VISION 2
Irrigation Control Systems
USER GUIDE

GOLDTEC
CONTROL SYSTEMS

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1. Introduction

The **VISION 2** irrigation control system is the second generation of the well-known **VISION** family.

Additionally, to the outstanding features of the **VISION** system, the new generation now offers internet communication so that users of the **VISION 2** system can access their controllers from everywhere, anytime.
** Please NOTE that this is not an included feature but an optional extra.

Users are offered two options for accessing the system: one known as the **CONSOLE** which is a software package that has to be installed on a **PC**, the other is just an internet site called the **SPOT** which does not need any loading and is meant to be used on **CELLULAR PHONES** and **TABLETS**.

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.

On the other end there are the controllers that also login to the **SERVICE** and stay online. The **SERVICE** will repeatedly interrogate all the online controllers in order to keep its **DATA BASE** up to date, so that users interested in some information about their controllers, can find it in the **DATA BASE**.

The aim of the following manual is to describe the features of the **VISION 2** controllers and teach the users how to program it using the local **MMI** of the controller.

Prior to start using the controller in any specific facility, a configuration procedure must be executed in which the image of the controller is defined. In this manual we assume that the configuration procedure has been fully completed either by using the "**Image Maker**" of the **CONSOLE** or by the local **MMI** .

For learning how to use the CONSOLE software, see the "VISION 2 PC CONSOLE User Guide"

The Key-board description

Function keys- F1, F2, F3, F4 (from left to right) handle position dependent functions. The functions are specified above the keys at the Function bar of each screen.

Arrows for inside screen movement– moving from one field to another UP, DOWN, LEFT and RIGHT

Numeric keys + Short cut keys- While being inside the MAIN MENU, each numeric key serves for direct jumping into the subject whose name is printed above the key

MENU key- Used for getting back to the Main Menu from any other screens

PAGE UP key- for moving to screens located above the current screen

PAGE DOWN key- for moving to screens located below the current screen

1.1 How to Switch-Up and Shut-Down the system

Switching up and shutting down the **VISION 2** controller are activities that deserve some explanations:

Switching up the **VISION 2** from a switched off state is done in 2 steps:

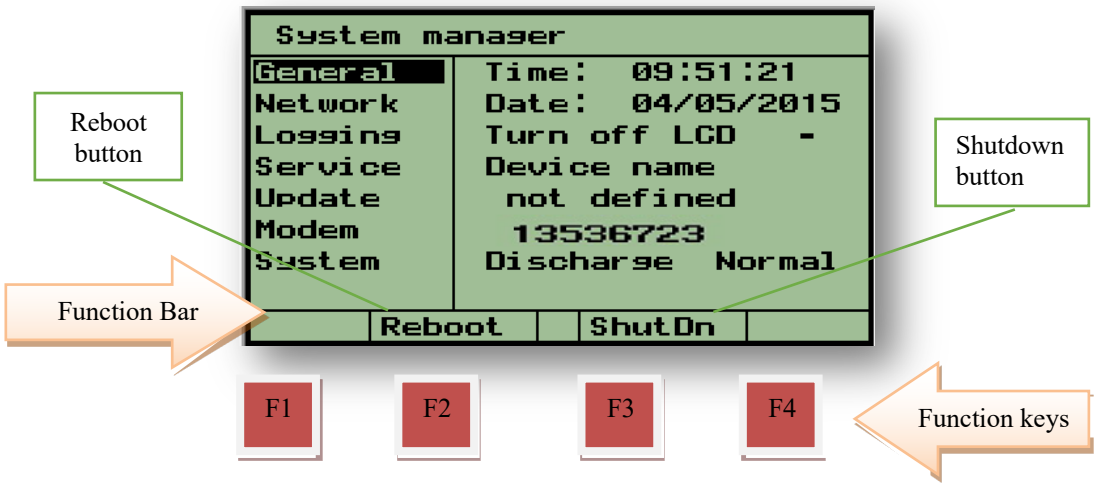
1. Turning ON the **Power Switch**
2. Pushing the **Start button**

About the **Power Switch** and **Start Button** see the paragraph of the **Power Supply Board** below. Each time the software is restarted there will be some introductory screens displayed, then the **System manager** screen (described below) will appear for a few seconds and eventually the **Main menu** of the DREAM application will be displayed. The user should wait patiently until this stage is reached.

The internal structure of the **VISION 2** is very much like the structure of a desktop personal computer that has an operating system which handles multiple applications simultaneously. This kind of activity is naturally involved with opening of multiple files as required by the active applications. As in PCs, cutting the power before closing the open files may be a harmful action and therefore should be avoided. For this reason we are not supposed to turn off the power switch of the controller before the software was commanded to shut down.

The software **Shutdown** button is located at the **Function Bar** of the **System Manager** screens, which can be reached from any of the **VISION 2** application screens, by pushing simultaneously the **PgDn** (∨) and **PgUp** (∧) buttons.

Pushing the **F3=Shutdown** button is the only safe way for shutting down the **VISION 2** controller. Shutting down takes time, it is necessary to wait until the lights on the CPU board turn off. Only after the lights on the CPU went off, it is safe to switch off the **Power Switch** (see below).

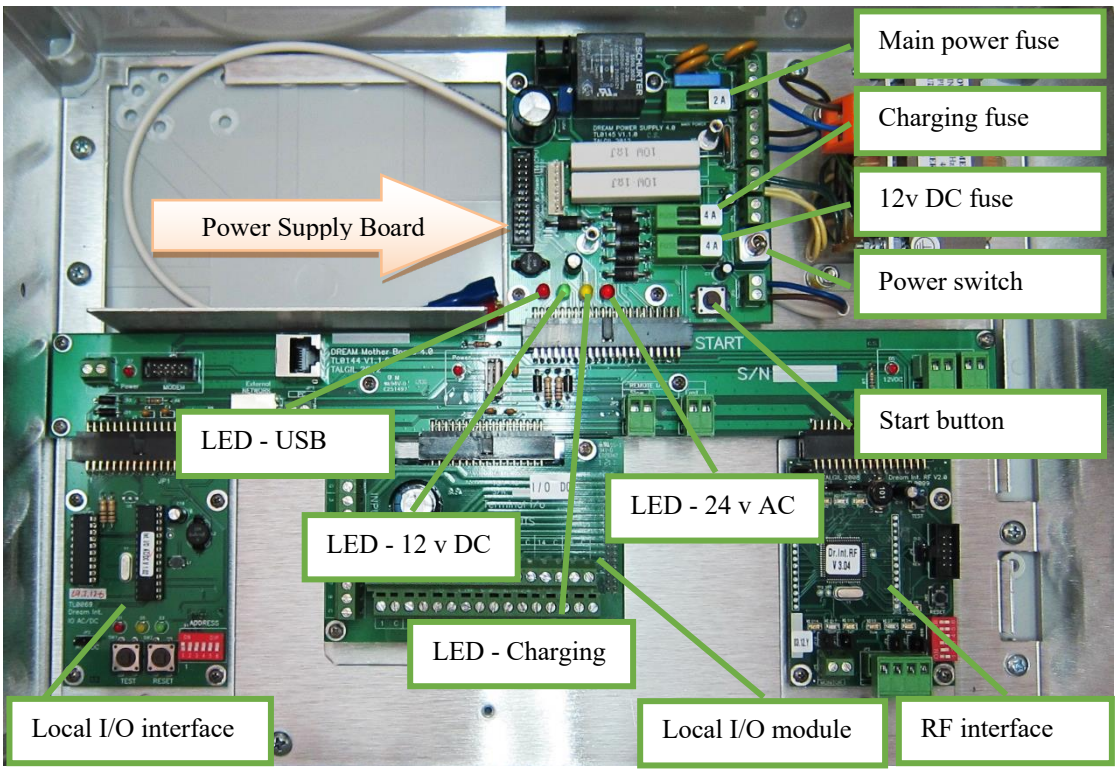


- The **Shutdown** software key turns the **VISION 2** system OFF.
- The **Reboot** software key turns the **VISION 2** system OFF and then ON again.

The **Reboot** and **Shutdown** functions are activated by pushing the red function keys located underneath the **Function Bar** of the screen. Both functions preserve all the data included in the controller except the statuses and left quantities of programs.

1.2 The Power Supply Board

In the following paragraphs we are going to have a look inside the box of the **VISION-2** controller, although the information may seem to be a little technical, we think it can be useful if the user gets familiar with the functions of the switches, the LEDs, the fuses and some main components of his system.



When the **Power Switch** is off, only the yellow LED should keep on lighting, indicating that the charging of the backup battery continues.

When the **Power Switch** is turned on, some more LEDs of the power supply board will start lighting.

The red LED 🔴 indicates that 24v AC arrives to the system from the transformer (in AC systems only). If this does not happen, the power from the mains and the **Main Power Fuse** have to be checked.

As mentioned above, the yellow LED 🟡 indicates that the charging voltage (13.9v DC) for the backup battery is generated. If this LED does not light, check the **Charging Fuse**. The backup battery should never left to be deeply discharged, it may harm the battery, therefore if the charging source is expected to be disconnected for a long period, the backup battery has to be disconnected as well, otherwise when the charging is restarted, the deeply discharged battery may draw a high charging current that may blow the **Charging Fuse (F3)**.

The green LED 🟢 indicates that the 12v DC arrives into the system. The 12v DC is used for feeding all the electronic boards of the system; it may be generated either from the charging device or from the backup battery, when the charging device is off. In case of AC systems the charging device is the transformer, while in DC systems it is the solar panel. The system is protected from excess current consumption from the 12v DC source, by the **12v DC Fuse (F2)**.

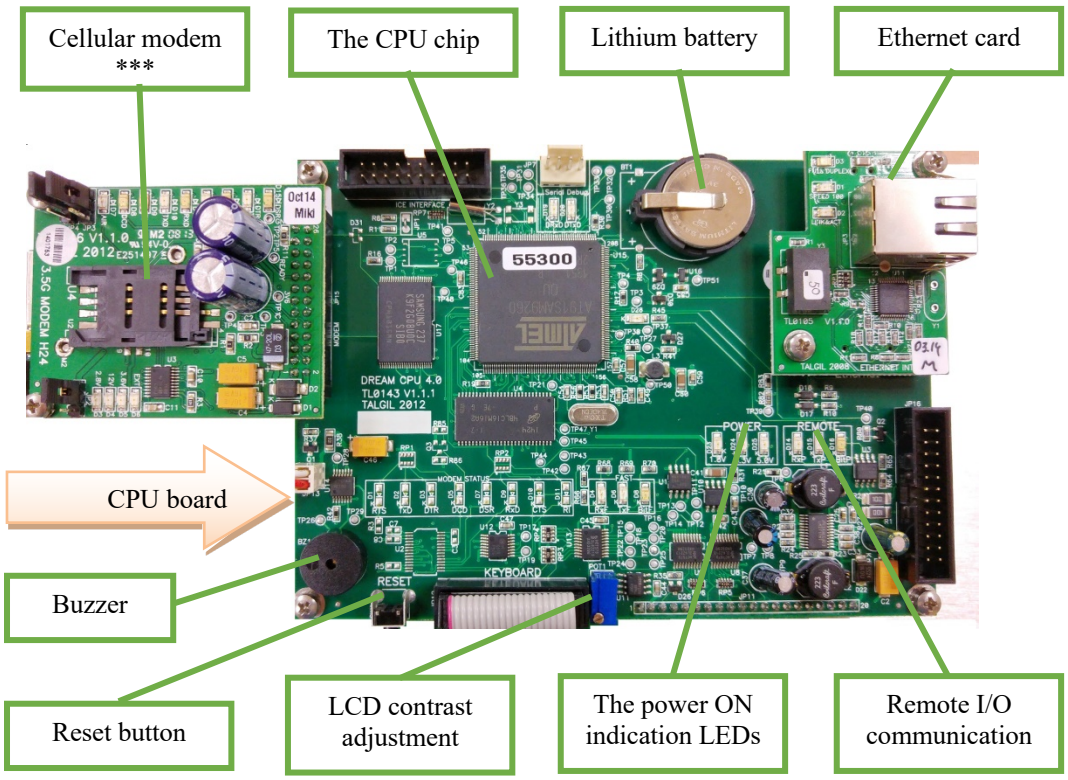
⚠

Important remark: The charging current passes through both the **Charging Fuse** and the **12v DC Fuse**, so if for some reason the **12v DC fuse** is blown there will be no battery charging, although the charging voltage exists (yellow LED 🟡 ON).

The red LED 🔴 of the USB will start lighting only after the **Start Button** is pushed, indicating that the system is now up and running. Together with the USB LED of the power supply board, the red LED 🔴 on the Mother Board and the three red **power LEDs** on the CPU Board 🔴🔴🔴 will start lighting as well.

1.4 The CPU board

Looking underneath the front panel, at the back of the **LCD display** we are going to find the **CPU Board** which is the brain behind all the activities of the controller. Let's get familiar with some of the components on the CPU board:



When the **VISION 2** application starts running, a few activities start in parallel:

- The **LCD display** connected to the **CPU board** will start showing some introductory screens until arriving to the **Main Menu**.

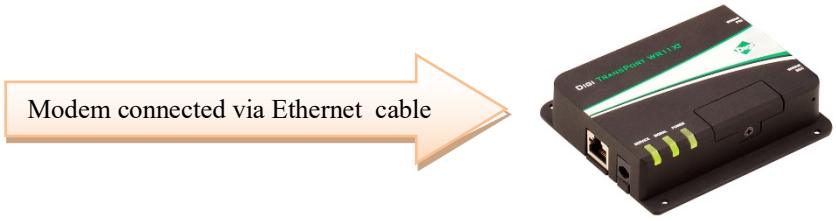
- The **CPU** starts scanning all the **Interfaces** second by second, sending them the required status of the outputs receiving back the status of the inputs. This activity is indicated by blinking of the **REMOTE I/O** communication LEDs on the **CPU Board** and on each of the **Interfaces**.

- Right after starting up the **VISION 2** application, the controller starts looking for its host server on the Internet, in order to login to the service.

