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RAIN BIRD ESPLXD 2 Wire Decoder Controller Installation Guide

**Flow Sensor
Installation Guide**

Contents

ESPLANADE 2 Wire Decoder Controller

The purpose of this document is to present a Complete Flow Sensor Installation guide on the ESPLANADE 2 Wire Decoder Controller.

The Flow Sensor Installation Key points we will cover.

1. The Flow Sensor Selection. Installation and wiring.
2. The Flow Sensor Programming. Assign to SD211 Decoder Address, assign Sensor Type, Assign to Flow Zone, and make sure correct MV selected.
3. Set the Flow Rates, The Learned Flow, Set station rates (Manually entered) by customer. (This is not recommended) explain why.
4. Set the SEEF and SELF Settings (explain the Alarms and Actions).
5. Turn Flow Watch on.
6. Explain what Flow Manager does to the schedule.
7. Explain what the Manual MV Water Window does and how it can affect the Flow Watch if it is not programmed correct. Especially when the mainline will be used with a QCV that will exceed the POC rate by 130%, FEES Alarm will activate.
8. Setting the MV Water Window
9. Manually Opening a MV Water Window

The Flow Sensor Selection, Installation and Wiring. Decoder Needed SD211.

Rain Bird offers a variety flow Sensor models based on Hydraulic needs.

Flow Sensor Models			
Part Number	**Model Number**	**Description**	**Dimensions**
Brass Tee's			
M80111	FS200B	2″ (50mm) Brass Tee Flow Sensor	425″ x 835″ x 2.94″ (108mm x 212mm x 75mm)
M80110	F515,013	1 1/2″ (40mm) Brass Tee Flow Sensor	65″x 5.19″ x 2S" (165mm x 132mm x 64mm)
M80101	FS 100E	1″ (25mm) Brass Tee Flow Sensor	5.45″ x4.94″ x 221″ (138mm x 126mm x 56mm)
Plastic Tee's			
M80107	FS400P	4″ (110mm) PVC Tee Flow Sensor	7.38″ x 7.83° x 538″ (187mm x 199mm x 137mm)
M80104	F5300P	3″ (75mm) PVC Tee Flow Sensor	6.50″ x 6.83° x 4.23″ (165mm x 173mm x 107mm)
M80103	F5200P	2″ (50mm) PVC Tee Flow Sensor	5.63″ x 5.64″ x 2.88″ (143mm x 143mm x 73mm)
M80102	F5150P	11/2″ (40mm) PVC Tee Flow Sensor	5.0″ x 5.16″ x 238″ (127mm x 131mm x 60rnm)
M80108	FS100P	1″ (25mm) PVC Tee Flow Sensor	3.50″ x 3.94″ x 1315″ (89mm x 100mm x 33mm)
M80109	F5075P	3.4 is (20mm) PVC Tee Flow Sensor — _	3.31″ x 3.85″ x 1.05″ (84mm x 98mm x 27mml
M80119	FS050P	172″ (12mm) PVC Tee Flow Sensor	106″ x 3.85′ x 0.84″ (78mm x 98mm x 21 mm)
Inserts			
M80106	FS350SS	Stainless Steel Insert	7.13′ x 3″(diameter) (181mm x 76mm (diameter))
M80105	F53,508	Brass Insert	7.13″ x 3″(diameter) (181mm x 76mm (diameter))

After the Flow Sensor is selected based on Hydraulic Needs. We will use the installation Guide. This guide is to help you install the Flow Sensor after the Master Valve with the proper Clearance on the Main Line.

