

Overview

The PikoMeter is an integrated canal turnout gate and meter that enables you to remotely deliver precisely-measured quantities of water.

Users can order their water online or over the phone, and the PikoMeter will automatically open and close at the right time to deliver the water. The PikoMeter's control gate modulates to maintain a pre-set flow rate, even with fluctuating canal water levels.

Sonarar® flow measurement technology uniquely enables the meter and control gate to be integrated into a single device. It means installation and maintenance costs are lower, while measuring with unrivaled accuracy in harsh conditions.

Its all-in-one design means everything – drive system, motor control, flow measurement, power supply, local control keypad and telemetry – functions as a single unit. There are no installation problems or incompatibilities, it simply works.

Plus the option of integrated ultrasonic water level measurement enables the meter to measure even when partially-full.

And no matter where you are, with a smartphone and SCADAConnect® software you can open and close the gate, read the meter, check historical data and monitor real-time performance.

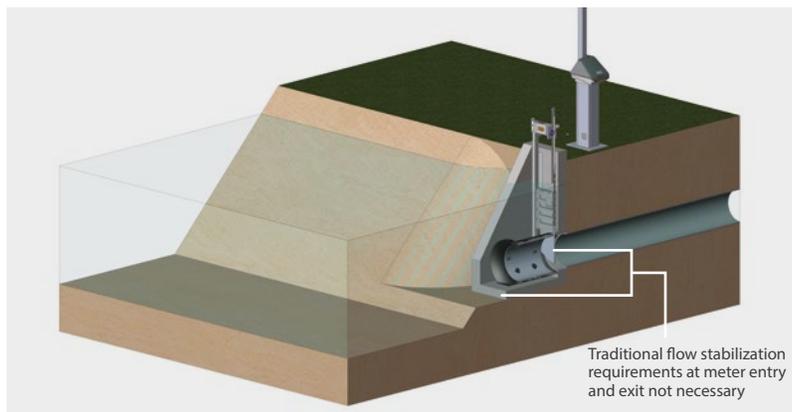
The PikoMeter's built-in software provides the following control possibilities:

Control objective		Gate action
Local	Position	Automatically moves the gate to a desired position and stays there
	Flow	Automatically adjusts the gate to maintain a constant flow rate, regardless of the site's upstream and downstream water levels

A TCC® product

The PikoMeter is one of the products making up a modular family of precision hardware and software called TCC (Total Channel Control®). TCC is an advanced technology set designed to improve the management and productivity of water in open canal and gravity pipeline distribution. Unlike traditional infrastructure, TCC products can interact and work together to help managers improve:

- water availability
- service and equity to users
- management and control
- canal operator safety



Features

- Sonaray® flow measurement accuracy of $\pm 2.5\%$
- Solar-charged battery system
- Compact, lightweight construction for easy installation
- Integrated SCADA communication system

An ideal solution for...

- Canal to pipe applications
- Cost-effective metering at smaller turnouts
- Turnouts in remote locations
- Measuring very low flow rates



Control Pedestal

Each PikoMeter installation includes a robust pedestal that provides power and control to the gate and is a secure, weatherproof housing for electronic components and batteries.

The pedestal also serves as a local user interface. A keypad and LCD display are located under the lockable lid, allowing farmers to monitor, or operators to control and troubleshoot on-site.

Remote management

The PikoMeter can be managed remotely with Rubicon's SCADAConnect® software or third-party SCADA systems. Authorized users can remotely view real-time and historical flow information and configure alarms that can be sent via text message to nominated phones.

Low maintenance

The PikoMeter requires minimal maintenance. Comprehensive error detection and on-site diagnostics are built into the meter software. Factory pre-calibrated, its digital measurement does not drift or require periodic recalibration to maintain accuracy.

- High-quality components designed for long-life
- Built-in on-site diagnostic software and remote alerts
- Control and meter components easily accessible for visual inspection

Gate control technology

The PikoMeter features CableDrive™, Rubicon's actuation system proven over many years in thousands of devices. The drive is a wire cable and drum mechanism that provides positive drive in both the raise and lower directions. It ensures precise gate positioning to within 0.02in (0.5mm) and repeatability under high-duty cycle operation.



