

Overview

The SlipGate is a new generation of precision sluice or slide gate with an all-in-one design that makes remote automated control as simple as installation.

All-in-one means everything has been designed – drive system, motor control, power supply, local control keypad and telemetry – to function as one single unit. There are no integration problems or incompatibilities, it simply works.

Designed from the ground up with technological innovations, the SlipGate provides precision and reliability even under the high-duty cycles that are a consequence of automation. The patented drive system, laminated panel and unique adjustable seals remove the risk and ongoing maintenance issues associated with trying to automate existing gates.

To enable installation in those remote sites that are most costly to visit, the SlipGate is powered with a high performance solar power system. And that also means you can avoid the electricity costs often associated with automation.

In-built support for the most common SCADA software protocols and a variety of radio or GPRS options provide flexibility without compromising design integrity and reliability.

Automatic control

The SlipGate is designed to easily integrate a third-party level sensor or flow meter or Rubicon's own standalone MicronLevel® water level sensor mounted nearby. The built-in software provides seamless SCADA management of the integrated meter or sensor and the following control possibilities.

Water level control	When interfaced with a water level sensor, the SlipGate software will collect data from the water level sensor and modulate the gate to maintain a desired level in the pool immediately upstream or downstream, depending on the water level sensor location.
Flow control	When interfaced with a flow meter, the SlipGate software will collect data from the flow meter and modulate the gate to maintain a desired flow rate.

A TCC® product

The SlipGate 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:

- the availability of water
- service and equity to users
- management and control
- health and safety for channel operators



Features

- Sophisticated control software
- Integrates with a level sensor or flow meter
- SCADA ready communication system
- Solar-charged or AC charged battery system
- Not affected by seating or unseating head
- High duty cycle operation

An ideal solution for...

- Sites with large operational head variations
- Sites where level and flow measurement is not needed or already exists
- Automating farm service points
- Gates used to evacuate channels in stormwater situations
- Remote locations without AC power



Control pedestal

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

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

High strength construction

FormiPanel™ is Rubicon's high strength construction method that uses techniques adopted from the aerospace and marine industries.

The gate panel assembly is made from 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.

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 $\pm 0.5\text{mm}$.

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

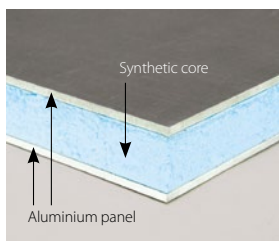
Remote management

The SlipGate can be managed remotely with a third-party SCADA system or Rubicon's SCADAConnect®. With SCADAConnect, authorised users can remotely adjust the SlipGate, view real-time and historical information and configure SMS alerts.

As an alternative to in-house SCADA systems, SCADAConnect can also be deployed as an entry level cloud solution to manage SlipGates over the internet using just a web browser and cellular networks.



Control pedestal



FormiPanel™ construction



SolarDrive® electronics



SCADAConnect® software

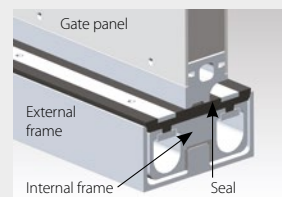
Unique seal technology

Gate seals are fitted on three or four sides of the gate leaf depending upon whether the entire leaf is under water. The seals are continuous and fitted to the internal frame of the SlipGate. They extend along the full perimeter of the outer and underside of the gate panel.

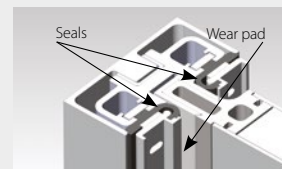
Seals on both the upstream and downstream sides of the gate mean it can hold flow in both directions and is not affected by seating or unseating head.

The crush between the seals and the gate leaf wear pads can be easily adjusted to compensate for wear. The pads are constructed with PVC to reduce the coefficient of friction and increase service life, especially under high duty cycles.

The unique gate leaf profile crushes the bottom seal when the gate is closed to ensure an excellent seal.



