



# OSMAC Satellite Controller Series

## 13" x 8.5" Cabinet With Electric Actuation

### Installation Instructions

#### Introduction

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

**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 comply with all applicable electrical 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.

To avoid lightning strikes, select an installation site in which the controller will not be the highest object in the general vicinity.

1. Prepare a hole for foundation and conduit approximately 24" W x 12" L x 24" D (62 cm W x 31 cm L x 62 cm D). See **Figure 1**.
2. Prepare a connecting trench to route power, earth ground, and field wires.
3. To serve as wiring conduit, position two  $\frac{3}{4}$ " (19 mm) sweep ells and one 2" (51 mm) sweep ell as shown. Cement straight sections of PVC pipe to ells as needed to extend 1–2" (25–51 mm) past top of foundation. Cover ends of pipe with tape. Backfill soil to about 6" (15 cm) below finish grade.

**Note:** For enhanced installation appearance, prepare sides of foundation hole with wooden forms.

4. Using  $\frac{5}{16}$ " x 4- $\frac{1}{2}$ " mounting bolts and  $\frac{5}{16}$ "-18 hex nuts supplied, prepare plastic mounting template as shown in **Figure 2**. Threaded end of bolts should protrude 1- $\frac{1}{2}$ –2" (38–52 mm) from top surface of template.
5. Pour concrete into formed hole and trowel smooth.
6. Press mounting template into concrete until flush and level. Align template with conduit as shown to prevent pedestal/conduit interference. See **Figure 3**.
7. To prevent pooling around pedestal, finish foundation with gradual slope away from template. Allow concrete to harden sufficiently before continuing. See **Figure 3**.

