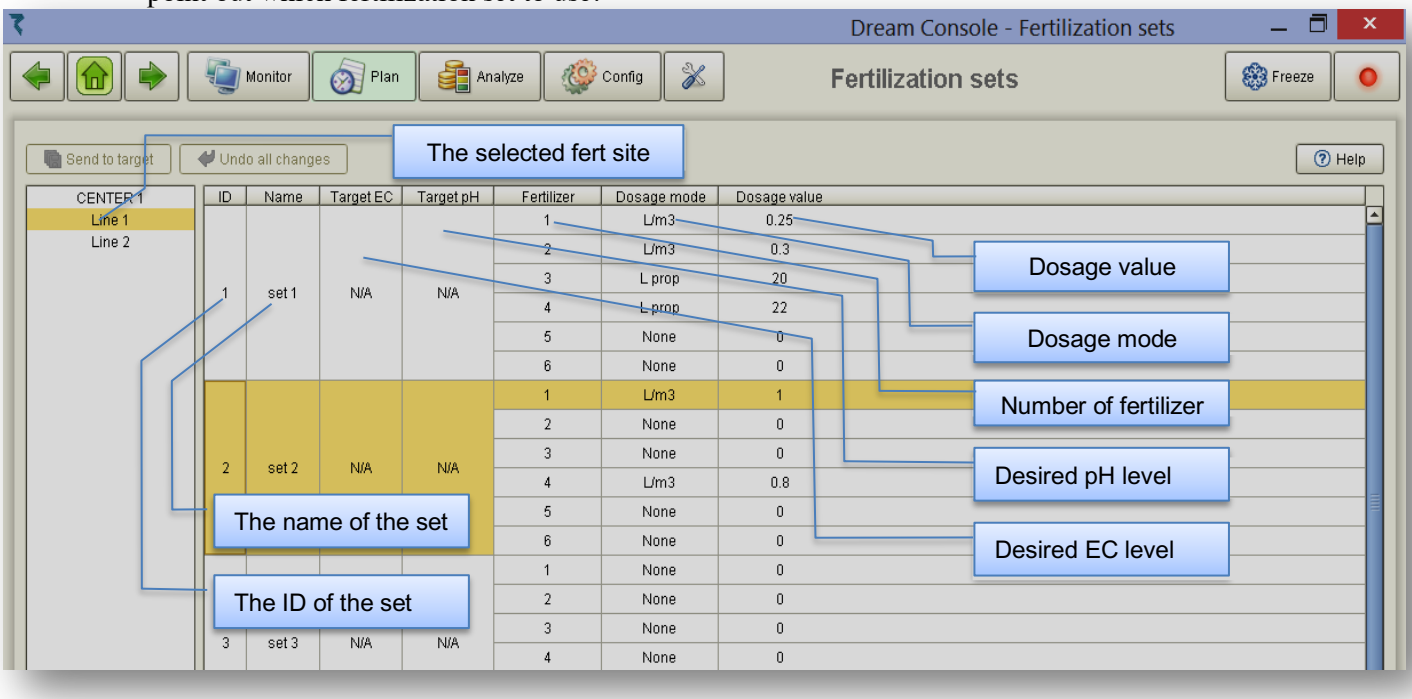
Notice that –

- Programs in the library can be edited the same way as regular irrigation programs.

3.14 Planning – Fertilization sets

The **Fertilization sets** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Fertilization sets**. The subject will be included in the **Menus** only when enabled at the local MMI of the target, entering **Setup/ Dealers Definitions.**

Fertilization sets are predefined combinations of fertilizer dosages stored in a library. Instead of redefining frequently used combinations, each time they need to be used, the user can simply point out which fertilization set to use.



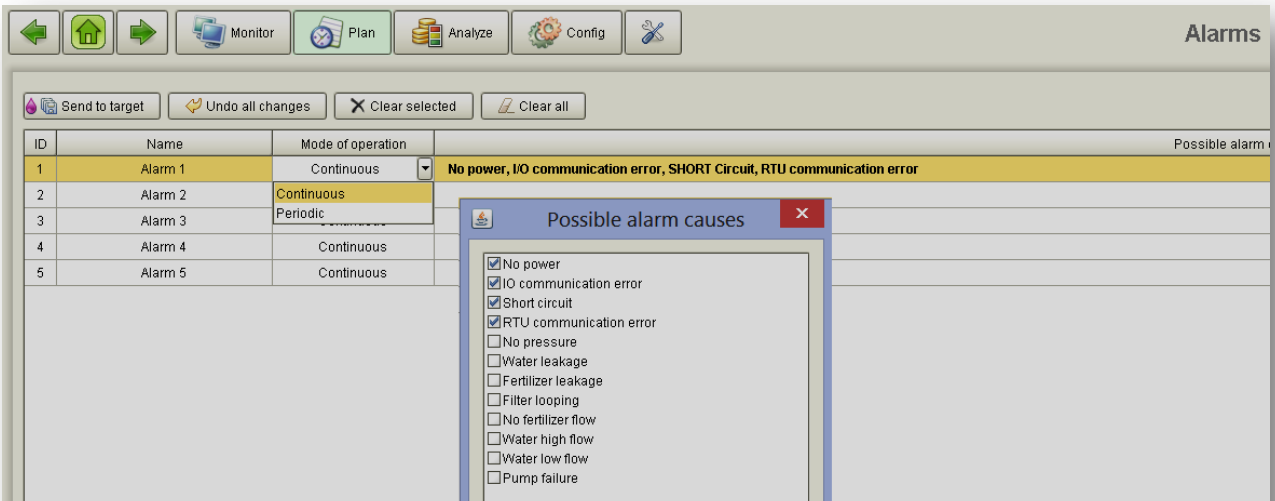
Notice that –

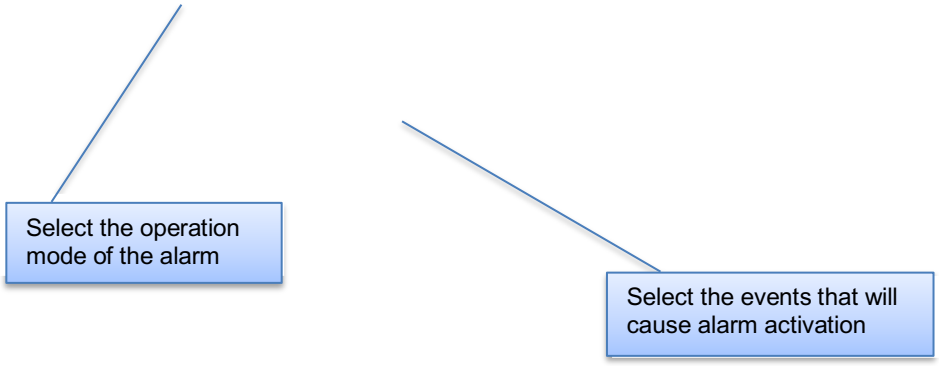
- Each fertilizer site can have 9 sets stored in the library. Each set will include combinations of dosages of the fertilizers included in the specific site.
- When the fertilizer site includes pH and EC control, the fertilizer sets may include set-points of the desired pH and EC levels.

3.15 Alarms

The **Alarms** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Plan/ Alarms**. The subject will be included in the **Menus** only when the image of the controller contains **Alarm outputs.**

When allocated in the target's image **Alarm outputs** can be set to be activated in various **Alarm cases**.




Select the operation mode of the alarm
Select the events that will cause alarm activation

4. Monitoring activities

The following chapter deals with the **Monitoring tools** supplied by the System.

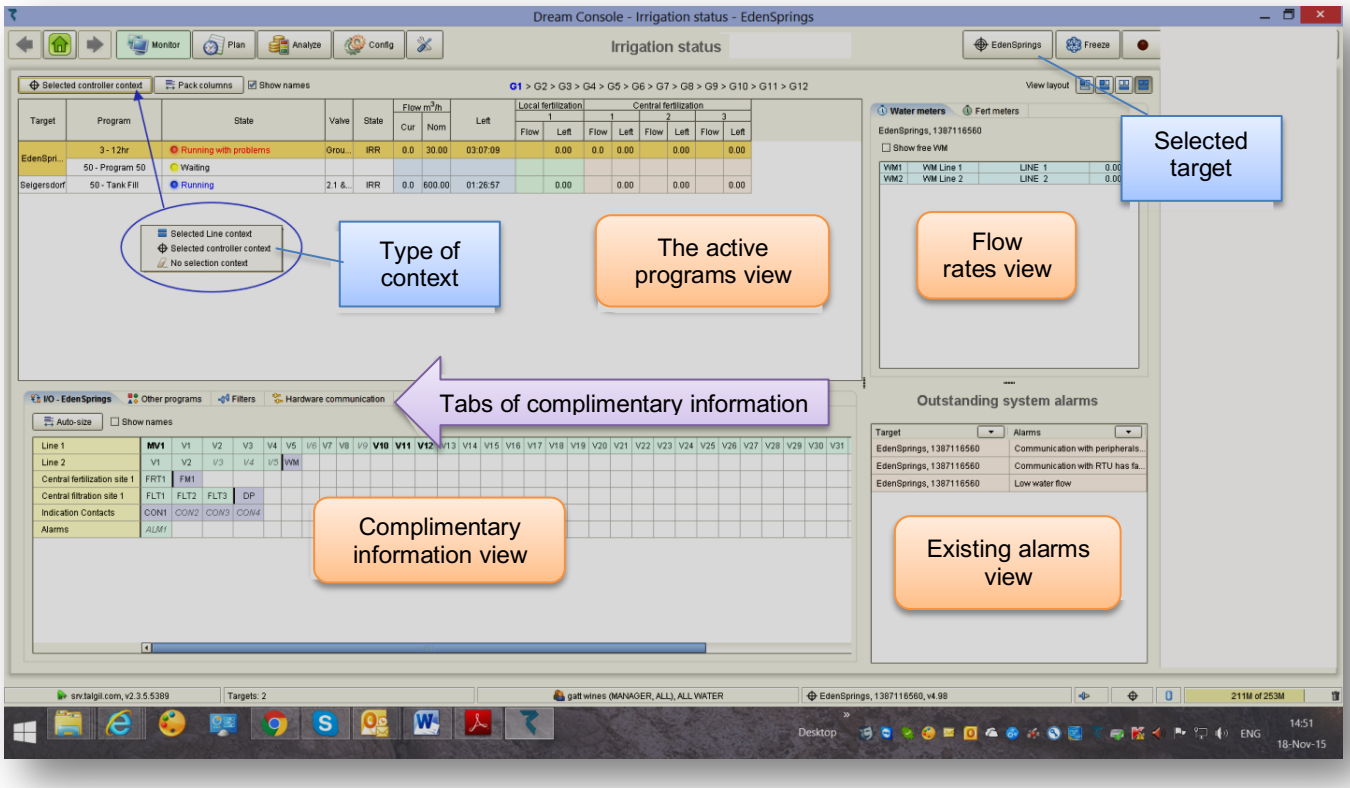
4.1 Monitoring – Irrigation status

The **Irrigation status** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Monitor/ Irrigation status**.

The **Irrigation status** perspective is meant to supply the user the most relevant information about the ongoing activities in his system. The perspective operates in context of multiple targets – the current status of the **Active programs** in all the targets which belong to the user's projects will be displayed.

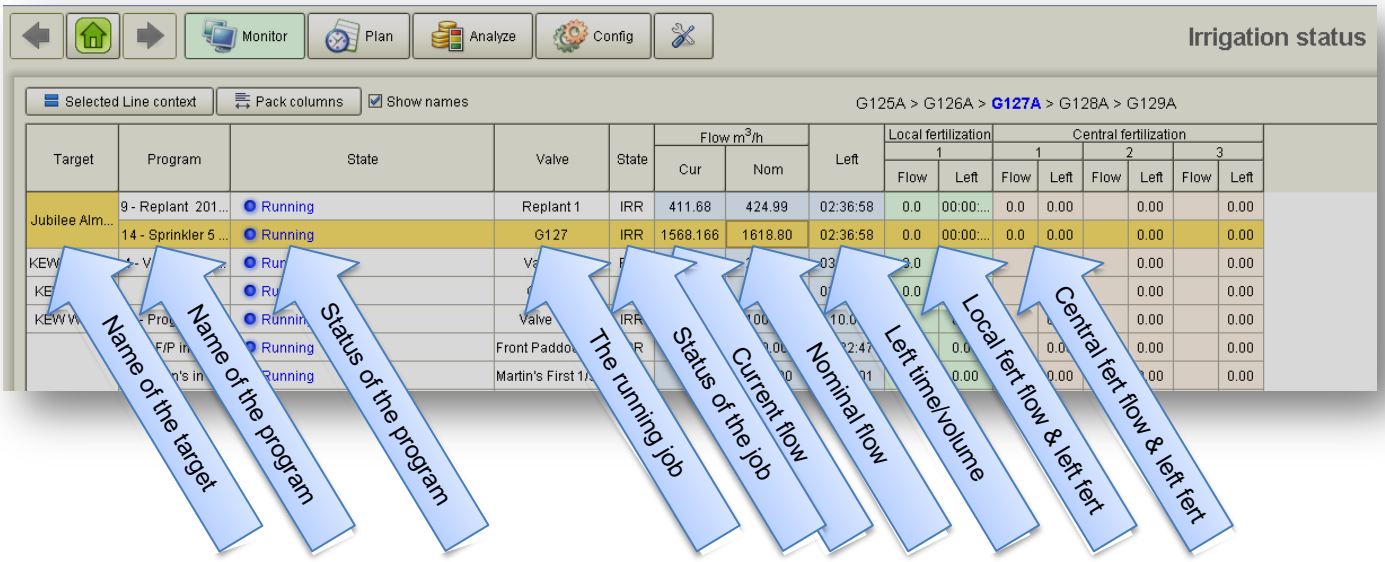
The perspective is divided into several views and the user can decide which views will be displayed and which will be hidden - at the **top left** there is the **Main view** that shows the **Active programs**, in the **top right** the view of **Flow rates** of all water meters and fertilizer meters, at the **bottom right** the view of the **Outstanding system alarms** and at the **bottom left** the view with **Complimentary information**.

Apart from the **Main view** with the **Active programs,** the contents of the other views are context sensitive. The context can be of the **selected target** or the **selected irrigation line.**



The Active programs view – supplies information about the **Active programs** with the currently running jobs in all the targets that the user has access to.

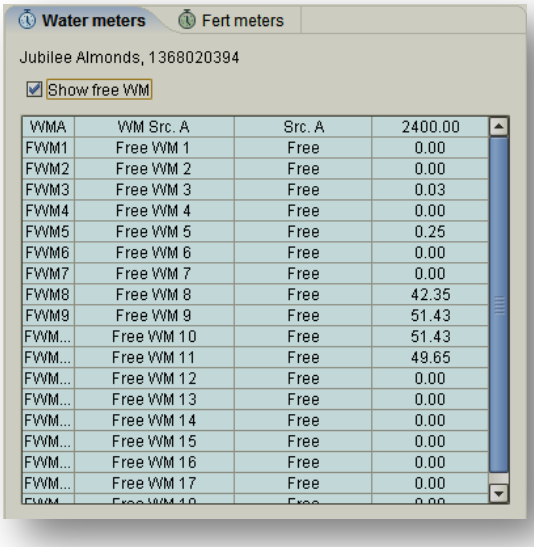
Per each active program the following information is supplied:

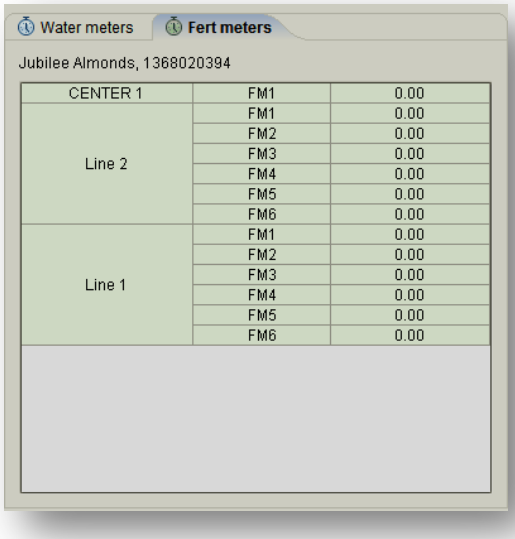


Notice that –

- When an **Active program** contains pH/EC control parameters, there will be additional columns supplying information about the **Planned**, **Actual**, **Average** pH/EC levels and the calculated **Scale** (correction factor).

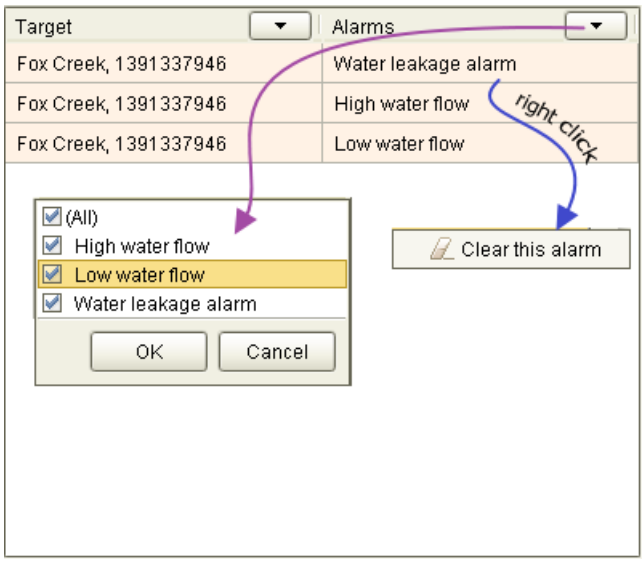
The Flow rates view – supplies information about the **Flow rates** of the water meters and fertilizer meters belonging to the selected line or selected target, depending on the context selection.





The Outstanding system alarms view – supplies information and enables clearing of the **Outstanding alarm events.** Content of the view will depend on the context selection made, line context or target context.

For clearing alarms, right click on the alarm status you wish to clear.



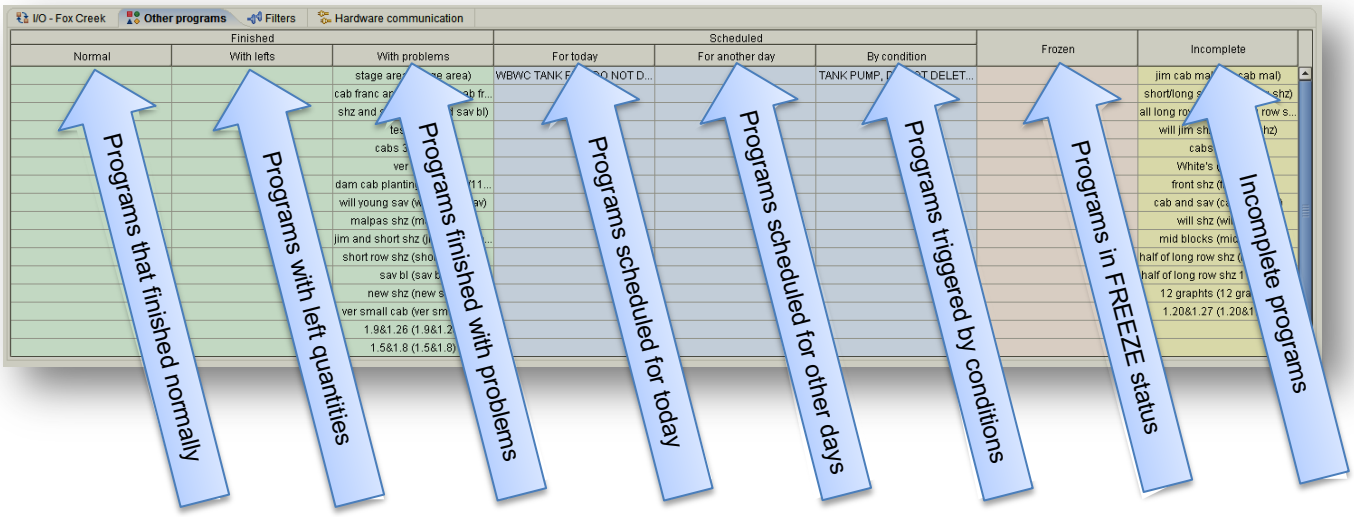
Notice that –

- When clicking on the ▾ key in the "Alarms" column, we shall be able to filter the displayed alarms, only the checked alarms will be displayed.

The Complimentary information view – most of the tabs included in the **Complimentary information view** are also included in the **Plan/ Irrigation programs** perspective and were covered already in paragraph 3.1.4 Added values of the Irrigation programs perspective.

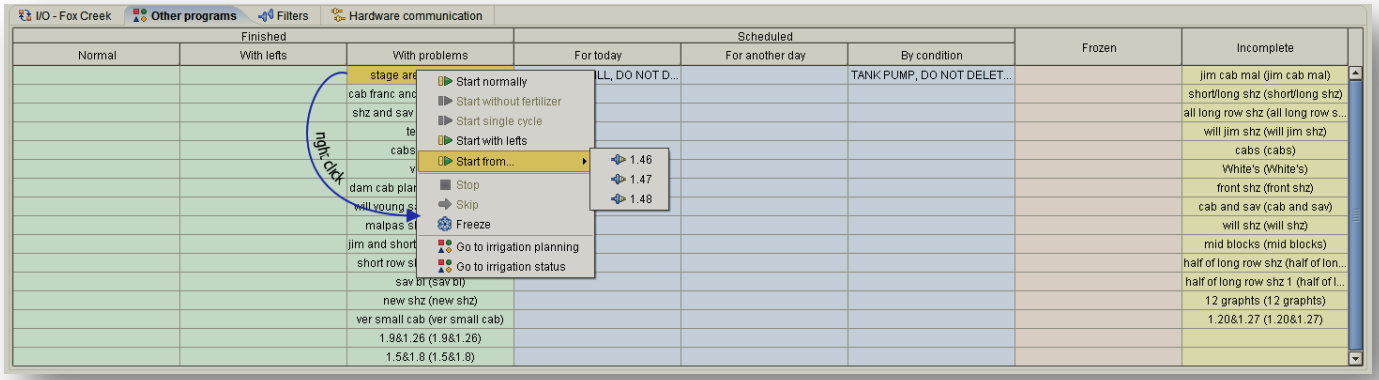
The only tab which is not included in the above paragraph is the one that deals with **Other programs,** the programs that do not appear in the **active programs** displayed at the **active programs view**.

The Other programs view – The **Other programs view** is arranged as follows:



Notice that –

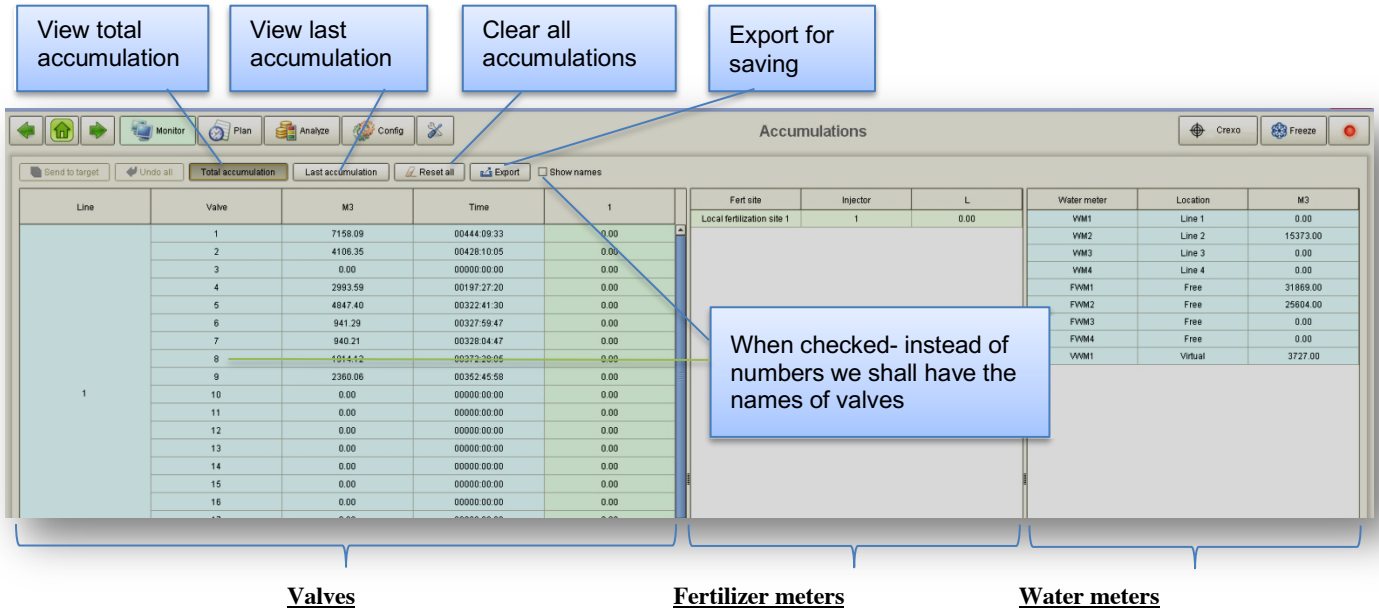
- Incomplete programs are programs that are ready to be started but they are not scheduled to start by themselves. These programs can be started manually.
- Right clicking on any of the programs in the **Other programs view** will enable the user to do some operations as demonstrated below:



4.2 Monitoring – Accumulations

The **Accumulations** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Monitor/ Accumulations**.

