

Introduction

The wall-mount Sentinel controller unit is designed for installation on a structurally-sound building wall. The metal cabinet is moisture resistant and suitable for outdoor installation.

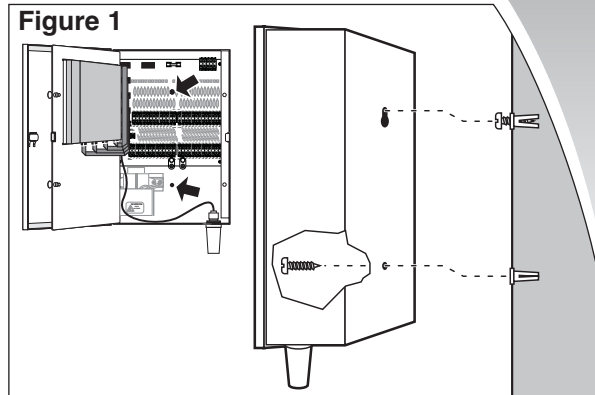
Additional materials required to complete the installation must be obtained separately. A material list can be compiled by reading through the instructions completely prior to starting the installation.

Mounting the Controller

1. Open the cabinet door and TM mounting plate. Position the controller on the wall and mark the top mounting hole locations.
2. Install the top mounting screw leaving the screw head about 1/8" (3mm) out from the wall. See **Figure 1**.

Note: Use the correct type of screws for the wall construction material. For masonry or dry wall, install screw anchors to enable screws to be tightened securely.

3. Hang the controller on the screw. Install the lower mounting screw and tighten both screws to ensure the controller is securely fastened.



Installing Conduit

Note: Electrical conduit and adapters are not supplied with the controller but may be required for installation in your area. Check local electrical codes and install conduit according to requirements.

1. For power wires, remove the terminal strip cover located below the transformer. Install a conduit from the circuit breaker panel to the controller cabinet using the 1/2" (13mm) thru-hole or 3/4" (19mm) conduit knockout.
2. For field wiring, either 2" (51mm) or 3" (75mm) conduit can be installed. If 3" (75mm) conduit is required, remove the knockout ring provided to increase the hole size. Sufficient space is provided to enable either a hex nut or star nut to be installed on the conduit fitting.

Connecting Power Wires

⚠ WARNING: All electrical components must meet applicable national and local electrical codes including installation by qualified personnel. These codes may require a means in the fixed wiring of disconnecting AC power having a contact separation of at least 0.120" (1/8" or 3mm) in the line and neutral poles. Ensure the AC power source is OFF prior to connecting to the controller. The wire used for connection to the controller must have insulation rated at 105°C minimum.

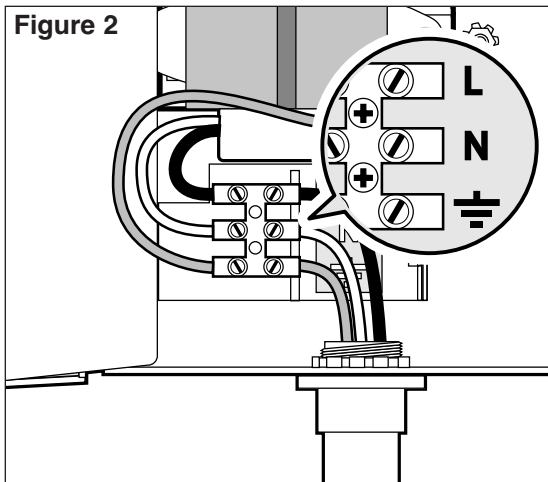
⚠ IMPORTANT! Do not connect the controller to one phase of a three-phase power supply used by a pump or other electrical equipment.

1. Ensure the power is disconnected at the source. See WARNING above.
2. Route the AC power and equipment ground wires through electrical conduit to the controller.
3. Remove the cover plate installed directly below the transformer. Use a small flat-bladed screwdriver to secure the wires.