Figure 1

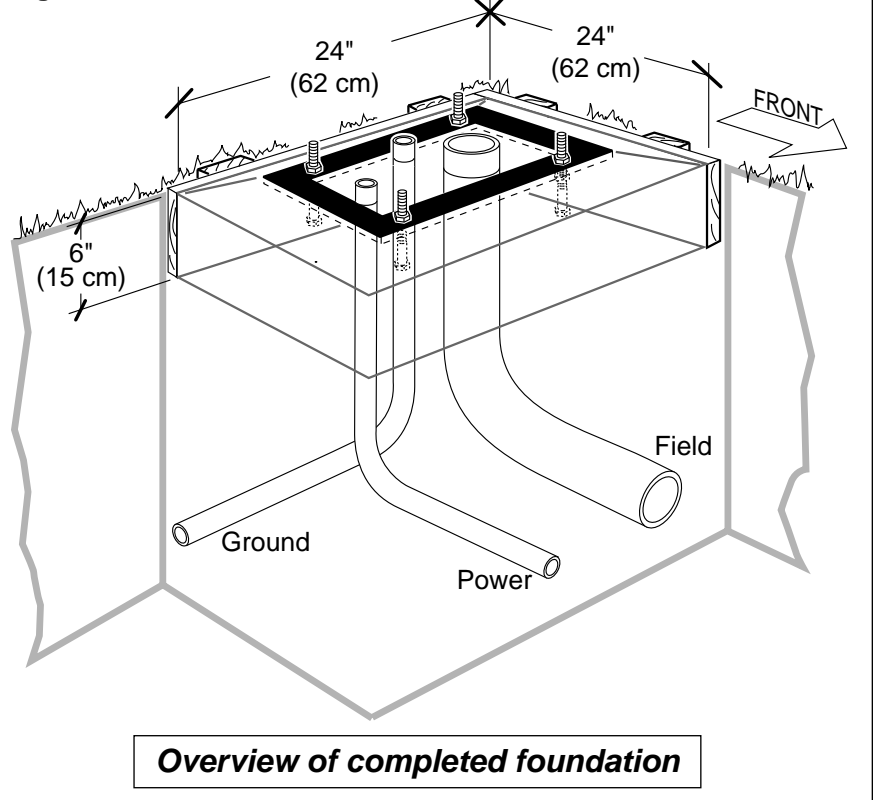


Figure 2

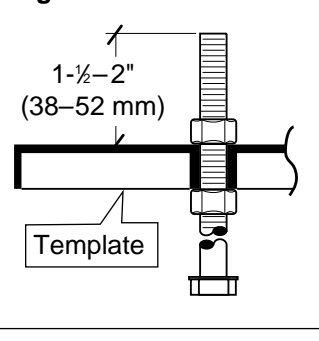
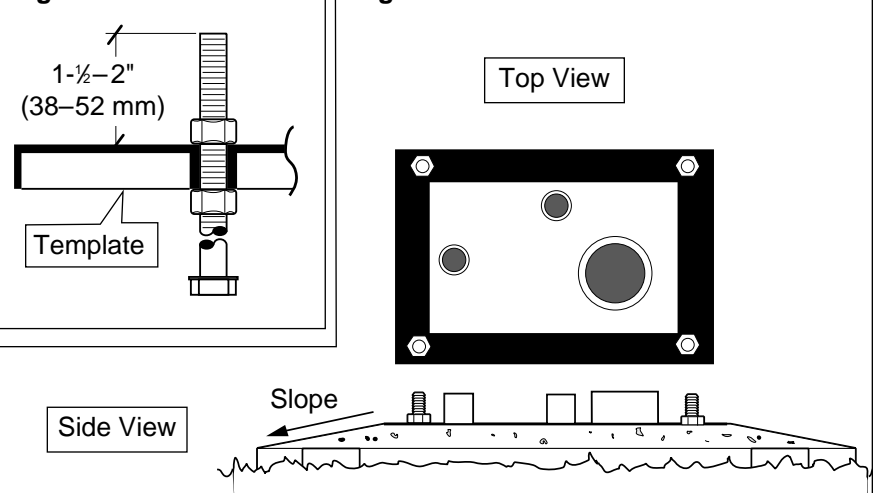
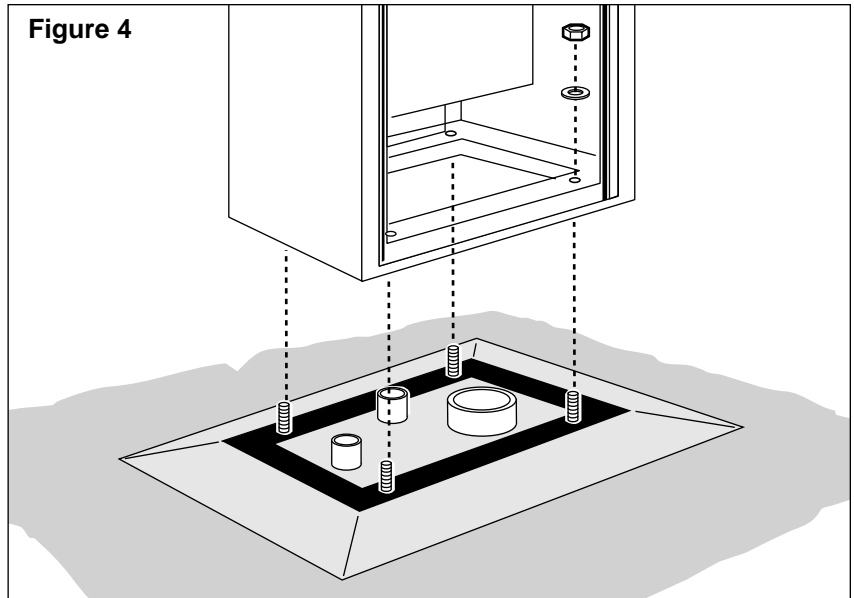


