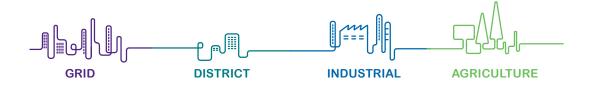




Octave Release 4.02

Ultrasonic Water Meters

A Tuned Measure

















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 (11/2"-2") with polymer body DN40-DN150 (11/2"-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

N I VV

W-270

Construction

Cast Iron - epoxy coated, stainless steel (SS316)* or highly reinforced polymer for $1\frac{1}{2}$ " 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.2005, 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
Severity levels	Mechanical class M1 Electromagnetic environment class E1
Pressure Loss	ΔP 0.16 bar

Outputs

Julputs							
Analog Output	The Analog Output shows the currently me	easured flow rate.					
· .	This output is a 4 - 20 mA current loop (the						
		rward and reverse flow (see Operation Manual for more details).					
	The 20mA point is programmable per custo	omer 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:					
, , , , , , , , , , , , , , , , , , ,	 Two scaled forward and/or reverse mo 	ode pulses					
	One scaled forward pulse and one alar	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 displa	ay 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 mo	1. Two scaled forward and/or reverse mode pulses					
	· ·	2. One scaled forward pulse and one alarm frequency output					
		programmed different than displayed units					
	Pulse resolution will be shown on the displa						
	Onsite power supply of 5-35 VDC is needed.						
SSR (Solid State Relay)	The SSR is a dual electronic relay output that provides pulse per						
•	quantity with these options:						
	 Two scaled forward and/ or reverse put 						
	2. One scaled forward and one alarm free						
	3. Measuring units of the output can be	programmed different than displayed units					
	Pulse resolution will be shown on the displa	ay for each pulse separately.					
	Onsite power supply of 5-35 VDC is needed	d .					
Encoder Output	The Encoder Output is a serial communicat	tion protocol utilizing UI1203 or UI1204 (Sensus protocol).					
	Additional pulse output is available as an op	ption.					
Modbus Protocol Output	The improved full Modbus/ MBus protocols	s include an optional pulse output and have the following available					
/ M-Bus	functions:						
545	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						



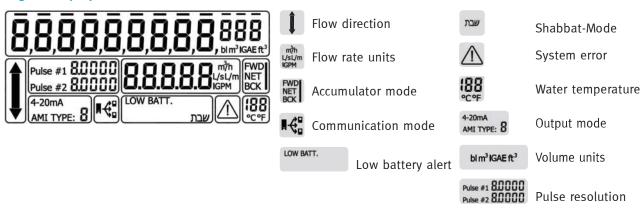








Digital Display



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



ultra reliable metering



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:









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

- The world's leading solution for handling bulk flow rates
- Diameter sizes from 2"up to 12"

features.

- Made with highly durable materials epoxy coating, cast iron and more
- Reliability at the highest level





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 11/2" 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



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



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









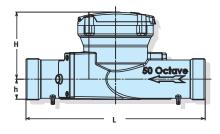


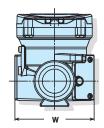
Technical Information

Dimensions

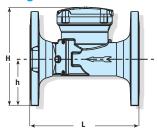
Model		Octave									
Newinalaina	(mm)	40 Threaded	50 Threaded	50	65	80	100	150	200	250	300
Nominal size	(inch)	1½ Threaded	2 Threaded	2	2.5	3	4	6	8	10	12
L - Length without cou	ıplings (mm)	300	300	200	200	225	250	300	350	449	499
W - Width (mm)		113	113	165	185	200	220	285	340	406	489
H - Height (mm)		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			

