Using Flowmeters for Monitoring Irrigation Applications

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Practical considerations in using flowmeters for monitoring water applications in pressurized systems

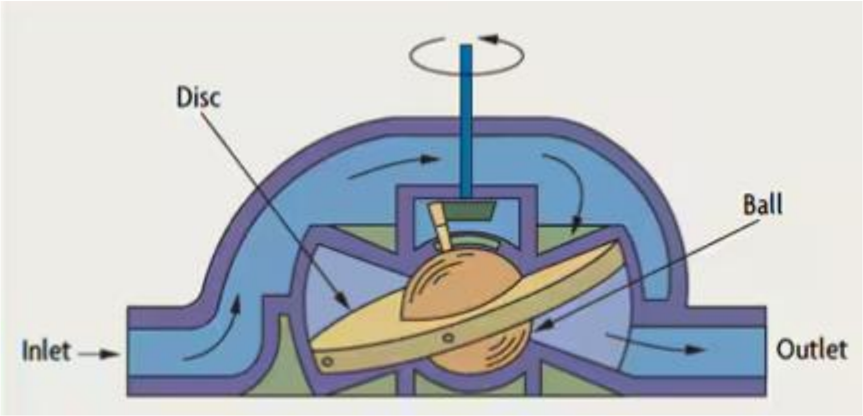
- Measurement technology
- Flow rate
- Pipe diameter
- Positioning
- Straight pipe length
- Register (display)
- Pulse output for interfacing with dataloggers

Main types of flowmeters used in irrigation

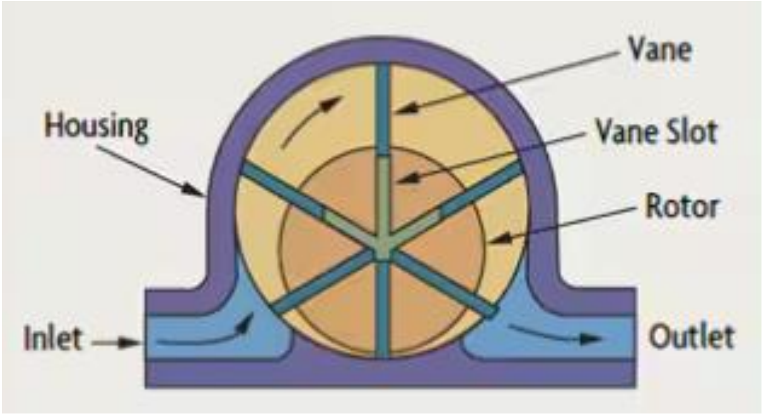
- Impeller (turbine, propeller)
- Paddle wheel
- Magnetic
- Ultrasonic
- Positive displacement (nutating disc)

