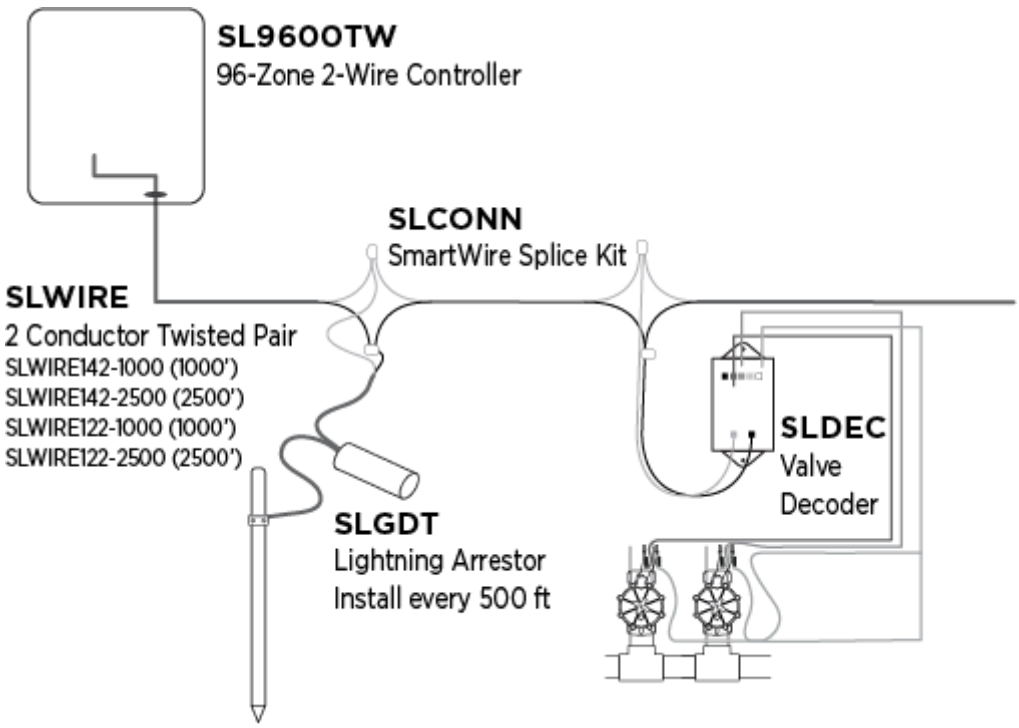
SmartWire Owners Manual

- SmartWire SL9600TW Owner's Manual
- SmartLine Controller Owner's Manual
- Controller Program Template
- Controller Basic Watering Schedule Template
- Controller Smart Watering Schedule Template

1.0 How it Works

A decoder is installed at each valve box to activate the valves. Each decoder has a unique address which identifies it to the Weathermatic SL9600TW 2-wire programming module. The SL9600TW 2-wire decoder module broadcasts a command to activate the specific address. All the decoders on the 2-wire system "decode" the message but only the appropriate decoder responds and turns the attached valve on or off. The decoders on the 2-wire system read the message sent from the appropriate valve, turning the valves on and off accordingly. The decoder then will respond back with a status message.

The advantages of a SmartWire™ system include cost savings from reduction in copper wire usage and corresponding trenching, simplicity of wiring and troubleshooting and ease of expansion when additional zones are needed. Weathermatic SmartWire™ 2-Wire allows for connection of up to 3 separate 2-wire paths to simplify installation on larger projects. SmartWire™ is a member of the SmartLine® family of water management products offering automated, on-site water management.