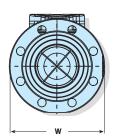
Threaded





Flanged

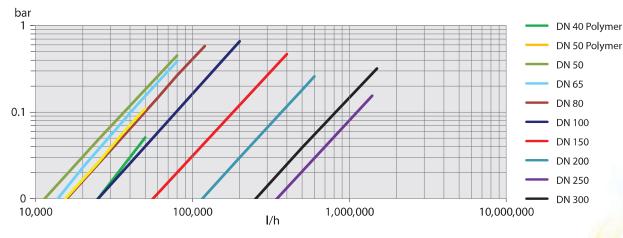




Meter Performance Acc. ISO 4064- rev. 2005

flowrate	meter size								
m³/h	DN	DN	DN	DN	DN	DN	DN	DN	DN
/!!	40 - 11/2"	50 - 2"	65 - 2.5"	80 - 3"	100 - 4"	150 - 6"	200 - 8"	250 - 10"	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



For the most updated version, please view our website: www.arad.co.il Specifications are subject to change without notice.





Arad Ltd. www.arad.co.il



Arad Technologies Ltd. www.aradtec.com



Master Meter, Inc. www.mastermeter.com





Cicasa www.cicasa.com



Arad Metering Technologies www.aradmetering.com



WaterTech S.p.A. www.wtmeters.com





Installation Manual

ENGLISH







1.0 General and Safety

- Do not install, operate or maintain this flow meter without reading, understanding and following the factorysupplied instructions. Otherwise, injury or damage may result.
- Read these instructions carefully before beginning installation and save them for future reference.
- Observe all warnings and instructions marked on the product.
- Consider handling and lifting instructions to avoid damage.
- If the product does not operate normally, refer to the service instructions or to a qualified ARAD service engineer.
- There are no operator-serviceable parts inside this product.

2.0 Product Liability and Warranty

Arad's standard products (the **"Products"**) are sold to Customer and are purchased by Customer under the terms of warranty set forth herein below:

- 1. Arad warrants that the Products shall, under conditions of normal use and when properly installed, administered, applied and maintained, be free from defects in material and workmanship (the "Warranty"), for a period of 12 months following delivery thereof to Customer (the "Warranty Period").
- 2. Arad's sole obligation and liability under the Warranty shall be limited to the replacement, the repair or the refund of the original purchase price, at Arad's sole discretion, of any defective Products which are proven not to conform to the Products' specification and which are returned to the factory or service center designated by Arad during the Warranty Period by the Customer after completing a failure report. All provided that written notice of such defect is given by the Customer to Arad within 21 days after discovery thereof. Freight cost to such factory or service center will be paid by the Customer and freight cost from such factory or service center to Customer will be paid by Arad.
- 3. Arad will not be responsible for and will have no obligation under the Warranty to any non-conformity of the Products, caused, in whole or in part, as a result of misuse, abuse, tampering with or modification of any of the Products and/or by accidents, fault or negligence, improper administration, application and/or use, installation, service, repair and/or maintenance of the relevant Products, by act of vandalism or by any causes whatsoever (including but not limited to environmental conditions) that are external thereto.
- 4. The foregoing warranty is a limited warranty and is exclusive and in lieu of all other warranties, express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose and shall constitute the Customer's sole and exclusive remedy with respect thereto. Replacement or repair in the manner provided above will constitute fulfillment of all of Arad's obligations with respect to the quality and performance of the products. No dealer, distributor, agent or employee of either Arad or customer is authorized to modify these warranties. Such modification shall be null and void and shall not bind Arad for any and all purposes.
- 5. Except and to the extent provided under the warranty, in no event shall Arad be liable, whether in contract, tort or otherwise, for any damages, whether direct or indirect, consequential, incidental, special or punitive, resulting from any defect in the products, including, without limitation, loss of profits, business, income, anticipated savings, goodwill or other commercial loss, even if Arad had been advised of the possibility of such damages, except to the extent that such liability may not lawfully be excluded.

Customer shall be solely responsible for the selection, use, efficiency and suitability of the Products.

3.0 Items Included With Order:

- One OCTAVE ultrasonic flow meter, size as indicated on the packaging box, pieced together into a complete compact system (flow tube plus electronics).
- One OUTPUT module, either digital or analog (based on the customer's order).