Figure 3



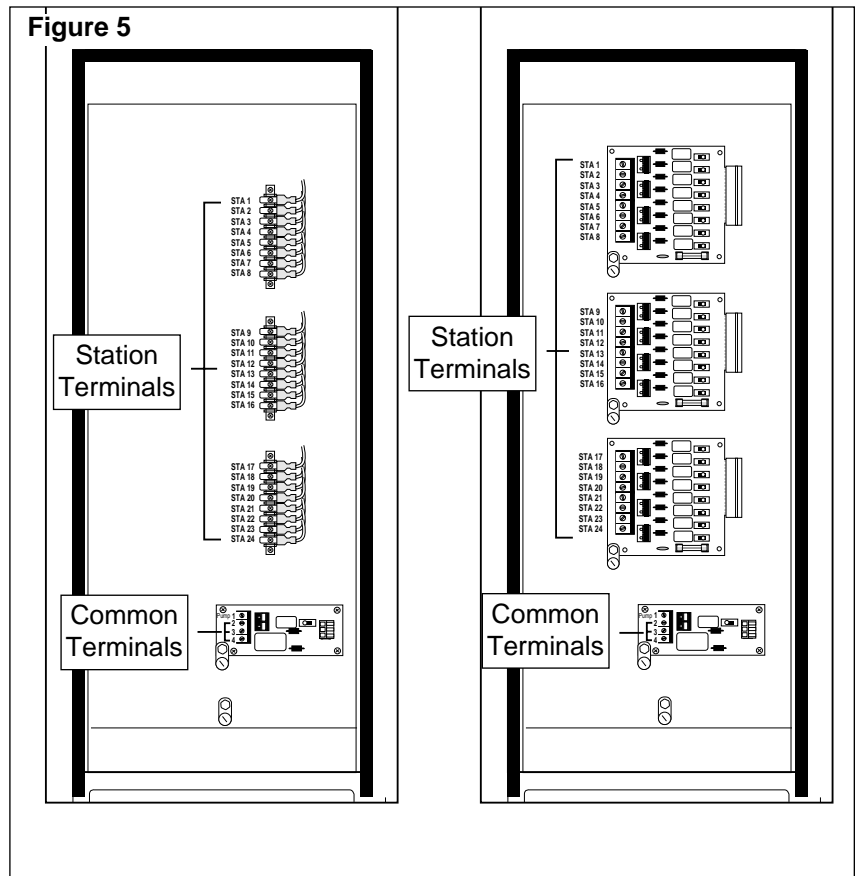
8. Remove hex nuts from mounting studs.
9. Unlock and remove pedestal doors.
10. Position pedestal on foundation with studs protruding through holes in base.
11. Install a flat washer and hex nut on each stud and tighten securely. See **Figure 4**.



### Connecting Control Valve Wiring

1. Attach a control wire to one lead of each valve solenoid. Attach a common wire to remaining lead of all valve solenoids. *Waterproof all field wire connections!*
2. Label control wires and common wire(s) for identification during installation. Route wires through 2" (51 mm) conduit into controller cabinet.
3. Secure valve control wires to station terminals in desired operating sequence. Secure common wire(s) to COM terminals of pump/common surge module. *(Three common terminals are provided.)* See **Figure 5**.

**CAUTION:** If connecting more than one valve per station, refer to the **MOTOROLA** documentation provided for maximum allowable solenoid load.



## Connecting Earth Ground Conductor

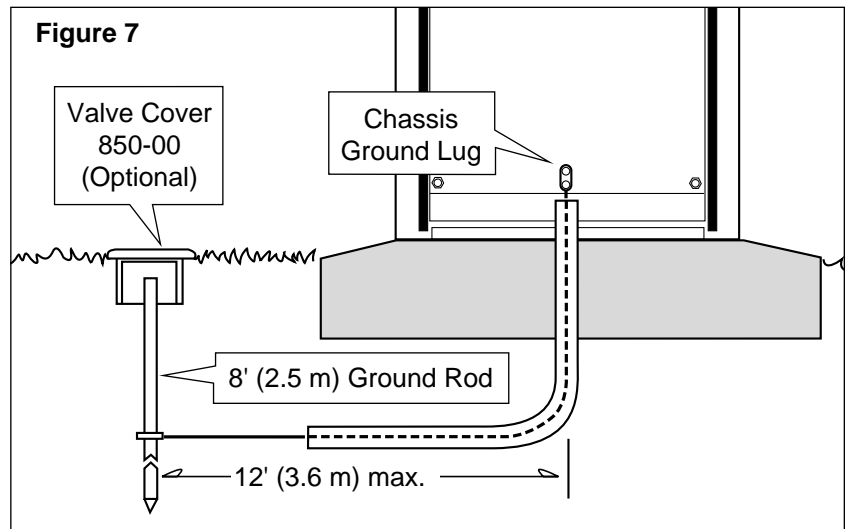
A low resistance earth ground conductor must be connected to one of the controller chassis ground lugs (ground lugs are attached to the front and rear chassis plates) to enable operation of the built-in surge protection devices. A ground conductor (or conductors) with a total resistance of 10 Ohms or less must be installed within 12' (3.6 m) of each satellite installation site.