Upstream
10Xs
10 veces
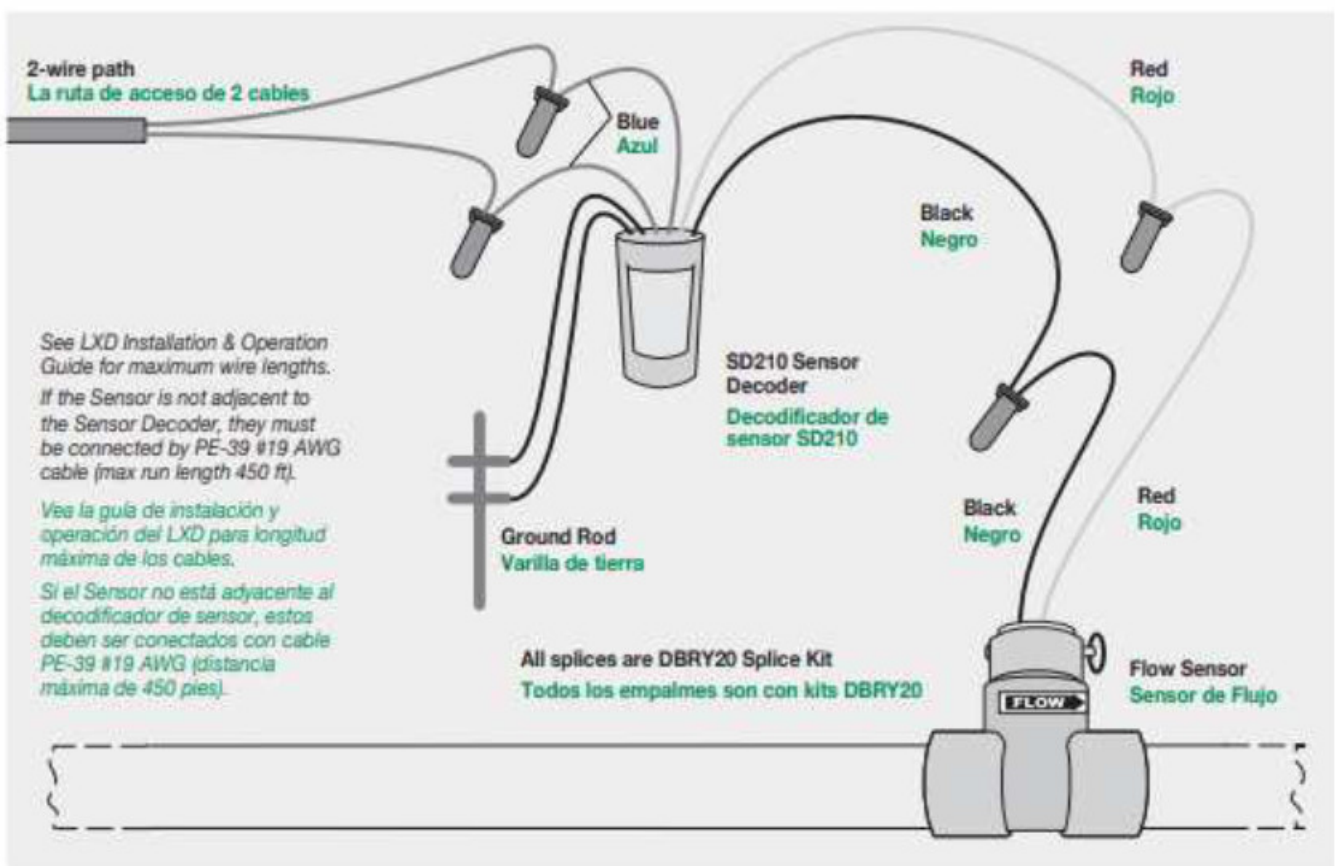aguas arriba

Downstream
5Xs
5 veces
aguas abajo
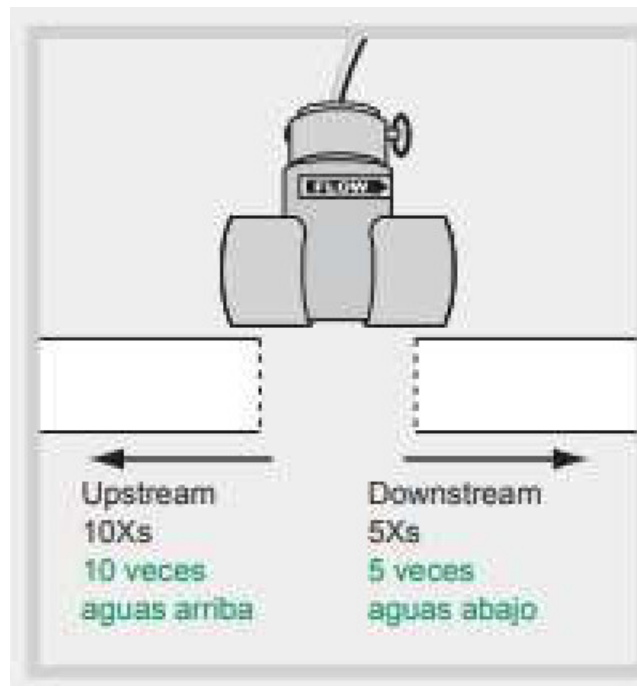
Note: The sensor can be installed in a horizontal or vertical pipe. Provide a clear, unobstructed distance of at least 10Xs the pipe's diameter upstream of the sensor and at least 5Xs the pipe's diameter downstream of the sensor.

Example: For a 2″ pipe, you will need at least 20″ of straight, unobstructed pipe upstream of the sensor and at least 10″ of straight, unobstructed pipe downstream from the sensor.

Then we will wire the SD211 Sensor to the Decoder:

Diagram B: ESP-LXD with Flow Sensor and Sensor Decoder.

2-wire path
La ruta de acceso de 2 cables

Blue
Azul

Red
Rojo

Black
Negro

SD210 Sensor Decoder
Decodificador de sensor SD210

See LXD Installation & Operation Guide for maximum wire lengths.

If the Sensor is not adjacent to the Sensor Decoder, they must be connected by PE-39 #19 AWG cable (max run length 450 ft).

Vea la guía de instalación y operación del LXD para longitud máxima de los cables.

Si el Sensor no está adyacente al decodificador de sensor, estos deben ser conectados con cable PE-39 #19 AWG (distancia máxima de 450 pies).

Ground Rod
Varilla de tierra

Black
Negro

Red
Rojo

All splices are DBRY20 Splice Kit
Todos los empalmes son con kits DBRY20

Flow Sensor
Sensor de Flujo

The Flow Sensor Programming. Assign to SD211 Decoder Address, Assign Sensor Type, Assign to Flow Zone, and make sure correct MV selected

To optimize the controller's flow features, it's important to first understand Flo Zones. A Flo Zone is a collection of one or more stations all using the same water source. In a simple irrigation system such as a private residence, water is often supplied from a single source (typically from the local municipality) and in that case all stations are part of a single Flo Zone. In a typical commercial installation, each Flo Zone will have its water source(s) controlled by individual Master Valve(s) (or Ms). For this reason, the number of Flo Zones is often the same as the number of Ms. The number of Flo Zones can never be greater than the number of water sources and if multiple water sources (and likely MVs) supply the same section, then the number of Flo Zones will be less than the number of MVs. It's important to fully understand your system's hydraulic properties to set up your water sources, MVs and Flo Zones appropriately.

It is important to know that if we have installed a flow sensor we are assigning it to the correct Flow Zone. A Flow Zone is a collection of one or more stations all using the same water source. In a typical Commercial installation, each Flow Zone will have its water source(s) controlled by individual Master Valve(s) or Pumps. The ESPLXD Controller can have up to 5 Flow Zones.

The ESPLANADE will use the SD211 Sensor Decoder; from the decoder we will gather the Decoder address to program on the controller. The decoder address will be 5 digits. Example: 56202

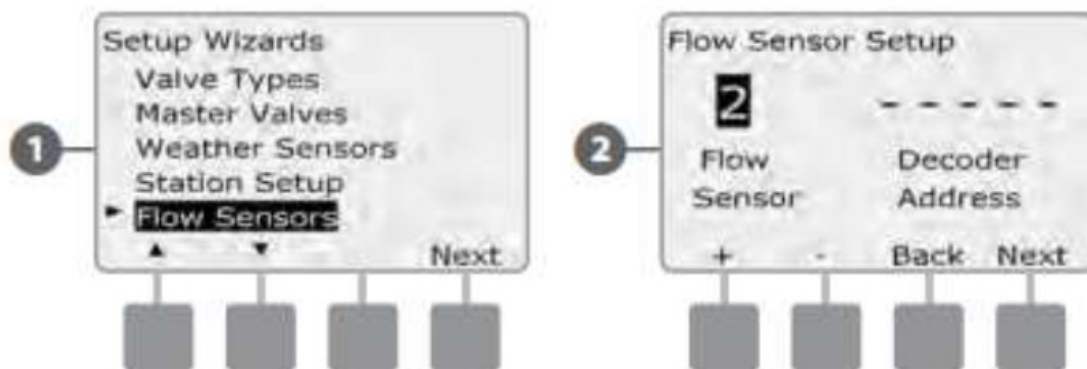We will then program it on the controller under Setup Wizards:

Set Up Custom Flow Sensor

▶ Turn the controller dial to Setup Wizards.

