



OSMAC Satellite Controller Series

13" x 8.5" Pedestal With Hydraulic Actuation

Installation Instructions

Introduction

The following instructions provide step-by-step installation procedures for the OSMAC satellite controller series designed for hydraulically-controlled irrigation systems. Reviewing the instructions completely before starting the installation will enable you to determine the additional materials and tools required for completion.

For your protection and the safety of the user, please pay strict attention to all Caution and Warning statements within this document. Assure all installation practices and materials comply with all applicable electrical, plumbing and construction codes.

Preparing Foundation

The controller pedestal cabinet requires a concrete mounting foundation for proper support. Dimensions given are the minimum recommended for adequate stability. Refer to **Figure 1** for the following installation procedure.

CAUTION: If controller is subject to freezing temperatures, thermal protection should be installed to prevent freeze damage. See Winterization – Prolonged Shutdown p. 3 for additional information.

1. Prepare a hole for foundation and conduit approximately 26" W x 20" L x 24" D (66 cm W x 50 cm L x 62 cm D).
2. Prepare connecting trenches to route power, earth ground and hydraulic control tubing.
Note: Buried depth of power wires and hydraulic tubing must comply with code requirements.
3. Position sections of $\frac{3}{4}$ " (20 mm) sweep elbow and/or straight sections of PVC conduit for each of the following components: power wires ①, earth ground wire ② and discharge line ③. Provide a gravel sump at base of discharge line. See **Figures 1** and **3**.
4. Position a 3" (75 mm) PVC sweep elbow ④ for supply and valve control tubing. Add straight sections of pipe as needed to extend 1"-2" (26-51 mm) above top surface of foundation.
5. Seal ends of conduit with tape. Backfill hole to provide a 6" (150 mm) foundation thickness. Box sides of foundation with 1" x 6" (26 mm x 152 mm) boards.
6. Use plastic mounting template to check placement of conduit. All conduit should fit inside template without interference. Adjust conduit as necessary before continuing.
7. Prepare mounting template with $\frac{5}{16}$ x $4\frac{1}{2}$ " mounting bolts and $\frac{5}{16}$ " -18 hex nuts (supplied) as shown in **Figure 2**. Bolt threads should protrude $1\frac{1}{2}$ - 2" (38-52 mm) from top surface of template.
8. Pour concrete into form, working carefully around conduit with trowel.
9. Press mounting template into concrete until flush and level. Center template with conduit to prevent pedestal/conduit interference. See **Figure 3**.
10. To prevent pooling at base of pedestal, finish top surface with gradual slope away from mounting template. Allow concrete to harden sufficiently before continuing.

