

GalPro AC/DC

Operating Manual



Gal Pro

Thank you for choosing Galcon's Gal Pro controller.

Galcon Company has invested its comprehensive knowledge, accumulated throughout the years, to develop a new irrigation controller that answers the high demands of agriculture.

The controller excels in its new hardware and software. A great deal of emphasis was placed on user friendliness. The Gal Pro allows you to enjoy high performance, data collection and reliability for many years. All this, at a very low, unprecedented price.

Please read the operating manual before undertaking any action on the controller.

We wish you enjoyable and efficient use throughout the years.

The Galcon team



Index

1. Preface	5
2. Controller Description	6
3. Installation	8
a. Physical connection	8
b. Output connection	9
c. Input Connection	11
d. Power Supply	11
4. First Operation	14
5. Controller Definition	16
a. Service Menu	16
b. System Setup Menu	17
c. Water Meter Menu	19
d. Fertilizer System Menu	20
e. Filter Flush System Menu	21
f. Alarm Menu	22
g. Log Books Menu	22
6. Programming	23
a. Valves - Water and Fertilizer Programs	24
b. Sequence Setup	26
c. Sequence Timings	27
7. Information and Programming	28
a. System Status	28
b. Valve Status	29
c. Valve Information	30
d. Sequence Status	31
e. Sequence Information	32
8. Manual Overriding	36
9. Alarm Menu	37
10. Data Loggers	38
11. Advance operation guide	39
a. Flow Control Mechanism	39
b. Condition Input Operation	40
12. Maintenance	42
a. Output Checkup	42
13. Technical Specification	43

1. Preface

The **Gal Pro** is a small economical controller designed for the irrigation and fertilization of plantations, orchards and small to medium sized open fields.

The Gal Pro is produced in two sizes:

Gal Pro 4:

Designed to operate 4 Irrigation valves, Master valve, Fertilizer pump, 2 filters, and an Alarm output.

Gal Pro 8:

Designed to operate 8 Irrigation valves, Master valve, Fertilizer pump, 2 filters and an Alarm output.

Gal Pro is manufactured in two configurations,

Gal Pro DC:

The controller operates 2 or 3 wires 12VDC Latching solenoids.

The controller is operated by 4 * 1.5 volt batteries (installed inside the controller casing) or an external power supply of 12 VDC - disposable dry battery or rechargeable battery of 5-7 Amp.* Hours. Using the rechargeable battery requires the use of an adequate power supply with an output of 13.8 volts or a solar panel of 5 Watts.

Gal Pro AC:

Operated by standard socket of 220V or 110V. If necessary protection cards can be added for controller's inputs and outputs.

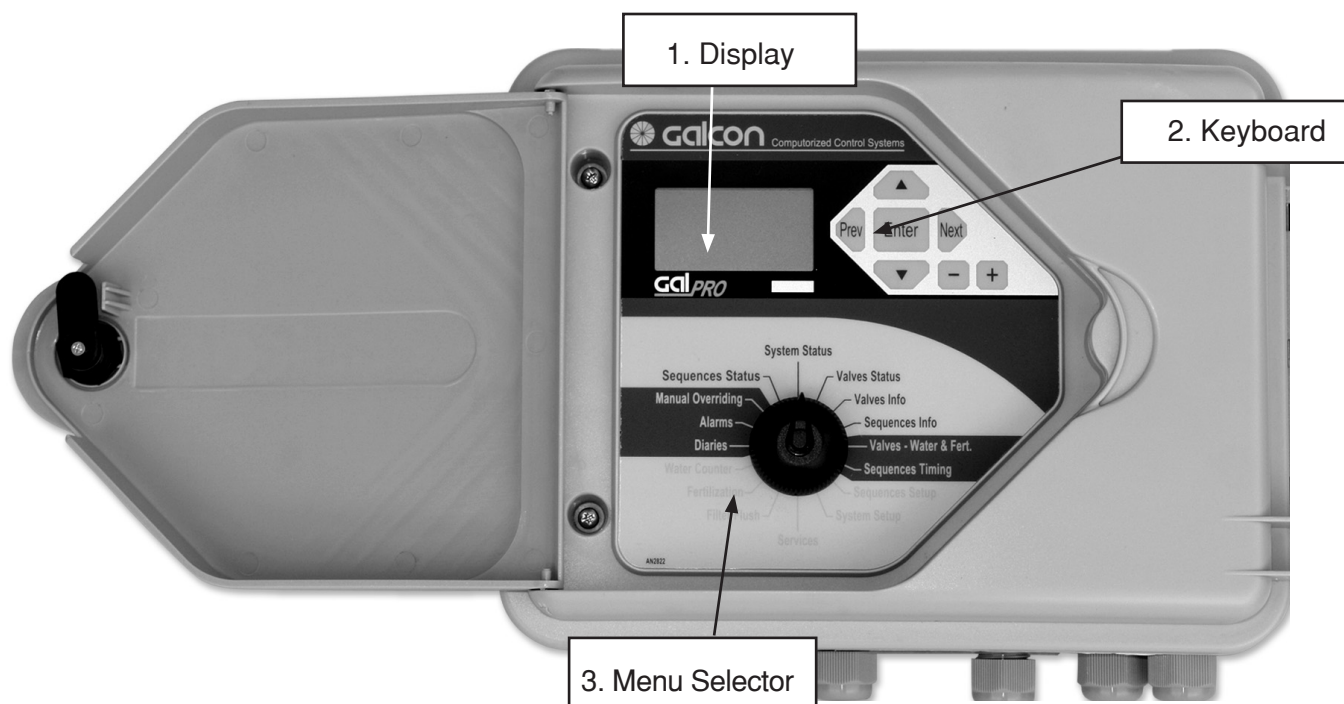
The controller operates solenoids of 24VAC type.

In both of the controller's configurations the controller's outputs and inputs are predefined and fixed.

The definitions and programming data are maintained even when the controller is disconnected from power. However some types of data are lost. The data that is lost when disconnected are: time, date, accumulations of water and fertilizers and data loggers.

In Gal Pro AC a 9V battery can be connected in order to preserve all the data during a power failure.

2. Controller Description



1. **Display** - 5 alphanumeric display rows.

The first row shows the current position of the menu.

The next 4 rows show information and enable programming.

The display is normally off. Pressing any key or turning the "Menu Selector" turns the display on. When the keys are untouched for more than two minutes the display turns off.

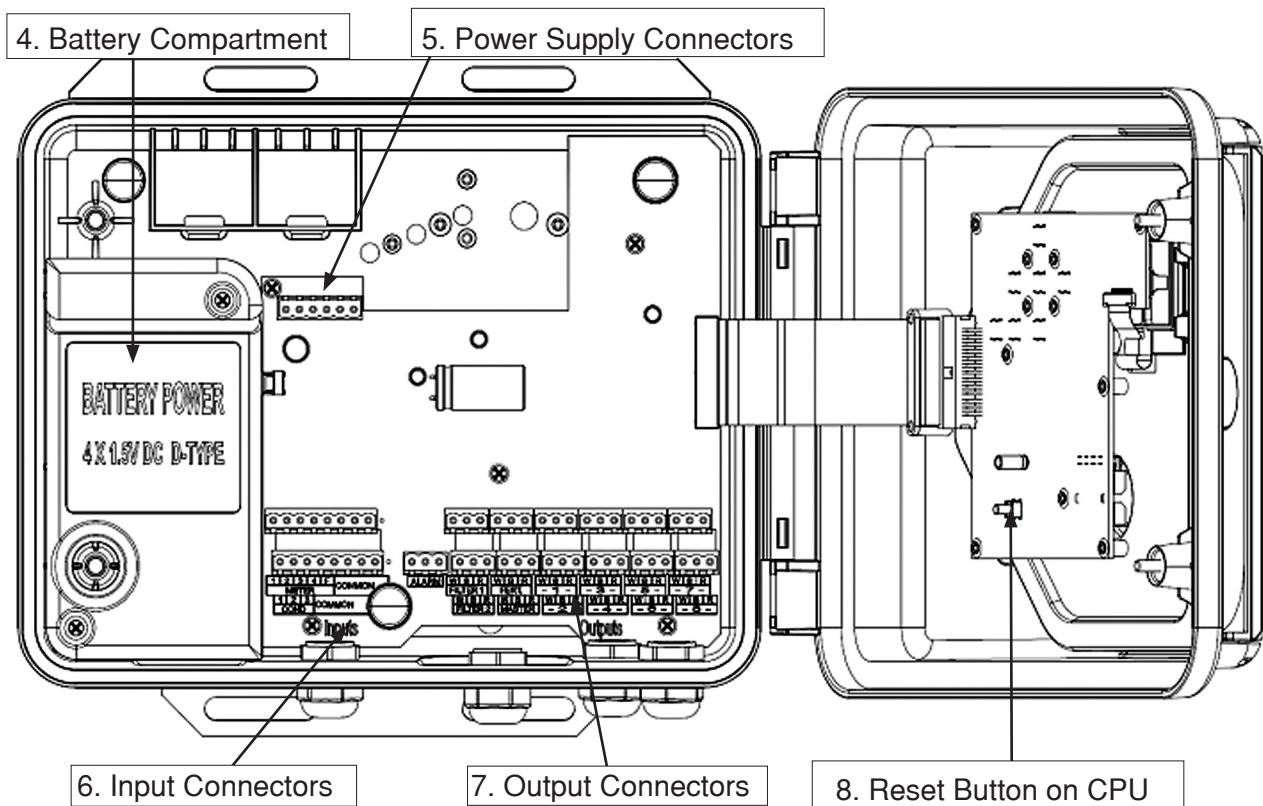
2. **Keyboard** (7 keys)

The keyboard provides navigation, information and programming.

3. **Menu Selector** (16 positions)

The selector enables direct access to all of the controller options. It is possible to turn the selector in both directions.

2. Controller Description



4. **Battery Compartment** - 4 * D type 1.5 Volt batteries for Gal Pro DC

5. **Power Supply Connectors** - Connect the internal batteries or external power supply. Please see the explicit instructions in the Controller Installation chapter.

6. **Input Connectors** - Connect the water meters, fertilizer meters and conditioned inputs such as pressure stat, differential pressure stat etc.

7. **Output Connectors** - Connect the system solenoids and alarm outputs.

8. **Reset Button on CPU** - Pressing this button resets the following parameters: time and date, logs and accumulations. Controller definitions and irrigation programs are not affected by the reset button. Only use this button if experiencing severe disruption of the controller activity.

