



WeatherTRAK

2-Wire System Design Guide

- Overview
- Design
- Specifications

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Overview

WeatherTRAK 2-Wire products provide simplicity of 2-wire control with the proven water savings, automation and central visibility and control you expect from commercial WeatherTRAK solutions.

How do WeatherTRAK 2-Wire Products Work?

WeatherTRAK 2-Wire products provide the same programming and WeatherTRAK Central benefits as a traditionally controlled

WeatherTRAK controller, the difference is that it communicates and powers the control valves using shared two-conductor wire paths and individual station decoders. The WeatherTRAK 2-Wire system provides irrigation control utilizing constant low-voltage on one or more two-conductor wire paths, the 2-wire path. The 2-wire path is connected from the controller to one or more WeatherTRAK 2-Wire station decoders. The WeatherTRAK 2-Wire enabled controller then uses the 2-wire path for communication as well as to power all of the valves in an irrigation system on that path. All valves are connected to station decoders, so the need for a control wire per valve back to the controller is eliminated.

The WeatherTRAK 2-Wire controller turns on specific valves by sending messages over the 2-wire path addressed to a specific station decoder. The station decoders can be addressed in the field or ordered pre-addressed from HydroPoint. The WeatherTRAK 2-Wire system is also capable of sending messages from a decoder, such as the WeatherTRAK 2-Wire Flow decoder, to the WeatherTRAK 2-Wire controller. This allows flow sensors and master valves to be installed using the 2-wire path.



Design Considerations

When designing a decoder based system, including the WeatherTRAK 2-Wire system, the designer must ensure there is enough power and voltage along the entire 2-wire path, by considering the 2-wire path lengths, layouts and grounding. When properly designed, these factors ensure that the overall system has enough power to communicate to all the 2-wire decoders and activate the station valves.

Layout of the 2-Wire Path

The recommended 2-wire path layout is a star configuration. The star configuration is easy to troubleshoot if there are issues in the field. An illustration of the star configuration follows.