Figure 1

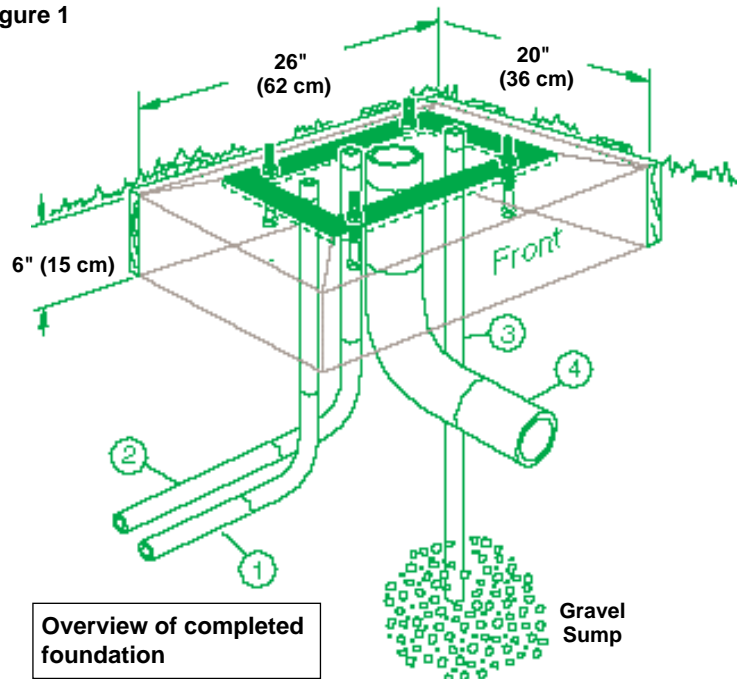


Figure 2

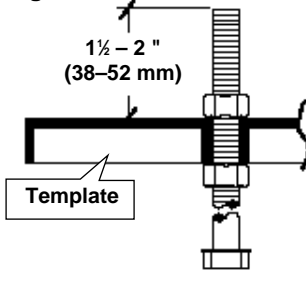
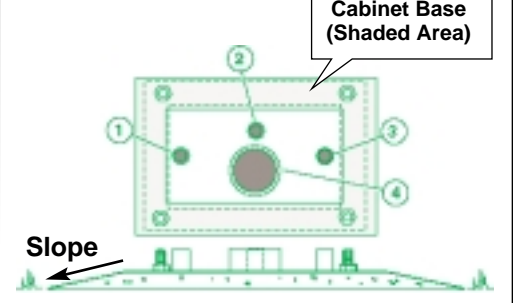
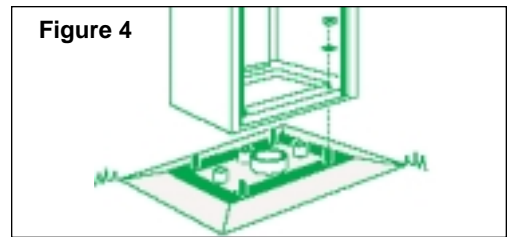


Figure 3



11. Remove hex nuts from mounting studs.
12. Unlock and remove pedestal door.
13. Position pedestal on foundation with studs protruding through holes in base.
14. Install a flat washer and hex nut on each stud and tighten securely.

See **Figure 4**.



Installing Control Tubing

Note: To operate properly, the controller must be connected to a filtered (100 mesh or finer) water source which is **equal to or greater in pressure** than the irrigation water supplied to any valve it controls.

Note: If installing a controller with more than 16 stations, two supply lines must be provided. Install as required for your controller model.

1. For supply line(s), route ½" (12.5 mm) schedule 40 PVC from pump or main water source to controller location.
2. Using Toro adapter fittings 995-14 and 900-24, connect a length of Toro ¼" O.D. x ⅜" I.D. polyethylene control tubing for each supply filter and route into controller through 3" (75 mm) conduit.
3. Remove tube retainer and cap from inlet of supply filter. Slide tube retainer onto supply tube. Push tube onto barbed fitting and secure with tube retainer. Repeat for additional filter as necessary.
4. Install a separate length of control tubing to barbed fitting of discharge port and route into gravel drainage sump.
5. Route a separate length of poly tubing from each valve location through 3" (75 mm) conduit into controller. For ease of installation and future identification, label each tube at both ends with valve location or intended station number.
6. At controller, install each control tube into actuator as follows: Carefully trim end of tube on a slight angle. Insert tube end into tube retainer cap approximately ⅜" (9.5 mm). Pull lightly on tube after insertion to ensure proper retention. See **Figure 6**.

Note: Actuator(s) **without** a control tube connected must have a plug cap installed. **Supply water will discharge from actuator if not plugged.** An O-ring installed in the tube retainer cap (shown in **Figure 6**) must be removed and installed in the plug cap prior to installation. Several plug caps are supplied with controller. If additional plug caps are required, order part number 89-8205.