4.0 Supplied Documentation:

- Condensed installation and user manual.
- Report of factory meter settings.
- Certificate of calibration data.

5.0 Unpacking and Inspection

- This product has been thoroughly inspected and tested before shipment and is ready for operation.
- After carefully unpacking the meter, inspect for shipping damage before attempting to install. If any indication of mechanical damage is found, immediately contact the responsible transportation service and your local ARAD LTD. representative.



6.0 System Description and Measurement Method

- The OCTAVE's measurement method is based on an ultrasonic, transit-time, dual-beam sensors which determines the length of time it takes an ultrasonic sound wave to travel the distance between the two sensors located on the meter's body. The sensors function as both the sender and the receiver, each one alternating these functions so that the ultrasonic wave travels both with and against the direction of the flow. Since the ultrasonic wave travels slower against the flow than with the flow, the time difference of two waves traveling with and against the flow leads to determining the velocity of the water.
- The OCTAVE ultrasonic flow meter is a battery-powered precision flow meter designed for linear, bidirectional flow measurement of water.
- Flow measurement values can be transferred through the standard comminucation digital or analog output.
- The OCTAVE can be set up for a wide range of applications.

7.0 Notes

- For proper flow measurements, the OCTAVE's measuring tube should be completely full at all times. Non-wetted sensors show loss of signal. Though this will not cause damage to the meter, it will, however, not measure flow and display zero.
- Flow direction: The OCTAVE is a bidirectional flow meter. Note the indicating arrow on the OCTAVE's display for forward and backward flows.
- In case of direct sunlight exposure, it is recommended to keep the lid closed, though no direct damage will occur with the lid open.
- Do not expose the OCTAVE to excessive vibration. To avoid vibration, support the pipeline on both side of the meter
- Ambient working temperature: -25 to +55°C.
- Water working temperature: 0.1 to +50°C.
- To avoid measuring errors due to air in the flow tube, observe the following precautions:
 - Since air collects at the highest point of the system, installation of the flowmeter should be at the lowest point.
 - Always install control valves downstream of the meter in order to avoid cavitation.
 - Never install the meter on a pump suction side in order to avoid cavitation.

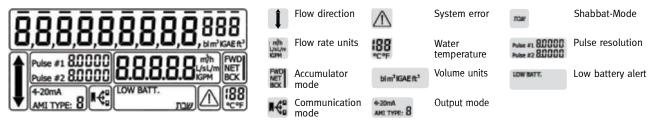
8.0 Counter Flanges

- Refer to the standard dimensional drawings for flange spacing, accommodating for the thickness of gaskets.
- Install meter in line with the pipe axis. The flange faces must be parallel to each other.
- Permissible length deviation: Lmax Lmin 0.5mm (0.02").

9.0 Start-up

- ✓ Check that the meter has been installed correctly (Please refer to mechanical installation guide Page 5).
- Check that the flow rate and volume units are correctly preprogrammed on the display.
- Check that the output module is correctly attached.

10.0 Digital DisplayMechanical Data





Sleep Mode - After 24h (or according to any default choosen) of empty pipe line/ pipe without water the meter will switch to sleep mode.



11.0 Mechanical Data

Maximum Working Pressure	16 bar				
Liquid Temperature	.1 up to 50 ° C				
Precision Class	6O 4064 rev.2014, Accuracy class 2				
Configuration	Compact - The display is built in to the unit				
Power Source	D size Li-battery: up to 15 years life time				
Environmental Protection	² 68, Ambient operation temp25°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				
Severity levels	Mechanical class M1 Electromagnetic environment class E1				
Pressure Loss	ΔP 0.16 bar				