Star Configuration

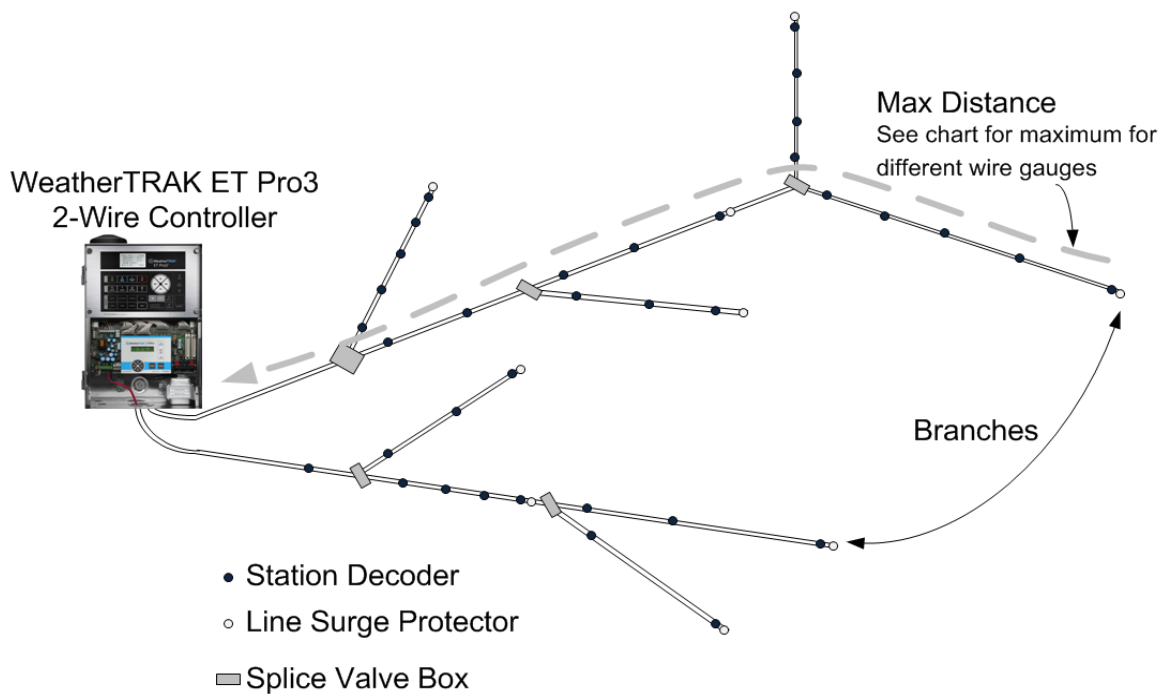


Figure 1 Star Configuration: 2-Wire Path

Wire Length Limits for the 2-Wire Path

WeatherTRAK 2-Wire provides easy installation and wire extending options. This section describes the 2-wire path length limits both worst-case and typical.

Typical 2-Wire Path Length Limits

This represents the typical scenario where decoders are installed evenly along the 2-wire path.

Number of simultaneous valves	Valves evenly distributed along 2-wire (ft.)	
	AWG 16	AWG 14
1	11,000	17,800
2	10,200	16,300
3	8,800	14,100
4	7,800	12,500
5	7,000	11,200
6	6,300	10,100
7	5,800	9,200
8	5,300	8,500

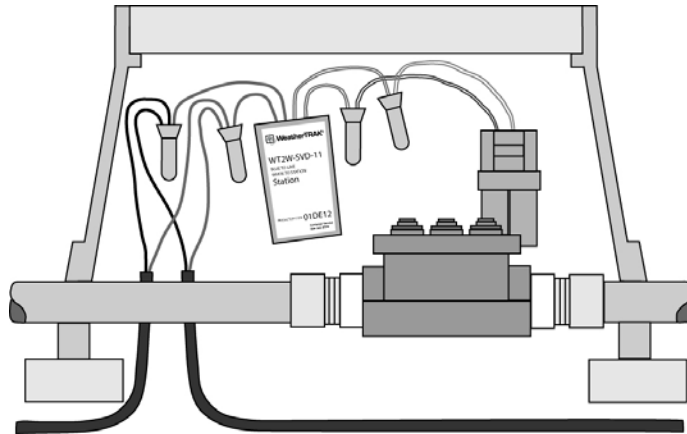
Worst Case 2-Wire Path Length Limits

This represents the worst-case scenario where all the installed decoders are at the end of the 2-wire path.

Number of active valves on 2-wire path	Maximum wire length (ft.) assuming #16/2-wire
1	6,200
2	5,600
3	4,900
4	4,300

Station Decoder to Solenoid

Each irrigation control valve must be connected to a WeatherTRAK 2-Wire Station Decoder (WT2W-SVD-11). Each station decoder is programmed with a station number. The station decoder must be connected to the 2-wire path and the solenoid using the included 3M DBR/Y-6 splice kits. The decoder and splice kits should be based in a valve box for easier troubleshooting and diagnostics.



Notes:

WeatherTRAK 2-Wire systems are **NOT** compatible with the following solenoids:

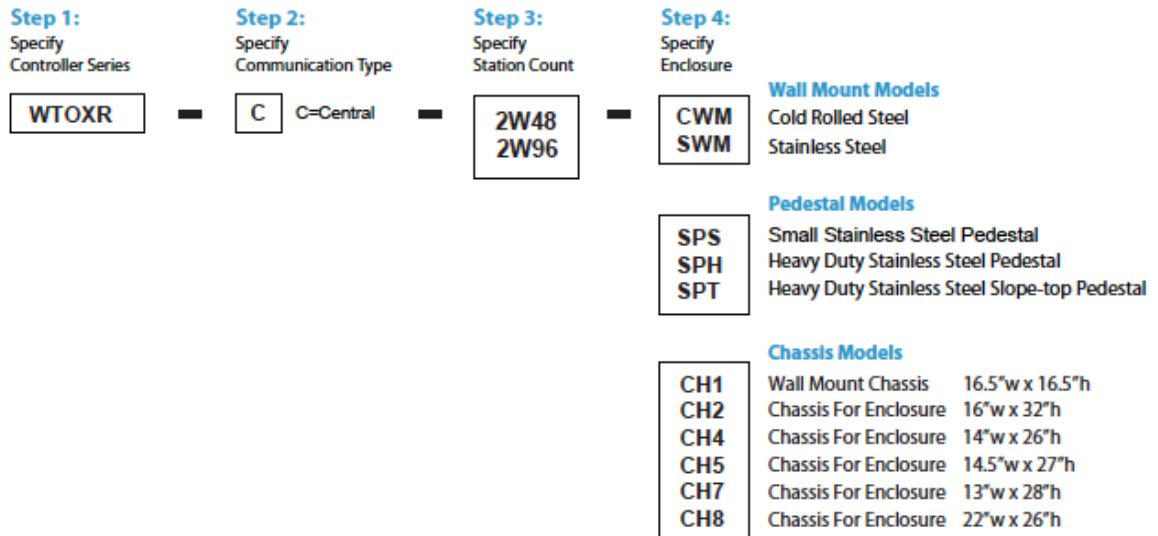
- DC latching solenoids
- Toro Spike-Guard™ solenoids
- Netafim Aquative Plus® solenoids

Rain Bird DV Series valve solenoids are **NOT** recommended for use with the WeatherTRAK 2-Wire system due to their high current draw.

Available Configurations

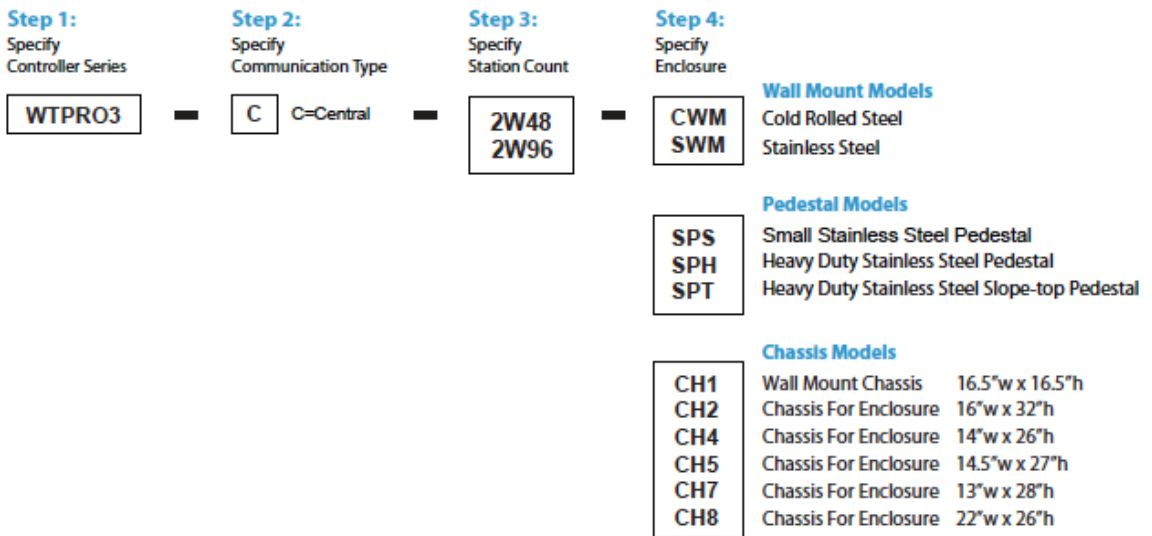
WeatherTRAK OptiFlow XR 2-Wire

WeatherTRAK OptiFlow XR 2-Wire



WeatherTRAK ET Pro3 2-Wire

WeatherTRAK ET Pro3 2-Wire



WeatherTRAK 2-Wire System Component Specifications

WeatherTRAK 2-Wire Controller Specifications

Operational Features

- Scales from 1 to 96 stations
- Single station decoders for easy installation and troubleshooting - splice kits included
- Non-volatile memory stores settings without battery
- Automated valve and decoder fault detection and diagnostics with built-in amp meter
- Built-in decoder programmer or hand-held programmer, WT2W-HHP
- Supports up to two 2-wire paths with independent line isolation and diagnostics
- Up to 12 simultaneous valves