3. Controller Installation

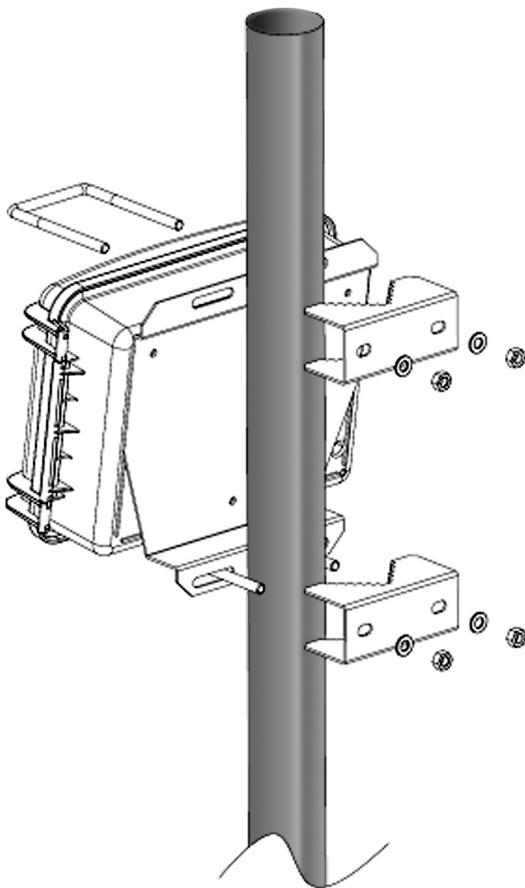
Physical Connections

The controller is designed to withstand sunny and rainy weather conditions. However it is preferable to provide additional protection from the climate by installing it in a sheltered position. Appropriate installation of the controller will ensure its dependable running throughout the years.

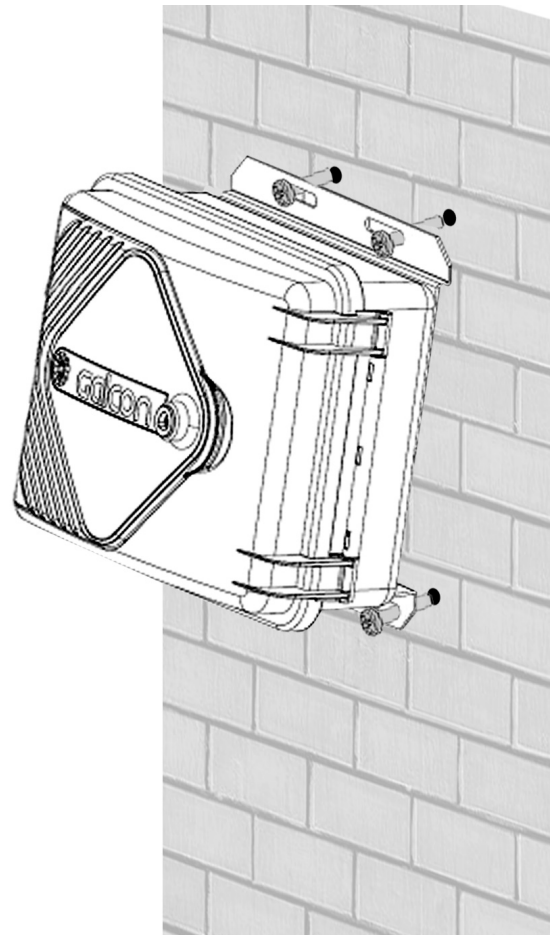
The controller can be installed in two ways:

- Mounted on a wall or any vertical board.
- On a 1¼" - 1½" diameter metal post via the provided bands.

Metal Post Mounting Diagram



Wall Mounting Diagram



3. Controller Installation

Output Connections

The **Gal Pro 4** has 9 outputs:

4 Irrigation Valves

Master Valve

Fertilizer Pump

2 Filters

Alarm

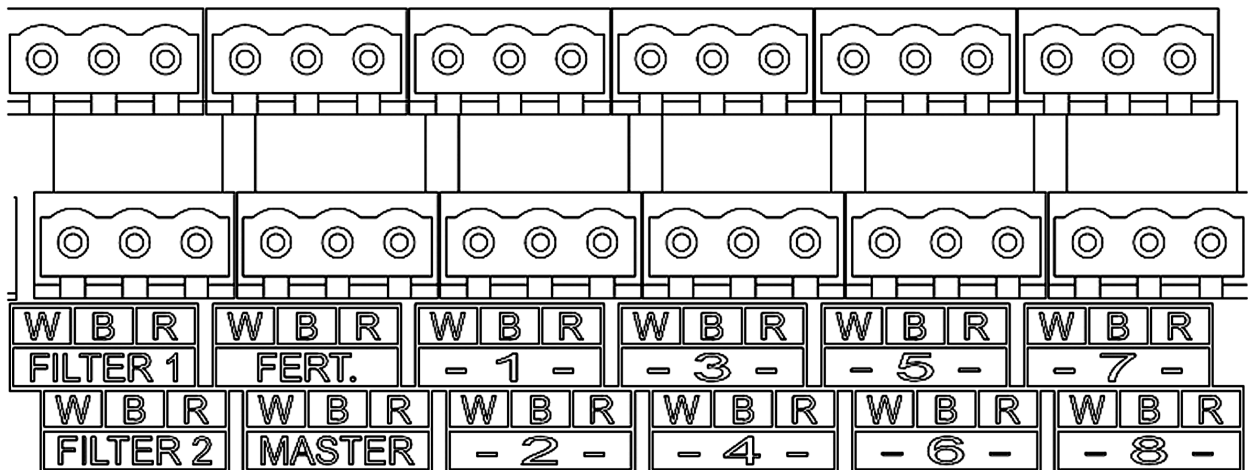
The **Gal Pro 8** has 13 outputs:

8 Irrigation Valves

The rest of the outputs are identical to the Gal Pro 4

The solenoids are installed on a bar below the controller.

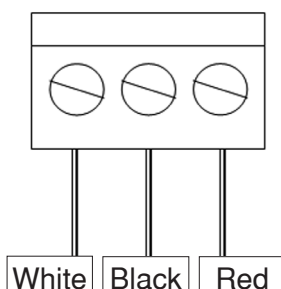
Output Connection Diagram:



1. Remove all of the detachable connectors.
2. Insert the solenoid wires via the antigrons on the bottom of the casing and connect them to the detachable connectors. Please make sure that the wires are connected correctly according to their coloring.

Three Wire Solenoid Connection for Gal Pro DC.

Please Note!!! The wires are connected according to the following order:



3. Controller Installation

Two wire solenoids for Gal Pro DC (black and red wires only) are connected in the same way (the white wire connector is left unconnected). In this way the solenoid is "normally open" i.e. when the output is idle the solenoid sends water. When inverting the command is required, simply switch between the red and black wires.

Connection of solenoids for Gal Pro AC

The red wire has to be connected to the output and the second wire has to be connected to the COM.

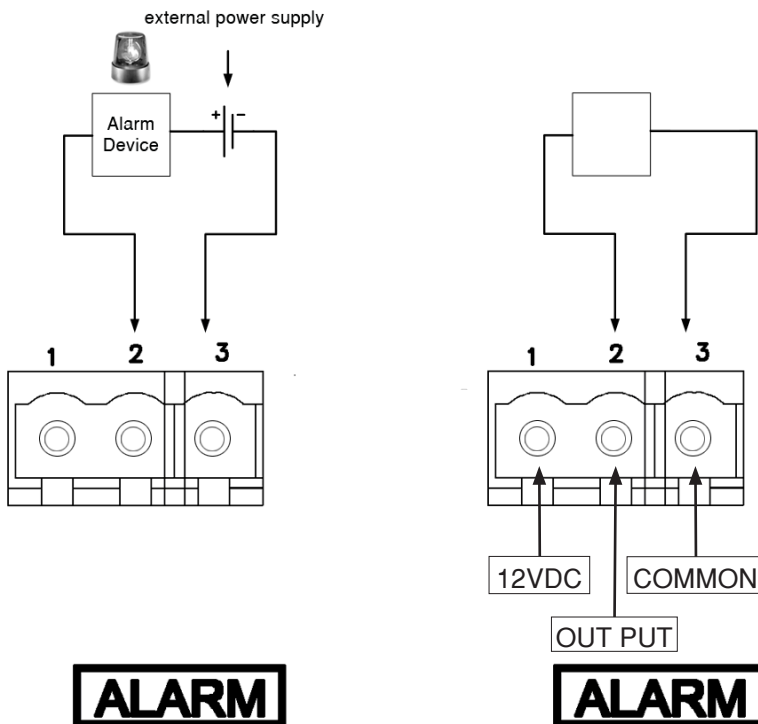
*It is highly recommended to mark with an indelible pen all of the output functions.

Connect all of the detachable connectors.

Alarm Output Connection

The alarm output is designed to send out an alarm. The alarm output can be connected to devices such as: a siren, flashing lights, a cellular dialer that sends text messages etc. The alarm device is operated via an external power supply for Gal Pro DC Controller with a relay switch connected to the controller.

Alarm Connection Diagram:



3. Controller Installation

Input Connections

The controller has the following inputs:

4 Water Meters

Fertilizer Meter

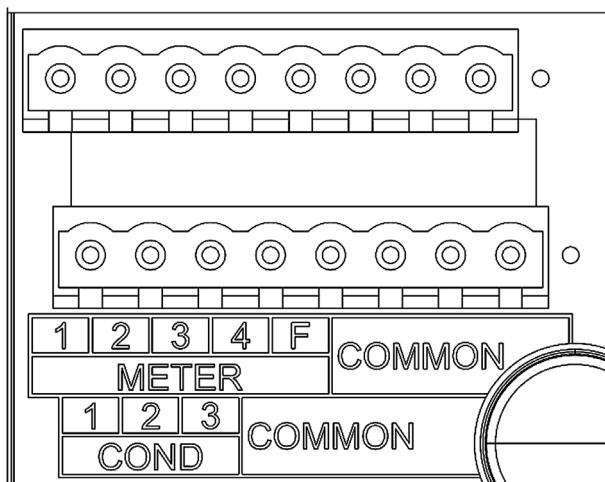
3 Condition inputs - these inputs are connected to devices and enable to condition the controller programming on the input contact by condition types such as: start, stop, pause or operate. The condition devices include:

Pressure Stat - a device that enables pausing the system in the case of low pressure.