1.5 *The concept of the internet communication*

The **DREAM 2** accesses the internet in the following ways:

- Using an **Intergrated Internet modem** that utilizes a SIM card
- Using an **Ethernet card** for connecting to a **L**ocal **A**rea **N**etwork
    - Client supplied modem that utilizes a SIM card
    - Client supplied internet via ethernet cable to their own network



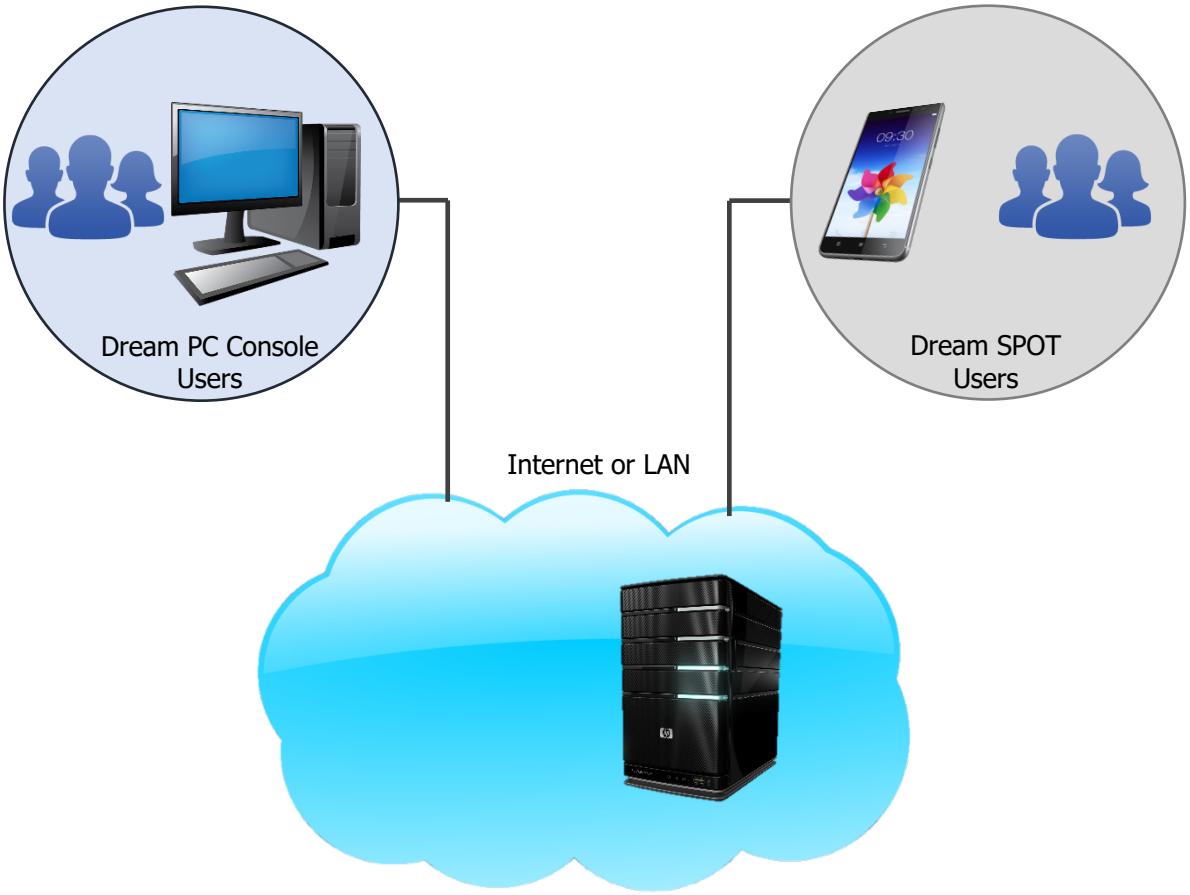
The controllers after power up use their internet link to login to the service and stay online.

As mentioned above, users have two options for accessing the system: one option is the software package called **CONSOLE** and the other is the internet site called **SPOT**.

Both options enable the users to login to the **SERVICE** which will coordinate 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 decides about who is permitted to access which controller.

The **Server** 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**.

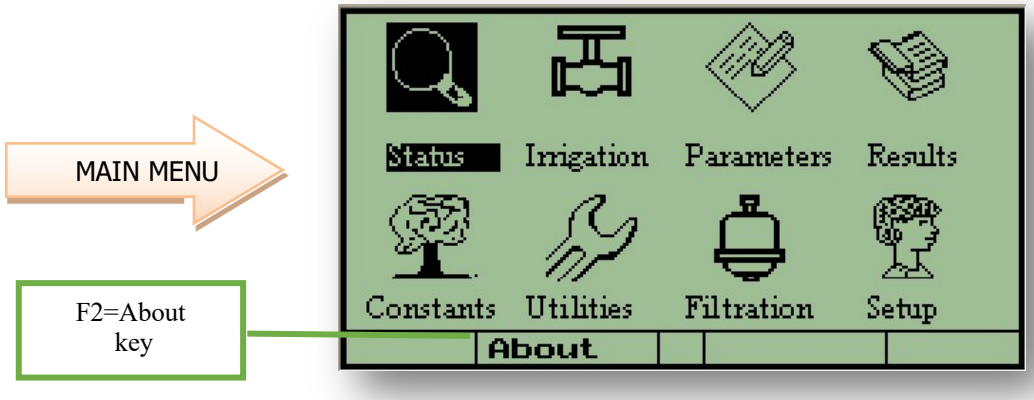
The drawing below demonstrates the physical layout of the communication between users and targets (controllers) in the **VISION 2** system.



For setting up the internet communication there are some parameters to be defined. The setting of these parameters is the job of the technical person in charge of the system installation. Those who are interested can find information in the chapter dealing with the **SYSTEM MANAGER** screens in the **Installation Manual of the DREAM 2**.

Finding your way inside the VISION 2

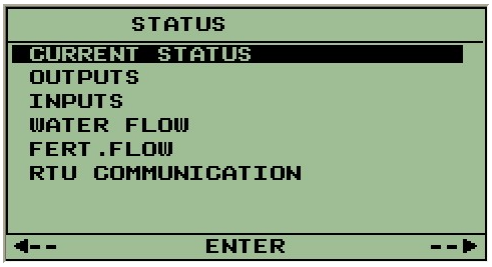
The **MAIN MENU** of the **VISION** includes 8 subjects represented by 8 icons as shown below. Underneath each icon there is a **SUBMENU** through which we can reach any of the screens included in that subject. Selecting any of the subjects is done by placing the cursor (black background) on the desired icon and hitting the **ENTER** key. For getting back to the **MAIN MENU** from any screen use the key at the bottom rightmost corner of the numeric keypad.



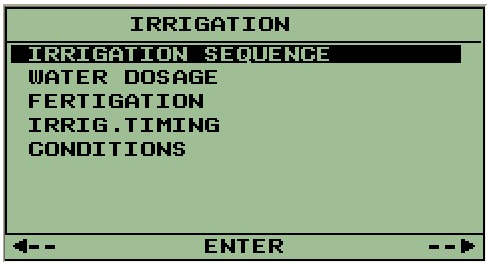
Having a closer look at the numeric keypad we shall see that above each key there is some additional printing, this is to indicate that each key while being in the **MAIN MENU** can act as a shortcut to the screen associated with it.

Each subject of the Main Menu when selected reveals a Sub Menu, use the inside screens movement arrows (⇦ ⇨⇧ ⇩) to select the desired subject and hit the **ENT** (Enter) key for selection.

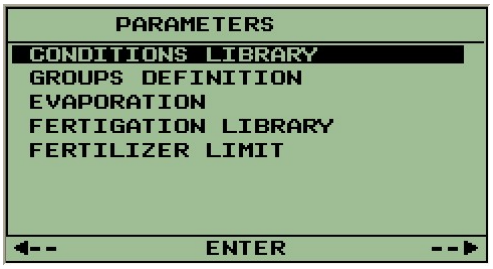
STATUS – showing statuses of the system and it's components



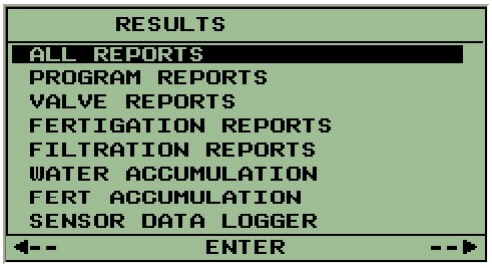
IRRIGATION – supplying the tools for definition of irrigation programs, including tools for inspection of the irrigation process and the tools for intervention when necessary



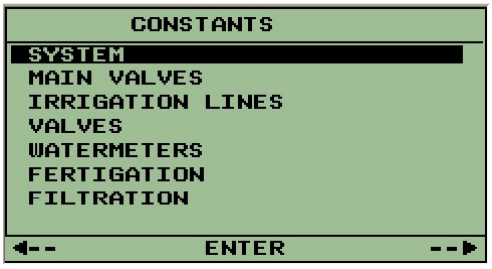
PARAMETERS – dealing with definition of supplementary parameters related to irrigation and fertigation processes



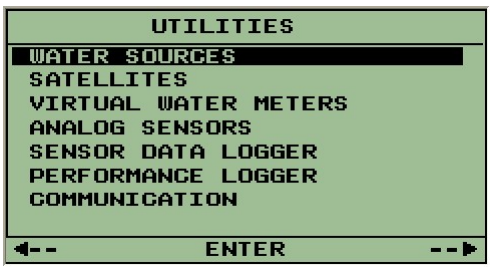
RESULTS – showing reports and accumulations resulting of the system's activity. The reports can be viewed under various categories



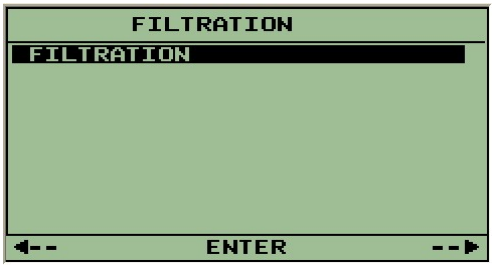
CONSTANTS – setting the constant parameters of all the system components



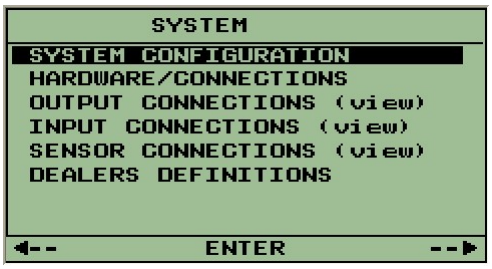
UTILITIES – dealing with special functions that can be utilized in various system activities



FILTRATION – handling the filters flushing programs



SETUP – contains all the necessary activities involved with the system configuration and setup



The contents of the Main Menu and the Sub Menus may vary according to the relevance. For example, if no filters are defined, the subject “FILTRATION” will be omitted from the Main Menu.

To simplify the access to the more popular subjects, a direct jump can be made by using the shortcut function of the numeric keys while being in the Main Menu. The subject associated with each key is printed above the numeric keys. While being inside any subject of a submenu the function keys F1 = ◄-- and F4 = --► can be used for circling between the other subjects included in that submenu.

Defining Irrigation Programs

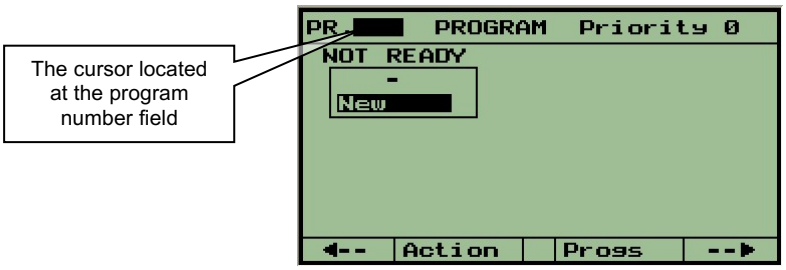
Irrigation programs are defined in 3 steps:

1. Defining the **IRRIGATION SEQUENCE** which specifies the sequence of valves to be irrigated by the program.
2. Defining the **WATER DOSAGE** and **FERTILIZER DOSAGE** per each member of the sequence.
3. Defining the **IRRIGATION TIMING** of the program, when the program will be activated.

After completing the first 2 steps, the program is considered READY, but it will work only if manually started, for automatic start, step 3 must be completed as well.

STEP 1 – The Irrigation Sequence definition

Any irrigation program's definition starts with the definition of the sequence of valves to be irrigated by the program. For a new program definition, the cursor must be located at the program number field and then, the function key **F3 = "Progs"** enables execution of commands related with programs editing. Select the option **"New"**, the system will respond by suggesting the next free number for the new program which can be accepted or changed.



The sequence of valves can now be inserted. To terminate the sequence definition use the **ENT** key.

When the system contains more than a single irrigation line, valves will be referred to by specifying both the line number and the valve number as shown in the example sequence below. Otherwise valves are referred to by they ordinal number only.

When the system contains several water sources (A,B,C,…F), the user may select the desired water source for each valve by pushing **F4 = "Src"**, otherwise the system will select the default water source of the specified line.

The sequence may include not only individual valves, but also predefined Groups of valves (G1, G2 etc…).
Groups definition can be found under the subject 

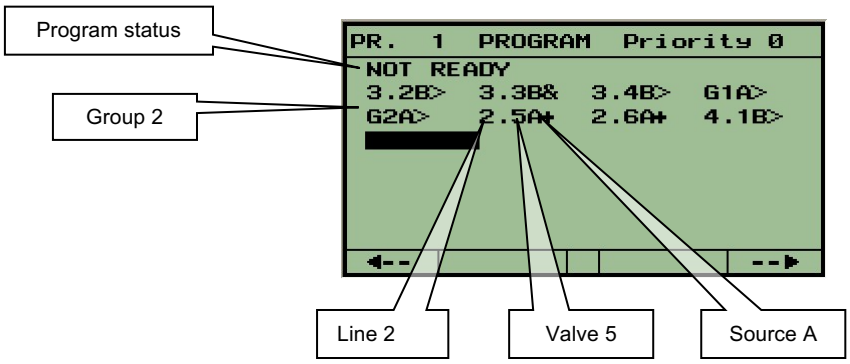
The order by which the valves will be operated is defined by the following 3 symbols:

➤ - SEQUENTIAL OPERATION - one valve after the other.

& - TEMPORARY GROUPS - valves of the same line to be irrigated with a common dosage. (must be enabled in Dealers Definition)

✚ - STARTING TOGETHER - coordinated start of valves with individual dosages. (must be enabled in Dealers Definition)

The following picture shows an example sequence.

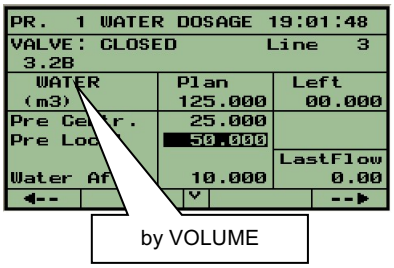


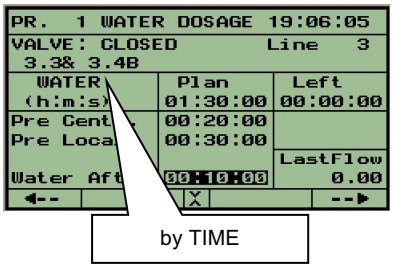
STEP 2 – The Water Dosage definition

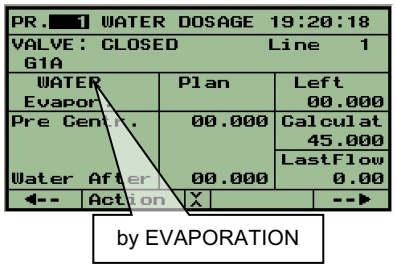
Each member of the sequence must have a water dosage defined in order to be able to irrigate. In the dosage definition screen the sequence members are arranged in a vertical order, the movement to the next or former member is done by the PAGE UP (▲) and PAGE DOWN (▼) keys.