The **Accumulations** perspective contains information about the accumulated water and fertilizers for all the valves and all the water and fertilizer meters. As for the valves, the total or the last irrigation's **Accumulation** can be requested.



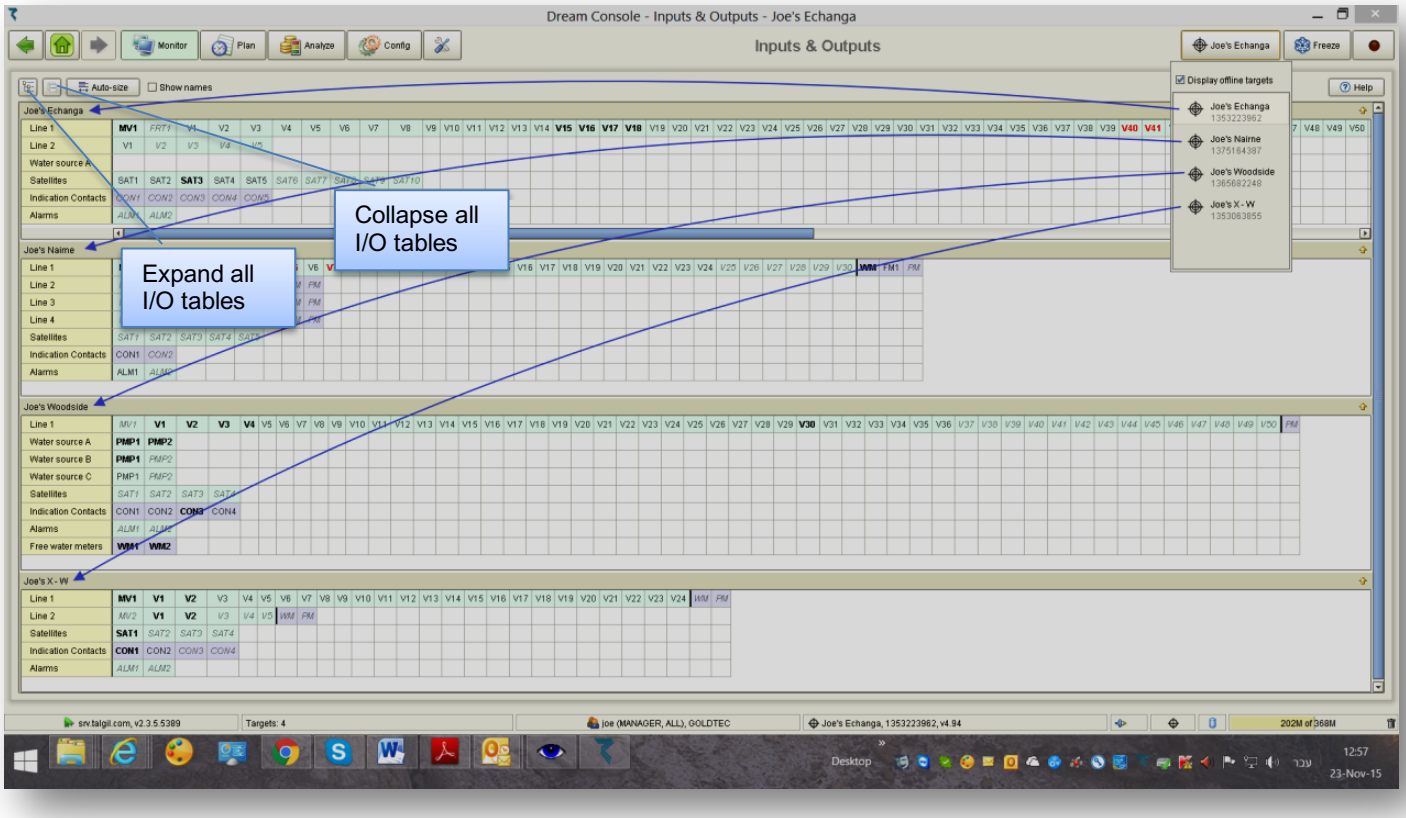
Notice that –

- The contents of the **Accumulation** table can be exported for saving in an Excel formatted (csv) file.
- The contents of the table can be edited.
- The total accumulation contains all that has been accumulated since the last time the accumulation was cleared.
- Valves that irrigate by time will have time accumulation by default, but if the line contains a water meter, there will be volumetric accumulation as well.
- Valves that irrigate by volume will have volumetric accumulation by default, but if we wish to get time accumulation as well, the appropriate parameter at the **Dealers Definitions** must be set.

4.3 Monitoring – Inputs & Outputs

The **Inputs & Outputs** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Monitor/ Inputs & Outputs**.

The **Inputs & Outputs** (I/O) perspective gives a consolidated view of the statuses of all Inputs and Outputs of all the controllers accessible by the user.

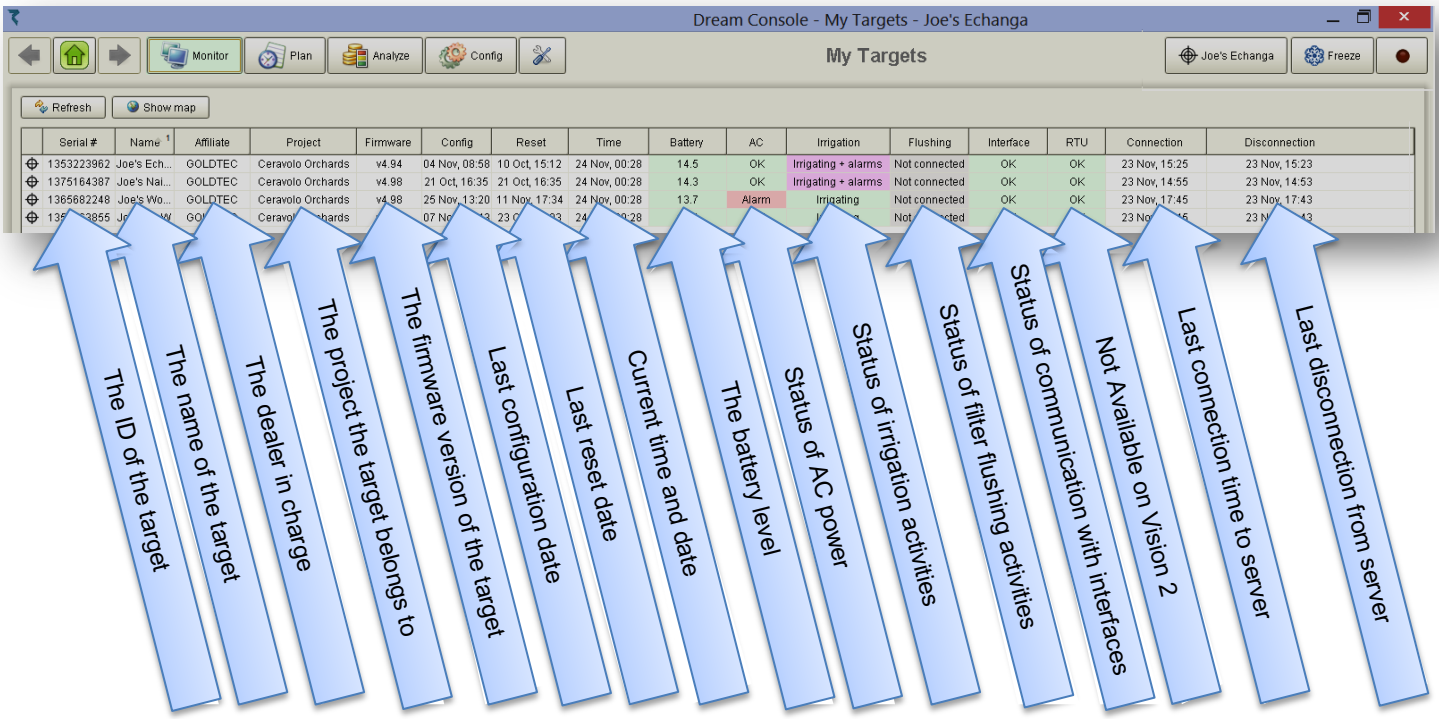


The explanation about the details of the I/O view and the meaning of the various printing fonts and various colors of the characters is fully covered at paragraph 3.1.4 Added values of the Irrigation programs perspective above at **The I/O view** topic.

4.4 Monitoring – My Targets

My Targets perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Monitor/ My Targets**.

My Targets perspective supplies general information about the targets accessible by the user. The following information is supplied.



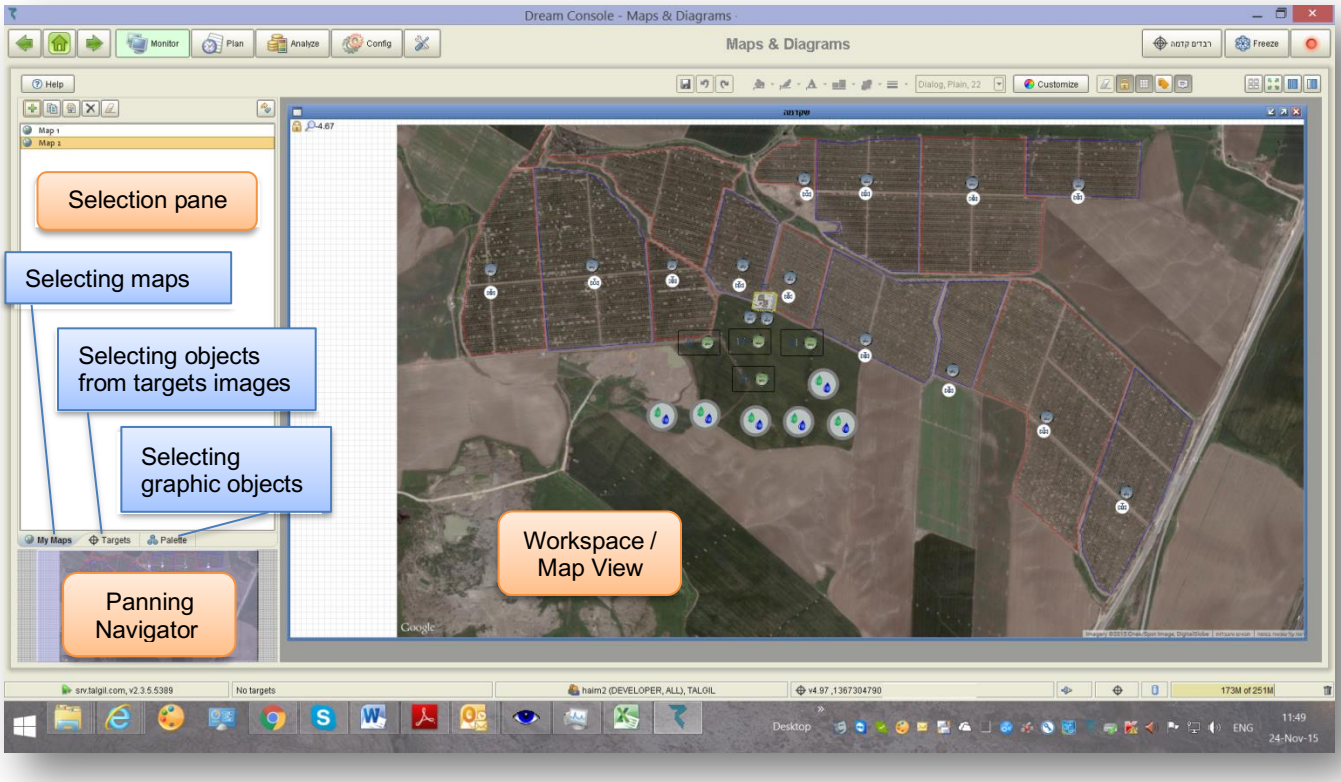
4.5 Maps & Diagrams

The **Maps and Diagrams** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Monitor/ Maps and Diagrams.**

The **Maps** perspective is dedicated for supplying a visual picture of the state and the activities of one or more targets.

Users may construct various maps, give them names and then switch amongst them to access a particular visual slice of the system. As background the user can select to use a **Schematic** drawing of the network or a **Topographic** map view. On this background the user can place an arbitrary combination of objects by dragging and dropping from the selection pane that contains all the components constituting the controllers images. When the map is complete the combination of objects supplies a vivid picture by animation effects and changing colors. The user may combine objects by "pipes" that will give the feeling of flow when there is water flowing from the source toward these objects. Additionally, blocks of the map can be placed inside polygons associated with object placed on the map, so that the status of the object will influence the look of the block on the map.

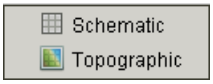
The map layout contains the following parts:



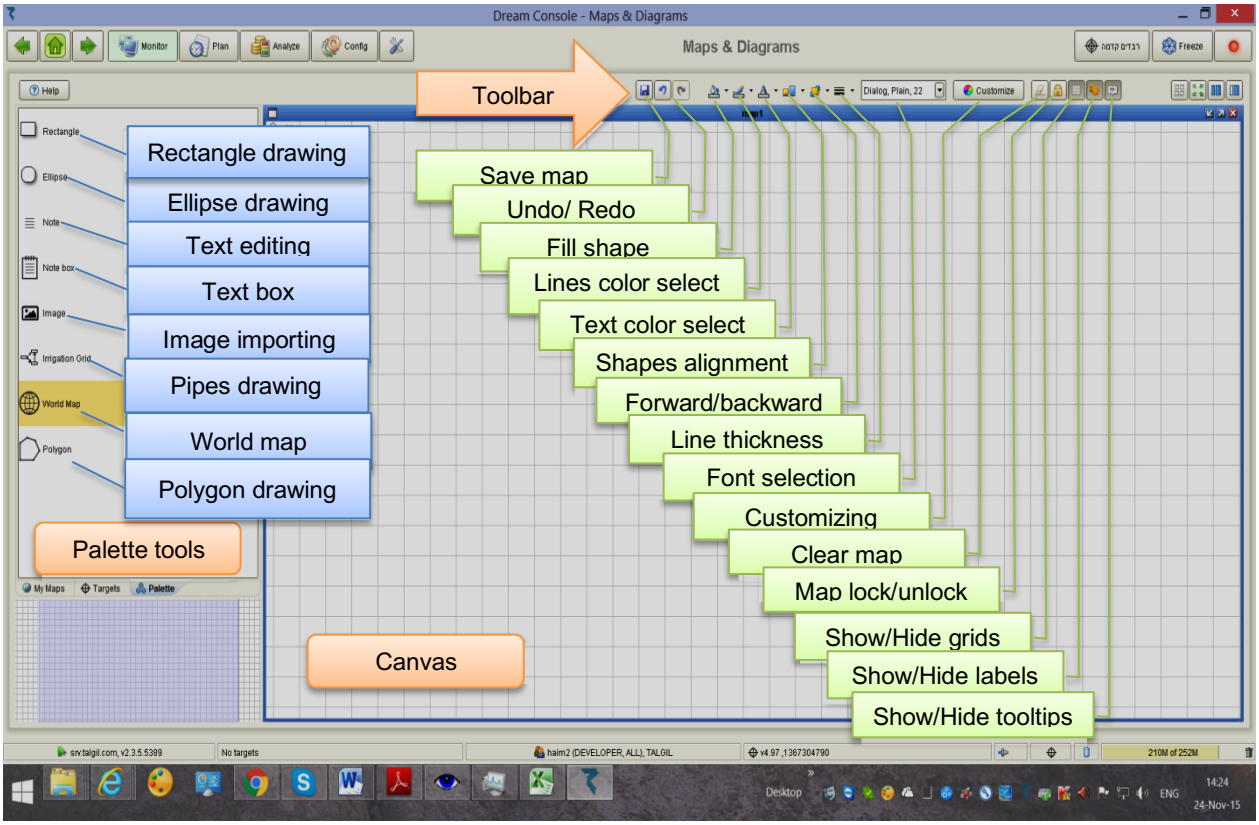
The contents of the **Selection pane** depend on the type of items the user would like to select:

- Selecting maps from the list of maps.
- Selecting objects from the Target's image to be placed on the map.
- Selecting graphic items to be included in the map.

Creating a new map – for creating a new map the key has to be clicked as a result the user will be asked to select the type of background they would like to use for the map



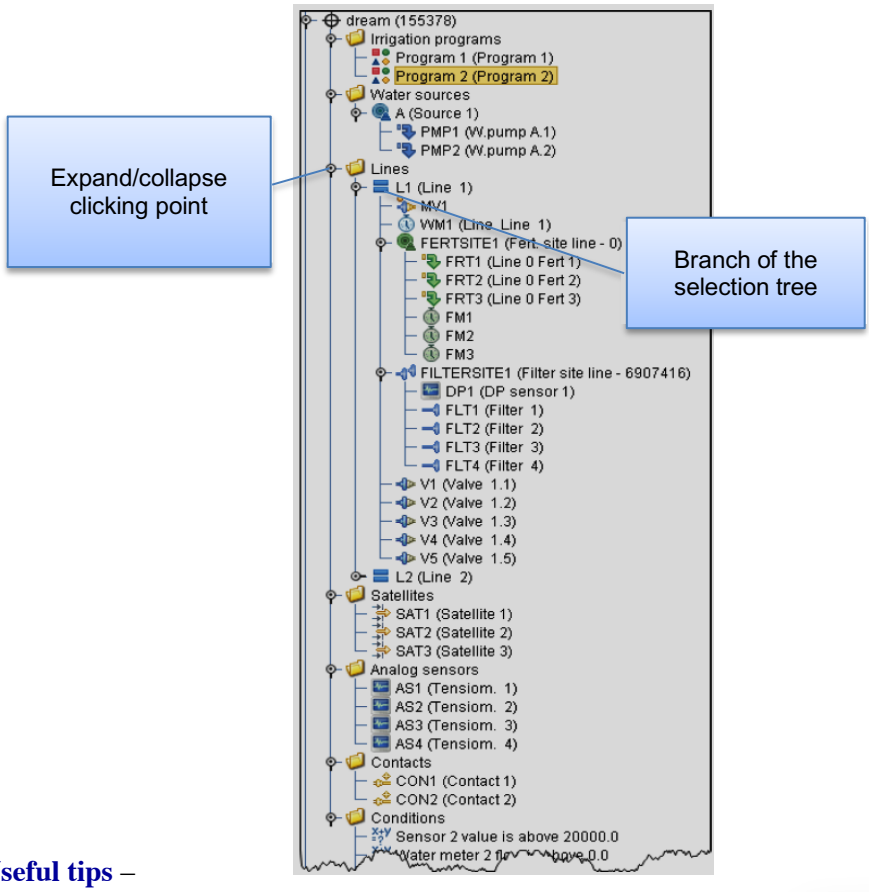
If the **Schematic map** was selected then after giving a name to the map the workplace of the map perspective will turn into a clear canvas and the user will be able to use the graphic tools supplied in the **Palette pane** and in the **Toolbar** and create/ import a schematic map.



If the **Topographic map** was selected, then after giving a name to the map the workspace will be filled with a GoogleEarth map showing the area where the target is located. Notice that each target when introduced to the Administration software can have it's geographic location defined. Now the mouse scroll-wheel can be used for Zooming in and out the geographical map until a satisfactory view is obtained. The **Palette pane** and the **Toolbar** tools can now be used for completing the map background if needed.

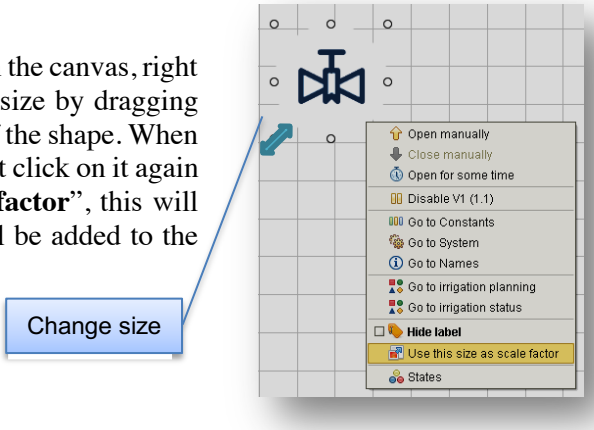
After creating the background of the map whether **Schematic** or **Topographic,** the user will have to add the objects of the **Target's image** that he wishes to appear on the map.

Placing objects in the map – Selecting the **Targets** tab will display in the **Selection pane** the **Selection tree/ trees** of the **Target/Targets** the user has access to. The **Selection trees** contain the objects belonging to the **Targets' image** and which can be placed on the map by **drag and drop** action.
Selection trees can appear in expanded or collapsed form, in order to expand/collapse a branch of a tree, one should click the dot which the branch is starting from.

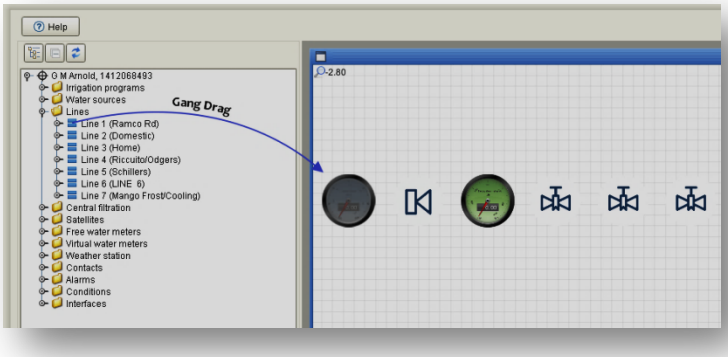


Useful tips –

After placing the first object of a certain type on the canvas, right click on it and you will be able to change its size by dragging one of the corners to or away from the center of the shape. When you are satisfied with the size of the object right click on it again and select the option "**Use this size as scale factor**", this will make all the objects of the same type that will be added to the map, have the same size.

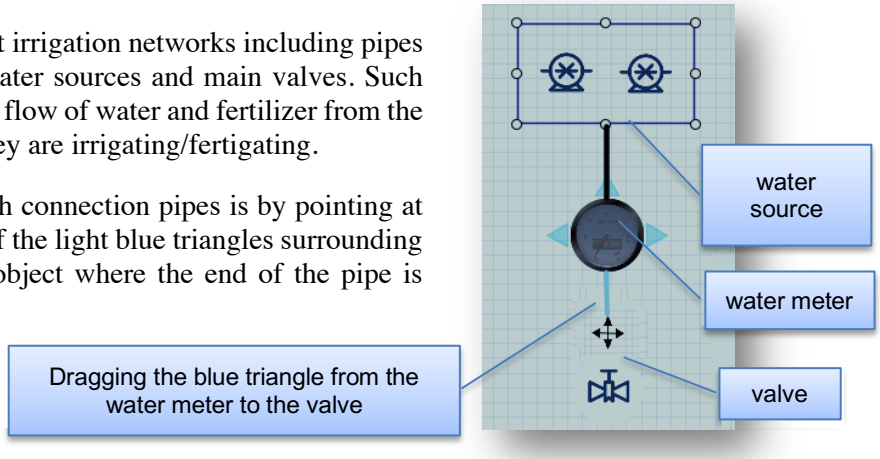


If an irrigation line branch is dragged and dropped into the canvas area in its **collapsed** shape, the whole contents of the irrigation line will be **Gang Dragged** into the map.

