



# SpiRely™ Series

AWWA ULTRASONIC WATER METER

**Spire Metering delivers the latest Commercial and Industrial ultrasonic metering technology for reliable flow measurement. The rugged SpiRely water meter provides sustained accuracy over its service life and seamlessly integrates with modern AMR/AMI systems.**



## Applications

- Any Application requiring high accuracy across the full flow range for revenue billing
- Municipal water and water-distribution networks
- Waste water, irrigation, reclaimed water, and storm water
- Commercial buildings: Malls, campuses, hospitals, industrial parks, and airports
- Industrial water: Steel mills, heavy manufacturing plants, power plants, and food & beverage facilities

## Features & Benefits

- No moving parts; maintenance-free ultrasonic measurement with no accuracy drift over service life
- Fully encapsulated heavy-duty enclosure IP68 / NEMA 6P submersible rated
- Straight-through flow-cell design with no diameter reduction and no strainer required. Negligible pressure loss reduces pumping costs.
- Meets or exceeds AWWA C715
- Detects active leaks, reverse flow, tampering, high flow rates (potential pipe burst) events

- Leak and tamper detection, DMA (District Metered Area) leak-detection deployments
- AMR/AMI projects that require flow accuracy with low life-cycle costs



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## AWWA ULTRASONIC WATER METER



The SpiRely™ Series Ultrasonic Water Meter is purpose-built for municipal, commercial, and industrial water-metering applications where demanding conditions cause conventional mechanical meters to fail.

The SpiRely™ Series is engineered for robust performance in harsh environments. The flow sensor uses piezoelectric transducers to generate ultrasonic signals with no moving parts to wear out as in traditional mechanical meters. The electronics, transducers, and cabling are fully encapsulated within a heavy-duty NEMA 6P / IP68 rated fully submersible enclosure, making the meter suitable for indoor, outdoor, and submerged installations.

The SpiRely™ series uses advanced multi-path ultrasonic transit-time sensors to conduct extremely accurate flow measurements.

Depending on the meter variant, two pairs (CI2) or four pairs (CI4) of ultrasonic transducers interrogate the flow along independent paths, so distortion of the flow profile has minimal impact on the measurement. This is a significant advantage over single-path ultrasonic meters: in many real-world installations, straight-pipe run after an elbow, valve, or pump is insufficient, or the meter is not perfectly aligned with the pipeline. In those conditions, swirl and other secondary-flow effects routinely cause measurable error in single-path designs.

The SpiRely™ Series meets ISO 4064 (and OIML R49) for Class D accuracy and exceeds AWWA C715. Operating water temperature is 32 °F to 140 °F (0 °C to 60 °C) continuous duty, with short-term excursions to 185 °F (85 °C). The large display can be configured to show cumulative volume, instantaneous flow rate, leak alarms, reverse-flow events, and additional diagnostics. Remote readout options include encoder (Sensus UI1203 protocol), RS-485/Modbus, pulse, LoRaWAN, and wM-Bus. The wM-Bus interface supports both drive-by and AMI fixed-network reading.

The SpiRely™ Series distinguishes itself with a rugged design, multi-path ultrasonic technology, a wide dynamic range, a long-life field-replaceable battery, and extensive AMR/AMI options. It performs reliably even in challenging conditions — high-particulate water and harsh installation environments. Commercial and industrial installations benefit from precise, wear-free flow measurement, operational reliability, and a long service life.



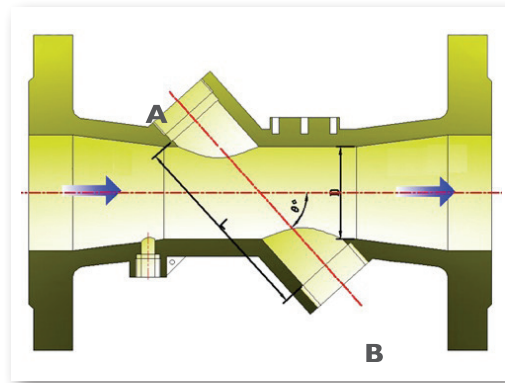


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### Operating Principle

The SpiRely™ Series ultrasonic water meter comprises a flow-cell, ultrasonic transducer pairs, and an integrator. The transducers are mounted at optimal positions on the flow-cell, with each pair arranged face-to-face with one transducer upstream and one downstream as shown in the diagram. The CI2 variant uses two transducer pairs whereas the CI4 variant uses four pairs.



