

Fertigation Control Systems

- **Connectivity**
 - PC compatible
- **Alarm**
 - Alarm and warning system
- **Backlight**
 - Backlit, LCD display



Variety and customization of models

A wide variety of models are available to cover the requirements of specific fertigation applications. The HI 8000 series are fully customizable and upgradable on the hardware and program level.

HI8000 series models can be selected based on the irrigation and fertilization type of control along with the additional features that are proper for the specific application.

Some of the most important criteria in selection of controller type are: number of irrigated sectors: 8, 16, 24, 32; type of irrigation control: in volume or in time; type of fertilizer control: by EC, by



Volume, ratiometric; type of pH correction: acid or alkaline; control of incoming water: one, two or three sources of water; control of dosing with venturi or motorized electrovalves; redundancy of the conductivity or pH probes; mounting solution: panel or wall mounted.

Irrigation control

Irrigation control differs based on the type of control: by irrigation water volume or by irrigation time; the number of sectors that have to be irrigated, the available sources of water for irrigation – one or more with or without reusing the irrigation drain water.

Irrigation control is started by opening the irrigation valves and starting the main irrigation pump. The control of all these elements is performed by the controller based on concepts of irrigation programs.

Irrigation programs

Up to 10 irrigation programs can be set by the user with different irrigation parameters: irrigation periods, type of irrigation control, irrigated sectors and volume or irrigation time specified for each sector, conditions to start irrigation such as time, accumulated solar radiation, low level in tanks (hydroponic crops), temperature variations, linked to another program, priority of program, number of repetitions. For irrigation water, each program has a defined pH set point, EC set point (if the quantity of fertilizer is dosed according with conductivity), and receipt of fertilizers. Control of agitators is specified by programs according with the irrigation periods.

Irrigation water

The quality of irrigation water is assured by proper control of pH and the quantity of nutrients (fertilizers) present in irrigation water.

Fertilization control

Fertilizer can be dosed during irrigation using the Venturi tubes principal or with motorized valves. The control of the quantity of dosed fertilizer can be performed using the volume counters. The system supports dosing from up to 4 fertilizer tanks with specific receipts.

The concentration of the fertilizer in irrigation water can be controlled based on the conductivity reading, proportional with irrigation water based on the receipt or ratiometric, in which case the certain quantity of fertilizers are added with the amount of programmed water.

pH control

The pH control is performed in order to adjust the pH of water to the irrigation program set point.

The pH correction can be performed with alkaline or acid solution based on the characteristic of the incoming water.

The control of pH and EC is performed with PID, PI or proportional control. The tuning of the PID control can be accomplished by the user manually, or automatically by the PID auto-tuning feature.

Agitators and filter cleaning

The automatic control of agitators used in fertilizers tanks and filter cleaning system complete the needs of a standard fertigation system.

In order to keep the fertilizer concentration constant before and during the irrigation program, the fertilizers are mixed in their tanks based on the agitators program. The system can manage up to two filters mounted to protect the probes and in-line dosing elements.

With differential presostates, the filters are monitored and when necessary, the irrigation programs are automatically suspended and washer filter cleaning is started. This process removes any deposits and sediments that may appear on filters to increase the systems life.

Redundancy of EC and pH probes

For safety reasons, the systems can be equipped with 2 conductivity probes and two pH electrodes in redundancy so that the system can generate an alarm in the case of reading differences between them. A third conductivity probe can be mounted to verify and compensate the incoming water conductivity.

Logging system

The logging of the controller can be selected on three levels: input reading variations, statistics of reading (average of pH and EC) or events (start of programs, opening valves, ...).

Alarm system

The alarms of these systems are related to measured water quality parameters like conductivity and pH: out of range, differential reading between redundant probes; over dosing of conductivity or acid or alkaline correction solution, tanks at low level or no dosing detected by counter movement. Similar alarms can be generated after the units self-diagnostic tests are run.