Control Pedestal



Keypad and display



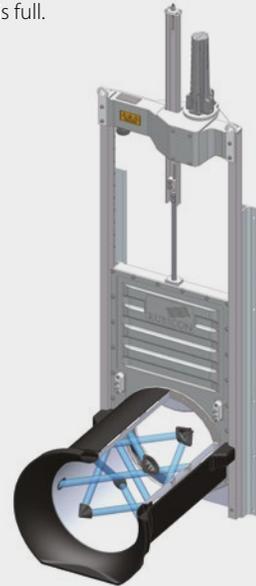
SCADAConnect®

Sonaray® flow measurement technology

The PikoMeter employs Rubicon's Sonaray cross-path ultrasonic flow measurement technology. Twenty transducers across five planes send and receive ultrasonic pulses to determine velocity by measuring the transit time taken for the pulses to travel between transducers.

Cross-path measurement means that the control gate can be located directly downstream from the measurement area without affecting accuracy.

The PikoMeter also has a downward-facing transducer to determine whether or not the measurement cylinder is full.



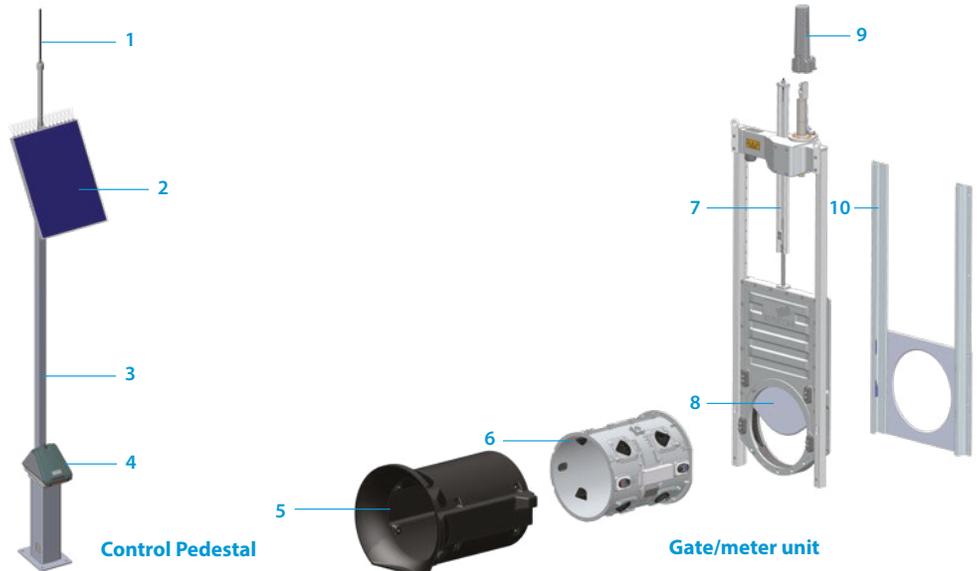
PikoMeter® components

Control Pedestal

- 1 Antenna
- 2 Solar panel
- 3 Hinged mast
- 4 Secure controller housing with LCD display

Meter/control unit

- 5 Entry flare
- 6 Sonaray sensors
- 7 CableDrive
- 8 Control gate
- 9 Motor housing
- 10 External frame



Easy to install

PikoMeters are designed to mount to existing headwall structures as well as purpose-built emplacements, significantly reducing costs associated with civil work.

- Installed and operational in two days during irrigation or off-season
- Factory calibrated and pre-configured

Partially-full flow measurement

A MicronLevel® ultrasonic water level sensor can be optioned to provide a precise measure of canal water levels, plus it enables the PikoMeter to measure flow even when not completely full. The MicronLevel sits within the internal frame, or alternatively a long-range MicronLevel Air sensor can be externally mounted nearby.

