

FG100 User Guide

Flow Sensing - Redefined

Designed to make water conservation simpler, more affordable, hassle free



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Introduction

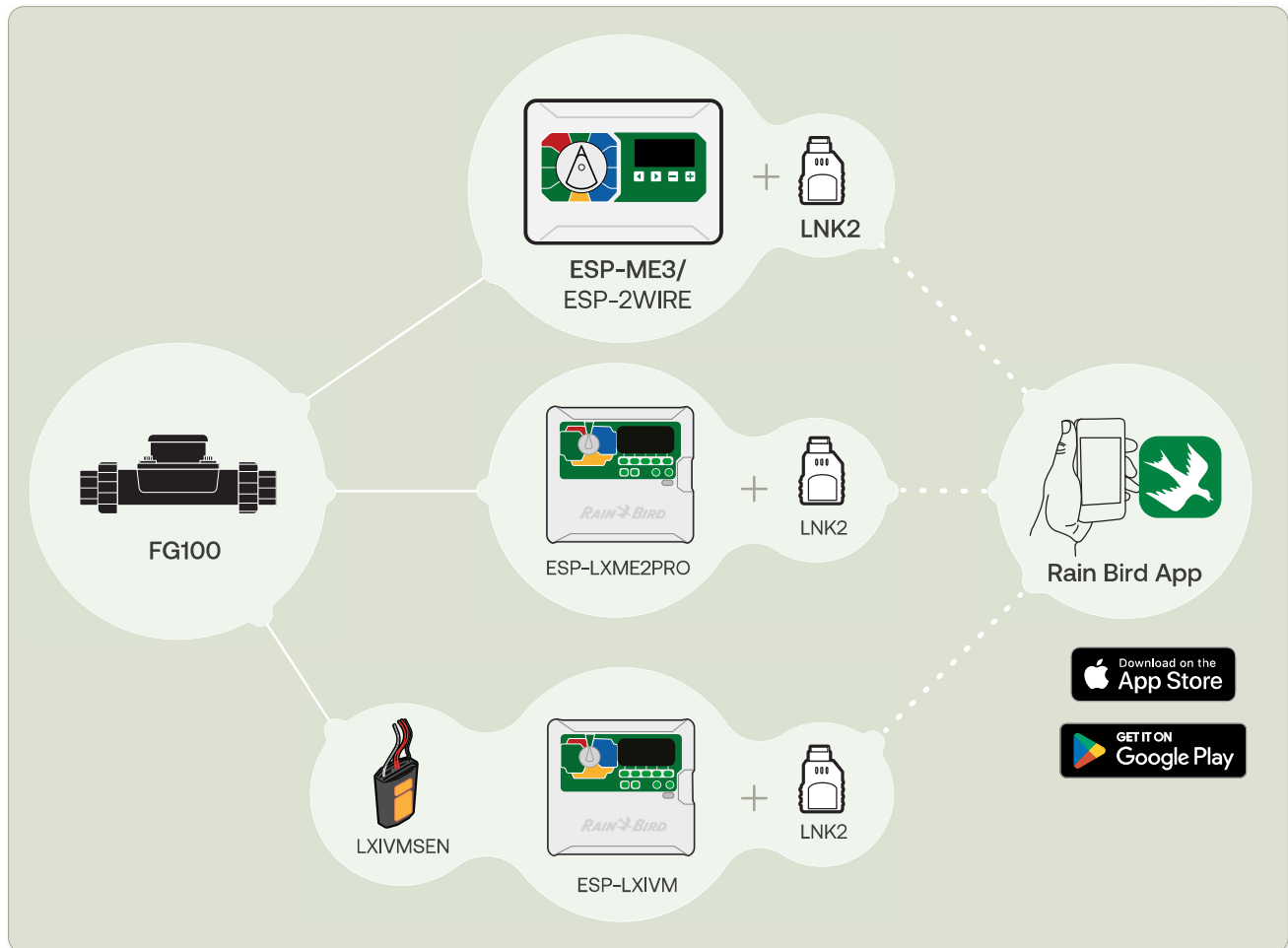
This guide provides instructions for installing and operating the FG100 flow sensor.

Designed for residential and smaller commercial applications, the FG100 monitors irrigation and instantly identifies when there is a leak or line break so it can be addressed early. This durable flow sensor manages water efficiency, protects homeowners from potential damages and positions you as a guardian of your customers' property and landscape—earning you a stronger reputation over time.

Maximize convenience by combining with the ESP-ME3 controller and an LNK2 Module, which allows you to monitor flow remotely. This can be done conveniently via the Rain Bird Mobile App, which is accessible on both iPhone and Android devices once the LNK2 module is installed.

System Configuration

The FG100 Flow Sensor is intended to be installed with the Rain Bird ESP-ME3 and ESP-LX controllers. Performance has not been confirmed with non-Rain Bird controllers. Additional functionality can be unlocked by pairing a compatible controller with the LNK2 WiFi module and the Rain Bird App.



LNK2 and Rain Bird App

Connect the FG100 to a controller equipped with the LNK2 WiFi Module to remotely monitor system health and manage advanced flow settings through the Rain Bird Mobile App.

Other Rain Bird Controllers

Other Rain Bird Controllers: The FG100 is compatible with the additional Rain Bird controllers. For some 2-Wire controllers such as the ESP-LXIVM and ESP-LXD, a sensor decoder (LXIVMSEN, SD210TURF) is also required. For detailed instructions, please refer to the specific controller's documentation.