Sensor connections

All the sensors: EC, pH, temperature are connected to the controller via transmitters.

pH and EC are temperature compensated on the transmitter level. The output of analog transmitters can be calibrated at two points for pH and conductivity. Also, the controller offers a calibration in two points for pH and one point for conductivity.

User interface and digital connection

The user interface is based on an 4 x 20 character line LCD, organized for settings and consultancy. The UI has multi-language support.

The RS232 connection permits the connection to a PC.

Internal back-up system

The systems internal back-up power system offers a special feature; in the case of losing external power, the controller will stop the irrigations and memorize the irrigation programs that were not performed. The controller will start from the uncompleted programs after power has been restored. The programs will be executed based on their priority level with full respect of the quantity of irrigation water, pH level, and concentration of fertilizers.

Additional features that can be found are control of the external power supply and control of mixing of different water sources (clean water, drain irrigation water).



Two panel mount units used in a fertigation system

HI8001 (panel mount) and HI8002 (wall mount) models

The HI8001 and HI8002 fertigation controllers provide up to 10 programs to irrigate up to 32 sectors using time or volume irrigation control. Each irrigation program has one pH and one EC setpoint. The start condition of the program, the irrigation sectors and the time or volume for each sector are user defined. The irrigation water is pH corrected based on the pH control, with acid or alkaline solution and can contain nutrients for crops based on up to 4 fertilizer receipts. Correction of time or volume of irrigated water can be based on accumulated solar radiation or can be manually requested by user. Agitator control and filter cleaning control are performed automatically. The instruments read up to 3 EC probes, one to verify the incoming water EC, and the other two are in-line redundant for safety to measure the current irrigation water EC. The two pH electrodes are mounted in-line redundant for safety to read the irrigation water pH. The instruments provide an alarm system and logging organized on user selectable three levels.

HI8051 (panel mount) model

The HI8051 fertigation controller provides up to 10 irrigation programs to irrigate up to 24 sectors using time or volume control. Each irrigation program has one pH and one EC setpoint. The start condition of the program, the irrigation sectors and the time or volume for each sector are user defined. The irrigation water is pH corrected based on the pH control with acid or alkaline solution and can contain nutrients for crops based on up to 4 fertilizer receipts. Fertilizer dosing is performed based on the EC, volumetric or ratiometric control. Another important feature is the correction of irrigated water volume or time based on accumulated solar radiation or manually requested by user. Agitator control and filter cleaning control is performed automatically.

The instrument reads up to 3 EC probes, one to verify the water incoming EC, and the other two redundant in-line for safety, to measure the current irrigation water EC. The two pH inputs are mounted in-line redundant for safety to read the irrigation water pH. This instrument provides an alarm system and logging organized on three user selectable levels. An important added feature is this models ability to mix 3 sources of incoming water. Fresh water, reused water and all dosing are performed based on the motorized valves that are activated by motors that allow different flows of the fertilizers, acid and alkaline solutions used for pH correction.



HI98143 pH/EC Transmitter

Models	HI8001/HI8002	HI8051
Irrigation control	Time/volume control, 10 programs/5 priority levels with up to 99 repetition	Time/volume control, 10 programs/5 priority levels with up to 99 repetition
Irrigation start condition	By Time, by solar radiation, by 5 external tank low level	By Time, by solar radiation, by 5 external tank low level
Fertilization control	By EC	By EC, By volume, Ratiometric
Fertilizers	Up to 4 valves	Up to 4 motorized valves
pH control/correction	Acid or alkaline	Acid or alkaline, motorized pump
Agitators control	Yes	Yes
Filter control/cleaning	2 differential presostate/2 filter cleaning relays	2 differential presostate/2 filter cleaning relays
Fertilizer tank levels/counters control	Level	Level and counters
Irrigation counter	Yes	Yes
Acid/Alkaline tank level/counter control	Level	Level and counter
EC inputs	Up to 3, 0,0 to 10 mS/cm	Up to 2, 0,0 to 10 mS/cm
pH inputs	Up to 2, 0,0 to 14,0 pH	1, 0,0 to 14,0 pH
Temperature Compensation	EC, pH	EC, pH
Solar radiation input	1; 0 to 2000 W/m ²	No
Temperature	No	1
Wind speed	No	No
Engine power back-up	No	No
Irrigated sectors	Up to 32	Up to 24
Mixing source of water	No	Yes, 3 sources
PC connectivity	RS 232	
Alarms	Yes, user selectable levels	
Logging	Yes, three level	
Power Supply	115V/220V ±10% 50Hz/60Hz	
Environment	wall mounted: NEMA 4X specifications	
Dimensions	wall mounted: 280 x 330 x 165 mm (11.2 x 13.2 x 6.6"); panel mounted: 178 x 260 x 116 mm (7.1 x 10.4 x 4.6")	
Weight	wall mounted: 4.95 Kg (11 lb.); panel mounted: 3.4 Kg (7.5 lb.)	

