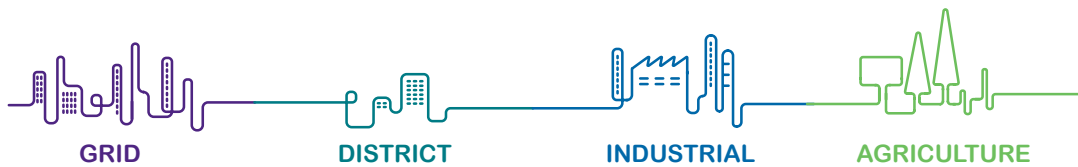




# octave Release 4.02

Ultrasonic Water Meters

A T u n e d M e a s u r e





## The OCTAVE Ultrasonic Meters

A revolutionary, precise and ultra reliable ultrasonic bulk water meter with no moving parts. With superior hydraulic and batteries that last up to 15 years, the Octave is today's best choice for bulk meters.

- Applications**  
 Utilities, Waterworks, Industrial and Agricultural applications
- Available Sizes**  
 DN50-DN300 (2"-12") with cast iron body  
 DN40 and DN50 (1½"-2") with polymer body  
 DN40-DN150 (1½"- 6") with stainless steel body\*
- Standards**  
 MID 2014/32/EU (based on OIML R49:2013, EN 14154 and ISO 4064:2014)  
 AWWA  
 WRAS  
 NSF  
 ACS  
 KTW  
 W-270
- Construction**  
 Cast Iron - epoxy coated, stainless steel (SS316)\* or highly reinforced polymer for 1½" and 2" (DN40 and DN50, only threaded version)  
 All external bolts and nuts are made of stainless steel.  
 The size of the meter and the direction of flow are cast in raised letters on the outer surface of the case.  
 \* DN40 and DN50 with threads, DN50-DN150 only with floating flanges

## Technical Specifications

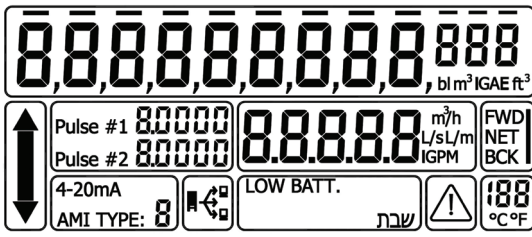
|                                 |   |
|---------------------------------|---|
| <b>Maximum Working Pressure</b> | 16 bar  |
| <b>Liquid Temperature</b>       | 0.1 up to 50 °C   |
| <b>Precision Class</b>          | ISO 4064 rev.2005, Accuracy class 2   |
| <b>Configuration</b>            | Compact - The display is built in to the unit   |
| <b>Power Source</b>             | 2 D size Li-battery: up to 15 years life time   |
| <b>Environmental Protection</b> | IP 68, Ambient operation temp. -25°C up to +55°C  |
| <b>Volume Display Options</b>   | <ol style="list-style-type: none"> <li>1. Net (Forward less reverse)</li> <li>2. Forward only</li> <li>3. Reverse only</li> <li>4. Forward &amp; reverse alternating</li> </ol> |
| <b>Data Logger</b>              | Volumes and alarms data (48KB, 4130 data points)  |
| <b>Connections</b>              | 1½-2" threaded: with couplings to NPT/ BSP<br>2"-12" flanged: flanges according to ISO, BS 10 and ANSI 150  |
| <b>Severity levels</b>          | Mechanical class M1<br>Electromagnetic environment class E1   |
| <b>Pressure Loss</b>            | ΔP 0.16 bar   |