The dosage definition process starts with the selection of the dosage mode. When the cursor is placed at the dosage units field, the dosage mode can be selected. The following dosage modes are supported:

hh:mm:ss	– by time
m3	– by volume
m3/area	– by volume of water per each unit of area
evaporation	– by volume calculated from the accumulated evaporation since last irrigation
evaporation time	– by time calculated from the accumulated evaporation since last irrigation

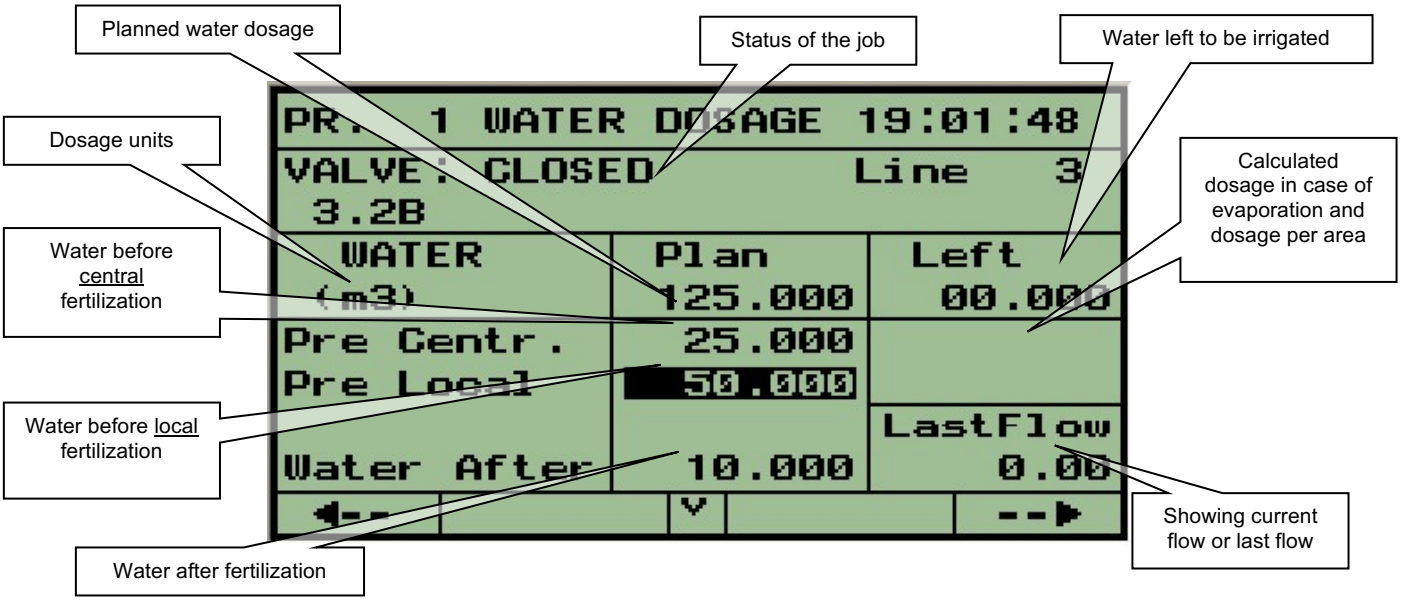






Notice that when irrigating by evaporation (or by m3/area) there is no planned value to be inserted but there is a calculated value. For detailed explanation of dosage by evaporation and dosage by volume per area see appendix **"A"** of special dosage modes.

The function of the various fields is explained below.



There is an option to define a special dosage of "water before" for Local fertilizer №1 to make it different from the others. This option must be enabled through the **DEALERS DEFINITION**.

Coordinated start of members of a sequence using the **+** sign, is meant mainly for coordinating the central fertigation of various valves. In that case, for eliminating contradicting demands, the system does not permit individual central fertigation jobs but is dealing instead with a common fertilizing job shared by all the coordinated members. Therefore when the option of "starting together" of valves with the **+** sign is enabled, the definition of the water before will be done in the common fertilizer dosage screen instead of in the water dosage screen and hence the appearance of those screens will be slightly different.

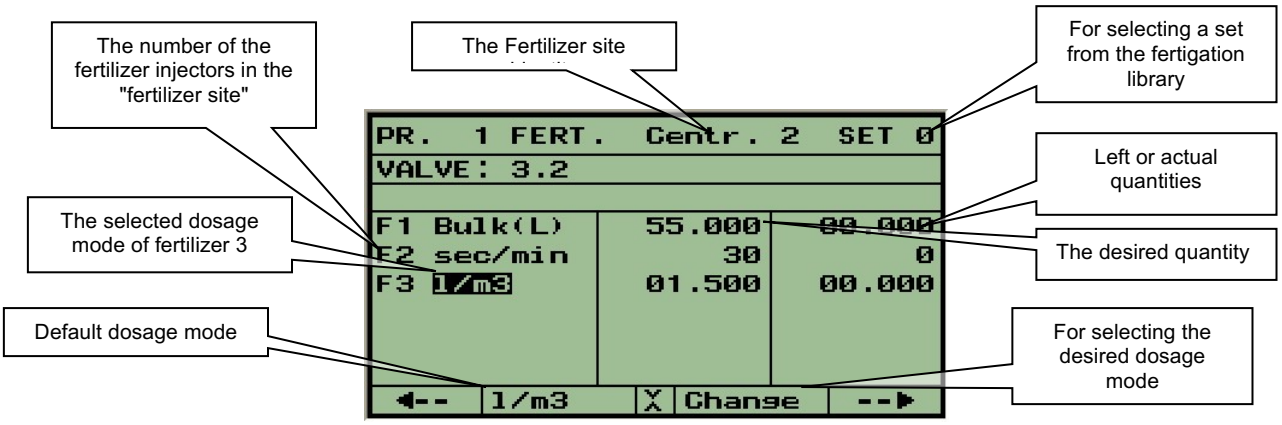
STEP 2.1 – Local and Central fertilizer dosage

The VISION 2 recognizes central and local fertilization sites. The central fertilization enables a number of irrigation lines to share the same fertilizer site, while the local fertilization is intended to serve individual irrigation lines only. The screens used for defining the local and the central fertilizers dosage appear next to each other and they are programmed in the same way.

The following dosing options are available:

l/m3 – liters of fertilizer per each cubic meter of water
sec/min – seconds of injection per each minute of irrigation
m:s/m3 – minutes and seconds of injection per each cubic meter of water
l/min – liters of fertilizer per each minute of irrigation
Prop(L) – the specified fertilizer quantity will be injected proportionally
Bulk m:s – continuous injection of the fertilizer quantity specified by time units
Bulk(L) – continuous injection of the fertilizer quantity specified in liters.

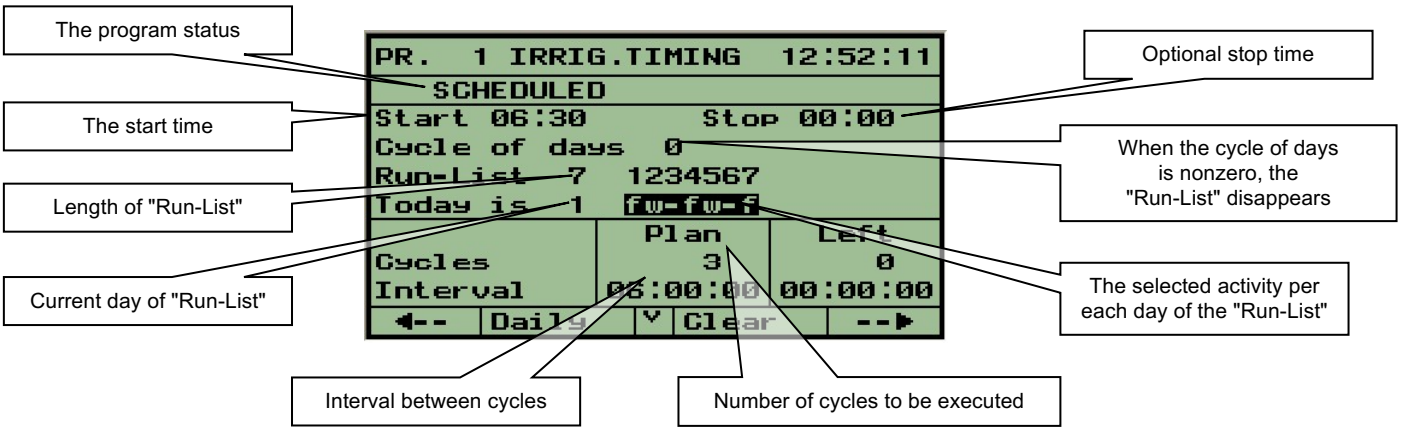
Notice that the VISION 2 offers the convenience of using a library of predefined **FERTILIZER SETS** to be used by irrigation programs. For detailed explanation see the subject of **FERT. SET LIBRARY** within the **PARAMETERS** submenu.



Locate the cursor at the dosage mode field next to the desired fertilizer number. Select the desired dosage mode either by using function key № 2 for selecting the default mode or function key No. 3 for opening all the dosing options. Define the desired fertilizer quantity or desired proportion.

STEP 3 – Irrigation Timing

In order for a program to be started at a desired time, it must have a start time and the days of operation defined. Such a program will be considered SCHEDULED. The scheduling is done by the following screen:



The days of operation can be specified either by defining a nonzero cycle of days or by setting up a “Run-List”. The length of the “Run-List” can go up to 16 days, the user should mark each day the desired activity of the specific day: **(f)** indicates fertigation, **(w)** indicates water only **(-)** indicates no activity and the symbol **(s)** indicates single time activation (but including both irrigation and fertilization) .

Notice that only one way of specifying the irrigation days is permitted at any time, therefore when the cycle of days is nonzero, the "Run-List" disappears.

Optionally a stop time can be defined per program; when that time arrives the program will be terminated.

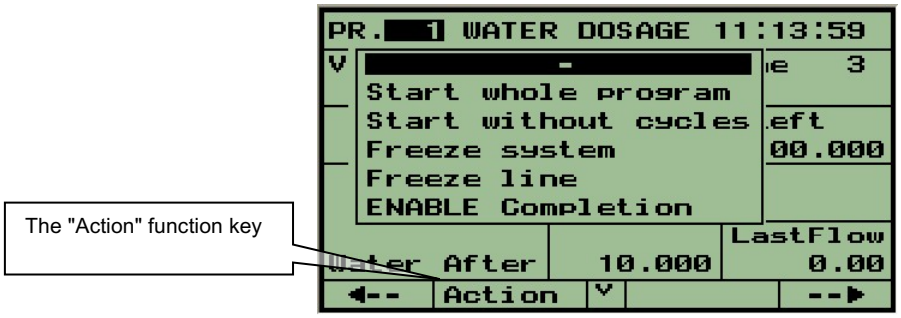
If a program has to be repeated several times a day, the number of cycles and the interval between the cycles have to be defined.

Manual Start/Stop and Freeze/Unfreeze

In any of the screens used for defining irrigation programs, when the cursor is located at the program number, the function key F2 gets the title “Action” enabling manual **start/ stop** of programs and also **freeze/ unfreeze** operations.

When a program contains left quantities of water, or left cycles to be executed, the user will have the option to "Start with Left" in order to complete the left quantities.

Freezing means stopping activity until manually released. One can "Freeze" the whole system or individual lines. "Freezing" individual lines is permitted only in the **WATER DOSAGE** screen, where the line number is specified.



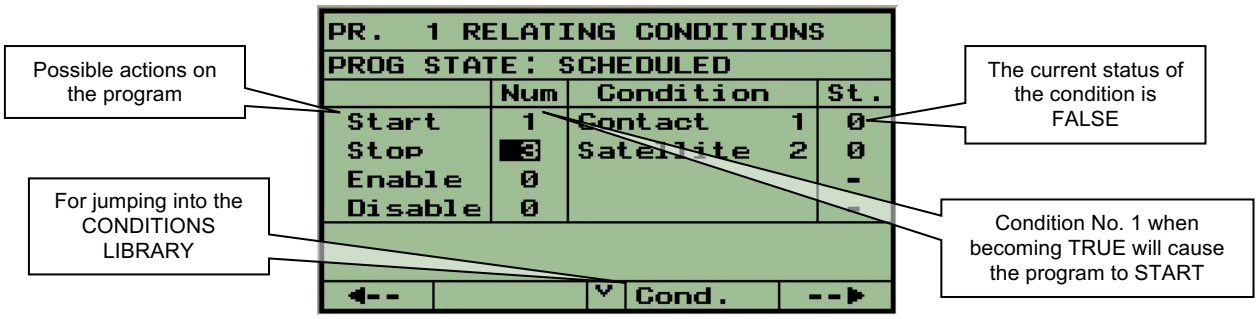
ENABLE COMPLETION – is an option that can be activated per each program individually. Once activated the option remains active until giving the opposite command. A program with enabled completion feature, will check at the end of its irrigation whether some of the included valves have uncompleted dosage (probably because of some malfunctions). The system will try to complete those leftovers.

Relating Conditions with Programs

Conditions can be used for causing programs to **start/ stop** or for **enabling / disabling** their operation.

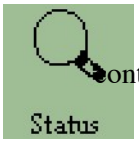
Prior to using the conditions they must first be defined. Conditions definition is done under the **CONDITIONS LIBRARY** (see below), which can be reached through the submenu,

or from within the screen used for relating conditions to programs when the cursor is located at the column of conditions number, then **F3 = "Cond"** can be used for getting into the conditions library.



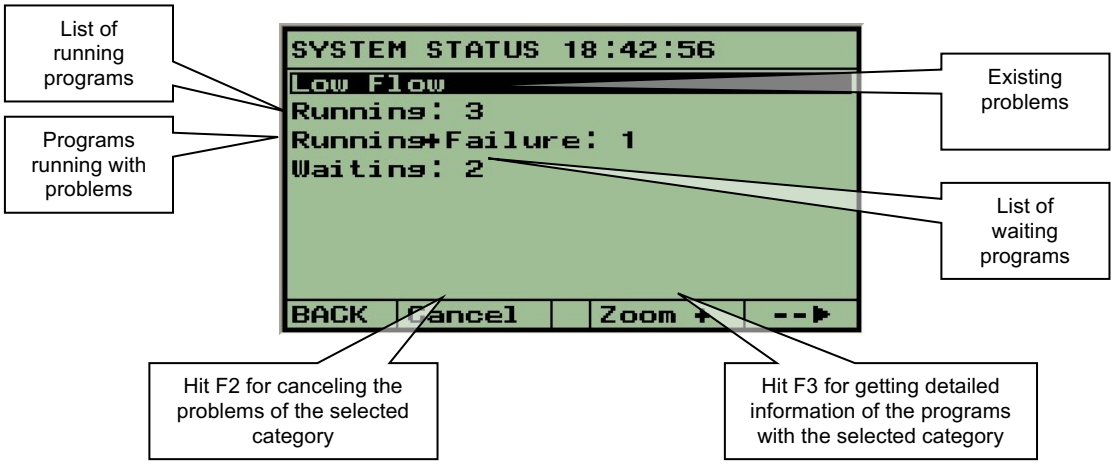
By specifying the ordinal number of the desired condition in the row of the desired action we create a relation that will cause the action to be executed when the condition becomes TRUE.

Checking the Current Status of the System

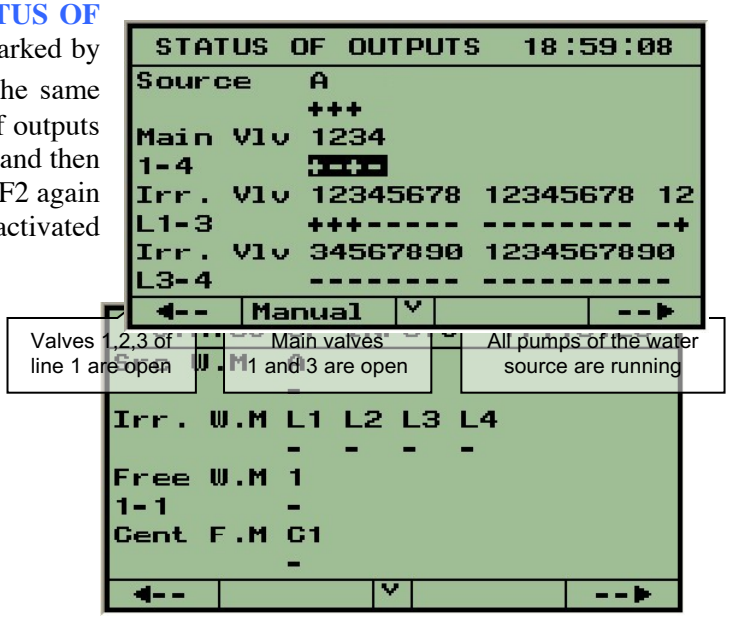
The sub menu of 

contains several options as follows:

The **CURRENT SYSTEM STATUS** supplies general information about activities in the system, including existing problems, currently irrigating programs, waiting programs, terminated programs and programs that are still scheduled for today.