The Setup Wizards screen appears. Press the Down Arrow button to select Flow Sensors; then press next.

1. The Flow Sensor Setup screen appears. Press the + and – buttons to enter the desired Flow Sensor number; then press Next.

2. Press the + and – buttons to enter the decoder address; then press Next.
   NOTE: An alarm will show if a duplicate sensor decoder address is entered for more than one flow sensor. See (The ESPLXD Controller Installation, Programming & Operation Guide) Section A, Alarm Conditions for more details.
3. Select your Flow Sensor Type. By default it is Disabled;

4. Press the + and – buttons to select the Sensor Model. In our example we will select the FS150P; then press Next.

5. We will see the next screen confirming the Master Valve and the Flo Zone we assigned to the Flow Sensor; then press Next.

Setting the Flow Rates

Flo Watch unleashes the true power of the ESP-LED controller. Flo Watch compares current flow conditions to expected learned or user-entered flow rates and takes various actions based on your settings and input. Since current flow conditions are required, Flo Watch can only be used when flow
sensors are present. To use Flo Watch, you must do all of the following: A.
Install flow monitoring hardware into the appropriate locations of your irrigation system. You should install one flow sensor just downstream of each master valve but upstream of any valves. To ensure stable readings, flow sensors should be installed at least ten times the distance of the pipe diameter downstream of the Master Valve with an additional five pipe diameter distance between the flow sensor and any additional hardware. B. Connect each flow meter to an SD-211 sensor decoder using the instructions in the "Connecting Decoders" portion of the Installation section of this manual. C. Set up the flow sensors using the flow sensor setup wizard described in the Setup Wizards portion of the Basic Programming section of this manual. D. Follow the directions below to set up Flo Watch. b NOTE: Once you have set up flow on your controller, the
current flow rate will be displayed on the Auto screen unless you turn off Flo Watch..
The ESP-LED controller lets you set the flow rates you expect or to automatically Learn Flow rates based on real usage. Once flow is learned or manually entered, the FEES and SELF settings let you define the parameters for excessive or low flow and to set the behavior of the controller when these conditions are detected. You can also turn Flo Watch off or back on again if you like. Flo Watch needs expected flow rates to work properly. Flow rates can be entered manually or can be learned automatically through a Learn Flow process. An automatic Learn Flow operation will Learn Flow for each station that has programmed run times. Ensure you have set up runtime for all stations included in a Learn Flow exercise prior to setting up a Learn Flow. A Flo Zone is a group of stations downstream of a master valve and flow sensor. In a shared main line, rations may be downstream of more than one master valve and flow sensor. Since LXD supports up to 5 Master Valves, as many as 5 Flo Zones can be created. An irrigation system consisting of 5 MVs flowing into 5 individual main lines would result in 5 Flo Zones. An irrigation system consisting of 5 Master Valves flowing into one shared main line would result in 1 Flo Zone.
NOTE: Prior to learning or manually setting flow, it is a good idea to check the master valve assignments for each

of your stations. See the "station Setup" portion of the Setup Wizards portion of this manual in Basic Programming.

NOTE: Water pressure, particularly from municipal sources, can vary significantly throughout the day. To mitigate this variance, use the time delay option to delay the Learn Flow start time to when irrigation would normally operate.

Turn the Dial to Module Programming; then press Next.

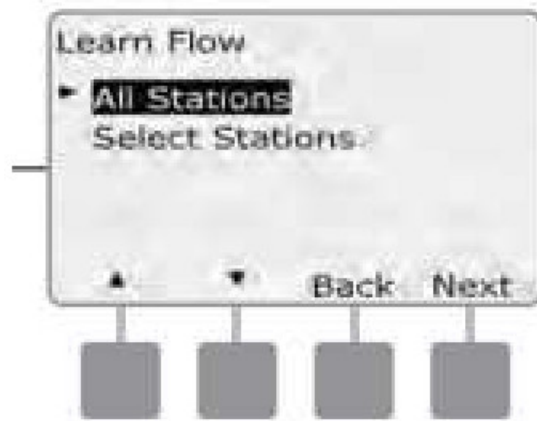Using the up and down buttons select Set Flow Rates; then press next.

Select the Learn Flow with up and down buttons; then press next. Rain Bird recommends this method. We do not recommend setting the Station rates as this may not be accurate.

We will select all stations; then press next.

We will get the message Learn Flow will work only with; then press next.
We will see the requirements for Learn Flow; then press next.

- **Note:** In order for the controller to learn the flow for all the irrigation stations they must have a decoder

  address, station run time, High medium priority and be assigned to a master valve.

  We can set the learn flow for a later time or to start now by leaving the delay of time at 00:00; then press next.

  We will then get the warning:

  Attention Learn Flow will over write the existing Learned Flow Rates: then press Start.

- **NOTE:** You can choose to run the exercise now or choose a timed delay of up to 24 hours.

Set the FEES and SELF Settings (explain the Alarms and Actions).
To most effectively use Flo Watch, you will want to first set your FEES and SELF thresholds and actions. FEES stands for Seek and Eliminate Excessive Flow and deals with how you want your controller to respond when excessive flow is occurring, as might be the case with a mainline break or a valve which is stuck in the open position. SELF stands for Seek and Eliminate Low Flow and deals with what the controller should do when low flow is present, as might be the case during a pump failure, Municipal water supply issue or when a valve fails to open The FEES Settings screen appears with High Flow threshold selected, allowing you to set the top limit (between 105-200%) of station flow rate that must be achieved to be considered excessive.
Turn the Dial to Module Programming; then press next.


Select Flow Smart Module; then press next.
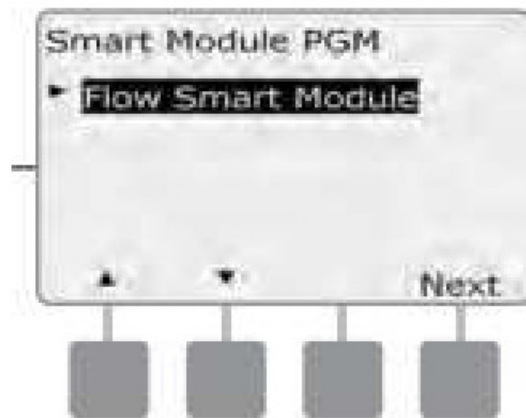
The Flo Watch screen appears with FEES/SELF Settings selected; press Next.