1. Drive one or more  $\frac{5}{8}$ " x 8' (16 mm x 2.5 m) copper clad steel ground rod into well moistened soil.
2. Using a # 6 AWG (6 mm<sup>2</sup>) non-insulated copper wire, connect ground rod to chassis ground lug in a direct route avoiding sharp bends.
3. At chassis ground lug, measure ground wire resistance at controller using a Megger Direct Reading Earth Resistance Testing Instrument\* or equivalent. If required, install additional ground rods in series to attain 10 Ohms or less. Calculate resistance (Rt) of multiple conductors as follows:

<p>Rt = total resistance of conductors  Rt = 1.1 times Rm divided by N  Rm = average conductor resistance  N = number of ground conductors</p>
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**Note:** Due to variations in soil composition and terrain, alternate types of grounding conductors may be required to achieve a resistance of 10 Ohms or less at the controller. Contact an authorized Toro distributor for assistance.

\* Available from James G. Biddle Company, Plymouth Meeting, PA, U.S.A.

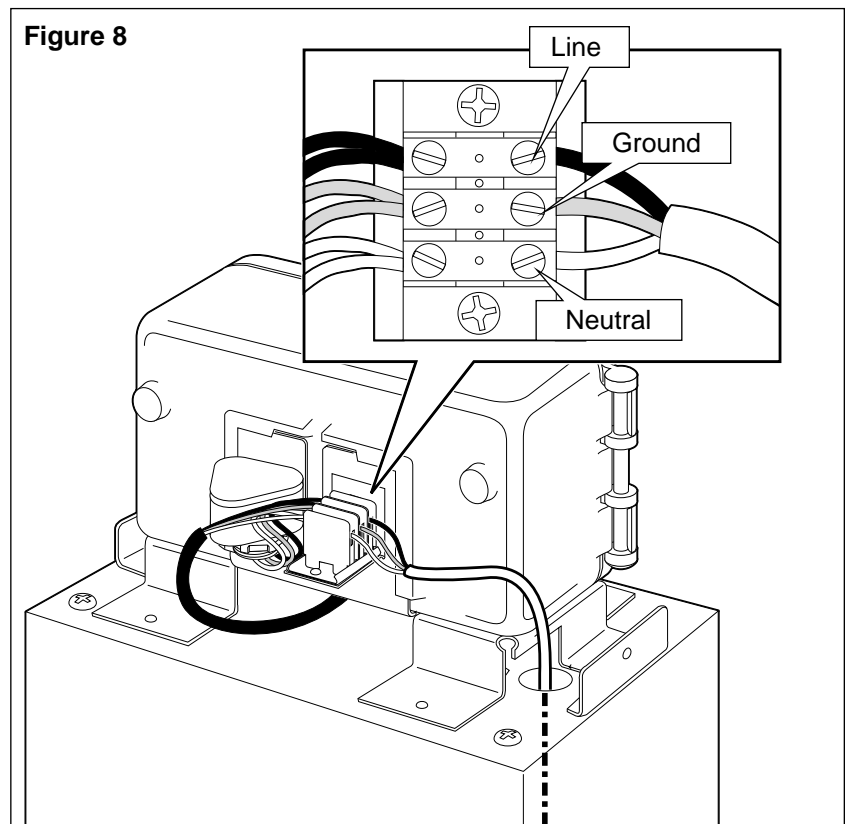


## Connecting Power and Equipment Ground Wires



**WARNING**  
**ALL ELECTRICAL CONNECTIONS MUST BE MADE IN COMPLIANCE WITH ALL APPLICABLE ELECTRICAL CODES. DISCONNECT POWER TO CONTROLLER AT SOURCE PRIOR TO MAKING ANY WIRE CONNECTIONS. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY AND/OR EQUIPMENT DAMAGE.**

1. Remove protective cover from top of controller cabinet (secured with two screws).
2. Remove metal cover from back of RDR unit secured with three  $\frac{5}{8}$ " hex nuts.
3. Route insulated three-core solid copper power cable from power source into controller pedestal through sweep ell conduit.
4. Route power cable through pedestal to back of RDR unit and connect Line, Neutral and Equipment Ground wires to terminal strip as shown in **Figure 8**.