For 120 VAC models, secure the wires as follows: Line (black wire) to "L", Neutral (white wire) to "N" and Equipment Ground (green wire) to "⚡". See **Figure 2**.

For 230-240 VAC models, secure wires as follows: Line (brown wire) to "L", Neutral (blue wire) to "N" and Equipment Ground (green wire) to "⚡".

4. Reinstall the cover plate and apply power to the controller.



Connecting the Valve Wires

- To provide a field common wire, attach one wire to either solenoid lead of all sprinkler valves and master valve (optional). See **Figure 3**.
- Attach a separate control wire to the remaining solenoid lead of each valve. Label the control wires with the intended station number for identification at the controller.

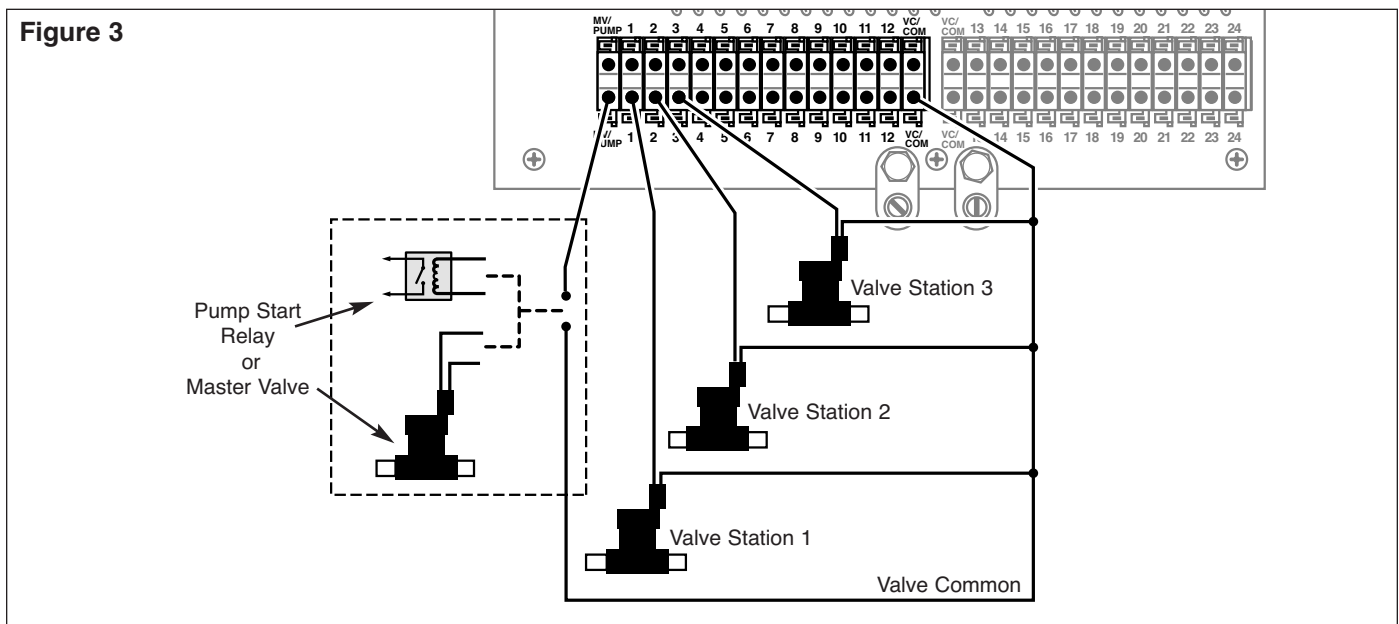
⚠ IMPORTANT! All wiring splices must be waterproofed to prevent short circuits and corrosion. A maximum load of 12 VA (0.5 amps) may be connected to each station. A maximum load (including master pump relay or master valve) of 50 VA (2 amps) may be programmed to operate simultaneously. Exceeding these limits can damage the controller.

- Route the control and common wires into the controller cabinet. Remove approximately 1/2" (13mm) of insulation from the ends of each wire. Shorter lengths of the exposed wire will be inadequate for contact.

