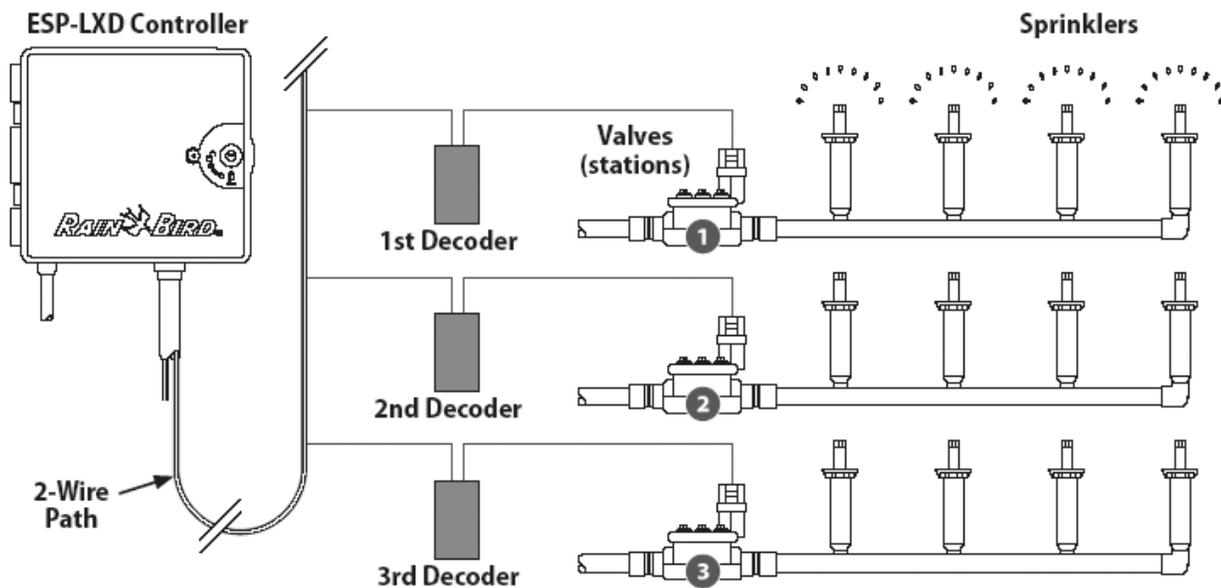


## 2-Wire Decoder System Overview

A Rain Bird ESP-LXD 2-Wire Decoder Control System provides modular control of small to large irrigation systems. Unlike traditionally-wired controllers that power the valve solenoids directly through individual valve wires, a 2-wire decoder controller uses a 2-wire cable to interconnect decoders that control the valve solenoids.

An ESP-LXD controller is programmed similar to a traditional-wired controller. The difference is factory assigned decoder addresses are assigned to stations, master valves, and sensors. As irrigation programs execute, the controller sends commands via the 2-wire path cable to the decoders located at each valve and sensor. The decoders directly activate the solenoids on the valves and monitor the sensors.



**Typical 2-Wire Decoder to Valve Connections**

## ESP-LXD 2-Wire Decoder Controller

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The ESP-LXD has a standard capacity of 50 stations and is expandable to 125 or 200 stations increments using the ESPLXD-SM75 75-station modules.

### ESPLXD-M50 2-Wire Decoder Module

Included with every ESP-LXD is the ESPLXD-M50 2-Wire Decoder and Flow Smart Module, a “double-wide” module which snaps onto two adjacent mounts on the controller backplane. The ESPLXD-M50 Module includes the lugs for attachment of the two-wire path cables.

- FloWatch™ logs flow and quickly identifies and isolates high or low flow situations, such as mainline breaks. Manages up to five (5) Points of Connection each through separate or combined Master Valves and FloZones – See Appendix for various configurations.
- FloManager™ Manages flow demand and ensures you don't overtax your water supply. Finds combinations of stations to operate simultaneously to use all available capacity from the water supply.

### ESPLXD-SM75 75-Station Expansion Module

Adds an additional 75 stations in the ESP-LXD and snaps onto the controller backplane. One ESPLXD-SM75 module increases the station capacity to 125 stations and two increases the station capacity to 200 stations.