Programmable Features

- Eight programs with five program modes, two start times
- Proven WeatherTRAK Scheduling Engine optimizes by plant, soil, sprinkler, and slope data
- Automated daily runtime adjustments using site specific ET Everywhere™ weather
- Percentage adjust – fine tune by station
- Automated skip days based on zone specific soil moisture depletion
- Sports turf and high desert specific scheduling
- User-defined water days and water windows per program to comply with agency regulations
- Runtime rationing protects plant health under constricted water windows
- Multi-station manual watering from 1-99 minutes
- Independent station programming (72 cycles/station) with automated cycle and soak

Supported Devices

- Four master valves and flow sensors supported (a total of 4 direct or decoder based master valves and flow sensors in any combination)
- Compatible with WeatherTRAK Flow3, FlowHD as well as Badger, CST and Netafim RS flow sensors
- Dedicated pump start

Central Control Features

- Cellular radio and first year WeatherTRAK Central service included
- Built-in remote with free WeatherTRAK Mobile app or Pro-Max™-UA, TRC™ Commander 32 interface
- Remote web-based programming at WeatherTRAK.net
- Remote operation via WeatherTRAK Mobile

Wiring Requirements

- 3M DBR/Y splice kits required for all electrical wiring connections to the 2-wire path
- WeatherTRAK Wire (Paige Electric P7389D) required for all 2-wire path applications

Surge Protection and Grounding

- Line surge protection every 500 feet or 5 decoders to protect line against voltage transients and at end of each 2-wire branch
- Grounded with resistance of 2-wire to ground of 50 Ω maximum and 10 Ω maximum at the controller

Enclosures and Chassis

- Wall mount enclosure option in both stainless steel or powder-coated steel, with option to mount on small pedestal
- Three stainless steel enclosure options
- Five chassis options to quickly retrofit existing high value pedestals

Warranty

- Five-year warranty for WeatherTRAK ET Pro3
- Ten-year warranty for WeatherTRAK OptiFlow XR

Controller Electrical Specifications

- Input Power 120 VAC +/- 10%, (60 Hz) or 220 VAC +/- 10%, (60 Hz)
- Idle State Power 3.0 Watts Maximum
- Output Power Station: 24VAC Valves up to 1000 mA including a pump start
- Master Valve: 24VAC Valves up to 1000 mA
- Flow Sensor: Loop Current 6.5 mA, 0-400Hz
- Total Load: 3.0 Amps (80 VA)

- Certifications FCC Certified, UL Listed on all full enclosures models and UL Registered on all chassis models

WeatherTRAK Flow Specifications

See specific WeatherTRAK controller specification for more details.

- Mainline / catastrophic break detection and shutdown
- WeatherTRAK True Leak Detection™ and leak management
- Real-time station specific flow monitoring and control
- Remote station learned flow
- Fault detection, diagnostics and alerts
- Supports multiple flow sensor brands and custom K and offset
- Normally open or normally closed master valve

WeatherTRAK Central Specifications

- Multi-user access via secure login with access levels
- Station Group Management: multi-controller station changes
- Manual watering via web or mobile app
- Smart alert and email notification
- Alerts dashboard and detail with drill-down interface
- Customized naming: controller, program, and station
- Customizable controller and site-based reporting
- Analytics-based one-click reporting (export to Excel or PDF)
- Customizable dynamic filtering and search
- Setting change tracking history: station and program specific
- Actual and estimated usage by site, controller, and station
- WeatherTRAK Site Asset Manager: interactive Google™ Maps site landscape asset inventory reporting
- WeatherTRAK Budget Manager: performance tracking and analysis of water consumption to budget
- Access to manual operation, station % adjust, controller mode, and rain pause via WeatherTRAK Mobile

WeatherTRAK 2-Wire Components Specifications

Station Decoder (WT2W-SVD-11)

The station decoder connects to each control valve solenoid. This kit also includes four (4) 3M DBR/Y splice kits. This decoder can also be used for the master valve.