Press the + and – buttons to set the High Flow Threshold,
NOTE: Consider using the default setting of 130% (or higher) for SEEF high flow threshold. Using a lower percentage can result in false alarms due to normal hydraulic variability; then press Next. ;

- **NOTE:** To ensure accurate recording of flow rates, do not create any manually-generated flow such as flow created with manually operated quick coupling valves, while a Learn Flow is taking place

- **NOTE:** Be sure to Learn Flow again if you make any changes to your system which affects its hydraulics.

- **NOTE:** If the flow rates for one or more stations seem low, check your flow metering hardware and flow sensor. Low flow readings can be caused by faulty flow meters or flow sensors.
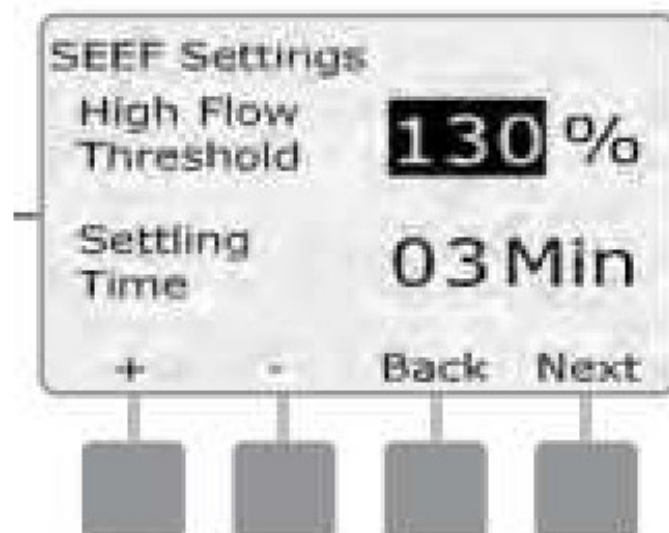
Settling Time is selected, allowing you to set the minimum time (from 1-10 minutes) that a flow rate must remain at (or above) the threshold before the controller will issue an alarm or take action. Rain Bird recommends 3 minutes. Press the + and – buttons to set the Settling Time; then press Next

The FEES Actions screen appears, allowing you to set the controller's behavior when a FEES condition exists.

A. Diagnose and Eliminate; allows the controller to determine if the High flow condition is due to a problem on the mainline (broken pipe, stuck valve, etc) or downstream of one of the valves that was running when the high flow condition was detected. The controller will eliminate the high flow condition by closing the Flo Zone master valve(s) to eliminate a mainline problem or closing the problem valve to eliminate a problem with a station.

- **NOTE:** If you choose the Diagnose and Eliminate action, be aware that all Flo Zones, stations and hardware, including Flo Zones unaffected by a FEES or SELF and non-irrigation hardware, may be temporarily shut down during the FEES or SELF diagnostic process. For this reason, if uninterrupted operation of non-irrigation hardware, even during a FEES or SELF diagnostic procedure, is critical for your installation we recommend operating non irrigation hardware with latching relays or selecting a FEES and

    SELF Action other than Diagnose and Eliminate.

B. Shut Down and Alarm; instructs the controller to shut down the master valve(s) on the Flo Zone when a high flow condition is detected. The controller will not attempt to diagnose if the problem is on the mainline or downstream of a valve. This will shut off all Scheduled irrigation.

C. Alarm only; allows the controller to issue an alarm condition, but take no other action.

Press the + and – buttons to set the FEES Action; then press Next.
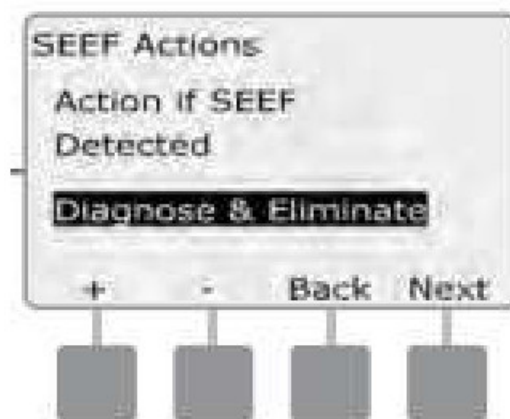
The SELF Settings screen appears with low flow threshold selected, allowing you to set the bottom limit (between 1-95%) that a station must achieve to be considered low flow. Press the + and – buttons to set the low flow threshold; then press Next.

- **NOTE:** Consider using the default setting of 70% (or lower) for SEEF low flow threshold. Using a higher percentage can result in false alarms due to normal hydraulic variability.

    Settling Time is selected, allowing you to set the time limit (from 1-10 minutes) that a station flow rate must remain at (or below) the threshold before the controller will issue an alarm or take action. Press the + and – buttons to set the Settling Time; then press Next.
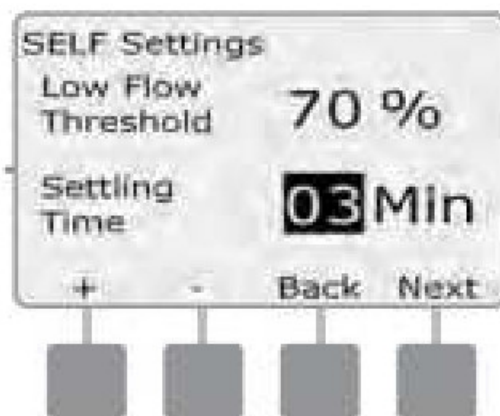
- **NOTE:** If you are using Cycle+Soak, be sure to set your FEES and SELF settling times shorter than the cycle portion of your Cycle+Soak station runtime. A FEES or SELF condition cannot be detected if the FEES and SELF settling times are equal to or longer than station cycle times.

