

Sentinel Field Satellite Controller Plastic Pedestal Installation Instructions

⚠ CAUTION: For your protection and the safety of the product user, please comply with all Caution and Warning statements within this document. All installation practices must comply with all applicable national and/or local electrical and building codes.

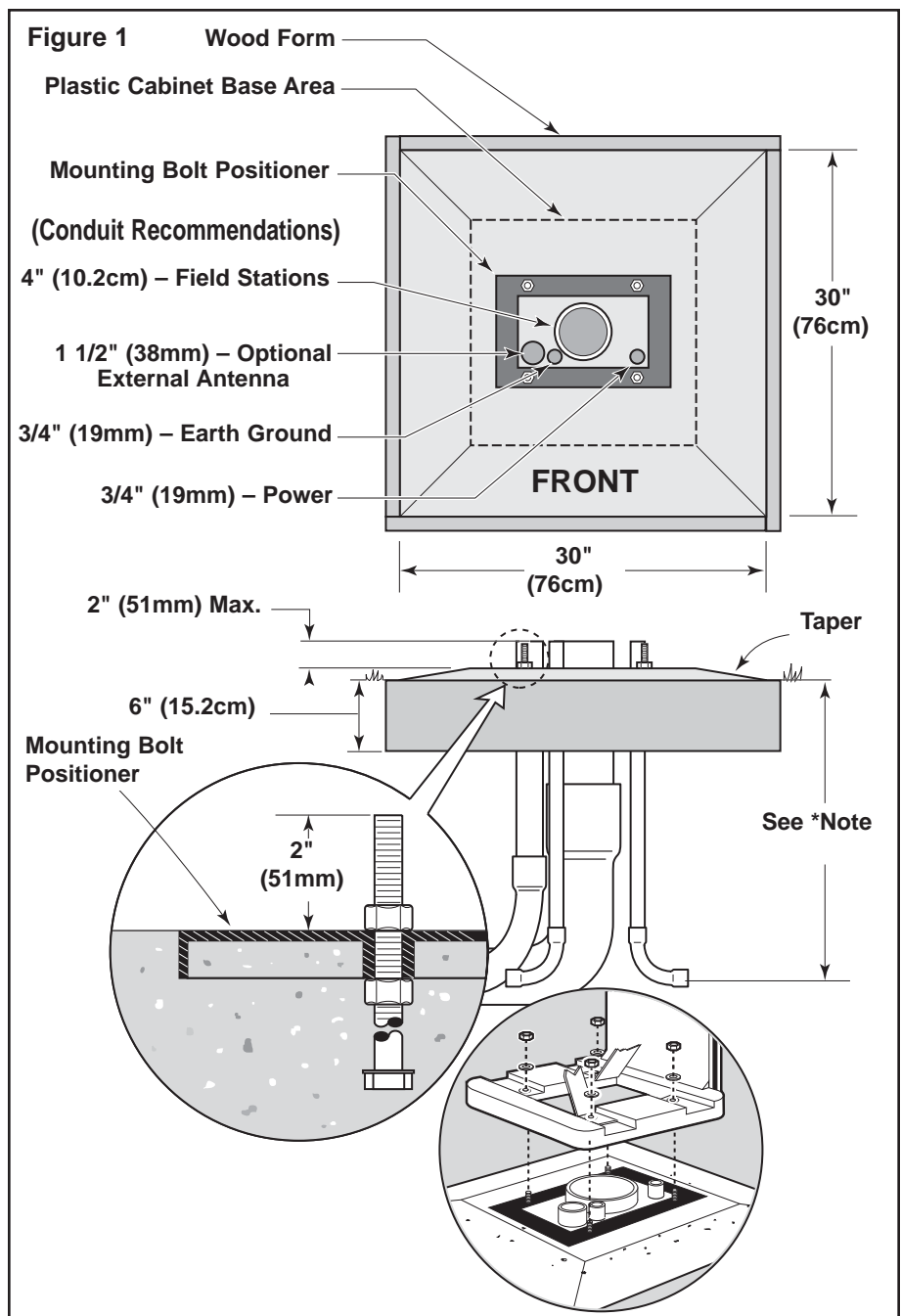
Introduction

The pedestal-mount satellite controller is designed for installation on a substantial concrete pad with embedded conduit of various diameters to enable wiring connections for power, field, earth ground and optional external antenna. Pedestal anchor bolts and a mounting bolt positioner are supplied with the controller.

