

SENSITIVE CONTROLLERS FOR IRRIGATION

HOW THEY WORK

The Sensitive Controllers for Irrigation are equipment developed with the only goal of providing automatic irrigation management to improve the rational use of irrigation water.

Therefore, these equipments have light sensors, osmotic sensors of the soil humidity, rain sensors and a software that processes the signals issued by the sensors by means of a microprocessor. Water is used by the irrigation systems depending on the needs of plants, when photosynthesis takes place, according to the field capacity and the soil conditions regarding the amount of humidity.

Due to the osmotic capabilities of the Soil Humidity Sensor, it can be used to efficiently protect the underground water springs, as we will describe.

The software manages the information gathered by the light, soil humidity, and rain sensors. The microprocessor receives these signals, and the operations of the controllers are enabled or disabled. This allows it to program the water application cycles according to the water needs of the plant in each of its stages. The microprocessor's continuous memory can store the generated data, during an undefined period of time, while the equipment is working, in order to obtain at any moment a historic record of the amount of irrigation water applied. This information can then be stored on a 1.44 Mbytes floppy disk.

The Light Sensor has a great sensitivity as it can react to the initial sunlight of the day, in order to supply water through the irrigation systems before the photosynthetic processes begin, if so required.

The Osmotic Sensor of the Soil Humidity, composed of an expanding nucleus or nanosensors, when needed, is programmed to detect, process, and transmit in real-time and to faraway places if required, to the microprocessor, the resulting tension variations due to the lack or existence of humidity at the previously established levels, according to the field capacity of each hydric area, depending on the depths of each soil layer. These sensors can be programmed to operate according to the frequency or the schedules required for compatibility with the cycles of the plants, that you wish to irrigate.

The Rain Sensor prevents the system from working when there is rain.

The Controller has digital output to remotely monitor the operation and output to trigger the operation of sets of motorized pumps to fertilize and irrigate and/or to increase the pressure of the irrigation systems.

The whole operation of the system can be monitored in real-time and from faraway in Windows environments, by means of the communication system of the equipment, and by Internet, Intranet or Corporative Data Network.

Two Controller versions will be described. The first version: "CSE-KJ" with 9 models, has a power supply of 90/240 V AC, and has a photoelectrical cell to guarantee that the system will work only when the photosynthesis takes place. The second version: The "CSS-KJ" also has 9 models. It works with solar energy, by means of photovoltaic modules, which are sufficiently sensitive to transform the energy when there is only a 15% of luminosity. This makes it possible to guarantee that the system will work during the initial photosynthetic processes of plants.

In this way, the Sensitive Controllers do not allow irrigation systems to operate unless the photosynthesis process is occurring. When this occurs, plants need to breathe through the soil's pores and the water would not permit this breathing process to take place and would contribute to the acceleration of the deterioration of the soil's nutrients. And they do not allow water to be applied beyond the field's capacities, thus the exhaustion and hydric scarcity of roots are avoided.

The Controller must operate 24 hours per day if it will be used to protect underground water springs. When it uses solar energy, the photovoltaic module will have a set of batteries to guarantee the operation of the system without interruptions.

The software manages the signals that are sent by the soil humidity sensors, which indicate the amount of humidity in the underground areas, that should remain dry. The Rain Sensor prevents the system from working when there is rain and modifies the expected results.

Therefore, the Sensitive Controllers are used to control the irrigation water and to identify and prevent the contamination of underground water springs.

The equipment will be managed by the software, which was developed exclusively to attain these goals, for all of the applications hereby described, and by the hardware of customized connections that are easily accessible and have a friendly interface.

There is a diagram enclosed of a typical system with a single thread

Sensitive Controllers for Irrigation with Solar Panels