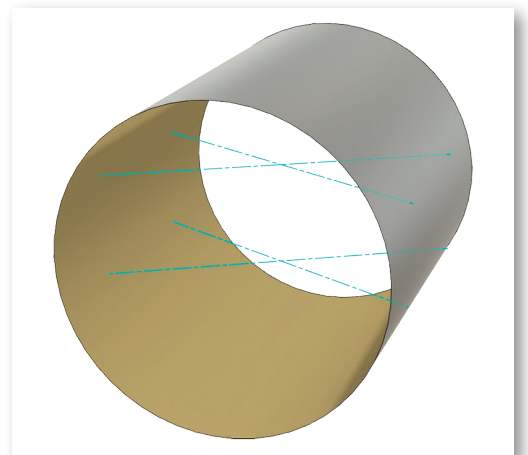
The integrator (or calculator) coordinates the transducers, driving each to emit a pulse of ultrasonic energy that travels through the water toward the opposing transducer. As each pulse arrives at the opposing element, the integrator uses advanced digital signal processing to measure its transit-time precisely.

Because the transit-time difference between the upstream and downstream pulses is directly proportional to flow velocity, the integrator computes velocity from this difference and then derives volumetric flow rate using the known flow-cell geometry and fluid-dynamics correction.

Because measurement relies solely on ultrasonic pulses, the meter contains no moving parts. And because the algorithm uses the transit-time difference rather than absolute transit-time, common interfering variables (temperature, pressure, solids concentration, and water quality) cancel out. The result is an inherently robust flow measurement system.

### Unique Multi-path Technology

In practice, it is difficult to install a flow sensor in perfect alignment with the upstream pipeline. A slight misalignment distorts the water flow profile inside the meter and can introduce significant measurement error. To address this, Spire Metering developed a unique multi-path flow sensor design to solve this problem. In the CI4 variant, four ultrasonic transducer pairs interrogate the flow along four independent acoustic paths; a fluid-dynamics-weighted averaging algorithm then combines the four readings into a single high-accuracy flow value.





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### Technical Specifications

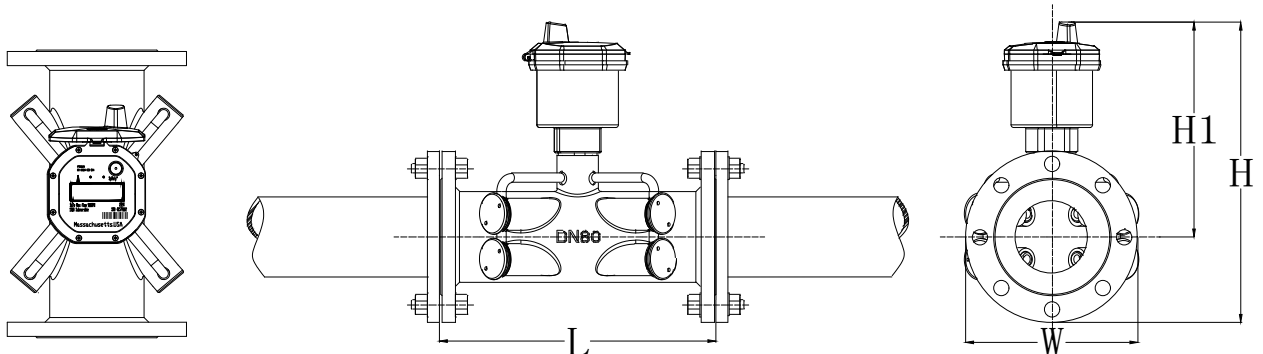
#### Metrology Performance

|  | Unit | Nominal Size |      |       |       |       |       |       |
|--|------|--------------|------|-------|-------|-------|-------|-------|
|  |      | DN50         | DN80 | DN100 | DN150 | DN200 | DN250 | DN300 |
|  |      | 2"           | 3"   | 4"    | 6"    | 8"    | 10"   | 12"   |
| <b>Start Flow</b>  |      | 0.1          | 0.15 | 0.18  | 0.3   | 0.5   | 0.5   | 1     |
| <b>Minimum Flow Rate</b><br>(±5% of reading)               |      | 0.56         | 1.4  | 2.24  | 5.59  | 8.8   | 10    | 14    |
| <b>Normal Flow Range Lower Limit</b><br>(±1.5% of reading) | GPM  | 1            | 2.5  | 3.5   | 9     | 18    | 25    | 36    |
| <b>Normal Flow Range Upper Limit</b><br>(±1.5% of reading) |      | 250          | 550  | 1000  | 2300  | 3500  | 6200  | 9600  |
| <b>Maximum Continuous</b>                                  |      | 220          | 500  | 920   | 2000  | 3500  | 6200  | 9600  |
| <b>Safe Max Operating Capacity (SMOC)</b>                  |      | 250          | 550  | 1000  | 2300  | 3500  | 6200  | 9600  |
| <b>Pressure Loss at SMOC</b>                               | psi  | 3.08         | 3.14 | 2.99  | 2.84  | 3.37  | 3.07  | 2.87  |