Third-Party Controllers

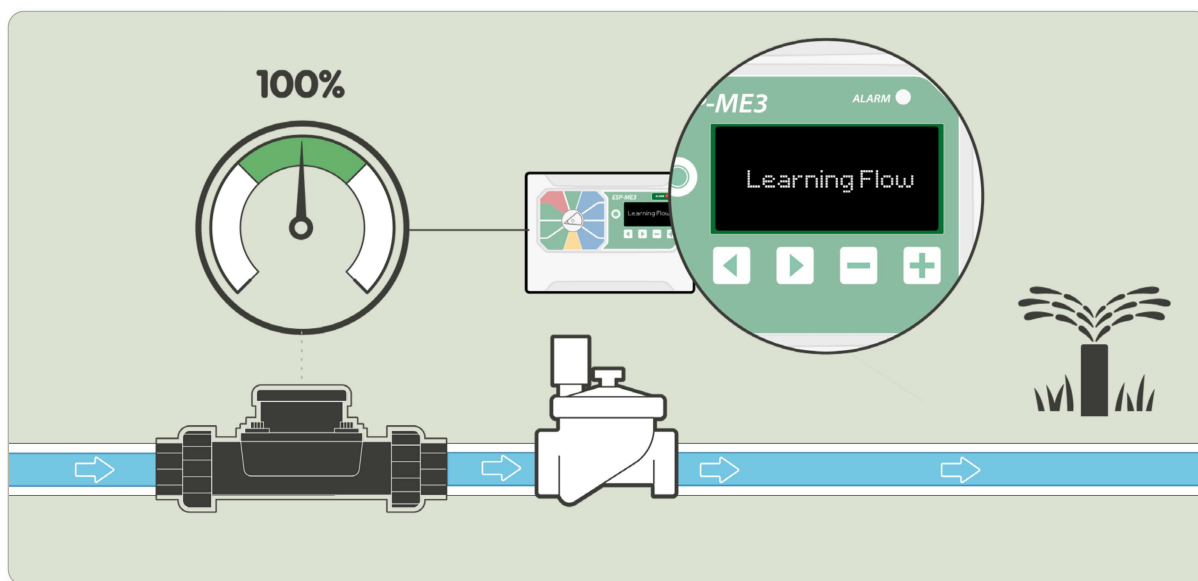
The FG100 may be compatible with third-party irrigation controllers that can be configured using [K-factor and offset, or pulses per gallon](#).

Feature Overview

The features described here refer to functionality of the ESP-ME3 controller. Some features require the ESP-ME3 to be connected to the Rain Bird app using the LNK2. Flow sensing features will vary by controller. Please refer to the documentation of your specific controller.

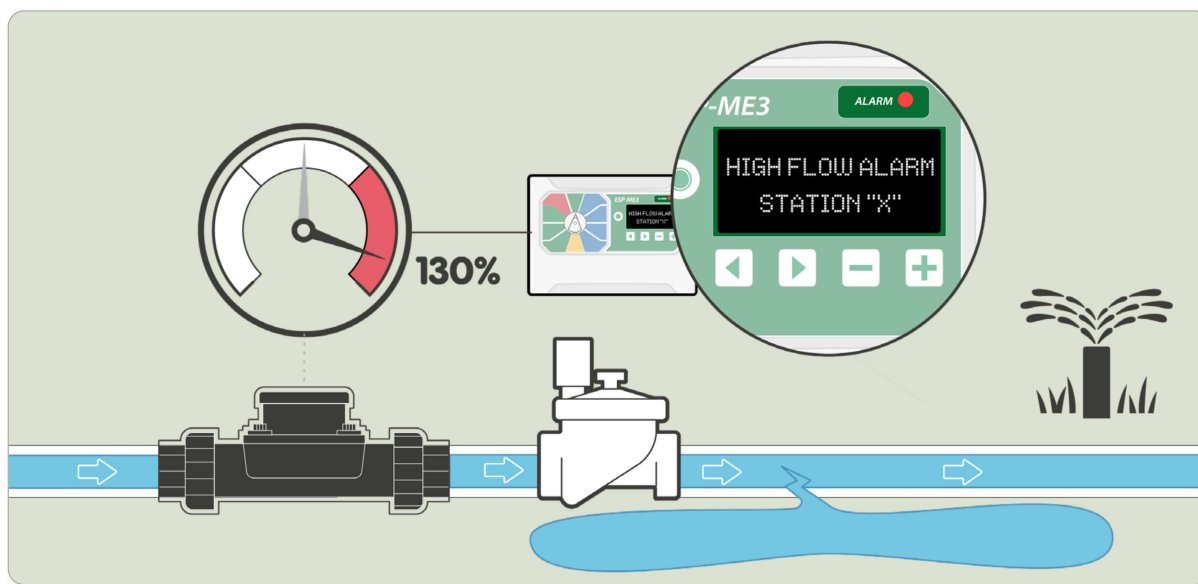
Learn Flow

Rain Bird controllers use Learn Flow technology to establish a baseline expected flow rate for each station. The controller does this by running each station for several minutes when you first set up the FG100 and recording the flow data.



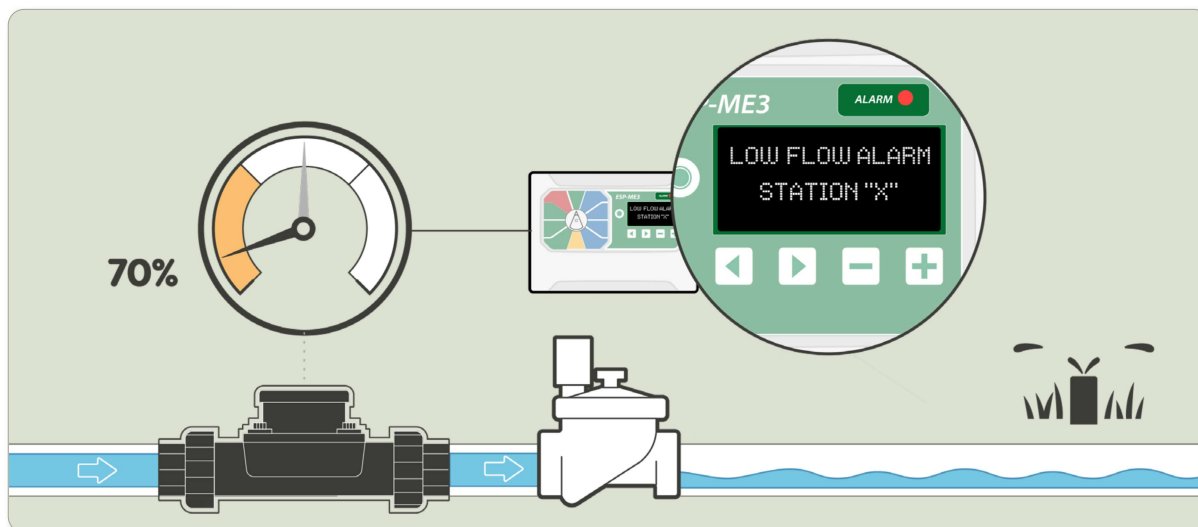
Flow Sensor Detects High Flow

If the FG100 detects a flow exceeding 130% of the [Learned Flow](#), automatic irrigation is shut off station by station, and an alarm is activated. The threshold and behavior can be adjusted from within the [Rain Bird app](#).