2.0 Getting Acquainted With Your SmartWire SL9600TW Controller

2.1 Getting Acquainted With Your SL9600TW Control Panel 🔗

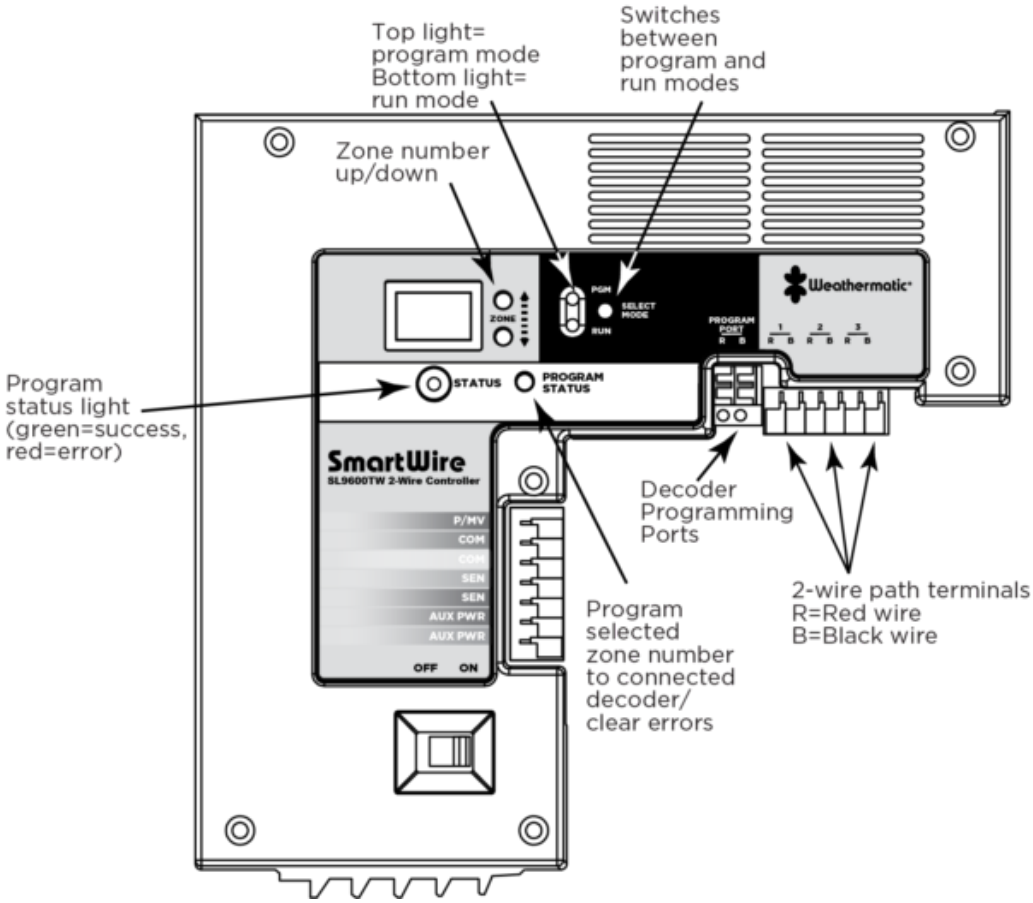
See 1.1 Getting Acquainted with Your Control Panel in the SmartLine Owner's Manual

2.2 Quick View

See 1.2 Quick View in the SmartLine Owner's Manual

2.3 Getting Acquainted With Your SL19600TW Module

The SL9600TW 2-Wire Decoder Module is permanently mounted in the SL9600TW cabinet and cannot be utilized with any other controller. The SL9600TW will display 48 or 96 programmable zones depending on Model number. You cannot exceed a total of 96 zones.