#### Dimensions and Weight

|                     |      |       |       |       |       |       |        |        |
|---------------------|------|-------|-------|-------|-------|-------|--------|--------|
| <b>L</b>            | mm   | 254   | 305   | 356   | 457   | 508   | 451    | 502    |
|                     | inch | 10"   | 12"   | 14"   | 18"   | 20"   | 17.75" | 19.75" |
| <b>W</b>            | mm   | 150   | 190   | 229   | 279   | 343   | 406    | 502    |
|                     | inch | 5.91  | 7.48  | 9.01  | 10.98 | 13.5  | 15.98  | 19.75  |
| <b>H1</b>           | mm   | 220   | 240   | 250   | 280   | 300   | 325    | 340    |
|                     | inch | 8.8   | 9.45  | 9.84  | 11.02 | 11.81 | 12.8   | 13.38  |
| <b>H</b>            | mm   | 300   | 335   | 365   | 420   | 472   | 528    | 590    |
|                     | inch | 11.81 | 13.18 | 14.37 | 16.8  | 18.58 | 20.78  | 23.22  |
| <b>Weight (CI2)</b> | kg   | 11    | 16    | 20    | 33    | 48    | 60     | 86     |
|                     | lbs  | 24.2  | 35.2  | 44    | 72.6  | 105.6 | 132    | 189.2  |
| <b>Weight (CI4)</b> | kg   | 13    | 18    | 22    | 35    | 50    | 62     | 88     |
|                     | lbs  | 28.6  | 39.6  | 48.4  | 77    | 110   | 136.4  | 193.6  |

