



# wPrime™ Series 280W-CI

## ULTRASONIC WATER METER

**Spire Metering offers the latest in Commercial/Industrial ultrasonic metering technology for reliable flow measurement. The rugged 280W-CI water meter will provide sustained flow accuracy for the life of the meter while providing connectivity to smart AMR/AMI solutions.**

## Applications

- Any application that requires high accuracy across all flow rates for Revenue Billing
- Municipal, Commercial, and Distribution applications including reclaim and irrigation water requirements
- Commercial buildings:  
Malls, Campus, Hospitals, Industrial Parks, Airports, Facilities
- Industrial water:  
Steel, Heavy Manufacturing plants, Power Plants, Food & Beverage



- Fire service (Commercial)
- Leak and Tamper detection, DMA (District Metered Area) leakage detection system
- AMR/AMI projects which require flow accuracy with low life cycle costs

## Features & Benefits

- Quad-path technology:  
Improves accuracy, increases tolerance to installation errors and reduces straight-pipe run requirement
- Low pressure drop. Saves significant pumping cost
- Fully encapsulated in a heavy-duty enclosure with IP68 rating
- No moving parts; dependable ultrasonic performance without maintenance
- Not affected by water impurity. Withstands the challenges in harsh environments, such as the Middle East and Africa
- Excellent performance at all flow rates; accuracy does not degrade over the life of the meter
- Exceeds ISO4064 Class D and AWWA C750
- 10 Year battery life
- Bi-directional flow; no strainer required
- Does not measure entrained air in pipe
- Unaffected by magnetic interference
- DN50 (2") to DN300 (12") sizes
- Tamper-proof design
- AMR/AMI ready with pulse encoder, 4-20mA, M-Bus, MODBUS, BACnet, long range RF or GSM/GPRS wireless
- Data Logger with 700 daily totals and 24 monthly totals
- Built-in temperature sensor for wide range temperature compensation
- Built-in pressure sensor for pipeline pressure monitoring in real time

DS-280W-CI-1309\_Rev.1.8US



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# wPrime™ Series 280W-CI

## ULTRASONIC WATER METER



A member of the wPrime™ Series, the 280W-CI Ultrasonic Water Meter is specially designed for commercial and industrial water metering applications where the environment is challenging and traditional mechanical water meters fail.

280W-CI is carefully engineered to offer robust performance in harsh environments. The flow sensor utilizes a crystal to generate an ultrasonic signal. There are no moving parts to wear out over time, as in traditional mechanical meters. The electronics, transducers and cables are all encapsulated in a heavy-duty metal enclosure which is IP68 rated. It is suitable for both outdoor and indoor applications and anywhere the meter may be submersible.

The 280W-CI offers the most advanced water flow measurement by using state-of-the-art



quad-path ultrasonic technology. It employs at least 4 pairs of ultrasonic transducers to interrogate the flow from different positions, so that flow profile distortion has minimal impact on the measurement results. This is a significant improvement compared to single-path ultrasonic flow meters, because it is very common in real applications that there is not enough straight-pipe run after an elbow, a valve or a pump, or the sensor installation is not perfectly aligned with existing pipe line. In those scenarios, turbulence (swirl) or other type of secondary flow could cause errors with single-path flow meters.

The technical specification of the 280W-CI water meter meets the ISO 4064 (or OIML R49) water meter standards for Class D accuracy, and exceeds the AWWA C750-10 water meter standard. The operational temperature ranges from 32.2°F to 140°F including safety temperature up to 185°F. The built-in pressure sensor provides critical real-time pressure information of the pipeline for leak detection and network pressure optimization. The large display can be set to display the flow total, flow rate, working time, leakage alarm, reverse flow, and more. The meter also has a remote readout which could be configured as pulse, M-Bus, RS485/MODBUS, 4-20mA, BACnet, or wireless.