Outputs

Jutputs						
Analog Output	The Analog Output shows the currently m	easured flow rate.				
3 1	This output is a 4 - 20 mA current loop (the					
	9 , , 9	orward and reverse flow (see Operation Manual for more details).				
	The 20mA point is programmable per cust	comer 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				
3 " , ' !	options:					
	 Two scaled forward and/or reverse m 	ode pulses				
	2. One scaled forward pulse and one ala	' ' '				
		programmed different than displayed units				
	Pulse resolution will be shown on the disp	lay 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:					
•	 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 disp					
	Onsite power supply of 5-35 VDC is neede					
SSR (Solid State Relay)	The SSR is a dual electronic relay output that provides pulse per					
•	quantity with these options:					
	 Two scaled forward and/ or reverse p 					
	One scaled forward and one alarm free					
		programmed different than displayed units				
	Pulse resolution will be shown on the disp					
	Onsite power supply of 5-35 VDC is neede					
Encoder Output	The Encoder Output is a serial communica	ition protocol utilizing UI1203 or UI1204 (Sensus protocol).				
·	Additional pulse output is available as an c	option.				
Modbus Protocol Output	The Modbus Protocol Output has the follo	wing available functions:				
/ M-Bus	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					
Output Extension Cable	5m extension cable for installation in pits a	i i				

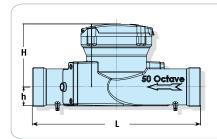


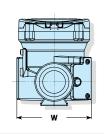
Dimensions

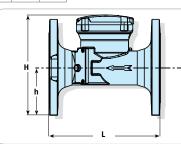
Mode	l	Octave									
No maio al sima	(mm)	40 Threaded	50 Threaded	50	65	80	100	150	200	250	300
Nominal size	(inch)	1½ Threaded	2 Threaded	2	2.5	3	4	6	8	10	12
L - Length wit couplings (m		300	300	200	200	225	250	300	350	449	499
W - Width (m	m)	113	113	165	185	200	220	285	340	406	489
H - Height (m	ım)	155	155	194	210	210	223	282	332	383	456
h - Height (m	m)	35	35	40	90	90	103	140	165	203	245
Weight (kg) - cast iron bod	у		8	9	11.5	13	15	32	45	68	96
Weight (kg) - polymer bod	у	1.4	1.45								

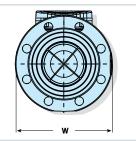
Dimensions Stainless Steel Meters (AWWA flanges only)

Mode	Octave Stainless Steel						
Nominal size	(mm)	50	80	100	150	200	
Nominal Size	(inch)	2	3	4	6	8	
L - Length without couplings (mm)		254	305	356	457	508	
W - Width (m	W - Width (mm)		190	229	280	343	
H - Height (m	H - Height (mm)		216	250	276	327	
h - Height (mm)		53	90	115	130	162	
Weight (kg)- stainless steel body		5.5	11.5	17	27	51	









12.0 Mechanical Data

12.1. Handling the Flow Meter

Important handling information:

- Do not lift the Octave by the electronic housing.
- Do not carry the Octave by its lid.
- Do not place the Octave on the electronic housing.

• When handling the Octave, avoid hard blows, jolts or impacts.

12.2. Installation: Location and Position

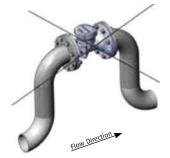
Note: The Octave needs to operate with downstream back pressure of minimum 0.5-0.7 Bar. Do not install the meter with a fully open downstream pipe (with no back pressure).

Recommended installation





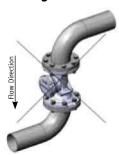
Conditional installation



Recommended: If this is not the highest point in the system or a hydraulic jump has been installed to keep the flow meter full.

Not recommended: If this is the highest point in a system or if pipeline and/or flow meter is subject to being emptied between uses avoid this installation.