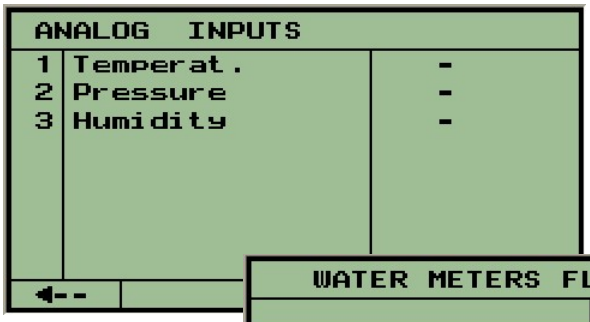


The next screen which is called the **STATUS OF OUTPUTS**, shows all activated outputs marked by **(+)** and all the others marked by **(-)**. The same screen can be used for manual activation of outputs for testing. Use **F2 = "Manual"** and then locate the cursor at the desired output. Use F2 again for turning the output ON/OF. A manually activated output is marked by **(⮝)**.

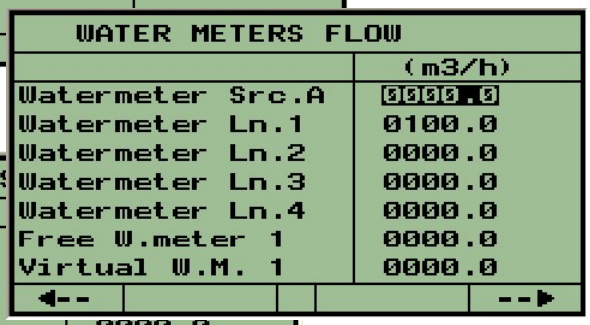


The next two screens show the statuses of the digital and analog inputs. In the digital inputs screen each closed contact is marked with a (+) sign an and open contact with (-) sign.

Analog inputs will appear with their actual value. A (-) sign indicates that the sensor is disconnected.

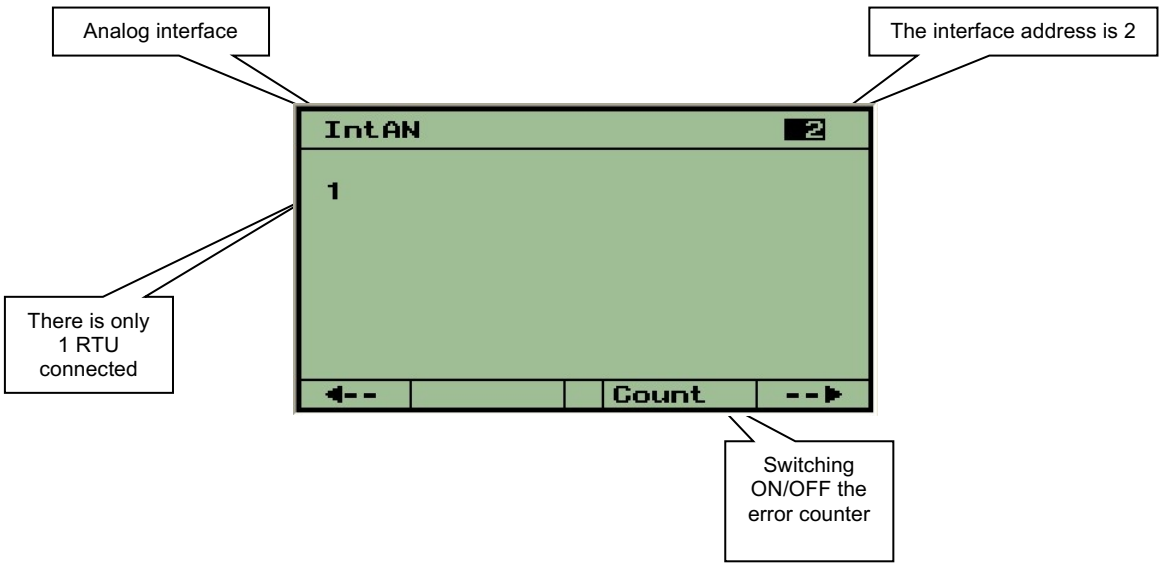


Following there are two screens showing the flow rates of all the water meters and all the fertilizer meters in the system.



The last status screen supplies information about the status of communication with all the analog RTUs in case they are used by the particular system.

RTUs having communication problem will be underlined.



PARAMETERS of Irrigation and Fertigation

The following paragraph describes some topics which are complimentary to the definition of irrigation and fertigation programs.

Conditions Library

Conditions are the tools by which the user can manipulate activities depending on various events.

The conditions defined by the user are stored in the **CONDITIONS LIBRARY**, each condition with its ordinal number. In order to become active, the condition must be enabled, and then it will be constantly checked by the system to be **TRUE (1)** or **FALSE (0)**.

When needed, irrigation programs can be related with conditions in order to start, stop, wait, or continue (see above **RELATING CONDITIONS WITH PROGRAMS**). When the condition becomes TRUE the desired action will be executed.

The following types of conditions can be defined:

Contact – depending on the status of a dry contact input whether it is OPEN or CLOSED, changing from OPEN to CLOSED (OP>CL) or from CLOSED to OPEN (CL>OP).

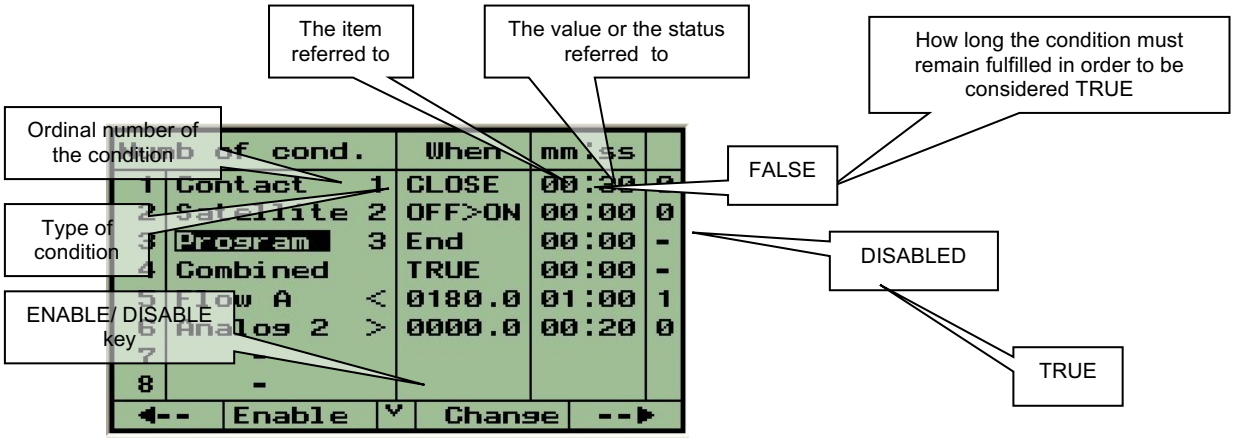
Satellite – depending on the status of a satellite output whether it is ON or OFF or changing from ON to OFF (ON>OFF) or from OFF to ON (OFF>ON).

Program – depending on the status of a program whether it is NOT RUNNING, RUNNING, ENDING or STARTING

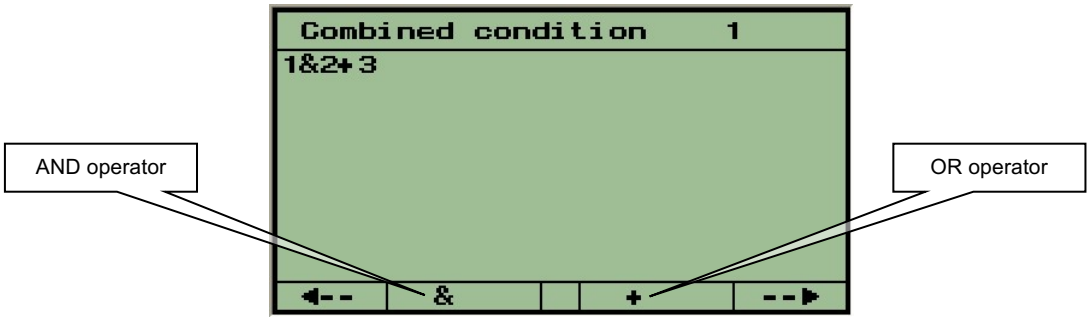
Combined – depending on several conditions combined by OR/AND operators

Flow – depending on the flow of a real or virtual water meter whether the flow is above or below the set-point

Analog – depending on the value of an analog input



Whenever a combined condition is being defined an auxiliary screen appears in which the user may define the formula of the combination.



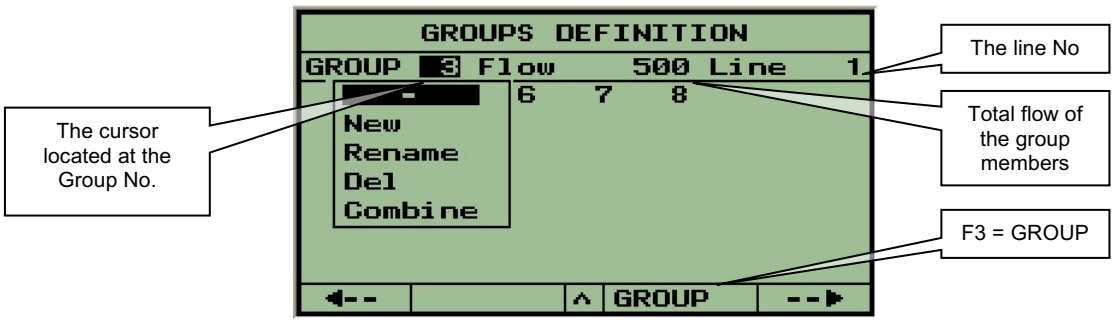
The formula 1&2+3 should be interpreted as 1 & (2+3) which means that in order for the combined condition to become TRUE, condition No. 1 must be TRUE, AND conditions No. 2 OR No. 3 must be TRUE.

Whenever a flow condition is being defined an auxiliary screen appears containing a list of all the water meters from which the user may select the water meter to refer to. The same way when defining conditions on analog sensors an auxiliary screen supplies the list of sensors from which the desired one can be selected.

Groups Definition

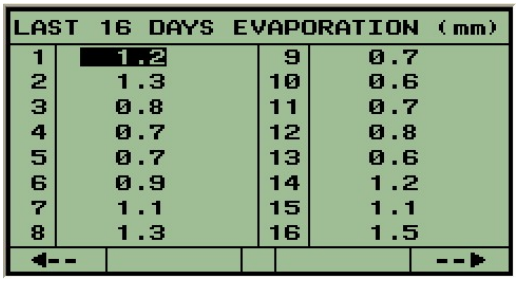
Valves which are usually irrigated together may be defined as a **GROUP** of valves. Such groups will be named as G1,G2,G3…and will be stored in a groups library for later use. The valves included in such a group must all belong to the same irrigation line. The maximum number of valves in the group is 30. When larger groups are needed it is possible to combine 2 groups together.

In order to create a new group, place the cursor at the group number field, press **F3="GROUP"** and select **"New"**. The system will suggest a free group number which the user can accept or change.
The user will have to specify the line number of the valves to be included in the group and then specify the valves one by one. Each valve number will be followed by ENTER. Next to the Group No. the expected total flow of the group will be displayed.



Evaporation

For the purpose of dosing by evaporation, the system stores the data of the daily evaporation of the last 16 days as shown in the following table:



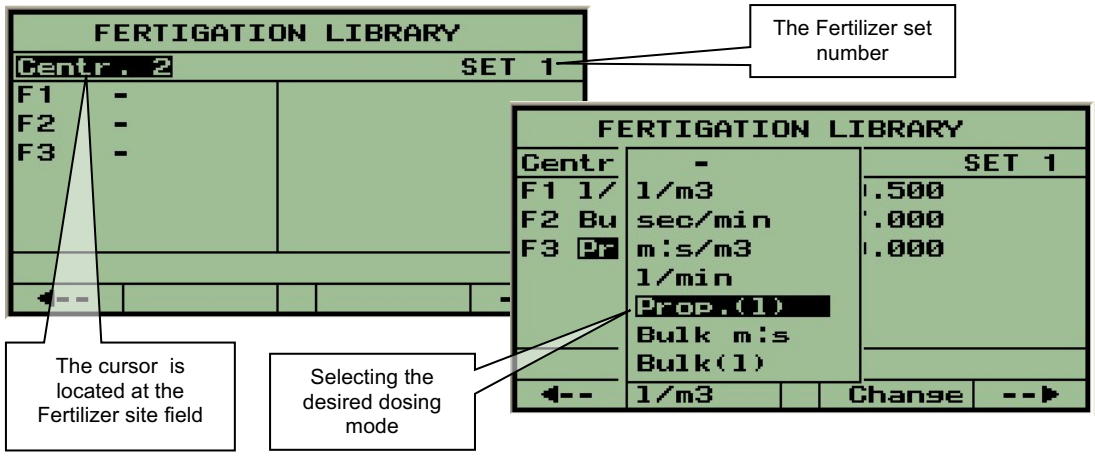
The evaporation of the last 24 hours has to be stored at location 1. Location 2 contains the information of the day before etc…, so that at location 16 there will be the evaporation of 16 days ago. Each day at midnight all the table is shifted one position. So that the evaporation at location 15 takes the place of location 16, that of location 14 will be placed at location 15 etc. The evaporation at location 1 will be copied to location 2 as well, assuming that the evaporation of the new day is the same as of the day before. This way the table always contains the evaporation of the last 16 days.

For understanding the mode of dosage by evaporation see the appendix **"A"** of special dosage modes.

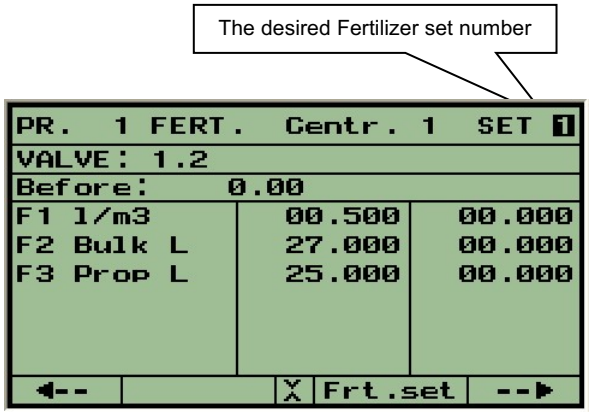
Fertilizer Sets Library

The **FERT SETS LIBRARY** stores predefined formulas of fertilization to be used by the irrigation programs. Up to 9 formulas can be stored per each fertilization site. In order to be able to use the Fertilizer Sets Library the option must first be enabled at the **DEALERS DEFINITION**.

When the cursor is placed at the Fertilizer site field use the (⮟)(⮝) keys to reach the desired site, then locate the cursor at the Fertilizer set number and use the (⮟)(⮝) again to reach the desired set. Now when the cursors is placed next to the fertilizer injector number, select per each fertilizer the desired dosing mode and finally insert the desired quantity or desired proportion per each fertilizer.



The picture at the right shows how irrigation programs can use the Fertilizer Set. The user specifies the desired Set number in the fertilizer dosage screen; the predefined set will immediately pop up and save the labor of repeatedly defining the same dosages whenever the same recipe is needed.