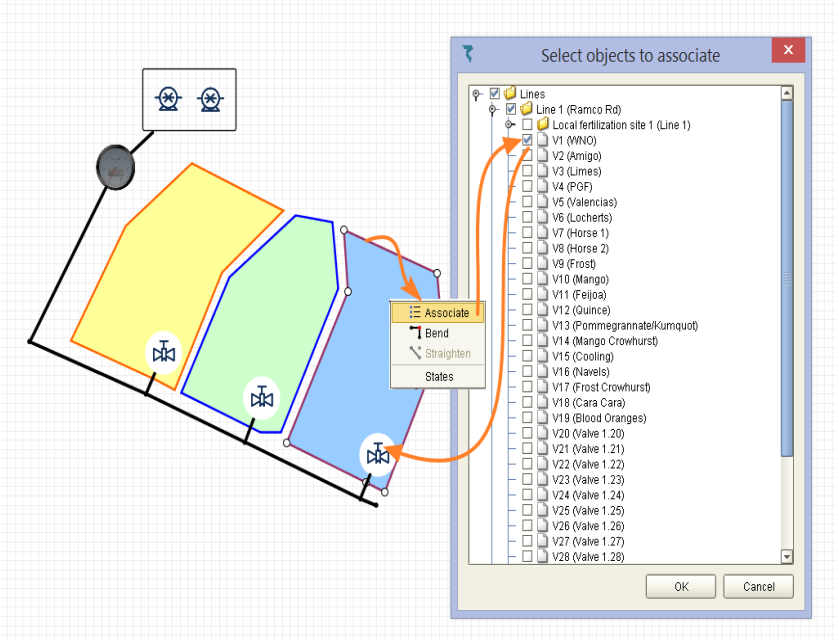


Users will be able to construct irrigation networks including pipes connecting objects to their water sources and main valves. Such network of pipes will indicate flow of water and fertilizer from the source to the objects while they are irrigating/fertigating.

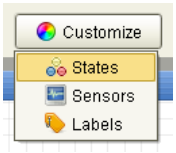
The easiest way to create such connection pipes is by pointing at the object and dragging one of the light blue triangles surrounding the object toward the other object where the end of the pipe is supposed to be connected.

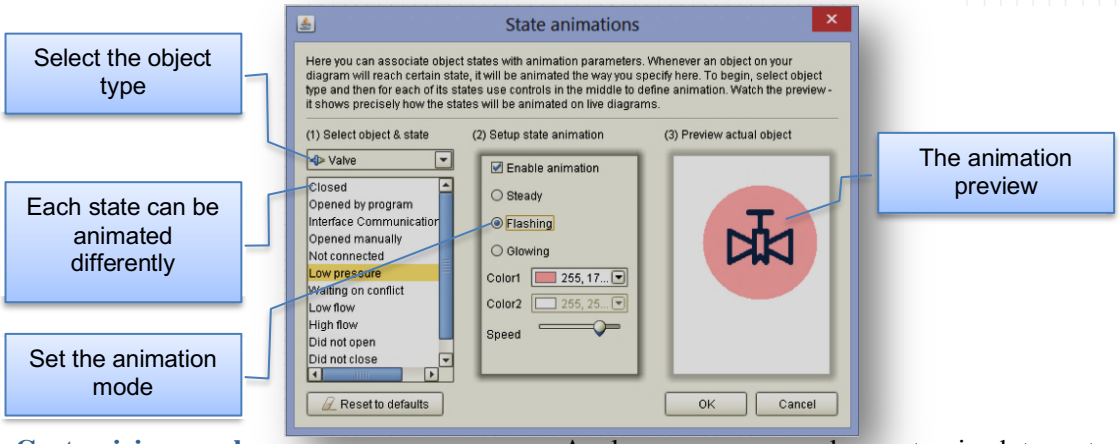


The **polygon** tool should be used in the following way:
First the **polygon** has to be adjusted to the block it is supposed to represent. Right click on the **polygon** and use the "**Bend**" tool wherever a bending point is needed. You can stretch the bending points according to the corners of the block. When you are satisfied with the shape of the **polygon** you can right click on one of its laterals and select the "**Associate**" option.
Mark the objects you would like the **polygon** to be associated with.
You better use the **forward/ backward** tool to send the polygon to the **back** layer.

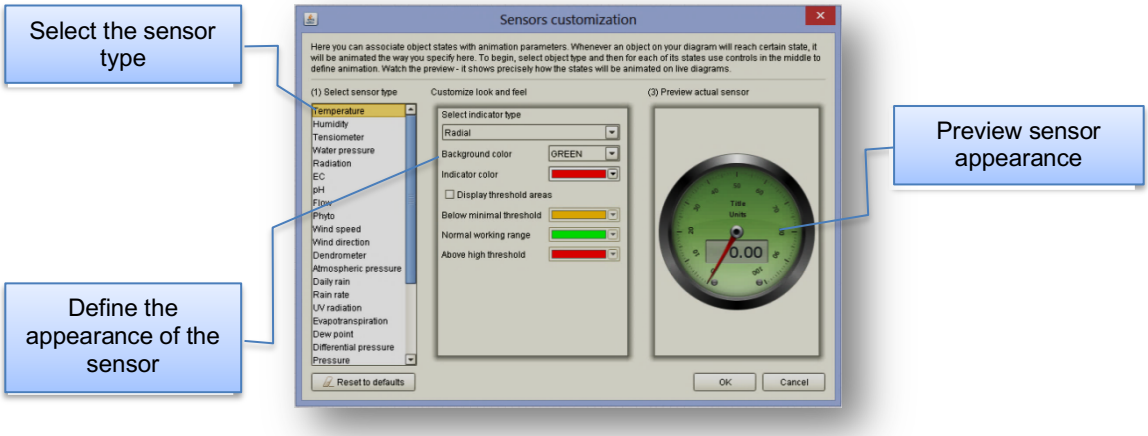


Customizing Objects states- the purpose of customizing objects is to define whatever animation and which colored background will represent each status the object may get. The following window is used for defining the **Objects states animation**. It opens when **Customize/ States** is selected.





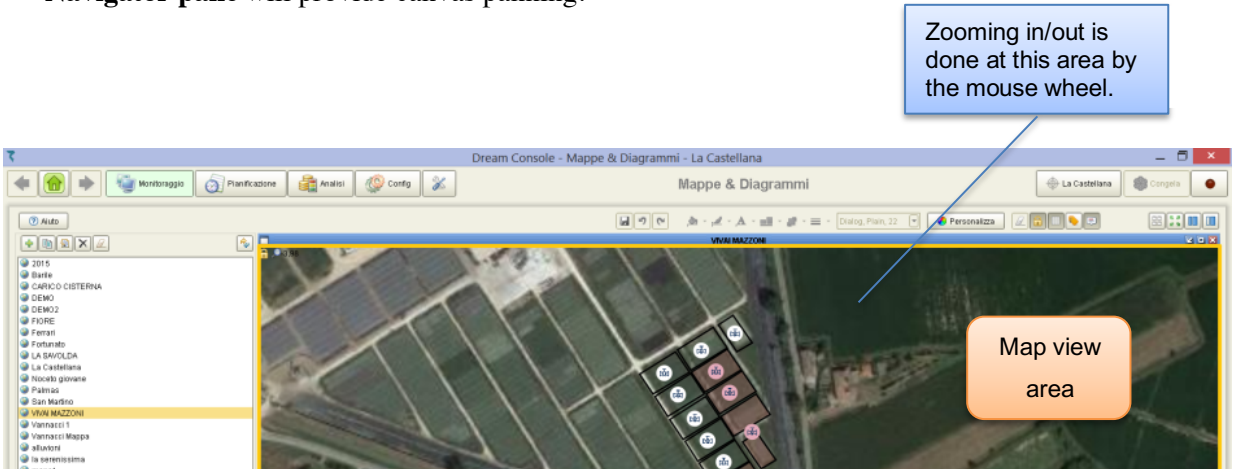
Customizing analog sensors appearance- Analog sensors may be customized to get a different appearance as follows:

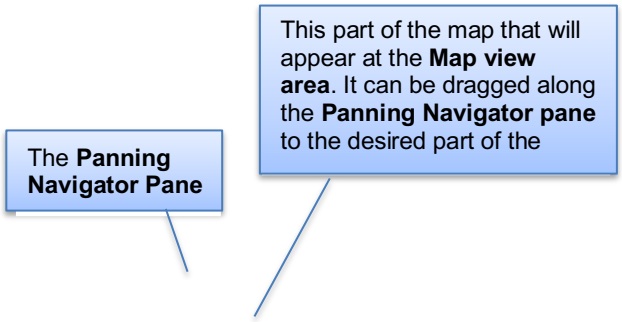


Customizing Labels- **Labels of objects** may include several parts such as: **Target name** (optional),
ID of the object (mandatory - always displayed), **object name** (optional), **Location ID and name** (optional), **State** (optional). The user may decide which parts of the **Labels** they prefer to see and which parts to hide. Remember that there is a key for global **hide/show labels**.

<u>When the whole map is complete and no more changes are needed, do not forget to lock the Map view by clicking the lock key.</u> 

Zooming/ Panning Navigator- the user may decide which part of the map will appear at the **Map view** by using the following tools:- **Zooming in/out** is executed at the **Map view** area by the **Scroll wheel** of the mouse, left mouse button drag at the **Panning Navigator pane** will provide canvas panning.

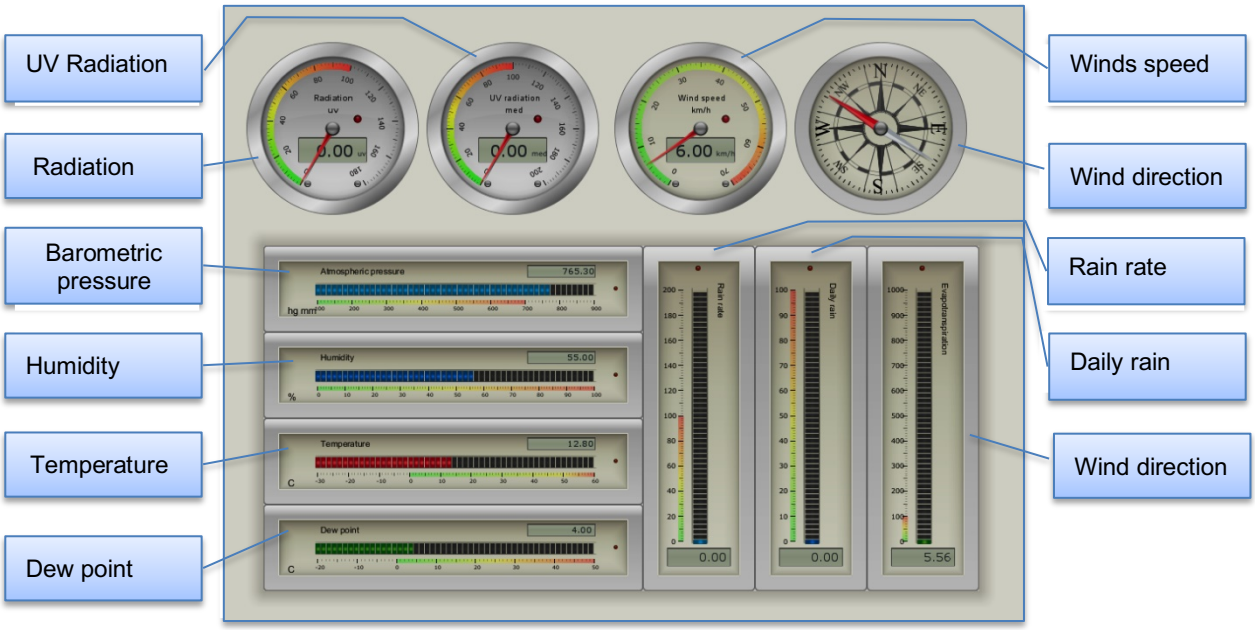




4.6 Monitoring – Weather station

The **Weather station** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Monitor/ Weather station**. The subject will be included in the **Menus** only when the image of the controller has a **Weather station interface** defined**.**

There are 11 parameters transmitted from the **Weather station** to the DREAM control system, the **Weather station** perspective presents these parameters in the following way:



Notice that –

- The paramerts arriving from the **Weather station** can be stored in a logfile for later analysis. For this to happen, the data acquizition rate has to be defined as explain below at **Configure/ Data Acquizition**.

5. Analyze

The following chapter deals with the **Analytic tools** supplied by the **CONSOLE** for analyzing the accumulated information resulting from the **Target's activities**.

5.1 Event log

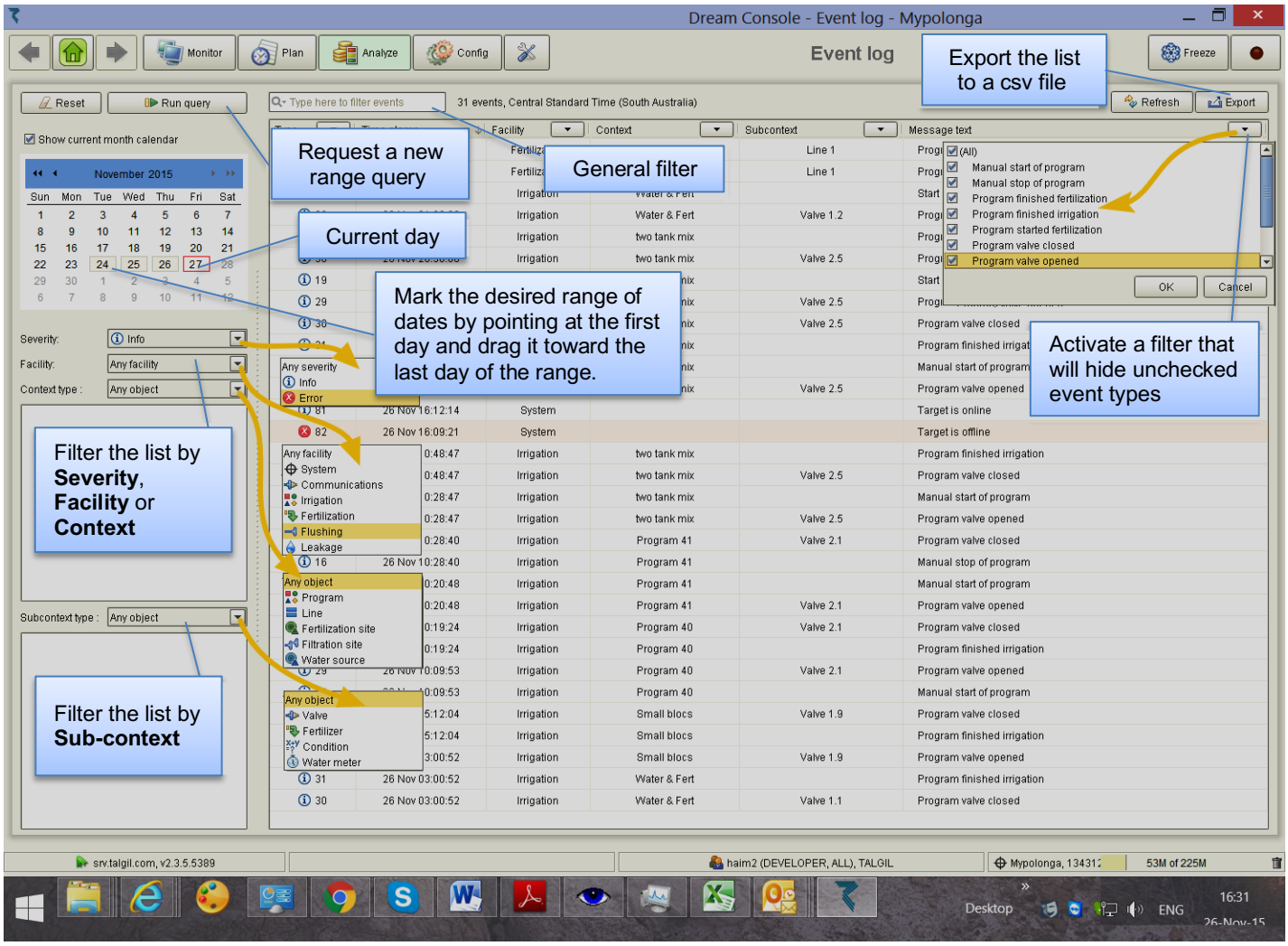
The **Event log** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Analyze/ Event log**.

The **Event log** perspective is the place at which the user may check the list of events following the activities moment by moment. The **Event log** is stored in the memory of the **SERVER** in a chronological order and can be retrieved from there by a request with specified range of dates.

How long back will the **SERVER** keep the **Event log**? The answer depends on the **Data retention** settings done at the **ADMINISTRATION** software. Check with the person in charge of the system setup that the **Data retention** parameters were properly set.

Users will be able to query system events by combining any of the following criteria choices:

- time range
- severity
- facility
- context and/or sub-context object(s)



Notice that –

- By default the events of the current day will be listed.

5.2 Data reports

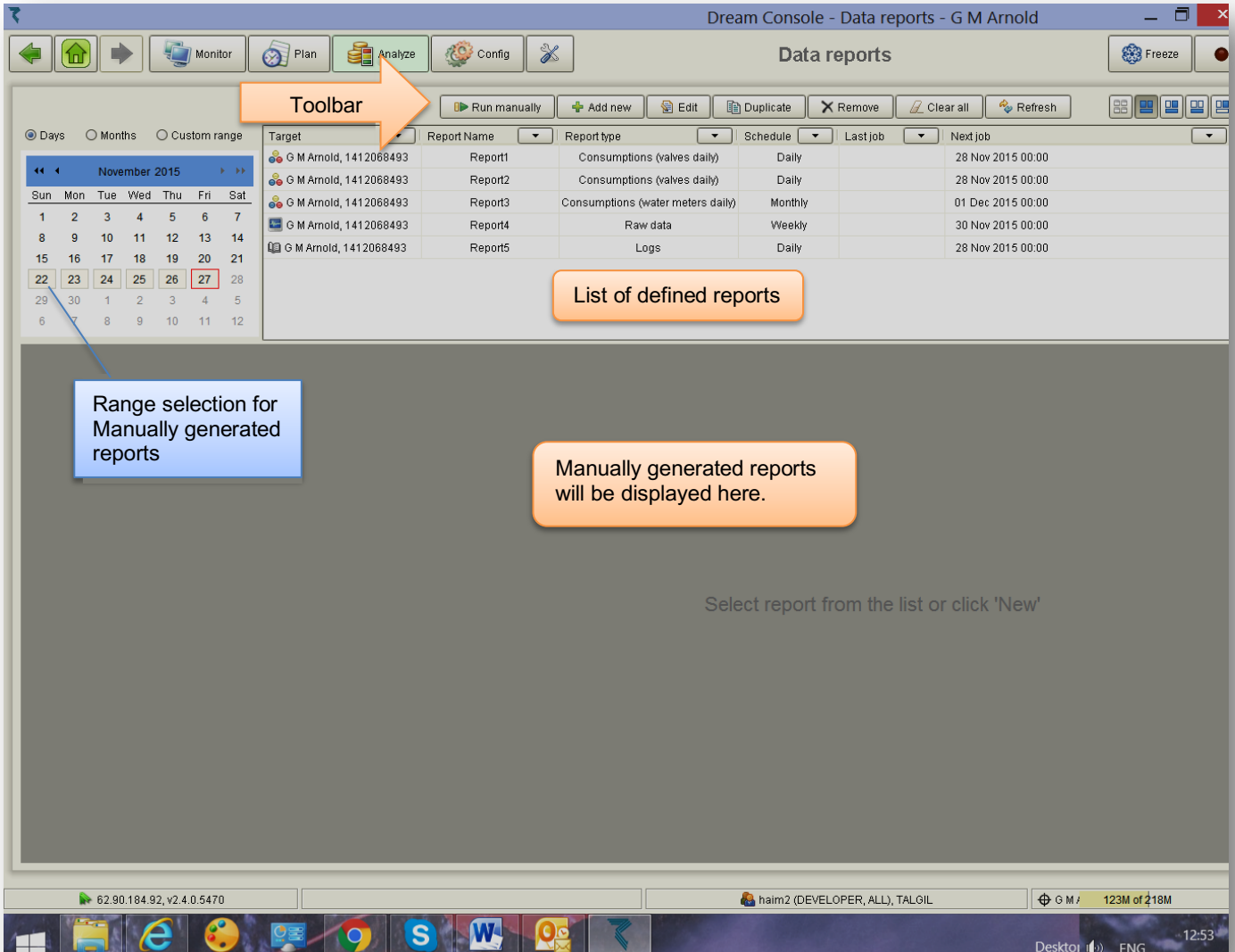
The **Data reports** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Analyze/ Data reports**.
The **Data reports** perspective is the place where the user may define formatted documents by which various reports may be generated.

There can be various types of reports: **Consumption** reports, **Raw data** reports or **Event log** reports.

- **Consumption** reports may refer to a selected **group of valves**, to a selected **group of water meters**, to certain **crops**, or to certain **plots.** These reports will supply data about the consumption of the selected items.
- **Raw data** reports may refer to an arbitrary combination of items picked from the target's image and will supply information about their statuses.
- **Event log** reports will contain a list of events taken from the memorized **Event log** and optionally filtered by **Severity**, by **Facility**, and/or by **belonging object**.

The defined reports are just skeletons that do not contain any data until really generated. Users will be able to generate reports on manual demand or reports can be scheduled to be generated automatically in a predefined cycle. The generated reports can be set to be delivered as E-mails to the listed recipients in **Excel worksheet** format (csv).

The **Data reports** perspective has the following structure:



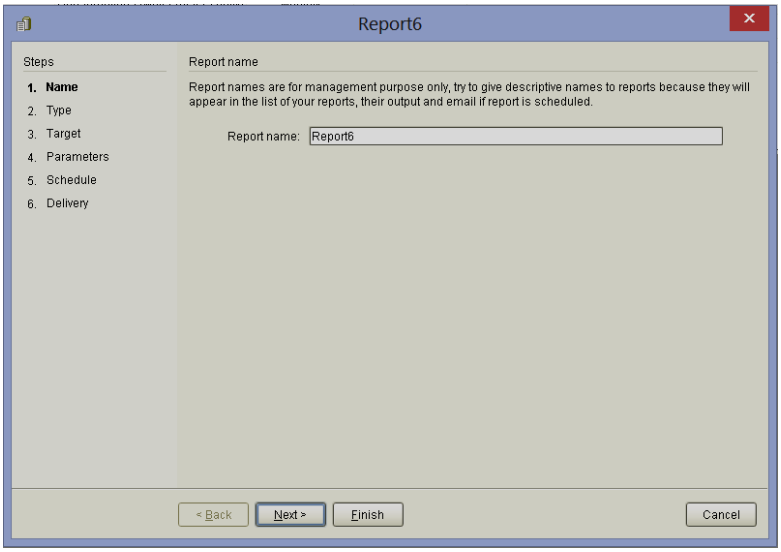
5.2.1 *Creating new Reports*

Creation of new **Reports** is done by means of a wizard.

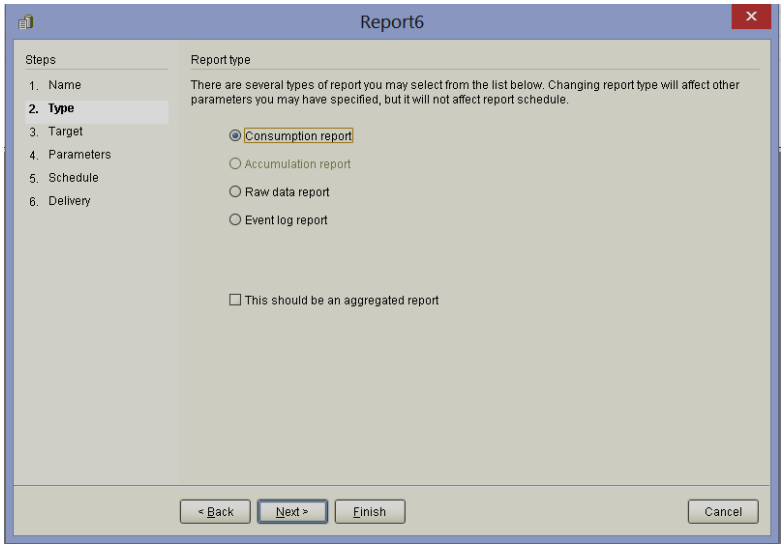
To run the wizard, the **Add new** key has to be clicked. 

The wizard is divided into 6 steps that lead the user through the definition process. At the end the key has to be clicked.