Note: The quick-connect terminal blocks will accept one 12 AWG (4mm²) or two 14 (2.5mm²) AWG solid copper wires in each position. Insert the wire into either opening provided. Pull lightly after insertion to ensure positive retention. To release the wire, press either tab located directly above and below the terminal.

- Two field common terminals are provided for each 12-station terminal block. Attach the field common wire(s) to the terminal(s) labeled **VC/COM**.
- Connect each valve control wire to the appropriate station number terminal.

Note: The Hot Post provides 24 VAC to enable valve testing or identification at the controller. With the valve common connected, simply touch the station wire to the Hot Post to energize valve.



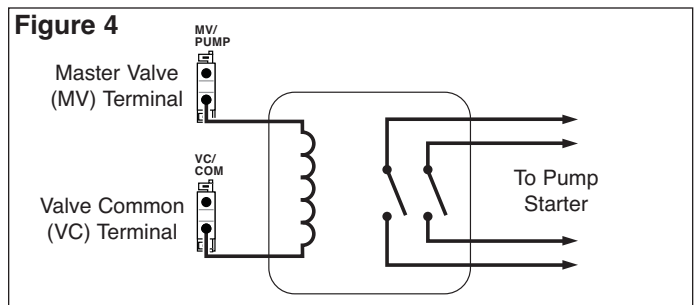
Connecting a Pump Start Relay

When a pump is to be operated by the controller, a compatible relay must be used. The relay coil will be connected to the master valve (MV) terminal and must be rated for 24 VAC at 0.5A maximum. The relay contacts will be connected to the pump start terminals and must be rated for use with the particular pump.

Note: Transient suppressors may be needed across the relay contacts in installations using large pumps.

⚠ WARNING: Do not connect the master valve output terminal directly to the pump start terminals. This will damage the controller.

- Connect the master valve output terminal (MV) to one side of the relay coil.
- Connect the other side of the relay coil to the valve common (VC) terminal. See **Figure 4**.



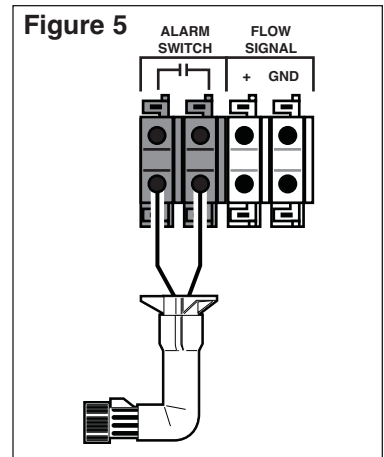
Alarm and Sensor Terminals

The alarm switch and sensor terminals are designed to monitor a dry contact switch. The alarm functionality is programmable in the system software. The alarm switch input can be programmed to start or stop selected programs or follow contact status if desired.

The Flow Signal terminal is designed to read “shorting pulse output” from a Data Industrial flow meter (or equivalent). If a rain tipping bucket or evapotranspiration (ET) gauge is being used, the terminals will be used as a normally open contact switch where the controller measures the timing of the contact closures to determine if it is a flow, rain or ET pulse.

1. Connect the wire pair to the alarm switch and/or flow measuring device and route into the controller through 1/2" (13mm) conduit.
2. Connect other end of the wire pair to the appropriate terminals, Alarm or flow. See **Figure 5**.

Note: Refer to Sentinel Field Satellite Controller User’s Guide for Alarm and Flow operation.



Connecting an Earth Ground

The surge protection components provided in the Sentinel Controller reduce the potential for surge damage by shunting induced high voltage spikes to earth ground. Therefore, an important step in the installation process is to properly connect the controller to an earth ground source, especially if the controller is located in a lightning prone area.

