

# **DIG Corporation Irrigation product Specifications**

## **SECTION 02810**

### **IRRIGATION SYSTEMS**

#### **Part 2 Products**

#### **2.1 Automatic Irrigation Controller [Light][Solar]**

**Irrigation controllers shall be single, solid-state independent controllers conforming to the following:**

The controller shall be powered by an internal, ultra high efficiency, photovoltaic module with a microelectronics energy management system fueled by ambient light. The controller shall be protected by a vandal-resistant, waterproof enclosure fashioned from space-age composite material and made to endure extreme environments. The controller shall function day and night in any weather and in most outdoor locations where no direct sunlight is required and communicate to a micro-power solenoid actuator via two-way digital control pulses at 3.5 volts DC. The controller shall have a daily exposure to light levels which need to be no higher than the equivalent of 25% of the ambient light level at 55 degrees latitude under 10-year worst-case weather conditions (worst day measured in 10-year period). The controller shall have a fully protected circuitry from electrostatic discharge up to 27,000 volts.

#### **2.1.1 Controller Features**

- a. Controllers shall operate 4, 6, 8, 12 or 16-station models and/or a master valve (master valve replaces station 8 and 16).
- b. The 4, 6 and 8 station controllers shall operate and use a standard series micro-power solenoid actuator with globe valve or a micro-power solenoid actuator with the correct adapter to be mounted on any other valve.
- c. The 12 or 16 station controllers shall use terminal number 1 to 6 on the 12 station and terminal number 1 to 8 on the 16 station with a standard series micro-power solenoid actuator and use terminal number 7 to 12 on the 12 station and terminal number 9 to 16 on the 16 station with expansion series micro-power solenoid actuator
- d. Controller shall have bilingual software in English and Spanish.
- e. The controller LCD screen shall be activated with a special Key powered by a 9 volt alkaline battery to provide access and security to a simple 4-button programming pad and the LCD shall display all the schedule information.
- f. The controller shall have 4-independent programs with 3-start times per station.
- g. Ability to program in one minute increments up to 5 hours and 59 minutes with separate setting for hours and minutes.
- h. A programmable watering calendar choice of a 1 to 39 day interval, odd/even days or any day(s) of the week.
- i. A feature that shall include password protection for added security.
- j. Rain stop from 1 to 99 days with automatic restart.
- k. A 12 month budget adjustment from 10% to 200% in 10% increments.
- l. A manual feature that allows a single desired station to cycle start for any preset, preferred duration.
- m. The controller shall have the option to operate automatic, semi- automatic and manual cycle via the controller.
- n. Status report to check amount of watering time applied during current and previous month.

- o. The controller shall have the option to assign any switch type rain sensor, moisture sensor or freeze sensor to an individual valve or to the entire system using a SKIT adapter.
- p. The controller shall activate the micro-power solenoid actuator @ 3.5 volts to a distance of up to 2400' (727m) using NFPA 70 copper conductor 12-gauge (1.6 mm) irrigation wire type UF.
- q. The controller shall be capable of operating pump start relay or a master valve.
- r. The controller shall have lightning protection to fully isolate the controller from electrical ground, and offer virtual immunity to ground currents from overhead power-lines and/or close proximity to lightning strike.
- s. The controller shall have a full two-year repair or replacement warranty.
- t. The controller shall have a lifetime lightning warranty.
- u. The controller and its components shall be manufactured by DIG Corporation, Vista, CA.

## **2.1.2 Controller System Components**

### **a. Mounting column**

The controller shall be mounted on a galvanized mounting column with a length of about 33" with a curved sweep at the bottom to permit ease of wire pull.