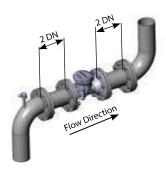
Wrong installation



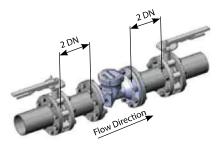


The Following Examples are Arad's Recommendations For Achieving Top Performance

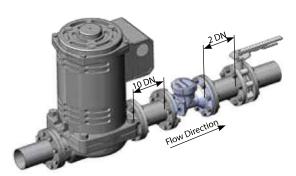
- When installing the Octave downstream of any hydraulic component (valve, pump) the recommended installation requirements are no less than the drawings recommendations.
 - For upstream & downstream straight pipes please use as much as installation site will allow (the longer the better)
- When installing Pressure Breaker after the meter the pipe length should be at least 2 pipe diameter (the longer the better).



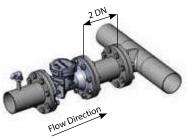
2 pipe diameters before and after elbows (90°)



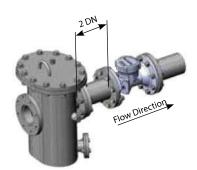
Minimum of two (2) pipe diameters before and after



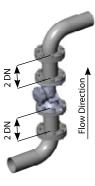
Minimum of ten (10) pipe diameters after pumps



Minimum of two (2) pipe diameters before T connections



Minimum of two (2) pipe diameters after strainers



2 pipe diameters before and after elbows (90°) in vertical installations



13.0 Polymeric Octave Installation - General Instructions

Please follow the general instructions for water meters (Check Valve, upstream & down stream and system flushing on new installations).

Existing and new installations:

1. It is recommended that the meter will NOT be installed in the middle of the system, so the meter will not suffer from the load of all the installed fixtures.



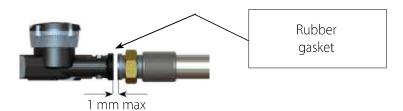
2. It is recommended that at least one side of meter will be connected to a PVC (or plastic) pipe.



3. Please make sure that the end connections are parallel and inline to each other.

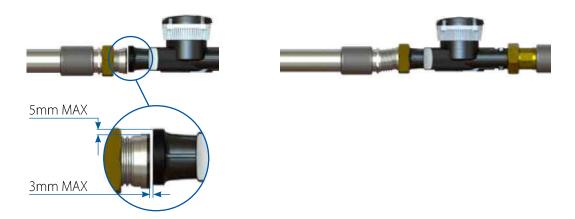


- 4. When using standard tail piece, please use rubber gaskets only (not fiberglass)! After adding the gaskets the gap between the end connection and the meter should not exceed 1mm. Please unscrew the end connection in order to keep the recommended distance.
- Please do not use force in order to close the gap.
- Please don't do any welding while the meter is connected to the pipe.





5. If it is not possible to use plastic connections on one side of the meter, please consider the use of our flexible couplings. These couplings were especially developed for the polymeric Octave meters. You will need to use this coupling only on one side of the meter - please install the coupling on the outlet, if possible - as described in the below pictures.



6. Please start to tighten the end connections by hand. Final tightening will be with no more than 100Nm torque.



7. Please don't do any welding while the meter is connected to the pipe.



8. In case it is not possible to use plastic end connections (at least on one side), please support the meter as shown in the drawing below.

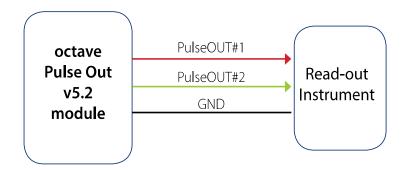


14.0 Electrical Outputs

- 1. Open Drain dual output
- 2. Dry Contact dual output
- 3. SSR dual output
- 4. Analog output (4-20mA)
- 5. MODBUS output
- 6. M bus output

14.1. Open Drain dual output

Connections Diagram



Cables

Signal connection polarity is mandatory!