3.0 Planning Your 2-Wire Layout

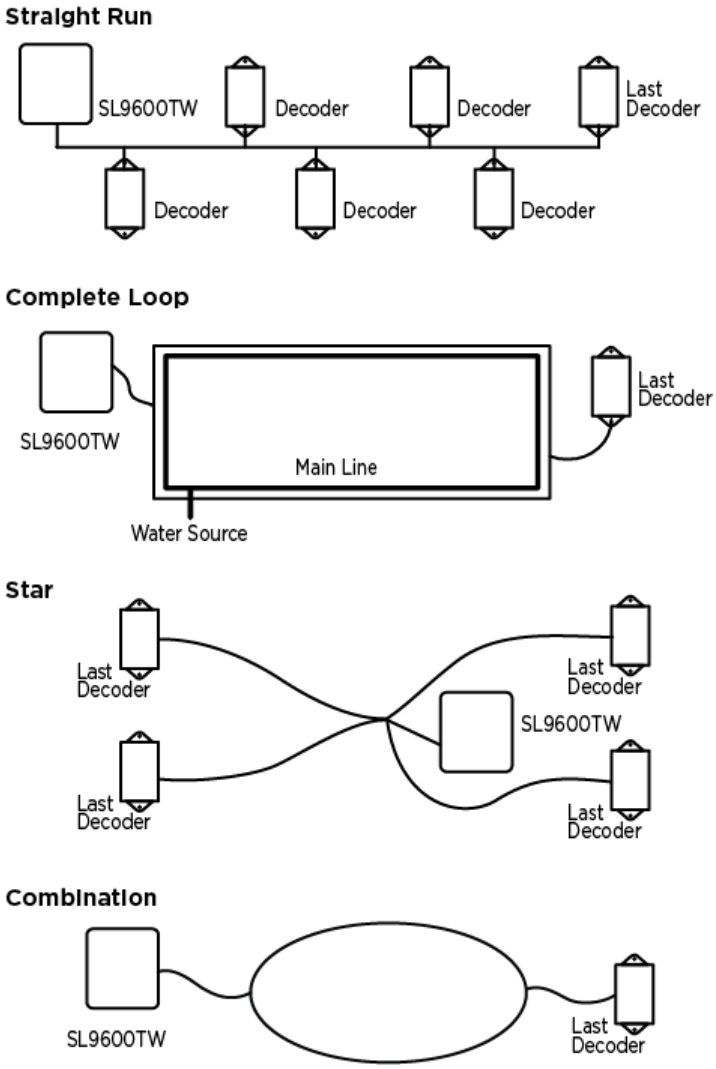
The SmartWire™ SL9600TW 2-Wire Decoder Module allows you to have several options in cable routing to determine the most efficient 2-wire layout for your project. You can connect as many as three 2-wire runs. Maximum decoder to valve distance is 100 feet (30.5m).

Each 2-wire run can be laid out in Straight Run, Complete Loop, Star, or Combination configurations as shown to the right.

It is suggested that a continuous loop be laid out around the site. This usually follows the main water lines. The loop will start at the SmartLine® controller and continue around the site and then return to the

controller. This provides the best communication and power path for the system. The loop provides a redundant path for the power and signal allowing the system to continue operation if the loop is cut.

Branches can come off the main loop and they do not need to be looped back to the main trunk line. These branches can be other loops, stars or single dead-end lines. The system will work with most wiring configurations if the wire length requirements are met. (Note: Keep BLACK to BLACK and RED to RED when wiring the communication wire.)

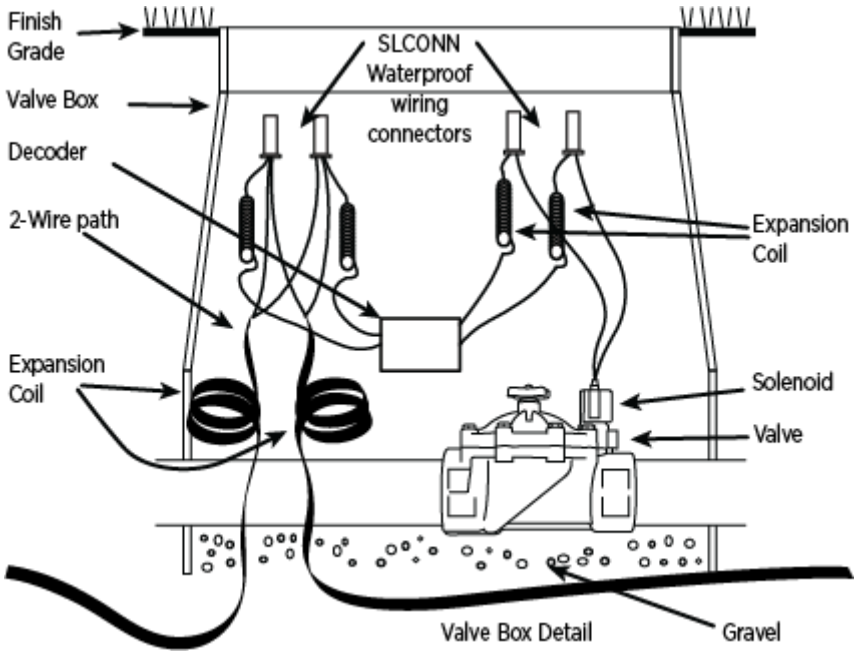


3.1 Attaching Components

Twist wires together and secure with the SLCONN wire connector using the appropriate connector for the wire size being used.