Additional materials required to complete the installation must be obtained separately. A material list can be compiled by reading through the instructions completely prior to starting the installation.

Pedestal Installation

1. Prepare a hole for the foundation and wiring conduit using the minimum recommended dimensions shown in **Figure 1**.
Note: Refer to local electrical codes for required wire burial depth.
2. Trench to the foundation site as required for each wiring run.
3. Position straight and sweep elbow conduit sections in foundation hole as shown. Tape the conduit ends to seal out dirt. Backfill soil to form a 6" (15.2cm) foundation depth. Conduit should not extend more than 2" (51mm) above the finished top surface of the foundation.
4. Prepare the sides of the foundation hole with wood forms.
5. Prepare the mounting bolt positioner with the 5/16 x 4-1/2" bolts and nuts (provided) as shown in **Figure 1**. The threads should extend 2" (51mm) from the top surface of the bolt positioner.
6. Pour concrete into the formed foundation hole. Press the mounting bolt positioner into the concrete until it is **flush and level with the foundation surface** and aligned with the conduit.
7. Finish the concrete with a level flat area of 16" x 16" (41cm x 41cm) for the pedestal base. To prevent pooling at the base of the pedestal, add a slight taper away from the cabinet base contact area. Allow concrete to sufficiently harden before continuing.
8. Remove the hex nuts from the mounting studs. Remove the cabinet cover and doors. Carefully position the controller onto the studs. Install a flat washer and a hex nut on each stud and tighten securely.



Earth Ground Installation

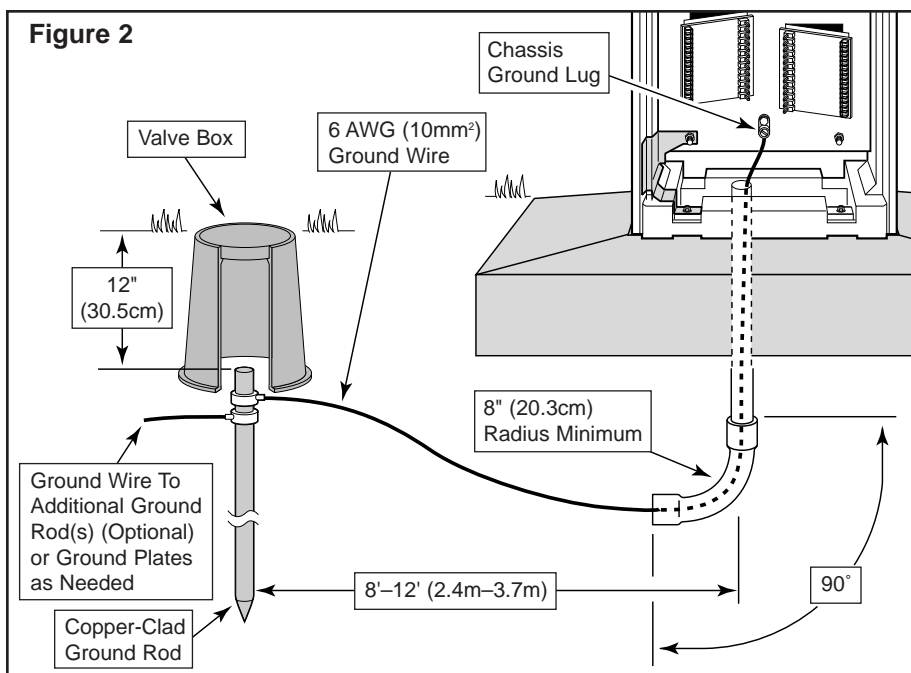
Important! The satellite surge protection components cannot properly function unless an efficient pathway to earth ground is provided. The ground path must be as direct as possible, without sharp bends and must not exceed 30 ohms resistance (when measured with an earth ground resistance test device). A resistance reading of 0–10 ohms is considered excellent, 11–20 ohms is acceptable and 21–30 is considered marginal. All electrical components throughout the irrigation system should be grounded in a manner which provides the same ground potential.

The following instructions depict one of several acceptable earth grounding methods. Due to variables in soil composition and terrain, the method shown may not be suitable for your installation site. Contact your local Toro distributor for assistance and availability of the required earth ground resistance test instrument. Recommended ground testers are: AEMC Instruments, model 3710 clamp-on tester, or Biddle Megger, model 250260 (or equivalent).