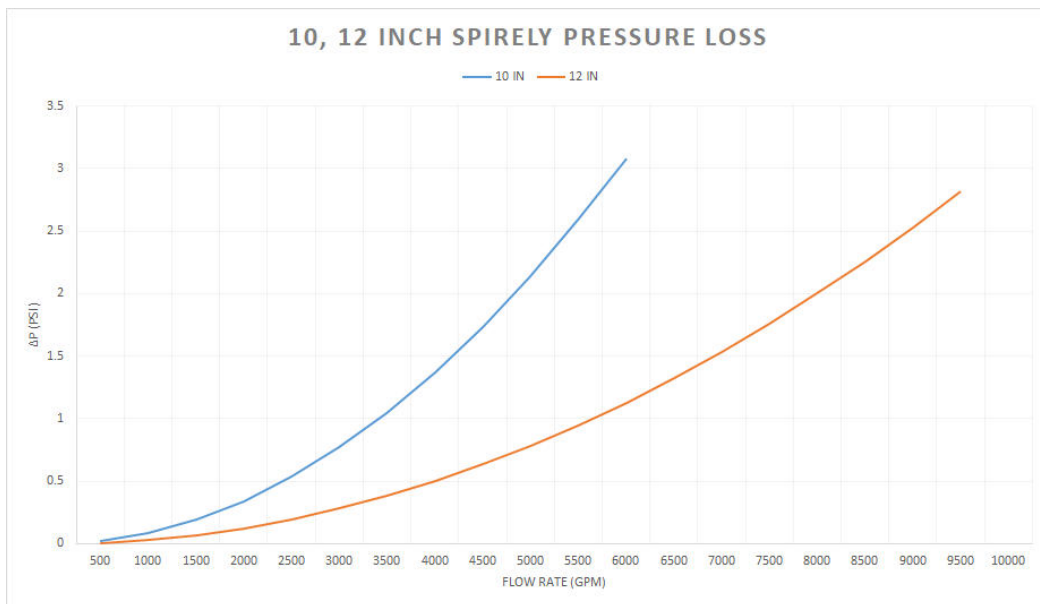
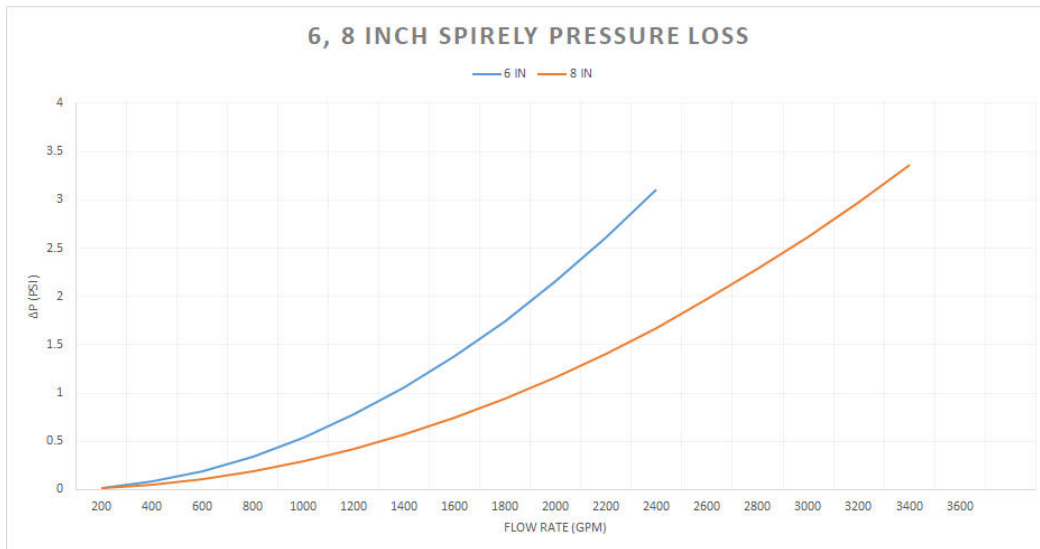
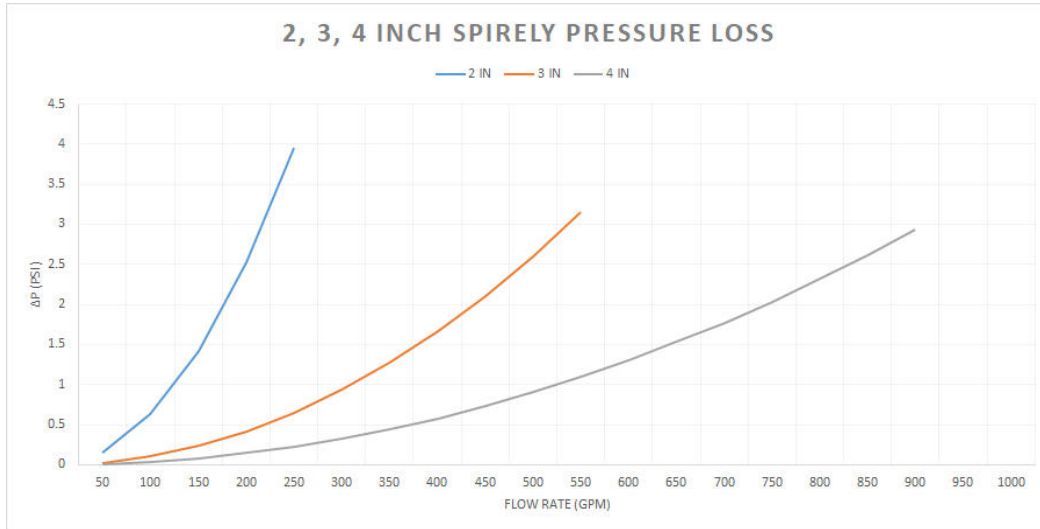
#### Dimensional Drawings





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### Electrical Data

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|                          |  |
|--------------------------|--|
| Power Supply:            | 3.6V Lithium thionyl chloride (Li-SOCl <sub>2</sub> ) primary cell |
| Battery Life:            | ≥10 years at t <sub>BAT</sub> <86°F (30°C). Field-replaceable.     |
| Backup Power:            | Internal Super capacitor   |
| Communication Interface: | LoRaWAN Wireless, Pulse, RS485 / MODBUS, Sensus UI-1203, 4-20mA    |
| CE approval:             | EN61326-1:2013   |