Encapsulate the splice inside the 3M DBR type, grease filled waterproof connector. Use of a connector is required for all connections between the 2-wire path and the decoders.

Note: Adhere to all local and national building and electrical codes.



3.2 Wiring Sizes

Wire Size (Gauge)	**Straight Line Configuration** i.e. wire distance to the furthest decoder, no loop	**Loop Configuration** i.e. wire distance to the furthest decoder in the loop
#18	1,900 (579 m)	3,800 (1,158 m)
#16	3,100 (944 m)	6,200 (1,889 m)
#14	5,000 (1,524 m)	10,000 (3,048 m)
#12	8,000 (2,438 m)	10,000 (4,572 m)

Maximum total wire path length is 10,000 (3,048 m).
Weathermatic recommends the use of SLWIRE cable specifically designed for an irrigation control system and complying with the following specifications:

- Conductors must be so drawn, annealed, solid copper conforming to ASTM 33.
- Conductor insulation must be 4/64-inch thick polyvinyl chloride (PVC) conforming to UL #493.
- The two insulated conductors laid in parallel and encased in a single outer jacket of 3/64-inch thick, high-density, sunlight resistant polyethylene conforming to ICEA S-61-402 and NEMA WC5, having a minimum wall thickness of .045-inch.
- The two conductors must be color-coded: normally one conductor red and the other black. Both conductors shall be the same size.
- The following models meet the above specifications for direct burial cable: Weathermatic SLWIRE12; Weathermatic SLWIRE14.

4.0 Lightning Protection

Weathermatic SLGDT gas discharge tube lightning arrestors must be used on all 2-wire grids. The SLGDT lightning arrestor attaches directly to the 2-wire system and helps dissipate static electricity generated by a

nearby lightning strike. While Weathermatic components have lightning arresting features, the SLGDT provides an extra measure of protection.

4.1 SLGDT Lightning Arrestor Features

- Protects the 2-wire system from excessive static charges created by a lightning strike.
- Sealed and impervious to moisture, salts, fertilizers and mild chemicals. Can be buried directly in the soil.
- Shock resistant
- Freeze/heat resistant (-20° to 60° C)
- No electrical contact with the soil
- Each Lightning Arrestor protects a 300 foot radius

4.2 Electrical Specifications

- Requires no power from the 2-wire system
- Can only be connected to SmartWire™ 2-wire systems

4.3 Installating the SLGDT Lightning Arrestor

1. Connect the RED and BLACK lead wires to the 2-wire system RED and BLACK wires.
2. Attach the GREEN ground wire to Earth Ground (Grounding Requirements below)

- Use only DBY or DBR 3M Type waterproof connectors encapsulating a twisted wire connection inside (SLCONN included).
- For maximum protection, place an SLGDT every 600 feet along the 2-wire system.
- One SLGDT should be within 25 of the host SmartLine® controller.
- A single stub line must not exceed 50 feet without an SLGDT lightning arrestor.
- An SLGDT lightning arrestor must also be placed at the end of the 2-wire run that is the maximum distance from the SmartLine® controller, or if looped, at the point of maximum distance from the SmartLine® controller.

4.4 Grounding Requirements

- The GREEN ground wire must be attached to a #8 solid bare copper wire using the included SLCONN wire connector. Connect the bare ground wire to a grounding circuit with 12 Ohms or less resistance to earth ground, measured with a ground resistance meter or Megger.
- A grounding circuit is comprised of 4 major components:
    - Ground Rod(s) and/or Plate(s).
    - Ground Conductor.
    - Exothermic or Cadmium Weld connections.
    - Soil and/or Ground Enhancement Materials.
- Ground Rods/Plates must be installed in a 6” min. valve box, 6” below grade or below frost line, located within an irrigated zone to maintain soil moisture and maximum ground performance.
- Ground Rods shall be UL listed “copper clad”, 5/8” minimum diameter, 8’ of length, and must meet the requirements of NEC article 250-52(c).
- Ground Plates shall be a copper alloy specifically intended for grounding, with a minimum thickness of 0.060”. Each plate shall expose a minimum of 5 square feet of surface area to contact the soil, and meet the requirements of NEC article 250-52(d).