## Outputs

|                                       |  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
|---------------------------------------|--|---------------------------------|-----------------|----------------------|-------------------|--------------------------|--------------------------------|-----------------|-------------------------------|--------------------|--|
| <b>Analog Output</b>                  | <p>The Analog Output shows the currently measured flow rate.<br/>           This output is a 4 - 20 mA current loop (the end user must supply power to the unit).<br/>           The Analog Output is programmable for forward and reverse flow (see Operation Manual for more details).<br/>           The 20mA point is programmable per customer request (To any flow lower than the max flow of the meter).</p>  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| <b>Digital (pulse) Output</b>         | <p>The Digital (pulse) Output is an open drain transistor output that provides pulse per quantity with these options:</p> <ol style="list-style-type: none"> <li>1. Two scaled forward and/or reverse mode pulses</li> <li>2. One scaled forward pulse and one alarm frequency output</li> <li>3. Measuring units of the output can be programmed different than displayed units</li> </ol> <p>Pulse resolution will be shown on the display for each pulse separately.</p>  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| <b>Dry Contact Output</b>             | <p>The Dry Contact Output is a dual mechanical relay output that provides pulse per quantity with these options:</p> <ol style="list-style-type: none"> <li>1. Two scaled forward and/or reverse mode pulses</li> <li>2. One scaled forward pulse and one alarm frequency output</li> <li>3. Measuring units of the output can be programmed different than displayed units</li> </ol> <p>Pulse resolution will be shown on the display for each pulse separately.<br/>           Onsite power supply of 5-35 VDC is needed.</p>   |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| <b>SSR (Solid State Relay)</b>        | <p>The SSR is a dual electronic relay output that provides pulse per quantity with these options:</p> <ol style="list-style-type: none"> <li>1. Two scaled forward and/ or reverse pulses</li> <li>2. One scaled forward and one alarm frequency output</li> <li>3. Measuring units of the output can be programmed different than displayed units</li> </ol> <p>Pulse resolution will be shown on the display for each pulse separately.<br/>           Onsite power supply of 5-35 VDC is needed.</p>  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| <b>Encoder Output</b>                 | <p>The Encoder Output is a serial communication protocol utilizing UI1203 or UI1204 (Sensus protocol).<br/>           Additional pulse output is available as an option.</p>   |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| <b>Modbus Protocol Output / M-Bus</b> | <p>The improved full Modbus/ MBus protocols include an optional pulse output and have the following available functions:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">1. Alarms (battery, empty pipe)</td> <td style="width: 50%;">6. Current flow</td> </tr> <tr> <td>2. AMR serial number</td> <td>7. Flow direction</td> </tr> <tr> <td>3. Real Time Clock (RTC)</td> <td>8. Forward and reverse volumes</td> </tr> <tr> <td>4. Volume units</td> <td>9. Flow and volume resolution</td> </tr> <tr> <td>5. Flow rate units</td> <td></td> </tr> </table> | 1. Alarms (battery, empty pipe) | 6. Current flow | 2. AMR serial number | 7. Flow direction | 3. Real Time Clock (RTC) | 8. Forward and reverse volumes | 4. Volume units | 9. Flow and volume resolution | 5. Flow rate units |  |
| 1. Alarms (battery, empty pipe)       | 6. Current flow  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| 2. AMR serial number                  | 7. Flow direction  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| 3. Real Time Clock (RTC)              | 8. Forward and reverse volumes   |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| 4. Volume units                       | 9. Flow and volume resolution  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| 5. Flow rate units                    |  |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |
| <b>Output Extension Cable</b>         | 5m extension cable for installation in pits and vaults   |                                 |                 |                      |                   |                          |                                |                 |                               |                    |  |



### Digital Display



- ↑ ↓ Flow direction
- ↻ Flow rate units
- FWD NET BCK Accumulator mode
- ⚡ Communication mode
- LOW BATT. Low battery alert
- שבת Shabbat-Mode
- ⚠ System error
- 18.8 °C/°F Water temperature
- 4-20mA AMI TYPE: 8 Output mode
- bl m³ IGAE ft³ Volume units
- Pulse #1 800000  
Pulse #2 800000 Pulse resolution

### Digital Display

The vacuum sealed (IP68) digital display is equipped with the following:

- a. Forward & reverse flow notification symbol
- b. 12 digits accumulation volume
- c. Programmable decimal point for high resolution
- d. 4 digits for flow rate with automatic floating decimal point
- e. Programmable accumulation units available
- f. Programmable flow rate units available
- g. Alarm display for low battery and fault measuring

The digital display is identical for all sizes or models. The digital display shall be programmed as ordered by the customer.

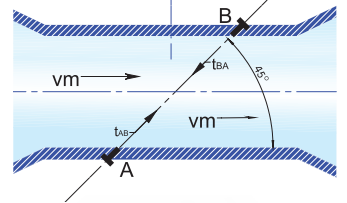
The transparent LCD digital display glass lens is made of molded heat treated 6 mm / 1/4" glass to ensure against scratching and breakage. Serial number is permanently stamped in the electronic digital display.

