Overview

The FlumeGate is a combined flow measurement and control gate designed for open channels. Accurate flow measurement, precise motor control, power supply and radio telecommunications are fully integrated in a single device.

In free-flow or submerged conditions, flow is calculated from the gate’s own measurements of upstream water level, downstream water level and gate position.

The FlumeGate can be operated as a stand-alone unit, or can coordinate with other gates along the channel to optimise the whole network’s flow. It can be managed and monitored on-site or operated remotely when connected to a SCADA network.

The FlumeGate automatically controls the flow of water by varying the gate position based on a desired set-point and on control objectives as shown in the table below.

<table>
<thead>
<tr>
<th>Control objective</th>
<th>Gate action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local</strong></td>
<td></td>
</tr>
<tr>
<td>Position</td>
<td>Moves to a desired set-point and stays there</td>
</tr>
<tr>
<td>Flow</td>
<td>Maintains a constant flow regardless of upstream or downstream levels</td>
</tr>
<tr>
<td>Upstream level</td>
<td>Maintains a desired level in the pool immediately upstream</td>
</tr>
<tr>
<td>Downstream level</td>
<td>Maintains a desired level in the pool immediately downstream</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>Changes the flow to match measured outflow from the network below the pool while maintaining a stable downstream water level</td>
</tr>
<tr>
<td>Supply</td>
<td>Changes the flow to match the flow supplied from the network above the gate while maintaining a stable upstream water level</td>
</tr>
</tbody>
</table>

* Network control is available when used with other Rubicon gates and NeuroFlo® network control software.

A TCC® product

The FlumeGate 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 channel 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
- channel operator safety

Features

- Ultrasonic water level measurement
- Integrated flow calculation and control software
- Solar-charged or 120-240V AC charged battery system
- SCADA ready communication system
- Robust high duty cycle operation
- Overshot design for better water level control
- Optional walkways with handrails for staff safety

An ideal solution for...

- Regulating structures or service points requiring low headloss
- Gate modernisation projects (more cost-effective than automating an existing gate)
- Remote locations without AC power
- Maintaining channel diversions or upstream water levels
- Measuring flow in channel-to-siphon applications
Control Pedestal
Each FlumeGate 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 a lockable lid, allowing secure access for authorised users to monitor, control and troubleshoot on-site.

High strength construction
FormiPanel™ is Rubicon’s high strength gate leaf construction that uses techniques adopted from the aerospace and marine industries. The gate panel assembly is a laminate construction that utilises high strength industrial adhesives to bond structural grade aluminium extrusions and skin plates to a synthetic core material. The result is strong, lightweight, and corrosion resistant.

Flow measurement
The FlumeGate calculates flow using measurements of upstream water level, downstream water level and gate position, achieving independently verified measurement accuracy of ±2.5%†. This accuracy is attributed to its unique design and precision manufacture.

Rubicon’s MicronLevel® water level measurement sensors are housed within the internal frame. A water-tight seal separates the upstream and downstream sensors.

• Unique, integrated stilling wells unaffected by surrounding objects, debris, foam, silt or other contaminants
• Self-calibrates on every reading to eliminate drift in speed of sound variations due to changes in temperature or humidity
• Specifically designed for use in harsh irrigation channel environments

Gate control technology
CableDrive™ is Rubicon’s actuation system designed to provide precision gate position accuracy and repeatability in harsh environments. The drive is a wire rope (cable) and drum mechanism that provides positive drive in both the raise and lower directions. It is designed for high duty cycle operation and provides precise gate positioning to within ±0.5mm.

The drive is managed by Rubicon’s SolarDrive® technology – a purpose-built integrated circuit board that manages gate positioning, solar power regulation, battery charge and the pedestal user interface.

Low maintenance
The FlumeGate’s modular design allows it to be maintained in the field with minimal tools, training, and easily replaceable parts.