Flow Sensor Detects Low Flow

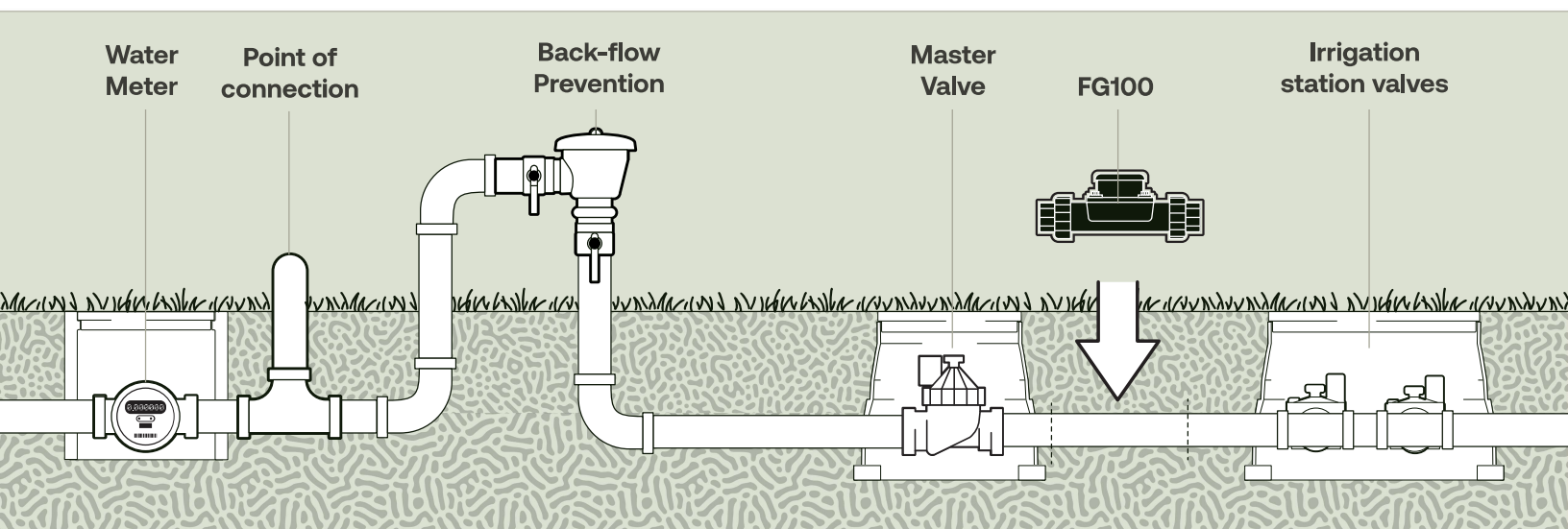
If your flow sensor detects flow below 70% of the Learned Flow then automatic irrigation will be shut off by station, and an alarm will be activated. The threshold and behavior can be adjusted from within the [Rain Bird app](#).



Mechanical Installation

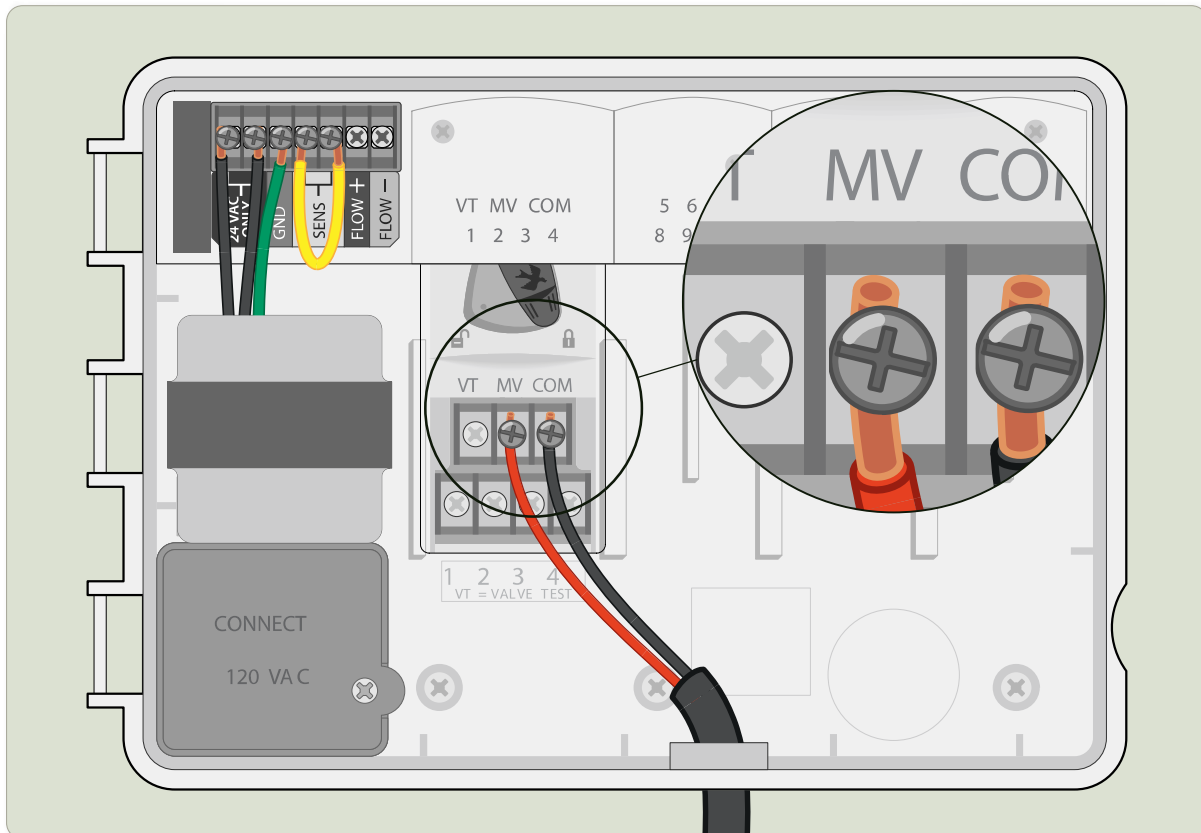
Pick a Spot

The flow sensor should be installed between the back-flow prevention device and the first irrigation valve. The FG100 has no straight pipe requirement meaning it can be installed immediately after the [master valve](#) in the same valve box.



Do I have a Master Valve?

If there is a wire connected to the MV (Master Valve) terminal of your controller then there is a master valve in your system. The diagram below shows how this would look in the ESP-ME3.