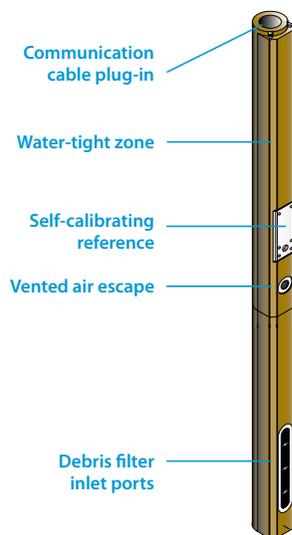
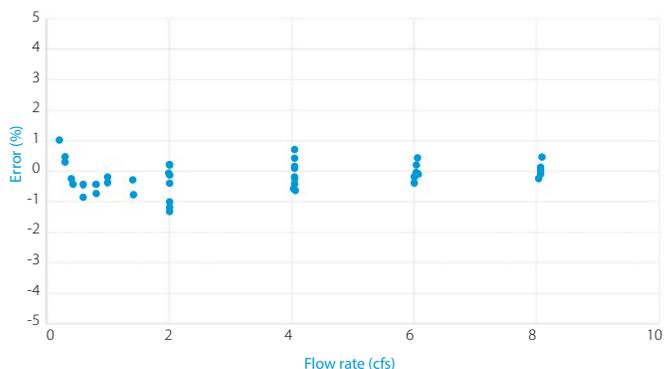
Accurate flow measurement

Extensive independent laboratory and field testing of the ultrasonic array measurement technique has shown that accuracy is maintained in a wide range of conditions:

- Turbulent water
- Obstructions at the meter entry
- Water contaminants

PikoMeter® measurement accuracy

(18in PikoMeter measured under normal operating conditions relative to ABB Magmaster)



MicronLevel® sensor detail

PikoMeter® specifications

General	
Minimum flow rate	0.2 cfs
Maximum flow rate	17.6 cfs
User interface	LCD screen
Data interface	RS232/485, USB, Ethernet
Unit of measure	Metric/imperial
Local interface language	English, Spanish, French, Chinese and Italian
Data tags	A comprehensive set of tags are available for integration into SCADA systems
Data storage	All volumetric usage is accumulated and backed up to an SD card. Historical data can be uploaded locally via USB for post processing.
Control	Local or remote via SCADA
Electronics	SolarDrive® power management and control technology in Control Pedestal. Each unit passes a 12hr heat pre-stress and 100% functional test.
Motor	12V DC
Gate position	256 count magnetic encoder
Seal performance	<0.1 gallons/minute/foot of seal (exceeds American and European standards AWWA C513 & DIN 19569)
Actuation options	12V DC powered (solar); 120-240V AC powered; mechanical override; electrical override pendant and battery
Flow measurement	
Technique	Cross-path ultrasonic transit-time
Transit time measurement resolution	100 picoseconds
Measurement frequency	1.5 seconds
Accuracy	±2.5% in accordance with ISO 4064/OIML R 49
Velocity/measurement range	Accuracy listed above is achieved at flow velocities greater than 2in (50mm) per second
Sensor quantity	21 ultrasonic transducers
Calibration method	Factory pre-calibrated. Simple in-field verification process
Alarming	Alarm indicates if meter is not full; with partially-full measurement optioned, alarm indicates if water falls below minimum level.
Water level measurement (optional)	
Technique	Ultrasonic
MicronLevel®	Accuracy 0.02in (0.5mm), resolution 0.004in (0.1mm)
MicronLevel® Air	Accuracy ± 0.5% at 77°F, resolution 0.004in (0.1mm)
Material	
Frames	Extruded marine grade aluminum
Gate panel	Marine grade aluminum
Gate and meter body	Cast aluminum with protective coating
Hardware	Stainless steel
Shafts	Stainless steel
Seals	EDPM rubber
Wear strip	PVC
Pressure rating	Refer to the dimensions and maximum water levels table on page 4
Water level sensor	Anodized aluminum and copolymer acetyl plastic with stainless steel fittings
Power	
Power supply	12V DC self-contained battery charged from solar panel or AC line power
Solar panel	80, 120 or 160 watt polycrystalline silicon solar cell
Batteries	Sealed gel lead acid with temperature sensor (~5yr life, provides ~5 days of operation without solar or AC line power) or optional lithium LiFePO4
Communications	
Protocols	DNP3, MDLC, Modbus, PLC-5, SLC500, TCP/IP