The SELF Actions screen appears, allowing you to set the controller's behavior when a SELF condition exists.
A. Diagnose and Eliminate allows the controller to determine if the low flow condition is due to a problem on the mainline (affects all valves in Flo Zone) or downstream of one of the valves that was running when the low flow condition was detected. The controller will eliminate the low flow condition by closing the Flo Zone master valve(s) to eliminate a mainline problem or closing the problem valve to eliminate a problem with a station.
B. Shut Down and Alarm instructs the controller to shut down the master valve(s) on the Flo Zone when a low flow condition is detected. The controller will not attempt to diagnose if the problem is on the mainline or downstream of a valve.
C. Alarm Only allows the controller to issue an alarm condition, but take no other action
Press the + and – buttons to set the SELF Action; then press Next.
The Delay to Re-Enable screen appears, allowing you to select how long (from 0 to 24 hours) before your system is re-enabled and program starts are allowed.

- **NOTE:** If you select a Delay to Re-Enable time of 00:00, the controller will not attempt to start irrigation again until you have cleared all FEES and SELF alarms
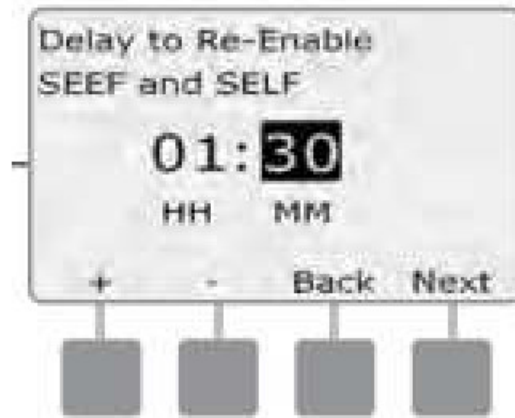
Press the + and – buttons to set hours before Re-Enable; then press Next
Press and HOLD buttons to accelerate settings for hours and minutes.

- **NOTE:** If the selected action for both FEES and SELF is Alarm Only, then the system is not disabled and the Delay to Re-Enable screen will not be shown.

Press the + and – buttons to set minutes before Re-Enable; then press Next.

- **NOTE:** FEES and SELF settings are not active until Flo Watch is activated. You may also wish to temporarily disable Flo Watch occasionally, such as when normal maintenance is occurring.
- **NOTE:** If the flow rates for one or more stations seem low, check your flow metering hardware and flow sensor. Low flow readings can be caused by faulty flow meters or flow sensors.
- **Note:** When you do the Learn Flow this will automatically log the Highest Flow Rate as the Flow Zone Rate

Turn Flow Watch on

Turn the dial to Module Programming; then press Next.

1. The Smart Module PG screen appears with Flow Smart Module selected; press next.
2. The Flow Smart Module PG screen appears. Use the Down Arrow to select Flo Watch; then press next.
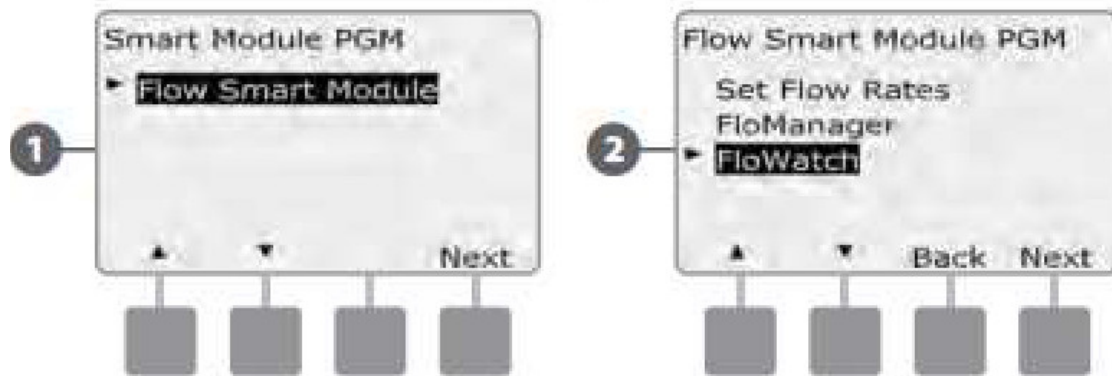
3. The FloWatch screen appears. Use the Down Arrow to select FloWatch On/Off; then press next
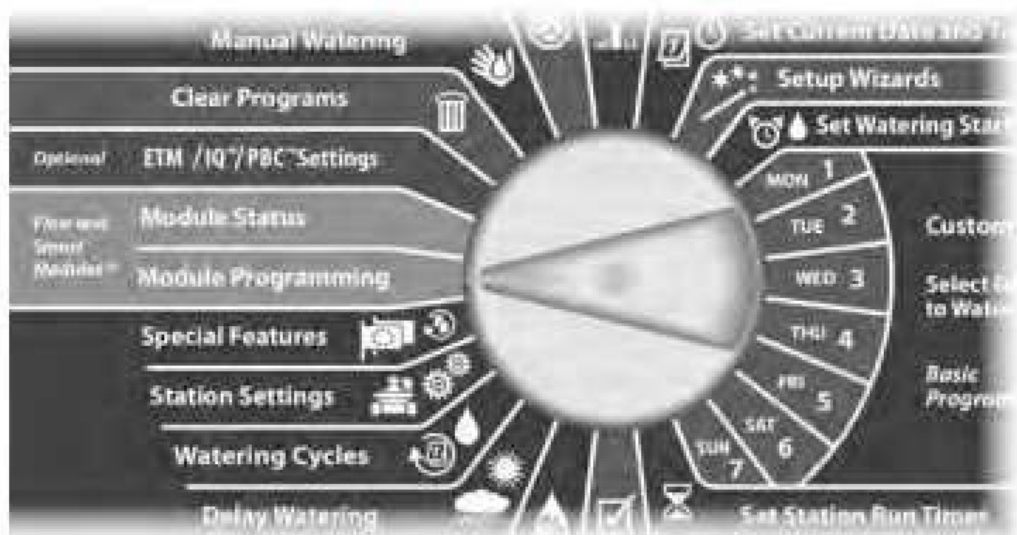4. Press the On button to enable FloWatch, or else press off to disable
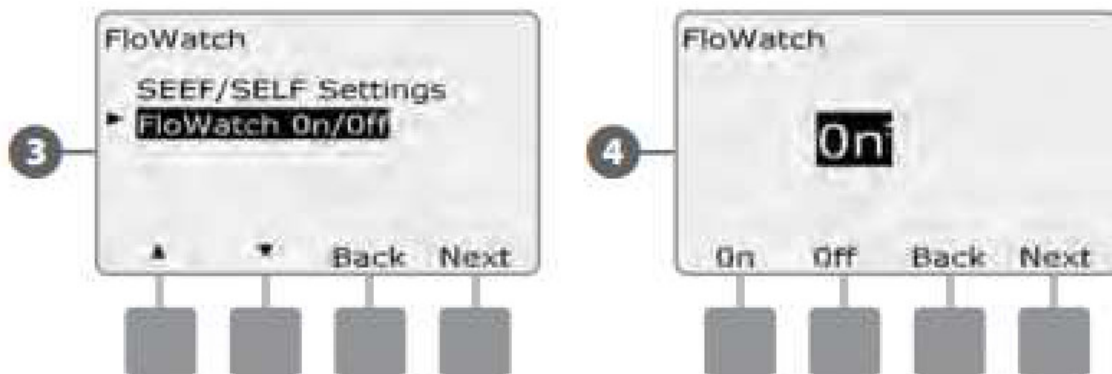
Explain what Flow Manager does to the schedule. (Optional)

