

FLOW-SYNC™

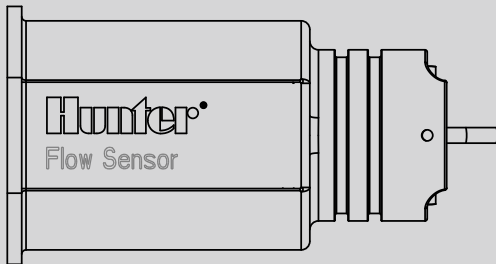
Hunter®

HFS

Hunter Flow-Sync

Flow Sensor for Use with
Compatible Hunter Controllers

Owner's Manual and
Installation Guide



For more information visit hunterindustries.com

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INTRODUCTION

The Hunter Flow-Sync allows flow-capable controllers, such as the Hunter ACC and I-Core, to monitor actual flow in irrigation systems.

With proper setup at the controller, this allows the controller to record and report actual flow in liters or gallons. Flow learning controllers can also use Flow-Sync to learn typical flow for each zone of irrigation, and monitor during watering for high and low flow conditions.

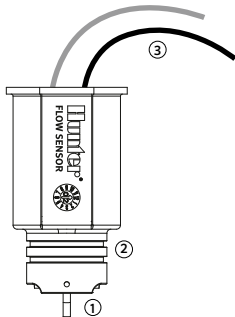
Flow-Sync equips controllers to respond on their own to incorrect system performance, preventing damage to landscape and wasted water resources.

FLOW-SYNC COMPONENTS

This section will give you a brief overview of some of the components of the Flow-Sync system.

A. FLOW-SYNC

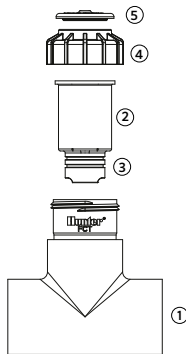
1. **Impeller:** Rotates when flow is occurring
2. **O-rings:** Provides sealing of sensor in sensor body
3. **Wires:** Black and red wires connect sensor to the ACC controller



B. FLOW-SYNC BODY (FCT Series)

1. **Flow-Sync Tee:** The Tee is installed into the irrigation system and houses the Flow-Sync
2. **Plug** (replace with Flow-Sync at installation)
3. **O-rings:** Provides sealing of plug in sensor body
4. **Cap:** Retains plug or sensor in sensor body
5. **Cover:** Snaps over the top of the sensor

Note: FCT Tees are ordered for the desired pipe diameter separately from the Flow-Sync (see table on page 8).



SYSTEM OVERVIEW AND FLOW-SYNC OPERATION

Flow-Sync is typically installed near the point of connection, in an appropriately-sized FCT Tee.

Flow-Sync can connect to the host controller via two direct burial-rated 18 AWG/1 mm wires up to 1000 ft/300 m away from the controller.

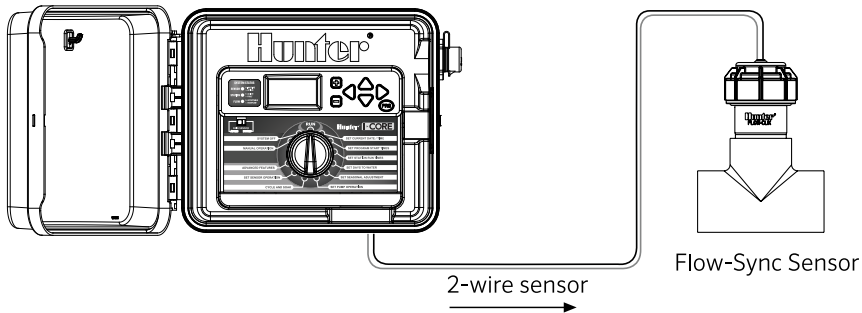
Flow-Sync can also connect to ACC99D family decoder controllers via the ICD-SEN sensor decoder, and report up the same two-wire path used by the ICD station decoders. Flow-Sync does not require any additional power source.

Flow-Sync sensors operate with an impeller positioned in the flow through the pipes.

As the impeller turns, pulses are generated to the controller, which converts them to gallons or liters, depending on the Units of Measurement selection in the controller.

Flow-Sync is a reporting device, and does not respond to flow situations on its own. Flow-Sync is almost always installed in conjunction with a Master Valve, which can stop flow in a damaged pipe when high flow conditions are detected.

Standard 24 Volt Controller



INSTALLING THE FLOW-SYNC SENSOR AND FCT TEE

The Flow-Sync Sensor is designed to install within an FCT tee fitting, sized for the pipe in which it will be installed.