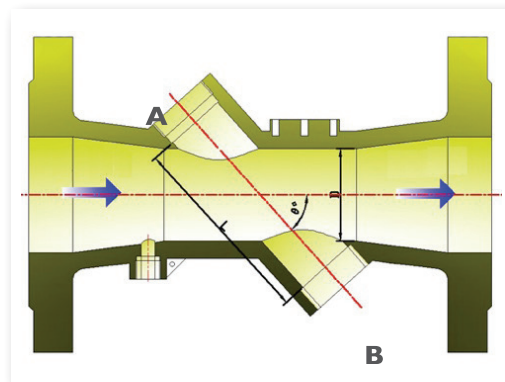
**Spire Metering's 280W-CI Ultrasonic Water Meter stands out among the competition due to its rugged design, quad-path technology, wide dynamic range, real-time pressure information and extensive AMR functions. The 280W-CI performs reliably when the water has high particulates or when the environment is harsh. Both commercial and industrial installations can profit from the advantages of precision, wear-free flow measurement, operational security and long service life.**



# wPrime™ Series 280W-CI ULTRASONIC WATER METER

## Operating Principle

The wPrime series ultrasonic water meter consists of a flow-cell, a pair of ultrasonic flow transducers and an integrator. The transducers are firmly mounted on the flow-cell at the optimal position. As illustrated, the transducers face each other with one on the upstream, and the other on the downstream.



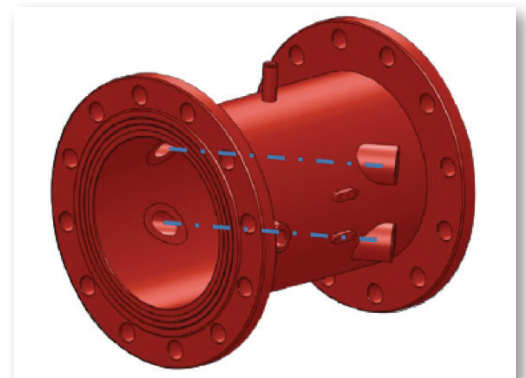
The integrator (or calculator) controls the two ultrasonic transducers to transmit and receive ultrasounds to conduct precise flow measurement. Specifically, it operates the two transducers which transmit a pulse of ultrasonic energy into the water flow toward the opposite transducer. The integrator detects the pulse signal which has traveled within the flow tube, and then is received by the opposite transducer. With advanced digital signal processing technology, the integrator precisely measures the arrival (or transit) time of each pulse signal.

Since the transit-time difference between the two pulses is directly proportional to flow velocity, it can calculate the flow velocity and flow rate. This is accomplished by combining it with the geometry of the flow-cell and fluid dynamics theory.

Only ultrasonic pulses are used to interrogate the flow which enables the meter to have no moving parts. Since the principle is based on the transit-time difference, all the interfering factors, such as temperature, pressure, solid concentration and water quality, are cancelled out. The end result is an ultrasonic metering system which is inherently robust.

### Advanced Quad-path Technology

In real application, it is not easy to install the flow sensor perfectly in line with the pipe line. A slight misalignment could cause flow profile distortion inside the flow cell, and thus cause significant measurement errors. Spire Metering developed a quad-path technology to solve this problem. Four pairs of ultrasonic transducers are mounted on the flow sensor body to interrogate the flow from four different paths (for illustration purposes, the figure shows a dual-path sensor design.) A flow calculation algorithm based on fluid dynamics theory is then used to derive an average flow reading with improved accuracy.





# wPrime™ Series 280W-CI ULTRASONIC WATER METER

## Automatic Meter Reading

The wPrime series water meter offers a variety of interface options, such as M-Bus, RS485/ MODBUS, BACnet, Pulse encoder, 4-20mA and wireless (GSM, GPRS and Radio). It is very flexible to be integrated into an AMR/AMI system.