Positive displacement flowmeters

Nutating disc



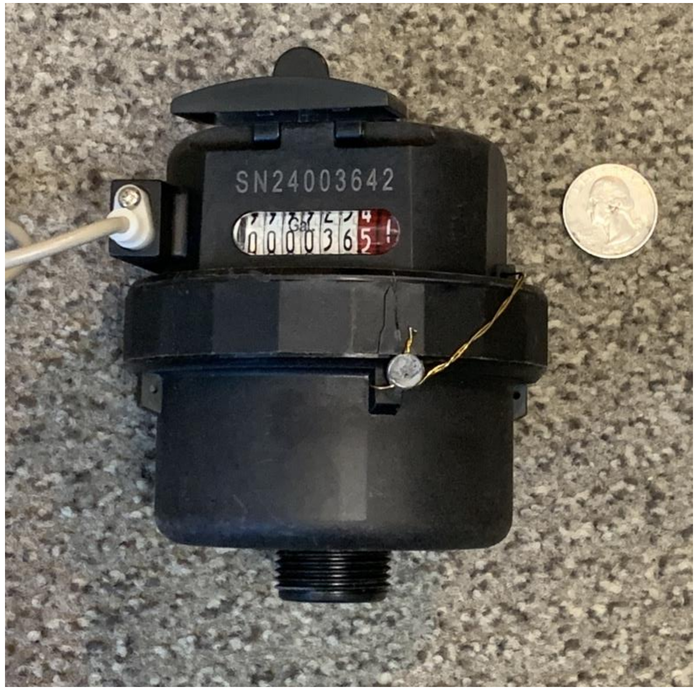
Rotating valve



Nutating disc flowmeters for low flow rates

Badger residential meter

DN15



Magnetic and ultrasonic flowmeters

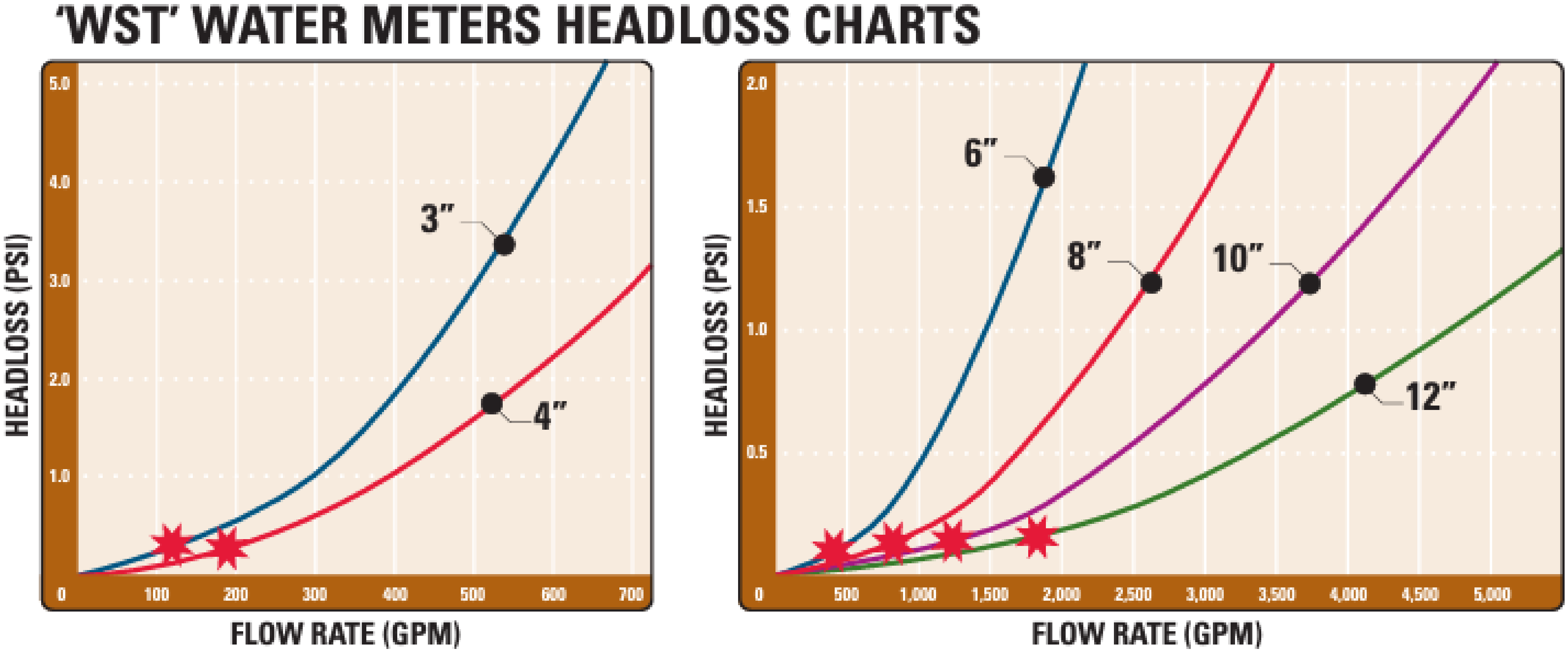
Seametric Ag3000
Magmeter

Seametric Ag90
Insertion Magmeter

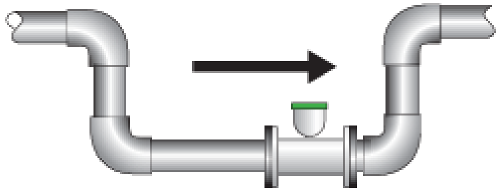
Bermad IRM10
Magmeter

Netafim Octave
Utrasonic

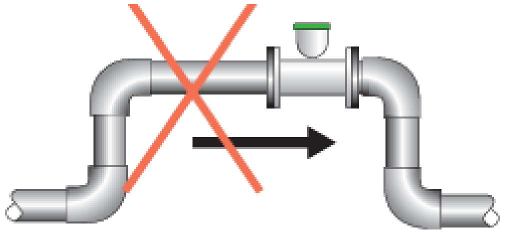
Choose an appropriate size meter for flowrate to minimize pressure losses