### Octave Features

- Excellent long-term stability and reliability
- Rugged mechanical design - Submersible (IP68)
- Bi-directional - including bi-directional outputs (digital and analog)
- Flexible data formats including flow directions, flow rates and volumes
- AMR and cellular networks ready with alerts and statistic features
- Multiline LCD
- Programmable Display (units and outputs resolution)
- EMI / RFI Protection
- Glatt kosher

### Measuring Principle

Imagine two identical swimmers crossing a river on the same diagonal line, one with the flow and the other against the flow. The swimmer moving with the flow needs much less time to reach the opposite bank. Ultrasonic waves behave exactly the same way. The sound wave that flows in the direction of the stream moves faster than the one that flows against the stream. The transit times TAB (Transit time of ultrasonic waves from sensor A to sensor B) and TBA (from sensor B to A) are measured continuously. The time difference (TBA - TAB) is directly proportional to the mean flow velocity (Vm) of the liquid. The flow rate is a result of the velocity multiplied by the cross section area of the flow tube size.



## Octave Line-Up of Advanced Ultrasonic Water Metering

The Octave family of products offers the water metering field advanced technologies with exceptional levels of accuracy which are suitable for four different applications:



### GRID

Octave is a revolutionary precise and exceptionally reliable ultrasonic bulk water meter, perfectly suitable for large projects, as key meters in grids and DMA (District Metered Areas). The Octave combines superior hydraulic characteristics with advanced alert, data and statistical features.

- The world's leading solution for handling bulk flow rates
- Diameter sizes from 2" up to 12"
- Made with highly durable materials - epoxy coating, cast iron and more
- Reliability at the highest level

### DISTRICT

All of the recognized advantages of Octave, featuring with highly durable materials - cast iron complex, polymeric materials and a variety of new diameter sizes. Suitable for use in medium flow rates from apartment buildings to small neighborhoods/housing projects:

- Polymeric version available in diameter sizes 1½" and 2"
- Reduced weight to ease load on the plumbing systems and prevent distortions
- Low friction sensibility and high durability time
- Cost effective
- Made from recyclable materials
- Sizes 2"- 4" in cast iron complete the range for district uses

### INDUSTRIAL

The Octave Stainless Steel is especially suited to water metering in challenging environments such as production plants, mining and industrial processes.

- Diameter sizes from 1½" to 6"
- Reliable operation in harsh environments
- Suitable for handling aggressive water in industrial processes
- Low friction sensibility and high durability over time

### AGRICULTURE

For agricultural appliances the Octave is perfectly suitable as main meter with it's high accuracy, low headloss, electronic information options and diverse electrical outputs.

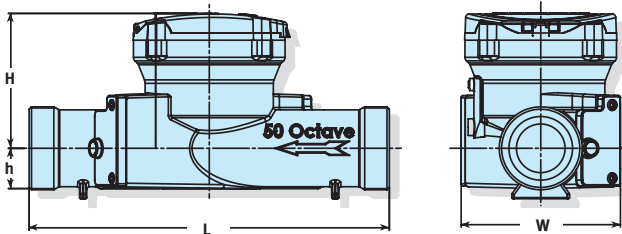
- Diameter sizes from 2" up to 12"
- No moving parts
- Reliable and accurate

