



## Wireless Flow Sensor

### Flow Sensor One (FS1)

#### Features:

- Flow Ranges from 3.0 to 5,000 GPM
- Dual-Mode: Flow Rate and Total Flow
- 1.0% Error Band
- Integrated Antenna
- Internal Battery

#### Compatibility:

- IEEE 802.15.4 Transceiver
- ISM 2.4 GHz Frequency
- ZigBee/IEEE 802.15.4 Compliant

#### Device Description

Measuring about 250mm long, the Electrochem FS1 is a compact, self-contained wireless flow sensor. Accurate flow measurements are transmitted wirelessly to a suitable base station such as the Electrochem BS1, and passed to a host system such as a PC or PLC. The FS1's internal battery powers the sensor for the entire calibration period of one year.

#### Advanced Sensing

Flow is measured utilizing a Blancett stainless-steel flow meter which houses inlet and outlet flow straighteners and a turbine assembly. Flow can be measured as an instantaneous rate or the sensor can act as a totalizer, keeping a running count on the amount of fluid that passes through. The measureable flow ranges depend on the bore size selected; larger bore sizes are capable of measuring larger flow rates.

#### Integrated Data Acquisition

Signals are amplified and digitized into 24-bit words and converted to units of measure at a rate of up to 480 readings per second. This is all accomplished using a precision mixed signal microcontroller (MCU) which integrates an analog-to-digital converter (ADC) and a high-speed microcontroller. Accurate measurements are passed to the wireless subsection for transmission.

#### Cutting Edge ZigBee

Our ZigBee/IEEE 802.15.4 compliant wireless interface combines an ultra-low power RF transceiver with protocol software to form a transparent wireless communication solution that has self-organizing and self-healing properties. The mesh network allows for ease of installation around obstruction, redundancy in communication paths, and longer range. The 2.4 GHz frequency band is suitable for worldwide use.

#### Capable Radio Hardware

The IEEE 802.15.4 Standard details the Physical Layer (PHY) and Medium Access Control (MAC) specifications, and offers the building blocks for different types of networking known as "star, mesh and cluster tree." Network routing schemes are designed to ensure power conservation, and low latency through guaranteed time slots. Communication redundancy is a unique feature of the ZigBee network layer, eliminating "single point of failure" in mesh networks. Key features of the PHY include energy and link-quality detection, and clear channel assessment for improved coexistence with other wireless networks. The MAC specifies automatic packet acknowledgment, provides options for transmission in a range of pre-selected time intervals, and supports 128-bit AES security. The MAC and ZigBee application software is implemented in a code-efficient microcontroller that communicates digitally with the sensor data acquisition hardware.



# Purchasing Information

Flow Sensor One ..... FS1-CODE (Replace CODE with selection from below.)

## Parts:

Battery ..... 100-100402

## Accessories:

Base Station One USB (BS1-U) ..... 100-100467FG

Base Station One RS-232 (BS1-R) ..... 100-100468FG

Base Station One NG (BS1-NG) ..... 100-100961

Blancett is a registered trademark of Racine Federated Inc.

For complete product specifications, pricing and accessory information:

Call (716) 759-5800 or visit [www.ElectrochemSolutions.com](http://www.ElectrochemSolutions.com)

**SPECIFICATIONS:** Typical for 25°C unless otherwise specified.

## PERFORMANCE

Flow meter codes .....

Code	Bore Size	Connection	GPM Range
3755	3/8"	1/2" Male NPT	0.6 - 3.0
5005	1/2"	1/2" Male NPT	0.75 - 7.5
7505	3/4"	1/2" Male NPT	2.0 - 15
375	3/8"	1" Male NPT	0.6 - 3.0
500	1/2"	1" Male NPT	0.75 - 7.5
750	3/4"	1" Male NPT	2.0 - 15
875	7/8"	1" Male NPT	3.0 - 30
110	1"	1" Male NPT	5.0 - 50
115	1-1/2"	1-1/2" Male NPT	15 - 180
121	1-1/2"	2" Male NPT	15 - 180
120	2"	2" Female NPT	40 - 400
130	3"	3" Grooved End	60 - 600
140	4"	4" Grooved End	100 - 1,200
160	6"	6" Grooved End	200 - 2,500
180	8"	8" Grooved End	250 - 3,500
200	10"	10" Grooved End	500 - 5,000

Error band ..... 1.0% full scale range

Output format ..... 32-bit floating point (IEEE754)

Output rate ..... 0.6 to 10 readings per second

## ELECTRICAL

### Battery

Type ..... Lithium thionyl chloride (Li/SOCl<sub>2</sub>)

Size ..... 2/3 AA

Voltage ..... 3.6 V

### Battery life

Standard range ..... 1 year

Extended range ..... 2 months

Insulation resistance ..... >100 megaohms @ 50 VDC

## MECHANICAL

Media ..... Liquid

Flow meter ..... Blancett Turbine Flow Meter Model 1100

Housing material ..... 316 stainless-steel

Rotor material ..... CD4MCU stainless-steel

Burst pressure

3/8" to 2" bore size ..... 5,000 psi

3" to 10" bore size ..... 800 psi

Turndown ratio ..... 10:1

Sensor body material ..... 316L stainless-steel

Weight (FS1-110) ..... 1000 g

## ENVIRONMENTAL

Operating temperature ..... -40°C to 85°C

Flow temperature ..... -100°C to 165°C

## WIRELESS

### Range

#### Standard

Indoor/urban ..... 30 m

Outdoor line-of-sight .... 100 m

#### Extended

Indoor/urban ..... 100 m

Outdoor line-of-sight ..... 1500 m

Operating frequency ..... ISM 2.4 GHz

### Agency approvals

#### Standard

FCC Part 15.247 ..... OUR-XBEE

Industry Canada (IC) ..... 4214A-XBEE

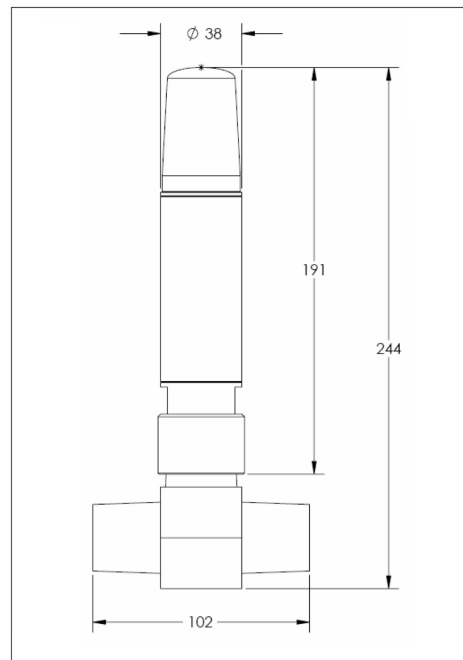
Europe ..... ETSI

#### Extended

FCC Part 15.247 ..... OUR\_XBEEPRO

Industry Canada (IC) ..... 4214A-XBEEPRO

Europe ..... ETSI



All dimensions are shown in millimeters.