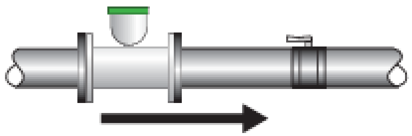
Positioning of flowmeters*
(magnetic, ultrasonic, impeller)



Recommended:
Keep pipe full at meter for accuracy



Not Ideal:
Allows air pockets to form at meter



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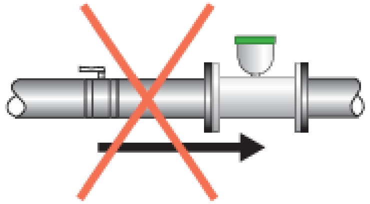
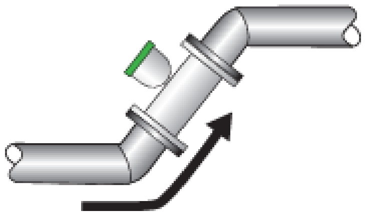
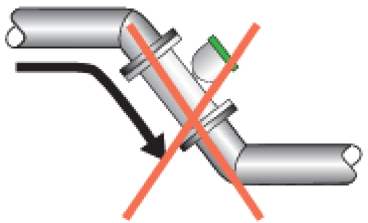


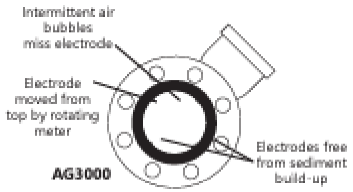
Not Ideal:
Post-valve cavitation can create air pocket



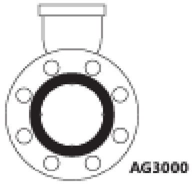
Recommended:
Allows air to bleed off



Not Ideal:
Air can be trapped



Best:
Improved accuracy results from unimpeded electrodes



Not Ideal:
If pipe contains air bubbles or sediment (may affect accuracy)

*Seametric Ag3000 installation manual

How accurate are flowmeters?

Netafim WST (impeller)

Seametric AG90 (mag)

Seametric AG3000 (mag)

Netafim Octave (ultrasonic)

Seametric AG2000 (mag)

Bermad M10 (mag)

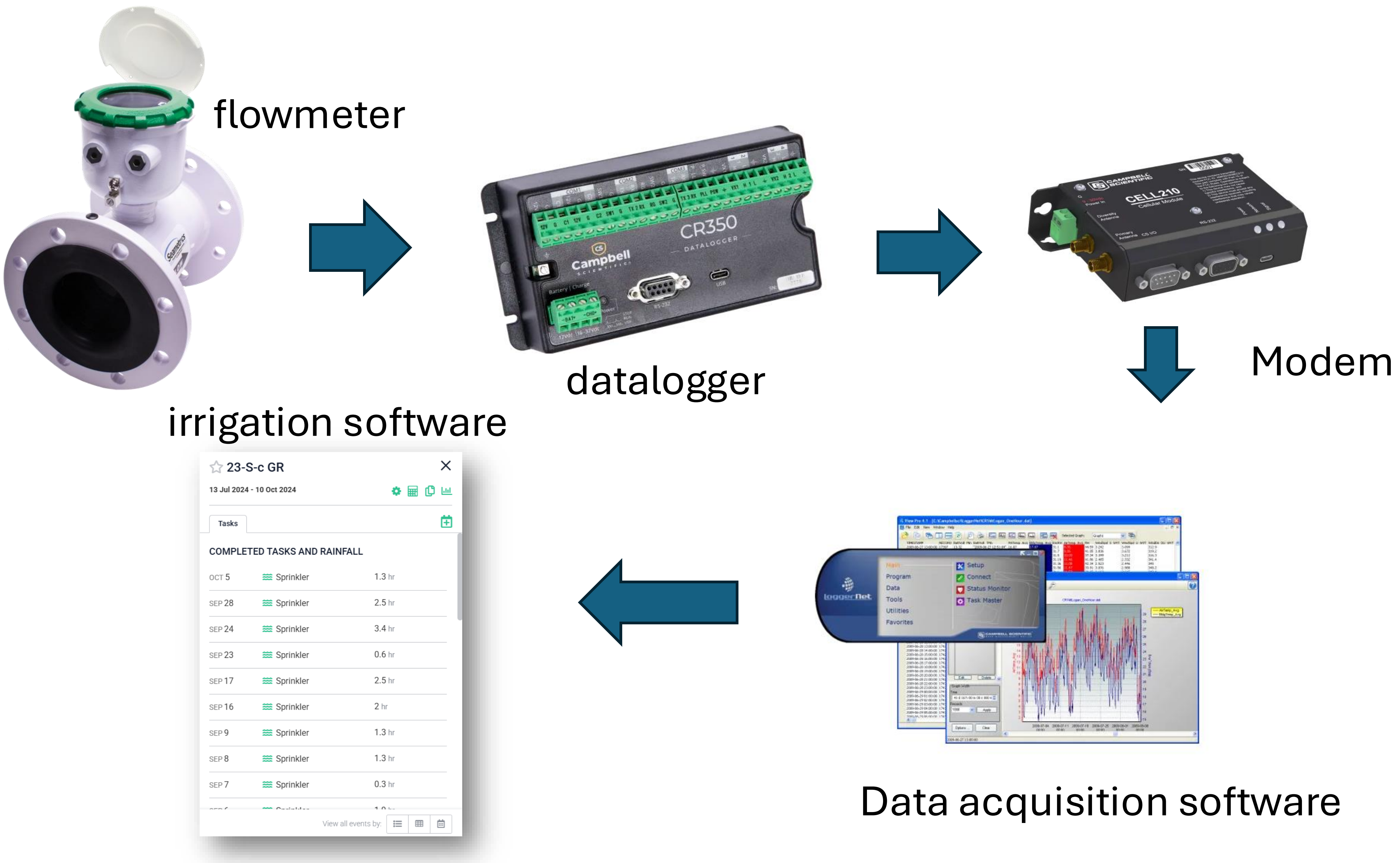
Flowmeter accuracy testing results (average of 5 reps)