### **b. Micro-power solenoid actuator**

#### **b1. Micro-power solenoid actuator with globe valve**

The remote control valve (standard or expansion series), with a micro-power solenoid actuator shall be a globe type, normally closed, using 3.5-volt DC bipolar pulse. The valve shall be pressure rated up to 150 PSI and have balanced opening and closing. The valve(s) body size shall have a 3/4" up to 2" FNPT inlet and outlet and constructed of weather resistant, high impact glass reinforced nylon and stainless steel spring (303). The valve(s) one piece diaphragm shall be buna-N reinforced nylon fabric (NR). The valve(s) shall have a flow control and internal manual bleed located under the micro-powered actuator solenoid and allow for manual operation by turning the manual bleed handle a ¼ turn. The valve(s) shall provide easy access for removing all parts from the top of the valve without disturbing normal valve installation.

#### **b2. Micro-powered solenoid actuator only**

Micro-power solenoid actuator (standard or expansion series) shall be with the correct adapter to be mounted on any other valve. The controller shall communicate to the micro-powered solenoid actuator via two-way digital control pulses at 3.5 volts bipolar pulse.

### **c. LEIT Key**

The controller shall use one LEIT-Key (powered by a 9 volt battery) to provide access and to activate the controller's LCD screen.

## **2.1.3 Controller System Accessories**

### **a. Stainless Steel Enclosure**

For added protection the controller shall have the option to add a (304) Stainless Steel vandal resistant enclosure with strip perforations on top, allowing light to enter the controller and a lockable hinged door.

## **b. Sensor Adapter**

The controller or the micro-powered solenoid actuator shall have an option to connect to all type of switch type sensors via the SKIT sensor adapter. The SKIT adapter shall be used as an interface between the controller and a compatible rain, moisture or freeze protection sensor.

## **c. Swivel fittings**

Micro-powered solenoid actuator with globe valve shall be used with swivel fittings and shall allow in case of repair that the valve may be brought to the surface to be serviced without removing the irrigation box or cutting the pipe. The swivel fitting shall be constructed of injected molded polypropylene, UV resistant. The swivel fitting shall feature high impact strength plastic and highly chemical resistant. The male thread of the swivel fittings shall be attached to both sides of the valve. The female thread side of the swivel fitting shall have a large swivel 1", 1 ½" or 2" (FNPT) with encapsulated Nitric rubber "O" ring in such a manner that allows quick and easy tightening to a PVC male adapter without tools and Teflon tape. The swivel fitting operating pressure shall not exceed 150 psi.

## **2.1.4 Electrical Circuits**

Install irrigation wires at least six inches below finish grade and lay to the side and below main line.

**a.** Control wire for LEIT operated valve NFPA 70 copper conductor, 14-gauge [1.8 mm] irrigation wire, type UF, shall be used for station wire with runs up to 1,500 feet (454 m). NFPA 70 copper conductor 12-gauge [1.6 mm] irrigation wire, type UF, shall be used for station wire with runs up to 2400' (727m).

**b.** Electrical splices shall be waterproof and shall be located in valve box.

**c.** An expansion curl shall be provided so that in case of repairs the valve may be brought to the surface to be serviced without disconnecting the control wire.

### **Part 2 Submittals**

Fill in the appropriate number of units and submit (qty) with a copy of the catalog and instruction manual.

**a.** The LEIT powered irrigation controller shall be \_\_\_\_\_ each of the LEIT [4004] 4 station [4006] six stations [4008] eight station or 12 station [4012E] 16 station 4016E]

**b.** The two-way data communication micro-powered solenoid actuator or and valve shall be \_\_\_\_\_ each of:

- 1) Standard series micro-powered solenoid actuator and valve model [150S-075] for ¾", [150S- 100] for 1", [150S-150] for 1½" and [150S-200] for 2" Actuator and valve [s] or equal
- 2) Expansion series micro-powered solenoid actuator and valve model [150E-075] for ¾", [150E- 100] for 1", [150E-150] for 1½" and [150E-200] for 2" Actuator and valve [s] or equal ( used only with 4000E controller).
- 3) If other than the above are selected, use the two-way data communication micro-powered solenoid actuator with the correct adapter to match the valve in use (See page 3 of LEIT catalog for actuator compatibility).