For international applications, optional slip-BSP adapters are available separately for sizes up to 75 mm.

HFS FCT Tee Fitting Models (All tees are glue/slip type fittings)			
Model	Material	Diameter (US)	Diameter (mm)
FCT 100	Schedule 40 (white)	1"	25 mm
FCT 150	Schedule 40 (white)	1.5"	37 mm
FCT 158	Schedule 80 (gray)	1.5"	37 mm
FCT 200	Schedule 40 (white)	2"	50 mm
FCT 208	Schedule 80 (gray)	2"	50 mm
FCT 300	Schedule 40 (white)	3"	75 mm
FCT 308	Schedule 80 (gray)	3"	75 mm
FCT 400	Schedule 40 (white)	4"	100 mm

BSP Adapters	
Diameter (mm)	Model
25 mm	795700
37 mm	795800
50 mm	241400
75 mm	477800

Install the FCT tee fitting first, then install the Flow-Sync Sensor into the fitting.

Observe the following general rules when choosing the sensor location and preparing to install:

- Flush system with plug in place before installing the Flow-Sync sensor, to prevent damage to the impeller.
- Always install Flow-Sync together with a Master Valve, to provide overflow protection.
- Install the Flow-Sync and Master Valve as near the point of connection to the water supply as possible.
- Flow-Sync requires a section of straight pipe on either side of the tee fitting to provide accurate measurement of flow. Tees, ells, and other fittings cause turbulence which affects accuracy.
- There must be a length of straight pipe at least 10 times the diameter of the pipe upstream from the Flow-Sync (toward the water supply).
- There must be a length of straight pipe at least 5 times the diameter of the pipe in the downstream direction (toward the sprinklers).

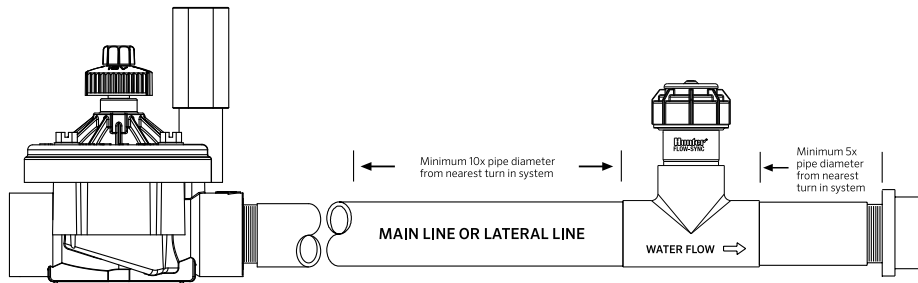
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- Example: FCT-200 is installed in a 2"/50 mm diameter pipe. The tee should have 20"/50 cm of straight pipe upstream, and 10"/25 cm straight pipe downstream.
 - Install the Flow-Sync and FCT assembly in a sturdy irrigation valve box.
 - Flow-Sync has an impeller which will turn in the flow of water. If the water source is not a public water supply, add a filter upstream from the Master Valve and Flow-Sync to protect the impeller from rocks or stones, which may damage the impeller.

The FCT tee fitting is designed for glue ("slip") connection. Use approved PVC solvent-welding glue to install either threaded fittings, or directly into the irrigation pipe if desired.

Metric thread adapters are available and are listed in this manual on page 8.



Avoid excess glue when attaching fittings. Uncured blobs of excess glue on the fitting's interior can interfere with paddlewheel operation.



INSTALLING THE FLOW-SYNC SENSOR INTO THE FCT FITTING

The FCT tee fitting comes with a plug that allows for installation of the FCT into the irrigation system prior to installing the Sensor. This allows the FCT tee to be installed separately from the sensor and prevents damage to the sensor during installation of the body.



NOTE: Do not attempt to remove the sensor plug or sensor while the system is under pressure

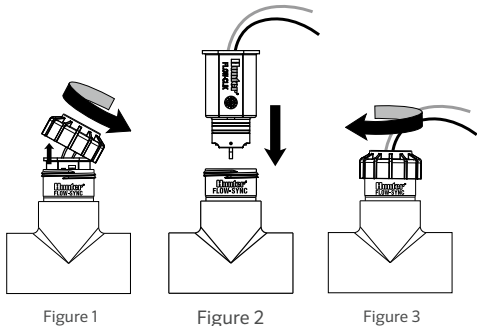
To install the sensor into the body:

- 1.** Turn the system pressure off.
- 2.** Unscrew the cap from the top of the FCT (figure 1).
- 3.** Use pliers or a screwdriver and carefully pry the plug from the FCT tee.
- 4.** Insert the sensor into the FCT. The sensor has a flat side that engages with a flat on the inside of the sensor body (figure 2).

