SMART IRRIGATION
GROUNDS NEWS
March/April 2019

ESP-LXD 2-Wire Controller Series: Flow and Station Management

The ESP-LXD 2-Wire Decoder Controller can help you monitor the total flow rate of your irrigation system and the flow rate of individual stations. Monitoring the flow rate can help you identify problems faster and the ESP-LXD can be configured can to shut down a zone if unexpected high flow rates are detected. The flow information can also be used to optimize the irrigation schedule to meet short watering windows.

The ESP-LXD can manage up to five water points of connection, five master valves, and five FloZones through a variety of hydraulic configurations using the following:

- Master Valve – A valve or pump start relay that controls (on/off) a point of connection where the irrigation system connects to the water supply.
- Flow Sensor – Used to monitor the irrigation system's real-time flow rate. The current system flow rate is displayed at the controller and a total flow is displayed in the flow log. The flow rate is used to detect high- or low-flow conditions, diagnose the condition, shut down the valve or water source, and issue alarms.
- FloZone – A group of stations that receive water from one or more points of connection. Each water source would have its own Master Valve and Flow Sensor. If a mainline receives water from two or more points of connection the controller combines the input from all associated flow sensors to determine the FloZone real-time flow rate.

There are two primary Flow Management features:

- FloManager – Manages the total system flow rate by dynamically selecting one or more stations that operate simultaneously to use the full capacity of the water source. Operating the irrigation system at peak flow capacity shortens the overall time it takes to irrigate the site and reduces pumping power costs.
- FloWatch – Monitors and logs the real-time system rate with a flow sensor. The Learn Flow Utility records the nominal flow rate of each station. If a high- or low-flow condition is detected, the controller will follow user configured steps to diagnose and shutdown the problem valve or water source.

SimulStations™

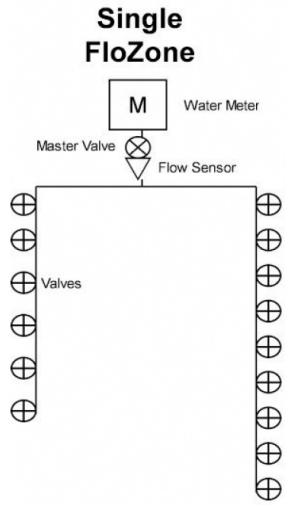
The ESP-LXD can operate multiple programs and stations concurrently. The controller ensures enough power is available to operate a maximum of eight valve solenoids simultaneously.

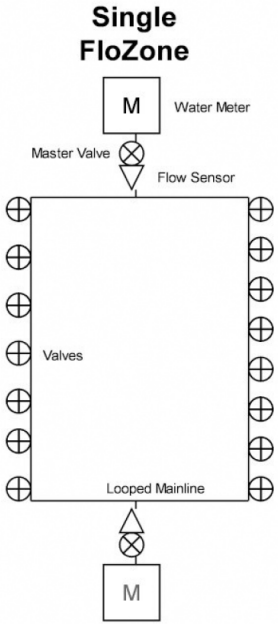
- One to eight SimulStations are available per program.
- One to four SimulStations are available for non-irrigation stations per program.

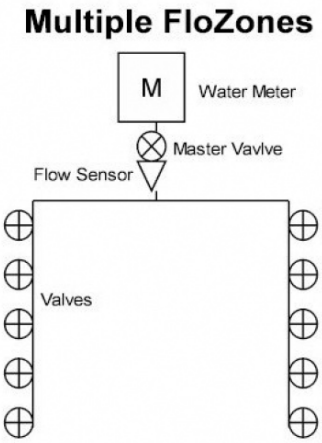
When SimulStations are set to a maximum of 8, if a normally closed master valve must be held open for irrigation to occur, it will reduce the maximum number of SimulStations to 7.

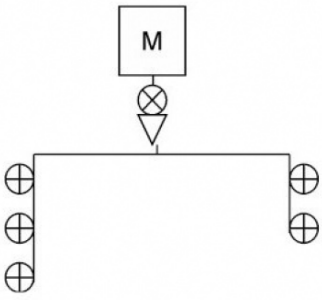
FloZones

The following example represent the capabilities of the ESP-LXD controller to manage the FloZones of the irrigation system:









Flow Sensor Sizing

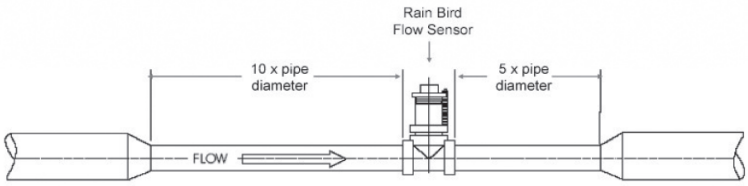
- FS050P, FS075P, & FS100P flow sensors have an operating range 2 to 20 ft/sec (water velocity in pipe).
- FS150P, FS200P, FS300P, FS400P, FS100B, FS150B, FS200B, FS350B & FS350SS flow sensors have an operating range 1/2 to 30 ft/sec (water velocity in pipe).
- Select a flow sensor size based on the smallest station flow rate and the largest system flow rate.
- If a single flow sensor is outside the operating range of a single sensor a dual bypass flow sensor system is recommended.