Procedure

1. Drive a 5/8" by 8' copper-clad steel rod into well-moistened soil not more than 12' from the satellite. The top of the ground rod should be slightly below grade level.
2. Use a "Cad weld" fastener to attach a length of #6 solid copper wire near the top of the ground rod. Avoiding sharp bends, route the wire through the foundation (pedestal mount) or through a knock-out opening in base of wall mount controller cabinet. Secure the wire to the large copper ground lug. See Figure 2.

Note: Make sure the soil surrounding the ground rod(s) remains well moistened at all times. The addition of some form of irrigation may be required if the satellite is installed in a non-irrigated location.



3. Measure the ground resistance per the instructions provided with the ground test instrument. If the resistance exceeds the acceptable limit, additional ground rod(s) can be installed at a distance equal to twice the buried depth of the first rod; i.e., 16' (4.9 m). Interconnect the ground rods using #6 (10 mm²) solid copper wire and test again. If the measured ground resistance continues to read above the acceptable limit, contact your local Toro distributor for further assistance and recommendations.

Input Power Installation

⚠ CAUTION: When installing multiple controllers, polarity of the Line and Neutral connections must be properly maintained throughout the irrigation system. Reversed polarity may cause damaging potentials to exist at one or more controller locations. An equipment ground wire from the power source must be connected to each satellite controller.

WARNING

AC POWER WIRING MUST BE INSTALLED AND CONNECTED BY QUALIFIED PERSONNEL ONLY.



ALL ELECTRICAL COMPONENTS AND INSTALLATION PROCEDURES MUST COMPLY WITH ALL APPLICABLE LOCAL AND NATIONAL ELECTRICAL CODES. SOME CODES MAY REQUIRE A MEANS OF DISCONNECTION FROM THE AC POWER SOURCE, INSTALLED IN THE FIXED WIRING, HAVING A CONTACT SEPARATION OF AT LEAST 0.120" (3 MM) IN THE LINE AND NEUTRAL POLES.

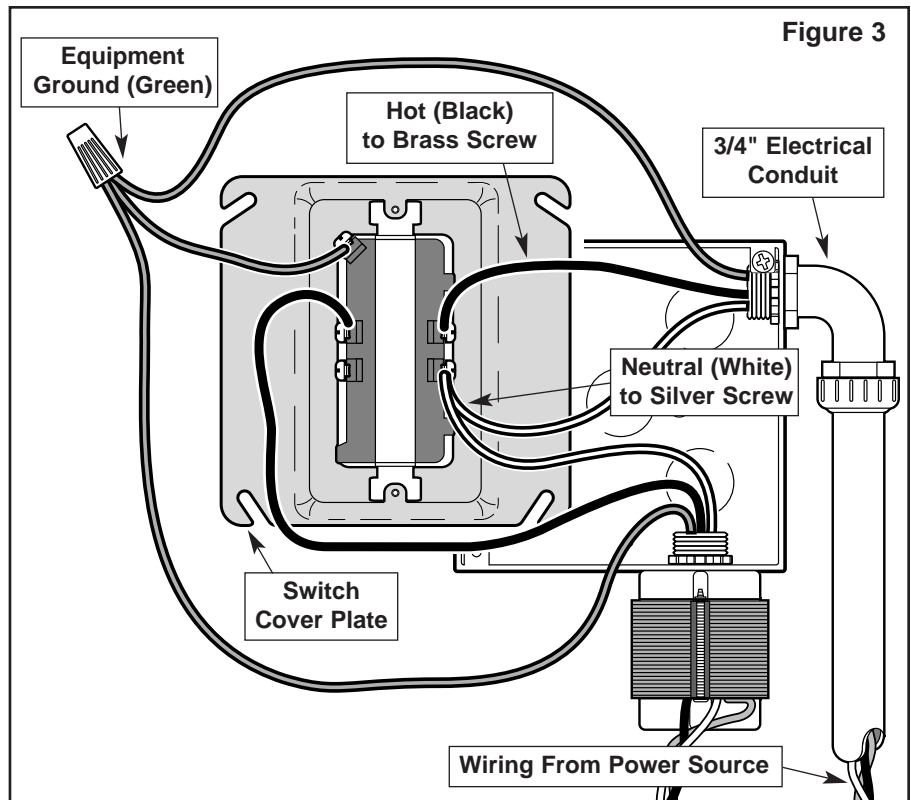
ENSURE THE AC POWER SOURCE IS OFF PRIOR TO CONNECTING TO THE CONTROLLER.