If you have not already done so, use the Setup Wizards to set up all master valves and their FloZones. It's not necessary to install or set up flow sensors to use FloManager, but if you do have this hardware present it's usually helpful to set it up prior to activating FloManager. See Section B, Flow Sensors Setup for more details

One of the most powerful flow management features in the ESP-LXD controller is FloManager, which enables the controller to allocate available water pressure and volume to various stations based on their hydraulic requirements. This can be done even if flow sensors are not present. FloManager works by adding another layer of station or FloZone prioritization based on available water resources. For example, if FloZone 1 has 20 GPM available flow and two stations each consuming 6 GPM are currently in operation for a total of 12 GPM, FloManager will not allow an additional station to start unless it consumes 8 GPM or less. This helps ensure that your system's hydraulic resources are not overtaxed and that sufficient water is available to every sprinkler in every station.

Turn the dial to Module programming; press Next.

1. The Smart Module PGM screen appears with Flow Smart Module selected; press next.
2. The Flow Smart Module PGM screen appears. Use the Down Arrow to select FloManager; then press next.
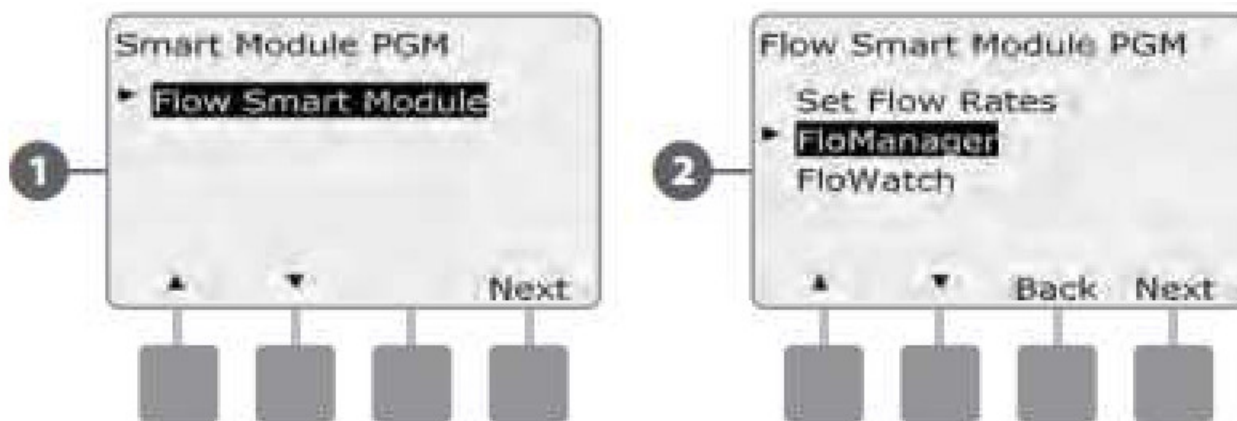
3. Press the On button to enable FloManager, or press Off to disable.
4. If Station Sequencing was previously set to Station Numbers, then turning FloManager ON will automatically change the setting to Station Priorities. Press Accept to make the change or else press Reject. See Section D, Advanced Programming, Station Sequencing. The controller will Run the Stations with the Highest Flow Rates first.
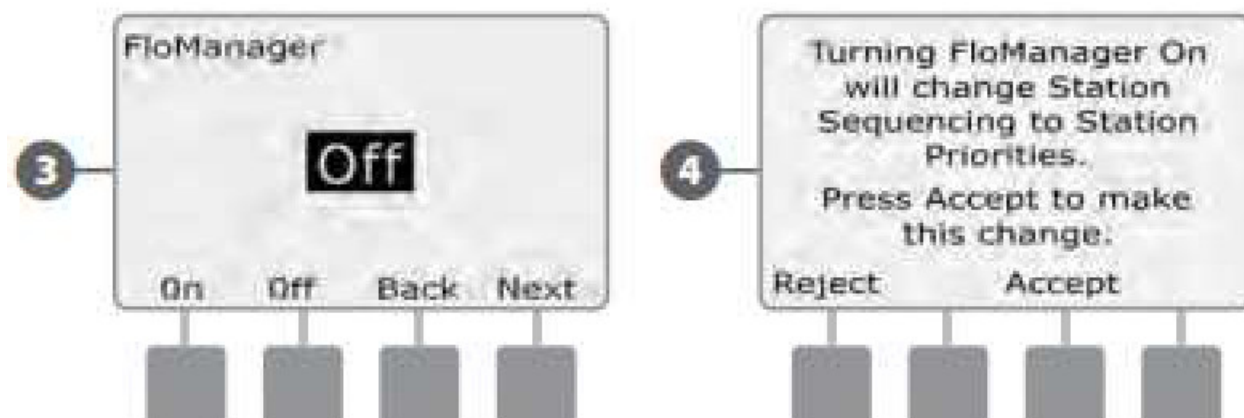
7. Explain what the manual MV Water Window does and how it can affect the Flow Watch if it is not programmed correct. Especially when the mainline will be used with a QCV or other water needs that will exceed the POC rate by 130%, SEEF Alarm will activate.
Sometimes you may want to use quick coupling valves or other manual watering methods during times when you are not irrigating. To ensure that these devices have water, you can set up an MV Water Window. The MV Water Window works the same way as other Water Windows, but instead of allowing irrigation it simply opens Normally Closed master valves (NCMVs) and allows a user-defined flow rate to coordinate with flow sensing. Note this is very important if Flow watch has been activated and the customer will need to irrigate outside of the normal schedule or a QCV valve will be used.
Turn the controller dial to Manual Watering.
If FloWatch is enabled, the controller will request incremental flow allowed for the MV Water Window. Press the + and – buttons to enter a sufficiently large value so that flow from hoses and other manual watering devices will not trigger a false SEEF alarm.
Note: If your POC rate is higher than the Flow Zone Rate whether it was learned or User Entered and Learned Flow is turned on once it reaches 130% for the settling time the SEEF (High Flow Alarm) will be triggered.
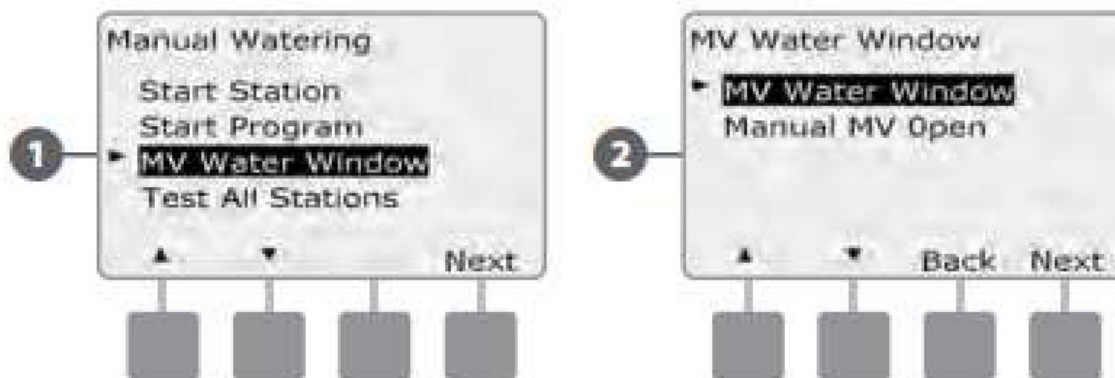
Set up MV Water Window