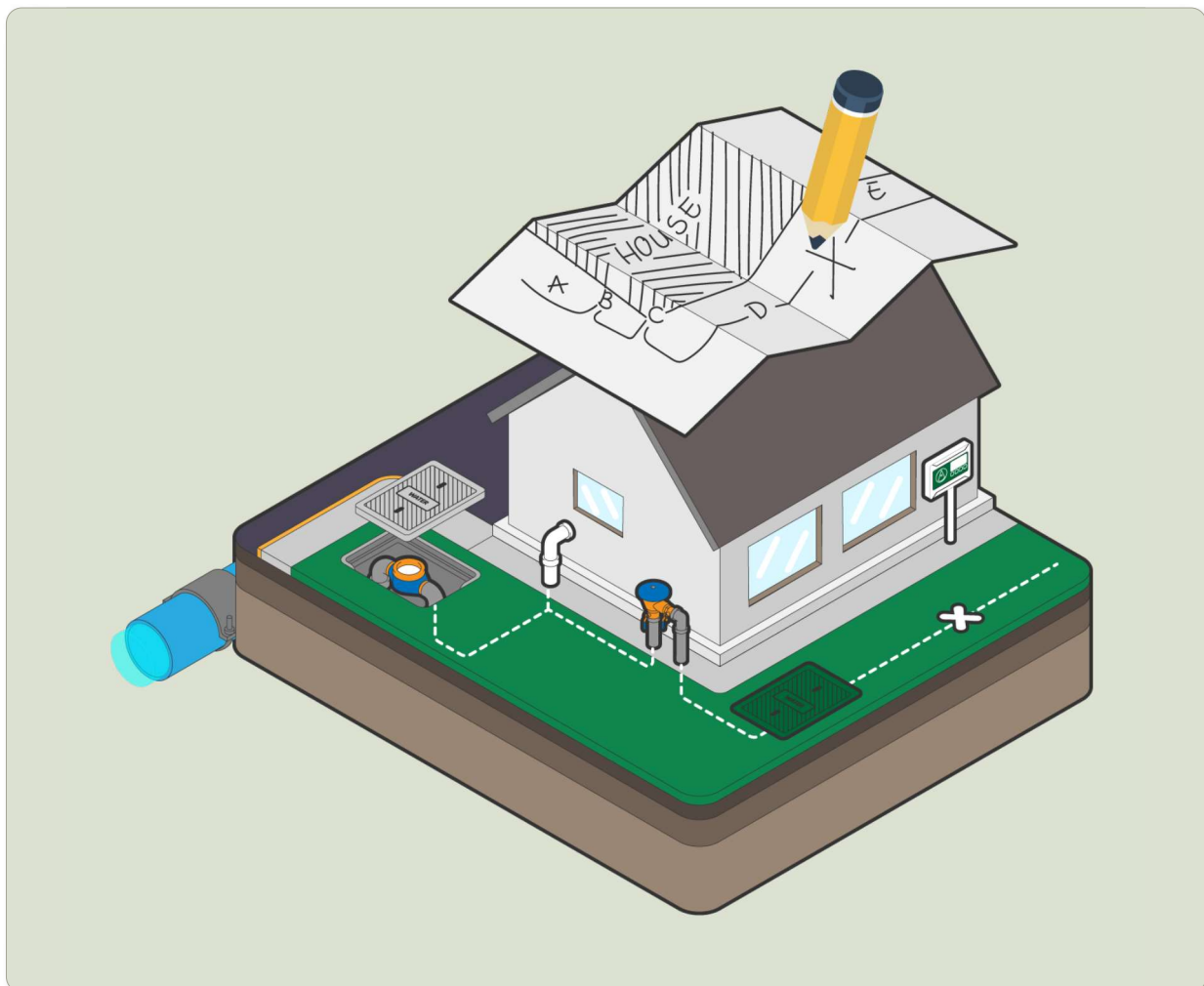
NOTE

2-Wire controllers (e.g. ESP-LXIVM) use decoders and may not feature a MV terminal.

Retrofit

If you are installing the FG100 into an existing irrigation system then Rain Bird recommends you start by walking your property and making a rough sketch of showing the location of the components shown above. This will help you to determine the ideal location for the flow sensor. This will minimize how much digging you will need to do.

Keep in mind that you will need to bury the wire that connects the flow sensor to the controller, so the further the installation location is from the controller, the more digging you'll need to do!



Recommended Configurations

Once you have [picked a spot](#) to install your flow sensor you should now be able to choose an install configuration from the 3 shown below. Installing the FG100 vertically may negatively effect performance.

With Master valve (Configuration 1)

If your system has a [master valve](#) then we recommend installing the FG100 immediately after the master valve in the same valve box.

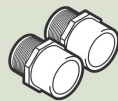
NOTE

You may experience a slight drop in accuracy with this configuration. To help with this condition, please use the [custom K-factor and offset](#).

NPT/BSP Fitting



1X Male to male BSP/
NPT “Nipple” adapter



2x Male BSP/
NPT adapter

Slip Fitting



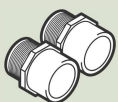
With First Irrigation Valve (Configuration 2)

If your system does not have a [master valve](#) or it is impracticable to install the FG100 with the master valve, then we recommend installing the FG100 immediately before the first irrigation valve in the same valve box.

NOTE

You may experience a slight drop in accuracy with this configuration. To help with this condition, please use the [custom K-factor and offset](#).

NPT/BSP Fitting



2x Male BSP/
NPT adapter

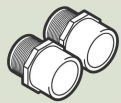
Slip Fitting



On its own (Configuration 3)

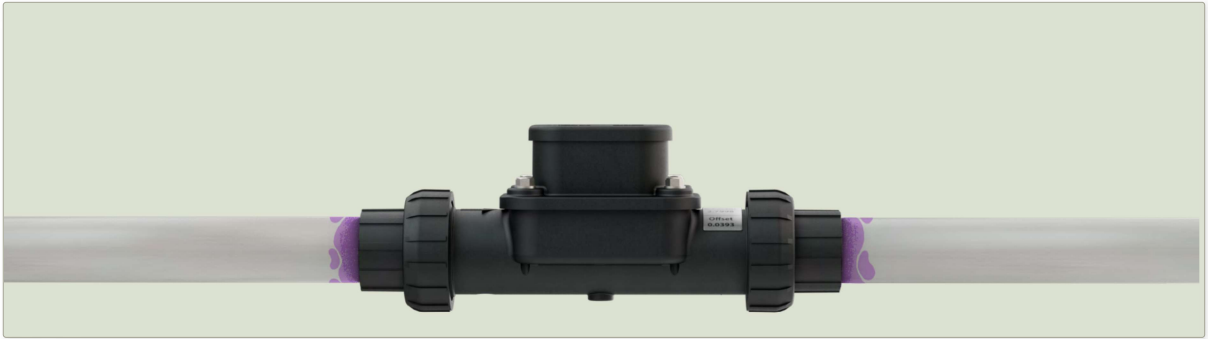
If it is impractical to install the FG100 with the [master valve](#) or first irrigation valve then you should install it in its own valve box, downstream from the master valve and upstream from the first irrigation valve.