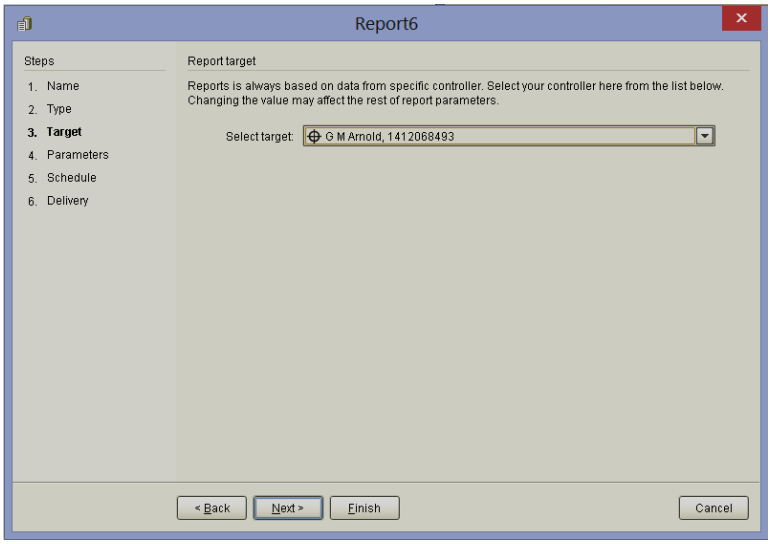
The first step is about giving the report a name.



The second step deals with selecting the type of report we would like to create - **Consumption** report, **Raw data** report or **Event log** report.

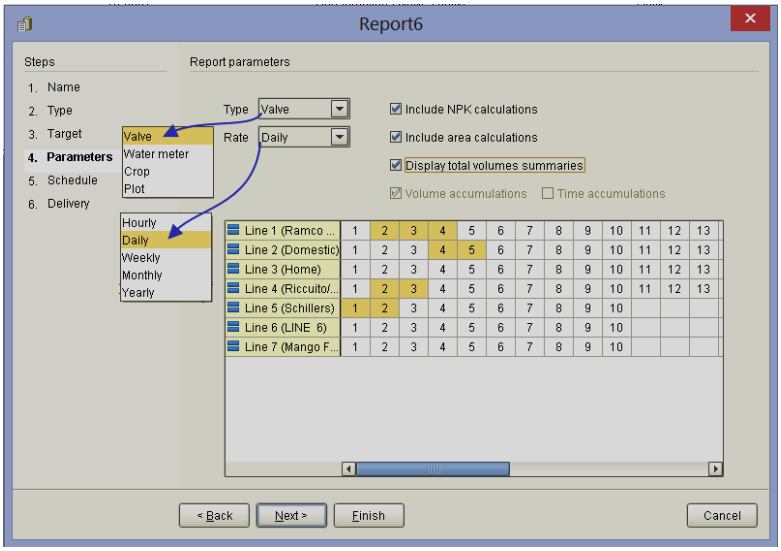


In the third step we need to select the target which the report will be dealing with.



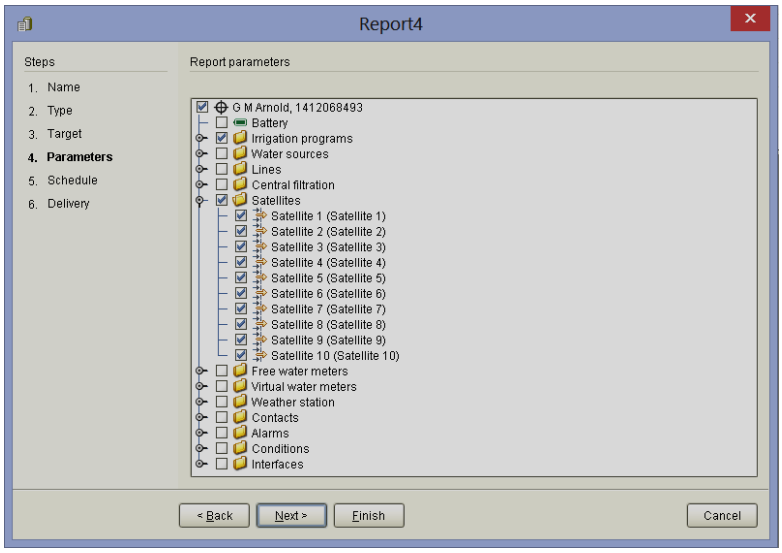
The fourth step deals mostly with selecting the items that will be included in the report and therefore it depends on the type of the report we are dealing with.

In case of **Consumption** report, the items for selection will be **Valves**, **Water meters**, **Crops**, or **Plots**. First we need to select the **Type of items** and then by clicking on the items we make them included in the report (colored yellow or checked at the checkbox). To complete the definition of the report we need to add some more information about its contents, the **Rate** at which the data will be sliced, whether or not to include **Per area** calculations, **NPK** and **totals** per each time slice.

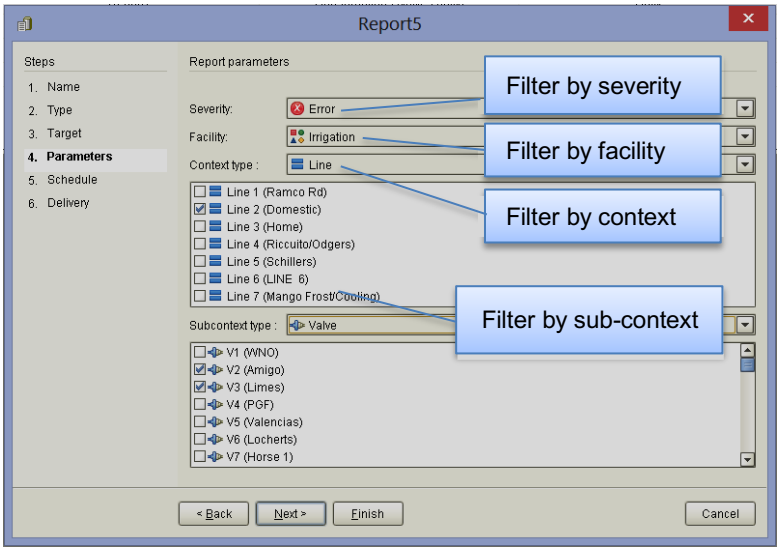


Notice that –
For being able to create **Crop**, **Plot** reports and for including **NPK** data, there has to be some preparatory work to be done, defining the crops, plots and the fertilizers used. The process will be discussed below at 5.2.2 Analysis settings.

In case of **Raw data** report there will be a tree of items presented for selecting the items to be included in the report.



When defining **Event log** reports the user is given multiple filtering tools to be able to pick out the particular events he is interested in.



As mentioned above the defined reports are empty skeletons without any data inside. There are two ways to have them be filled with data –

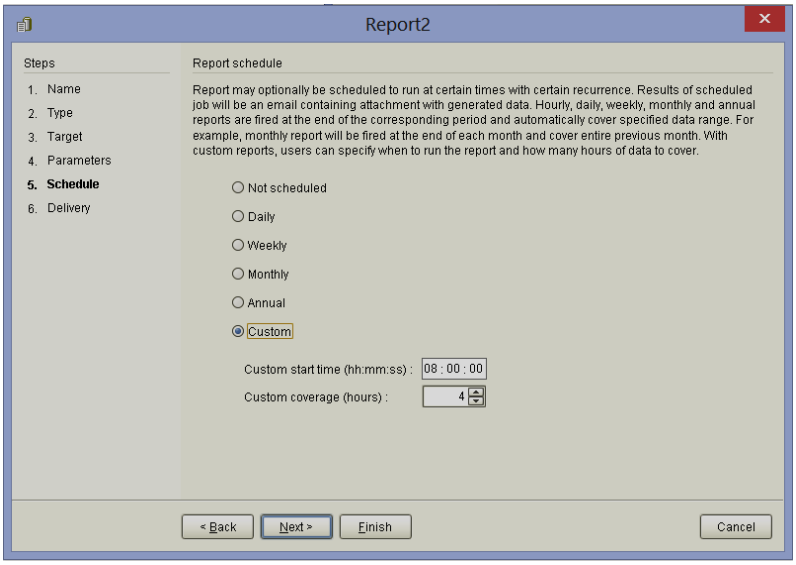
1. By issuing a 

command.
2. By scheduling the report to be created and transmitted in a certain rate.

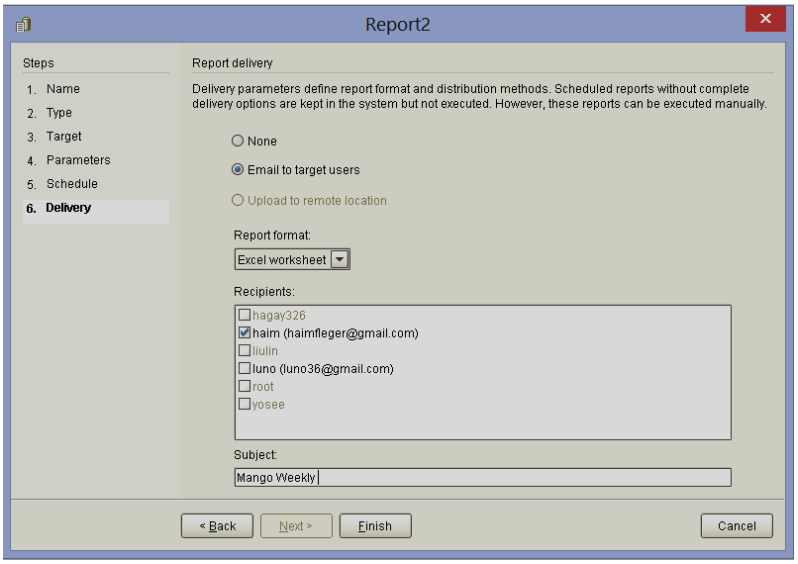
For generating a report manually the user needs to select the report from the list of reports, define the time range he would like the report to cover and then issue the **Run manually** command.

The other option, the automated report generation is actually defined at the stage the report skeleton is created by defining a **Schedule** for its generation.

- **Daily**- generated at the end of each day covering 24 hours of data.
- **Weekly**- generated at the end of each week, covering 7 days of data.
- **Monthly**- generated at the end of each month, covering 1 month of data.
- **Annual**- generated at the end of each year, covering 1 year of data.
- **Custom**- generated at specified time daily covering specified number of hours.



The automatically generated reports can be delivered to a list of Email recipients, or alternatively stored at a specified location.



5.2.2 Analysis settings

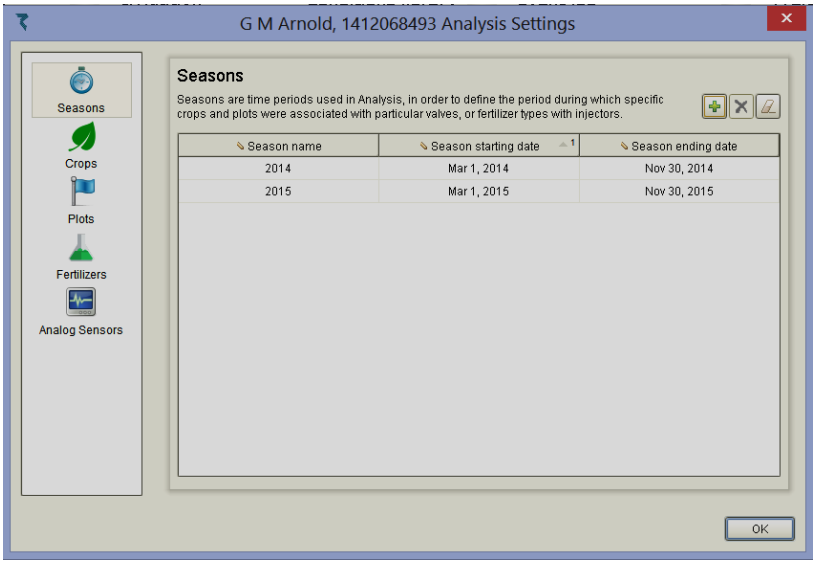
The **Analysis settings** topic can be accessed through the **Main menu** or the **Pull down menu** when selecting **Analyze/ settings**.

Most of the definitions made at the **Analysis settings** deal with complementary data to be used during the reports generation.

If the user would like to generate reports related to the **Crops** and the **Plots** he got, or if he is interested in knowing the contents of **NPK** supplied to each **Valve**, **Crop** or **Plot,** he has to make these extra definitions.

It is important to understand that all the **Consumption** reports are based on the repeated sampling of the water and fertilizers **Accumulations** recoded per the **Irrigation valves**. So if we want to be able to project that information on the **Crops** and the **Plots**, we need to define which **Irrigation valves** belong to each **Crop** and to each **Plot**. However that correlation may be dynamic and can change by **Seasons**, therefore the user will have to make his definitions based on **Seasons**.

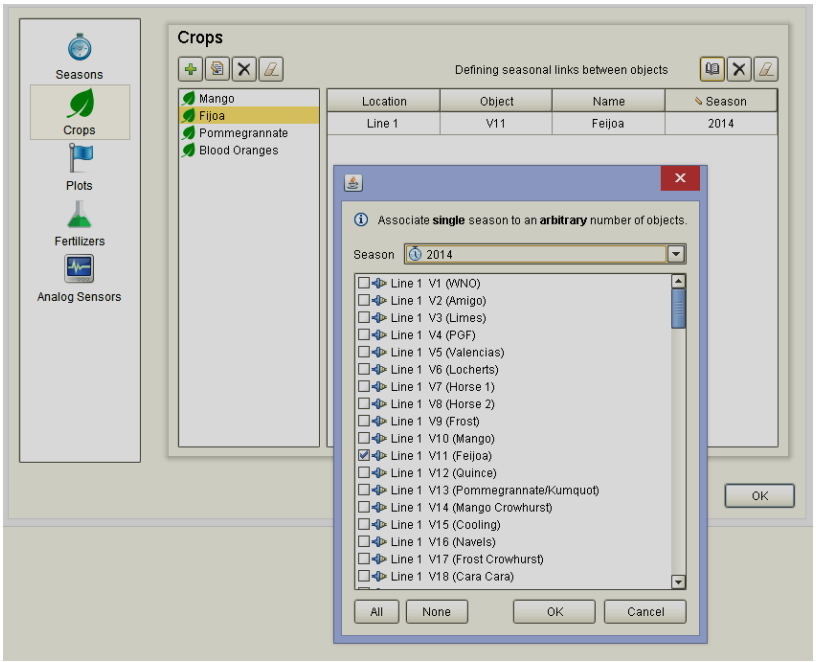
Use the key to add a new **Season**.



Crops and **Plots** are defined in the same manner-

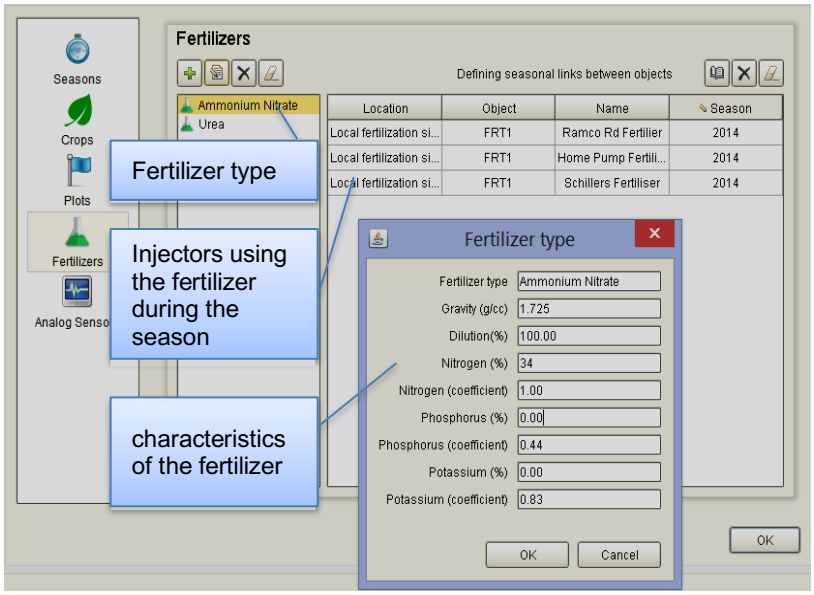
First the name of the new **Crop** or **Plot** is added by using the key.

Then a table opens at which the user can select the **Season** of interest and mark the **Valves** belonging to the new **Crop** or **Plot** at that **Season**.



The **NPK** rating of a fertilizer describes the amount of **Nitrogen** (**N**), **Phosphorus** (**P**), and **Potassium** (**K**) in a fertilizer and these are the three main nutrients needed for the growth of plants.

So in order to be able to tell how much of those nutrients were supplied to each **Valve**, **Crop** or **Plot** in each **Season**, we have to define which kind of fertilizer was in use by each injector along the **Season** and what are the characteristics of those fertilizers. Then the system will convert the accumulated volume of injected fertilizer into amount of **N,P,K** supplied.



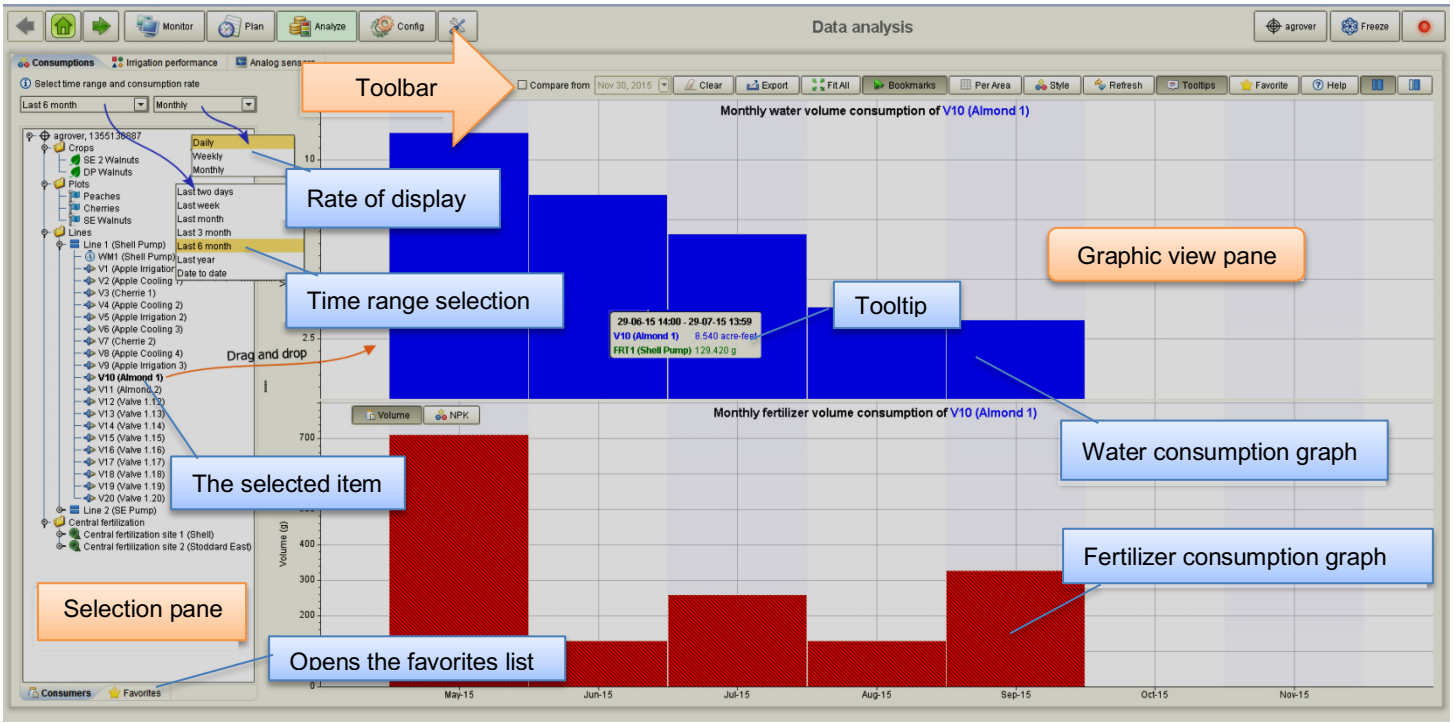
5.3 Analyze – Consumptions

The **Consumptions** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Analyze/ Consumptions**.

The **Consumptions** perspective supplies various tools that help analyzing the information accumulated in the data base about the water and fertilizers consumed by the **Valves**, **Crops**, **Plots** in the system.

We have mentioned already that all the **Consumptions** data is based on the repeated sampling of the water and fertilizers **Accumulations** recoded per the **Irrigation valves.** In order to make that repeated sampling happen, we must define the **Data acquisition** rate at which the **Accumulations** will be sampled, how to make this setting will be explained in the paragraph 6.4 **Data acquisition** below.

The following drawing demonstrates the structure of the **Consumptions** perspective:



Notice that –

- In order to get the desired information out of this perspective we need at least three steps:

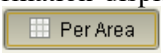
    1. **To select the time range**
    2. **To select the rate of display**
    3. **To drag and drop the desired item into the Graphic view pane**

- The information displayed at the **Graphic view pane** can be **Exported** by clicking . The result will be a table containing the same information in a tabular format. The contents of the table can be saved in a "**csv**" file which is the type of files used by **Excel**.

- Fertilizer consumption can be displayed in two different ways – **by volume** and **by NPK**. When displayed **by volume**, there will be one bar for each fertilizer volume, when displayed **by NPK**, there will be exactly 3 bars, each representing cumulative volume of N, P and K for all fertilizers at the given time span.

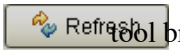
- The 

key turns on the **Tooltip view** that shows in numeric format the consumption values at each time pointed on the graph.

- The information displayed can be presented as **Consumption per area** by clicking . 

- Using the 

key enables saving the collection of items included in the graph under a specified name that will be added to the **Favorites list**. When the name of the graph in the list will be double clicked, the system will draw again the graph with fresh data based on the time range selected. This saves the effort of defining frequently used graphs again and again.

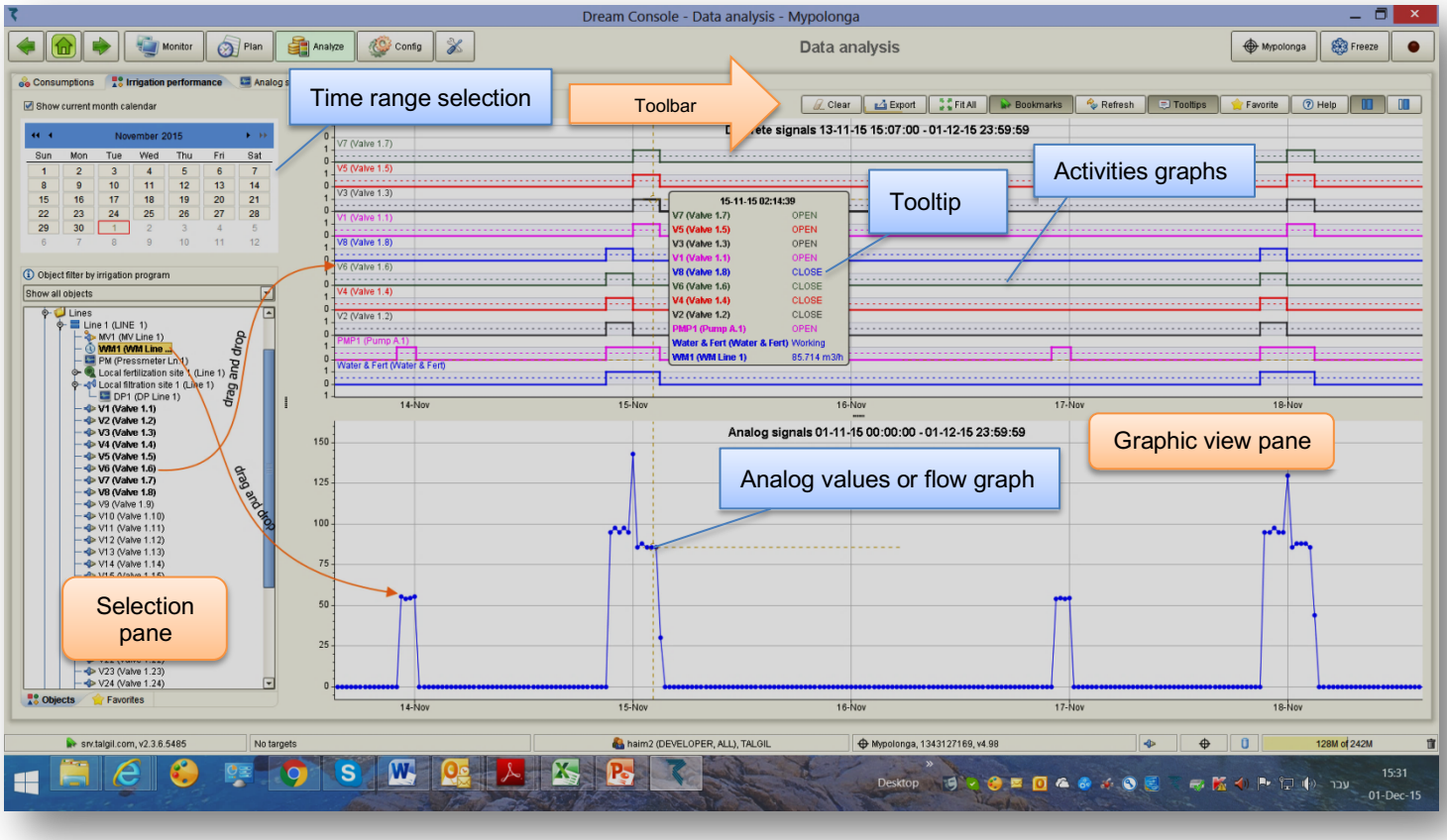
- The 

tool brings up to date information from the controller and refreshes the graphs.