## Optional Cartridges

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### PBC-LXD Programming Backup Cartridge

Backup and restore programming for up to eight ESP-LXD Decoder Controllers.

- Option: Attach a barcode scanning pen (sold separately) and scan the peel-off barcode labels from the Programming Chart included with the controller. Your decoder addresses are entered for you automatically saving you time. MS100-2 Barcode Scanning Pen - Unitech [www.ute.com](http://www.ute.com)

Communication Cartridges for IQ™ Remote Water Management

Through the incorporation of an IQ-NCC Communication Cartridge, the ESP-LXD controller can be controlled from the Rain Bird IQ Platform.

IQ-NCC communication options:

- GP** GPRS/Cellular
- EN** Ethernet
- WF** Wi-Fi
- RS** RS-232 (RS-232 used for Radio or Direct Connect)

## Flow & Weather Sensors

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### Flow Sensors

Up to five (5) flow sensors can be installed on the 2-Wire path. SD-210 Sensor Decoder are required for each sensor. Rain Bird FS-Series Flow Sensors are available in ½" to 4" PVC Tee, 1" to 2" Brass Tee, and Brass and Stainless Steel Insert Style models.

### Rain Bird FS-Series Flow Sensors

#### FS050P

- ½" Slip x Slip, PVC Tee Flow Sensor

#### FS075P

- ¾" Slip x Slip, PVC Tee Flow Sensor

#### FS100P

- 1" Slip x Slip, PVC Tee Flow Sensor

#### FS150P

- 1-½" Slip x Slip, PVC Tee Flow Sensor

#### FS200P

- 2" Slip x Slip, PVC Tee Flow Sensor

#### FS300P

- 3" Slip x Slip, PVC Tee Flow Sensor

#### FS400P

- 4" Slip x Slip, PVC Tee Flow Sensor

#### FS100B

- 1" Threaded, Brass Tee Flow Sensor

#### FS150B

- 1-½" Threaded, Brass Tee Flow Sensor

#### FS200B

- 2" Threaded, Brass Tee Flow Sensor

#### FS350B

- Brass Insert (for Pipe Saddle) Flow Sensor for 3" to 12" Pipe Diameters
- Pipe Inside Diameter entry required

#### FS350SS

- Stainless Steel Insert (for Pipe Saddle) Flow Sensor for 3" to 12" Pipe Diameters
- Pipe Inside Diameter entry required

#### Custom

- 3rd-party flow sensor or meter
- K-Factor and Offset entry required (supplied by 3rd-party manufacturer)
- Reed-Switch 2-wire output only with minimum 2 pulses per 10 seconds for the lowest station flow rate

## Rain Bird Weather Sensors

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The ESP-LXD can have one locally wired (to the decoder module) sensor and up to 3 sensors installed on the 2-wire path. A SD-210 Sensor Decoder is required for each 2-wire path weather sensor.

### Notes:

- 1. Operates only with switch-type normally closed sensors.**
- 2. Not compatible with tipping rain-can sensors.**
- 3. Compatible with Rain Bird Anemometer Wind Speed Sensor when used with a Rain Bird PT-3002 Pulse Transmitter.**

### RSDBEX

- Wired Rain Shutoff Sensor, Bracket Mount
- Configure as Rain Sensor

### RSDCEX

- Wired Rain Shutoff Sensor, Conduit Mount
- Configure as Rain Sensor

### WR2RFC

- Wireless Rain/Freeze Shutoff Sensor
- Configure as Rain/Freeze Sensor

### ANEMOMETER

- Wind Speed Sensor (WSS)
- Requires Rain Bird PT3002 Pulse Monitor
- Configure as Wind Sensor

### WS1

- Soil Moisture Sensor (SMS)
- Irrrometer Water Switch - [www.irrometer.com](http://www.irrometer.com)
- Configure as Soil Moisture Sensor

### Custom Prevent

- Normally-closed sensor that prevents station operation when sensor circuit opens