Figure 5

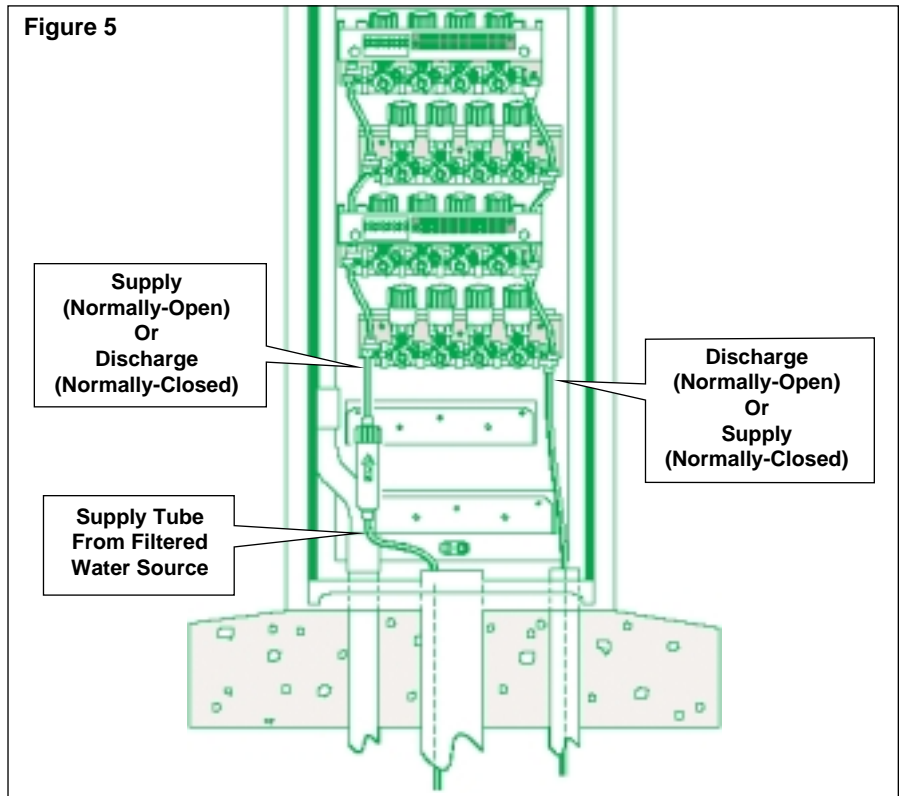
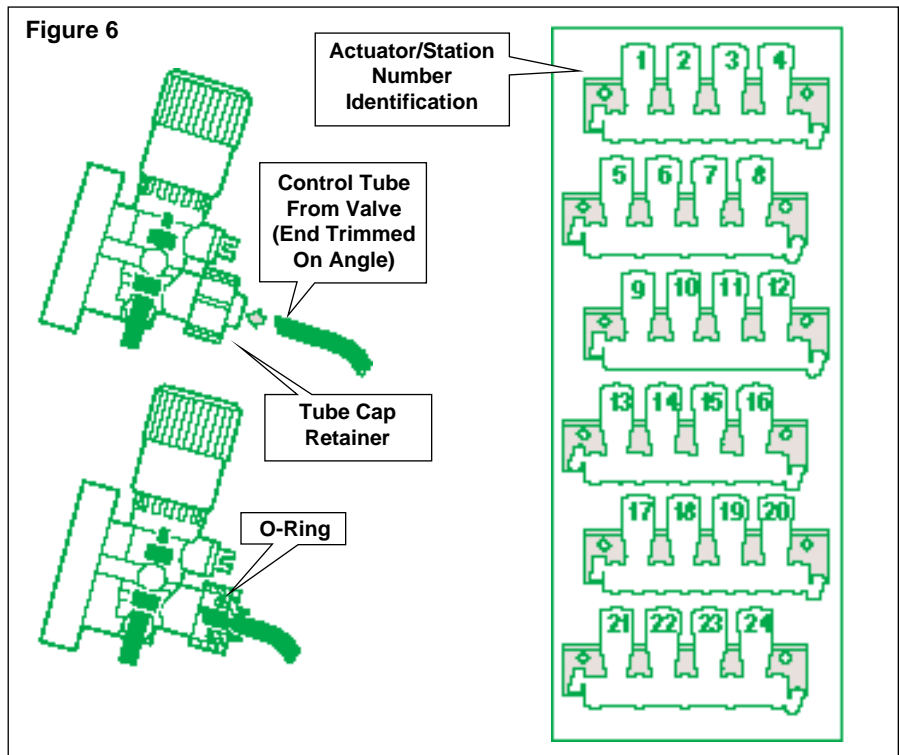