5.4 Analyze – Irrigation performance

The **Irrigation performance** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Analyze/ Irrigation performance**.

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.



Notice that –

- In order to get the activity graph of an item we need the following steps:

  1. **To select the time range**
  2. **To drag and drop the desired item into the Graphic view pane**

- The information displayed at the **Graphic view pane** can be **Exported** by clicking . The result will be a table containing the same information in a tabular format. The contents of the table can be saved in a "**csv**" file which is the type of files used by **Excel**.

- The key turns on the **Tooltip view** that shows the statuses of the selected items and the values of the analog sensors at the time pointed on the graph.

- The colors of the items on the graph are selected randomly, however by right clicking on a selected graph the user may set a preferred color for that item. The selection will be memorized and .each time the same item will be selected this color will be reused.

- Using the Favorite key enables saving the collection of items included in the graph under a specified name that will be added to the **Favorites list**. Any time the user wishes to see the graph with the same items again, all they have to do is double click the name of the graph and the system will display the graph with fresh data based on the time range selected. This saves the effort of defining frequently used graphs again and again.

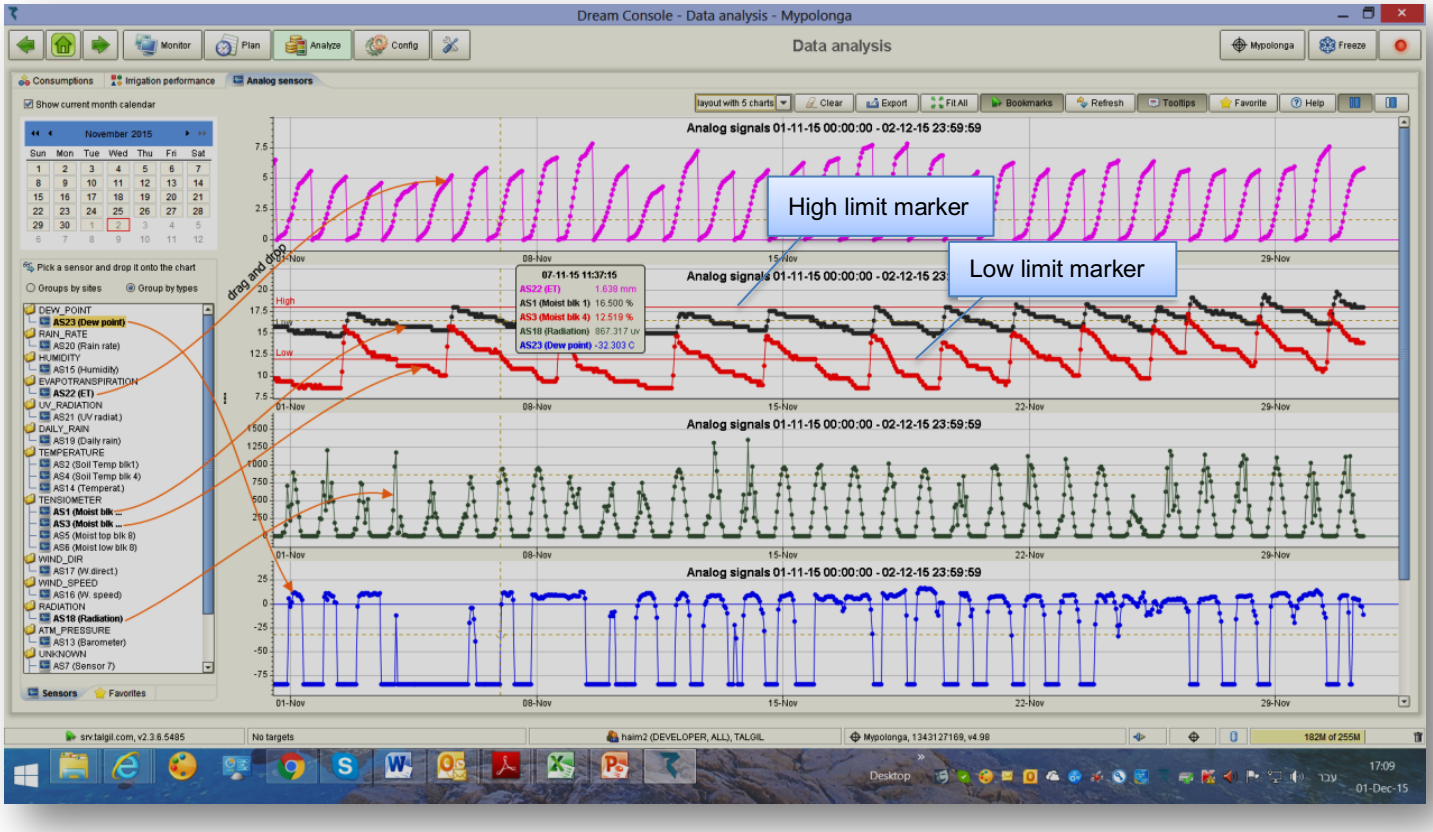
- The Refresh tool brings up to date information from the controller and refreshes the graphs.

- The user can **Zoom in/out horizontally** by rotating the mouse wheel. **Zooming vertically** can be obtained if at the same time the "**Ctrl**" key of the key board is held down.

5.5 Analyze – Analog sensors

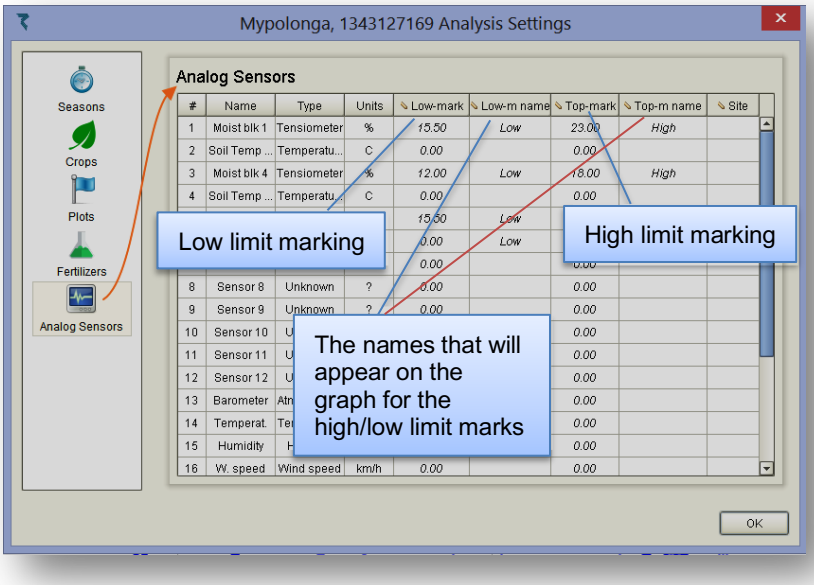
The **Analog sensors** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Analyze/ Analog sensors.**

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.



Notice that –

- We can still place on each chart several sensors if their range of values does not differ too much.
- The user may define a threshold in % from the last reading so that changes in the sensor's value will only be recorded if the change exceeds the threshold. The threshold definition is done at the Dealers definitions.
- Analog sensors can be defined high/low limit lines to be presented along with the graph of the sensor. This helps the user to easily recognize when the graph of the sensor passes a certain limit. Defining these limit lines is done as follows:



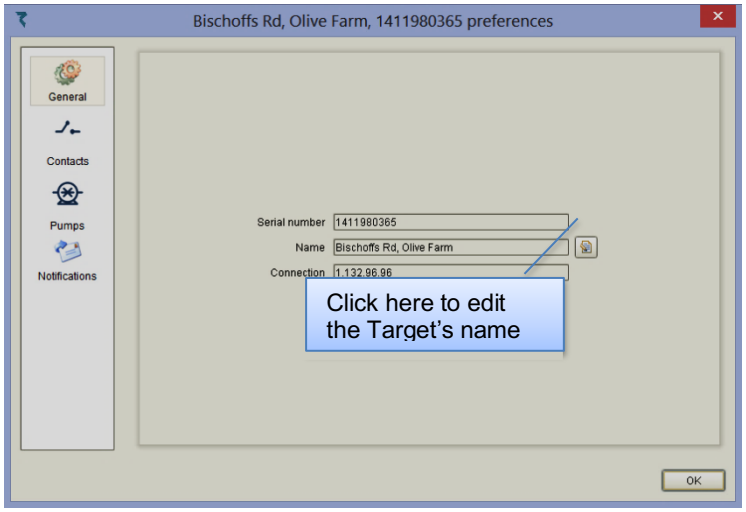
6. Configure

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.

6.1 Configure – Preferences

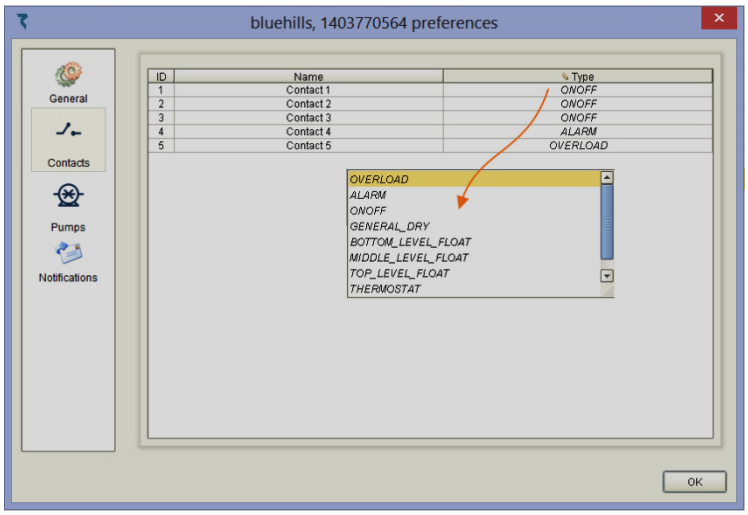
The **Preferences** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Configure/ preferences**.

When selecting the topic of **Preferences** the user gets the assistance of a wizard that helps him define some parameters that may enhance the usability and the friendliness of the software.



General - In the **General** preferences the user may see the serial number (ID) of the controller, the IP address of the controller and its current name. The name of the controller can be edited.

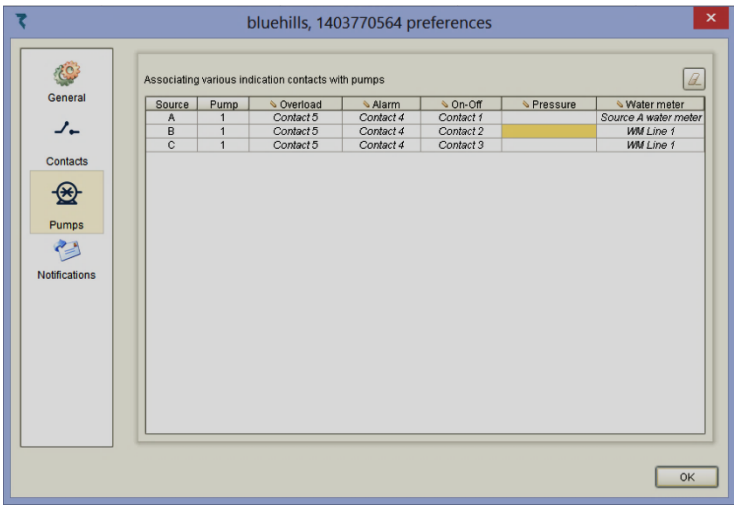
Contacts – When general contacts are included in the configuration of the controller, the function of each contact is not specified. Here we can categorize the contacts by defining the function they are used for.



Pumps – Water source pumps can be associated with some specially categorized contacts.

An **Overload** contact will indicate an overload problem, an **Alarm** contact will indicate an alarm reported by the electric box of the pump, the **ON/OFF** contact indicates whether the pump is running or not.

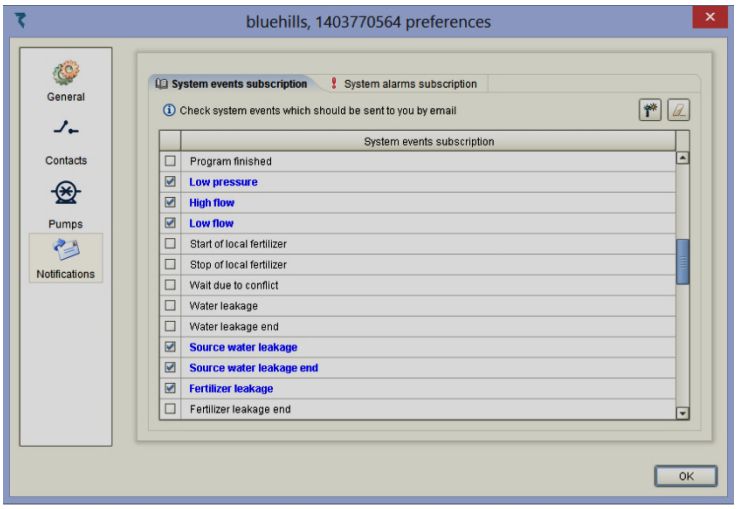
The pump can also be associated with a water meter that represents its flow.



Notifications – there are two options of notifications the user may request:

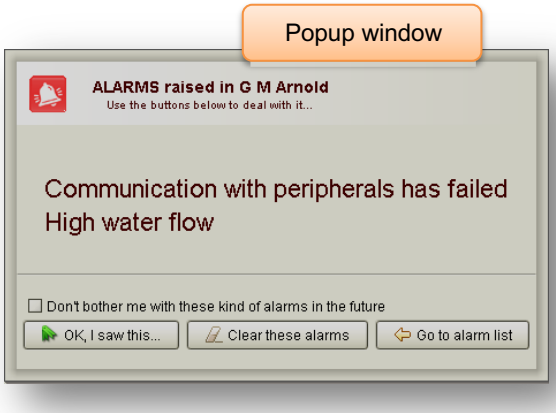
1. **Notification by Emails**
2. **Notification by popup window**

Popup windows are meant for notifying the user while he is next to his PC and **Emails** are meant for notifying the user while he is away from his PC.
In both cases the user is expected to check the boxes of the events they wish to be notified about.



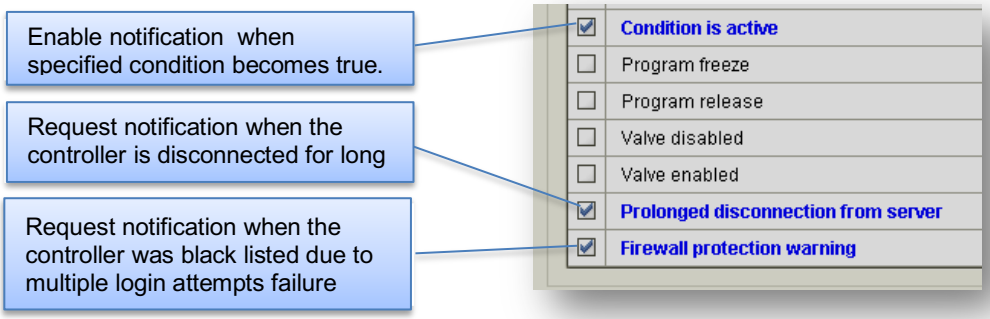
In the case of **popup windows,** the user can respond in three ways:

The user can **dismiss** the notification without doing anything, they may **clear the alarm** events that caused the notification, or they may **go to the alarm list** where they can not only clear the alarm but get additional information about the events.



Notice that –

- Notifications requests are set per target, so users of multiple targets need to define their notification requests per each target separately.
- In order to receive **Email notifications** the user must have his Email introduced to the system and **Email notifications** enabled. This is done at the **Console preferences/ My stuff** described at paragraph 7.1.2 below.
- There are three **Email notifications** that deserve special attention:



6.2 Configure – Constants

The **Constants** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Configure/ Constants**.

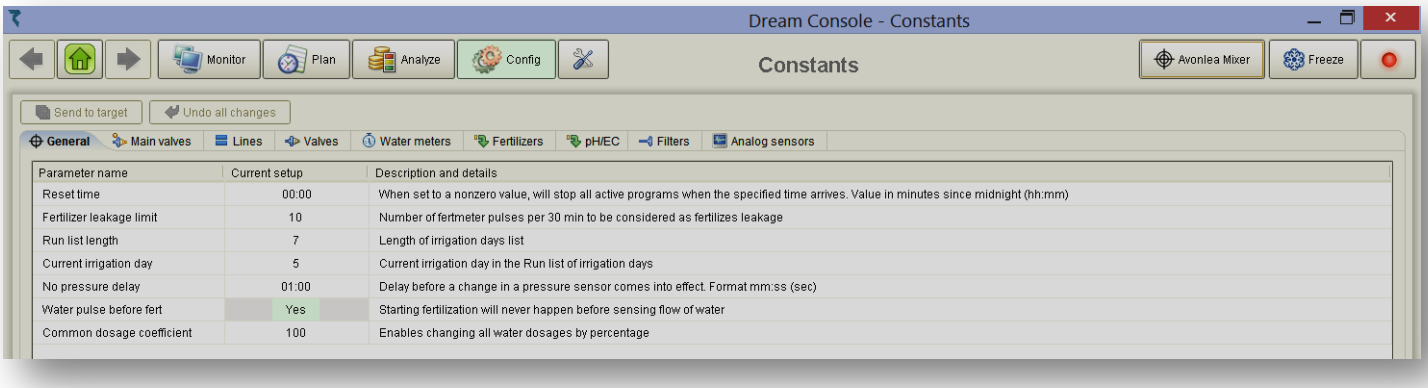
Under the **Constants** topic the user will find all the constant parameters of the items included in the system. The **Constants** are divided into categories accessible through separate tabs and discussed below in the following sections:

a) General
b) Main valves
c) Lines
d) Valves
e) Water meters
f) Fertilizers
g) pH/EC
h) Filters
i) Analog sensors.

The following paragraphs present the various sections of the **Constants** definitions. Notice that some sections will not appear in case the specific item is not included in the image of the selected target.

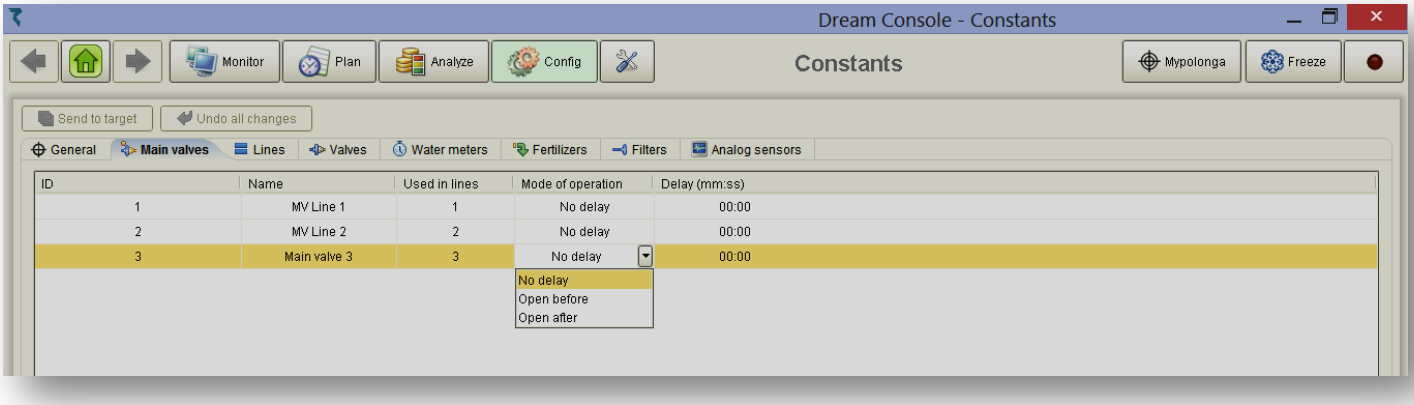
6.2.1 General

The following section deals with some **general** parameters of the system



6.2.2 Main valve

The following section deals with parameters defining the behavior of the main valves.

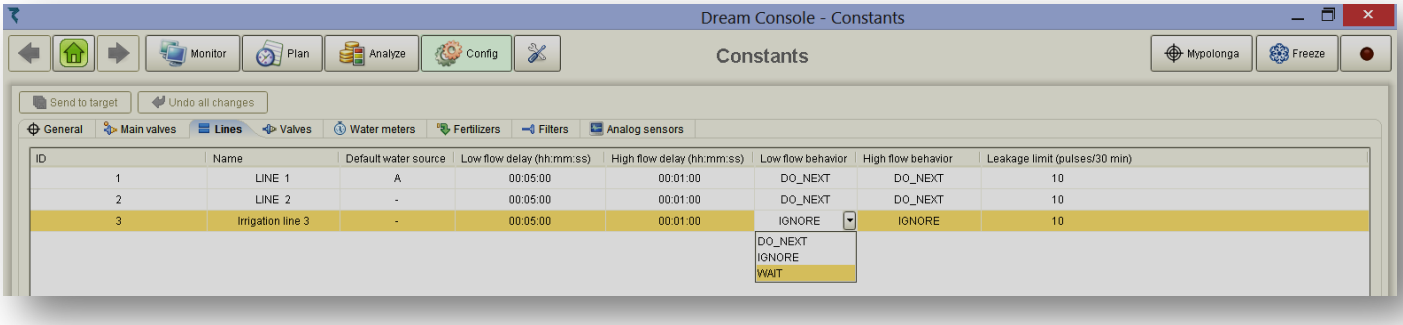


Notice that –

- Main valves can be defined to open before, after or together with the irrigation valves. When the main valve is defined to open before the irrigation valves, it will shut down after the closing of the last valve; the delay will be the same.

6.2.3 *Irrigation lines*

The following section deals with defining parameters of the Irrigation lines.

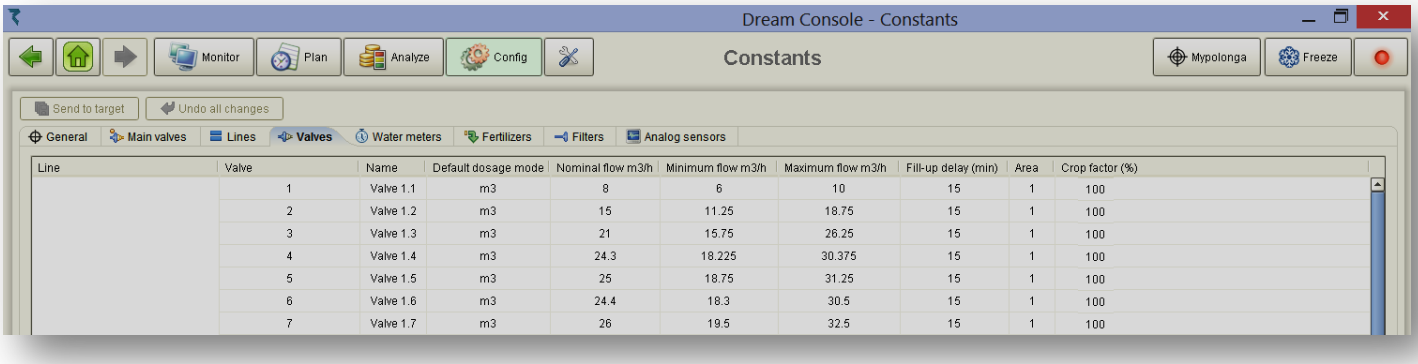


Notice that –

- The **Default water source** of the Irrigation line will be selected whenever a new irrigation job is defined without explicitly specifying the water source to take the water from.
- The **Low flow delay/ High flow delay** define the delay between the detection and the reaction to a High/Low flow event.
- The Leakage limit defines the number of pulses detected while the line is not supposed to irrigate, if the number of these illegal pulses surpasses the defined limit, a leakage alarm is raised.