### Custom Pause

- Normally-closed sensor that pauses station operation when sensor circuit opens

## Controller Enclosures

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The ESP-LXD Series 2-Wire Decoder Controller standard enclosure is a NEMA 3R rated, plastic, locking, wall-mount enclosure. Optional painted metal and Stainless Steel enclosures include:

### LXMM

- Painted metal, locking, wall-mount enclosure, NEMA 3R

### LXMM-PED

- Painted metal, locking pedestal for LXMM enclosure, NEMA 3R

### LXMM-SS

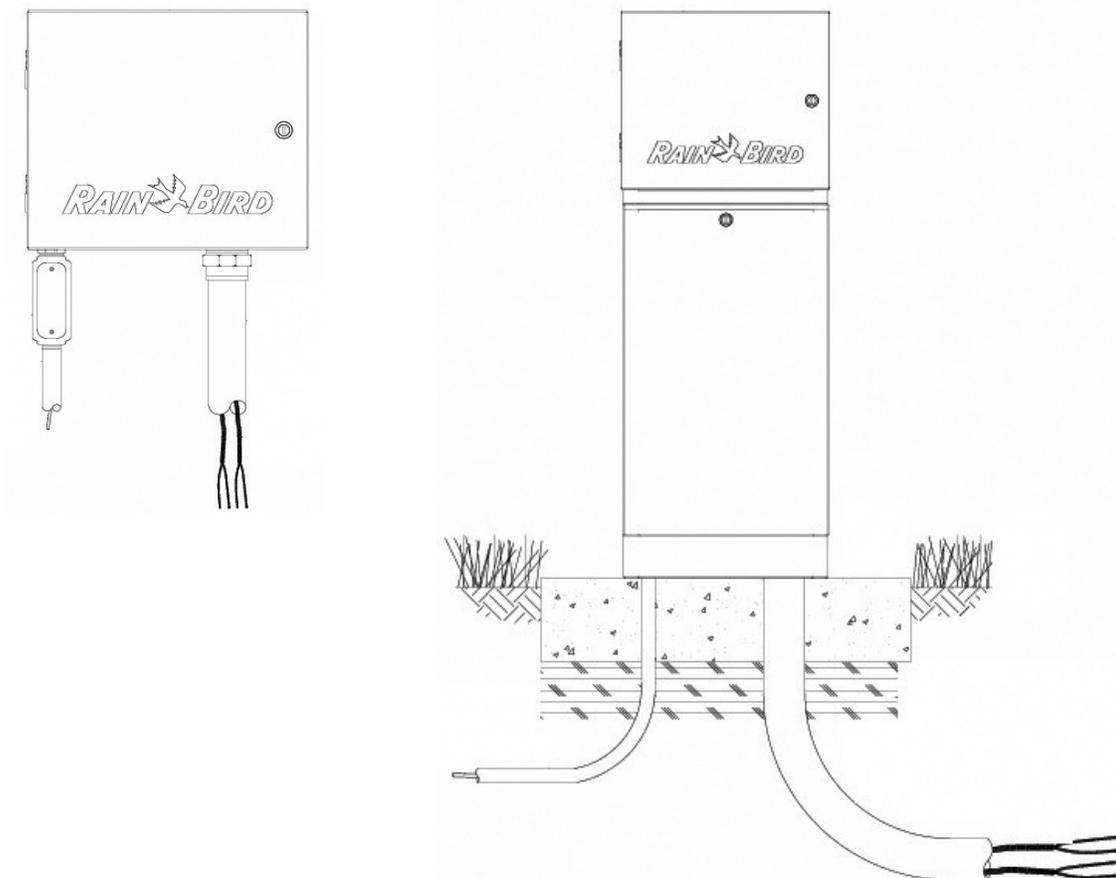
- Stainless Steel, locking, wall-mount enclosure, NEMA 3R

### LXMM-PEDSS

- Stainless Steel, locking pedestal for LXMM-SS enclosure, NEMA 3R

### Metal Cabinet & Pedestal

The ESP-LXD controller standard plastic case field installs into the LXMM or LXMM-SS enclosure for wall-mount applications. Add the LXMM-PED or LXMM-PEDSS pedestal for free-standing controller applications.