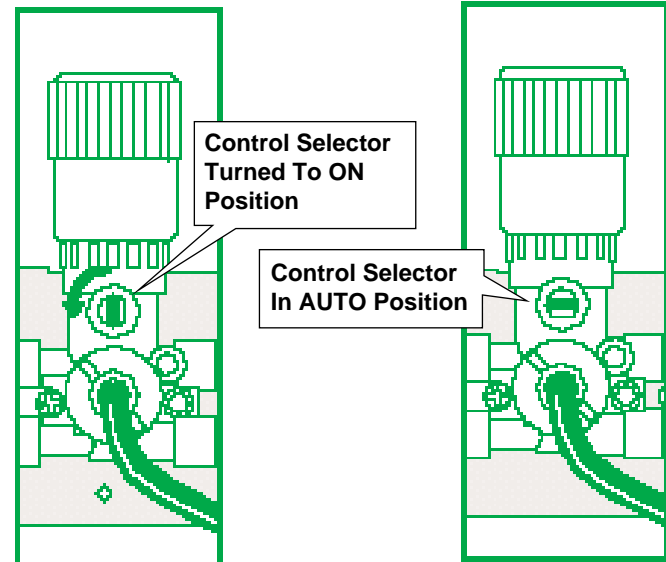
Figure 6



7. Pressurize supply line. Flush, pre-fill and connect valve control tubes as follows:

- **Normally-Open:** Turn control selectors (color-coded **blue**) counterclockwise 1/4 turn to **ON** position. At selected actuator, turn control clockwise 1/4 turn to **AUTO** position; water will begin flowing through control tube.
- **Normally-Closed:** At selected actuator, turn control selector (color-coded **green**) counterclockwise 1/4 turn to **ON** position; water will begin flowing through control tube.
- At valve location, allow water to flow from control tube until all air and debris has been purged. Slide tube retainer onto control tube, push tube onto barbed valve fitting and secure with retainer.
- Turn selected actuator to **ON** position for **Normally-Open** or **AUTO** position for **Normally-Closed** to stop flow of water from actuator.
- Repeat procedure for all valves.
- When all valves have been connected, turn all actuator controls to **AUTO** position.

Figure 7



Control Tube Removal

The actuator assembly uses a unique tube retention method which will not allow the tube to be pulled out once it has been inserted. If control tube removal is required, use the following procedure as illustrated **Figure 8**:

1. Unscrew tube retainer cap (counterclockwise) and remove from actuator assembly.
2. Cut tube on a slight angle leaving tube remnant approximately 1"(25 mm) long remaining in cap.
3. Push tube remnant through cap or grasp remnant with pliers from inside of cap and pull through to remove.
4. Reinstall tube retainer cap and hand tighten. Reinstall control tube.

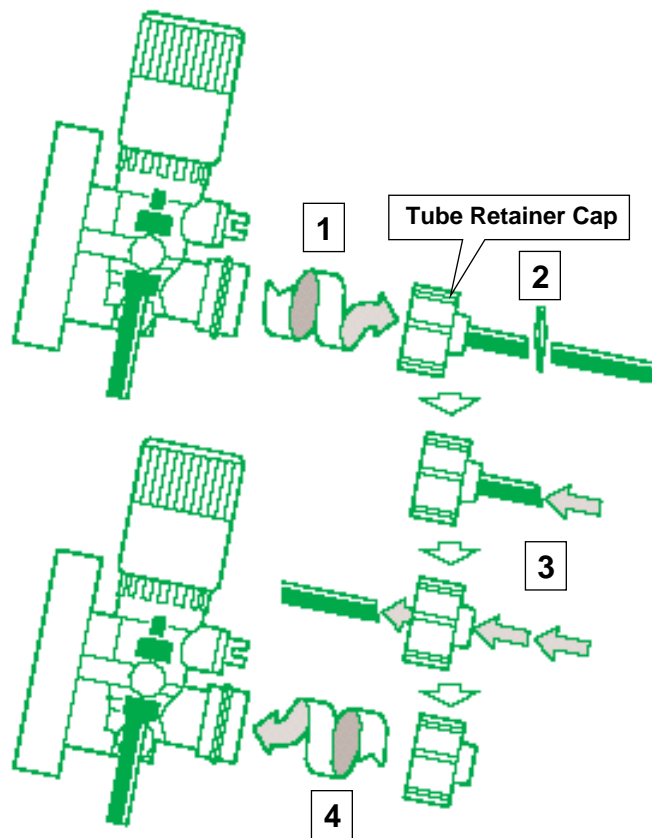
Winterization – Prolonged Shutdown

To prepare the hydraulic converter system for prolonged shutdown during winter months (if watering is not required), use the following procedure:

1. Turn system supply water off.
2. Remove supply filter cap to relieve inlet water pressure, then reinstall.
3. • **Normally-Open:** Turn all control selectors to **ON** position.
• **Normally-Closed:** Leave control selectors in **Auto** position.