c. The light powered irrigation controller shall require \_\_\_ each of LEIT- Control Key to enter the system. The same key can be used with any LEIT controller.

d. Each irrigation controller shall require one mounting column and shall have \_\_\_ each of MCOL 4000 mounting column and column kit.

e. The controller or the micro-power solenoid actuator shall require if applicable \_\_\_ each of the SKIT sensor adapter, used as an interface between the controller and compatible rain, moisture and/or freeze protection sensors.

f. The light powered irrigation controller shall also require \_\_\_\_\_ each of the ENCL 4000 (If a stainless steel enclosure is required for extra protection against vandalism and theft).

### **Part 3 Execution**

#### **3.1 LEIT Powered System Installation**

##### **a. Integrated Micro-power solenoid actuator and valve (150x-xxx)**

Install control valve with micro-power solenoid actuator (150x-xxx) below grade, inside the irrigation box using a male adapter swivel fitting. The male thread of the swivel fittings shall be attached to both sides of the valve. The female thread side of the swivel shall be attached to a PVC male adapter without tools, pipe dope or Teflon tape. When there is more than one valve manifold together inside the irrigation box use swivel tee for correct spacing between the valves. Install control valve with micro-powered solenoid actuator with a minimum of 2 to 4" clearance from the top of the box. The arrow molded on the valve shall be pointing in the direction of the water flow. Control wires shall be laid loosely without stress or stretching. Wires shall be taped together and labeled with station number. Control valve wires shall be connected using sealed waterproof splices. Support the corner of the irrigation box with a common red brick. Use gravel in the bottom of the valve box. Valve box support and placement shall conform to standard methods used by the irrigation industry. After installing sprinklers or drip system the contractor shall test and operate the control valve manually by pressurizing the system and turning the solenoid-housing counter clockwise ¼ turn to open and clockwise to close to make sure control valves open and close manually before connecting control wires.

##### **b. Micro-power solenoid actuator only**

Match all versions of commercially available brass or plastic AC valves with the appropriate solenoid actuator (see list of LEMA solenoid actuators on page 3 of the LEIT catalog).

- 1) Installing solenoid actuator, unscrew the conventional solenoids from each of the valves that have been used and remove the valve stem, plunger spring and "o" ring.
- 2) Select the solenoid actuator with the correct adapter that is compatible with the valve and separate the actuator and magnet from the stem assembly by unscrewing the nut on the top.
- 3) Remove (if assembled) adapter and manual bleed from the micro-power solenoid actuator and install it to the compatible valve port used.
- 4) Screw the solenoid actuator stem assembly into the correct adapter port. Make sure the "o"-ring is inside the manual bleed adapter. Firmly tighten the stem with a flat-head screwdriver, but do not over tighten.

- 5) Slip the solenoid actuator and magnet over the stem assembly and secure with the provided nut. The nut should be tightened firmly enough, so that it cannot be removed using your hand. Do not over tighten. Make sure to position the solenoid actuator with the label facing upwards. If you are still having a problem with selecting or installing the appropriate solenoid actuator for your valve, contact DIG Customer Service at 1 (800) 322-9146.
- 6) After installing sprinklers or drip system, contractor shall test and operate the valve with the micro-power solenoid actuator, manually, by pressurizing the system. Contractor shall turn the solenoid-housing counter clockwise ¼ turn to open and clockwise to close to make sure that the control valve is opening and closing correctly before connecting the control wires.
- 7) Micro-power solenoid actuator wires shall be connected using sealed waterproof splices.

### 3.2 Installation if applicable of [rain] [moisture] [freeze] sensor(s)

Install as per manufacturer's recommendation

- a. When installing a [rain] [moisture] [freeze] sensor(s) use SKIT waterproof sensor adapter as an interface between the controller and compatible switch type, normally closed sensor (s).
- b. The sensors two normally closed wires shall be connected to the interface adapter black wires and the hot (red) and common (white) wires from the interface adapter to a valve actuator or controller.
- c. All wires shall be connected using sealed waterproof splices.