5. Replace the cap on the sensor body. Hand tighten only. (figure 3).
6. Feed the two sensor wires through the hole in the cover and snap the cover on the cap.



NOTE: Never glue the HFS sensor into the fitting! The threaded cap is designed to seal under pressure



WIRING THE FLOW-SYNC TO THE IRRIGATION SYSTEM

WARNING! Flow-Sync is only designed for low-voltage connection to approved irrigation controller flow terminals. Do not install in high-voltage 110V or 230V circuits.

Flow-Sync has two wire leads for the controller connection. These may be extended up to 1000 ft/300 m from the controller with direct burial-rated 18 AWG (1 mm) wires. Flow-Sync may also be used with Hunter ICD-SEN sensor decoders.

Wiring the Sensor

The red and black lead wires from the Flow-Sync Sensor are for DC voltage. The red wire is positive

(+) and the black wire is negative (-).

When extending the wires to reach the controller flow sensor connection, the red and black wire polarity must be observed. Use an extension wire that has a similar color code.

Connect the red lead from the sensor to the red (+) flow terminal in the controller. Connect the black lead from the sensor to the black (-) terminal in the controller. Use only quality waterproof connectors for all wire connections

- In the ACC controller, the terminals are marked “Flow,” one for red and one for black.

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- In the I-Core controller, the terminals are marked either S1 (one is red, and one is black) or S2 (or S3 in metal versions).

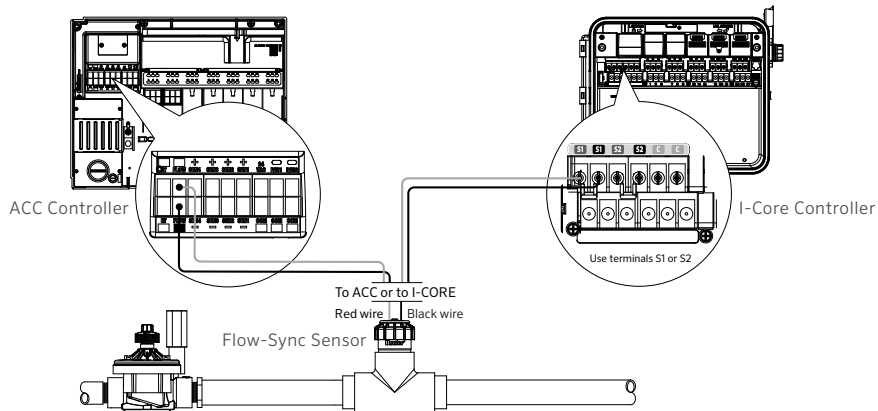
When used with a Hunter ICD-SEN sensor decoder, consult the manual for the ICD-SEN.

- Flow-Sync may only be used on Port A of a sensor decoder.
- Cut the purple loop (Port A) on the sensor decoder.
- Observe polarity-when the loop is cut, the lead on the station label side of the ICD-SEN is the negative (-) side.

- Connect the black wire from Flow-Sync to the negative side of the decoder port, and connect the red wire to the positive side of the port.
- Finish configuration as described in the ICD-SEN and ACC controller documentation.



Note: The Flow-Sync Sensor can be installed up to a maximum of 1,000 ft/300 m from the controller when installed with 18 AWG or 1 mm gauge or larger copper wire.



Proper irrigation system design and operation assures optimum performance of the Flow-Sync in monitoring for potential high flow conditions. Flow-Sync is primarily designed to shut off the irrigation system in the event of a catastrophic system failure such as a main line or lateral line break. However, depending upon the design of

the irrigation system, the Flow-Sync can offer increased protection when components such as sprays or rotors are damaged or removed due to vandalism. The following may be helpful in making your Flow-Sync System operate at its optimum level.

SYSTEM CONSIDERATIONS

Working With Flow-Sync

Hunter flow-capable controllers are designed to measure and record actual flow, shut off irrigation when a high flow condition occurs, and identify which stations caused the condition.

The controller's Learn mode samples each station individually, and learns a typical flow for each station in the system. During actual irrigation, the flow can be observed at the controller. Actual flows are recorded and stored in the controller facepack. The ACC or I-Core controller will also compare actual flows to the estimated total of all

active stations, to see if there is an unacceptable difference, indicating a leak or break.

Consult the controller documentation closely for setup and operation of flow monitoring. It is vital to set the correct pipe size, so that the controller interprets the flow data correctly. It is also important to set adequate overage amounts (minimum is 15% over normal) and delays (default is one minute) to prevent false alarms.