	Wire	Function
Long cable	Red	Pulse Out#1
Long cable	Green	Pulse Out#2
	Black	GND

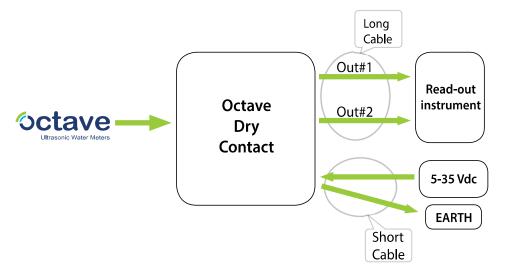
Outputs Type	Open Drain
Cable Length - supplied	1.5/5 [meter]
Maximum Cable Length*	500 [meter]
Maximum Applied Voltage	35 [Vdc]

^{*} Cable Teldor PN 8005003101 or similar



14.2. Dry Contact dual output

Connections Diagram



Cables

*Signal connection polarity is mandatory!

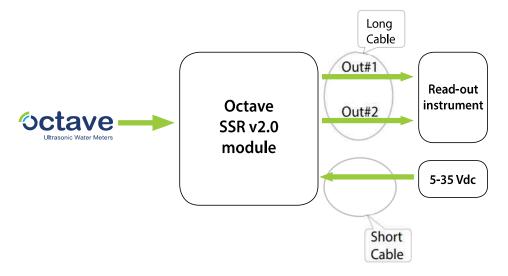
	Wire	Function
Long cable	Red + Orange	Out#1
Long cable	Black + Brown	Out#2
Short cable*	Red	5-35V+
	Black	5-35V-
	Yellow	Earth

Outputs Type	Dry Contact
Cable Length - supplied	1.5/5 [meter]
Maximum Cable Length*	500 [meter]
Supply Voltage	5-35 [Vdc]
Switching Power max.	15 [Watt]
Life Expectancy	10 ⁹ [Cycles]

^{*} Cable Teldor PN 8005003101 or similar

14.3. SSR dual output

Connections Diagram



Cables

* Signal connection polarity is mandatory!

Long cable	Wire	Function	
	Red + Orange	Out#1	
	Black + Brown	Out#2	
Short cable *	Red	5-35V +	
Short cable	Black	5-35V -	

^{*} Optional

Outputs Type	Bi-directional Solid State Relay
On-Resistance max.	25 [Ω]
Minimum Pulse Width	10 [msec]
Output current max.	120 [mA]
Total Power Dissipation max.	800 [mW]
Supply Voltage	5-35 [Vdc]
Cable Length - supplied	1.5 [meter]
Maximum Cable Length*	500 [meter]

^{*} Cable Teldor PN 8005003101 or similar



The SSR module is powered by internal battery.

External power supply in a range of 5-35Vdc could be used for certain Pulse parameters and Flow Rate combination.

Pulse resolution or Pulse width are directly affect the internal battery lifetime.

The following setup examples showing the calculated internal battery lifetime for 10 and 5 years:

10 years	No. of Outputs	Q4 [m3/h]			Calculated battery lifetime [years]	
DN-50	2	50	0.01	30	11.4	
	2	50	0.01	30	11.4	
DN-80	2	80	0.01	20	10.7	
DN-100	2	125	0.01	12	11.4	

5 years	No. of Q4 years Outputs [m3/h]		Pulse Resolution [m3/pulse]	Pulse Width [msec]	Calculated battery lifetime [years]
DN-50	2	50	0.001	7	5.1
	2	50	0.01	70	5.1
DN-80 2		80	0.01	45	5.0
DN-100	2	125	0.01	30	4.8

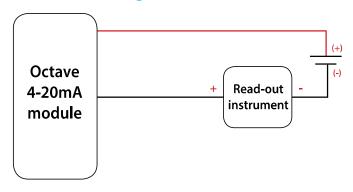


14.4. Analog output 4-20mA

- The current output is a passive 4-20mA. Power needs to be supplied by the customer.
- 4mA is always "0" (zero) flow and the 20mA is programmable according to the customer requirements. (If the customer did not specify, the 20mA will be the maximum flow rate).