## Technical Information

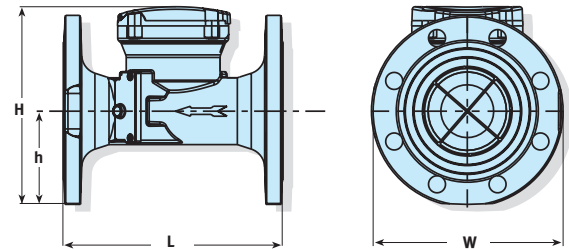
### Dimensions

| Model                              |        | Octave         |                |     |      |     |     |     |     |     |     |
|------------------------------------|--------|----------------|----------------|-----|------|-----|-----|-----|-----|-----|-----|
| Nominal size                       | (mm)   | 40<br>Threaded | 50<br>Threaded | 50  | 65   | 80  | 100 | 150 | 200 | 250 | 300 |
|                                    | (inch) | 1½<br>Threaded | 2<br>Threaded  | 2   | 2.5  | 3   | 4   | 6   | 8   | 10  | 12  |
| L - Length without couplings (mm)  |        | 300            | 300            | 200 | 200  | 225 | 250 | 300 | 350 | 449 | 499 |
| W - Width (mm)                     |        | 113            | 113            | 165 | 185  | 200 | 220 | 285 | 340 | 406 | 489 |
| H - Height (mm)                    |        | 155            | 155            | 194 | 210  | 210 | 223 | 282 | 332 | 383 | 456 |
| h - Height (mm)                    |        | 35             | 35             | 40  | 90   | 90  | 103 | 140 | 165 | 203 | 245 |
| Weight (kg) - cast iron body       |        |                | 8              | 9   | 11.5 | 13  | 15  | 32  | 45  | 68  | 96  |
| Weight (kg) - polymer body         |        | 1.4            | 1.45           |     |      |     |     |     |     |     |     |
| Weight (kg) - stainless steel body |        | 4              | 4              | 6   |      | 7   | 9.5 | 16  |     |     |     |

#### Threaded



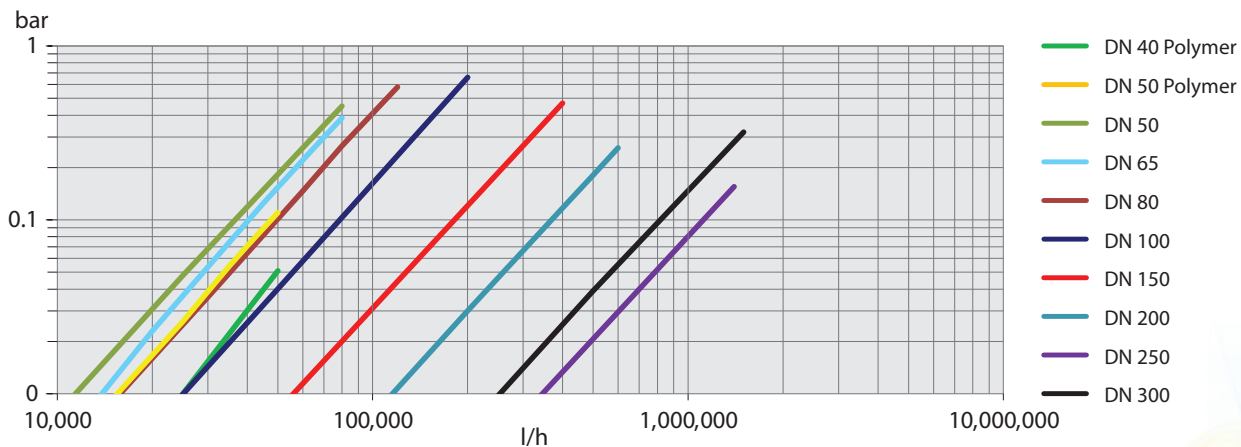
#### Flanged



### Meter Performance Acc. ISO 4064- rev. 2005

| flowrate<br>m³/h          | meter size     |               |                 |               |                |                |                |                 |                 |
|---------------------------|----------------|---------------|-----------------|---------------|----------------|----------------|----------------|-----------------|-----------------|
|                           | DN<br>40 - 1½" | DN<br>50 - 2" | DN<br>65 - 2.5" | DN<br>80 - 3" | DN<br>100 - 4" | DN<br>150 - 6" | DN<br>200 - 8" | DN<br>250 - 10" | DN<br>300 - 12" |
| Q1 Minimum flow rate      | 0.160          | 0.080         | 0.080           | 0.125         | 0.200          | 0.500          | 0.800          | 2               | 2               |
| Q2 Transitional flow rate | 0.256          | 0.125         | 0.125           | 0.200         | 0.320          | 0.800          | 1.280          | 3.2             | 3.2             |
| Q3 Permanent flow rate    | 40             | 40            | 40              | 63            | 100            | 250            | 400            | 1000            | 1000            |
| Q4 Overload flow rate     | 50             | 50            | 50              | 80            | 125            | 313            | 500            | 1250            | 1250            |
| Q3/Q1 (R)                 | 250            | 500           | 500             | 500           | 500            | 500            | 500            | 500             | 500             |
| starting flow             | 0.025          | 0.025         | 0.025           | 0.025         | 0.025          | 0.2            | 0.2            | 0.5             | 0.5             |

### Head Loss Curve 1½" - 12"



### Installation Requirements

- The meter must be full with water all the time
- For details view the installation manual



MAXMARK

For the most updated version, please view our website: [www.arad.co.il](http://www.arad.co.il)  
 Specifications are subject to change without notice.

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