Model	Suggested Operating Range (Gallons / Minute)	Suggested Operating Range (Liters / Minute)	Suggested Operating Range (Cubic Meters / Hour)
FS050P	1.9 - 18.9	7.2 - 71.7	0.43 - 4.3
FS075P	3.3 - 33.2	12.6 - 125.8	0.75 - 7.5
FS100P	5.4 - 53.9	20.4 - 204	1.2 - 12.2
FS150P	5 - 100	18 - 378	1.1 - 22.7
FS200P	10 - 200	36 - 756	2.3 - 45.4
FS300P	20 - 300	78 - 1134	4.5 - 68.1
FS400P	40 - 500	150 - 1890	9.1 - 113.6
FS100B	2 - 40	6 - 150	0.5 - 9
FS150B	2 - 82.6	6.3 - 313	0.4 - 18.7
FS200B	4.9 - 294	18.5 - 1112	1.1 - 66.7
FS350B	12 - 45000*	48 - 168000*	2.7 - 10200*
FS350SS	12 - 45000*	48 - 168000*	2.7 - 10200*

** Depends on pipe size and material*

Flow Sensor Installation

The flow sensor is to be placed in straight run (sensor



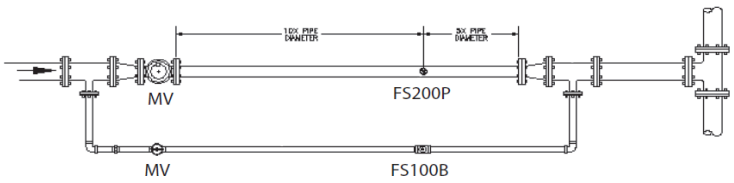
- A sensor run of no less than 10 times the pipe diameter on the sensor inlet is required.
- A sensor run of no less than 5 times the pipe diameter on the sensor outlet is required.

- The associated master valve would typically be installed on the upstream side before the sensor run.

Low Flow Bypass Design

A low flow bypass design is where two flow sensors are utilized to accurately measure both low and high flow rates on a single water source.

- The larger master valve's pressure regulator is set three to five lbs. lower than the pressure regulator on the smaller master valve.
- Low flows will automatically flow through the small master valve and flow sensor until the flow rate increases to the point where the three to five PSI differential is overcome, and flow will automatically flow through both master valves and flow sensors.
- Configure both master valves and flow sensors on the same FloZone.



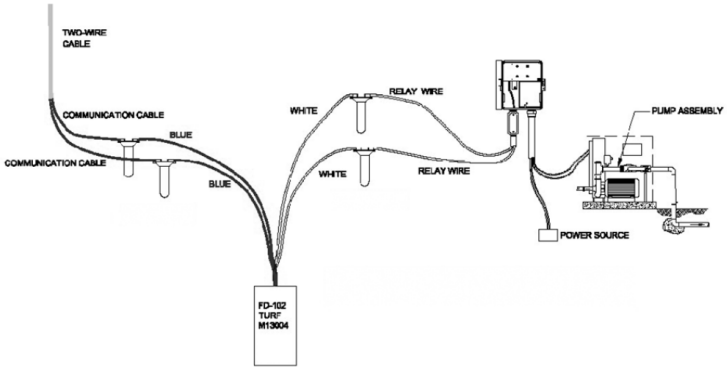
Master Valves

The ESP-LXD can support up to five master valves via FD Series Decoders configured as a master valve. Each is programmable by station. Both normally-closed and normally-open master valves are supported.

- Normally-closed master valve (default) – The valve is powered to open and opens each time a station operates.
- Normally-open master valve – A specialty valve that is powered to close and will only close when a flow problem is detected by the controller. Normally-open master valves are popular for systems with quick coupling valves making water available for manual watering at any time.

PSR-Series Pump Start Relays

Rain Bird PSR Series Pump Start Relays can be used with FD series decoders configured as a Master valve to start a pump. See installation detail below for connecting the ESP-LXD to the pump start on the pump station panel.



Consult the ESP-LXD 2-Wire Decoder Control System Installation & Troubleshooting Guide for more installation and trouble-shooting tips. Download here.