Differential Pressure Stat - a device that enables flushing filters according to the pressure differential over the filters.

Thermostat - a device that enables irrigation during extreme temperatures.

Electric Tensiometer - a device that enables starting irrigation according to the soil humidity.



Please Note: The first row includes (from left to right): 4 water meters, fertilizer meter and 3 commons.

The second row includes: The 3 condition inputs and 5 commons.

1. Remove all of the detachable input connectors.
2. Insert the solenoid wires via the antigrons on the bottom of the casing and connect them to the detachable connectors. (Every input has 2 wires - "input" and "common")
It is highly recommended to mark with an indelible pen all of the output functions.
3. Connect all of the detachable connectors.

Power Supply to Gal Pro DC Controller

As stated in the preface the controller can be powered by 4 * D type 1.5 volt batteries installed in the controller casing or by a 12 VDC external power supply.

Please Note: During first time operation you will be requested to define the power supply voltage.

When the controller is used for intensive operation it is recommended to use an external power supply.

Intensive operation includes the following situations:

The controller operates many valves and fertilization.

The controller irrigates several times a day.

Fertilization is proportional i.e. the fertilizer pump starts and stops frequently during the irrigation.

3. Controller Installation

When using an external power supply please use a rechargeable battery of at least 5 amp.* hours connected to a suitable charger. When the controller is located in the vicinity of the power network, you may connect the charger to the network. If not, use a solar panel in order to charge the battery.

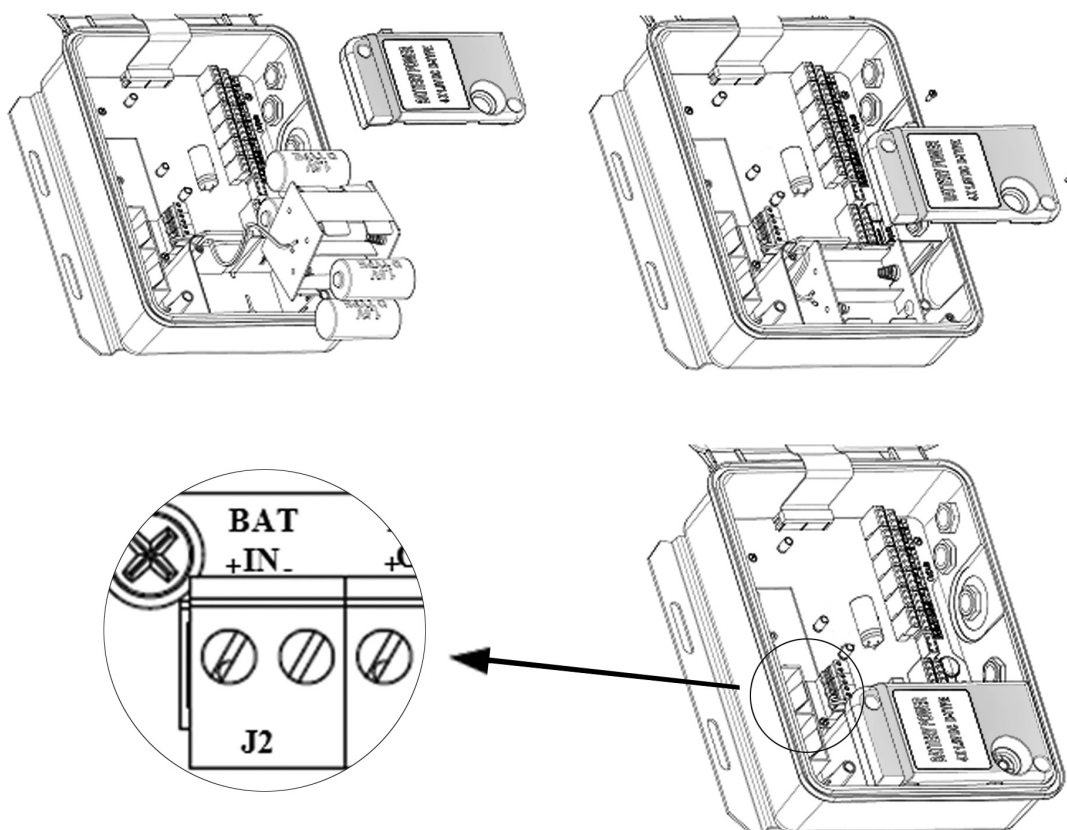
Please Note: When using a solar panel it is recommended to use a charge controller to protect the battery from overcharging.

Internal Battery Power Supply

1. Remove the battery compartment cover by unscrewing the 2 Phillips screws.
2. Insert the 4 * alkaline D type 1.5 Volt batteries. Please pay attention to the position of the batteries.
3. Close the battery compartment.
4. Connect the power supply connector to the "BAT IN" connector on the terminal board.

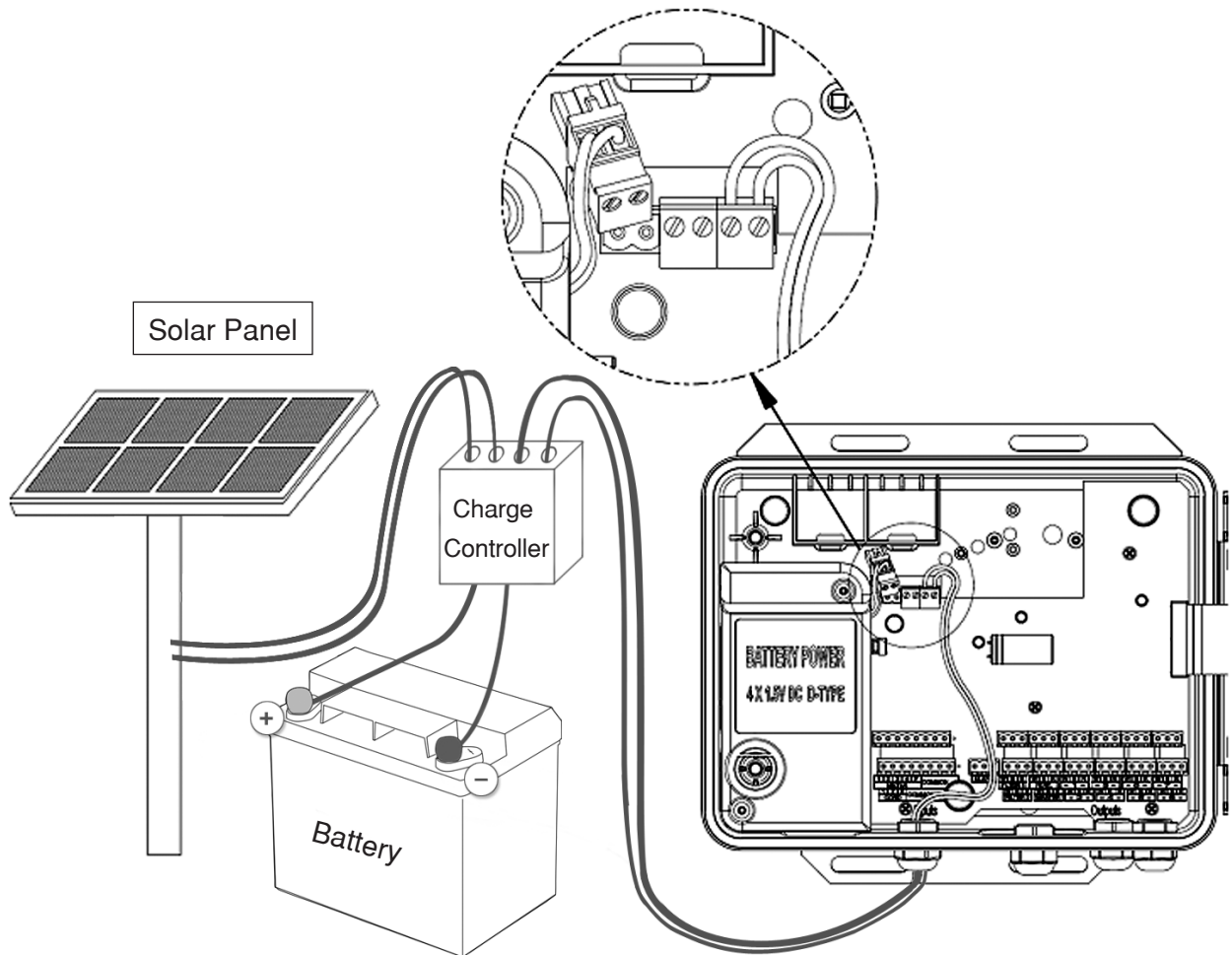
External Power Supply

Install the rechargeable 12 VDC (at least 5 amp. * hours) battery next to the controller in suitable



3. Controller Installation

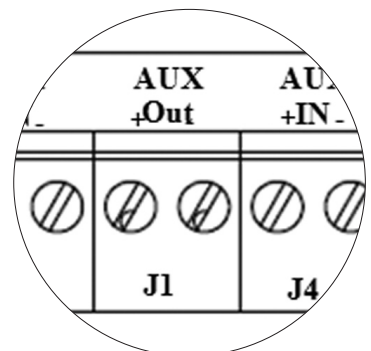
casing. Connect the battery to the "PWR" connector on the terminal board. Pay attention to the polarity.



The "BAT OUT" connector on the terminal board is designed to supply power to an "Amiad" fertilizer pump pulse transmitter or other uses.

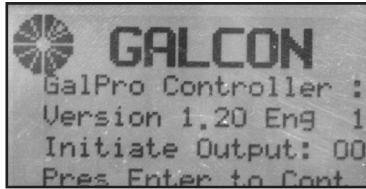
Power supply to Gal Pro AC controller

From Gal Pro AC controller exits a standard electric cable of 220V or 110V (as ordered).



4. First Time Operation

When connected to the power supply for the first time the following screen appears:



The controller initializes (closes) the outputs. This process lasts several seconds, at the end of the initialization the following message appears:

Initiate Output: 00

Press Enter to continue

Keyboard



The keyboard includes the following keys:

The arrow keys **▲▼** are used to move between the rows of the controller screen.

The **"Next"** and **"Prev"** keys are used to move between elements in multi-element screens such as: valves, sequences, water meters and paging the log book.

The **"+"** and **"-"** keys are used to change the numeric value in programming and the selection of different options in the definition of the controller. Continual depression of these keys accelerates the rate of change of the numbers.