Note: Prior to restarting system, ensure all actuator control selectors are in the **AUTO** position.

Figure 8



Connecting Earth Ground Conductor

To enable operation of the controller's surge protection components, a low-resistance earth ground conductor must be connected to both controller ground lugs located on the lower edge of the front and rear chassis plates.

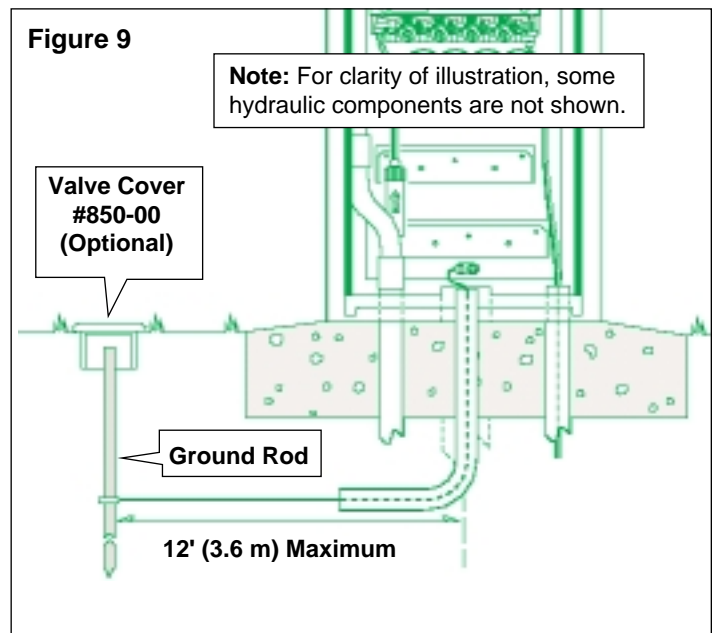
An optimum ground connection will have 10 Ohms or less resistance when measured with an earth resistance measuring instrument.*

Grounding methods have been developed for application in a variety of soil conditions. Please note the following grounding method is provided as an example only, and may not be applicable to your existing soil conditions. Contact a local Toro distributor for additional grounding recommendations and assistance.

Procedure

1. Drive a $\frac{5}{8}$ " (13 mm) by 8' (2.5 m) copper-clad steel ground rod into well-moistened soil within 12' (3.6 m) of the controller.
2. Using wire clamp, connect a 6 gauge (6 mm²) non-insulated copper wire to ground rod. Route wire into controller avoiding sharp bends.
3. Route wire to ground lug and trim to appropriate length. Insert wire into ground lugs and secure with set screw. See **Figure 9**.
4. Measure resistance at ground lug using a Megger Direct Reading Earth Resistance Testing Instrument* or equivalent. If required, install additional ground rods in series to achieve 10 Ohms or less.

* Manufactured by the James G. Biddle Company, Plymouth Meeting, Pennsylvania. Contact a Toro distributor for assistance in obtaining this device.



Connecting Power and Equipment Ground



WARNING
DISCONNECT POWER SOURCE PRIOR TO MAKING ANY WIRE CONNECTIONS. DO NOT APPLY POWER TO CONTROLLER UNTIL INSTALLATION HAS BEEN COMPLETED. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY AND/OR EQUIPMENT DAMAGE.

Procedure

1. Remove protective cover from top of pedestal (secured with two screws) to expose RDR control unit.
2. Remove metal cover from back of RDR unit secured with three $\frac{5}{16}$ " hex nuts.
3. Using appropriate fittings, connect $\frac{3}{4}$ " (20 mm) conduit installed in foundation to $\frac{3}{4}$ " (20 mm) conduit provided in pedestal cabinet.
4. Route insulated three-core copper conductor cable from power source into pedestal through conduit to back side of RDR control unit.
5. Secure Line, Neutral and Equipment ground wires to terminal block as shown in **Figure 10**.
6. Install metal cover and secure with hex nuts.
7. Install protective cover on top of pedestal and secure with two screws.