- Grounding Conductor shall be a solid, bare copper wire or strap used to connect the green ground wire to the ground rod or plate, sized appropriately to achieve specified resistance.
- Exothermic or Cadmium Weld products such as CADWELD One Shot ®, shall be used to connect the #8 AWG bare copper ground conductor to the ground rod or plate.
- Ground Enhancement Materials such as Powerset®, PowerFill®, and GEM® shall be used as required to achieve specified resistance to earth ground.
- Local soil and site conditions will dictate what extent of grounding measures will be required. Generally there are 3 soil types that each require different methods and equipment to achieve the 12 Ohm minimum resistance to ground:
    - Clay soils: A single ground rod is typically sufficient, located in an irrigated zone, with CADWELD connections and no soil amendments. Some sites require a 6” diameter hole to be augured and backfilled with Ground Enhancement Materials.
    - Loam Soils: Typically a 3-ground rod grid is required, located in an irrigated zone, with CADWELD connections, 6” augured holes and Ground Enhancement Material are required.
    - Sandy soils: Require the most extensive ground circuits which require combinations of ground rods, plates, CADWELD connections and ground enhancement materials, located in an irrigated zone.
- Any combination of the above recommendations should be considered to achieve 12 Ohms or less. Long-term maintenance of any ground system requires that it be located within an irrigated or wetted zone.
- Refer to www.erico.com for a complete line of grounding equipment and materials.
- Refer to www.asic.org/design_guides.htm for American Society of Irrigation Consultants (ASIC) Guideline 100-2002 For Earth Grounding Electronic Equipment in Irrigation

5.0 Connecting the SL9600TW 2-Wire Controller

1. Connect the incoming power wires to the Power terminals on the SL9600TW.
2. You can connect (2) Master Valves or Pump Start Relays to the SL9600TW by decoder only. You will need to program a decoder as Zone 97 or zone 98 for use with the pump start relay or master valve. Note: if flow sensing is being utilized on this installation, the flow sensor must be connected to the AirCard via PE39 or PE89 cable for a maximum distance of 2000’. The flow signal is not to be input on the SmartWire path. Zone 97 will be associated with MV1 and Zone 98 will be associated with MV2.
3. You are ready to program your decoders. The SL9600TW will perform a “power-up self test” at initial powerup. The power-up self test will confirm the integrity of the processor and will test the display and all LEDs to make sure they are working. A successful test will terminate with two dashes “– –” in the display.

6.0 Programming the Decoders

Program all your decoders at the SmartLine® controller. You will need to mark each decoder with a pen (included) to record the zone number assigned to each valve. Note the adjacent chart of valve wire colors for each decoder:

- Each decoder will have RED and BLACK wires. These are the wires that will connect to the 2-wire path. The RED and BLACK are also the wires that you will insert in the Programming Ports on the SL9600TW to program the decoder.
- The wires on the other end of each decoder are for connection to your valves.
- 1-Valve Decoder: WHITE wire for the common and ORANGE wire for valve one.
- 2-Valve Decoder: Common is WHITE; ORANGE is valve one and YELLOW is valve two.
- 4-Valve Decoder: Common is WHITE; ORANGE is valve one; YELLOW is valve two; GREEN is valve three and BLUE is valve four.

6.1 Decoder Programming Steps

- Use the SL9600TW module mode button to select the PGM programming position.
- Insert the RED and BLACK wires on the decoder in the Programming Ports on the SL9600TW (RED to RED, BLACK to BLACK).
- Use up/down arrow buttons to select the zone number to be programmed.
- Push Program Status button to select the zone showing in the display window. Note: When you are programming a multi-valve decoder, the display will only show the zone number for the first zone to be assigned to that decoder. The remaining zones in the decoder are automatically assigned in sequential numerical order.
- A GREEN status light will confirm your selection.
- If programming is not successful, a RED status light will flash and an error code will be shown on the display. See Troubleshooting for description of error codes.
- Mark the zone number programmed on the decoder. Note: If you are using a multi-valve decoder, the decoder will record the zone selected in the order previously noted for wire colors. For example, if you are using the 4-valve decoder, the first zone programmed will be Orange, the second Yellow and so on. Mark the zone number on the decoder for reference during field installation. You should also mark all zone numbers on your valve layout plan for reference during installation of the decoders.