6.2.4 *Irrigation valves*

The following section deals with defining parameters of the Irrigation valves.



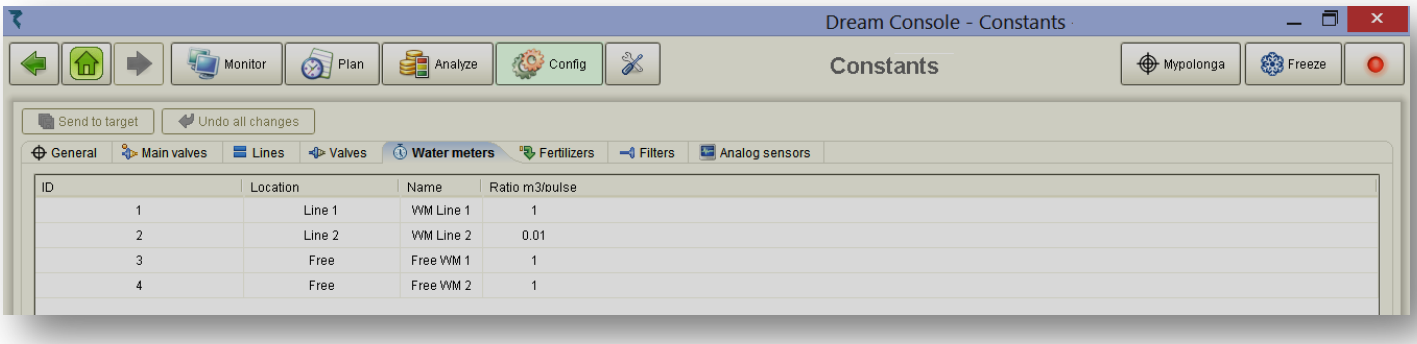
Notice that –

- The **Default dosage mode** will be selected automatically whenever a new irrigation job is defined. It saves the need to select each time the desired dosing mode.
- The **Nominal flow** of the valve is the expected normal flow of the valve, it is of high importance, and must not be left undefined.
- The **Minimal flow/ Maximal flow** of the valve define the limits of flow below/above which the flow will be considered out of order. If the user wishes to ignore low flow detection the **Minimum** should be set to "0". For ignoring high flow violations the **Maximum** should be set to a very high flow like 9999.

- The **Fill-up delay** defines in minutes the delay from opening the valve until the line gets full of water and flow stabilizes. During the **Fill-up delay** the system ignores flow violations and low pressure indication on the line.
- The **Area** parameter defines the area covered by the valve and it is taken into consideration when the water dosage is defined by **volume/area,** or when **Irrigation by evaporation** is used. The units by which the area is measured, are defined at the **Dealers definitions** in paragraph 6.3 below.
- The **Crop factor** is expressed in % and it is a coefficient that multiplies the calculated dosage when **Irrigation by evaporation** or by **volume/area** are in use.

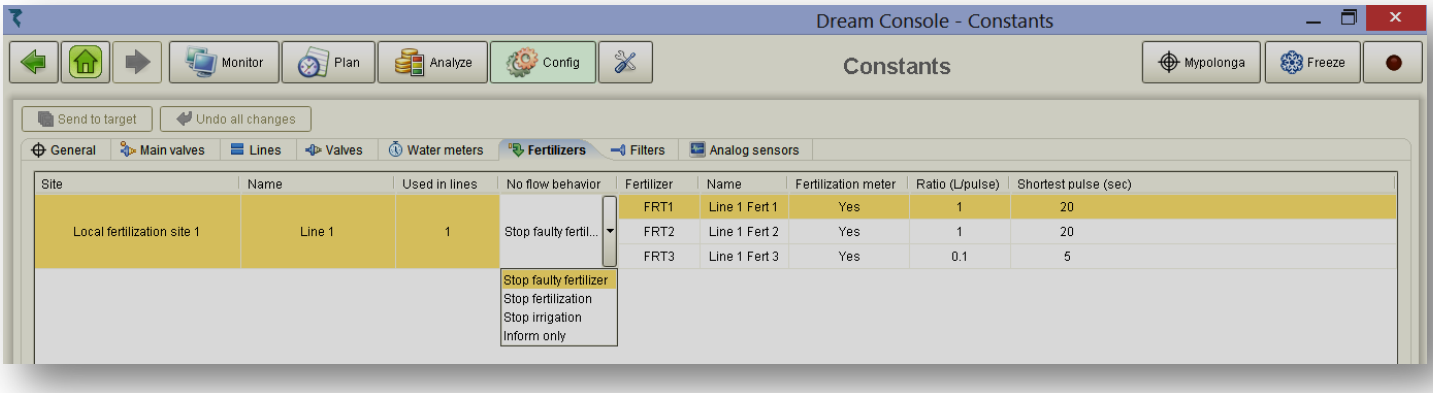
6.2.5 *Water meters*

The following section deals with defining the **Ratio** (volume/ pulse) of the **Water meters**.



6.2.6 *Fertilizers*

The following section deals with defining parameters of **Fertilizer sites**.

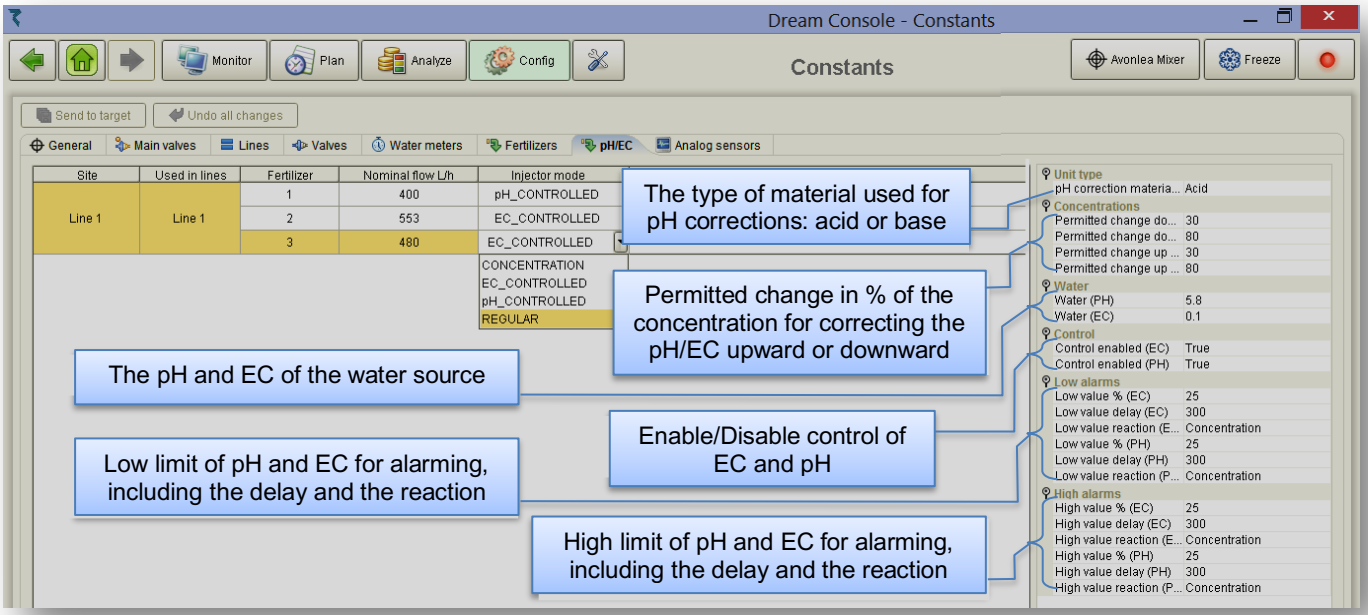


Notice that –

- When a **Fertilizer meter** is defined the **Ratio** (volume/pulse) of the **Fertilizer meter** must be specified.
- The **Shortest pulse** parameter defines in seconds the time slice by which the fertilizer pulse will be divided in case of time based proportional fertigation. The purpose is to get a better distribution of the fertilizer in the water.
- A special case – when the fertilizer meter gets damaged, then all the volumetric fertilizer dosages that were defined based on that meter, in all the programs, cannot be used anymore. In order to let the user keep working volumetrically until the fertilizer meter is repaired, he can go and erase the connection of the fertilizer meter from the connections list. This will notify the system that the fertilizer meter is not in use and instead the controller will use the **Ratio** and the **Shortest pulse** parameters for converting the volumetric fertilizer dosages into time and thus save the need to redefine all the fertilizer dosages. This of course requires the user to set the **Ratio** and the **Shortest pulse** properly so that the **Ratio** will really indicate the amount of fertilizer that the injector will inject within the time expressed by the **Shortest pulse.**

6.2.7 pH/EC

When the system includes **pH/EC control** the following parameters need to be defined:

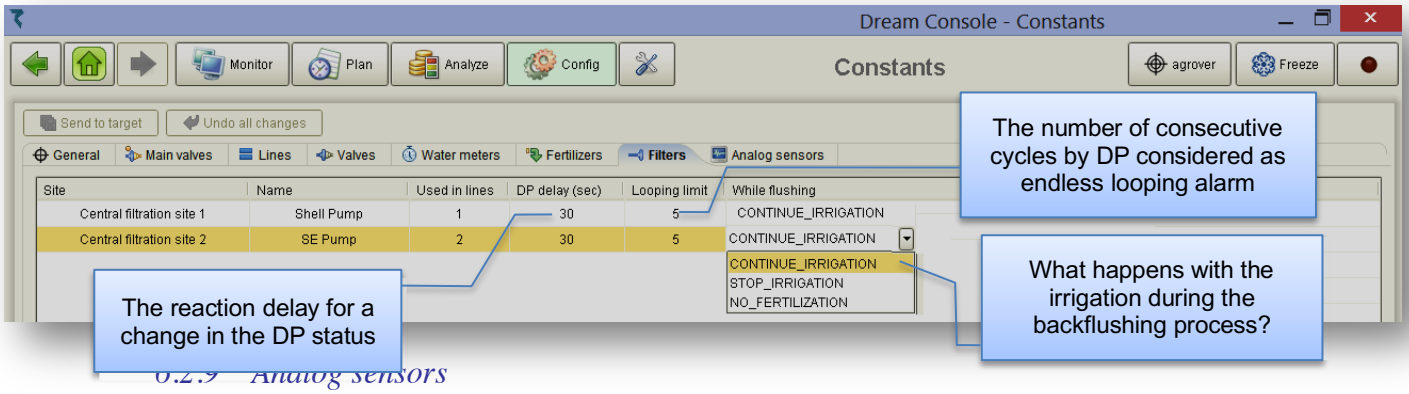


Notice that –

- The accurate setting of the **Nominal flow** of each injector is highly important and directly affects the ability of the system to stabilize on the desired set-points. The values of the **Nominal flow** are obtained from the **pH/EC interface** by communication and they result of the fert flow calibration.
- Each injector connected to the **pH/EC interface** can function in one of the following modes:
  a. **Regular** – in this mode the injector functions as any regular fertilizer injector.
  b. **pH controlled** – in this mode the injector participates in the process of the pH control.
  c. **EC controlled** – in this mode the injector participates in the process of the EC control.
  d. **Concentration** – in this mode the injector will maintain the defined concentration as long as the vales of the pH/EC are within the permitted limits

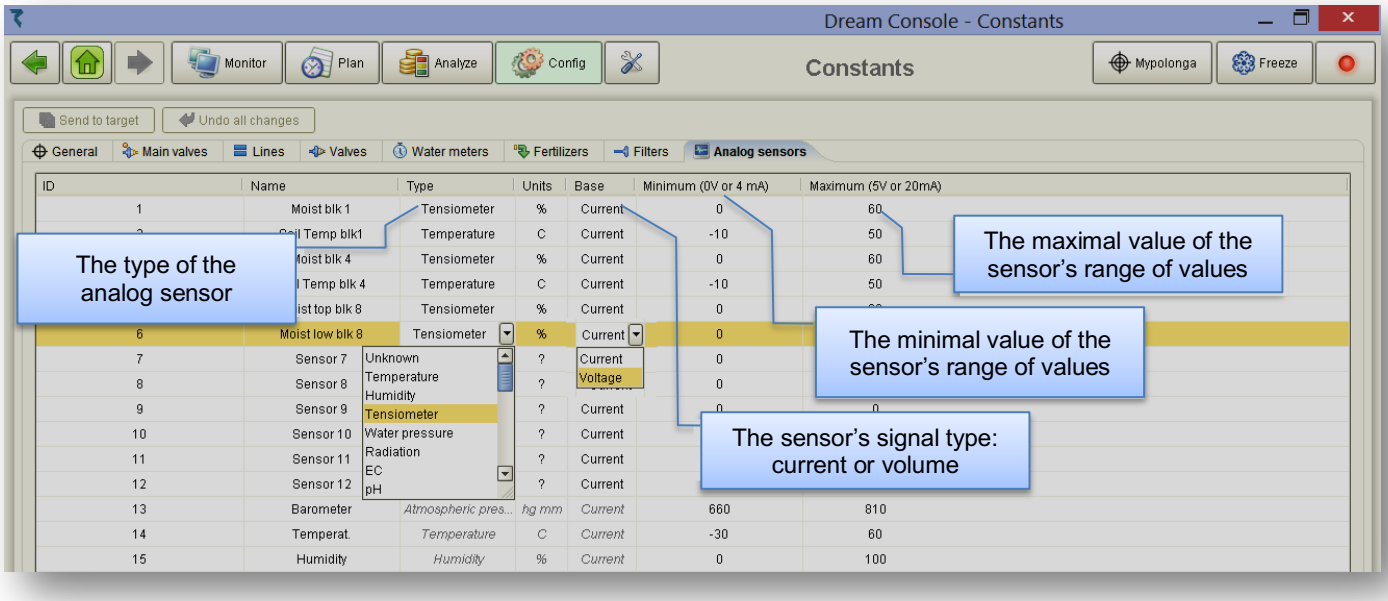
6.2.8 *Filters*

When the system includes Filters Backflushing the following parameters need to be defined:



6.2.9 *Analog sensors*

When the system includes **Analog sensors** the following parameters need to be defined:



6.3 Configure - Dealers definitions

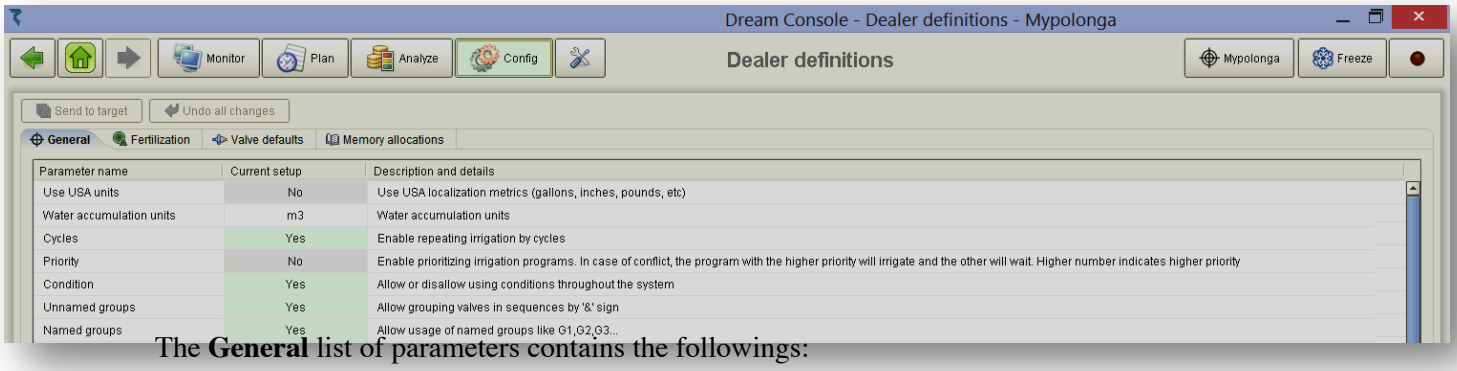
The **Dealers definitions** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Configure/ Dealers definitions**.

The person in charge of the system setup has been given some tools by which they can do some fine tuning of the system. This person can decide to hide unnecessary features and reveal useful ones. they can dictate some global default parameters, they can decide about the system behavior in some special cases and they can make changes in the memory allocation.
Dealer definitions are divided into the following categories and described in the following sections:

a) General
b) Fertilizers
c) Valve defaults
d) Memory allocations
e) Data acquisition

6.3.1 *Dealers definition – General*

The following section contains numerous yes/no questions and a few numeric settings that influence the general appearance of the **CONSOLE** and some basic features of the controller.



The **General** list of parameters contains the followings:

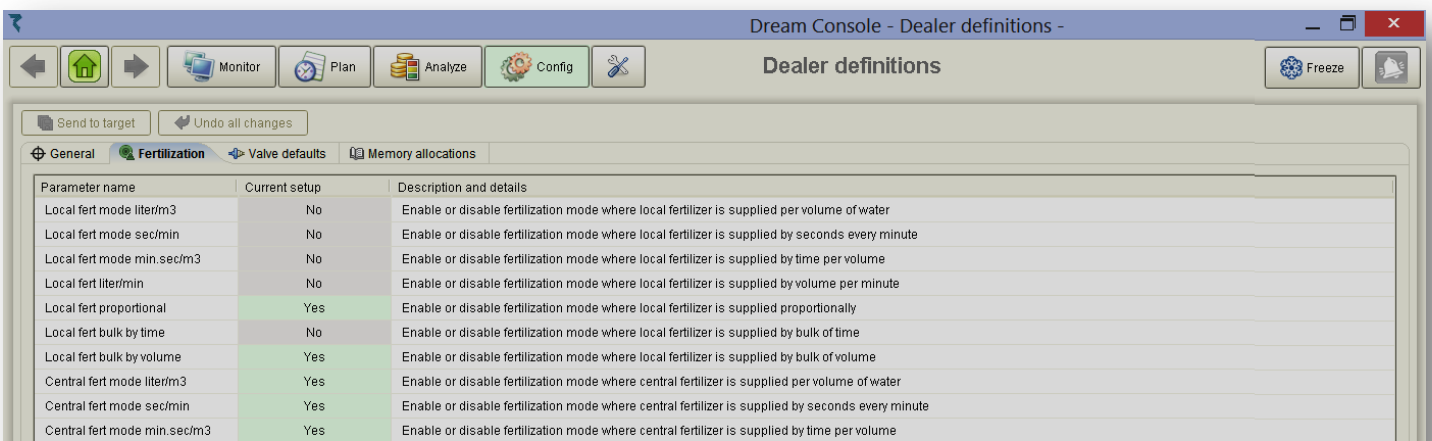
- **Use USA units** – for using gallons, thg, inches and other American standard units
- **Water accumulation units** – when USA units were selected the accumulation can be by thg, acre-feet or acre-inch.
- **Cycles** – permit using cycles per start.
- **Priority** – permit using priorities for programs. The priorities go from 0 (lowest) to 9 (highest).
- **Condition** – permit using conditions.
- **Unnamed groups** – permit grouping valves in sequences by the "&" symbol that will make them share the same water and fertilizer dosage.
- **Named groups** – permit using named groups like G1,G2,G3 stored in a library of groups.
- **Start together** – permit combining valves in a sequence by "+" symbol which will make them start together but with separate water dosages. If the valves are sharing the same fertilizer site, they will have a common fertilizer dosage plan.
- **Dosage per area** – permit dosing water by volume/area.
- **Evaporation control** – permit dosing water by evaporation.
- **Accumulated radiation** – permit triggering the cycles of irrigation by accumulated radiation.
- **Special water before** – permit using for the first local fertilizer injector a special definition of water before fertilization.
- **Stop time => Max duration** – use the Stop time of a program not as a time at which irrigation must stop, but as a maximal duration period.
- **Reuse valve in sequence** – permit the same valve to appear in the sequence more than once.
- **Sequential fertilization** – instead of injecting fertilizers in parallel, they will be injected one after the other, with a flushing procedure between them. The flushing is done by the last injector.
- **Use fertilizer sets** – permit using predefined sets of fertilizers stored in a library.
- **Use global fert limits** – force using global limits per valve that will define the total amount of fertilizer to be supplied to the valve per season. Each amount injected will

be deducted from the global limit until no more is left and then the injection of that fertilizer will be blocked for that valve.

- **Parallel programs in line** – permit irrigation of several programs at the same time on the same irrigation line as long as they do not irrigate the same valve at the same time.
- **Halt on repeated problems** – halt irrigation and freeze irrigation line when a high/low flow problem occurs repeatedly three times.
- **DP control** – permit the flushing to be triggered by the DP sensor during the line filling delay.
- **Frost protection** – permit using the frost protection mechanism.
- **Rain delay** – permit using the rain delay mechanism.
- **Sound alarms** – permit the alarm sound at the main menu of the controller while there exist alarm events.
- **Show I/O problems** – show communication problems at the display of the I/O status.
- **Gradual opening delay** – When irrigating groups of valves, the opening/closing will be gradual with a delay between the valves.
- **Delay for checking valve status** – The delay between the open/close command and the checking of execution, when the system contains sensors (flow switches or similar) to detect physical opening/closing of the valves.
- **Enable long sequences** – by default the length of sequences is limited to 28 members, the use of longer sequences must be explicitly enabled and then editing of sequences will not be permitted at the controller's MMI.
- **Collect communication log** – enable logging of the communication between the controller and its peripherals.
- **Collect time accumulations** – request accumulation by time additionally to volumetric accumulation.
- **Flow log data threshold** – in order to reduce the amount of the flow log data, we define a threshold that only when the change of the flow exceeds the threshold, it will be considered a change, otherwise the last value will be considered and no new value be recorded. The threshold is expressed in % from the last value.
- **Sensor log data threshold** – in order to reduce the amount of the analog sensors log data, we define a threshold that only when the change of the analog value exceeds the threshold, it will be considered a change. The threshold is expressed in % from the last value.

6.3.2 Dealers definition – Fertilizers

In the following section the person in charge of the system setup can decide which options of fertilizer dosage will be revealed to the user. Those that are not going to be utilized will be hidden.



Notice that –

- The list of **Fertilizer dosing** options is the following:

  a. **Liter/m3** – volume of fertilizer / volume of water.
  b. **Seconds/minute** – time of fertilizer / time of water.
  c. **Min:sec/m3** – time of fertilizer / volume of water.
  d. **Liters/min** – volume of fertilizer / time of water.
  e. **Proportional** – the proportion is calculated by dividing the desired amount of fertilizer with the desired amount of water.
  f. **Bulk by time** – continuous injection specified as bulk of time.
  g. **Bulk by volume** – continuous injection specified as bulk of volume.

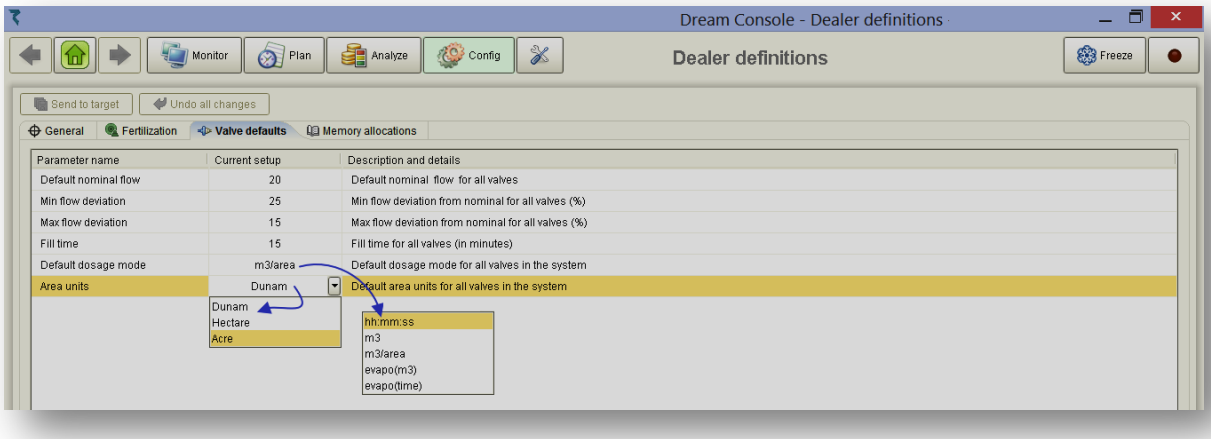
  The options "a-e" are all proportional modes of fertigation, in which the fertilizer is injected proportionally to the water. In options "a-d" the user defines the desired proportion, but in option "e" the proportion is obtained by calculation.