Turn the controller dial to Manual Watering

Turn the controller dial to Manual Watering.

1. The Manual Watering screen appears. Press the Down Arrow button to select MV Water Window ; then press Next.

2. The MV Water Window screen appears with MV Water Window selected; press Next.


3. Press the + and – buttons to set the time when the MV Water Window opens; then press Next.
   Press and HOLD buttons to accelerate settings for hours and minutes.

4. Press the + and – buttons to set the time when the MV Water Window closes. As you adjust the end time, the duration of your MV Water Window calculates automatically; then press Next. Note: To clear a previously set MV Water Window, press the + and – buttons to set both the Open and Close times to OFF (between 11:59 and 12:00 AM).
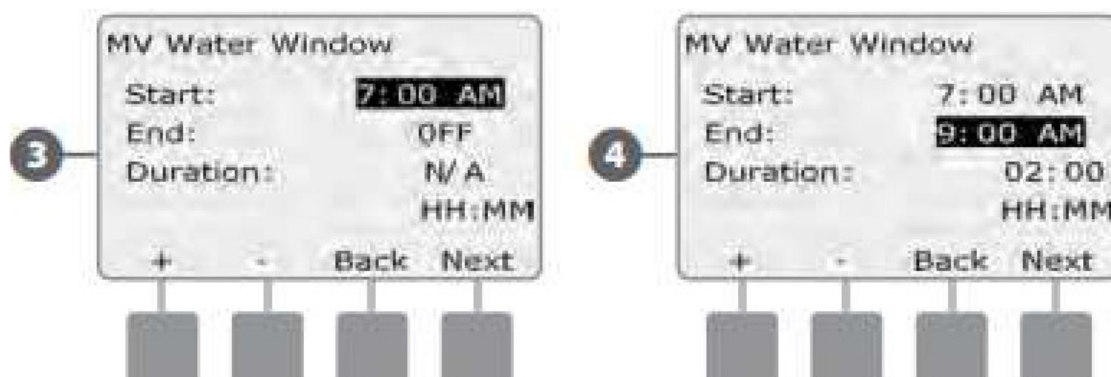

5. The MV Manual Watering Allowed On screen appears. Press the Yes button to allow MV Manual Watering to occur on a given day or press No to exclude that day.

6. Press the Next and Back buttons to navigate through the days of the week and repeat the selection process as desired; then press Next to navigate past Sunday
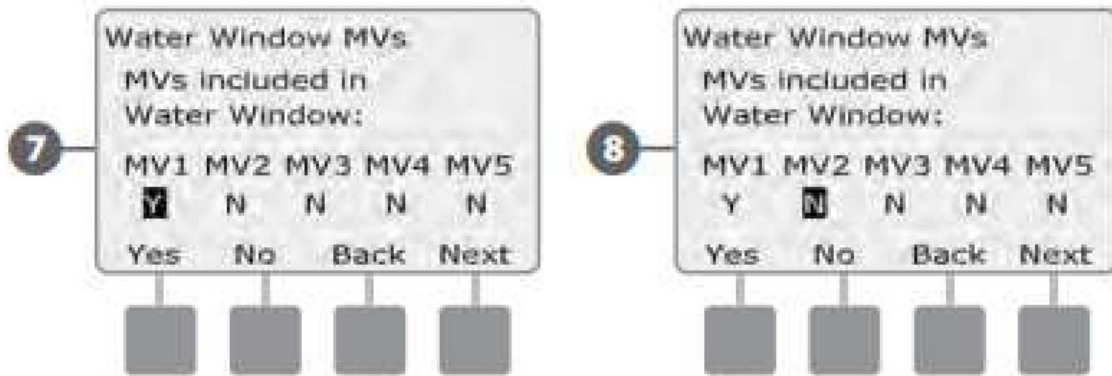
7. The MVs included in Water Window screen appears allowing you to choose which MVs to include in the MV Water Window. Press the Yes button to include the selected MV in the Water Window or press No to exclude it.