• Retractable level sensors allow for easy in-field servicing
• Seals can be replaced
• On-site diagnostics
• Service can be done by local Rubicon field technicians or authorised/trained independent local integrators

Easy to install
Rubicon’s FlumeGate products are designed to retrofit to existing in-line regulating 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-commissioned

Frame corner section
Sensor detail
Sensor location
FlumeGate® specifications

**General**
- **Maximum flow rate**: Varies by gate size, refer to flow rating table
- **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
- **Control**: Local or remote via SCADA
- **Drive mechanism**: CableDrive™ wire rope and cable drum assembly for precision positioning and long life
- **Electronics**: SolarDrive® power management and control technology housed in the local control pedestal. Each unit passes a 12hr heat soak prestress and 100% functional test.
- **Motor**: 12V DC
- **Gate position**: 256 count magnetic encoder
- **Seal performance**: <0.02 litres/second/metre of seal (exceeds American and European standards AWWA C513 and DIN 19569)
- **Actuation options**: 12V DC powered (solar); 120-240V AC powered; manual with hand-crank or car battery

**Flow measurement**
- **Accuracy**: ±±2.5% in accordance with AS 4747 and ISO 4064/OML R 49. Accuracy of FG-M-626-620 model verified by Manly Hydraulics Laboratory, August 2005.
- **Measurement frequency**: 10 seconds
- **Calibration method**: Factory pre-calibrated and internal self-calibrating sensors

**Water level measurement**
- **Technique**: Ultrasonic
- **Accuracy**: 0.5mm
- **Resolution**: 0.1mm

**Material**
- **Frames**: Extruded marine grade aluminium
- **Gate panels**: Composite laminate construction using marine grade aluminium sheet bonded to RTM Styrofoam on aluminium extrusion
- **Hardware**: Stainless steel
- **Shafts**: Stainless steel
- **Seals**: EDPM rubber
- **Corrosion protection**: Polyamine-cured epoxy coating is available for additional protection against chemical corrosion in consultation with Rubicon technical staff
- **Hinge**: Duplex stainless steel
- **Water level sensors**: Anodized aluminium 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, 160 watt polycrystalline silicon solar cell options
- **Batteries**: Sealed gel lead acid with temperature sensor (~5yr life, provides ~5 days of operation without solar or mains power input) or optional lithium LiFePO4

**Communications**
- **Protocols**: DNP3, MDLC, Modbus, PLC-5, SLC500, TCP/IP

Specifications subject to change.
Rubicon Water delivers advanced technology that optimises 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 installed in TCC systems in 15 countries.

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### Dimensions and maximum flow rates

<table>
<thead>
<tr>
<th>Model</th>
<th>Structure width</th>
<th>Weight</th>
<th>OE</th>
<th>CE</th>
<th>HUmax</th>
<th>HDmax</th>
<th>Q_F</th>
<th>Q_S</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGB-0626-0674</td>
<td>0.8 (2.5ft)</td>
<td>160 125 715</td>
<td>715 575 46</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGB-0626-0866</td>
<td>0.9 (3ft)</td>
<td>170 160 1035</td>
<td>1035 887 75</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGB-0626-1077</td>
<td>1.2 (4ft)</td>
<td>185 165 1230</td>
<td>1230 1071 103</td>
<td>72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGB-0626-1273</td>
<td>1.3 (4.4ft)</td>
<td>195 165 1230</td>
<td>1230 1071 129</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGB-0760-0866</td>
<td>1.6 (5.4ft)</td>
<td>230 165 1230</td>
<td>1230 1071 185</td>
<td>129</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGB-0760-1077</td>
<td>1.8 (6ft)</td>
<td>250 190 1385</td>
<td>1385 1218 205</td>
<td>142</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FGB-0760-1273</td>
<td>2.4 (8ft)</td>
<td>300 240 1800</td>
<td>1800 1580 374</td>
<td>296</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The dimensions above are for reference purposes only and may change over time. Contact Rubicon for complete dimensions and flow rating tables. Consultation with a Rubicon engineer or agent is recommended prior to gate sizing. Weight are approximate.

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### About Rubicon Water

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