NPT/BSP Fitting



2x Male BSP/
NPT adapter

Slip Fitting



Gather Your Tools



Trowel/
shovel Tape
Measure 1" Tube
Cutter PVC
Cement Teflon
Tape

HOMEOWNERS
If you do not feel comfortable performing any of the steps listed below we recommend hiring a professional irrigation contractor to complete the installation.
CAUTION
Always shut off your water and power supply before working on an irrigation system.

Before you dig

To avoid accidental damage to underground utilities, it's advised to consult your local utility company or relevant authorities for any essential procedures or guidelines before starting excavation work. They can provide you with information on how to check for buried utilities, ensuring a safe and trouble-free digging experience.

USA
811 is the national call-before-you-dig phone number. Anyone who plans to dig should call 811 or go to their state 811 center's website before digging to request that the approximate location of buried utilities be marked with paint or flags so that you don't unintentionally dig into an underground utility line.

Prepare a Section Of Pipe

If you are retrofitting the FG100 into an existing system it may fit into an existing valve box at your chosen location. If not then you will need to excavate a section of pipe large enough for your valve box at the [chosen install location](#).



Threaded Fitting Install

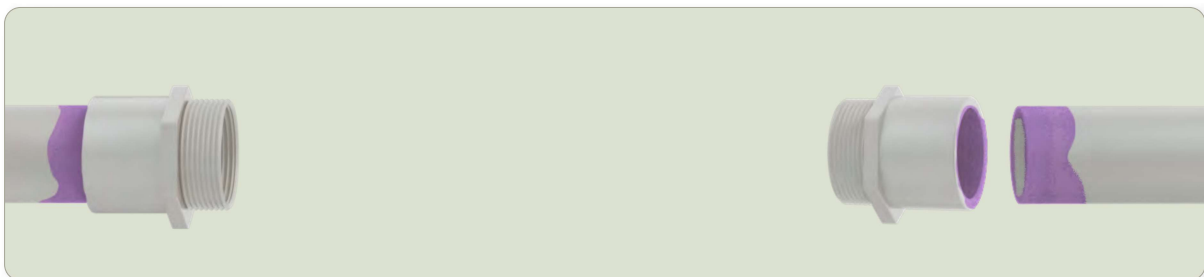
The steps below describe how to install the FG100 using the threaded (BSP/NPT) union fittings provided.



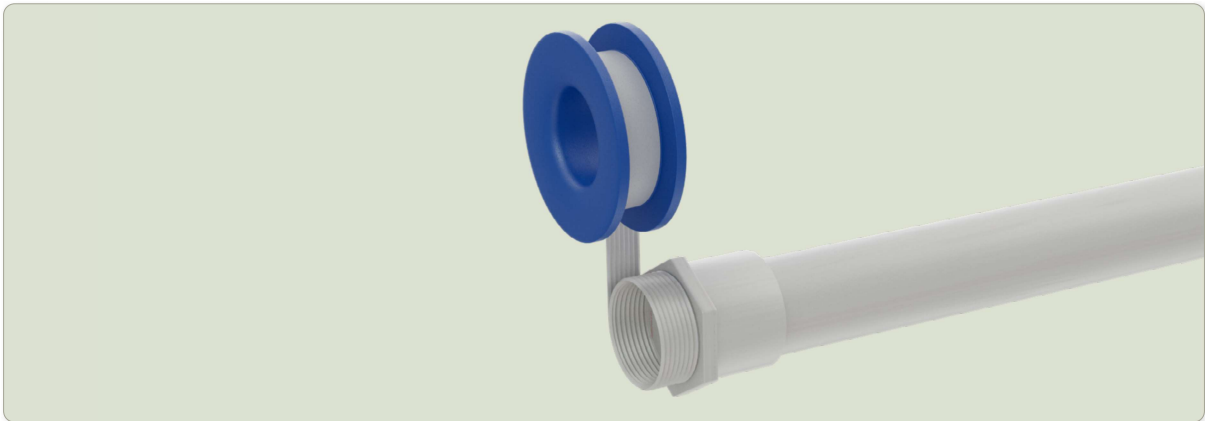
1. Measure and cut a 7 $\frac{7}{16}$ " (189mm) section of pipe to accommodate the FG100, Couplings and PVC fitting. If your installation includes an [in-line valve](#) then you will need to calculate the length of the section to remove based on your components. Make sure the cut is clean, free from burrs, and straight.



2. Glue the 1" male threaded union fittings to the cut ends of the pipe using PVC cement.



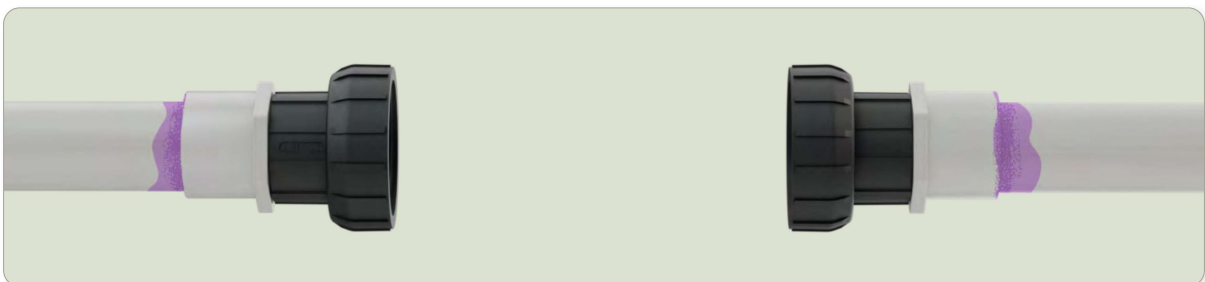
3. Apply Teflon tape to the male threaded unions.



4. Place the union nuts onto the glued male NPT/BSP adapters.



5. Make sure that the pipes are aligned properly to avoid cross-threading. Carefully thread the included NPT/BSP end connector onto the adapters, be careful not to over-tighten.



6. Make sure the red filter basket is installed on the upstream side of the flow sensor. Check that the green o-rings are installed properly in the channels on each side of the flow sensor as shown before attaching the flow sensor.



7. Align the FG100 with the union fittings ensuring that the “Flow” arrow is facing in the same direction that water will flow through your system.



8. Slide the nut over the female end and hand-tighten onto the male end. Avoid over-tightening as this can damage the threads or fitting.