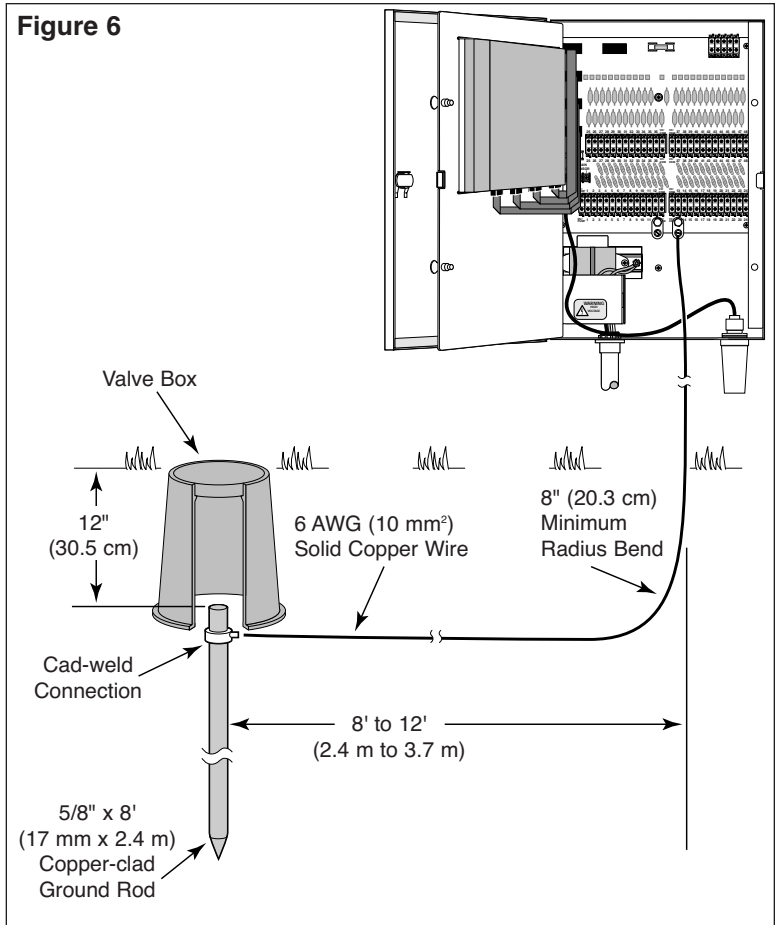
⚠ IMPORTANT! The built-in surge protection components cannot effectively protect the controller circuitry from power surge unless properly connected to an earth ground source. The 5-year lightning warranty will be voided if proper grounding measures are not completed as specified in the following procedure.

1. Remove one of the 3/4" (19mm) knockouts provided in the bottom of the cabinet for the ground wire connection.
2. Route a 6 AWG (10mm²) solid copper wire (avoiding wire bends with less than 8" [2.4m] radius) from the earth ground device (copper clad rod or plate) to one of the provided controller ground lugs. See **Figure 6**.
3. Attach the wire to the ground device using a Cad-weld™ connector (double or single lug ground clamps are not acceptable).
4. Measure the total resistance from the ground device to the controller ground lug using a Megger™ resistance measuring instrument.

⚠ IMPORTANT! Obtaining a Megger resistance reading of 10 ohms or less is required.

Note: Installation of additional grounding devices may be required to obtain 10 ohms or less resistance. An additional ground lug is provided for this circumstance. Do not connect the two ground wires to the same terminal.

If additional assistance is required to obtain proper grounding, contact your Toro distributor or field service representative.



Specifications

Wall-Mount Cabinet:

Powder-Coated Wall-Mount Enclosure
10 3/4" W x 15 3/4" H x 5 3/4" D

Temperature Range:

Operating – 14°F to 140°F (-10°C to 60°C)
Storage – -22°F to 158°F (-30°C to 70°C)

Power:

Input – 120 VAC, 60 Hz, 1.0A
Output – 24 VAC, 60 Hz, 1.75A (maximum total)
0.5A (maximum per station)
0.5A (maximum master/pump start relay)

Fuses:

24VAC – 250V, 2.0A Slow-Blow
Common – 250V, 2.0A Slow-Blow

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 watts
Current Consumption: Standby (Muted) – < 65 mA, Transmit 2 watts RF Power – < 1.0 Amps

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.