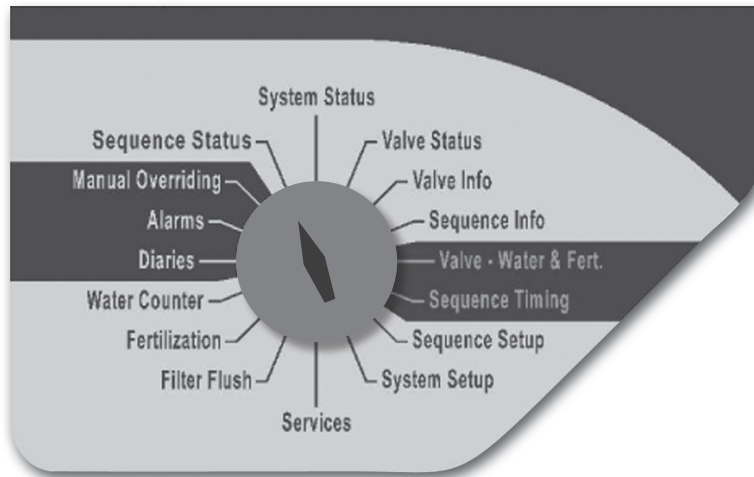
Simultaneous depression of **"Enter"** and **"+"** or **"-"** changes the numbers by tens.

The **"Enter"** key is used to enter some of the data into the controller:

1. Confirm changes of programming parameters.
2. To confirm some system actions when the "Press Enter to Continue" message appears.
3. To accelerate the number rate change.
4. When restoring factory defaults. See explanation in the "Controller Definition" chapter.

4. First Time Operation

Menu Selectors



The controller menus appear around the 16 state "Menu Selector". They are divided into the following 4 groups:

Group A: Irrigation system data - black letters on grey background.

Sequence Status - Current information about sequence timing and valve status in the sequence. Most of the parameters in this menu are editable.

System Status - General controller status information.

Valve Status - Current irrigation valve status. Some of the data is editable.

Valve Info - Valve timing and accumulation information.

Sequence Info - Additional data for sequence follow up. Not editable.

Group B: Irrigation Programming - blue letters on black background.

Valves Water and Fertilizer - Valve water and fertilizer programming.

Sequence Timing - Timing program for the sequences.

Group C: System definition and constants - blue letters on grey background.

Sequence Setup - Sequence constant data.

System Setup - System operation, flow control, condition input constants.

Services - Clock update, input/output status checkup, battery power checkup, direct output manual operation and controller reset.

Filter Flushing - Filter flush definition and checkup.

Fertilization - Fertilizer pump definition and data.

Water Counters - Water counter definition and accumulation data.

Group D: Operation and reports - grey letters on black background.

Manual Overriding - enables manual operation.

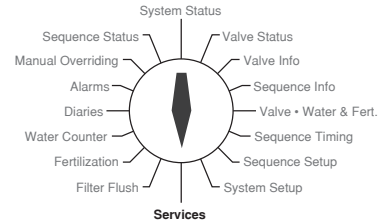
Alarms - alarm information and cancel.

Diaries - Controller operation history. Up to 128 events are listed.

5. Controller Definition

During first time operation and before programming irrigations, some initial parameters must be entered.

Service Menu



a. Date and Time Update

1. Turn the selector to the "Service Menu", press the "Enter" key. On the right side of the screen an arrow that marks the first row appears. In addition a cursor appears as an underscore below the "hours" of the clock. This cursor signifies that the data above it can be changed.
2. Edit the time via the "+" and "-" keys.
3. Press the "Next" key to move the cursor to the "minutes" and adjust accordingly.
4. If necessary move the cursor to the "seconds" and adjust accordingly.
5. Move down one row, the cursor appears under the "day" of the date. Adjust it accordingly.
6. Move the cursor to the right and adjust the "month" and the "year". The day of the week which appears on the right of the date will update automatically.

b. Voltage and Screen Contrast Definition

1. For Gal Pro DC Move down and skip the following rows: Input Status, Output Status, System Version and Voltage Display. The following row is "battery type". Define the voltage used, 6 Volts if using internal batteries and 12 Volts if using an external power supply.
2. Move down one more row and select the screen contrast level (5 is the default)

c. Solenoid Pulse Duration Definition For Gal Pro DC

In order to enable the use of different types of solenoids it is possible to define the pulse duration. The default pulse duration is 80 ms. It is recommended to consult Galcon technicians before changing this parameter.

1. Move down until you reach "out.command m.s 80". Via the "+" and "-" select the required pulse duration.

d. Restoring Factory Defaults

The following operation enables you to initiate the controller. All data apart from the time and date will be erased. It is recommended to perform initialization before first time operation.

1. Move down until you reach "load Dflt Setup" and via the "+" key select the "Yes" option. The message "Enter Password Keys" appears. Press the "Prev", "Enter" and "Next" keys simultaneously. The system closes all solenoids and loads the default data. At the end of this process the "Load Setup Complete" message appears.

5. Controller Definition

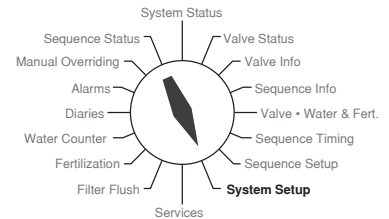
e. Output Initialization

The controller performs the initialization process automatically when connected to the power. Usually there is no need to perform this process unless you want to technically check solenoids due to replacement. Details about this process are further explained in the "Maintenance" chapter.

f. Irrigation Head Definition

System Setup Menu

Turn the selector to the system setup menu and enter the required definition according to the following table: (the values shown in the "Example" column are for illustration purposes only - please enter (when applicable) your required values)



Subject	Example	Explanation
	System Active	At this stage leave the head Not Active. Options: System Not Active - Stops all system activity and erases the accumulation data. The programming data and constants are not affected. System Active - System is active - the normal status. Fixed System Pause - Stops all system activity. Fixed Main Open - The system is working automatically (normally), the main valve is always open. It will only close in the case of a fault.
Queue Operation	Yes	Yes - Sequences work one at a time (not simultaneously). No - Sequences work simultaneously under the following conditions: a. Irrigation without fertilizers. b. Fertilization when the units are liter/m ³ with the same amount and without "water before/after". c. One of the valves is not on the fertilizer route.
Opn.Main Order	Aft.	Aft. - The main valve opens after the irrigation valve. Sim. - The main valve opens simultaneously with the irrigation valve. Bef. - The main valve opens before the irrigation valve.
Open Delay Sec.	10	The time delay between the main and irrigation valve according to the previous definition.
Cls.Main Order	Bef.	See "Open Main Order".
Close Delay Sec.	20	The time delay between the main and irrigation valve according to the previous definition.

5. Controller Definition

Subject	Example	Explanation
Overlap Time Sc.	10	The closing valve closes 10 seconds after the next valve in order to prevent water shock.
Pause-Cond.Input	1	If using "condition input" in order to "pause" the whole system, enter the number here. See detailed explanation in "Advanced Operation" (p.40).
Fill-Dly m3	2.0	Amount of water passing through the water meter from the start of irrigation until activating flow alarms.
Fill Delay Mnt.	5	The time that passes from start of irrigation until activating flow alarms. If both fill delays (time and amount) are defined the first to occur will activate flow alarms.
Flow Dev. Unit	M3/H	The unit for flow control (M3/H or %).
Flow Delay Unit.	M3	The flow delay unit for the definition in "Valve - Water&Fert." menu.
Fixd.Wtr Mult.	100%	Enables changing the amounts of all the valves at once. 0 - 200 %. When programmed "Water Mult." appears in the "System Status" menu.
Fixd.Cancl Fert	No	Cancel fertilizing even though there is a fertilizer program.
Cnd.1 OnDly-Sc	10	Delay in seconds to start according to condition input.
Cnd.1 OffDly-S.	10	Delay in seconds to stop according to condition input.
Cnd.2 OnDly-Sc.	10	See Condition 1.
Cnd.2 OffDly-S.	10	See Condition 1.
Cnd.3 OnDly-Sc.	10	See Condition 1.
Cnd.3 OffDly-S.	10	See Condition 1.

5. Controller Definition

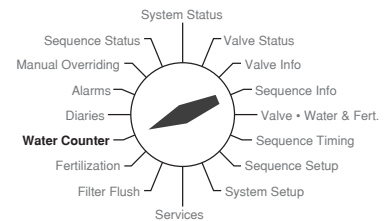
Water Counter Menu

Turn the selector to the "Water Counter" menu.

The upper row shows **Water Counter No. 1**

Move down until you reach **Wtr.Counter Setup**.

Enter the parameters as follows:



Subject	Example	Explanation
Puls.Size Ltr	100	Define the pulse size according to the water counter specification.
Pulse Dly-Sec.	300	The "time out" definition during which the controller waits for a water pulse before activating "no water pulse" alarm.
Fault React	Fault	The following options only apply when the irrigation unit is by Time. If the irrigation unit is according to Volume it will always create a fault. Fault - Reaching the "time out" from the previous item issues a fault message, stops the current valve and starts the next valve in the sequence. Two consecutive faults of this type causes the water meter to fault and all of the valves using this water meter will not work. Ignore - The controller continues irrigating. Alarm - During this fault the controller issues an alarm but does not stop irrigation.
Leak.Set-m3	5	The amount of water in M3 that the system allows when all of the valves are closed before issuing the "leak" alarm. It resets at the start of each irrigation.
Leak.Reaction	Fault	Fault - The controller will not allow irrigation and issues an alarm. Ignore - The programs using the water meter will irrigate normally. Alarm - During this fault the controller issues an alarm but allows irrigation.

If the system has more than one water meter, access the next screen via the "Next" key.

5. Controller Definition

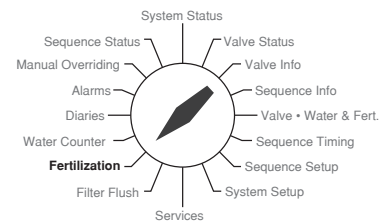
Fertilization Menu

Turn the selector to the "Fertilization" menu.