Input Power Installation (continued)

Note: Refer to **Figure 3** for the following procedure.

1. Ensure the controller power source is off.
2. Remove two retaining screws from the switch cover plate and swing it open to access the switch terminals.

Note: The switch cover plate is attached to the transformer wires. Use care when opening it to prevent straining the wire connections.
3. Route the Hot, Neutral and Equipment Ground wires from the power source into the junction box through the 3/4" electrical conduit.
4. Strip 1/2" of insulation from the Hot (black) wire and secure to the upper right switch terminal. Strip 1/2" insulation from the Neutral (white) wire and secure to the lower right switch terminal. Using an insulated wire connector, splice the Equipment Ground (green) wire to the green transformer wire.
5. Reposition and secure the switch cover plate. Ensure the switch is set to the Off (left) position.



Field Wire Installation

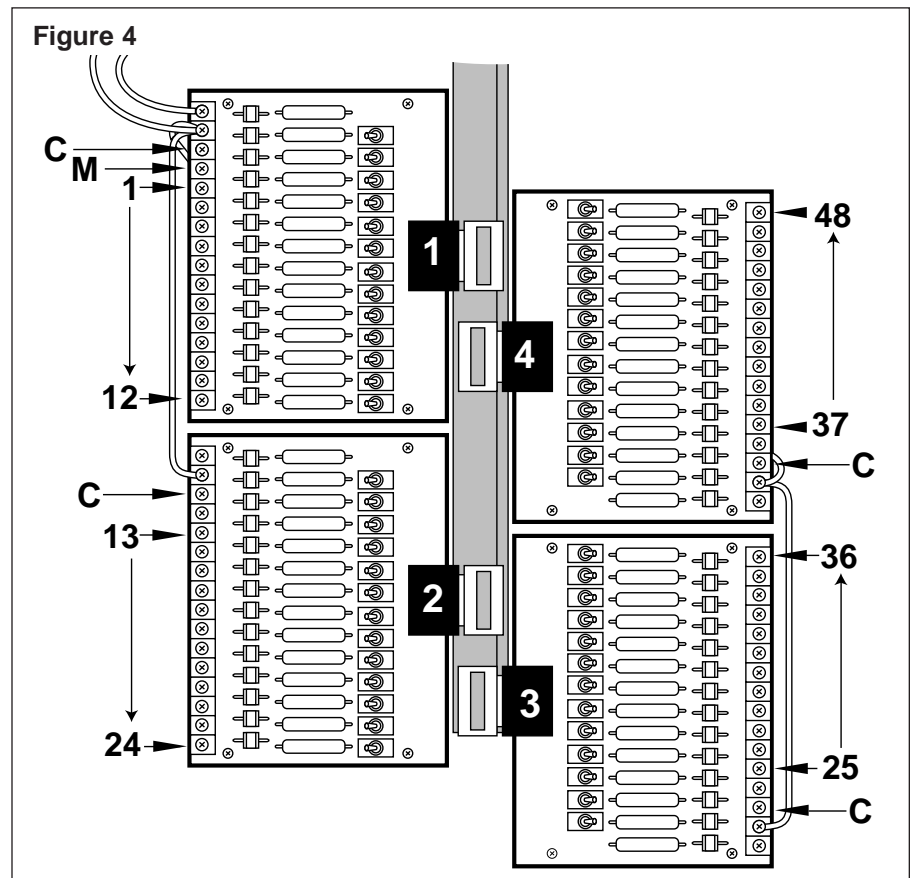
1. To provide a field common wire, attach one wire to either solenoid lead of all valves to be operated by the controller.
2. Attach a separate power wire to each remaining solenoid lead. Label these wires for identification at the station output modules.
3. Using an approved waterproof splicing method, properly insulate all wire splices.
4. Route the field wires into the controller cabinet through the 4" conduit. Remove approximately 3/8" insulation from the ends of each wire.
5. Connect the valve common wire to Terminal "C" of any station output module.
6. Connect each valve power wire to the appropriate station number terminal. See **Figure 4**.