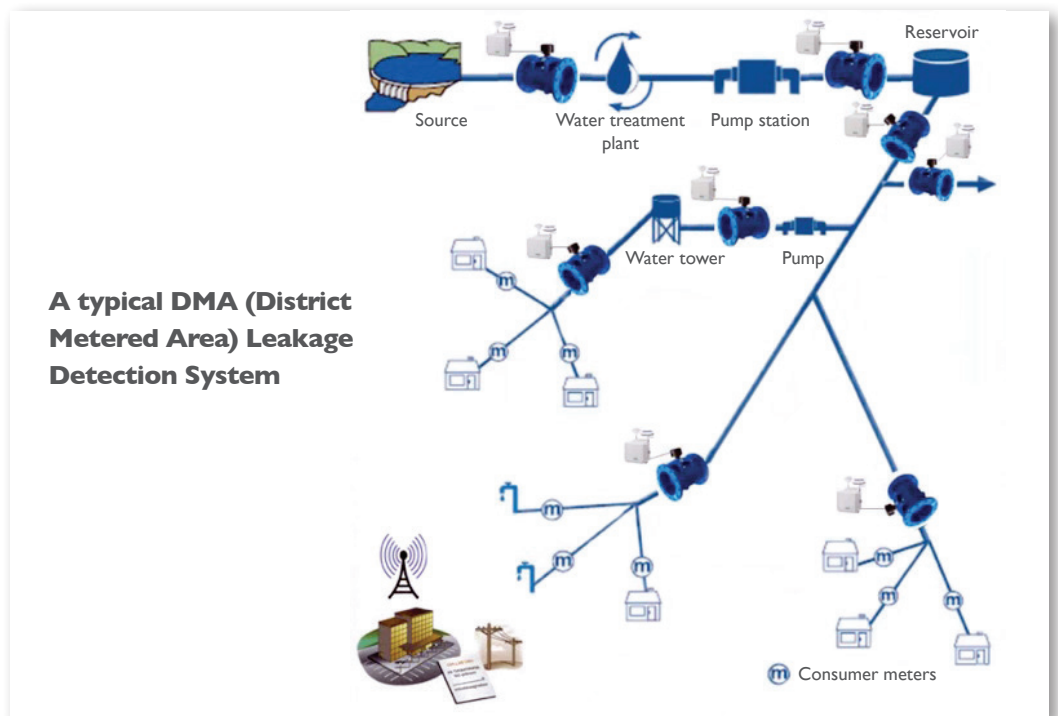
Spire Metering also offers a complete range of AMR/AMI solutions as well as an integrated billing system. The SpireCapture system is a cutting edge fixed automatic meter reading system which integrates both wired and wireless AMR/AMI technologies. The system provides a unified platform for meter reading and data management through M-Bus networks, RF wireless networks, GSM networks, GPRS networks as well as TCP/IP networks. In addition, it works seamlessly with Spire Metering's billing software to make data exchange fast, easy and reliable.

SpireCapture is an advanced, highly robust meter reading solution that delivers

comprehensive usage information as well as timely, high-resolution meter reading. This data enables gas, water, heat and electric utilities to eliminate on-site visits and estimated reads, reduce theft and loss, implement time-of-use billing, and profit from all of the financial and operational benefits of fixed-network AMI/AMR.

For information on AMR/AMI parts, such as concentrators, repeaters, protocol converters, data collection devices and more,