The first row shows **Pump Status N.Active**

Move down until you reach: **Fert. Pump Setup**

Enter the parameters as follows:



Subject	Example	Explanation
Pump Type	By Pulse	When the system has a fert. counter, define: By Pulse if not define: Venturi
Puls.Size Mil	100	Only define if the system has a fert. counter.
Pump.Flow L/H	200 L/H	This parameter must be defined when the pump is defined as Venturi. If it is not defined a "Fert. Pump Error" message appears.
Pulse Time Sec.	10	This parameter is necessary when operating a Venturi type fertilizer pump with proportional fertilization.
Continuous	Yes	During proportional fertilization: Yes - The fertilizer pump fertilizes all of the required amount between 2 pulses of water continuously. No - The fertilizer pumps work alternately between the 2 pulses of water according to the previous parameter.
Pipe Delay-Sec.	10	Defines the amount of time before starting the fertilizer pump in order to stabilize the water pressure.
Water Delay-Puls.	3	The number of water pulses that pass through the water meter before the fertilizing process starts.
No Pulse Sec.	180	The time out of the fertilizer pulses. If after that time a pulse is not received the system alarms. This could be due to lack of water or a faulty fertilizer meter.
Leakage Pulses	10	The maximum number of pulses that the system allows before issuing an alarm. This parameter helps to prevent false alarms.
Auto Reset Flts	No	In the case of automatic alarm canceling, whether the fertilizer pump participates in the alarm canceling. It is recommended to select No.

5. Controller Definition

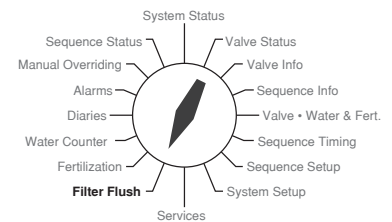
Filter Flush Menu

Turn the selector to "Filter Flush"

The first row shows Filtering

Move down until you reach: Filter Setup

Enter the parameters as follows:



Subject	Example	Explanation
Flush Def	One Unit	Not Activ - No filters connected One Unit - One filter connected Two Units - Two units connected
Wtr Setup.m3	50	Defines the amount of water passing through the filter between flushes.
Tim.Setup.Hr	2:00	The amount of time between flushes.
Cond. Input No.	2	The input number that the PD switch is connected to.
FlushTime-Sec	60	Flush time for each filter.
Wait Time-Sec	10	If the system has two filters, this is the amount of time between the flushing of the two filters.
Stop Irrig	Yes	Stops the irrigation during flushing in order to ensure sufficient flushing pressure.
Water count. No.	1	The water counter used if the option "Wtr Setup M3" is used. If using more than one water meter, enter zero in order to create a virtual water meter in which the flow rates and accumulations of all of the water meters are combined.
Max.Cont.Flushes	5	The maximum amount of flushes allowed if the PD switch keeps demanding flushing immediately after each flush (meaning that the filters are clogged and require manual attention). An alarm is issued above this number of flushes.
Fill Delay-Min.	2	The amount of time at the beginning of irrigation during which the filter system will not operate even if there is a flush demand.
Fail Reaction	Fault	Fault - The controller stops all irrigation and issues an alarm. Ignore - The controller ignores the filter fault. Alarm - During this fault the controller issues an alarm but allows irrigation.

5. Controller Definition

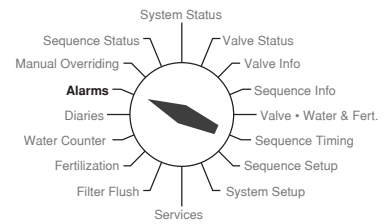
Alarm Menu

In this menu define whether to automatically cancel alarms and according to which frequency.

Turn the selector to **Alarms**

Move down until you reach: **Auto Reset-Min.** and define the cancel cycle in minutes. The controller will cancel all of the alarms that have been defined to participate in the automatic alarm cancel process.

If automatic alarm canceling is not required, enter zero (recommended).



Diaries Menu

In the diaries menu reset the diaries and define which messages are to be written in the diaries.

1. Turn the selector to **Diaries**

Move down until you reach: **Press + to reset diaries** and press "+". The message "press enter to reset" appears. Press "enter". The message "reset diaries done" confirms that the diaries have been reset and all messages have been deleted.

2. Move down until you reach: **Diary Msg. Setup**

The following is a list of possible diary messages:

Start Irrig.Msg.

Irr.Not Fin.Msg.

Start Fert.Msg.

End Fert. Msg.

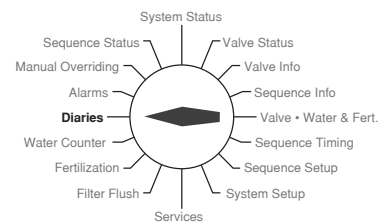
Under Flow Msg.

Over Flow Msg.

No Water Pulse

Wtr.Leakage Msg.

Fert.Fault Msg.



Select Yes for each message that you wish to be written in the diaries.

The following messages always appear in the diaries:

End Irrig.Msg.

Filt.Flush Msg.

Frnt.Leakage Msg.

Auto Updating

You have now finished defining the controller.

6. Programming

Principle of Irrigation Program Operation

The Irrigation Valve

The valve is a virtual element that has a physical counterpart that controls the actual valve in the field. It also has a program that specifies the quantities of water and fertilizer. In each valve define the water counter the valve uses and the condition input if necessary.

Sequences

The sequence is a group of valves that irrigate one after the other according to a predefined order. A sequence can include one valve only and up to all of the valves of the controller (maximum 8). The system has the timetable for the valves it contains.

Programming always includes:

- a. Programming water and fertilizer quantities for the valves - **Valves - Water & Fert.**
- b. Organizing the valves in the sequence in the **Sequence Setup** menu.
- c. Making the timetable for each sequence in the **Sequences Timing** menu.

The Fertilization Process Define the following parameters in the **Valves - Water & Fert.: Water Req., Fert Req., Water Before, Water After, Water Unit** and **Fert. Unit**.

Please Note: The Water Unit and the Fert. Unit are defined before the first operation of the controller.

Water Req. - The amount of water that the valve irrigates during the course of one irrigation cycle. It is measured in units of Liters or M3 according to the definition of the **Water Unit**.

Fert. Req. - The amount of fertilizer that is injected into the system.

Fert. Unit - There are 4 options:

1. **Bulk fertilizing in liters** - the controller fertilizes continuously until it finishes the amount of fert. required.
2. **Fertilizing by time in minutes** - the controller operates the fertilizer pump continuously for the required amount of time.
3. **Proportional fertilization according to Liter/M3** - The controller injects the defined amount into each M3 of water.
4. **Calculated proportional fertilization** - The controller divides the total amount of fertilization for the irrigation (programmed) by the amount of water and applies the proportion Liter/M3, resulting in continuous fertilization throughout the irrigation.

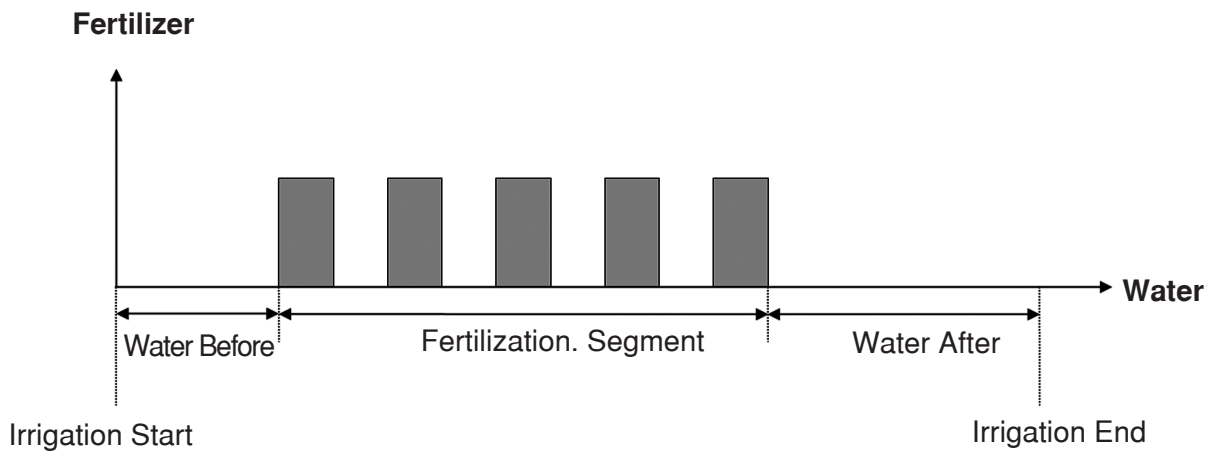
Water Before - The amount of water at the beginning of irrigation before fertilization starts.

Water After - The amount of water without fertilization at the end of irrigation. The controller stops the fertilization when the Water Left reaches this value even if the fertilization process has not been completed.

The fertilization process is always carried out in the "fertilization segment" which is between "water before" and water after".

The following diagram describes the fertilization process during the irrigation.

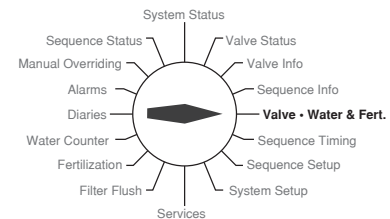
6. Programming



Valves - Water & Fert.

Turn the selector to Valves - Water & Fert. Menu

In this menu enter the water and fertilizer amounts and the valve constants.



Subject	Example	Explanation
Valve number	1	Change the valve number via the Next and Prev keys
Valve Setup	Automatic	Use the "+" and "-" keys to set the automat status for each active valve. Cancel - A cancelled valve will not irrigate even though it is programmed in a sequence. N. Activ -Undefined valve.
Please note !! When entering data for the first time:		First define the water counter number, the water and fertilizer unit before programming the water required.
Water Req.	30 M3	The amount of water for the irrigation cycle.
Frt.Req.	2 L/M3	The amount of fertilizer required according to the unit set in the Fert. Unit.
Wtr.Befor.	5 M3	The amount of water before starting the fertilization.
Wtr.After	1 M3	The amount of water after fertilization.
Water Count.No.	1	The water counter that counts the water for the valve.
Water Units	M3	Via the "+" and "-" keys select one of the options: M3, Seconds, Minutes, Hours, Liter.