▲ CAUTION: Maximum current load per station must not exceed 0.5A.

7. If a 24 V a.c. pump start relay or master valve is used, connect the power wire to terminal "M" of station output module number 1 and the common wire to any terminal "C".

Note: The Master (M) terminal on station output modules 2–4 is inoperative.

▲ CAUTION: The pump start relay current load must not exceed 0.5A. Do not connect the pump starter directly to the controller—damage to the controller will result.



Output Switch Operation

The 3-position switches provided on the station output module enables local control of the station and master valve* output.

***Note:** Only master valve switch on output station module number 1 is functional.

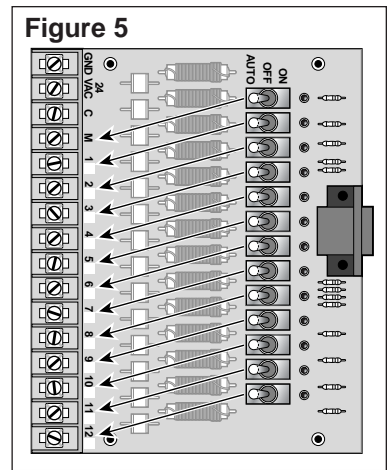
The switch positions are as follows:

ON – Manually activates the terminal. The terminal will remain on until the switch is moved to the **AUTO** or **OFF** position. An indicator LED will illuminate when the switch is on the ON position.

OFF – Shuts off the terminal. The terminal will be inoperative for both automatic and manual operation) while the switch is in the OFF position.

AUTO – Enables the terminal to be automatically controlled during automatic or manual operation.

▲ CAUTION: To prevent controller damage, do not operate more than six stations concurrently (1.75A total load maximum) during either manual or automatic operation.



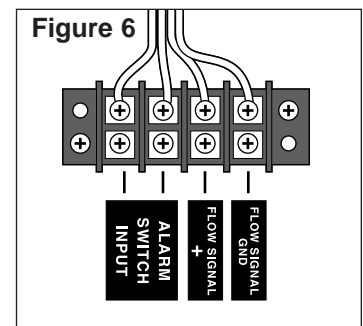
Alarm and Sensor Connections

The Alarm Switch is designed to monitor a dry contact switch and the alarm functionality is programmable in the system software. The Alarm Switch input can be programmed to start or stop programs of your choice and even follow the contact status if desired.

The "Flow Signal" is designed to read "shorting pulse output" from a Data Industrial flow meter. Or, if a rain tipping bucket or evapotranspiration (ET) gauge is used, this would be a normally open contact type. The controller measures the timing of the contact closures to determine if it is a flow pulse, rain pulse or ET pulse.

1. Connect a wire pair to the alarm switch and/ or flow measuring device and route into the controller through the field wire conduit.
2. Connect the wire pair to the appropriate terminals as shown in **Figure 6**.

Note: Refer to Sentinel Satellite User's Guide for operating instructions.



Specifications

Cabinet - Pedestal Mount:

Plastic Cabinet - 16" W x 43 1/2" H x 16" D
(41cm W x 127cm H x 41cm D)

Front, back, and top key-actuated locking covers.

Weight: 70 Lbs (32.8 kgs) (48-Stations)

Temperature Range:

Operating – -22°F to 140°F (-30°C to 60°C)

Storage – -40°F to 176°F (-40°C to 80°C)

Power:

Input – 120 V a.c., 60 Hz, 0.42A

Output – 24 V a.c., 60 Hz, 2.08A (max. total),
0.5A (max. per station)

0.5A (max. master valve/pump start relay)

Fuses: 250V, 2.0A Slow-Blow - 24 V a.c.

250V, 2.0A Slow-Blow - Common

Sensor Input:

Alarm Switch – Dry contact switch

Flow Signal – Normally open switch

Radio:

Equipment Type – Data radio, MAXON, model SD-125 U2

Frequency Band – UHF

RF Output Power – 2 watt

Current Consumption:

Standby (Muted) – < 65 mA

Transmit 2 watts RF power – < 1.0A

FCC License:

FCC ID # MNT - PC - UC

CSA License:

Canadian Certification # 153195333A

Electromagnetic Compatibility

Radio complies with FCC Part 22 and Part 90 of the FCC Rules

This equipment has been tested and found to comply with the limits for a FCC Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to the radio communications. Operation in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.