Solenoid requirements

Requires typical solenoid with approx. 400mA inrush current and approximately 200mA holding current.

Flow Decoder (WT2W-FD)

The flow decoder connects to compatible reed switch or photo diode based flow sensors. This kit also includes four (4) 3M DBR/Y splice kits.

Compatible Flow Sensor: WeatherTRAK Flow3, FlowHD, Badger 228PV series, Creative Sensor Technologies and Netafim hydrometer using reed switch or photo diode registers.

Line Surge Protection (WT2W-LSP)

The 2-wire path must be properly surge protected and grounded. Failure to properly ground and surge protect the controller and 2-wire path can result in failure of your controller and 2-wire system and voiding the warranty. See the section on grounding for specific installation recommendation using the line surge protector.

Wiring

Wire Specifications

Use the following recommended wire.

Wire Size: 14 or 16 AWG

Construction: Special irrigation control wire

Conductor: 2 same gauge solid core conductors conforming to ASTM B-33, B-3, or B-8

Insulation: Polyvinyl Chloride (PVC) conforming to UL-493 or UL-719 for thermoplastic-insulated style UF (underground feeder)

Outer Jacket: Low density, high molecular weight polyethylene (PE) with a thickness of 0.045"

Temperature: 60°C (140°F)

Voltage: 600 volts RMS max

Example of approved wire:

Coleman Cable #51452

Paige P7072D, P7296D, P7350D, and P7354D

Regency 14/2 and 12/2 Maxi Cable, Toro Decoder Cable, and Hunter Decoder Jacketed Service Wire DEC12/2BE and DEC14/2BE

Wire Splices

Use only 3M DBR/Y-6 splice kits for all electrical wiring connections to the 2-wire path. Improper wiring on the 2-wire path can cause serious damage to your controller or 2-wire irrigation system.

Grounding

The WeatherTRAK 2-Wire controller and 2-wire path must be properly surge protected and grounded. Failure to properly ground and surge protect the controller and 2-wire path can result in failure of your controller and 2-wire system and voiding the warranty.

To comply with proper installation specifications, the following components should be grounded:

Product	Maximum ground resistance [Ohms]
WeatherTRAK 2-Wire Controller	10
WT2W-LSP Line Surge Protector	50
WT2W-FD Flow Decoder	50

Each installed grounding system shall maintain a maximum ground resistance defined above.

The user should use a UL Listed copper clad 5/8" x96" ground rod to achieve the maximum ground resistance requirement.

Grounding the WeatherTRAK 2-Wire Controller

The WeatherTRAK 2-Wire controller should be protected through an optional AC Surge protector on the primary incoming power to the controller.

The WeatherTRAK 2-Wire controller provides a ground lug on the bottom front of the terminal board that accepts a #6 AWG bare copper wire that should be connected to a grounding system.

Using the WT2W-LSP Line Surge Protector

The WeatherTRAK WT2W-LSP line surge protector provides surge protection from the field for the WeatherTRAK ET Pro3 controller and 2-wire path. The WT2W-LSP should be installed in each of the following scenarios:

- **Near the WeatherTRAK 2-Wire products controller**

The WT2W-LSP should be spliced into each 2-wire path immediately after the controller in the closest location that the WT2W-LSP can be properly grounded; this provides surge protection for the WeatherTRAK 2-wire products controller.

- **Along the 2-wire path**

The WT2W-LSP should be spliced into the 2-wire path every 500 feet or every 5 decoders, whichever is smaller, and at the end of any 2-wire path branch longer than 25 feet.

- **At the end of the 2-wire path**

The WT2W-LSP should be installed at the end of each 2-wire path branch 25 feet or longer when using a star configuration.

Using the WT2W-FD Flow Decoder

The WeatherTRAK WT2W-FD has built-in line surge protection and should be grounded for each flow decoder installed on the 2-wire path.



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