Bottom gate seal (cross section)



Side seals (cross section)

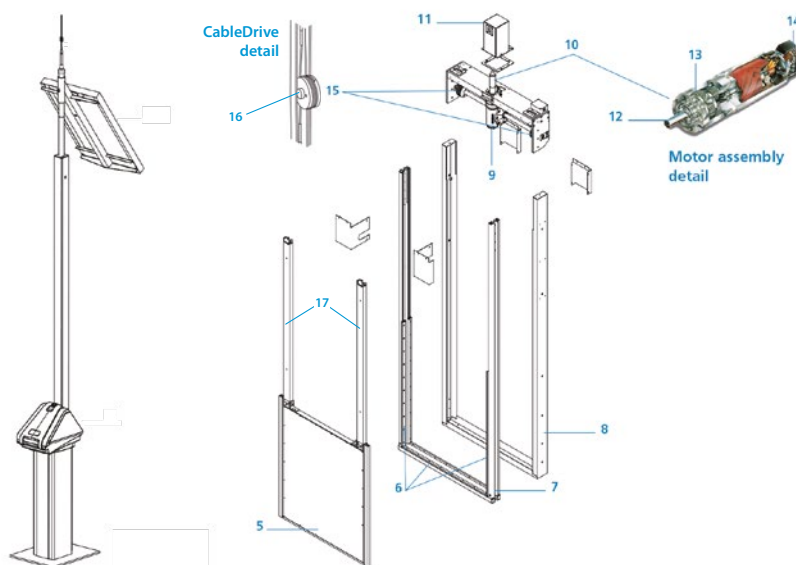
SlipGate® components

Control pedestal

- 1 Antenna
- 2 Solar panel
- 3 Hinged mast
- 4 Secure controller housing with LCD display
- 12 Motor drive shaft
- 13 Planetary gear box
- 14 Encoder
- 15 CableDrive assembly
- 16 Cable drum

Gate unit

- 5 Gate panel
- 6 Gate seals
- 7 Internal frame
- 8 External frame
- 9 Output drive assembly (gear box)
- 10 Motor and encoder
- 11 Motor cover
- 17 Cable guide



Low maintenance

The SlipGate's modular design allows it to be maintained in the field with minimal tools, training, and easily replaceable parts.

- Easily adjustable and replaceable gate seals
- On-site diagnostics built into the control software

Easy to install

Using a slide-in frame, SlipGates retrofit to existing check type regulating structures or mount to existing headwall structures to significantly reduce costs associated with civil work. They can also be mounted to purpose built emplacements.

In most cases a SlipGate can be installed and operational in two days; during irrigation or the off-season.



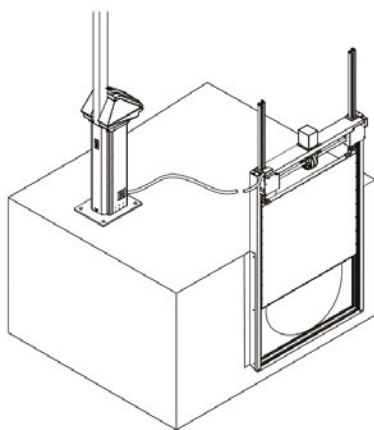
SlipGate® specifications

General	
Data interface	Local display (4 line LCD with keypad), Modbus serial, data interface
Unit of measure	User definable (metric/imperial [US])
Keypad language	English, Spanish, French, Chinese and Italian
Data tags	140+ available for integration into SCADA systems
Control	Local or remote via SCADA
Drive mechanism	CableDrive™ stainless steel 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 pre-stress and 100% functional test.
Motor	12V DC
Seating/unseating head	Not affected by seating or unseating head due to double-sided seal
Gate position	256 count magnetic encoder
Seal performance	Less than 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; mechanical override; electrical override pendant and battery
Material	
Frames	Extruded marine grade aluminium
Gate panel	Composite laminate construction using marine grade aluminium sheetbonded to RTM Styrofoam on aluminium extrusion
Hardware	Stainless-steel
Shafts	Stainless-steel
Seals	EDPM rubber (Durometer 70 [Shore A])
Wear strip	PVC
Power	
Power supply	12VDC self-contained battery charged from solar panel or AC line power
Solar panel	Solar panel 85W monocrystalline
Batteries	2 or 3 12V 28 Ah with temperature sensor (~5yr life, provides ~5 days of operation without solar or AC line power)
Communications	
Protocols	Modbus, DNP3, MDLC

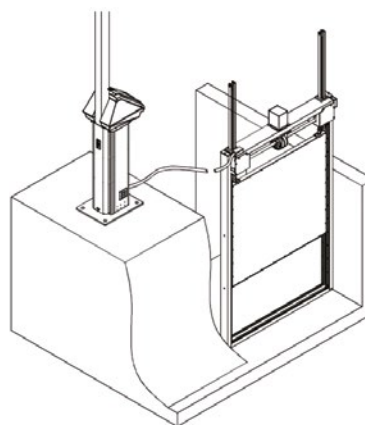
Specifications are believed to be correct as of April 2016. However, we reserve the right to alter specifications without notice.