  The selection of the dosing options is done both for the local and for the central fertilizer sites.

- One of the dosing options can be set as the default dosing mode.
- When the fertilization is controlled by pH and EC the only option permitted is **liter/m3**.

6.3.3 Dealers definition – Valve defaults

The following section deals with default values belonging to the irrigation valves.

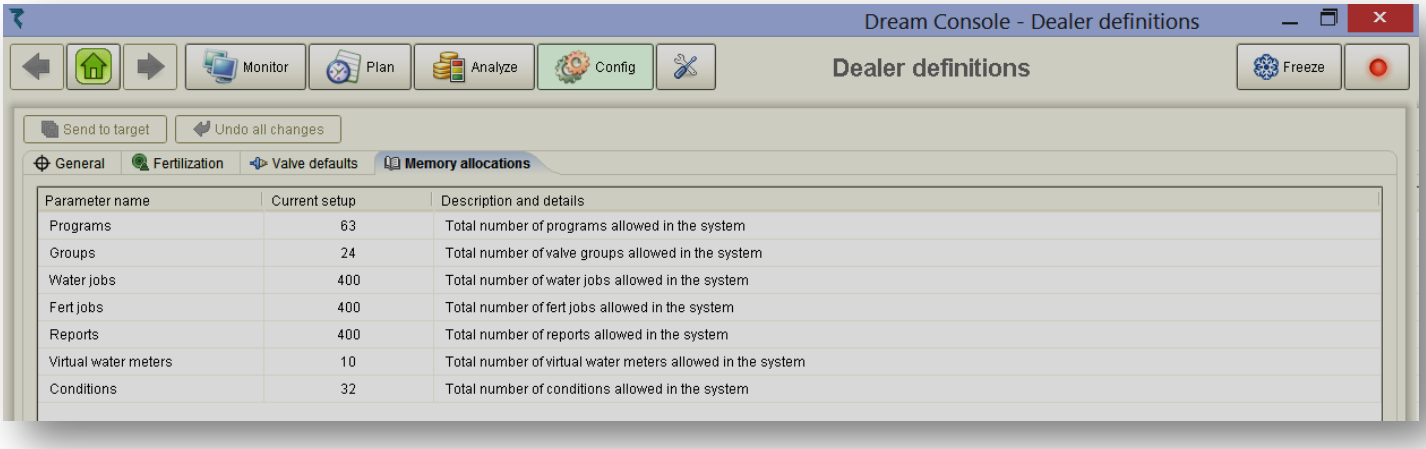


Notice that –

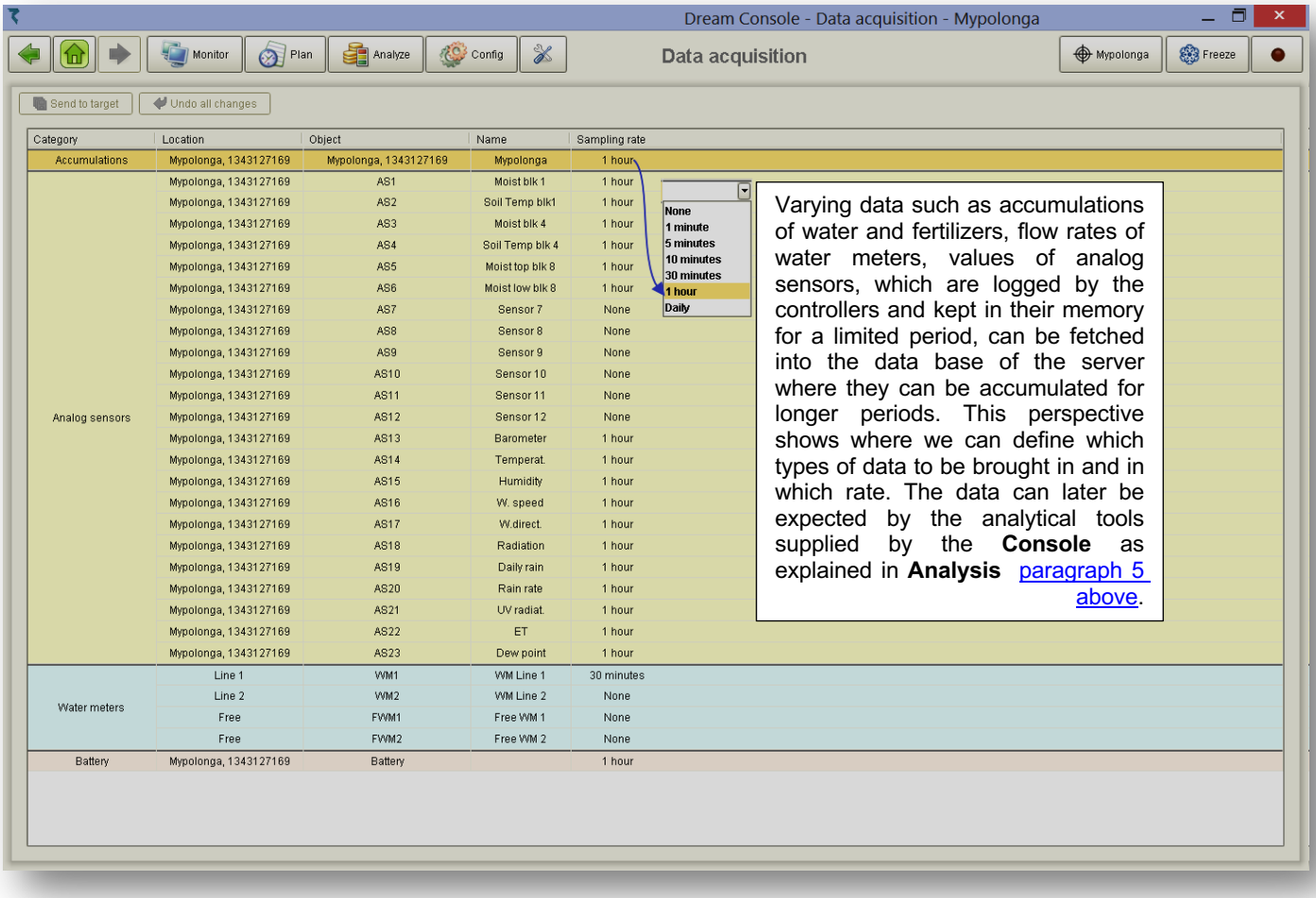
- The values of the **Nominal flow**, **Minimal / Maximal flow** and the **Fill time** will be used as default values for all valves, the user will be able to change and set the accurate values at the **Constants** of the **Irrigation valves** (paragraph 6.2.4 above).
- The **Default dosage mode** will be used whenever a new irrigation job is created.
- The selected **Area units** will be used whenever there will be reference to area based calculations.

6.3.4 Dealers definition – Memory allocations

The following section shows how much memory was allocated for various uses in the system. Usually there will be no need to make any changes here, however memory allocations can be increased when needed without losing any information.



6.4 Configure – Data Acquisition



Varying data such as accumulations of water and fertilizers, flow rates of water meters, values of analog sensors, which are logged by the controllers and kept in their memory for a limited period, can be fetched into the data base of the server where they can be accumulated for longer periods. This perspective shows where we can define which types of data to be brought in and in which rate. The data can later be expected by the analytical tools supplied by the **Console** as explained in **Analysis** paragraph 5 above.

Notice that –

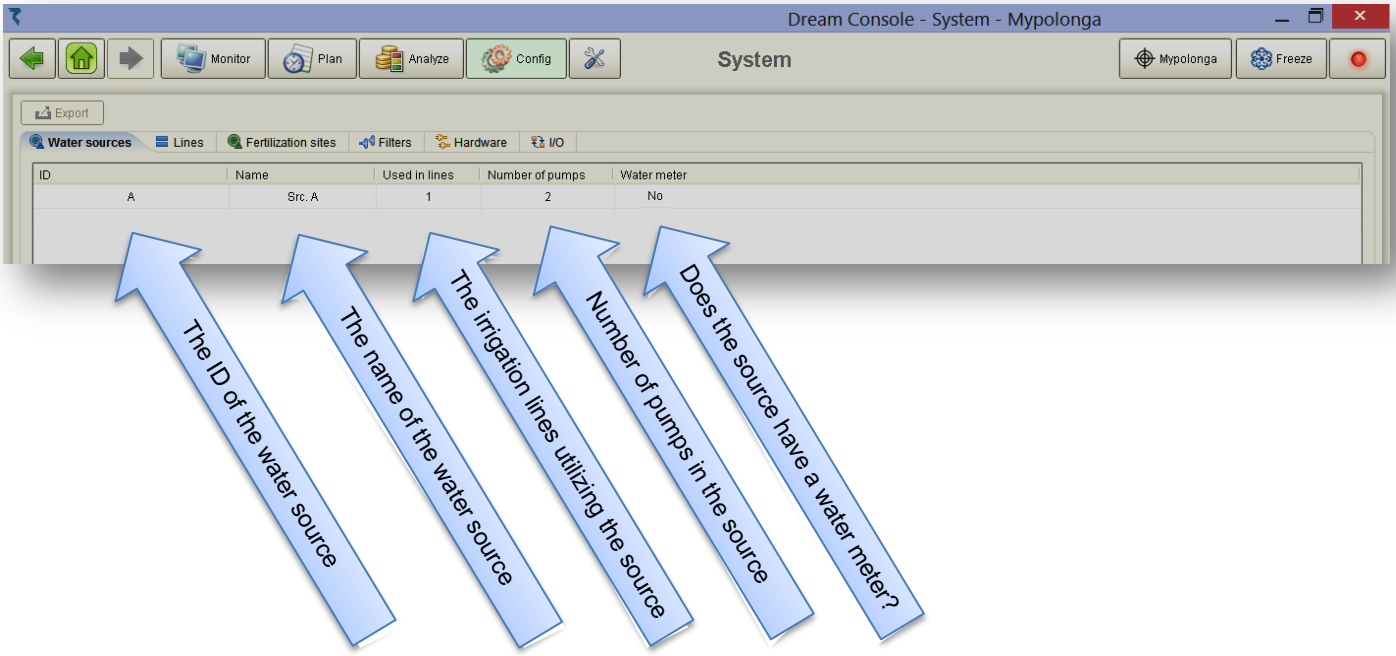
- How long will the **Server** keep the various types of logged information? The answer depends on the **Data retention** settings done at the **ADMINISTRATION** software. Check with the person in charge of the system setup that the **Data retention** parameters were properly set.

6.5 Configure – System

The following section is informative only; it contains information about the **System configuration**, including the contents of the hydraulic network to be controlled, the hardware used for setting up the system and a detailed list of where each item is physically connected.

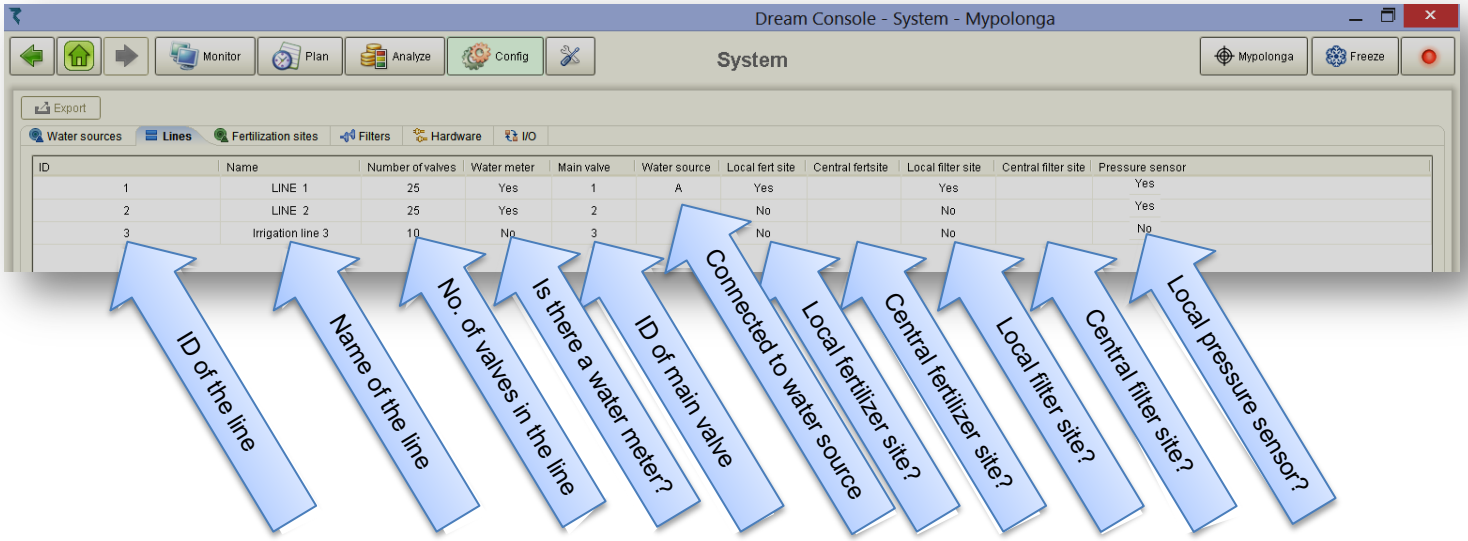
6.5.1 *System – Water sources*

When the hydraulic network includes **Water sources** the following information is supplied:



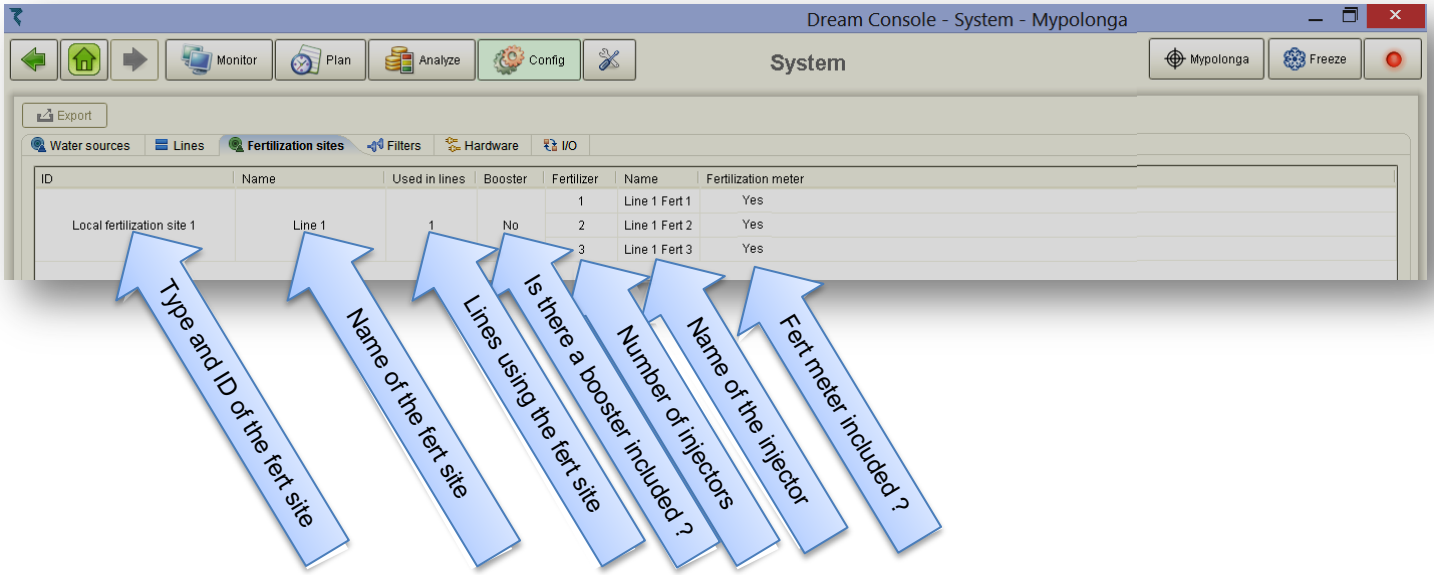
6.5.2 *System – Lines*

This section supplies details about the contents of the **Irrigation lines**.



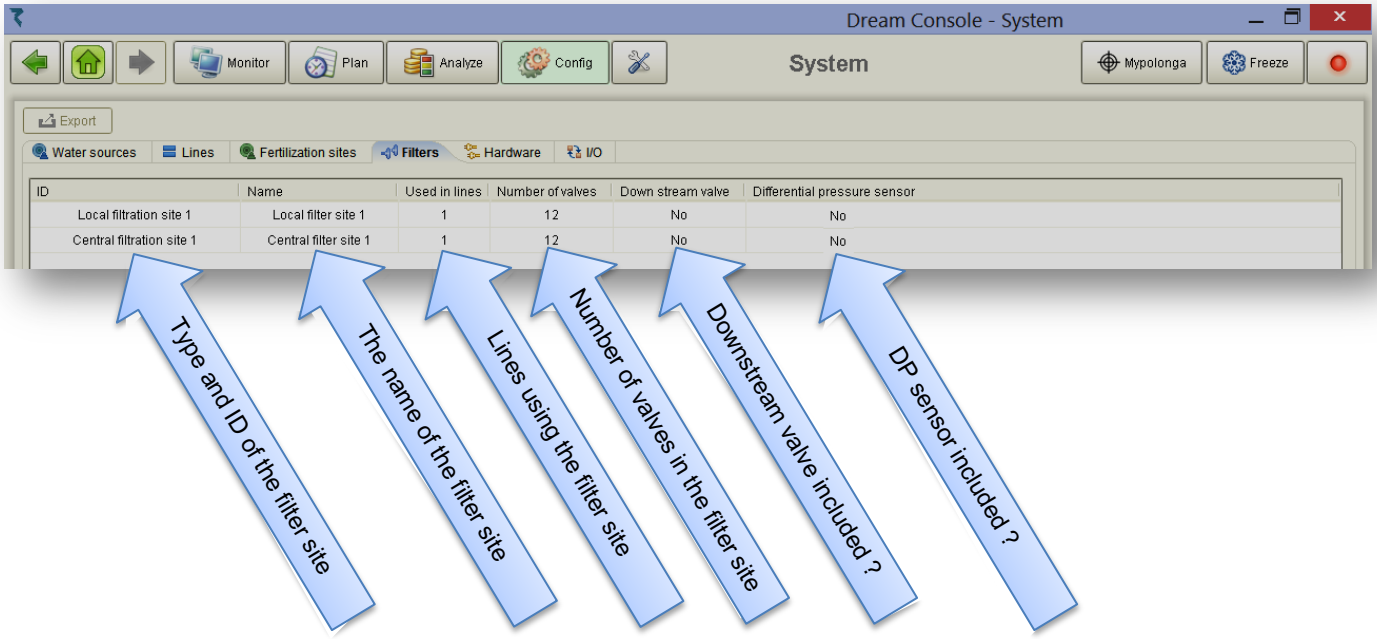
6.5.3 *System – Fertilization sites*

This section supplies information about the contents of the local and central **Fertilization sites**.



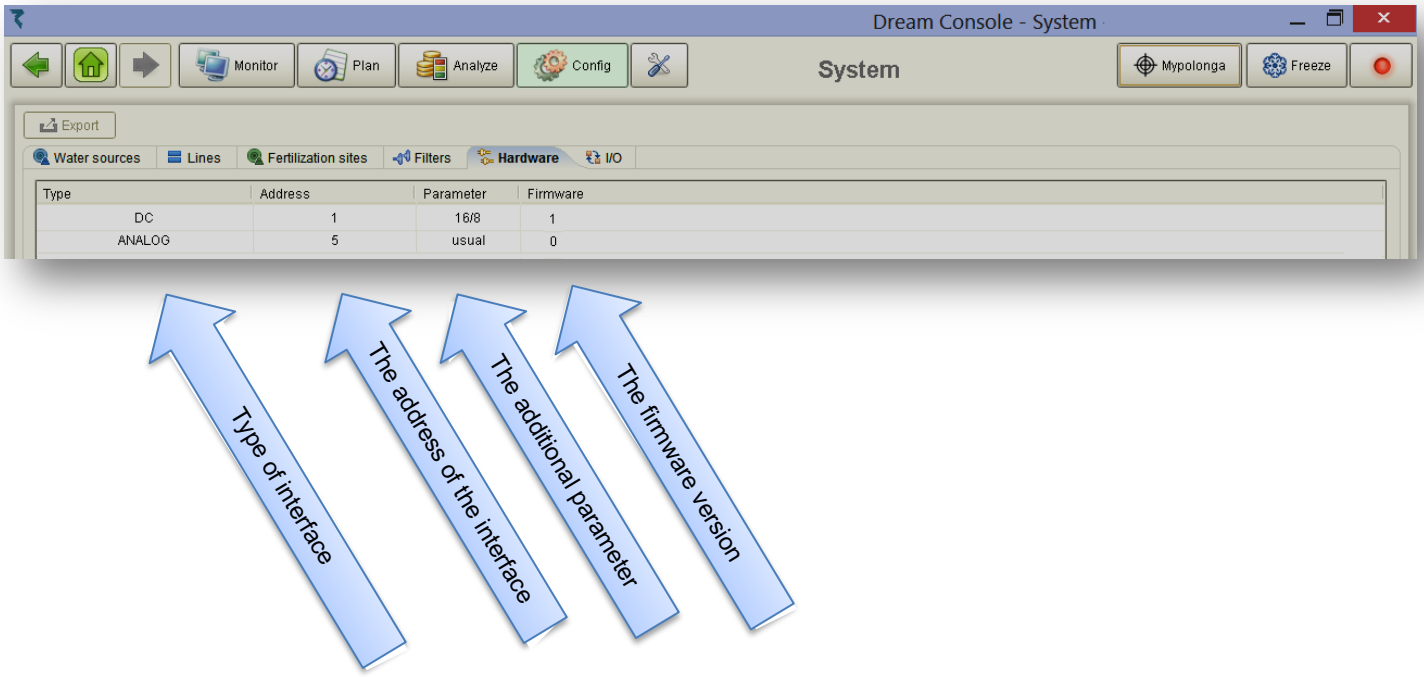
6.5.4 *System – Filter sites*

This section supplies information about the local and central **Filter sites**.



6.5.5 System – Hardware

Supplies information about the **Hardware** used for building up the control system. When speaking about the **Hardware** of the **VISION 2** we actually mean the ensemble of **Interfaces** through which the **C**entral **P**rocessing **U**nit communicates with the peripheral I/O boards, to which all the hydraulic accessories are connected. To each type of **Interface** there is a parameter supplying some additional information about that specific type of interface.