# FD-Series Decoders

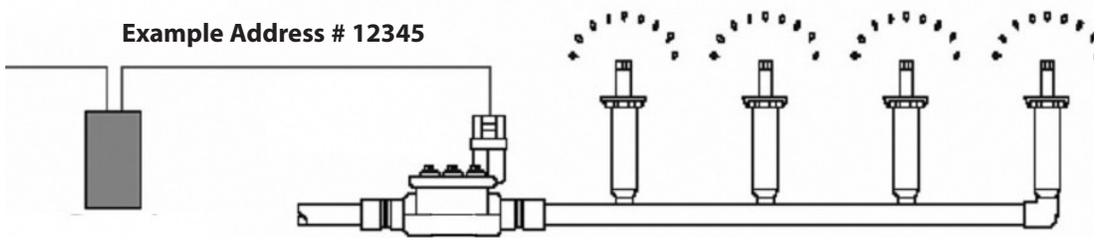
## Field Decoders - FD-TURF Series (Grey) & FD-Series (Black)

Field Decoders are used to control station and master valves. The decoder model number first digit represents the number of decoder addresses (stations or master valves) and the last digit the quantity of solenoids that can be activated per address. Each decoder is factory programmed with a unique three, four or five digit address that is utilized to associate with a station or master valve. There are five types of field decoders:

Rain Bird Field Decoder Models			
Decoder Model	Number of Addresses Per Decoder	Maximum Number Of Solenoids Per Address	Maximum Addresses Operating At Once
FD-101	1	1	1
FD-102	1	2	1
FD-202	2	2	2
FD-401	4	1	4
FD-601	6	1	6

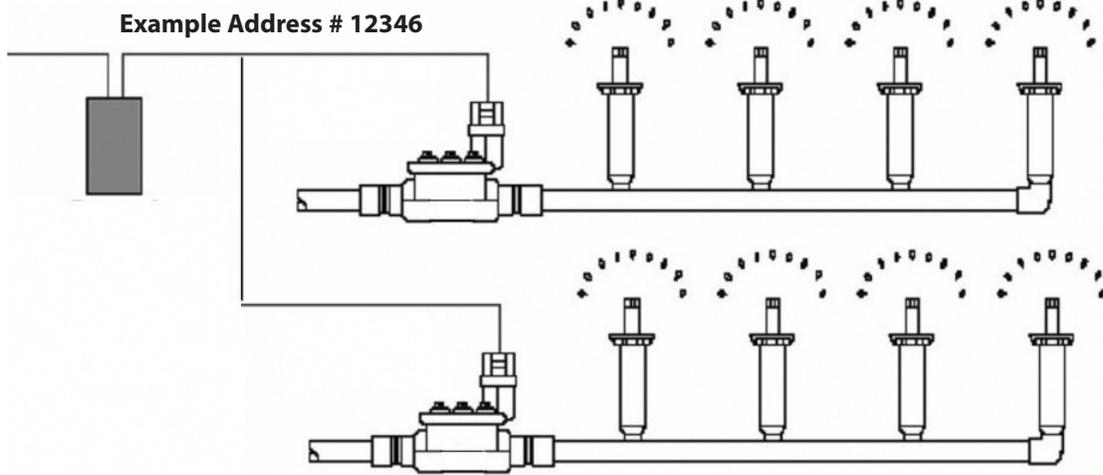
**Note:** When activating valves and pump start relays that are not manufactured by Rain Bird, there may be exceptions to the maximum number of solenoids per address that can be energized. Contact Rain Bird for more details.