6. Programming

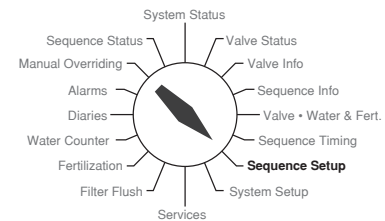
Subject	Example	Explanation
Fert.Units	L/M3	Via the "+" and "-" keys select one of the options: Liter, Minutes, Ltr/M3, Relate
Frt.Flt.React	Ignor	Via the "+" and "-" keys select one of the options: Ignor - The controller ignores fertilizer faults. Pause - Fertilizer fault stops the irrigation. If there are more valves in the sequence that are programmed "ignor", the system will operate them.
WtrFlow M3/H	12	Enter the nominal flow rate of the valve. Zero means no flow control.
UndrFlw.Dev.	30%	The percentage deviation below which the controller issues an alarm.
UndrFlw.React	Alarm	Select one of the following options: Ignor - The controller ignores the under flow fault. Alarm - The controller issues an alarm but the irrigation continues. Fault - The controller issues an alarm and stops irrigation.
OverFlw.Dev.	25%	The percentage deviation above which the controller issues an alarm.
OverFlw.React	Alarm	Select one of the following options: Ignor - The controller ignores the under flow fault. Alarm - The controller issues an alarm but the irrigation continues. Fault - The controller issues an alarm and stops irrigation.
Flw.Flt.Dly	5 Mins	The period of time (or M3, according to the definition "flow dev. unit" in the "system setup" menu) that the controller waits from the moment a flow fault occurs until the controller actually issues a fault status.
Vlv.On Fert Way	Yes	Enables to operate a non fertilizing valve with another fertilizing valve. Define "yes" for the non fertilizing valve.
Stop Cond. Input	0	Assign the condition input number to stop the valve.
Pause Cond.Input	1	Assign the condition input number to pause the valve.
CoValve Number	0	If you want to operate another valve along with this valve, enter its number here. The covalve does not accumulate the water and fertilizer and cannot contain another covalve. Any valve number can be programmed in a sequence and be a covalve as well.

Move to valve number 2 and the other valves by the next key.

6. Programming

Sequences Setup

In this menu define the constants of the sequence for the first time before programming the sequence.



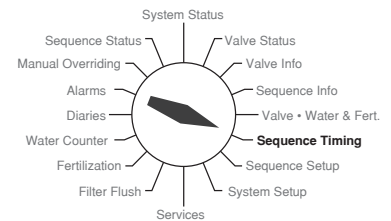
Subject	Example	Explanation
Sequence No	1	Change the number of the sequence by the Next and Prev keys.
Sequence Active	Yes	Select Yes for every active sequence.
Priority	Normal	Via the "+" and "-" keys select one of the options: Low, Normal, High. The priority of the sequence determines the order of irrigation in the case of a conflict.
1st Valve Number	1	The first valve that irrigates in the sequence.
2nd Valve Number	2	The second valve that irrigates in the sequence.
3rd Valve Number	8	The third valve that irrigates in the sequence.
4th Valve Number	0	The fourth valve that irrigates in the sequence.
5th Valve Number	0	The fifth valve that irrigates in the sequence.
6th Valve Number	0	The sixth valve that irrigates in the sequence.
7th Valve Number	0	The seventh valve that irrigates in the sequence.
8th Valve Number	0	The eighth valve that irrigates in the sequence.
Fix.Wtr Multip	100%	Enables changing all of the water amounts by one parameter.
Cancel Fertiliz.	No	Enables canceling fertilizing even when the fertilizer is programmed.
Start Cond.Inp.	0	Enter the condition input number to start irrigation.
Stop Cond.Inp.	1	Enter the condition input number to stop irrigation.
Pause Cond.Inp.	3	Enter the condition input number to pause irrigation.
Oper. Cond.Inp.	2	Enter the condition input number to operate irrigation.

For further information about condition inputs see the "Advanced Setup" (p40).

6. Programming

Sequence Timing

In this menu enter the timetable for sequence operation.



Subject	Example	Explanation
Sequence No	1	Change the sequence number via the Next and Prev keys.
Time Method	Cyclic.	Via the "+" and "-" keys select one of the options: Cyclic. - Irrigation according to cycle of days. For example 1=every day, 2=every other day and so on. Weekly - Irrigation according to selected days of the week.
Cycle Days	1	The number of days of the cycle - see the previous item.
Start Time	08:00	The start time.
Stop Time	0:00	The stop time for cyclic irrigation. At this time the irrigation stops and all of the remaining cycles are erased.
Cycles in Day	2	The number of cycles to be carried out.
Cycl.Time H:M	5:00	The time between two cycle starts.
Please note: The day of the week will only be displayed if the "time method" is weekly .		
Irrigate Sunday	No	Selecting Yes will start the sequence on this day.
Irrigate Monday	No	Selecting Yes will start the sequence on this day.
Irrigat.Tuesday	No	Selecting Yes will start the sequence on this day.
Irrig.Wednesday	No	Selecting Yes will start the sequence on this day.
Irrig. Thursday	No	Selecting Yes will start the sequence on this day.
Irrigate Friday	No	Selecting Yes will start the sequence on this day.
Irrig. Saturday	No	Selecting Yes will start the sequence on this day.

The controller setup is now completed. Move back to System Setup and select System Active. The controller carries out a short initialization process.

If the controller is programmed to irrigate today and the start time has already passed the controller will start irrigating immediately.

In the case of multiple sequences one has to consider:

Gal Pro AC can simultaneously open about 4 irrigation valves, main, fertilizer and filter, as opposed to Gal Pro DC which can open all the outlets simultaneously.

7. Information and Programming Menus

These menus include:

System Status

Valve Status

Valve Info

Sequence Status

Sequence Info

In addition to these menus there are current and accumulating data in the following menus:

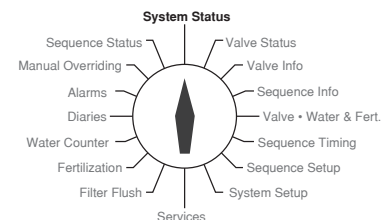
Water Counters

Fertilization system

Filter Flush System

System Status

This menu contains general data concerning the system status.

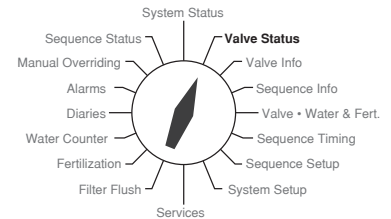


Subject	Example	Explanation
Curr. Time	10:32:46	The current time of the controller.
Date	12/03/2008 Fri.	The current date of the controller. The calculated day of the week appears to the right.
System Status	Active	Shows the system status. The options are: Active, Alarm, Pause, Fault, Irrigat, Fertig., Syslnit, OutTest.
I/O Status	---FM---2--	Feedback from all of the I/O of the system. The options are: 1 2 3 4 5 6 7 8 M F 10 20 The numbers represent the valves currently irrigating. M - Master Valve open F - Fertilizer pump working. 10 - First filter flushing. 20 - Second filter flushing.
Fert.Status	Active	The options are: N. Activ, Active, Fert., Fault.
Filt. Flush	Flushing	The options are: N.Activ, Active, Flush, Fault.

7. Information and Programming Menus

Valve Status

This menu shows the current status of the valves

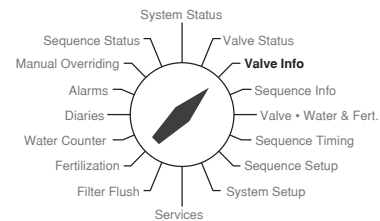


Subject	Example	Explanation
Valve No. Seq.No.	Valv No. 1 Seq No. 2	The valve to which the table relates and the sequence it is irrigating in (only when irrigation is on). Use the Next and Prev keys to change the number of the valve.
Valve Status	Irrigate	The options are: "N.Activ", "Def.Flt", "No Time", "By Cond", "Active", "Active", "Pause", "Fault", "Waiting", "Waiting", "Irrigat", "Fertig.", "Cancel", "VlvOpen".
Wtr.Don	2.50 M3	During the current irrigation.
Frt.Don.	4.8 Liter	During the current irrigation.
Current Flow Last Flow	14.6	During the irrigation the current flow is shown. When the valve is not irrigating the last flow is shown.
WaterLeft	17 M3	This parameter is editable during irrigation. The controller finishes irrigating when this parameter reaches zero.
	Auto Valve Operate	Use the "+" and "-" keys to select one of the following options: "Auto Valve Operat. ", " Stop Current Irrig.", "Pause Valve Operat.", "Cancel Irrig. Today"
Water Prg.	20 M3	The valve's programmed amount of water. Info only.
Frt.Req.	2 L/M3	The valve's programmed amount of fert. Info only.
Irr. Status	Irrigating	The options are: "N.Irrig", "Finish", "Not Fin", "Fault", "Waiting", "Waiting", "Irrigat", "Fertig"
Flow Setup	15.0	The nominal flow of the valve.
Time left Min.	94	Calculated time left till the end of irrigation.
Water Underflow	No	Status of the alarm.
Water Overflow	No	Status of the alarm.
Wtr.Pulse Fault	No	Status of the alarm.
Frt.Pulse Fault	No	Status of the alarm.
Today Wtr.Mul.	100%	Enables changing the water amounts for the valve.
Cncl.Fert.Today	No	Enables canceling fertilization on this valve.
Pause Vlv-Min.	0	Enables pausing the valve for a predefined amount of time.
Setup Info	Def.Ok	If there is a definition problem it will be shown here. The options are: "N.Activ", "Def.OK", "WtrUnit", "Cnt.Def", "PmpDef", "FertWay", "Tim.Def", "No Time"

7. Information and Programming Menus

Valve Info

This menu shows the accumulated data for all of the valves.

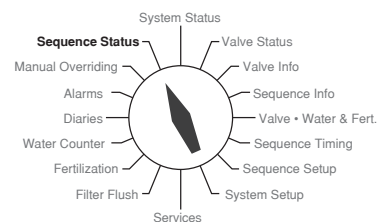


Subject	Example	Explanation
Valve Number	1	Change the valve number by the Next and Prev keys.
	Active	Identical to the parameters in the "valve status" menu.
Cycl.Left Today	1	The total number of irrigations left today in all of the sequences where the valve is programmed.
Cycl.Done Today	2	The total number of irrigation cycles carried out today.
Next Irr.Time	14:45	The next irrigation time of the valve in all of the sequences where it is programmed.
Days to Next Ir.	1	Numbers of days till the next irrigation. 0=today
Daily Water	54	The amount of water that the valve has accumulated today.
Daily Fert.	60	The amount of fert. that the valve has accumulated today.
Daily-Minutes	431	The amount of minutes that the valve was open today.
Last Irr.Time	20:15	The end of the last irrigation.
Last Irr.Date	21/03	The date of the last irrigation.
Wtr.Accum. M3	758	Editable.
Frt.Accum.Ltr	692	Editable.
Accum-Hr:Min.	58:24	Accumulated time of valve operation.
Start Ac.Date	18/02	The starting date for accumulation. Can be reset.
Prs. + to init accum	Done	Enables resetting all of the accumulations.