Typical installations

(Note: Maximum length of cable from pedestal to gate is 9m)



Face mount



Side mount

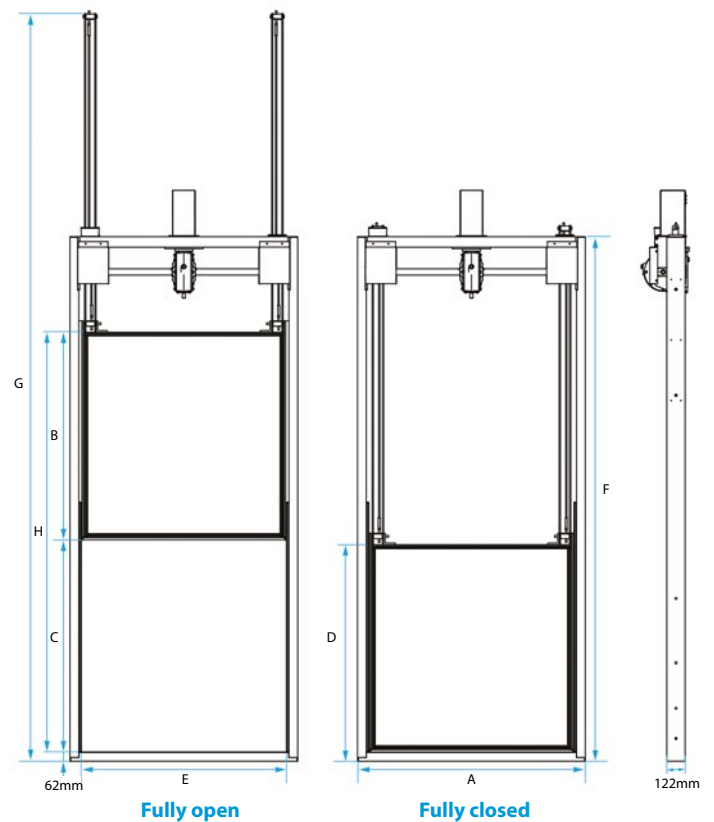
Dimensions and maximum water levels

Model	A	B	C	D	E	F	G	H	Weight
	mm	mm	mm	mm	mm	mm	mm	mm	kg
SG-1050-0915	1184	915	915	977	1034	2397	3388	1830	136
SG-1050-1220	1184	1220	1220	1282	1034	3007	4303	2440	155
SG-1050-1525	1184	1525	1525	1587	1034	3617	5218	3050	194
SG-1050-1830	1184	1830	1830	1892	1034	4227	6133	3660	157
SG-1180-0915	1314	915	915	977	1164	2397	3388	1830	146
SG-1180-1220	1314	1220	1220	1282	1164	3007	4303	2440	157
SG-1180-1525	1314	1525	1525	1587	1164	3617	5218	3050	165
SG-1180-1830	1314	1830	1830	1892	1164	4227	6133	3660	205
SG-1370-1220	1504	1220	1220	1282	1354	3007	4303	2440	167
SG-1370-1525	1504	1525	1525	1587	1354	3617	5218	3050	176
SG-1370-1830	1504	1830	1830	1892	1354	4227	6133	3660	217
SG-1485-1220	1619	1220	1220	1282	1469	3007	4303	2440	173
SG-1485-1525	1619	1525	1525	1587	1469	3617	5218	3050	183
SG-1485-1830	1619	1830	1830	1892	1469	4227	6133	3660	225
SG-1675-1220	1809	1220	1220	1282	1659	3007	4303	2440	185
SG-1675-1525	1809	1525	1525	1587	1659	3617	5218	3050	197
SG-1675-1830	1809	1830	1830	1892	1659	4227	6133	3660	240
SG-1790-1220	1924	1220	1220	1282	1774	3007	4303	2440	192
SG-1790-1525	1924	1525	1525	1587	1774	3617	5218	3050	201
SG-1790-1830	1924	1830	1830	1592	1774	4227	6133	3660	245

- A** Minimum structure width
- B** Gate panel height
- C** Opening height (maximum stroke)
- D** Top of gate panel (fully closed)
- E** Opening width (gate width)
- F** Frame height
- G** Overall height (fully open)
- H** Maximum check height (upstream water depth)

Contact Rubicon for complete dimensions. Consultation with a Rubicon engineer or agent is recommended prior to gate sizing. Utilise the standard orifice equations listed in the USBR Water Measurement Manual to determine the flow through an undershot gate. Weights are approximate.

Front and side views



About Rubicon Water

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.