### 3.3 Wire installation

- a. 14-gauge irrigation wire shall be used for station wire runs up to 1,500 feet
- b. 12-gauge irrigation wire shall be used for station wire runs up to 2400'.
- c. Install irrigation wires at least six inches beside mainline pipe in same trench
- d. Tag wires at control and control valve location with plastic tags.
- d. Use only Dry-Splice Series (or equal) sealed waterproof wire connectors on all field connections and use splices per installation instructions provided by the manufacturer, or otherwise required by local ordinance.
- f. **Do not use any electrical test equipment greater than 9 volts. It will cause irreparable damage to the actuators and/or controller and will void the warranty**

### 3.4 Controller installation

- a. Run the field wires along their respective trenches from the valve box up to the bottom end of the mounting column. Make sure not to exceed the maximum recommendation of wire distance and gauge (see chart). Push the wires up through the column until at least 12" (30 cm) of wires extend from the top of the mounting column.
- b. Use a splice box in front of the location of the mounting column. Run the field wires along their respective trenches from valve box up to the splice box at the bottom end of the mounting column. Make sure to review diagram of 12 or 16 station. A maximum of 10 wires shall enter the column to the controller. (see detail drawing # 4000E).
- c. Set the curved bottom of the mounting column in a 12" x 12" x 12" (30 x 30 x 30 cm) frame and pour the two 60 lbs. (27 kg) sacks of cement. Make sure the column is vertical and the opening in the curved bottom is accessible and unclogged. All wire enters the controller through the bottom of the mounting column (see drawing # 4000 and 4000E).
- d. Make sure the cement pad is dry before continuing with the installation.

- e. Remove the front door from the LEIT series controller and slide the controller into place on top of the mounting column. Make sure that at least 12" (30 cm) of the station wires are now inside the controller and cannot slip back down into the column. Then insert the clamp spacer and the screw (both included with the mounting column) into the hole located on the lower left side of the controller. Tighten the screw with the hex- key (included) until the controller does not turn, twist or pull off the mounting column
- f. Connecting the wires to the controller: Strip 3/10" (cm) of insulation from the tip of each of the wires. Plug the red (hot) wires into the connector strip labeled with the station number and tighten the connector screw with a screwdriver. If you are using a master valve or a pump, plug the hot wire from the MV/P into the station labeled MV/P. Plug the white (common) wire into either of the two common wire connectors labeled "common" located at the lower part of the connector strip and tighten connector screw with a screw driver.

### 3.5 Programming

- a. Entry to Irrigation Controller program shall be with the LEIT Key.
- b. Check to see that the 9-volt battery is in place.
- c. See manufacturer instruction manual for detailed instruction on controller programming.

### 3.6 Field quality control

Final testing prior to trench filling, the contractor shall program each station for one minute and operate each valve via the controller manual run program. The contractor shall check for proper operation of each station and make all the necessary corrections if any problems occur and retest the system before filling up excavations and trenches.

**If you have any problem call the manufacturer-at 1800-322-9146**

### 3.7 Final inspection

Contractor shall be responsible for all work until inspected. Contractor shall request the presence of the project operator at least two days in advance of final inspection and run each valve on the system for a minimum of one minute to verify correct controller and valve operation.

### 3.8 Completion of work

Upon job completion and testing of the system, the contractor shall instruct the user in proper operation and maintenance of the system and turn over to the authorized representative:

- 1) Catalog information # 41-013.
- 2) Instruction and programming manual # 26-400 and 26-401.
- 3) 1-LEIT- Control Key to enter the system. The same key can be used with any LEIT controller.
- 4) 2- set of keys to open the controller door.
- 5) Set of tools to remove controller from mounting column.

**END OF SECTION 02810**

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