14.4.1. Indor installation

Connections Diagram



Cables

* Signal connection polarity is mandatory!

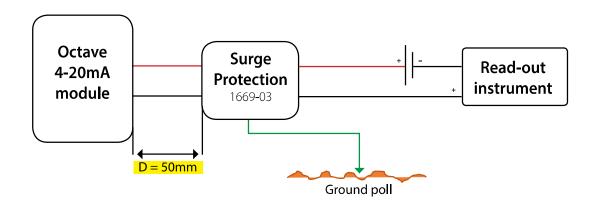
Wire	Function		
Red	current loop +		
Black	current loop -		

Outputs Type	4-20mA		
	current output		
Supplied Cable Length	1.5 [meter]		
Maximum Cable Length*	500 [meter]		
Loop supply voltage	12 - 24 [Vdc]		
Output Impedance	25 [MΩ] typ		

^{*} Cable Teldor PN 8005003101 or similar



14.4.2. Outdor installation Connections Diagram



Cables

*Signal connection polarity is mandatory!

Wire	Function	
Red	current loop +	
Black	current loop -	

Surge Protector

In regions with potential surge and lightnings it is suggested to add Surge Protector of type – Bourns 1669-03.

Important: Assembly distance from the Octave 20-4mA module - no more than 100mm!

The protector wiring is AWG #20 (0.5 mm2).

The solid colored red and black wires are to be connected to the 4-20mA modfule output, while the striped red/white and black/white wires (the 'protected' output) connect to the terminals of the field device.

Minimize looping of the solid colored input and ground conductors to reduce field coupling of surges into the protected output.

Grounding

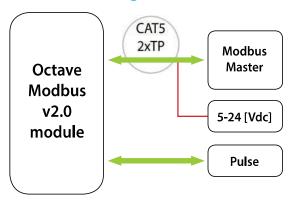
The protector body (stainless steel nipple) and green wire are electrically common.

The green wire should connect to a grounding pole verifed by the elctricity local company.

The green ground wire shuld be a 10 mm diameter at least

14.5. Modbus output

Connections diagram



Cables

ModBus	Wire	Function
	Blue	D0/A/Tx+
	White/Blue	D1/B/Tx-
	Orange	5 - 24Vdc
	White/Orange	Ground

Pulse*	Red	Pulse Out
	Black	Ground

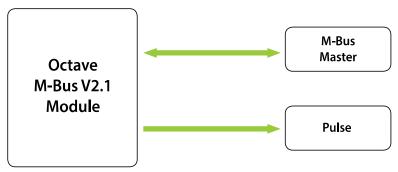
^{*} Optional

Outputs Type	RS485
Max Baud Rate	9600 [BPS]
Max Power Consumption	80 [mW]
Supply Voltage Range	5 - 24 [Vdc]
Max Cable Length	1000 [Meter]

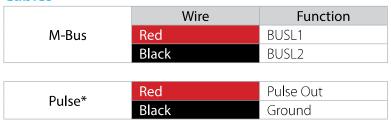
^{*} Cable Teldor PN 8005003101 or similar



14.6. M-Bus output Connections Diagram



Cables



^{*} Optional

Outputs Type	M-Bus		
Max Baud Rate	9600 [BPS]		
Max Power Consumption	80 [mW]		
M-Bus Voltage	24 to 36 [Vdc]		
Max Cable Length*	3 [Meter]		

^{*} Cable Teldor PN 8005003101 or similar



15.0 Module Replacement / Mounting Manual

1. Properly dry the area of the connector.





- 2. Remove seal cover from the screw using tool with sharp edge.
- 3. Remove the screws using Allen key 3mm.
- 4. Remove the module/cover.
- 5. Properly dry again the area of the connector.
- 6. Make sure the module o-ring is in position. If not, Insert new o-ring into the module. The o-ring must be lubricated (silicone grease)



7. Attach module to the connector.





8. Tight both screws by hand only, using Allen key 3 mm to achieve symmetric o-ring pressure, then apply the torque 2 N*m with torque wrench.