7.0 Programming the SL9600TW Controller

See 1.1 Getting Acquainted with Your Control Panel in the SmartLine Owner's Manual 🔗

7.1 Using the Programming Buttons 🔗
7.2 Current Time/Date 🔗
7.3 Program Start Times 🔗
7.4 Zone Run Times 🔗
7.5 Days to Water 🔗
7.6 Omit Times/Days/Dates (Optional) 🔗
7.7 Seasonal % Adjust (Optional) 🔗

8.0 Manual Start Functions

See 3.0 Manual Start Functions in the SmartLine Owner's Manual 🔗

8.1 Manual Zone 🔗
8.2 Manual Test 🔗

9.0 Programming for Smart Watering Mode

See 4.0 Programming for Smart Watering Mode in the SmartLine Owner's Manual 🔗

9.1 Set ZIP Code or Latitude 🔗
9.2 Enter Smart Data for Zones 🔗

10.0 Advanced Menu

See 5.0 Advanced Menu in the SmartLine Owner's Manual 🔗

11.0 Troubleshooting the SL9600TW Controller

Total Reset Procedure for the SmartLine® controller 🔗

Watering Cycle Pause Functions 🔗

Changing SLW or RFS5 Batteries 🔗

12.0 Troubleshooting Guide

Faults

- FAULT: ZONE XX INSUFFICIENT WATERING OPPORTUNITY
- FAULT: REMOTE BATTERY FAILURE
- FAULT: NO RECENT CONTACT WITH WEATHER SENSOR
- FAULT: ZONE XX OPEN, MV1 OPEN, MV2 OPEN
- FAULT: ZONE XX SHORT, MV1 SHORT, MV2 SHORT

13.0 Troubleshooting the SL9600TW Module

The SL9600TW provides special key combinations that can be used to access special features and information that can be helpful during the diagnostic process. These key combinations are as follows:

- Push Up Arrow and Down Arrow simultaneously to view the software version for your SL9600TW.

If an over current or over temperature is sensed by the SL9600TW decoder programmer, it will cause a FAULT message to appear on the display of the SmartLine® controller. Open the SmartLine® panel and check the FAULT on the display of the SL9600TW decoder programmer. Aer the FAULT is repaired, press the Program Zone button on the SL9600TW to clear the error message. Refer to the table below for SL9600TW error messages and corresponding corrective actions.

- Valve Locating: Use the SL9600TW controller Advanced Functions menu options for the valve locator to find the valve. This feature will create a “chatter” for a selected valve as a convenient method of locating buried valves. Use NEXT and BACK buttons to scroll to the valve you want to “chatter.”

Error Codes 🔗

14.0 Special System Features

- A unique address is configured in each decoder during the configuration process.
- Valves are actuated by a command from the decoder.
- Diagnostic features—The SL9600TW reports failing solenoids.
- If a solenoid has failed, the decoder senses an open circuit and/or over current condition and shuts down the valve.
- Each decoder will shut down if communication is lost to the decoder manager in the SmartLine® controller.
- Valves can be located up to 100 feet from the decoder.
- Decoder electronics are potted in chemical and waterproof compounds for impervious protection from moisture and dirt.

15.0 Electrical Specifications

- Input voltage 232 – 38 VAC over the 2-wire system.
- The Weathermatic SL9600TW can support a total of 96 valves plus 2 master valves. A maximum of 5 valves including master valve or pump relay can be operated concurrently.
- No electrical contact with soil.
- Shock resistant.
- Freeze/heat resistant (-20° to 60° C).
- All connecting wires are 14 gauge coated PVC and must be installed with industry standard waterproof connectors such as the 3M DBY or DBR.