7. Information and Programming Menus

Sequence Status

This menu shows the current status of the sequences.

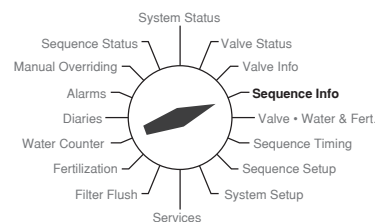


Subject	Example	Explanation
Sequence Number	1	The sequence to which the parameters are related. Change the sequence number by the Next and Prev keys.
	Irrigat	The current sequence status. The options are: "N.Activ", "Def Err", "Timing", "By Cond", "Active", "Alarm", "Pause", "Fault", "Waiting", "FltWait", "Irrigat", "Fertig.", "FltIrig", "FltFert"
Pause Seq.-Min.	0	Enables pausing the sequence for a predefined time in minutes.
Next Irr.Time	14:30	The next irrigation start time in the sequence. Editable.
Days to Next Ir.	1	0=today, 1=tomorrow and so on. Editable.
Irr.Cycles Left	1	Editable.
Time left Min.	45	Time remaining to the end of the sequence.
Manual Oper.	Automat	Use the "+" and "-" keys to manually alter the sequence status: Automat - the normal state. Start - Start the sequence again. Stop - Stops the current cycle. Pause - Permanently pauses the current cycle. CnclTdy - The sequence will not irrigate today.
Valve 1. Finish	Start	Enables manual control for each valve in the sequence. The following options are available: Automat Start Stop Pause CnclTdy As noted Gal Pro AC can open about 4 valves simultaneously.
Valve 0. None	Automat	
Valve 0. None	Stop	
Valve 0. None	Pause	
Valve 0. None	CnclTdy	
Valve 0. None	Automat	
Valve 0. None	Automat	
Valve 0. None	Automat	
Today Wtr.Mul.	0%	Enables changing the amount of water in all of the valves in the sequence today.
Cncl.Fert.Today	Yes	Enables canceling fertilization today.
Press + to reset the sequence		To reset the sequence press "+" and then "enter". Resets the sequence data to zero.
Setup State	OK	If there are any definition errors they will be displayed here. The options are: "N.Activ", "Def. OK", "Vlv.Def", "Tim.Def", "No Time"

7. Information and Programming Menus

Sequence Info

This menu shows data from all of the sequences.

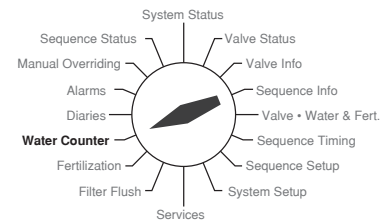


Subject	Example	Explanation
Sequence Number	1	The sequence to which the parameters are related. Change the sequence number by the Next and Prev keys.
	Fertig	The current status of the sequence. Identical to the parameters in "sequence status".
Cycl.Left Today	1	
Cycl.Done Today	1	
Valve 1.	Active	Status of all of the valves in the sequence. Info only. The options are: "None", "Vlv.Num", "Vlv.Def", "Active", "Finish", "Not Fin", "Fault", "Waiting", "Waiting", "Irrigat", "Fertil.", "Cancel"
Valve 2.	Active	
Valve 8.	Finish	
Valve 0.	None	
Valve 0.	None	
Valve 0.	None	
Valve 0.	None	
Valve 0.	None	
Last Cyc.Time	13:45	The end time of the last irrigation of the sequence.
Last Cyc.Date	23/05	The date of the last irrigation.
Wait Time-Min.	15	The waiting time while in the queue for irrigation. Info only.
Wait Reason	Free	The options are: Free - The sequence can irrigate. Valve - The sequence is waiting for a valve that cannot currently operate. Sequenc - The sequence is waiting for another sequence in the queue. FrtProg - When there is no queue definition and another sequence is irrigating with different fertilizer. Prior. - The sequence is waiting for another sequence with higher priority. Timing - The sequence is out of the time range defined for the irrigation.
Start Condition	Off	The status of the condition input.
Stop Condition	On	The status of the condition input.
Pause Condition	Off	The status of the condition input.
Oper. Condition	On	The status of the condition input.

7. Information and Programming Menus

Additional General Information

As previously mentioned, additional general information can be found in the following different menus: **Water Counters**, **Fertilization** and **Filter Flush**.

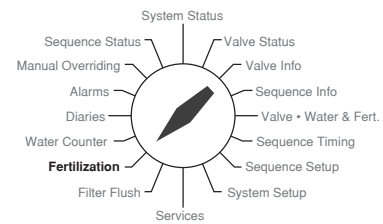


Water Counters

Subject	Example	Explanation
Water counter No.	1	The water counter to which the parameters are related. Change the water counter number by the Next and Prev keys.
Curr.Status	Active	The options are: N.Activ - The water counter is not defined. Active - The counter is defined properly. Irrigat - The water counter has a flow rate during irrigation. LeakFlt - The counter recognizes uncontrolled water. Not Exe - Pulse timeout has been reached. Fault
Current Flow	80	The current flow rate in the water counter.
Daily Wtr.-m3	136	The total amount of water that has flowed through the water counter today.
Accumulat.-m3	2483	The total amount of water irrigated since the last accumulation reset.
Start Ac.Date	01/04	The date when the last reset took place.
Leakage-m3	0	The amount of uncontrolled water since the last uncontrolled water reset.
Press + to init accm		Resets the accumulation in the water counter.

7. Information and Programming Menus

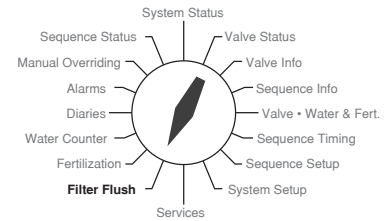
Fertilization



Subject	Example	Explanation
Pump Status	Active	Possible options: N.Activ - The pump is not defined. Active - The pump is defined properly. Fertil. - The pump is fertilizing. Fault - Fertilization is not carried out due to a fault.
Fert.Flow L/H	60	The flow rate of the fertilizer pump while it is working.
Frt.Req.	2	The required fertilizer. Is displayed when the pump is working.
Daily-Litre	14	The total amount of fertilizer injected today.
	No fert Pump Alarms	Fertilizer faults whilst fertilizing. The options are: "No fert Pump Alarms", "No Fert Pulse Fault", "Fert Leakage Fault"
Accum.-Litre	573	The total amount of fertilizer since the last reset.
Start Ac.Date	01/04	The date of the last reset.
Press + to init accum		Reset of all fertilizer pump accumulations.

7. Information and Programming Menus

Filter Flush System

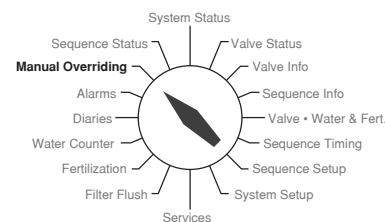


Subject	Example	Explanation
Status	Active	Possible options: N. Activ - Flush is not defined Active - Filter flush is defined properly. Flush - The system is currently flushing. Fault - The flushing system is in fault. The fault is "continuous flushed".
Curr. Flush Unit	1	The number of the filter currently flushing.
Start Condition	No	If a PD switch is connected it shows the status of the contact: No - The contact is open and flushing is not required. Yes - The contact is closed and flushing is required.
Fin. Pipe Delay Pipe Delay-Min.	0 5	Fin. pipe delay means that the fill pipe delay has finished. Pipe Delay-Min shows the time remaining for the fill delay.
Cycles Today	5	The number of times that the system has flushed today.
Wtr.Accum.m3	27	The amount of water flowed since the beginning of the last flush. Displayed if irrigation is defined by quantity.
Tim.Accum.Hr.	3:45	The time since the last flush.
Continuous Flush Fault	No	If the number of continuous flushes exceeds the definition, an alarm is shown here.

8. Manual Overriding


Manual Overriding

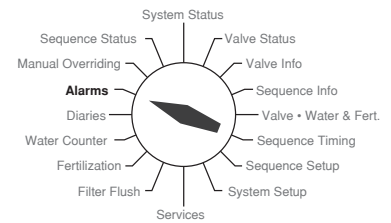
This menu shows the following data:



Subject	Example	Explanation
Pause Sys.-Min.	0	Enables pausing the controller for a predefined time. When this parameter reaches zero the controller continues.
Start Valve No.	0	Enables manually starting a valve which is not operated by a sequence. The valve operates according to its water and fertilizer program.
Stop Valve No.	0	Enables manually stopping a valve.
Start Sequence No.	0	Enables manually starting a sequence. This start will not change the program timetable.
Stop Sequence No.	0	Enables manually stopping an irrigating sequence.
Pause Sequence No.	0	Enables pausing an irrigating sequence.
Auto Sequence No.	0	Resume a sequence after pausing.
Manual Flush	Auto	The options are: Auto, Start, Stop . For manual operation select the required option and press enter .
Today Wtr.Mul.	100%	For all irrigation programs.
Cncl.Fert.Today	No	For all irrigation programs.

9. System Alarms

The first row of the alarm menu shows the alarm status in the system. When everything is okay the message "everything is OK" appears. During alarms all of the current alarms are listed in this row. In addition the  icon flashes on the screen.



Alarm Canceling

The options are:

1. Manual canceling:

Move to the **Prs to Cncl. Alarm** row and press the "+" key. The controller confirms the alarm cancellation with **Cancel Alarms Done**.