Flowmeter #	Manufacturer	Model	Diameter	Flow Technology	Average Volume (gallons)	Coefficient of Variation (%)	Average difference from mean volume (%)
1	Bermad	M10	4-inch	Magnetic	10213	1.2	1.7
2	Netafim	Octave	6-inch	Ultrasonic	10074	1.1	0.3
3	Seametric	AG90	6-inch	Magnetic	9931	1.1	-1.1
4	Seametric	AG3000	6-inch	Magnetic	10060	1.0	0.2
5	Seametric	AG3000	6-inch	Magnetic	10145	1.1	1.0
6	Netafim	WST	6-inch	Impeller	9556	1.2	-4.8

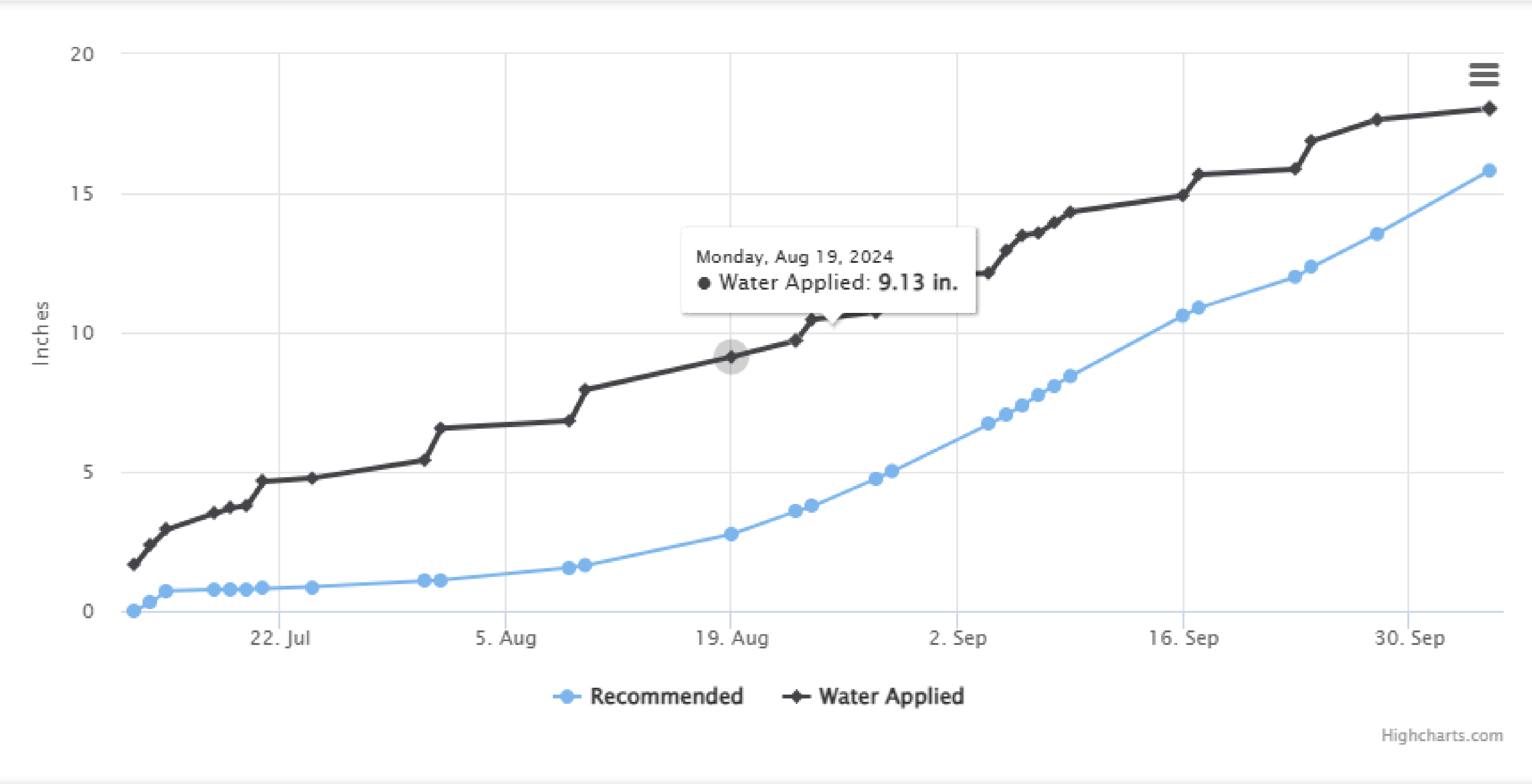
Pulse output is needed for recording of flow using a datalogger

1. Reed switch (magnet) creates voltage pulse (mechanical meters)
2. Voltage pulse output from flowmeter (electronic meters)

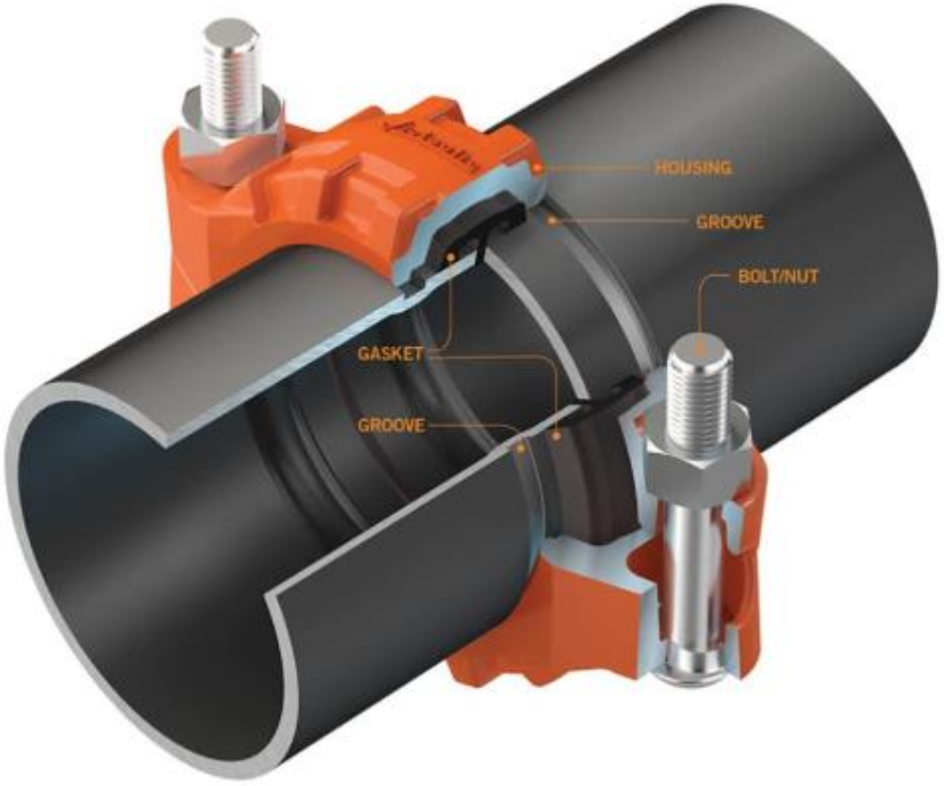
Automating retrieval of flowmeter data from the field



