ARAD GROUP
Integrated Metering Technologies

octave
Ultrasonic Water Meters
RELEASE 5.0

The OCTAVE-5 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-DN300 (1½"- 12") 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

Maximum Working Pressure	16 bar
Liquid Temperature	0.1 up to 50 ° C
Precision Class	ISO 4064 rev.2014, Accuracy class 2
Configuration	Compact - The display is built in to the unit
Power Source	2 D size Li-battery: up to 15 years life time
Environmental Protection	IP 68, Ambient operation temp. -25°C up to +55°C
Volume Display Options	1. Net (Forward less reverse) 2. Forward only 3. Reverse only 4. Forward & reverse alternating
Data Logger	Volumes and alarms data (48KB, 4130 data points)
Connections	1½-2" threaded: with couplings to NPT/ BSP 2"-12" flanged: flanges according to ISO, BS 10 and ANSI 150
Pressure Sensor (optional)	Gauge pressure 0 to 16 ±0.5 [bar]
Pressure Loss	ΔP 0.16 bar

Outputs

Analog Output	The Analog Output shows the currently measured flow rate. This output is a 4 - 20 mA current loop (the end user must supply power to the unit). The Analog Output is programmable for forward and reverse flow (see Operation Manual for more details). The 20mA point is programmable per customer request (To any flow lower than the max flow of the meter).
Digital (pulse) Output	The Digital (pulse) Output is an open drain transistor output that provides pulse per quantity with these options: 1. Two scaled forward and/or reverse mode pulses 2. One scaled forward pulse and one alarm frequency output 3. Measuring units of the output can be programmed different than displayed units Pulse resolution will be shown on the display for each pulse separately.
Dry Contact Output	The Dry Contact Output is a dual mechanical relay output that provides pulse per quantity with these options: 1. Two scaled forward and/or reverse mode pulses 2. One scaled forward pulse and one alarm frequency output 3. Measuring units of the output can be programmed different than displayed units Pulse resolution will be shown on the display for each pulse separately. Onsite power supply of 5-35 VDC is needed.
SSR (Solid State Relay) Pulse output	The SSR is a dual electronic relay output that provides pulse per quantity with these options: 1. Two scaled forward and/ or reverse pulses 2. One scaled forward and one alarm frequency output 3. Measuring units of the output can be programmed different than displayed units Pulse resolution will be shown on the display for each pulse separately. Onsite power supply of 5-35 VDC is needed.
Encoder Output	The Encoder Output is a serial communication protocol utilizing UI1203 or UI1204 (Sensus protocol). Additional pulse output is available as an option.
Modbus Protocol Output / M-Bus	The improved full Modbus/ MBus protocols include an optional pulse output and have the following available functions: 1. Alarms (battery, empty pipe) 2. AMR serial number 3. Real Time Clock (RTC) 4. Volume units 5. Flow rate units 6. Current flow 7. Flow direction 8. Forward and reverse volumes 9. Flow and volume resolution
Output Extension Cable	5m extension cable for installation in pits and vaults
BLE (low Energy Bluetooth)	Internal connectivity BLE module for service, additional to NFC connectivity

CAUTION

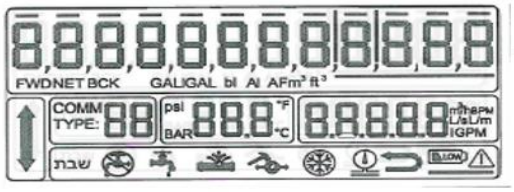
This device complies with part 15 of the FCC Rules. The User and the Installer should be aware that changes and modifications to the equipment not expressly approved by Master Meter could void warranty and the user's authority to operate the equipment.
Professionally trained personnel should install the equipment.

The antenna used for this transmitter must be installed to normally provide minimum separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

ATTENTION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

Digital Display



Volume (Totalizer)

Flow direction

FWDNET BCK — Accumulator mode

Flow rate units

GALIGAL bl Al AFm³ ft³ — Volume units

Communication I/O Type in use (including BLE)

Temperature and Pressure

Alarm and notification

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
h. Communication output , including BLE connectivity

The digital display is identical for all sizes or models.