Slip Fitting Install

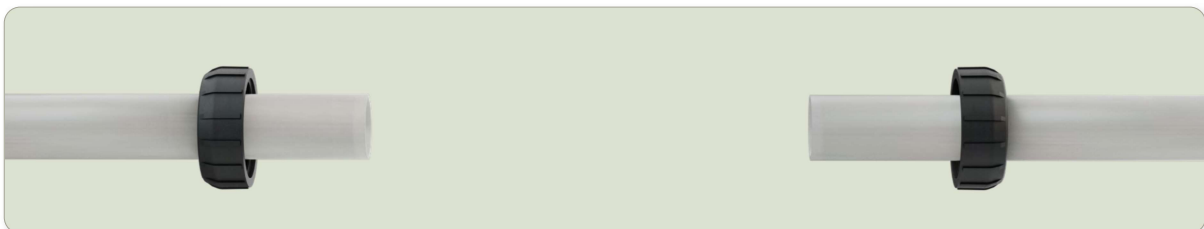
The steps below describe how to install the FG100 using the threaded (BSP/NPT) union fittings provided.



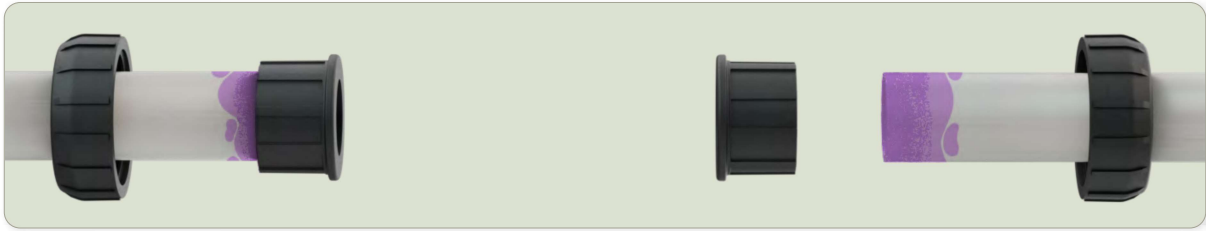
1. Measure and cut a $7 \frac{3}{16}$ " (183mm) section of pipe to accommodate the FG100, Couplings and PVC fitting. If your installation includes an [in-line valve](#) then you will need to calculate the length of the section to remove based on your components. Make sure the cut is clean, free from burrs, and straight.



2. Place the union nuts onto the cut pipe ends.



3. Glue the flow sensor slip fittings to the cut ends of the 1" pipe using PVC cement.



4. Make sure the red filter basket is installed on the upstream side of the flow sensor. Check that the green o-rings are installed properly in the channels on each side of the flow sensor as shown before attaching the flow sensor.



5. Align the FG100 with the union fittings ensuring that the “Flow” arrow is facing in the same direction that water will flow through your system.
6. Slide the nut over the female end and hand-tighten onto the male end. Avoid over-tightening as this can damage the threads or fitting.



Electrical Install

Irrigation Wire

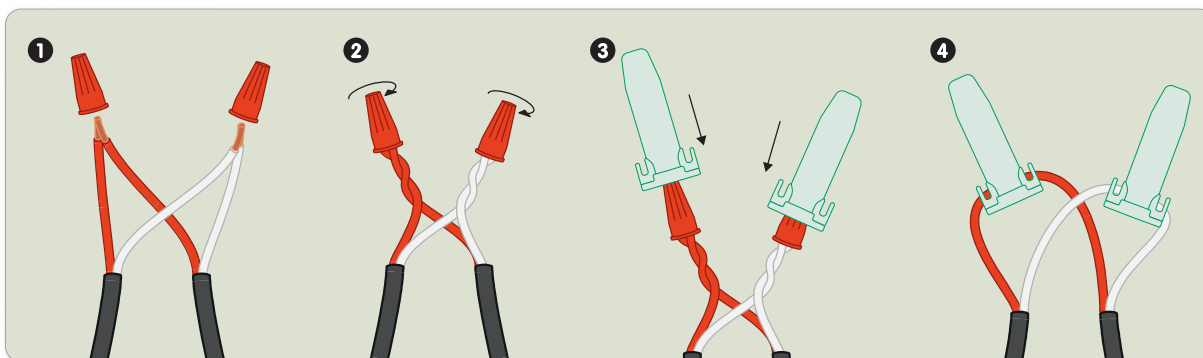
If your wire run is less than 500' / 152.4m then use standard 18g irrigation wire.

Shielded wire is recommended for installations with wire runs that exceed 500' / 152.4m, installation sites with significant wireless interference or to help protect against high-lightning locations.

CAUTION

Disconnect the power from the flow sensor source and/or receiving device prior to any installation or maintenance of the system. Connecting power (24VAC, 110VAc, etc.) directly to the flow sensor wires will damage the sensor.

Use WC20 buriable wire connectors to connect the flow sensor to the 18g irrigation wire.

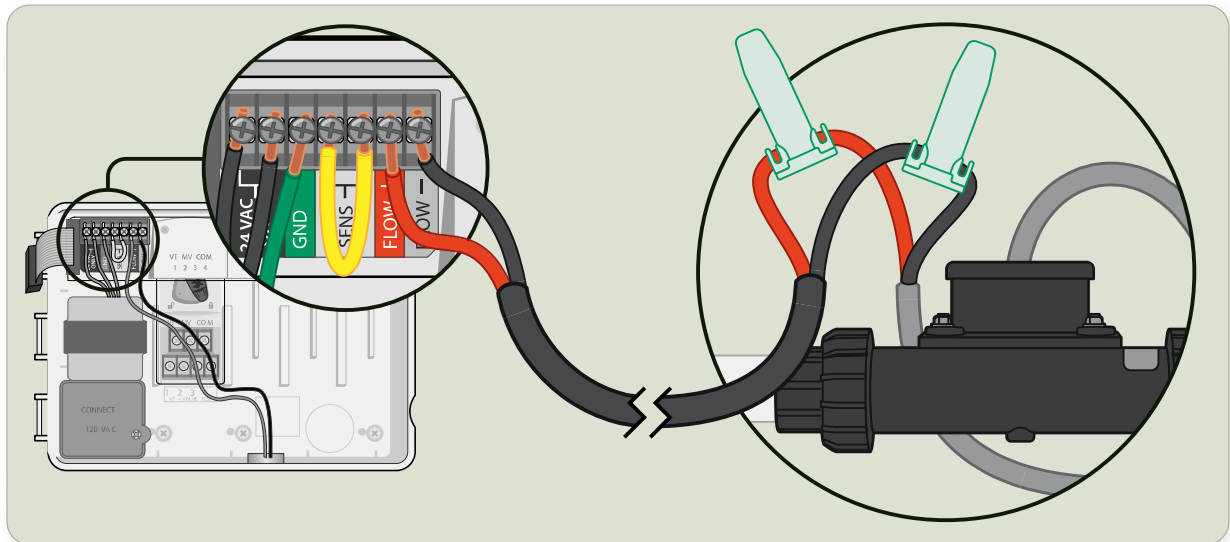


Wiring the FG100 to the Controller

If the FG100 is installed underground in a valve box then the irrigation wire that connects the FG100 to the controller should be buried underground.