RESULTS of irrigation activity

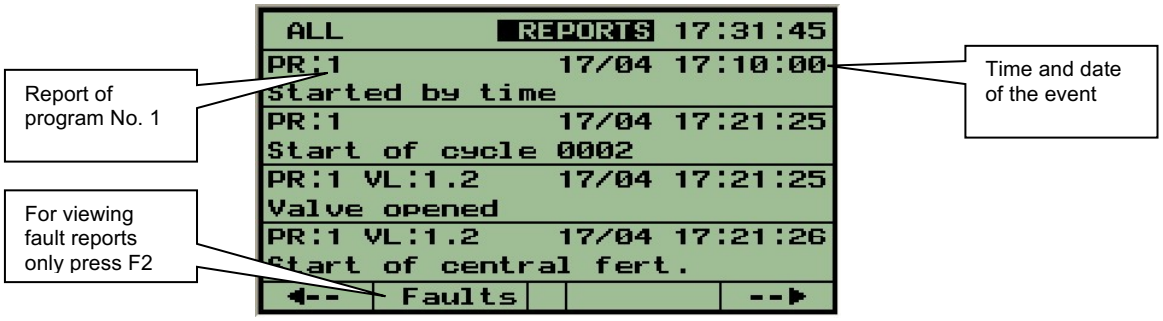
Under the title of **RESULTS** the VISION 2 supplies information resulting from the activities in the system. This is the place where you may find the **EVENTS REPORTS**, the **ACCUMULATORS** and the **SENSORS LOG RESULTS**.

Events Reports

Events happening in the system generate reports that can be viewed by various categories:

All reports
Reports of a particular program
Reports of a particular valve
Reports of fertilization
Reports of filtration

In each category there is an option of viewing only the fault reports. The events are arranged in a chronological order. When entering the reports display the latest 4 events will be shown. Use the (⮝) key to view the earlier reports. The following picture shows an example screen of reports.



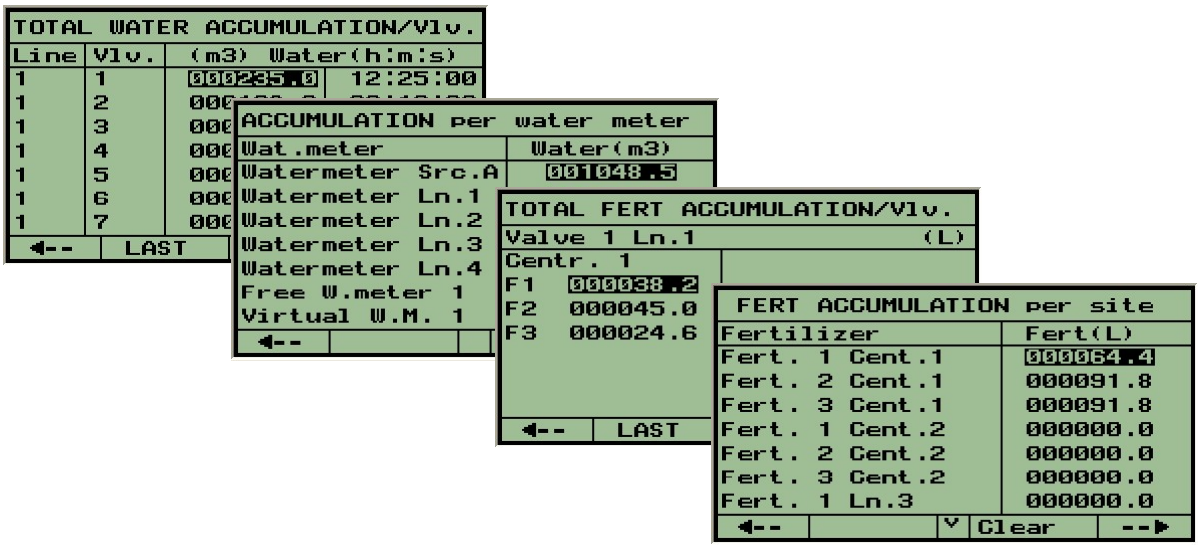
When the cursor is placed at the word REPORTS as shown above, pushing **F2="Faults"** will display only the fault reports.
By using the (⇧) (⇩) arrows the cursor can be moved to any of the displayed reports and then pushing **F2="Del All"** will delete all the messages of the same category, pushing **F3="Del Msg"** will delete the selected report only.

Accumulation

The system accumulates water and the fertilizer consumptions per each irrigation valve and per each water meter and fertilizer meter.

The accumulators of all the devices accumulate continuously until being cleared. For the irrigation valves the user can view also the accumulation of the last irrigation separately.

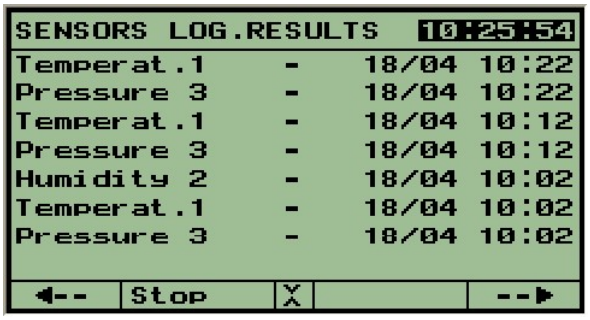
Irrigation valves connected to a water meter will accumulate volumetric accumulation as well as time accumulation when irrigating by time.



Sensors Logging results

When analog sensors are used with the VISION control system, the values of the sensors can be sampled and logged as explained in appendix **"B"** about **LOGGING ANALOG SENSORS**.

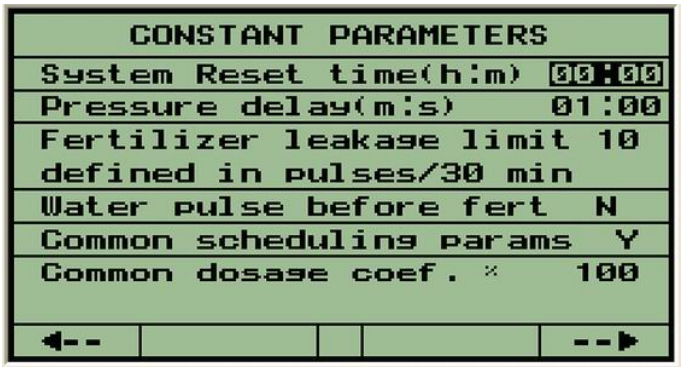
The results of the logging can be inspected when requesting the **SENSORS DATA LOGGER** from the submenu of **RESULTS**. The function key F2 can be used for starting and stopping the logging process.



Constants

The constant parameters that belong to a particular application are divided into categories as explained below:

System Constants



System Reset Time – when set to a nonzero value, will stop all active programs when the specified time arrives.

Pressure delay – expresses the delay before a change in a pressure sensor comes into affect.

Fertilizer leakage limit – pulses received from a fertilizer meter while it's associated injector is supposed to be closed, are considered illegal and when exceeding the limit, will indicate a fertilizer leakage that will be responded by stopping the irrigation of the related lines. When the limit is not reached, the illegal pulses counter is cleared every 30 minutes.

Water pulses before fert. – the user may request that starting fertilization will never happen before sensing flow of water.

Common Scheduling params – when set to YES, will force all the **RUN LISTS** of all the programs to be of the same length and to have the same "Current Day".

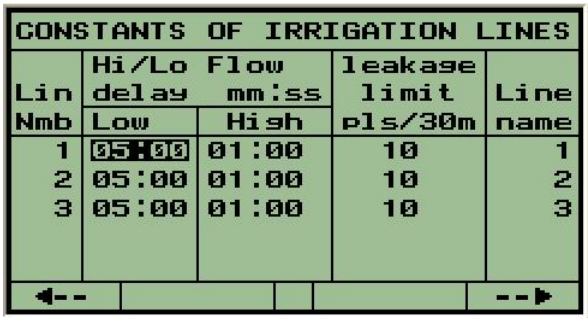
Common dosage coefficient – enables changing all water dosages by percentage.

Main Valves' Constants

Defining the way the main valves will be operated: without delay, before or after the irrigation valves.

When the main valve opens before, it will shut down after the valves, and vice versa.

Irrigation Lines' Constants

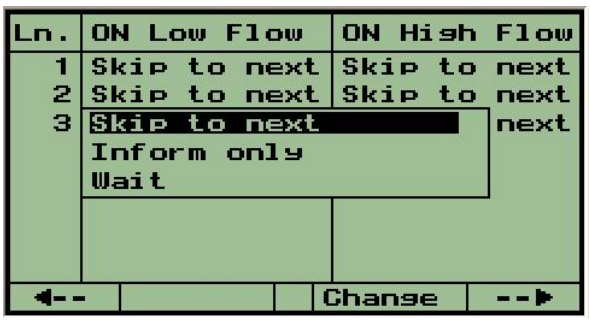


High/ Low flow delay – after line filling delay the system starts checking the flow to be within the specified limits. In case of high flow or low flow violations there will be no reaction before the specified delay.

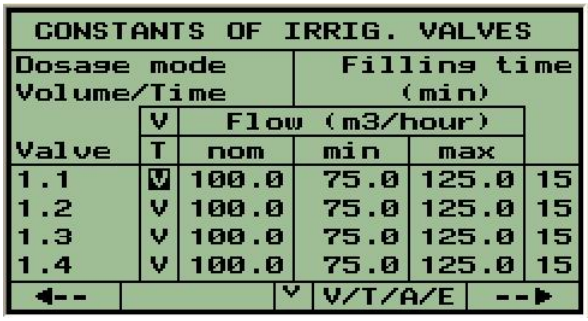
Leakage limit – pulses received from a water meter while the line is supposed to be closed, are considered illegal and when exceeding the limit will indicate a water leakage. The possible reaction can be selected as shown below. When the limit is not reached the illegal pulses counter is cleared every 30 minutes.

Line name – by default, irrigation lines are numerated 1,2,3 etc…however the user can change the line numbers to any number between 1 to 999.

The screen to the right complements the LINES' CONSTANTS and it is meant to enable selection of the desired reactions to high flow or low flow violations.



Valves' Constants



The valves' constants include per each valve the following information:

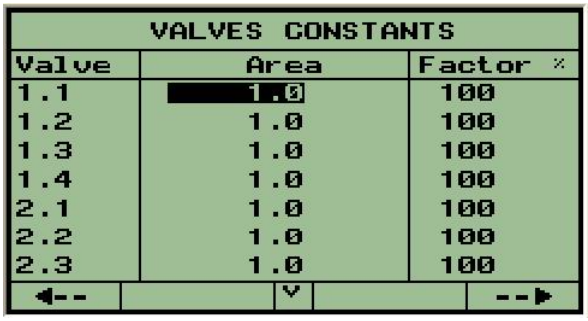
The default dosage mode – that will appear at the dosage screen when defining a new job of the specific valve. The possible options are:

V – volumetric
T – time based
A – volume per area
E – evaporation

The Nominal, Minimal and Maximal flows – the Nominal flow is the expected flow of the valve under normal conditions, the Minimal flow is the limit below which the flow will be considered LOW FLOW, the Maximal flow is the limit above which the flow will be considered HIGH FLOW.

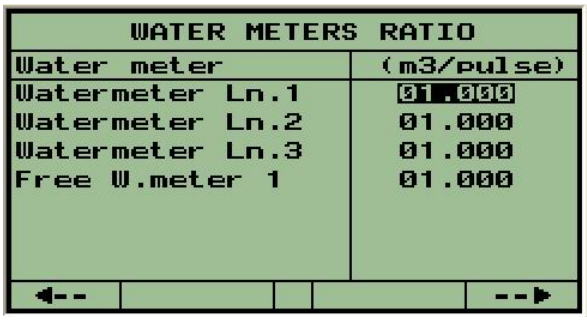
The filling time – defines the time during which the line is getting filled with water. During this period, flow and pressure violations are ignored.

The table to the right is accessible only when dosage per area or dosages by evaporation are enabled. It contains the area covered by each valve and the **CROP FACTOR** that represents in % the specific requirement of the crop irrigated by each valve.



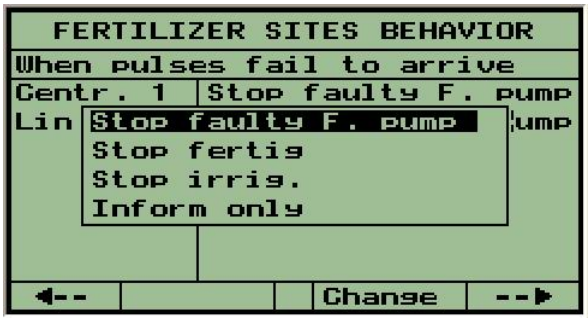
Water Meter Constants

The water meters' ratio – defines the amount of water represented by each pulse of the water meter.



Fertilizer Sites Constants

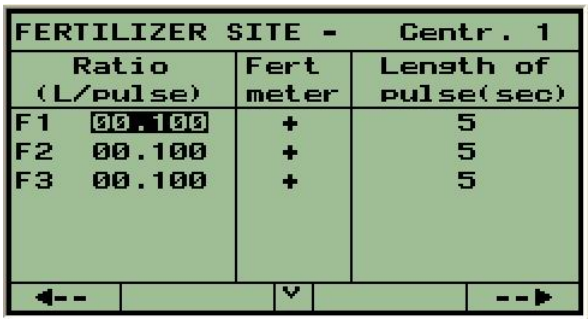
When pulses fail to arrive – Fertilizer injectors equipped with fertilizer meters are expected to supply pulses when activated. If no pulses arrive within 2 minutes from activation, the system will declare a fertilizer failure and will react according to the selected action:



Stop faulty injector – continue fertilization with the other fertilizers
Stop fertigation – stop all fertilizers of the fertilizers site but continue irrigation
Stop irrigation – both irrigation and fertilization will stop
Inform only – inform the problem but continue as usual

The Fertilizer meters' ratio – defines the amount of fertilizer represented by each pulse of the fertilizer meter.

The pulse length – defines the length of the pulses which will be used when fertilizing proportionally sec/min. if for example the required proportion will be 20 sec/min the system will inject each minute 4 pulses of 5 seconds with 10 seconds between the pulses.



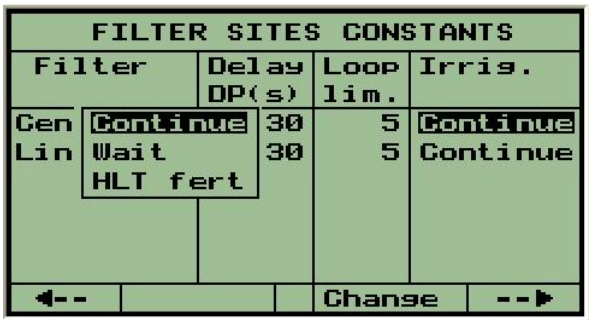
Special case – when a fertilizer meter gets out of order and cannot be used for some time, the user should do the following steps:

STEP 1 - Delete the connection point of the fertilizer meter from the connections list.
STEP 2 - Set the RATIO in the table to be equal to the amount of fertilizer injected by the specific injector within the specified pulse length. If for example the injector's flow is 100 liter/hour then for a pulse of 5 sec the injection will be (5/3600) x 100 = 0.138 liters/pulse.

After having those steps done, the system will continue fertilizing as before but instead of waiting for pulses from the fertilizer meter it will generate the pulses itself based on the knowledge of the injectors flow as supplied in step 2 above.

Filter Sites Constants

Each filter site may have the following parameters defined:



DP Delay – defines the period the DP contact has to remain closed in order for it to cause a flushing cycle to be started.

Looping limit – defines the number of consecutive flushing cycles caused by the DP indication, after which an "Endless looping" problem is declared.

What happens with the irrigation during backflushing?