## FD-101 One address – controlling one valve



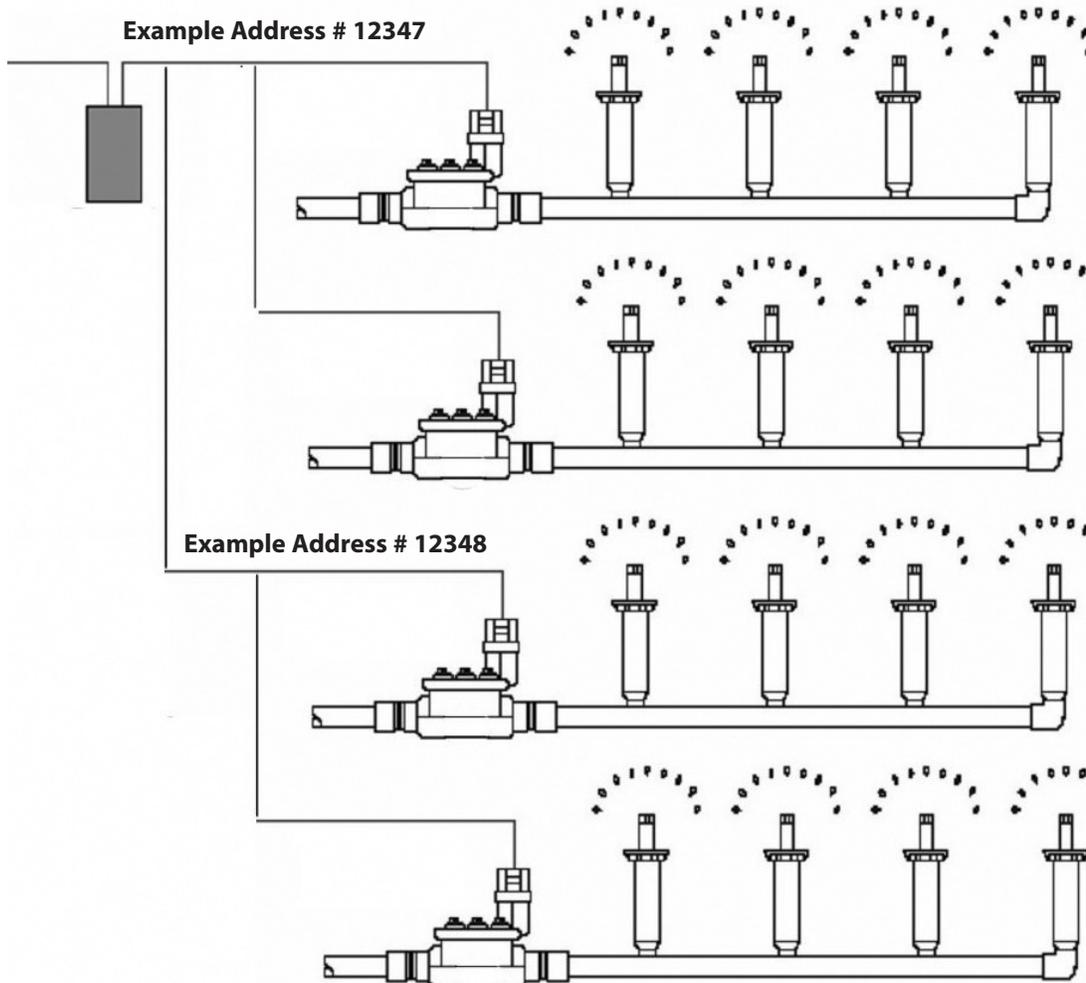
## FD-102 One address – controlling two valves simultaneously