9. Insert seal cover onto the screw.











EU Declaration of Conformity

Product line: Octave Ultrasonic Water meters

Sized 40 up to 300 mm



We Arad Itd.

Declare under our sole responsibility, that the above mentioned product line is consistent with the type described in the certificate UK/0126/0094 (issued 10/02/2017) approved by the Notified Body 0126 NMO in accordance with Directives 2014/32/EU) Annex II , Module B.

The quality system for production, final product inspection and testing of the water meters (MI-001) was approved by the Notified Body 0126 NMO in accordance with Directive 2014/32/EU Annex II Module D (Document No. UK/0126/46 issued 15/02/2017).

The object of the declaration described above is in conformity with the requirements of the following directive/s:

Directive 2014/32/EU Directive 2014/30/EU

The conformity was checked in accordance with the following harmonized standards /normative

BS EN ISO 4064-1:2014. Water meters for cold potable water and hot water, Metrological and technical

BS EN ISO 4064-2:2014. Water meters for cold potable water and hot water. Test methods BS EN ISO4064-3:2014. Water meters for cold potable water and hot water. Test report format.

Other instruction used:

OIML R 49-1:2013 Water meters for cold potable water and hot water. Part 1: Metrological and technical

OIML R 49-2:2013 Water meters for cold potable water and hot water.

Part 2: Test methods

OIML R 49-3:2013 Water meters for cold potable water and hot water.

Part 3: Test report format.

Signed for and on behalf of: Arad ltd, Dalia 1923900, Israel

Date: 02/04/17 Signed by : Michaela Avraham, Quality System Manager WRAD LTD. QUALITY ASSURANCE

Doc no DOCEUOCT, Doc date 02/04/17

Arad Ltd. | Dalia 1923900, Israel | Tel: 972-4-9897911, Fax: 972-4-9897960 | www.arad.co.il





Specifications are subject to change without notice.

For the most updated version, please check our website: www.arad.co.il



Mater Measuring Technologies Innovation through precision, quality and performance



SAI Global hereby grants:

Arad Ltd

Arad Ltd, Dalia, Israel

StandardsMark Licence

Manufactured to:

AS 4747.2:2013 - Meters for non-urban water supply - Technical requirements for closed conduit meters fully charged

"the StandardsMark Licensee" the right to use the STANDARDSMARK as shown below only in respect of the goods described and detailed in the Schedule which are produced by the Licensee or on behalf of the Licensee* and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the STANDARDSMARK and the Terms and Conditions for certification and licence. The Licensee covenants to comply with all the Rules and Terms and Conditions.

Licence No: SMK40543

Issued: 5 September 2016 **Expires**: 4 September 2021 **Originally Certified**: 5 September 2016 **Current Certification**: 5 September 2016

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Paul Simpson Global Policy Risk and Certification Manager



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Arad Ltd, Dalia, Israel

StandardsMark Licence

Manufactured to:

AS 4747.2:2013 - Meters for non-urban water supply - Technical requirements for closed conduit meters fully charged

Model identification of the goods on which the STANDARDSMARK may be used:

Model ID	Brand Name	Product Description	Model Name	Application	Nominal Size	End Connection	Date Endorsed
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	8" (DN200)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	6" (DN150)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	12" (DN300)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	10" (DN250)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	2.5" (DN65)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	2" (DN50)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	4" (DN100)	Flanged AS4087	30 Aug 2016
Octave	Arad	Ultrasonic Water Meter	Octave	Water metering	3" (DN80)	Flanged AS4087	30 Aug 2016

End of Record

Licence No: SMK40543 Issued Date: 5 September 2016

This schedule supersedes all previously issued schedules



^{*} For details of manufacture, refer to the licensee