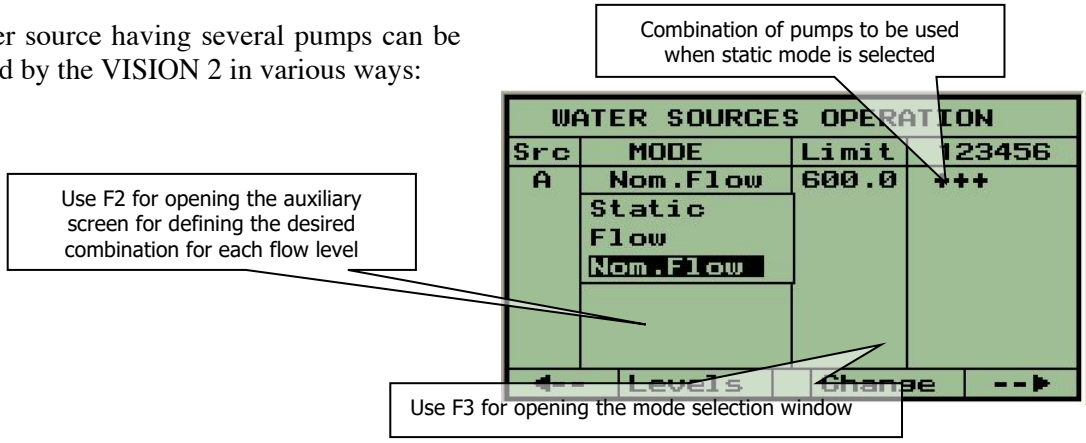
This question is answered by the selection made in the last column. The options are:

Continue – irrigation continues
Wait – irrigation will be waiting
HLT fert – fertilization will be halted

Utilities

Water Sources

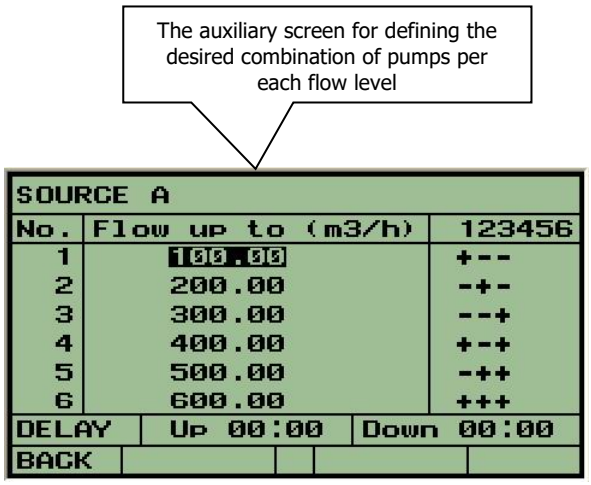
A Water source having several pumps can be operated by the VISION 2 in various ways:



Static – In the static mode the combination of pumps to be activated is independent of the flow demand, it will always be the same static combination as specified in the last column.

Flow – the combination of pumps that will be activated, depends on the actual flow demand. During line filling period the nominal flow will be used instead of the actual.

Nom. Flow – the combination of pumps that will be activated, depends on the nominal flow of the valves opened under the specific source.



When the selected mode of operation is by "Flow" or by "Nominal flow" the user must specify the various combinations of pumps to be used for each flow range. Each row of the table describes the flow and the combination that will be used up to this flow.

Delay Up – when the flow demand increases, the switching to the upper combination will take place after the specified delay.

Delay Down – when the flow demand decreases, the switching to the lower combination will take place after the specified delay.

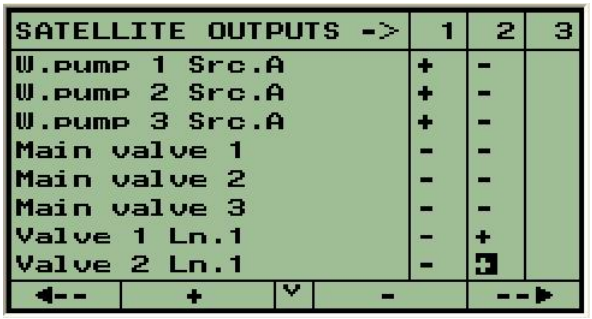
When working by the actual flow (not by the nominal flow) there is only one delay to be defined. This delay specifies the time during which the flow is expected to remain within its new value before a combination change will take place.

The water source may be associated with a real or virtual water meter measuring the water supplied by the source. The measured water is divided between the valves open under the source. Therefore, irrigation valves with no water meters can have their water measured by the meter of the water source.

Satellites

Satellites of defined outputs

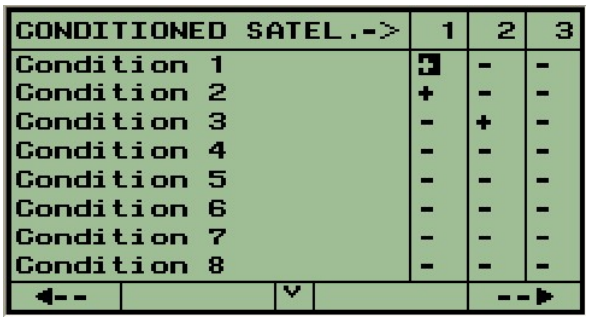
Satellite are outputs that can be logically attached to other outputs so that whenever any of those outputs is activated, the satellite will also be activated and remain active as long as at least one of the leading outputs remains active.



In the screen above, satellite No. 1 is defined as satellite of the pumps 1, 2, and 3 of water source A, it will be active as long as any of those pumps are active.

Satellite No. 2 is defined as satellite of valves 1 and 2 of line 1, it will remain active as long as any of those valves is open. Notice that the table above may be longer than one screen, use the (⮟)(⮝) keys to see the rest of it.

Conditioned Satellites



Satellites may be condition dependent so that as long as any of the related conditions is TRUE, the satellite will remain active. For relating conditions with satellites the row of the condition has to be marked with a + at the column of the appropriate satellite. For example in the table above satellite No. 1 depends on conditions No. 1 and No. 2.

Conditions depending on satellites

Among the other options conditions may also be defined on the statuses of satellites. See the explanation in the paragraph of the **CONDITIONS LIBRARY** above.

Virtual Water Meters

Virtual water meters are calculated water meters, which result from an arithmetic combination of real water meters. Prior to using virtual water meters, the number of those meters for the particular unit, must be set in the **DEALERS DEFINITION**. The VISION 2 recognizes three types of virtual water meters according to their uses:

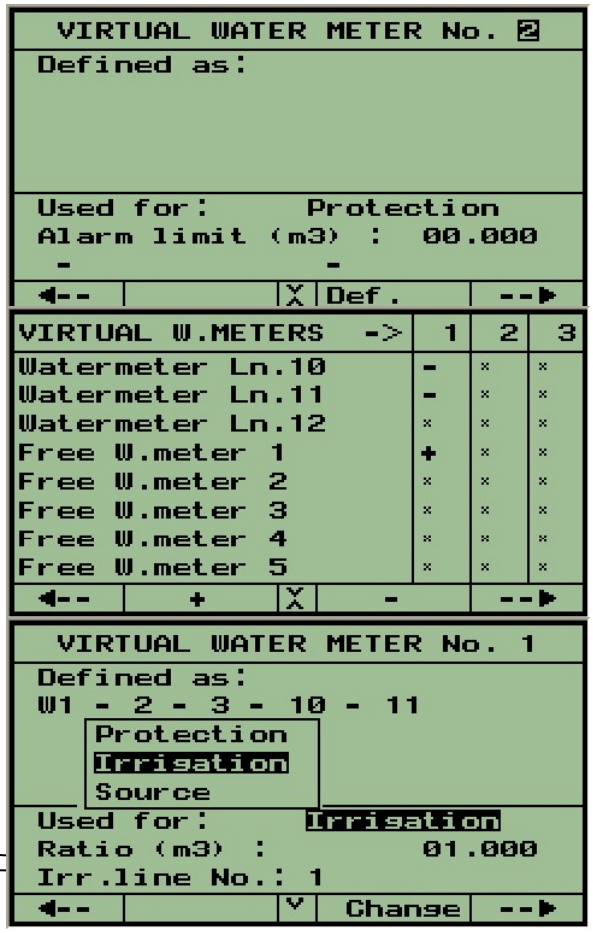
For irrigation	– measuring the water used by an irrigation line.
For network protection	– measuring the balance between the water going into and exiting from a particular network.
For water sources	– measuring the amount of water supplied by a water source.

The first step in the definition of a virtual water meter is the definition of the arithmetic formula associated with it. Use **F3 = "Def."** for opening the screen (see below) in which all the water meters of the system are listed.

Any water meter can be included in the formula by marking it positive **(+)** or negative **(-)**. After marking all the required water meters use F1= ◄-- to return to the former screen in order to complete the definition.

The next step will be the selection of the type of the water meter according to it's use.

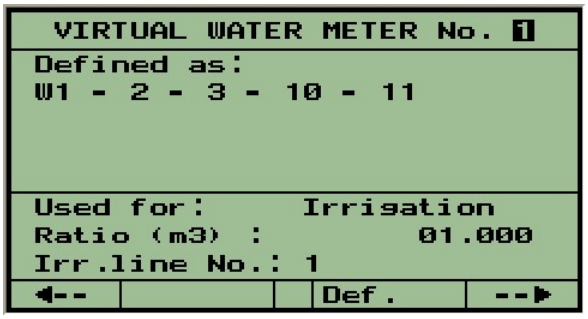
Use F3 ="Change" for selecting the desired use of the particular virtual water meter.



The rest of the definition procedure depends on the selected type of the virtual water meter.

Virtual water meter for irrigation

Apart from the formula and the type, a virtual water meter used for irrigation will have a definition of it's ratio and a definition of the associated irrigation line.

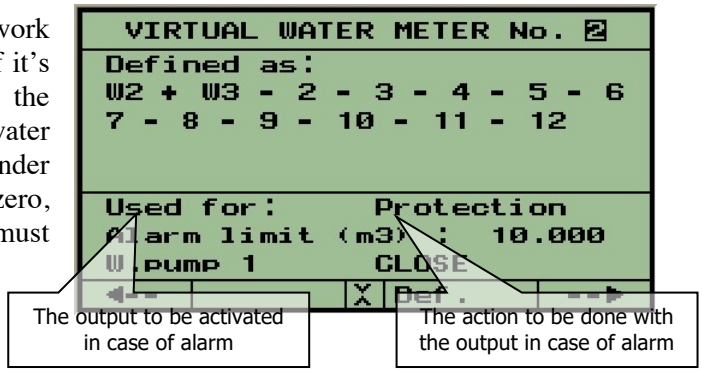


Each water meter included in the formula contributes to the resulting sum positively or negatively.

Only when the resulting sum is greater or equal to the ratio, an amount equal to the ratio will be considered as supplied to the irrigation line. It will be added to the accumulators and deducted from the amount left to be irrigated. When deciding about the ratio the user should take into consideration the ratios of the participating water meters.

Virtual water meter for network protection

A virtual water meter used for network protection will have on the positive side of it's formula all the water meters feeding the network, and on the negative side all the water meters consuming from the network. Under normal conditions, the result should be zero, since all the water going into the system must equal the water going out of the system.

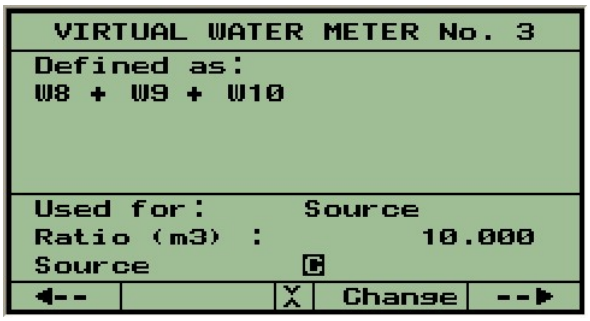


If the result is not zero, it indicates leakage of the network. However, since there may be some delay between the sensing of the water meters feeding the system and the sensing of the consumer water meters, we may get temporary nonzero values, which may create false alarm situations. Alarm limit must be set so that only when the limit is exceeded, the network protection will start to be considered, and only if it remains out of the limit for 4 minutes, the alarm will be fired.

The user may define the preventive action to be taken when the network protection alarm is activated, he may select an output to be OPENED or CLOSED. The output can be selected from the list of main valves, pumps and satellites defined in the particular unit.

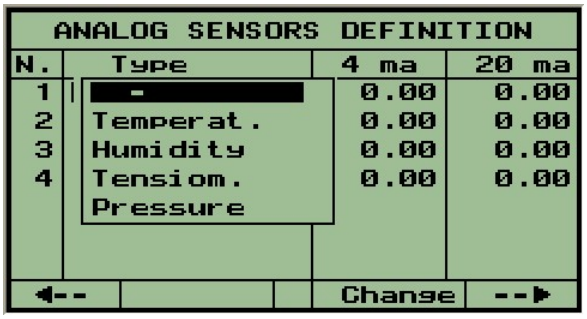
Virtual water meter for water sources

A virtual water meter associated with a water source is supposed to measure the water supplied by the source. The ratio definition serves the same function as explained above for virtual water meters used for irrigation.



Analog Sensors

For reading analog sensors the VISION uses a special interface which can handle up to 8 RTUs of 8 analog inputs each. The total number of analog sensors recognized by the VISION, must be defined during the **SYSTEM CONFIGURATION**. However the type of each analog sensor and the range of its scale is defined in the following screen:



First select the sensor type and then define the minimal value and the maximal value of it's scale at the 4mA and 20mA columns accordingly.

The analog sensors can be used for conditioning the system's operation and can be logged for analyzing the system's operation.

Sensors Data Logger

For learning how to define a data logger for logging analog sensors readings, see appendix **"B"** about **LOGGING ANALOG SENSORS**.

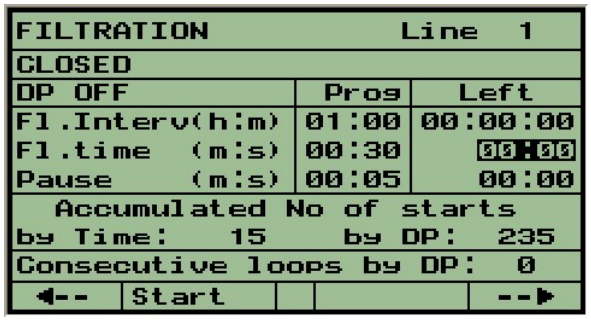
Performance Data Logger

For learning how to create and use a performance logger, see appendix **"B"** about **PERFORMANCE LOGGING**.

Communication

The Vision 2 system offers options of remote communication between PC's, Tablets and Smartphones vis the internet. This includes event logging and alarming on a range of user defined events.
For all these options, please contact a Goldtec Control Systems representative.

Filtration



The filtration program is defined per each filtration site independently. Each program contains the interval between the flushing cycles, the flushing time per station, and the pause between the stations.

The system supplies information about the status of the site, the status of the DP and the time left to the next cycle, and during operation the system shows the station which is currently being flushed, and the time left for flushing of that station.
Additional information shows how many flushing cycles have been executed by time, how many by DP and how many consecutive loops were done.

Notice that the count down of the interval to next flushing is halted if there is no irrigation in progress.

Notice also that the constants of the filter site define what will happen with the irrigation during the flushing process.
Execution of any flushing cycle, no matter what was the cause of it, will reset the left interval to its programmed value.
During the **DEALERS DEFINITION**, it can be decided whether or not to ignore the DP sensor during the line filling delay.

System SETUP

The setup process of a VISION system consists of several steps:

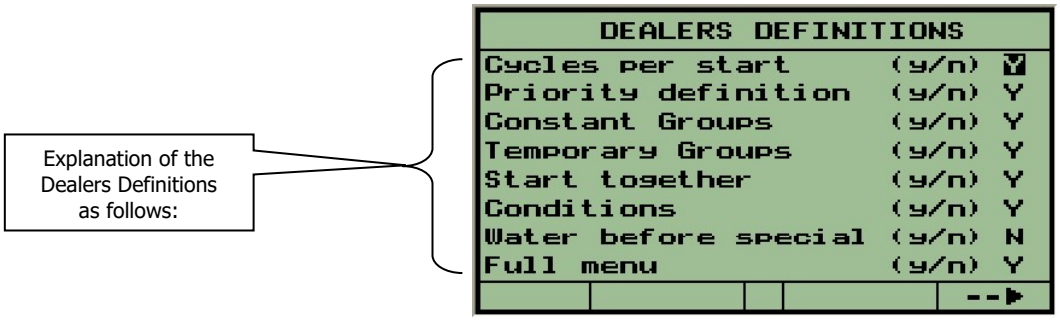
Step 1 - Network definition	– defining the hydraulic network to be controlled.
Step 2 - Hardware definition	–defining the hardware used for the control.
Step 3 - Connections definition	– defining where each of the network items are physically connected.