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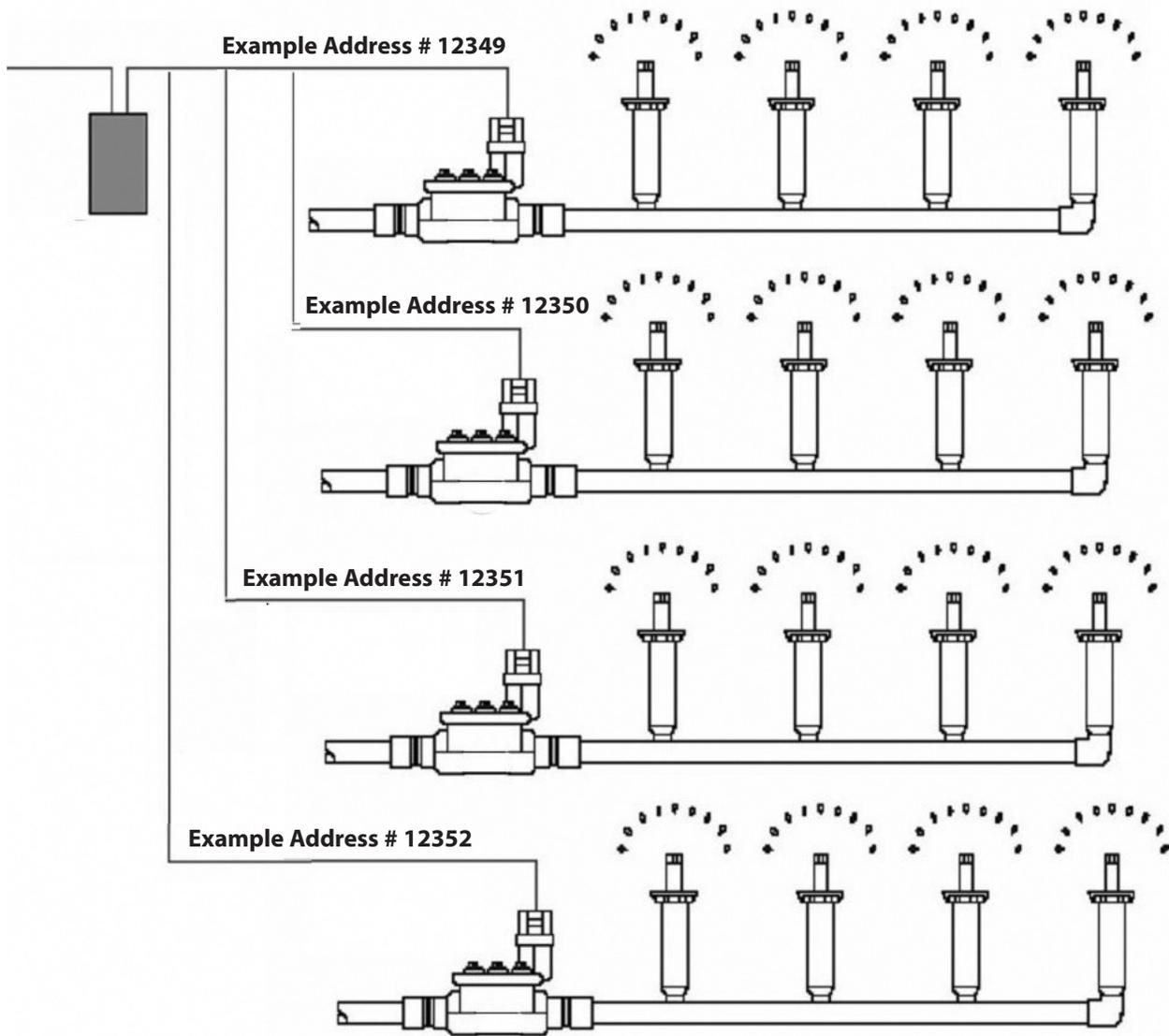
## FD-202 Two addresses – each controlling two valves simultaneously