Mainline Pressure Fluctuation

Some water sources may have varying pressure depending upon the demand for water upstream of the point of connection. During times of heavy demand, system pressure through the mainline may drop.

This is why the flow limit percentage and delay periods (set in the controller) are important, as false alarms lead to a lack of confidence in the system.

Additionally, excess air in irrigation piping causes the Flow-Sync impeller to spin freely during station startup, which may cause temporarily high readings. This problem may be reduced by installing check valves in the system, and by setting the alarm delay values to prevent premature alarms.

Proper System Maintenance and Operation

It is important that your irrigation system be maintained and is functioning properly for optimum performance. Check your irrigation system for any broken components or leaks also, making sure that all sprinklers are operating within the pressure ranges recommended by the manufacturer.

Hunter controllers equipped with flow terminals will have approximately 20 VDC present on the flow sensor terminals, with no flow input.

When flow begins, the voltage will pulse. On a standard voltmeter, the voltage will appear to drop, or pulsate. On voltmeters equipped with a frequency counter, the pulse frequency can be measured in Hz.

TROUBLE-SHOOTING GUIDE

Problem	Cause	Solution
Flow-Sync not reading	Water shut off	Verify that no isolation valves are closed, and that the water source is on.
	Controller not configured	Check controller flow sensor setup. Enter sensor size (and location, for sensor decoders) and other sensor information as required.
	Faulty Wiring- Use voltmeter to verify red and black wires are connected, and have not been reversed.	Fix any wire splices. Correct polarity (red and black).
	Damaged sensor- Impeller damage (debris in water) or Flow-Sync electronics damage (lightning)	Replace sensor.

Problem	Cause	Solution
Flow-Sync not reading correctly	Controller configured incorrectly	Set correct flow sensor size and type at controller.
	Turbulent flow at sensor	Insure that straight pipe is on either side of flow meter.
Frequent false alarms	Station settings too sensitive	Increase overflow percentage (and underflow if available).
	Wide range of flows for a single station	Increase overflow and underflow percentages, and delay interval.

SPECIFICATIONS

Operating Specifications

Temperature	Pressures	Humidity
0 to 140°F/60°C	up to 200 psi/13.7 bar	up to 100%

Flow Range

Flow-Sync Sensor Diameter	Operating Range (Gpm)	
	Minimum*	Suggested Maximum**
1"	2	17
1½"	5	35
2"	10	55
3"	28	120
4"	34	195

* Minimum recommended flow for the highest flow zone for your system

** Good design practice dictates the maximum flow not to exceed 5ft/sec. Suggested maximum flow is based upon Class 200 IPS plastic pipe

Maximum Distance Between Controller/Sensor Decoder and Sensor: 1000 ft/300 m
Wire: 18 AWG/1 mm, 36"/1 m leads (Ø = diameter)

Dimensions					
FCT Tee Fitting	Height	Width	Length	Straight Pipe upstream (Ø x 10)	Straight Pipe downstream (Ø x 5)
FCT 100	4.8"/12 cm	2.3"/6 cm	4.5"/11 cm	10"/25 cm	5"/13 cm
FCT 150	5.4"/14 cm	2.3"/6 cm	4.6"/12 cm	15"/38 cm	8"/20 cm
FCT 158	5.4"/14 cm	2.3"/6 cm	5.1"/13 cm		
FCT 200	6"/15 cm	2.7"/7 cm	4.7"/14 cm	20"/50 cm	10"/25 cm
FCT 208	6"/15 cm	2.7"/7 cm	5.4"/14 cm		
FCT 300	7"/18 cm	4"/10 cm	6.2"/16 cm	30"/76 cm	15"/38 cm
FCT 308	7"/18 cm	4.2"/11 cm	6.4"/16 cm		
FCT 400	8"/20 cm	5"/13 cm	6.2"/16 cm	40"/1 m	20"/50 cm

Flow-Sync Calibration Factors

Hunter controllers allow selection of the correct pipe size by FCT model number. No further calibration is needed.

If “Other” is selected, K-factor and Offset information may be entered directly. Following are K-factor and Offset values for best results with each available FCT model.

Flow Sensor Values		
Hunter Flow Sensor	K-Factor	Offset
HFSFCT100	0.44	0.39
HFSFCT150	1.13	0.00
HFSFCT158	0.92	1.22
HFSFCT200	2.13	0.23
HFSFCT208	1.72	1.70
HFSFCT300	4.61	0.18
HFSFCT308	5.87	1.07
HFSFCT400	8.77	0.48

NOTES

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