5. Install metal cover to back of RDR and secure with hex nuts.
6. Install protective cover to top of pedestal.



## Selecting Operating Mode

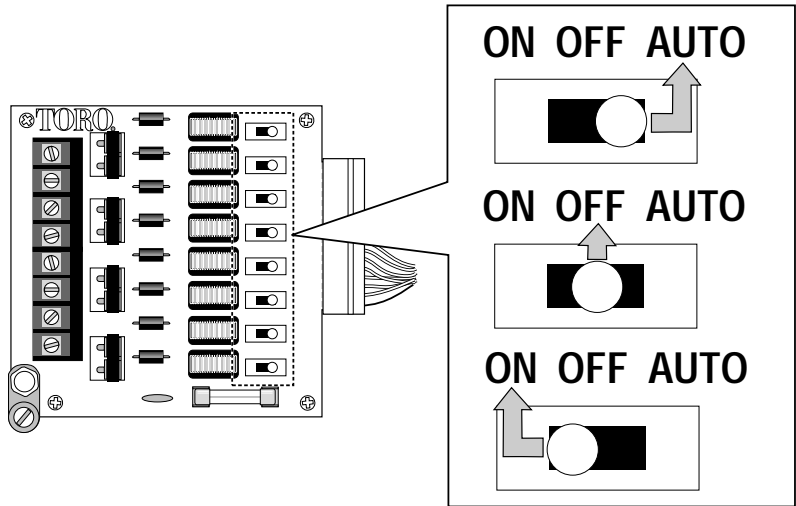
### (For Models with Station Surge Protection)

The valve station and pump/common surge protection modules incorporate slide switches which enable three operating modes to be selected for each valve station. Set switches accordingly:

- **AUTO** position enables the station circuit to function automatically per controller operation.
- **OFF** position disables the station until the switch is moved to AUTO or ON.
- **ON** position manually activates the station until the switch is moved to AUTO or OFF.

**Note:** Operation switch on pump/common surge module controls pump circuit only – valve common circuit is not affected by position of switch.

Figure 9



## Service Components

**Surge Devices** – The surge protection modules utilize replaceable, clip-mounted surge protection devices for each valve station and common circuit. The surge protection devices installed are quick reaction, gas ionization type, commonly called “surge pills”, which momentarily shunt high voltage directly to earth ground. Depending on the frequency and severity of lightning strikes incurred, the Surge Pills can generally withstand several high voltage surges before malfunction occurs. To ensure proper Surge Pill condition, a periodic test schedule should be established and maintained. Contact an authorized Toro distributor for service assistance.

**Fuse** – A 3 Amp “Slow Blow” fuse is utilized on the valve station surge modules. If fuse replacement is required, always use the same type and rating as installed from the factory.

**CAUTION:** Never install a replacement fuse with a higher amperage rating. Severe equipment damage can result.

Figure 10