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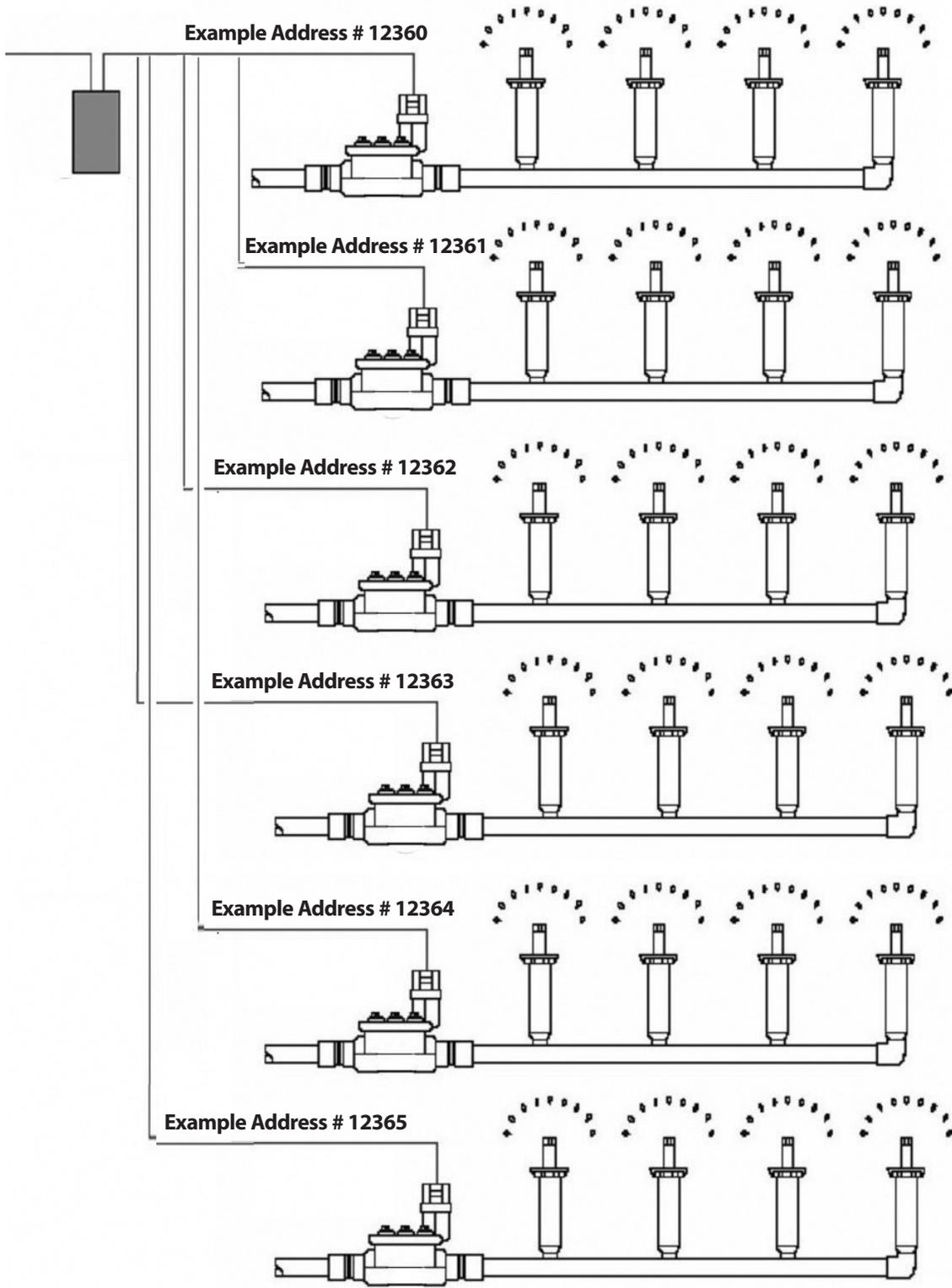
# FD-401 Four addresses – each controlling one valve

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# FD-601 – Six addresses – each controlling one valve

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## Field Decoders – FD-TURF-Series (Grey) or FD-Series (Black)

The Rain Bird ESP-LXD 2-Wire Decoder Controller is compatible with two types of FD Series Field Decoders.

- FD-TURF Series (Grey) Field Decoders are sold in the U.S. and Canada.
- FD Series (Black) Field Decoders are sold in the rest of the world.

The ESP-LXD controller automatically configures itself, by measuring the incoming voltage frequency, to operate with the correct type of decoder.