**please contact :** [solutions@spiremt.com](mailto:solutions@spiremt.com)







# wPrime™ Series 280W-CI

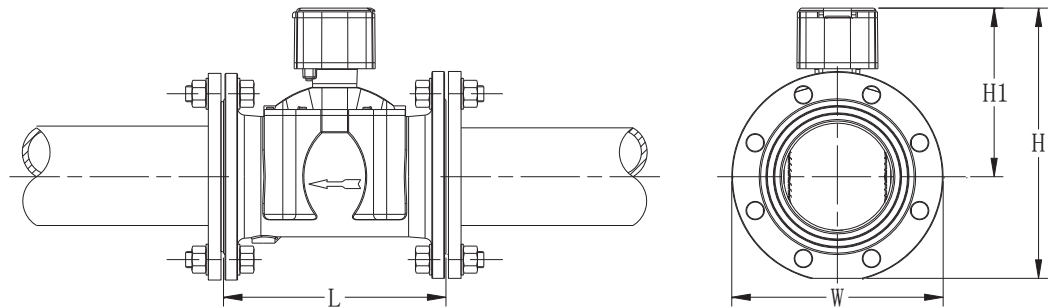
## ULTRASONIC WATER METER

### Technical Specifications

Nominal Size		2"	2.5"	3"	4"	5"	6"	8"	10"	12"
L	inch	7.9	7.9	8.9	9.8	9.8	11.8	13.8	17.7	19.7
W	inch	6.89	7.3	7.9	8.7	9.8	11.2	13.4	15.9	18.1
H1	inch	7.01	7.3	8	8.2	8.9	9.6	10.8	11.8	13.7
H	inch	10.35	10.9	11.5	12.4	13.7	15.1	17.2	18.9	22.8
Q4	GPM	137.6	220.1	346.7	550.4	880.6	1375.9	2201.4	3467.3	5503.6
Q3	GPM	110.1	176.1	277.4	440.3	704.5	1100	1761.2	2773.8	4402.9
Q2	GPM	0.7	1.13	1.78	2.82	4.51	7.04	11.27	17.15	28.18
Q1	GPM	0.44	0.70	1.11	1.76	2.82	4.40	7.04	9.91	17.61
Qs	GPM	0.11	0.14	0.18	0.30	0.42	0.58	0.99	1.55	2.25
<b>Pipe Joint</b>	Flange (Default: DIN)									
		Nut4-M16	Nut4-M16	Nut8-M16	Nut8-M16	Nut8-M16	Nut8-M20	Nut12-M20	Nut12-M24	Nut12-M24
<b>Body Material</b>	Ductile Iron or SS304					Ductile Iron				

**Note:**

- 1) Quad-path ultrasonic technology.
- 2) Default flange is ANSI flange. For meters made from SS304, matching flange is needed.
- 3) The data listed in above table is for dynamic range R250. For R500, Q2 and Q1 data would be half of those for R250.



**Pressure Sensor**

Pressure Range: 0.00~10.00 Bar*
Pressure Accuracy: +/-1% (@25°C) span
Temperature Range: -4°F ~ 185°F
Update time: 8s
Protection: Hermetically sealed

\*Note: The sensor can measure higher pressure, but the error will be higher than the specified.



# wPrime™ Series 280W-CI

## ULTRASONIC WATER METER

### Electrical Data

<b>Power Supply:</b>	Battery, 3.6V, Lithium
<b>Replacement Interval:</b>	5 years at $t_{BAT} < 86^{\circ}F$ , replaceable
<b>Power Consumption:</b>	<0.1W
<b>Backup Power Supply:</b>	Internal SuperCap
<b>Communication Interface:</b>	M-Bus, RS485 / MODBUS, Pulse, BACnet, Encoder, 4-20mA, long range RF, GSM or GPRS wireless
<b>CE approval:</b>	EN61326-1:2006

### Accuracy / MPE (Maximum Permissible Error)

MPE according to OIML R49 / ISO4064

Pipe Size	Accuracy Rate	Flowrate (GPM)	Pipe Size	Accuracy Rate	Flowrate (GPM)
2"	2%	137.6	5"	2%	880.6
2"	2%	110.1	5"	2%	704.5
2"	5%	0.7	5"	5%	4.51
2"	5%	0.44	5"	5%	2.82
2.5"	2%	220.1	6"	2%	1375.9
2.5"	2%	176.1	6"	2%	1100
2.5"	5%	1.13	6"	5%	7.04
2.5"	5%	0.7	6"	5%	4.4
3"	2%	346.7	8"	2%	2201.4
3"	2%	277.4	8"	2%	1761.2
3"	5%	1.78	8"	5%	11.27
3"	5%	1.11	8"	5%	7.04
4"	2%	550.4	10"	2%	3467.3
4"	2%	440.3	10"	2%	2773.8
4"	5%	2.82	10"	5%	17.15
4"	5%	1.76	10"	5%	9.91
			12"	2%	5503.6
			12"	2%	4402.9
			12"	5%	28.18
			12"	5%	17.61

### Metrology Data

<b>Accuracy Class:</b>	2 (according to ISO4064 / OIML R49)
<b>Metrological Class:</b>	D (according to ISO4064 / OIML R49)
<b>Range Q3/Q1:</b>	250
<b>Temperature Rating:</b>	T30

### Mechanical Data

<b>Environmental Class:</b>	B, Optional A
<b>Electromagnetic Class:</b>	E1
<b>Environmental Temp:</b>	32~131°F
<b>Permissible Flow Temp:</b>	32.2~140°F for permanent and up to 185°F for short-term (<24hours). Higher temperature rating can be made upon request. However, factory calibration is done at room temperature only.
<b>Enclosure Protection:</b>	IP68
<b>Integrator Detachable:</b>	No
<b>Lid Cover Protection:</b>	Yes
<b>Pressure:</b>	PN16

### Pressure Loss

The pressure loss of a flow sensor is proportional to the square on the flow :  $\Delta p = k \times Q^2$   
 Here  $\Delta p$  is pressure loss, Q is volume flow rate and k is the coefficient.  
 All meters have  $\Delta p$  less than 0.63bar at Q3, meet ISO4064 / OIML R49 standard and AWWA standard.