Compare applied vs recommended irrigations



Victaulic clamp system can help with installation of flowmeters



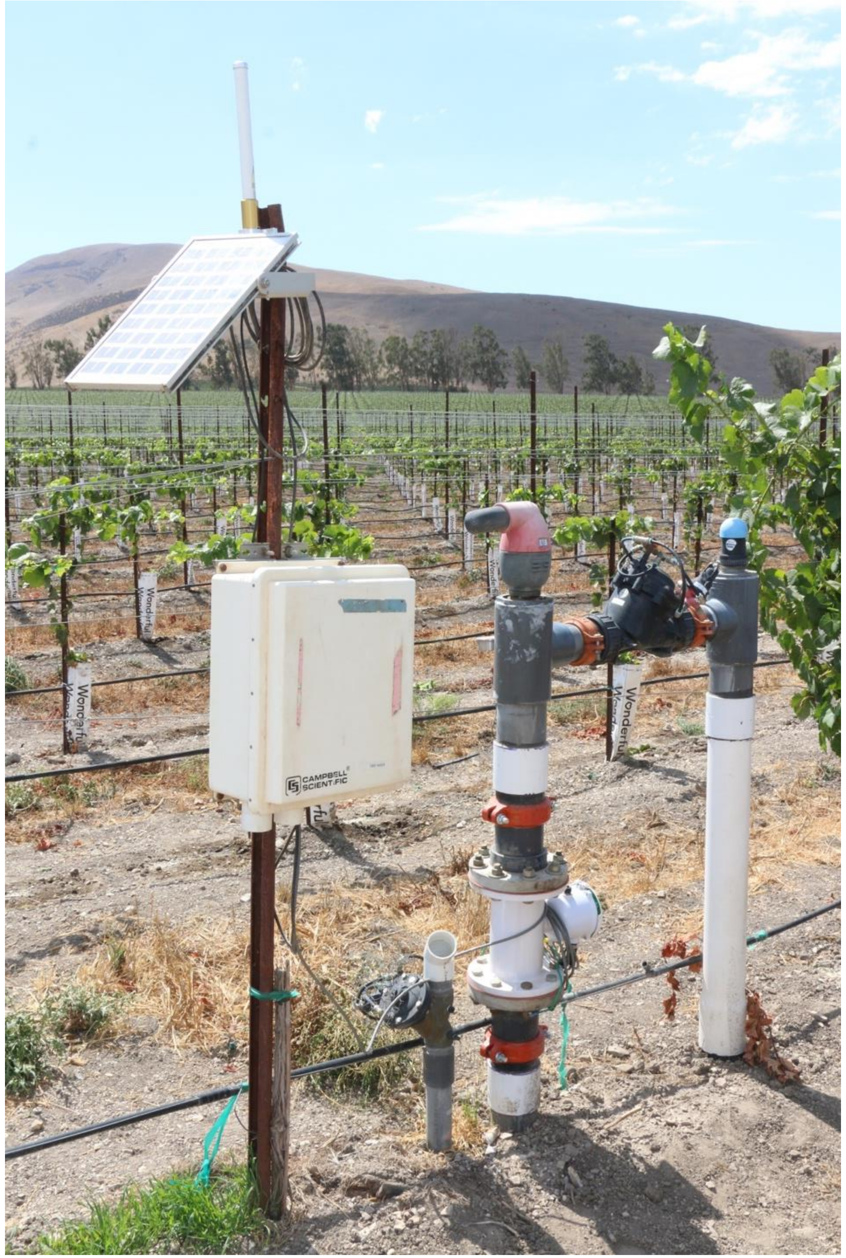
Victaulic coupler

Victaulic flange

Seametric AG2000 on a sprinkler system in celery

Seametric AG3000 on drip system in lettuce

Seametric AG3000 on drip systems in vineyards



Flowmeter installation on large and small vineyard blocks

10 inch Seametric AG3000

2 inch Netafim WST

Badger flowmeter installation in almond orchard