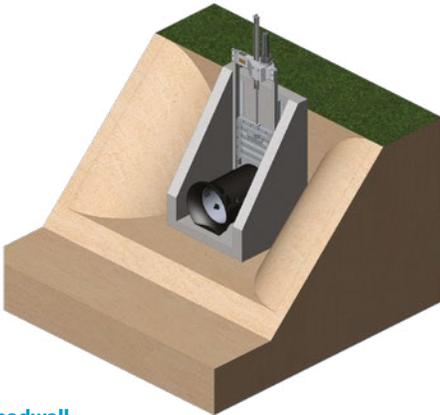
Dimensions and maximum water levels

Model	A	B	C	D	E	F	G	H	Weight
	in	in	in	in	in	in	in	in	
PM-450-1400	18	55	30	90	99	min 45	34	24	291
						max 65			
PM-450-1800	18	71	30	106	115	min 73	34	24	298
						max 80			

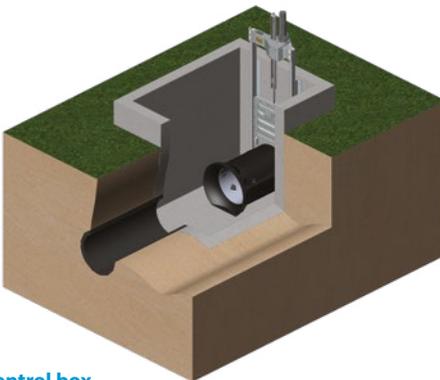
Contact Rubicon for complete dimensions or additional sizes. Consultation with a Rubicon engineer or agent is recommended prior to gate sizing. Weights are approximate.

- A** Internal meter diameter
- B** Maximum height of water above meter invert
- C** External frame width
- D** Overall height
- E** Fully-open height
- F** Headwall height
- G** Length
- H** External meter cylinder height

Mounting options

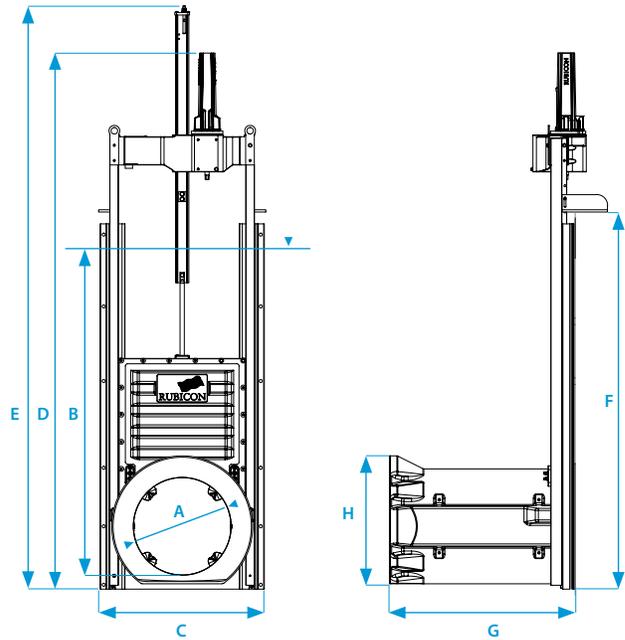


Headwall



Control box

Front and side views



About Rubicon Water

Rubicon Water delivers advanced technology that optimizes gravity-fed irrigation, providing unprecedented levels of operational efficiency and control, increasing water availability and improving farmers' lives.

Founded in 1995, Rubicon has more than 30,000 gates and meters installed in TCC systems in 15 countries.