8. Press the Next and Back buttons to navigate through the days of the week and repeat the selection process as desired.
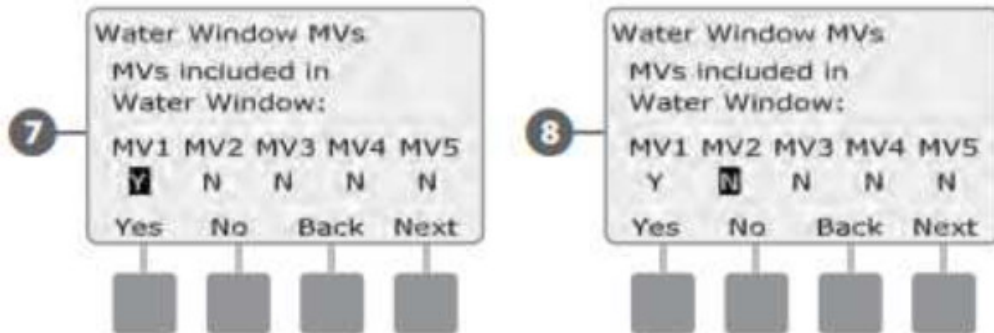
9. If FloWatch is enabled, the controller will request incremental flow allowed for the MV Water Window. Press the + and – buttons to enter a sufficiently large value so that flow from hoses and other manual watering devices will not trigger a false SEEF alarm.
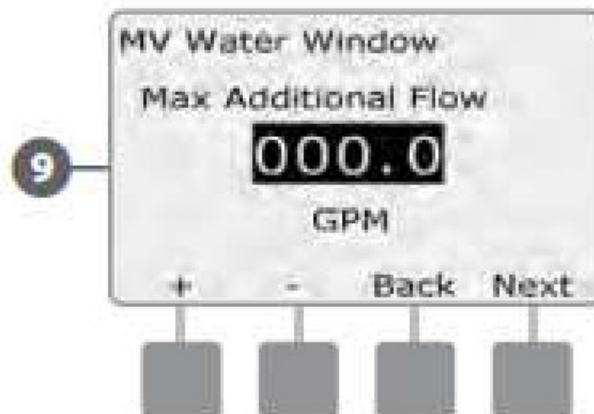

Manually Opening a MV

Occasionally it may be necessary to provide water to the system for unscheduled tasks. The Open MV feature allows you to leverage settings, such as allowable incremental flow, from your MV Water Window to open MVs for a short time.
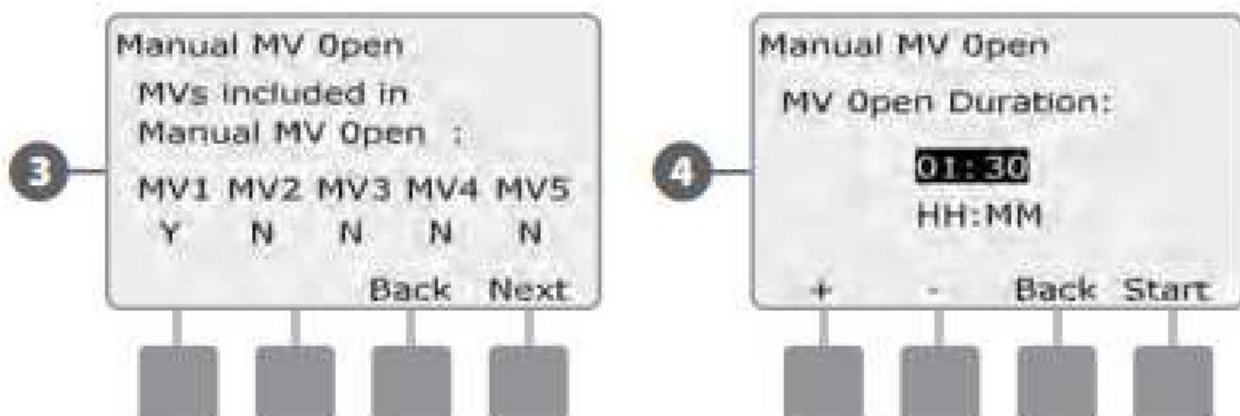
Turn the controller dial to Manual Watering

1. The Manual Watering screen appears. Press the Down Arrow button to select MV Water Window; then press Next.

2. The MV Water Window screen appears. Press the Down Arrow button to select Manual MV Open; then press Next.
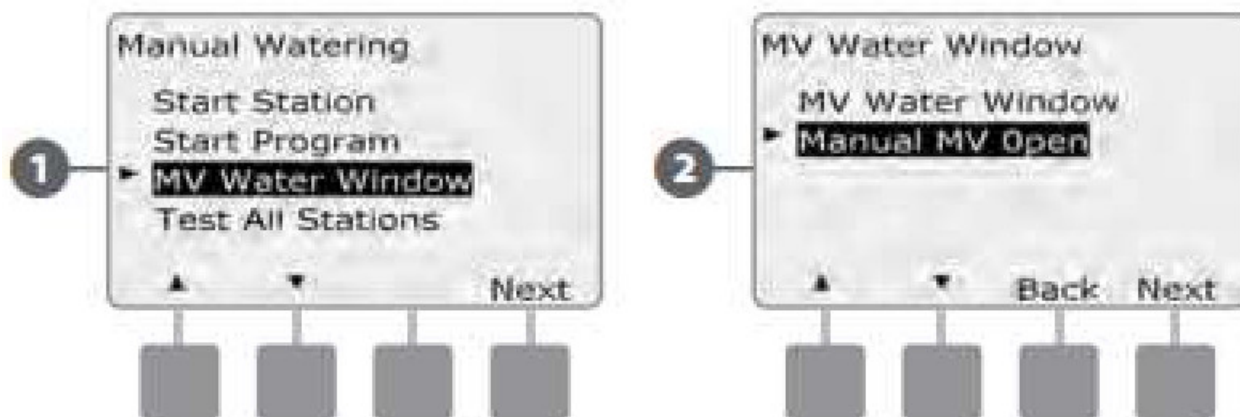
3. The Manual MV Open screen appears, showing all MVs that were previously selected to be included in the MV Water Window; press Next

4. The Manual MV Open screen appears. Press the + and – buttons to set the duration (in hours and minutes) for the MV to be open; then press Start. Press and HOLD buttons to accelerate settings for hours and minutes.

RAIN BIRD.

Documents / Resources

RAIN BIRD ESPLXD 2 Wire Decoder Controller [pdf] Installation Guide
ESPLXD 2 Wire Decoder Controller, ESPLXD 2, Wire Decoder Controller, Decoder Controller, Controller