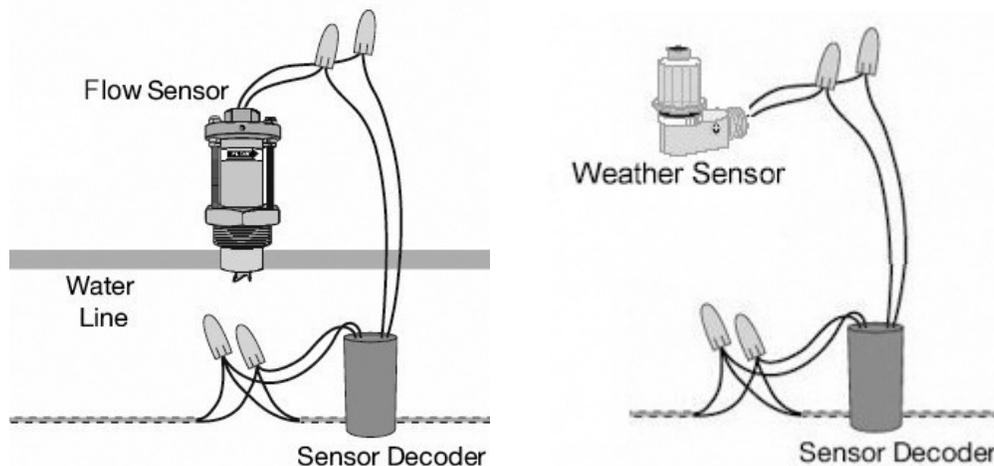
**Note: FD-TURF Series (Grey) and FD-Series (Black) Field Decoders cannot be used on the same system.**

### Examples:

1. The ESP-LXD 2-Wire Decoder Controller has been installed at a site in the U.S. where the incoming power is 120 VAC @ 60 Hz. When the controller is powered, it will automatically be configured to operate FD-TURF (Grey) Field Decoders.
2. The ESP-LXD 2-Wire Decoder Controller has been installed at a site in Europe where the incoming power is 230 VAC @ 50 Hz. When the controller is powered, it will automatically be configured to operate FD-Series (Black) Field Decoders.

## Sensor Decoder – SD-210 (Green)

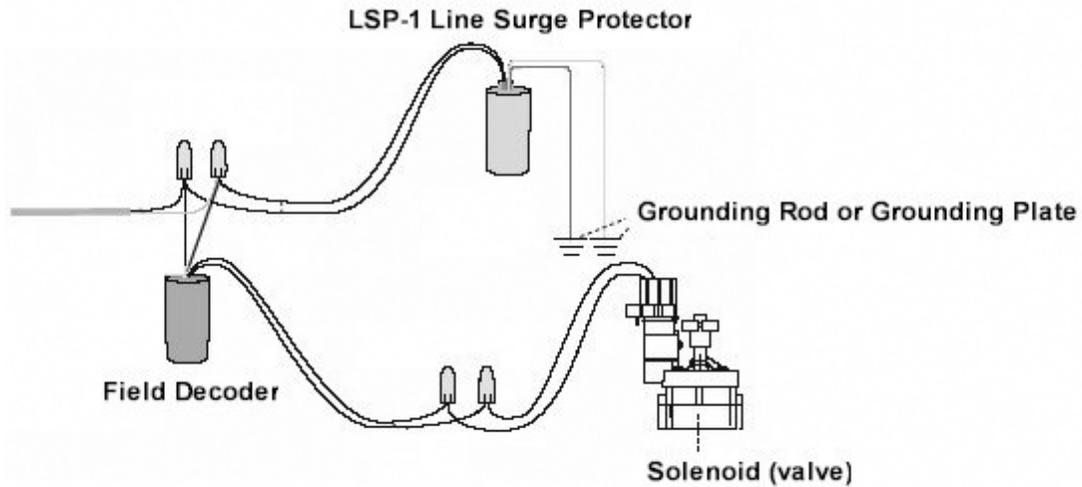
The Rain Bird ESP-LXD 2-Wire Decoder Controller integrates the use of select flow and weather sensors. The SD-210 Sensor Decoder is pre-programmed with a unique five digit address that is utilized to associate with a flow or weather sensor input.



**Note: SD-210TURF Sensor Decoders are required for use in U.S. and Canada (60 Hz power). SD210 Sensor Decoders are required for use in the rest of the world (50 Hz power).**

### Lightning Surge Protector – LSP-1 (Yellow)

The ESP-LXD controller and the 2-wire path must be properly surge protected and grounded. Doing so can help prevent damage to the controller and irrigation system and also significantly reduce troubleshooting, repair time and expense. Failure to do so could result in failure of your controller and voiding the warranty.



Refer to page 24 of the ESP-LXD 2-Wire Decoder Control System Installation & Troubleshooting Guide for recommended location and quantity of LSP-1 Lightning Surge Protectors.