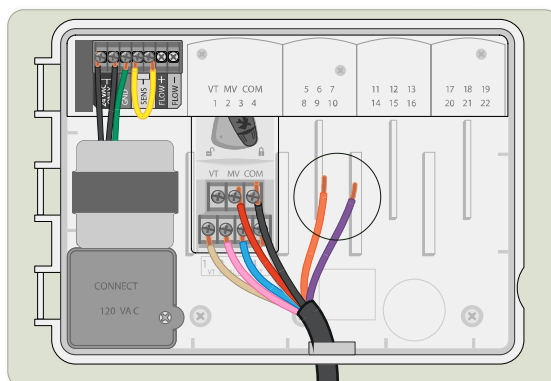
ESP-ME3

Connect the cable connected to the red flow sensor cable to the FLOW + terminal and the cable connected to the black flow sensor cable to the FLOW - terminal in the ESP-ME3 cabinet as shown below.



“Spare” Cable

Before digging, check the cabinet of your irrigation controller for any spare cables left over from your system’s installation. If you have two spare cables, you may be able to use them to connect your FG100, potentially avoiding the need to dig a new trench. Check your valve boxes for the other ends, they will be the same color.



LX Series controllers

Refer to the manual of the specific controller.

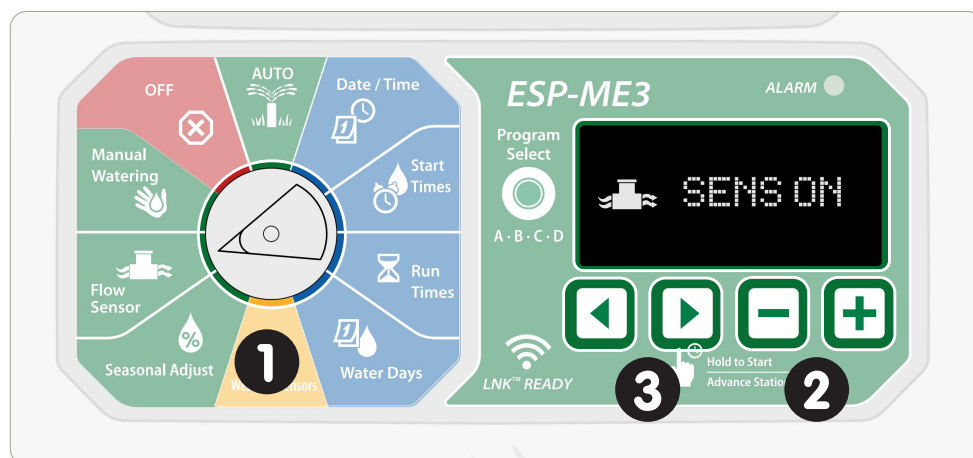
Non-Rain Bird Controllers

Refer to manufacturer's guidance.

Setup

ESP-ME3

1. Turn the dial to Flow Sensor.
2. Press - or + to select **SENS ON** (sensor on) or **SENS OFF**
3. The controller will begin to **LEARN FLOW**. It will run each station for 3-4 minutes to set the expected station flow.



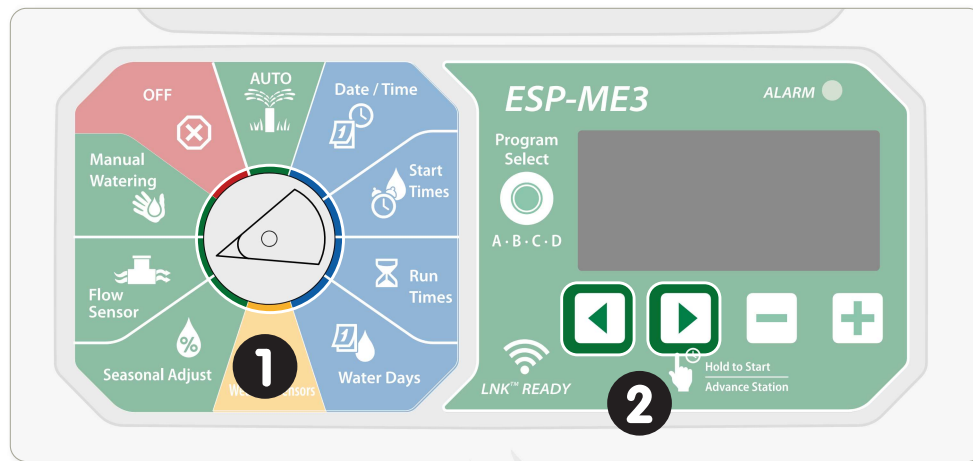
When set to **Sensor ON**, automatic irrigation will be suspended per station if detected flow exceeds learned flow by more than 30%. When set to Sensor OFF, all stations will ignore the flow sensor.

When switching from **Sensor OFF** to **Sensor ON**, the controller will begin to LEARN FLOW. It will run each station for a short period to set the expected station flow.

Turn a flow sensor on or off by station

This feature is useful if you have stations with expected flows outside the [operating specification](#) of the FG100.


1. Turn the dial to Flow Sensor.
2. Press and hold the left and right arrow buttons at the same time.



3. You will now be able to turn off flow sensor by station. Using the left and right arrow buttons to navigate between stations and the + and - buttons to turn the sensor on/ off.

Rain Bird App (LNK2)

With an LNK2 module installed in your ESP-ME3 controller you will be able to unlock additional flow functionality.

1. From the ESP-ME3 Controller screen in the Rain Bird app select the **Controller Settings** icon  expand the **Flow Sensor Settings** screen, make sure **Flow Sensor Installed** is checked.
2. Select **Change Flow Settings** set the Sensor Type to Rain Bird FG100.

NOTE

You may also input the FG100's specific [K-Factor and offset](#) by setting the sensor type to other.

3. Select **Learn Flow from** the **Flow Sensor Settings** screen, the controller will begin to **Learn Flow**. It will run each station for 3–4 minutes to set the expected station flow.

View and Edit Learned Flow Rates

If you have learned flow rates then you will be able to view and edit them on the **Change Flow Settings** screen.