Notice that –

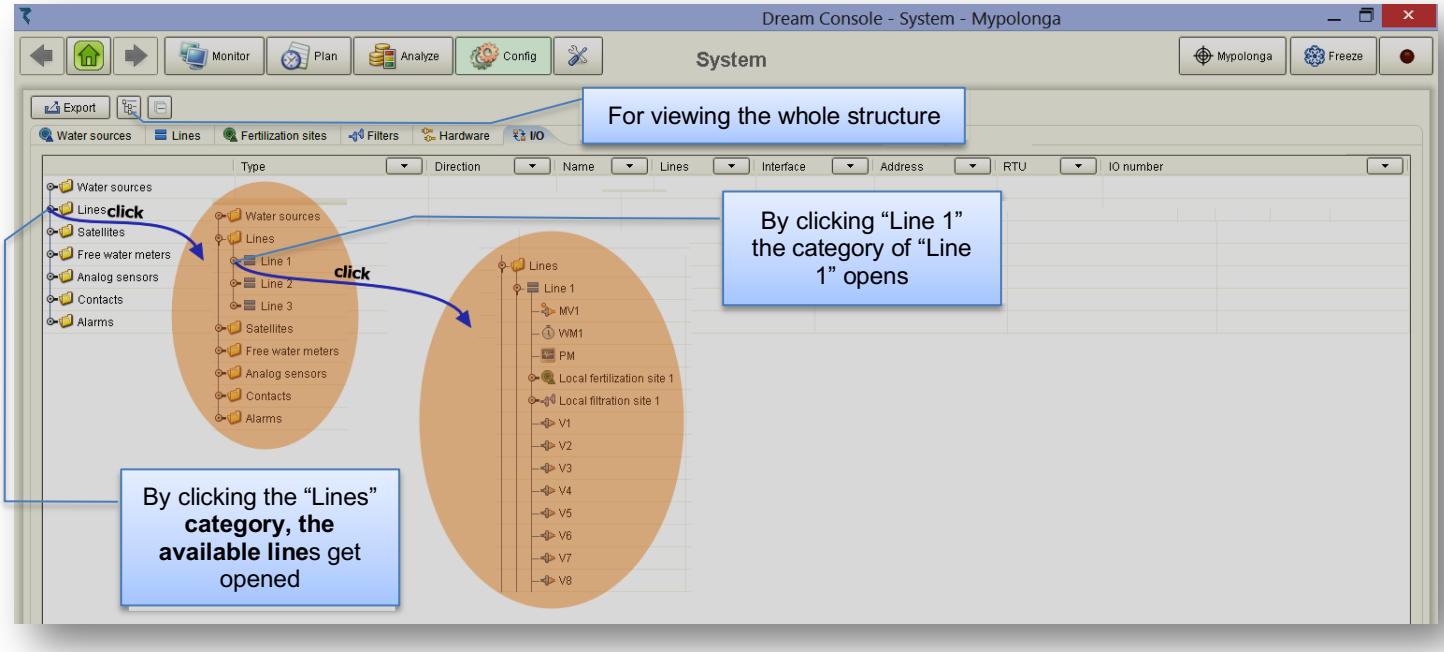
- Each **Interface** must be given a unique address, the address appearing in the hardware list must be equally set at the **DIP switches** (the address switches) of each **Interface**. The addresses need not be sequential.

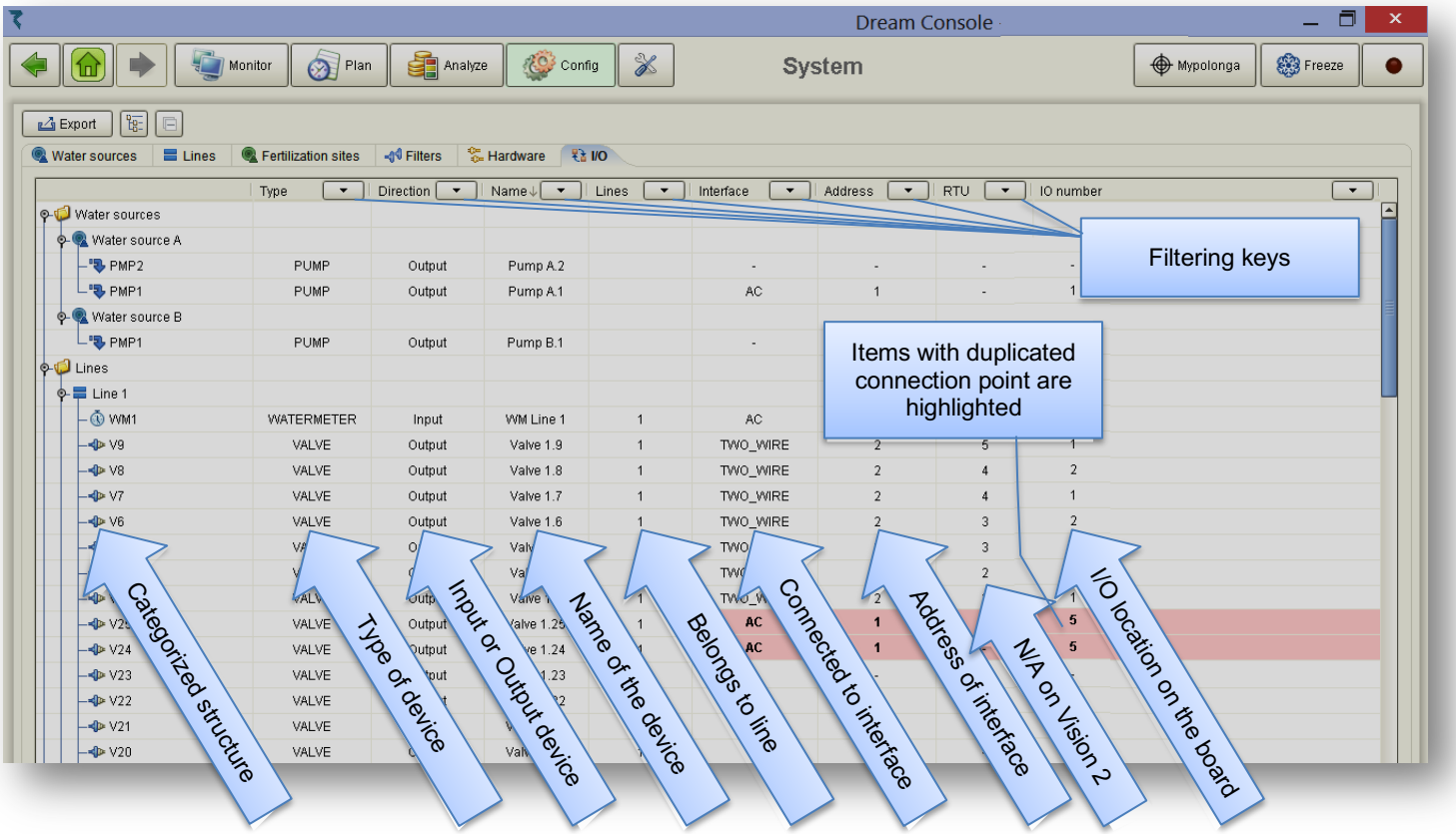
- The following type of interfaces exist:
  a. **Interface DC - ** the additional parameter defines how many outputs and inputs will the interface control: 16/8 or 32/16 (output/inputs). The outputs are **12 DC latching** and the inputs are of dry contact type.
  b. **Interface AC -** the additional parameter defines how many outputs and inputs will the interface control: 16/8 or 32/16 (output/inputs). The outputs are of **24v AC** and the inputs are of dry contact type.
  c. **Interface of 4 wired RTUs –** N/A on Vision 2 controllers
  d. **Interface of 2 wired RTUs** – N/A on Vision 2 controllers
  e. **Interface of RF RTUs** – N/A on Vision 2 controllers
  f. **Interface of pH/EC control -** the additional parameter defines the fertilizer site to which the interface belongs.
  g. **Interface of Analog inputs -** the additional parameter defines the type of analog interface in use. The following options exist: **Usual**, **Davis**, **THD**. The **Usual** is for standard Analog inputs, the **Davis** is for a weather station and the **THD** is for a special device that measures **T**emperature, **H**umidity and **D**ew point.

6.5.6 System – I/O

The following section deals with the connections list of all the items included in the **Hydraulic network** definition, to the available Inputs and outputs (I/O) boards.

The connections list is arranged in a categorized structure, so that the user can decide to view only the categories he is interested in or the whole structure if he likes to.





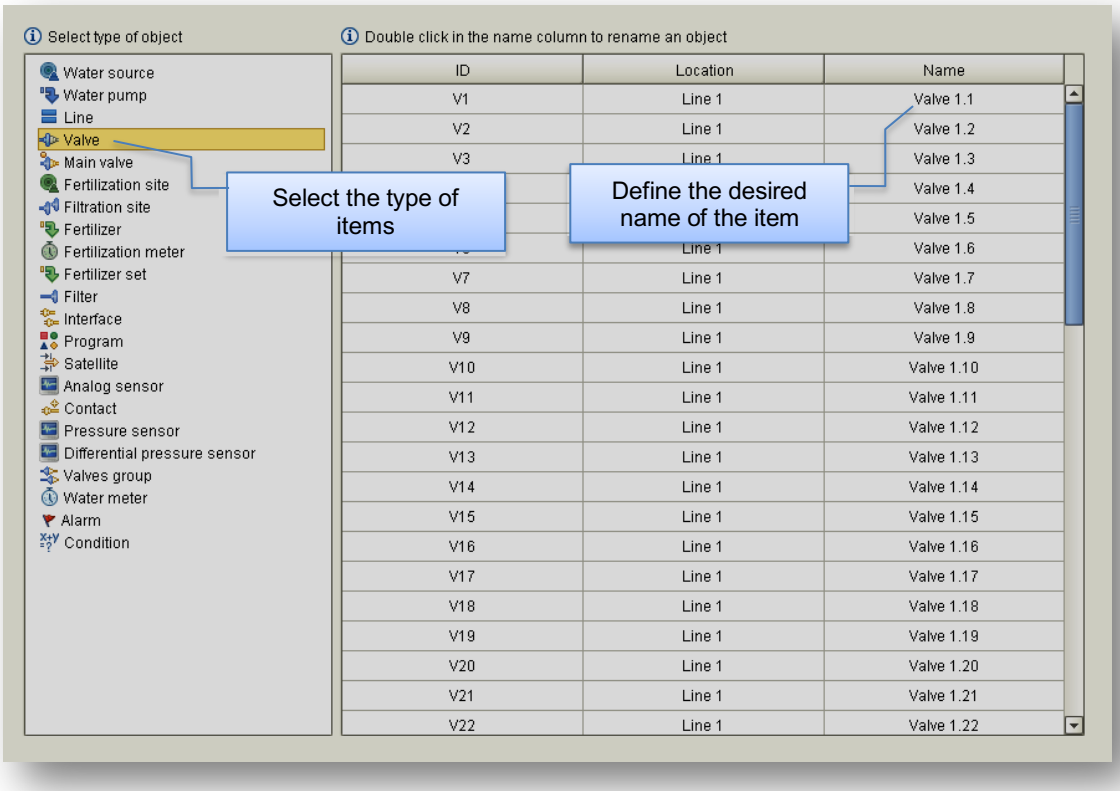
Notice that –

- The list can be filtered by any category, so one can ask to see for example only the inputs connected to interface 1.
- When more than one output or input is assigned to the same connection point, the items will be highlighted.
- The contents of the displayed part of the list can be exported into a “csv” (Excel) file, and then saved or printed as needed.

6.6 Configure – Names

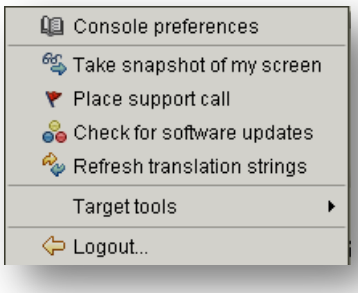
The **Names** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Configure/ Names**.

The **Names** section enables the user to define desired names to all the items included in the **Target’s image**, including abstract items such as irrigation programs and conditions. All items are given default names by the system; however it makes it much friendlier when the user can define each item a name which is more descriptive and better suiting the particular case.



7. Tools

The following chapter supplies information about some useful tools for setting some preferences, checking for updates, sending support calls and doing some operations with the target. Some of the tools may serve the end users and some are meant for the people in charge of the system setup and maintenance, let's call them technicians



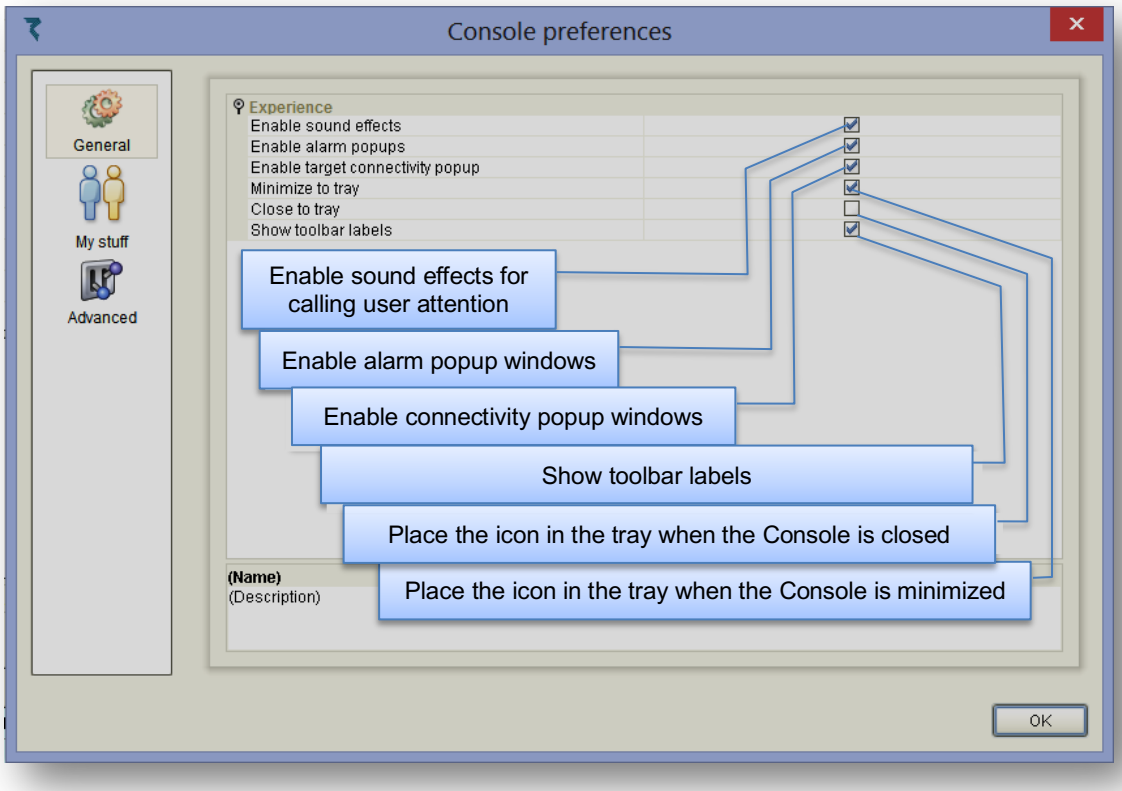
For end users

7.1 Tools – Console preferences

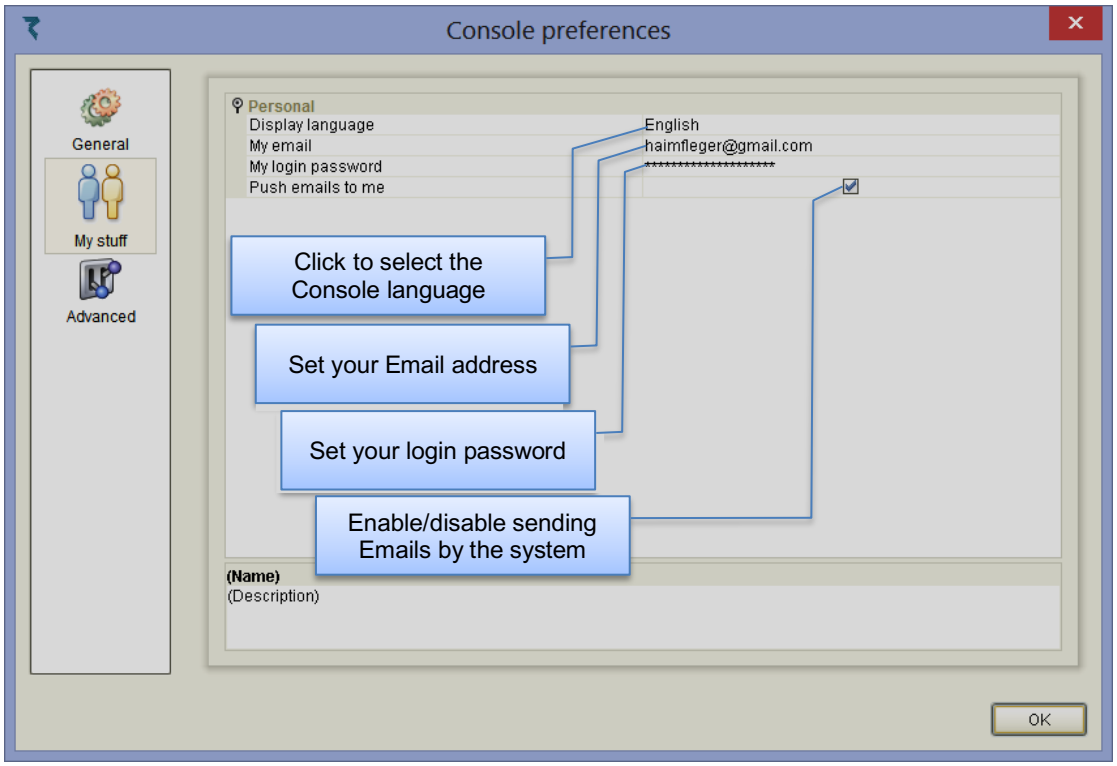
The **Console Preferences** perspective can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Console preferences**.

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

7.1.1 Console preferences – General

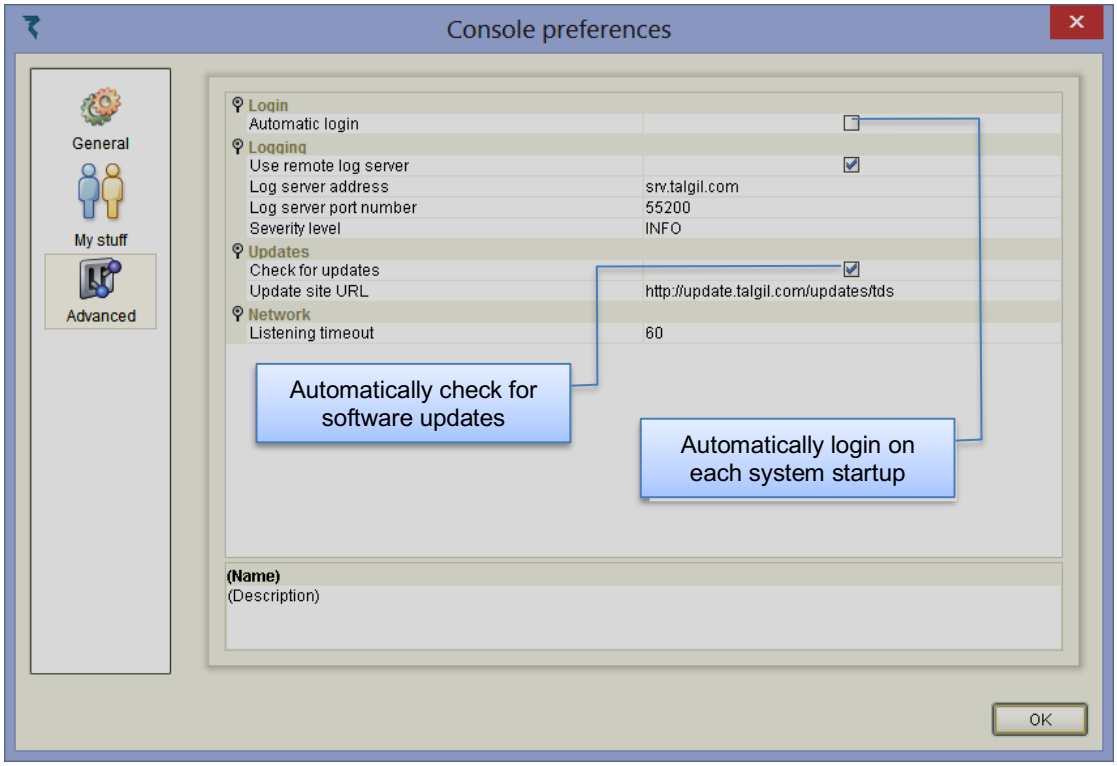


7.1.2 *Console preferences – My stuff*



7.1.3 *Console preferences – Advanced*

The **Advanced** preferences are meant for use mostly by the professional people. Except for **Automatic login** setting and **Check for software updates**, any changes made by nonprofessional users may have undesired consequences.



7.2 Tools – Taking snapshots of my screen

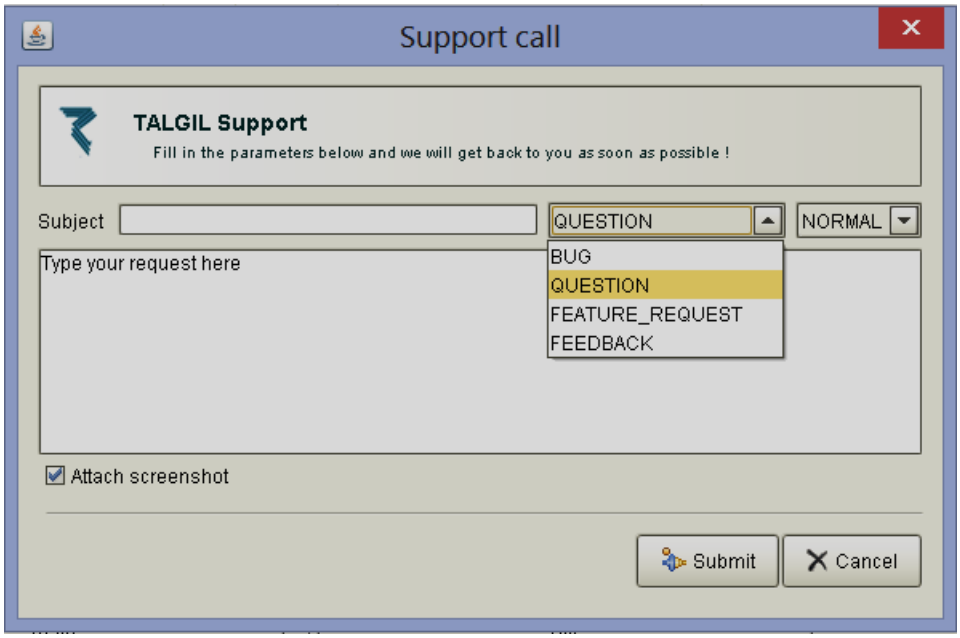
The **tool of taking screen snapshots** can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Take snapshots of my screen**.

The outcome of this tool is a "png" type file that contains a screenshot of the current perspective of the **CONSOLE.**

7.3 Tools – Place support call

The **Place support call tool** can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Place support call**.

The **Place support call tool** enables the user to report errors, send feedback, ask questions the technical support team of Talgil. Once the Support call is submitted, an Email is sent automatically to the support team.



7.4 Tools – Check for software updates

The **Check for software updates tool** can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Check for software updates**.

The technical staff of Talgil releases a new version of the **CONSOLE** software from time to time. The new versions usually contain bug fixes and new features. It is strongly recommended to have the **CONSOLE** up to date. The software updates are supplied free of charge. In paragraph 7.1.3 above it is shown that an **Automatic Check for updates** can be requested, however the user may issue a check for update command whenever he wishes to do so, by use of the **Check for software updates** tool.

7.5 Tools – Refresh translation strings

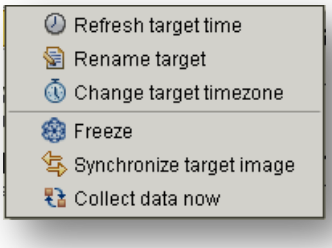
The **Refresh translation strings tool** can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Refresh translation strings**.

The purpose of the **Refresh translation strings tool** is to enable viewing the result of translated strings right on the perspectives of the **CONSOLE**. This is a helpful tool for those who are translating the screens of the **CONSOLE** to other languages.

7.6 Tools – Target tools

The **Target tools** can be reached from the **Main menu** or the **Pull down menu** by selecting **Tools/ Target tools**.

The list of **Target tools** for the end user and for the technicians is not the same, the additional target tools of the technicians will be discussed in chapter 8 below.



For end users

The end user target tools enable doing the followings:

Refresh target time – the targets are running their own internal clock, this clock is synchronized from the **SERVER** each time the target reconnects to the **SERVER**. However if the user wishes to refresh the target clock he can use this target tool.

Rename target – this tool enables the user to define a new name to the target.

Change target time-zone – each target has its **time-zone** defined according to its physical location. When the **SERVER** is sending the current time to the target for synchronization it is sending the **GMT** (**G**reenwich **M**ean **T**ime) and the target adjusts its internal clock by adding its displacement based on its **time-zone**.

Freeze – the **Freeze** command halts all activities of the target closing all outputs and staying in that position until the **Resume** command is issued.

Synchronize target image – the **SERVER** keeps an updated image of each of the targets, so that when a user needs any information from the target, he actually gets it from the target's image stored at the **SERVER**, however if the user has reason to believe that the image of the target kept at the **SERVER** is not perfectly up to date, he can use the **Synchronize target image** tool for updating.

Collect data now – the **Data acquisition** settings define the rate at which various types of data will be sampled and logged. The information is kept at the target log files and fetched into the **SERVER**'s data base from time to time. If the user wishes to get that logged data right away, he can ask to **Collect data now**.