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### Metrology Data

Meets AWWA C715 and ISO4064 / OIML R49

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|                              |  |
|------------------------------|--|
| Accuracy Class:              | 2 (ISO4064 / OIML R49)                   |
| Metrological Class:          | D (ISO4064 / OIML R49)                   |
| Temperature Rating:          | T30 (cold water up to 30°C per OIML R49) |
| Meets ANSI / AWWA Standards: | ANSI/AWWA: C715-18 Type II, C750-19      |

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### Mechanical Data

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|                              |   |
|------------------------------|---|
| Environmental class:         | B. (Class A optional)   |
| Electromagnetic class:       | E1  |
| Ambient temperature:         | 32°F to 131°F (0°C to 55°C)   |
| Permissible Flow Conditions: | Full pipe, clean or lightly contaminated water with suspended solids content < 5% by volume and particle size < 1/16" (1.5mm); non-viscous fluids.  |
| Process Water temperature:   | 32.2°F to 140°F (0°C to 60°C) continuous; intermittent up to 185°F (85°C) for <24 hours. Higher-temperature variants are available on request. Note: factory calibration is performed at room temperature only. |
| Ingress Protection:          | NEMA 6P / IP68  |
| Detachable Integrator:       | no  |
| Hinged Display cover:        | yes   |
| Working Pressure:            | 232 psi(16 bar/PN16)  |
| Body Material:               | 316 stainless steel   |

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### Pressure Loss

The pressure loss across the flow sensor is proportional to the square of the flow rate :  $\Delta p = k \times Q^2$  where  $\Delta p$  is the pressure loss(bar),  $Q$  is volumetric flow rate(m<sup>3</sup>/h) and  $k$  is the meter-specific loss coefficient. All sizes have  $\Delta p < 0.63$  bar at  $Q_3$ , meeting the requirements of ISO4064 / OIML R49 and AWWA C715.

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### Order Specifications

Base Unit

SR – 280W – CI  –  –  – 4 – F – B

| Channel Type           | ID | ID | Flange / Body Pressure |
|------------------------|----|----|------------------------|
| 2 channels (dual path) | 2  |    | B                      |
| 4 channels (quad path) | 4  |    | ANSI Flange* / RF150#  |

| Meter Size | ID   | ID | Sensor Body Material |
|------------|------|----|----------------------|
| 2"         | IN2  |    | 316 Stainless Steel  |
| 3"         | IN3  |    |                      |
| 4"         | IN4  |    |                      |
| 6"         | IN6  | 0  |                      |
| 8"         | IN8  | 2  |                      |
| 10"        | IN10 | L  |                      |
| 12"        | IN12 |    |                      |

| ID | Communication Interface  |
|----|--------------------------|
| 0  | Serial TTL (Default)     |
| 2  | Encoder (Sensus UI-1203) |
| L  | LoRaWAN US915            |

**\*Note:**

•The flange OD and thickness deviate slightly from those specified for an ANSI Class 150 flange.

**Optional Components**

| Output Interface Module*                                 | Model No.       |
|--|-----------------|
| Encoder Module   | 280AP-E-3BW     |
| 4-20mA & RS485 / Modbus Module                           | 280AP-MODAO     |
| NB-IoT Wireless Endpoint With Mushroom Antenna           | 280AP-MR-NB     |
| LoRaWAN 915MHz Wireless Endpoint With Mushroom Antenna   | 280AP-MR-LRW915 |
| Dual Pulse Output Module (dry contact, requires 9-12VDC) | 280AP-P2        |
| BACnet / MSTP Module (requires 12-24VDC)                 | 280AP-MSTP      |

**\*Note:** These modules require the base unit to be configured with a Serial TTL output. Select option 0 (Serial TTL) under Communication Interface in the base-unit model code.

**Example**

SR-280W-CI2-IN4-0-4-F-B designates the a SpiRely Series quad-path (CI4) commercial/industrial water meter, 4" size, with Serial TTL output, 316 stainless steel body and ANSI class 150 RF flange.





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## AWWA ULTRASONIC WATER METER

### Memo

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### About Spire Metering Technology

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Spire Metering is a global supplier of flow and energy management solutions. Through continuous innovation, we make sophisticated ultrasonic measurement technology affordable, reliable, and accessible. Our portfolio includes water, heat, general purpose flow, and high performance mag meters, along with complete AMR/AMI solutions. Contact us to discuss how Spire Metering Technology can support your application. Email: [sales@spiremt.com](mailto:sales@spiremt.com) or Phone: +1 978 263 7100.