Those steps are meant to be executed by authorized technician only. The detailed explanation about the system setup is out of the scope of this guide and can be found in the **INSTALLATION GUIDE**.

Dealers Definitions

The person in charge of the system setup has been given some tools by which he can do some fine tuning of the system. He can decide to hide unnecessary features and reveal useful ones. He can dictate some global default parameters, he can decide about the system behavior in some special cases and he can make changes in the memory allocation, because of the sensitivity of the data, changes will be permitted only after inserting a password (247) and only when the system is idle.

Although the **DEALERS DEFINITIONS** is not meant to be used by the everyday user, it is important to know what are the options that can be selected during those definitions.



Cycles per start – enable irrigation in cycles, which means repeating the irrigation a specified number of times.

Priority definition – enable prioritizing irrigation programs. In case of conflict, the program with the higher priority will irrigate and the other will wait. Higher number indicates higher priority.

Constant Groups – enable defining groups of valves, G1, G2 etc… The groups will be remembered and will be usable by various programs.

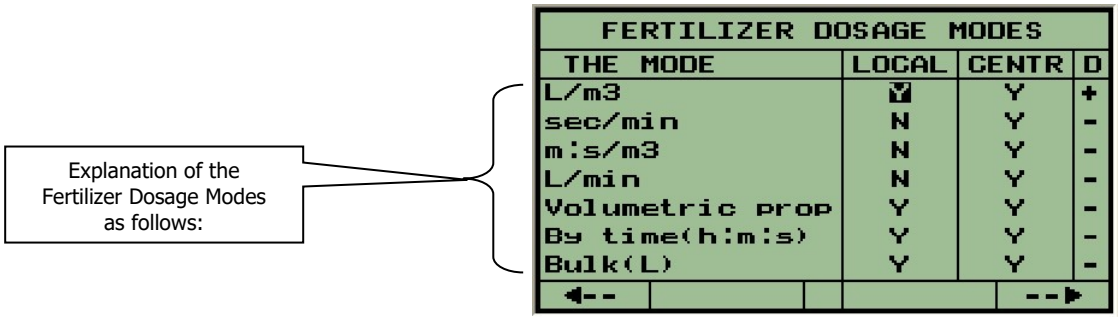
Temporary Groups – enable grouping valves together by the **"&"** sign. The group will have a common dosage and it is recognized only by the program in which it has been defined.

Start together – enable synchronizing the opening of various valves by the **"+"** sign. The valves can be of different irrigation lines. The purpose of the synchronization is to enable central fertilization of the valves. All the valves separated by the **"+"** sign, if requiring central fertilization, will share the same central fertilization job.

Conditions – enable using conditions.

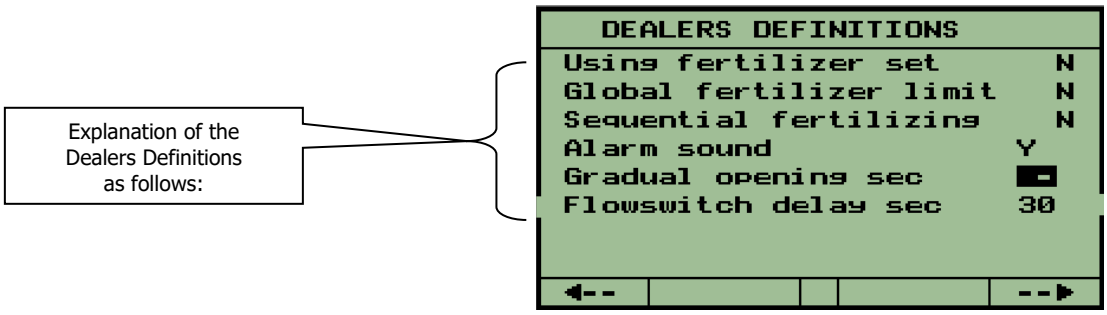
Water before special – enable definition of a special amount of water before fertilization for the first fertilizer of each local fertilizer site. This special amount differs from the water before, used by the other fertilizers.

Full menu – when full menu is enabled all the subjects are accessible by the user, otherwise some subjects of the **SETUP** menu will not be permitted.



In the screen above, we can define which of the fertilizer dosage modes will be revealed to the user. There can be a different definition for local and for central fertilization. The column marked **"D"** defines which mode will be the default mode.

L/m3 – liters of fertilizer per each cubic meter of water
sec/ min – seconds of injection per each minute of irrigation
m:s/m3 – minutes and seconds of injection per each cubic meter of water
L/min – liters of fertilizer per each minute of irrigation
Volumetric prop – the specified fertilizer quantity will be injected proportionally
By time(h:m:s) – continuous injection of the fertilizer quantity specified by time units
Bulk(L) – continuous injection of the fertilizer quantity specified in liters.



Using fertilizer sets – enable using fertilizer sets. The fertilizer sets are predefined formulas of fertilization to be used by the irrigation programs. See the subject **FERTILIZER SETS LIBRARY** in the submenu of **PARAMETERS**.

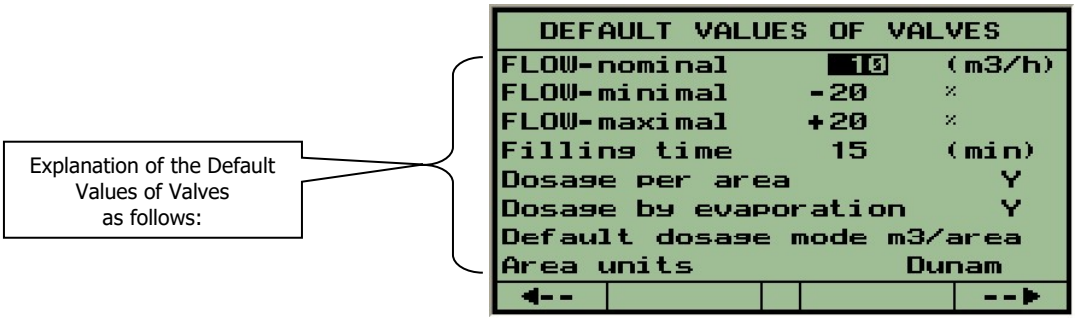
Global fertilizer limit – when this option is enabled, the system will control the total amount of each type of fertilizer supplied by each valve in order not to exceed the predefined limits set by the user for the whole season. The seasonal limit setting is done trough the subject **FERTILIZER LIMIT** in the submenu of **PARAMETERS**.

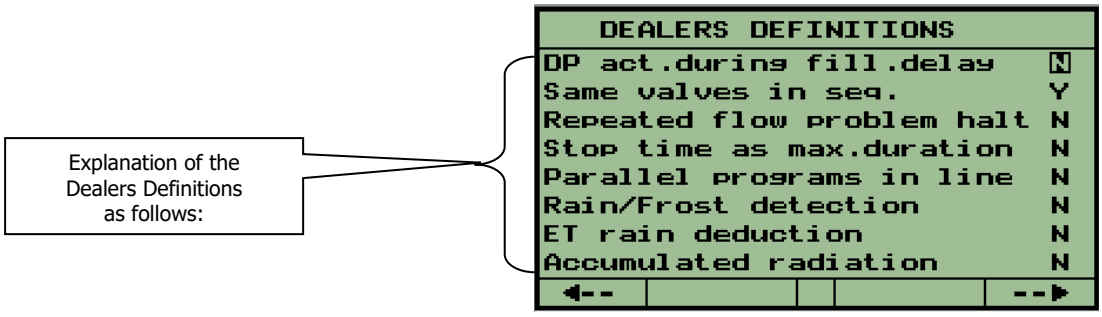
Sequential fertilizing – by enabling this option when more than one fertilizer injector is enabled in a fertilizer program the injectors will operate sequentially rather than operating all at one time.

Alarm sound – enable sounding the buzzer in case of problems existing in the system, while being in the screen of the main menu.

Graduated opening (sec) – when irrigating in shifts, each shift may include a large number of valves and if one shift terminates and another shift starts, there might be big changes in the pressure and the flow that can damage the system. To eliminate this kind of problems the VISION 2 offers the option of graduated opening/closing of valves. When this option is selected then instead of closing simultaneously all the valves of the terminating shift and opening simultaneously all the valves of the starting shift, the opening/closing will be executed in a graduated mode: one valve will get closed and one valve will get opened and after a specified delay another pair of valves will follow. The delay can be specified up to 60 seconds.

Flowswitch delay (sec) – when defined in Hardware definitions a flowswitch can be allocated to each valve indicating whether the valve has opened at the beginning of a program or has closed at the end of a program. The flowswitch delay is the time the switch will signal that it hasn't opened or closed.

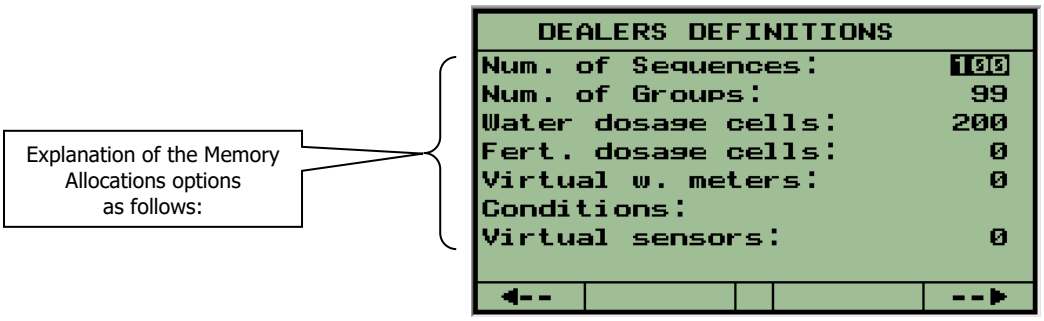

Explanation of the Default Values of Valves as follows:
DEFAULT VALUES OF VALVES
FLOW-nominal 10 (m3/h)
FLOW-minimal -20 %
FLOW-maximal +20 %
Filling time 15 (min)
Dosage per area Y
Dosage by evaporation Y
Default dosage mode m3/area
Area units Dunam
<-- -->
Flow nominal – the value of the nominal flow that will be set by default to all the irrigation valves.
Flow minimal – the value of the minimal flow that will be set by default to all the irrigation valves.
Flow maximal – the value of the maximal flow that will be set by default to all the irrigation valves.
Filling time – the value of the filling time that will be set by default to all the irrigation valves.
Dosage per area – enable the option of dosing the water by volume/area. When this option is enabled, the valves constants will be added a table in which the area covered by each valve and the crop factor are defined. See DOSAGE BY VOLUME PER AREA in APPENDIX A.
Dosage by evaporation – enable the option of dosing the water by evaporation. When this option is enabled, the valves constants will be added a table in which the area covered by each valve and the crop factor are defined. The PARAMETERS submenu will be have a new subject called EVAPORATION in which the daily evaporation is defined. See DOSAGE BY EVAPORATION in APPENDIX A.
Default dosage mode – defines the dosage mode that will be used as default whenever a new irrigation job is defined.
Area units – The units that will be used for defining the area covered by each valve.


Explanation of the Dealers Definitions as follows:
DEALERS DEFINITIONS
DP act.during fill.delay N
Same valves in seq. Y
Repeated flow problem halt N
Stop time as max.duration N
Parallel programs in line N
Rain/Frost detection N
ET rain deduction N
Accumulated radiation N
<-- -->
DP act. during fill. delay – this parameter defines whether during filling delay the DP contact will be referred to or ignored.
Same valves in seq. – when this parameter is set to "Y", it will be permitted to include the same valve, several times in the same sequence.
Repeated flow problem halt – when this parameter is set to "Y" and the system detects high flow or low flow problems with 3 valves of the same line consecutively, it will react by freezing the line and unless released manually, the line will remain frozen.
Stop time as max. duration. – when this parameter is set to "Y" the irrigating program will terminate at the set time even if the program has been paused due to wait conflict , pressure delay etc.
Parallel programs in line – when this parameter is set to "Y" will allow more than one program to operate simultaneously on an individual irrigation line.

Rain/Frost detection – when this parameter is set to **"Y"**, and the Vision/Dream Weather Station is installed and configured it will allow frost programs for start when a predefined temperature has been reached and also will allow the irrigation programs to pause if a daily rainfall level has been reached.

ET rain detection – when this parameter is set to **"Y"**, and the Vision/Dream Weather Station is installed and configured it will allow an irrigation program to irrigate automatically based of the ET data received from the weather station.

Accumulated radiation – when this parameter is set to **"Y"**, and the Vision/Dream Weather Station is installed and configured it will allow an irrigation program to irrigate automatically based of the radiation data received from the weather station.



The screen above enables changing the memory allocated by default for various purposes.

Num. of Sequences – defines the number of sequences that can be defined.

Num. of Groups – defines the number of groups that can be defined, including constant groups and temporary groups.

Water dosage cells – defines the total number of irrigation jobs that can be defined in all the sequences together.

Fertilizer dosage cells – defines the total number of fertilization jobs that can be defined in all the sequences together.

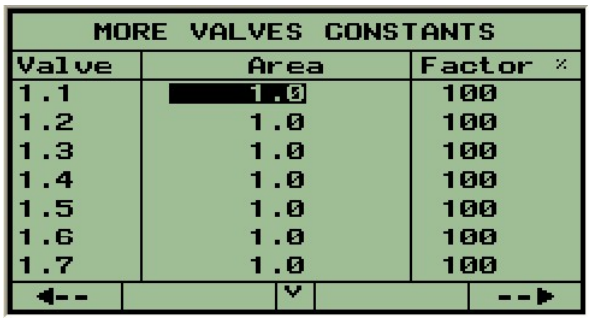
Virtual water meters – defines the number of virtual water meters that can be defined.
Conditions – defines the total number of defined conditions available.

Virtual sensors – defines the total number of virtual sensors that can be defined.

Appendix A

Special Dosage Modes

Within this topic we shall explain the **DOSAGE BY EVAPORATION** and **DOSAGE BY VOLUME PER AREA**. In order to be able to use these special dosage modes, they must be enabled through the **DEALERS DEFINITION**. Both of the two dosage modes are meant to save the calculation effort when trying to find out how much water to irrigate. Both methods are making use of the information about the area covered by each valve, which is part of the **VALVES CONSTANTS**.



The table contains both the area covered by each valve and a factor in % by which the calculated amount will be multiplied. The factor is meant to represent the special demand of the particular crop. The area units will be according to the selection made at the **DEALERS DEFINITION**.

Dosage by Evaporation

When irrigating by evaporation the amount of water to be supplied per each valve is calculated automatically by the system relieving the user from the necessity of calculating and defining the dosages per all the valves day by day.