Adjust Alarm Threshold

You can change the Alarm Threshold from the **Change Flow Settings** screen. The default is 130% of learned flow and 70% of learned flow.

Set alarm action

- **Alarm Only** - Regular irrigation will continue for all zones
- **Alarm & Skip Problem Zone** (Default) - Irrigation will be suspended for the problem zone (station)
- **Alarm & Skip All Zones** - Irrigation will be suspended for all zones (stations)

Adjust Settling Time

Settling Time is the time (from 1-10 minutes) that a flow rate must remain at or above the High Flow Threshold or below the Low Flow Threshold before the controller will issue an alarm or take action.

Manual K-Factor Offset Input

You may choose to input the [K-Factor and Offset values](#) manually. This can be done by setting the Sensor Type to Other.

The screenshot shows a mobile application interface for configuring a flow sensor. At the top is a green header bar with a back arrow, the title "Flow Sensor", and a "Save" button. Below the header, the "Sensor Type" is set to "Other" in a text box. Underneath, the "K-Factor" is set to "2.7998" and the "Offset" is set to "0.0393", each in its own text box. At the bottom, there is a green button with a pencil icon and the text "View/Edit Learned Flow Rates".

LX controllers

Refer to the manual of the specific controller.

Non- Rain Bird Controllers

Refer to manufacturer's guidance and input the [K-Factor and Offset](#) manually. Performance has not been confirmed with non-Rain Bird controllers.

Advanced Setup

K-Factor and Offset

Each device is individually tested, individual device K-Factor and Offset information is printed on the lower body label.

The K-Factor and Offset data represented in the chart below is an average of all FG100 Flow Sensors.

Flow Sensor Size	K-Factor	Offset	Pulses Output Rate
1"	2.822	0.1083	21 Pulses/ gallon

For improved accuracy you may choose to manually input the values printed on the label.



Installation Test Procedure

1. Turn on the Water and power
2. Run manual irrigation program from the controller
3. Check for leaks
4. Verify that the controller is registering flow rate. See your controller manual for detail on how to read flow from your controller.

NOTE

Once flow starts, readings from the controller may not be instantaneous. The lines need time to purge air, and the controller needs time to read the pulses from the FG100 in order to register accurate readings.

Maintenance

Winterization

There is no need to remove the FG100 for winterization. The FG100 can remain in the ground throughout the year.

Debris

If there is debris in the line then the FG100 should be removed by unscrewing the couplings. The filter basket should then be cleaned to remove any debris before being replaced. Make sure the filter and o-rings are securely set in place. Be careful not to over-tighten when reattaching the couplings.



Troubleshooting

ESP-ME3

If a High Flow condition is detected, a “High Flow Alarm” is shown at the display and the red alarm LED comes on. To clear the alarm press the “Hold to Start” right arrow button during the alarm message.

Initial Trouble Shooting

1. Check the filter basket for debris
2. Confirm that the expected flow rates are above the minimum recommended flow rates for the FG100 (see table below):

Minimum Flow	3 GPM	11.35 LPM
Maximum Recommended Flow	25 GPM	94.63 LPM
Maximum Flow	35 GPM	132.49 LPM

See [Operating Specifications](#) for more information.

3. Ensure that the FG100 has been [wired correctly](#).
4. Ensure there is flow in the system by running a manual irrigation program from the controller. Check to see if water is being emitted as expected.

Test the Controller

If the controller is not recognizing a flow input from this sensor, test the controller itself by disconnecting the flow sensor, and very quickly and repeatedly short together the flow +/- terminals or wires that connected the flow sensor to the controller. Do this about once a second for 30 seconds. The controller should recognize this shorting as flow. If it does not, the problem is in the controller, and not the flow sensor or the wiring to it.

Appendix

NPT/BSP Fittings

NPT/ BSP threaded fittings allow you to fully remove the FG100. If you anticipate the need for maintenance, replacement or might need to move the FG100 in the future, then union fittings would be the better choice. Union fittings allow for easy disconnection and reconnection, without the need to cut or permanently alter the piping.



Slip Fittings

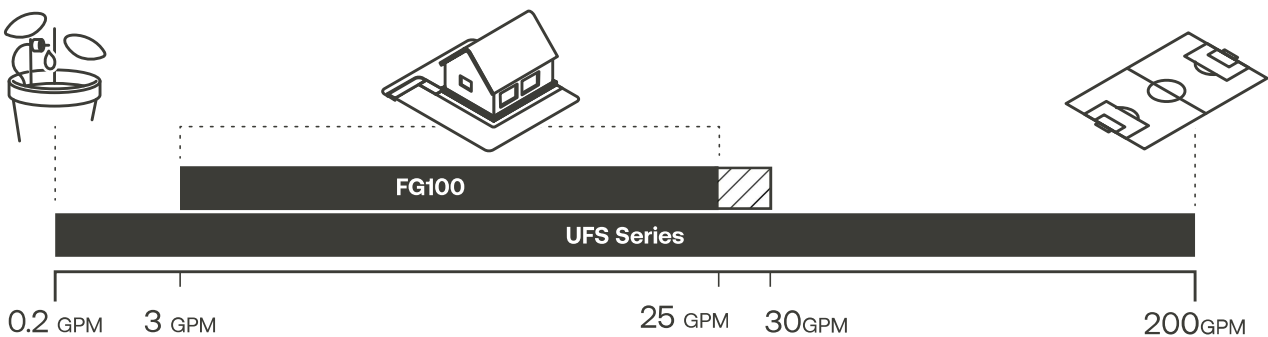
The slip fittings are glued directly to the pipe. Slip fittings will allow you to remove the main The FG100 body for maintenance but the connection hardware will remain permanently attached. Slip fittings can be used if the flow sensor won't require frequent maintenance, removal and will never need to be moved.



Operating Specifications

The FG100 is intended for residential and smaller commercial applications, and its minimum and maximum operating rates flow are well-suited for most flow zones. The operating flow range is shown below:

Minimum Flow	3 GPM	11.35 LPM
Maximum Recommended Flow	25 GPM	94.63 LPM
Maximum Flow	35 GPM	132.49 LPM



High-output rotors (such as those used on sports fields) may exceed the recommended flow rate of this device. High-efficiency emitters like drip irrigation and high-efficiency spray nozzles may have flow rates that fall below the minimum operating flow of the FG100.

In these situations, you can add more emitters to the flow zone to bring the expected flow rate above the minimum operating flow of the FG100. [You may also turn off flow sensing for these stations.](#) Alternatively the commercial grade UFS series flow sensors can be used.