# wPrime™ Series 280W-CI

## ULTRASONIC WATER METER

### Order Specifications

Base Unit

#### Attention



You must also order one output interface module from the Required Components table to make a complete system.

280W - CI -  -  -  -  -

#### Meter Size

IN2	IN020
IN2.5	IN025
IN3	IN030
IN4	IN040
IN5	IN050
IN6	IN060
IN8	IN080
IN10	IN100
IN12	IN120

#### Flange / Body Pressure

ANSI Flange\* / RF150#    B

#### Pressure Sensor

N	Without (Default)
Y	With

#### Dynamic Range

A	250 (Default)
B	500

#### Sensor Body Material

1	Ductile Iron
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#### \*Note:

• The actual outer diameter of the water meter flange is slightly smaller than the ANSI flange standard. All other parameters of the flange comply with the ANSI standard.

#### Required Components (Choose One)

Output Interface Module	Model No.
M-Bus Module	280WA-MB
RS485 Module for 485-BACnet/MSTP Adapter	280WA-485
RS485 / Modbus Module	280WA-485MOD
Encoder Module for English Unit	280WA-E-INxx
4-20mA & RS485 / Modbus Module	280WA-MODAO

#### Optional Components

External Adapter	Model No.
485-BACnet / MSTP Adapter (RS485 Module is required)	280WA-BACTP485

#### Example

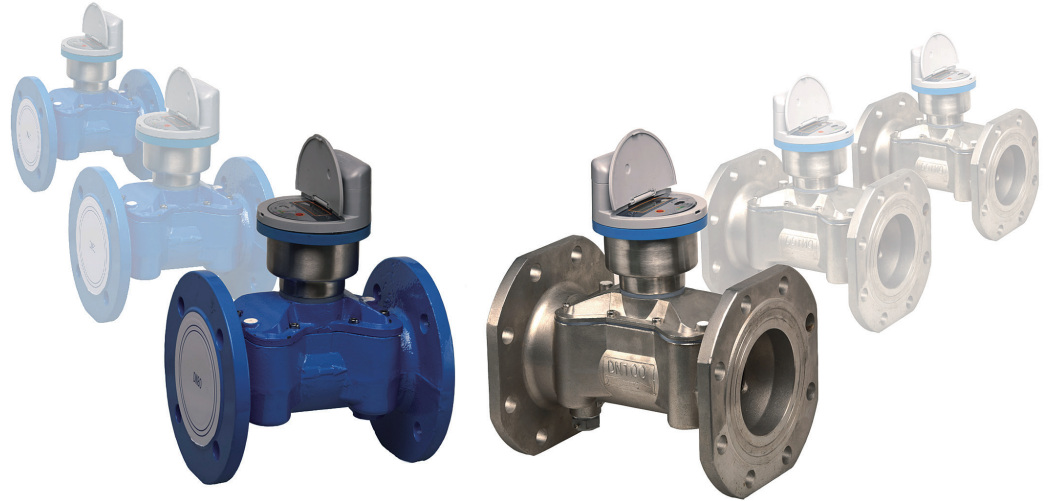
280W-CI-IN040-B-1-A-N stands for the wPrime series C&I water meter for 4" size with ANSI flange and English Unit display. Flow cell body is made from ductile iron. R250 dynamic range.

280WA-P-B-IN4 stands for a battery-operated pulse output module for a 4" water meter.



# wPrime™ Series 280W-CI

ULTRASONIC WATER METER



## Memo

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## About Spire Metering Technology

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Spire Metering is a global leader in flow and energy management solutions. Through continuous innovation, we transform complex ultrasonic technology into affordable, reliable solutions for accurate flow and energy measurement. Spire Metering offers water, heat, electricity and gas meters as well as AMR/AMI and billing solutions. Let us help you with your application today.