Ordering Information

Each HI8000 Series model is supplied instructions.

Choose your configuration:

HI8001-0100U Fertigation controller with priority for pH and EC, panel mount, 8 sectors, English, 115V.

HI8001-0100D Fertigation controller with priority for pH and EC, panel mount, 8 sectors, English, 230V.

HI8001-0200U Fertigation controller with priority for pH and EC, panel mount, 16 sectors, English, 115V.

HI8001-0200D Fertigation controller with priority for pH and EC, panel mount, 16 sectors, English, 230V.

HI8001-0300U Fertigation controller with priority for pH and EC, panel mount, 16 sectors, English, 115V.

HI8001-0300D Fertigation controller with priority for pH and EC, panel mount, 16 sectors, English, 230V.

HI8001-0400U Fertigation controller with priority for pH and EC, panel mount, 32 sectors, English, 115V.

HI8001-0400D Fertigation controller with priority for pH and EC, panel mount, 32 sectors, English, 230V.

HI8002-0100U Fertigation controller with priority for pH and EC, wall mount, 8 sectors, English, 115V.

HI8002-0100D Fertigation controller with priority for pH and EC, wall mount, 8 sectors, English, 230V.

HI8002-0200U Fertigation controller with priority for pH and EC, wall mount, 16 sectors, English, 115V.

HI8002-0200D Fertigation controller with priority for pH and EC, wall mount, 16 sectors, English, 230V.

HI8002-0400U Fertigation controller with priority for pH and EC, wall mount, 32 sectors, English, 115V.

HI8002-0400D Fertigation controller with priority for pH and EC, wall mount, 32 sectors, English, 230V.

HI8051-0300U Acid based fertigation controller with dual pH control, differential EC control, actuator control, multiple dosing and irrigation pump control, panel mount, 24 sectors, English, 115V.

HI8051-0300D Acid based fertigation controller with dual pH control, differential EC control, actuator control, multiple dosing and irrigation pump control, panel mount, 24 sectors, English, 230V.

Required Accessories	HI98143-22 pH/EC isolated transmitter, 4-20 mA sourcing current output <i>1 transmitter is needed in configuration with 1 EC probe and 1 pH probe (no probe redundancy feature) 2 transmitters are needed in configuration with 2 EC probes and 2 pH probes (for probe redundancy feature) 3 transmitters are needed in configuration with 3 EC probes and 2 pH probes (for probe redundancy feature and EC water incoming compensation)</i>
Recommended Accessories	HI1001 "flow-thru", double junction pH electrode with BNC connector and 3 m (10') cable. <i>1 or 2 electrodes are needed (2 electrodes for probe redundancy feature)</i>
	HI3001 "flow-thru", 4 platinum ring EC probe with built-in temperature sensor & 3 m (10') cable. <i>1, 2 or 3 probes are needed (2 for probe redundancy feature; 3 for probe redundancy feature and EC water incoming compensation)</i>
	HI60542 Electrode Holder for Direct Pipe (Order according with the total amount of ordered probes)
	HI710005 115 VAC to 12VDC power adapter
	HI710006 230 VAC to 12VDC power adapter