The digital display shall be programmed as ordered by the customer.

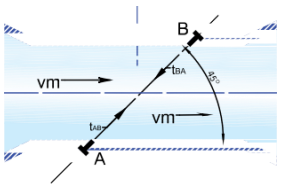
The transparent LCD digital display glass lens is made of molded heat treated 6 mm / ¼" glass to ensure against scratching and breakage. Serial number is permanently stamped Below the electronic digital display.

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:




GRI

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 11/2" 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.

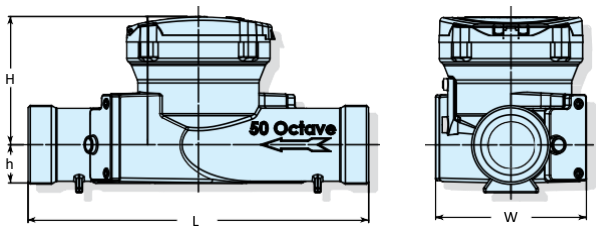
- Diameter sizes from 2" up to 12"
- No moving parts
- Reliable and accurate

Technical Information

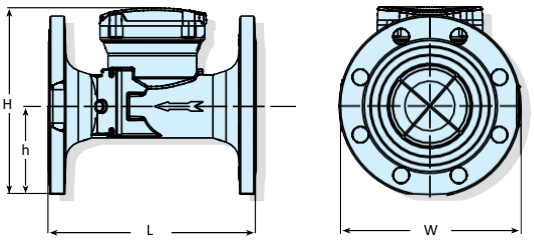
Dimensions

Model		Octave									
Nominal size	(mm)	Threaded	Threaded	50	65	80	100	150	200	250	300
	(inch)	Threaded	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



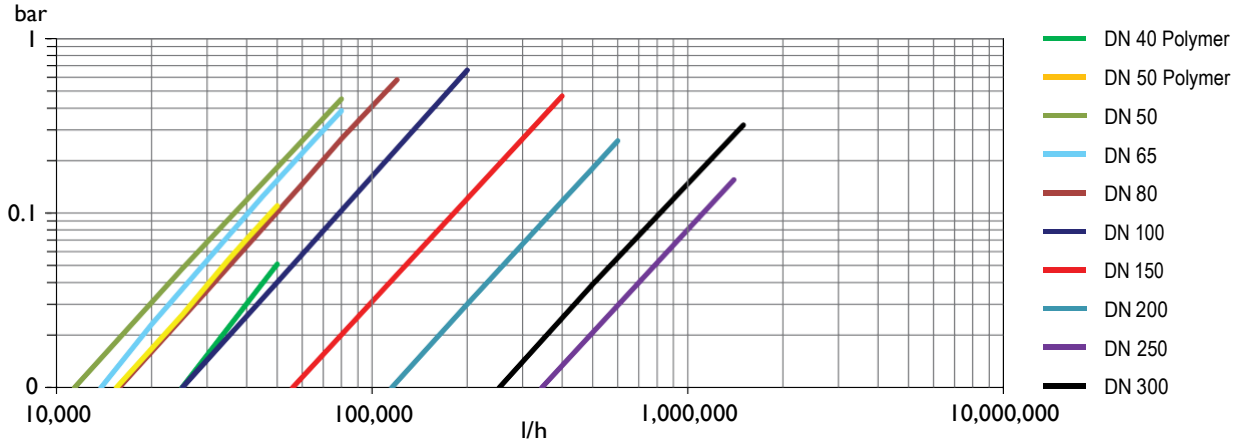
Flanged



Meter Performance Acc. ISO 4064- rev. 2014

Flowrat em³/h	meter size								
	DN 40 - 1½"	DN 50 - 2"	DN 65 - 2.5"	DN 80 - 3"	DN 100 - 4"	DN 150 - 6"	DN 200 - 8"	DN 250 - 10"	DN 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