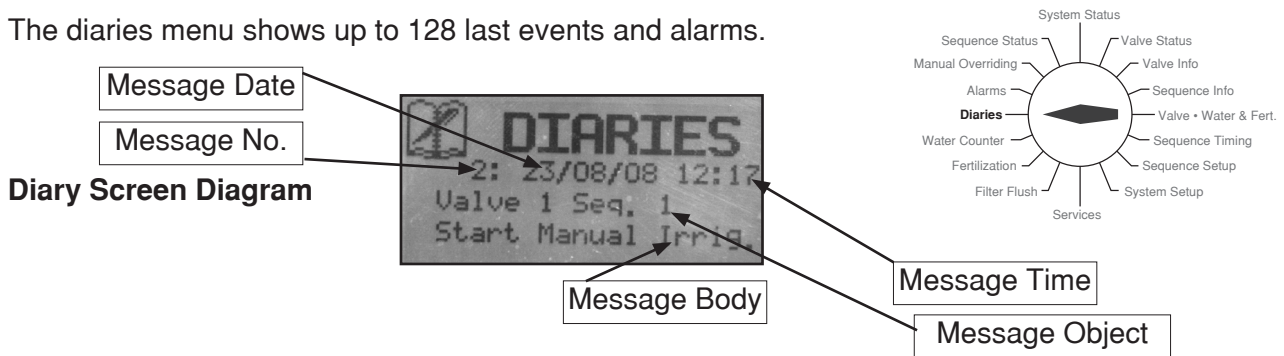
2. Automatic Alarm Cancellation

The controller performs automatic alarm cancellation in a cycle defined here. Move to the **Auto Reset-Min.** row and program the required cycle duration.

Please Note: Definition errors are not cancelled and will continue displaying until the problem is solved.

10. Diaries

The diaries menu shows up to 128 last events and alarms.



Each of the diary screens show a different event in the controller.

The first row shows from left to right: event time, event date and message index.

The second row shows the number of the element to which the message applies.

The third row shows the message content.

The fourth and fifth rows contain complementary information.

Scanning the Diary Events

The first event shown upon entering the diary menu is the last event recorded. In order to page back and see previous events use the **Prev** key. The **Next** key enables paging up.

Erasing the Diaries

After 128 events have been accumulated the controller automatically erases the last 64 events. In order to perform manual erasion of all of the events move down until you reach **Press + to Rst Diary**. Press the "+" key, the message **Enter to Confirm** appears. Press **Enter**, the message **Reset Diaries Done** appears.

Defining Diary Messages

Move down until you reach the **Diary Message Setup** row. Under this title a list of event types are shown. Define **Yes** for each type of event that you wish to appear in the diary.

11. Advanced Operation

Flow Control Mechanism

The flow control mechanism allows the controller to discover flow deviation. When discovered, the controller performs one of the following according to the definitions:

Stops irrigation and issues an alarm.

Continues irrigation and issues an alarm.

Ignores flow deviation.

Flow control is only possible for valves that have a water meter defined. It is also carried out when the water unit is **Time**. At the beginning of irrigation a parameter **Fill Delay** is active. This delay can be according to time or M3. During **Fill Delay** the flow deviation is ignored.

The following are the required steps for operating flow control:

1. Define the following parameters in the System Setup menu:

Fill Delay M3 - The amount of water in M3 that irrigate in the beginning of irrigation during which flow control is ignored.

Fil Delay-Mins - The amount of time during which flow control is ignored.

Flow Dev Unit - The units in which the flow control is detected.

Flow Delay Unit - The units Mins or M3 by which the flow control delay is measured.

2. In the Valve Water & Fert menu define for each valve the following parameters:

Water Flow M3/H - Enter the nominal flow rate of the valve.

Under Flow Deviation - Enter the allowed deviation below the nominal flow (according to the units % or **M3/H** as defined in the system setup).

Under Flow Reaction - The controller's reaction to this type of fault.

Over Flow Deviation - See underflow.

Over Flow Reaction - See underflow reaction.

Flow Fault Delay - According to the unit **Minutes** or **M3** as defined in the system setup. Additional information is found in the appropriate table.

Water Multiplication

The controller enables increasing or decreasing the water amounts without changing the amounts in the valves. The change can be permanent or only for today. The change is performed by percentage of the program amount (0-200%). 0% and 100% means no change.

Permanent Multiplication of Water for all of the Valves in the system

Enter the **System Setup** menu and move down to the **Fixed Water Multiplication** row and change the % accordingly.

A message about water multiplication appears in the following menus:

System Status

Sequence Status (in the irrigating sequence)

Valve Status

Valve Information

Sequence Information

11. Advanced Operation

Permanent Multiplication for Valves in a specific Sequence

Enter the Sequence Setup menu. Move down to Permanent Water Multiplication and change the % according to your requirements.

A message about water multiplication appears in the following menus:

Sequence Status - Only for the sequences in which the water multiplication.

Valve Status - Only for the valves for which the water multiplication is defined.

Valve Information - Only for valves which are defined in a sequence for which water multiplication has been defined.

Sequence Information - Only in sequences in which water multiplication has been defined.

Water Multiplication for Today Only for Valves in a Specific Sequence

Enter Sequence Status in the required sequence. Move down to Water Multiplication Today and change the % as required.

Water Multiplication Today Only for a Single Valve

Enter Valve Status menu in the required valve screen. Move down to Water Multiplication Today and change the % as required.

Operation According to Condition Input

As mentioned in the "Controller Setup" chapter, the controller has 3 inputs to which condition contacts can be connected. There are several types of condition inputs upon which the controller definition depends. The following are instructions for the connection and definition of the most widely used condition contacts. If you wish to connect other types of condition contacts please contact technical support at Galcon.

Pressure Stat Connection

Pressure stat contacts are connected to the pressure line and are designed to sense pressure set points and close a contact during high or low pressure. Connect the electrical connection to the controller condition input (2 wires).

Input Condition Definition for the Whole Controller

Enter the System Setup menu, move down to **Pause Condition Input** and enter the number of condition input to which the pressure stat is connected.

Define the delay and controller reaction for the condition contact. Move down to **Cond.1 OnDly-Sc**, this parameter defines the delay duration between the contact and the pause start. The time range is between 0-3600 seconds. This time delay is very important for stabilizing the system and preventing operation fluctuations.

Pause Contact Definition for Each Sequence Separately

If you wish to define a special condition contact for each sequence, make sure that the definition in the **System Setup** as previously described is not defined.

Defining the sequences participating in the pause process:

Enter **Sequence Setup** and move down to **Pause Condition Input** and enter the condition input

11. Advanced Operation

number. Move to the other sequences and enter the same parameter for all of the sequences that you wish to participate in the pause process.

Pressure Differential Switch Connection

PD switches are designed to sense the pressure difference between both sides of the filter. Connect the electrical connection of the PD switch (2 wires) to the condition input of the controller.

Defining reaction delay for the PD switch

Enter System Setup, move down to **Cond.x OnDly-Sc** (where x is the number of the condition input). This parameter defines the delay duration from the moment the contact closes until the reaction of the controller.

Move down to **Cond.x OffDly-Sc**. This parameter defines the delay duration from the moment the contact opens until the reaction of the controller (resuming normal irrigation).

Enter the **Filter Flush** menu, move down to **Cond.Input No.** and enter the number of the condition input to which the PD switch is connected.

Define the number of continuous flushes - this number determines how many continuous flushes are allowed before the controller enter a continuous flushing fault (5 is recommended).

At the PD switch adjust the pressure difference for which the contact is closed and flushing is carried out (0.5 is recommended).

The Difference between Operating and Start Conditions

Operating condition will start the sequence on an "on" connection and stop the sequence when the connection goes "off", whilst start condition will only start the sequence on an "on" connection but will not stop it when the connection goes "off". The sequence will only stop when it finishes the amount of water or time duration set for its valves.

Checking the Status and Activity of the Condition Input

The status of the 3 condition inputs can be seen in the **Service Menu**. The 3 condition inputs are shown as **C1, C2, C3** in the third row.

It is also possible to see the condition input status in **Sequence Info**.

12. Maintenance

Output Checkup

Technically turning on the controller outputs is designed in order to check solenoid connection and some other elements.

Before entering the output checkup process pause the controller.

Turn the selector to **Service Menu**.

Move down to **Output Test- Press + for Out Test**.

Press "+" in order to start the process.



When entering the process the controller scans all of the outputs and then prompts the next screen in which you can select, via the cursor, the number of output to open. Use the **Next** and **Prev** keys to move the cursor to the different outputs and press **Enter** to open the output. An additional **Enter** will close the output. It is possible to open several outputs together for a predefined time that is programmed in the **Out. Test. Tim-Sc parameter**.

Changing the Batteries for Gal Pro DC

The controller detects the battery voltage. This voltage is displayed in the service menu. When the voltage drops below the required value the controller shows a Low Voltage message.

Detecting too low voltage causes all of the solenoids to close and the controller permanently pauses.

When the controller has a low battery alarm you must replace the battery as soon as possible.

When the controller has a **No Voltage** alarm do not allow the controller to control the system.

13. Technical Specifications

Number of outputs in Gal Pro 4: 9 (4 valves, master, fertilizer pump, 2 filters and alarm).

Number of outputs in Gal Pro 8: 13 (8 valves, master, fertilizer pump, 2 filters and alarm).

Number of Inputs: 8 (4 water counters, 1 fertilizer counter, 3 condition inputs).

Analog Inputs: None

Input Voltage Gal Pro DC: 6 volts (4 * 1.5 VDC Alkaline D type batteries installed inside the controller). Or 12 VDC battery 5 Amp * H or more connected to a charger or solar panel.

Power Consumption When Idle: 0.2 - 0.3 mA.

Type of Solenoids: 12 VDC latch - 2 or 3 wires.

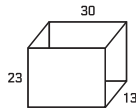
Pulse Duration: 20 mS to 200mS - programmable

Dimensions:

H - 23 cm

L - 30 cm

W - 13 cm



gal pro DC Weight(without Batteries): 1.75 kg

Gal pro AC Weight (without protection cards): 2.95 kg

Irrigation According to: M3, Liters, Seconds, Minutes, Hours

Fertilization According to: Minutes, Liter/M3, calculated proportional including water before and after.

Filter Flushing: Up to 2 filters according to time, water quantity or PD switch.

Irrigation Day Definition: according to cycle days or days of the week.

Irrigation Cycles per Day: From 1 to 255.

Diaries: Alarm and event records of irrigation activity. Up to 128 events.

Timing of Opening and Closing Valves: Full control of operation order of the master valve and the irrigation valves at the beginning and end of irrigation. Overlapping the valve operation in changing valves.

Manual Control: Full manual control of sequences and valves including control of irrigation outside of the program timetable.

External Conditions: 3 input conditions that enable operating, pausing, starting and stopping the irrigation according to condition elements with dry contacts.

Alarms: The controller displays all types of alarms during the irrigation and fertilization. It is possible to define automatic alarm canceling. In addition the alarm output can be connected to a cellular text message sender.

Saving Data: The controller saves all of the definitions and irrigation programs even when the power supply is disconnected. The data that are not saved are: time, date and accumulations.