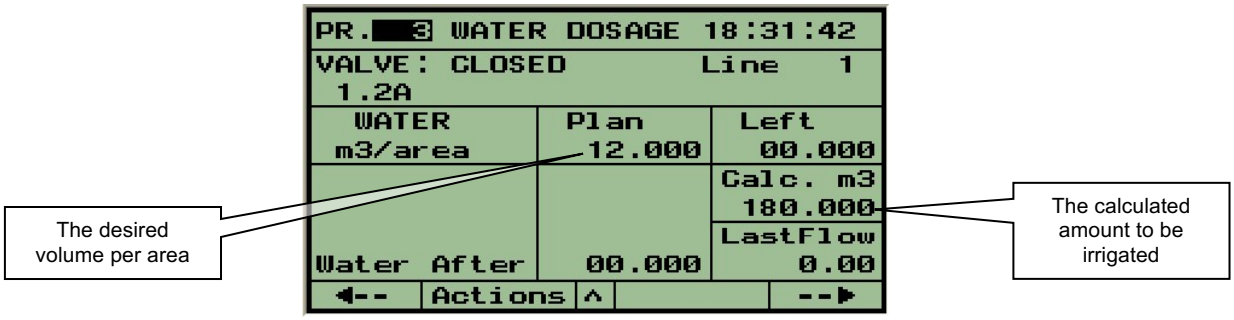
The calculation takes into account the number of days since the last time the specific valve was irrigated. Summing up the total evaporation during the elapsed days (data taken from the evaporation table of the last 16 days) and multiplying it with the area covered by the specific valve, we get the total amount of water lost by the specific area during the specified period. The result is then multiplied by the factor in % (taken from the valves constants) that represents the needs of the particular crop. This final result is the amount to be irrigated.

Notice that if the irrigation program is a cyclic program of "n" cycles, each cycle will irrigate the amount of the final result above divided by "n".

EXAMPLE: let's assume that the specific valve was irrigated 3 days ago. The evaporation of the last 3 days was 1.2, 1.3, 0.8 mm accordingly. The total evaporation is 1.2+1.3+0.8= 3.3 mm. The area covered by the valve equals 50 Dunam therefore the amount of evaporated water is 3.3 x 50 = 165 m^3. If the crop factor is 80 % the amount to be irrigated is 165 x 0.8 = 132 m^3. If there are 2 cycles defined, each cycle will irrigate 132/2 = 66 m^3.

Notice that the system offers the option of dosage by **EVAPORATION TIME** which uses actually the same calculation method explained above but the final result is converted into time units by dividing the volumetric result with the nominal flow of the valve. The irrigation will be by time.

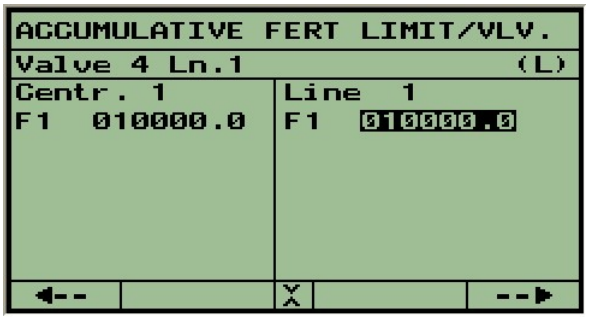
Dosage by Volume Per Area



For those who are used to think about irrigation quantities in terms of volume of water per each unit of area, the VISION offers the option of dosing the water by volume/ area. The units by which the volume and the area are measured, can be selected at the **DEALERS DEFINITION**. The system calculates the amount of water to be irrigated based on the predefined data of the area covered by the valve (defined at the **VALVES CONSTANTS**) multiplied by the desired volume per area specified by the user. The result is multiplied by the crop factor in % (defined also at the **VALVES CONSTANTS**) that represents the needs of the particular crop. This final result is the amount to be irrigated.

Global Accumulative fertilizers limit

There is an option to define global fertilizers limits per each fertilizer type of each valve so that the system will protect us from fertilizing more than necessary. During each fertigation process, the quantity left to reaching the limit gets smaller and smaller and when becoming zero the injection of the particular fertilizer will not continue. The option of using the **GLOBAL FERTILIZERS LIMIT** must be enabled through the **DEALERS DEFINITION.**

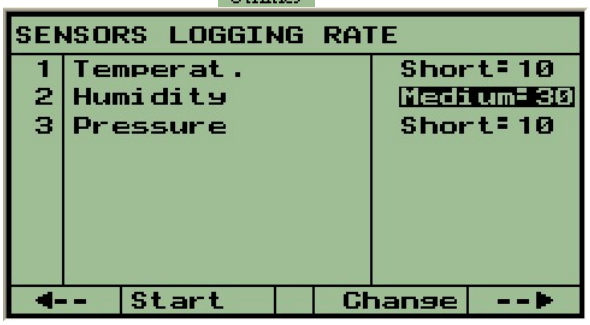


Appendix B

Logging Analog Sensors

The option of logging the readings of analog sensors' can be enabled at the **DEALERS DEFINITION** where it is possible to define the number of records to be stored at the allocated logger storage.

The process of logging the sensors will be executed in a cyclical manner, each sensor will be sampled in a selected rate. The setting of the logging rate per sensor and the starting of the logging process is done from the submenu of as explained below:



The sampling rate of each sensor can be set to Short, Medium or Long periods which by default equal 10, 30 and 60 minutes accordingly. The default values can be changed through the **VISION 2 PC Console software**.

For Starting / Stopping the logging process use **F2= "Start"**.

When the storage allocated for the logger gets full, the new samples will replace the oldest ones.

Performance logging

In order to be able to use the performance logger there must be storage allocated for the logger during the **DEALERS DEFINITION**. The allocation is done by specifying the number of records to be stored at the allocated logger storage. When the storage gets full, new samples will replace the oldest ones.

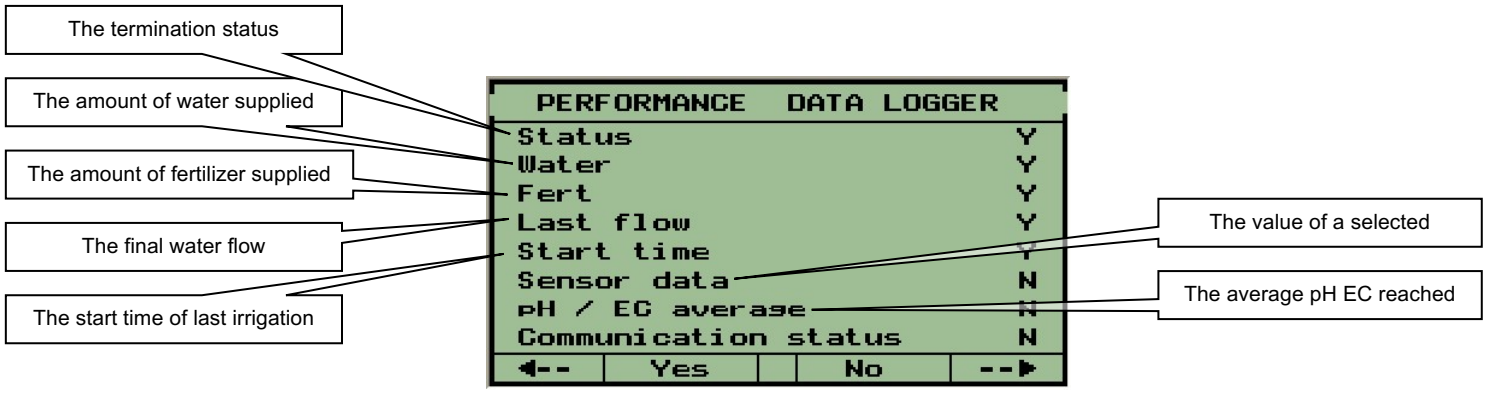
What kinds of performance information will be logged? In general, the possible logging may contain one of the two types of information:

Recording parameters related with the irrigation performance. The recording will take place at the termination of any irrigation program

Recording communication problems with RTUs and interfaces. The recording will take place each time there is a change in the status of communication with any RTU and any interface.

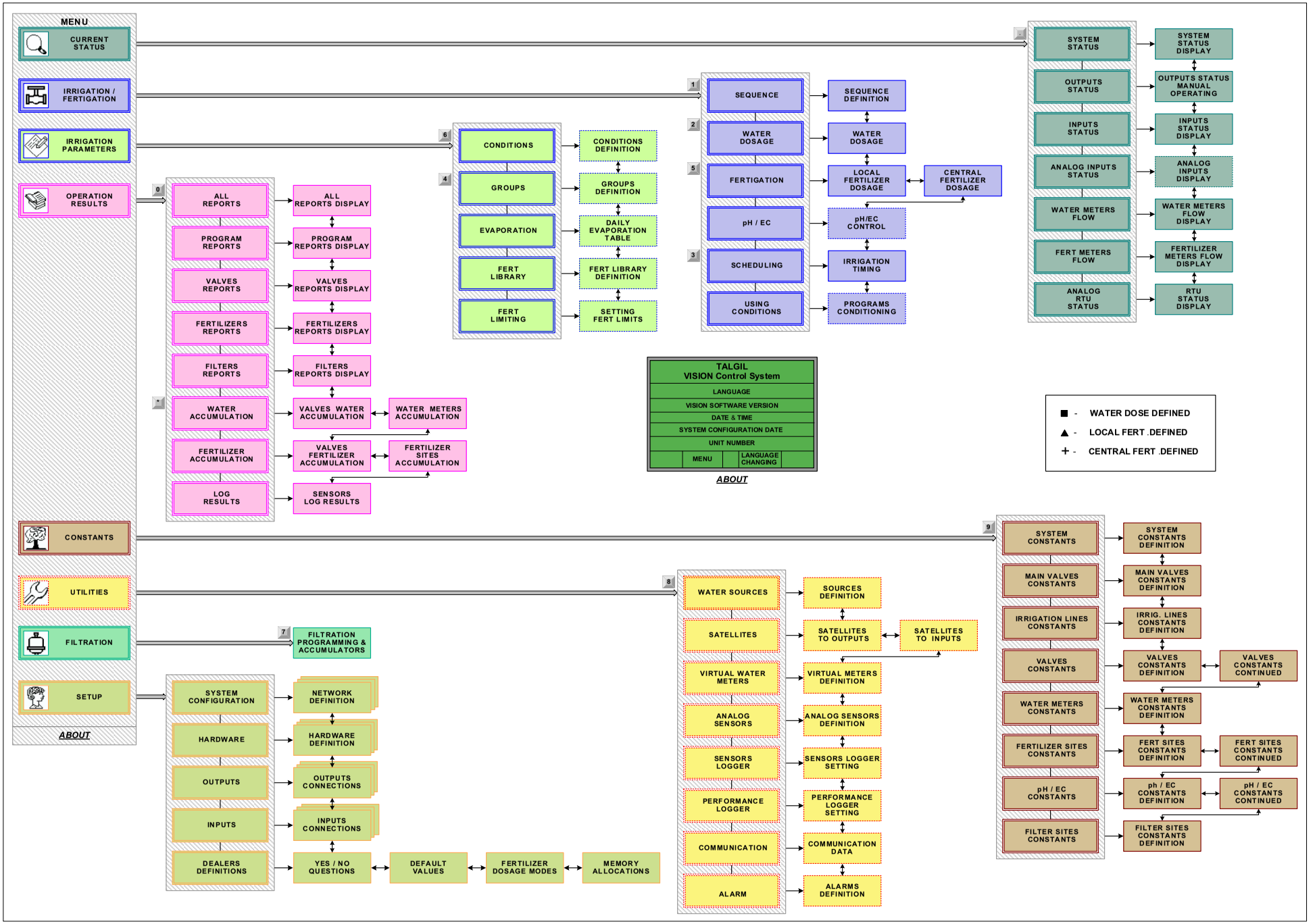
The selections of the information that will be logged, is made by the user within the submenu 

through the following screen:



When the communication status (last row) is selected, only communication problems will be recorded.

The results of the performance logger can be viewed only through the **VISION 2 PC Console software.**


MENU
CURRENT STATUS
IRRIGATION / FERTIGATION
IRRIGATION PARAMETERS
OPERATION RESULTS
CONSTANTS
UTILITIES
FILTRATION
SETUP
ABOUT
0
ALL REPORTS
PROGRAM REPORTS
VALVES REPORTS
FERTILIZERS REPORTS
FILTERS REPORTS
WATER ACCUMULATION
FERTILIZER ACCUMULATION
LOG RESULTS
ALL REPORTS DISPLAY
PROGRAM REPORTS DISPLAY
VALVES REPORTS DISPLAY
FERTILIZERS REPORTS DISPLAY
FILTERS REPORTS DISPLAY
VALVES WATER ACCUMULATION
VALVES FERTILIZER ACCUMULATION
SENSORS LOG RESULTS
WATER METERS ACCUMULATION
FERTILIZER SITES ACCUMULATION
6
CONDITIONS
GROUPS
EVAPORATION
FERT LIBRARY
FERT LIMITING
CONDITIONS DEFINITION
GROUPS DEFINITION
DAILY EVAPORATION TABLE
FERT LIBRARY DEFINITION
SETTING FERT LIMITS
1
SEQUENCE
2
WATER DOSAGE
5
FERTIGATION
pH / EC
3
SCHEDULING
USING CONDITIONS
SEQUENCE DEFINITION
WATER DOSAGE
LOCAL FERTILIZER DOSAGE
CENTRAL FERTILIZER DOSAGE
pH/EC CONTROL
IRRIGATION TIMING
PROGRAMS CONDITIONING
SYSTEM STATUS
OUTPUTS STATUS
INPUTS STATUS
ANALOG INPUTS STATUS
WATER METERS FLOW
FERT METERS FLOW
ANALOG RTU STATUS
SYSTEM STATUS DISPLAY
OUTPUTS STATUS MANUAL OPERATING
INPUTS STATUS DISPLAY
ANALOG INPUTS DISPLAY
WATER METERS FLOW DISPLAY
FERTILIZER METERS FLOW DISPLAY
RTU STATUS DISPLAY
TALGIL
VISION Control System
LANGUAGE
VISION SOFTWARE VERSION
DATE & TIME
SYSTEM CONFIGURATION DATE
UNIT NUMBER
MENU
LANGUAGE CHANGING
ABOUT
■ - WATER DOSE DEFINED
▲ - LOCAL FERT .DEFINED
+ - CENTRAL FERT .DEFINED
7
FILTRATION PROGRAMMING & ACCUMULATORS
SYSTEM CONFIGURATION
HARDWARE
OUTPUTS
INPUTS
DEALERS DEFINITIONS
NETWORK DEFINITION
HARDWARE DEFINITION
OUTPUTS CONNECTIONS
INPUTS CONNECTIONS
YES / NO QUESTIONS
DEFAULT VALUES
FERTILIZER DOSAGE MODES
MEMORY ALLOCATIONS
8
WATER SOURCES
SATELLITES
VIRTUAL WATER METERS
ANALOG SENSORS
SENSORS LOGGER
PERFORMANCE LOGGER
COMMUNICATION
ALARM
SOURCES DEFINITION
SATELLITES TO OUTPUTS
SATELLITES TO INPUTS
VIRTUAL METERS DEFINITION
ANALOG SENSORS DEFINITION
SENSORS LOGGER SETTING
PERFORMANCE LOGGER SETTING
COMMUNICATION DATA
ALARMS DEFINITION
9
SYSTEM CONSTANTS
MAIN VALVES CONSTANTS
IRRIGATION LINES CONSTANTS
VALVES CONSTANTS
WATER METERS CONSTANTS
FERTILIZER SITES CONSTANTS
pH / EC CONSTANTS
FILTER SITES CONSTANTS
SYSTEM CONSTANTS DEFINITION
MAIN VALVES CONSTANTS DEFINITION
IRRIG. LINES CONSTANTS DEFINITION
VALVES CONSTANTS DEFINITION
VALVES CONSTANTS CONTINUED
WATER METERS CONSTANTS DEFINITION
FERT SITES CONSTANTS DEFINITION
FERT SITES CONSTANTS CONTINUED
ph / EC CONSTANTS DEFINITION
pH / EC CONSTANTS CONTINUED
FILTER SITES CONSTANTS DEFINITION