NETAFIM™

OCTAVE®
ULTRASONIC FLOW METER

INSTALLATION & USER GUIDE

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GENERAL SAFETY & INFORMATION

- Do not install, operate or maintain this flow meter without reading, understanding and following the factory-supplied 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 and in this guide.
- Consider special handling and lifting instructions to avoid damage or personal injury.
- If the product does not operate normally, refer to the service instructions or call your Netafim Representative.
- There are no operator-serviceable parts inside this product.
- NOTE: The Octave sensors are very sensitive and are not designed to be modified by the end user. Any modifications void the warranty.

WARRANTY

Octave ultrasonic meters are warranted to be free from original defects in materials and workmanship for a period up to five (5) years. If the meter encounters a problem, Netafim USA will choose either to cover the cost of repair or replacement based on a five (5) year pro-rated schedule as follows:
- Year 0 through Year 2: 100%
- Year 2 through Year 3: 75%
- Year 3 through Year 4: 50%
- Year 4 through Year 5: 25%

All Octave meters must be installed with a Netafim branded Combination Air/Vacuum or Continuous Acting Air Vents to qualify for the five (5) year pro-rated product warranty. Consult Netafim for recommendations.

INCLUDED ITEMS

- One Octave ultrasonic meter, size as indicated on the packaging box, pieced together into a complete compact system (flow tube plus electronics).
- One pre-installed Output Module, either Digital or Analog (if ordered).
- Documentation includes: Installation/User Manual, Report of Factory Meter Settings and Certificate of Calibration Data.
- This product has been thoroughly inspected, tested and calibrated before shipment and is ready for operation.
- After carefully unpacking the meter, inspect for shipping damage before attempting to install. If any damage is found, immediately contact the responsible transportation company and Netafim USA.

OPERATION

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

SPECIFICATIONS

- Cast Iron Available in: 2", 3", 4", 6", 8", 10" and 12" (Flow Range of <1 - 5,500 GPM)
- SST 316 Available in: 2", 3", 4", 6" and 8" (Flow range of <1 - 2,800 GPM)
- Meter Body Configuration: Epoxy-coated Ductile Iron or Grade 316 Stainless Steel
- Inlet/Outlet: Flange
- Maximum Working Pressure: 230 psi
- Liquid Temperature: 32° to 122° F (0.1º to 50ºC)
- Precision Class: ISO 4064 rev.2005, Accuracy Class 2
- Configuration: Compact - display is built into the unit
- Power Source: 2 'D' size non-replaceable Lithium Batteries - 10 year warranted lifetime
- Environmental Protection: NEMA 6P + (IP68+), Ambient operation temperature for display: -13° to 131° F (-25° to 55° C)
- Display Units: Multi-line, programmable 9 digit LCD display
- Volume Display Options: 1. Net (Forward less Reverse), 2. Forward Only, 3. Forward and Reverse Alternating
- Outputs (optional): 1. Dual Digital Pulses (open collector or dry contact), 2. 4-20 mA (powered loop), 3. Encoder output
- Connections: Flanges ANSI ISO
- Severity Levels: Environmental class C, mechanical class M1, Electromagnetic environment class E1
- Pressure Loss: ΔP 16

DIMENSIONS & WEIGHTS

CAST IRON DIMENSIONS & WEIGHTS

SIZE	LENGTH (L)	WIDTH (B)	HEIGHT (H)	HEIGHT (h)	WEIGHT
2"	7.9"	6.5"	7.5"	1.6"	19.8 LBS.
3"	8.9"	7.9"	8.3"	3.5"	28.7 LBS.
4"	9.8"	8.7"	8.8"	4.1"	33.1 LBS.
6"	11.8"	11.2"	11.1"	5.5"	70.5 LBS.
8"	13.8"	13.4"	13.1"	6.5"	99 LBS.
10"	17.7"	15.9"	15.9"	8.0"	150 LBS.
12"	19.7"	19.2"	19.3"	9.6"	216 LBS.

STAINLESS STEEL DIMENSIONS & WEIGHTS

| SIZE	LENGTH (L)	WIDTH (B)	HEIGHT (H)	HEIGHT (h)	WEIGHT
2"	10"	5.75"	6.75"	2.1"	15 LBS.
3"	12"	7.5"	8.5"	3.5"	28 LBS.
4"	14"	9"	9.9"	4.5"	40 LBS.
6"	18"	11"	10.9"	5.1"	62 LBS.
8"	20"	13.5"	12.9"	6.4"	88 LBS.
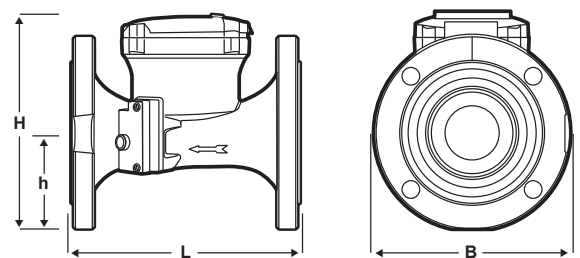
INSTALLATION

HANDLING THE METER

IMPORTANT:

- DO NOT use chains or wire cable to lift the Octave. To protect the epoxy coating, only use a nylon lifting strap with appropriate weight capacity.
- DO NOT lift the Octave by the electronic housing unit.
- DO NOT carry the Octave by its lid.
- DO NOT use bolt holes for grip when carrying the Octave.
- DO NOT position the meter on its electronic housing unit.
- When bolting the meter to pipe flanges, use washers on both nuts and bolts to protect the epoxy coating of the Octave.
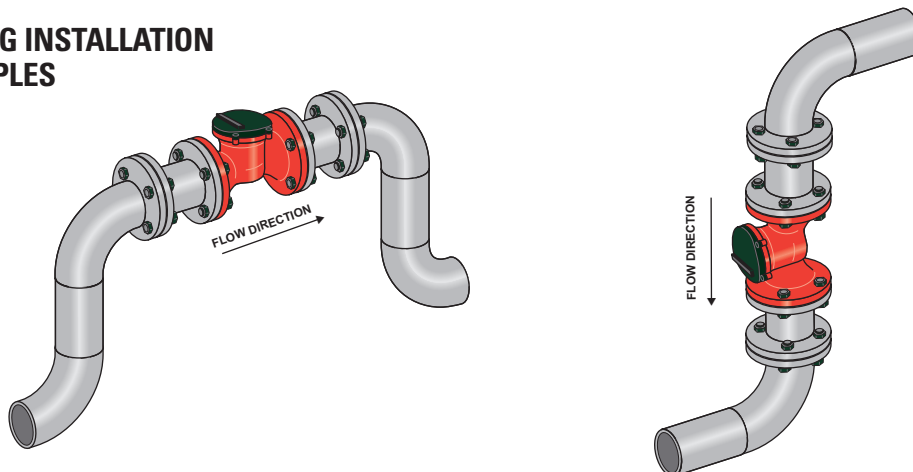- When handling the meter avoid hard blows, jolts or impacts.

INSTALLATION POSITION & LOCATION

Installation requirements for position and location are illustrated below.

PROPER INSTALLATION EXAMPLES

FLOW DIRECTION

FLOW DIRECTION

FLOW DIRECTION

WRONG INSTALLATION EXAMPLES

FLOW DIRECTION

FLOW DIRECTION
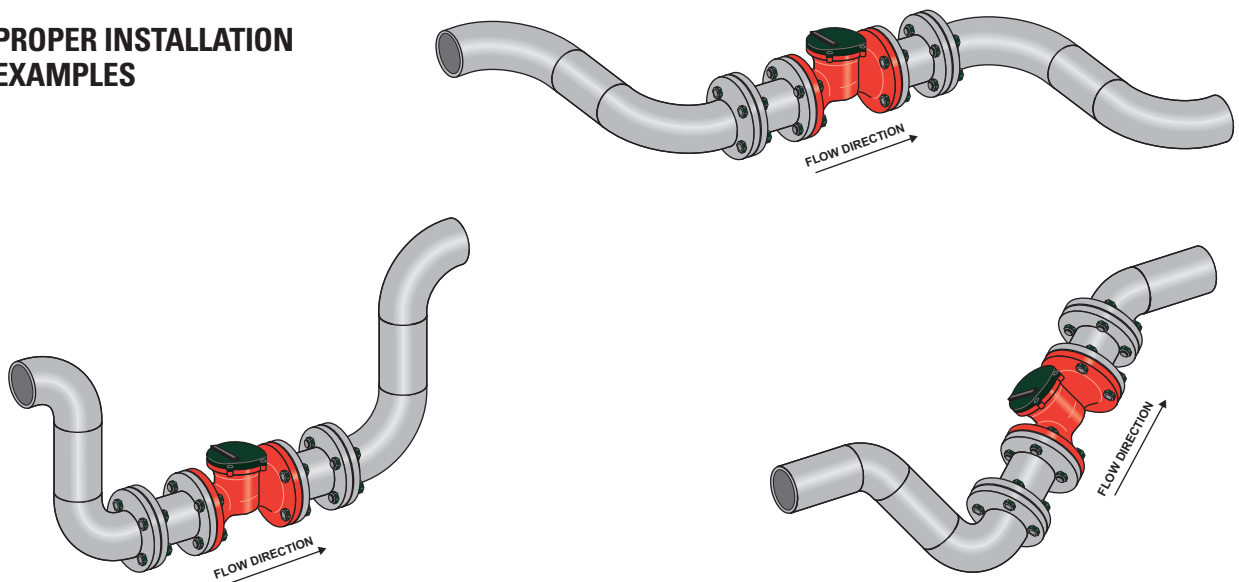
INSTALLATION NOTES

- For proper flow measurements, the Octave's measuring chamber 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 display for forward and backward flow.
- Leave the lid closed except when reading the meter.
- Do not expose the Octave to excessive vibration. To avoid vibration, support the pipeline on both sides of the meter.
- Ambient working temperature: -13° to 131° F
- Water working temperature: 32° to 122° F
- To avoid measuring errors due to air in the flow tube, observe the following precautions:
  - Since air collects at the highest point in the system, installation of the flow meter 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
- It is required to install Netafim branded Combination Air/Vacuum or Continuous Acting Air Vents right before the Octave meter. Consult Netafim for recommendations.

PIPE FLANGES

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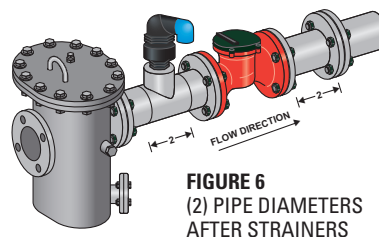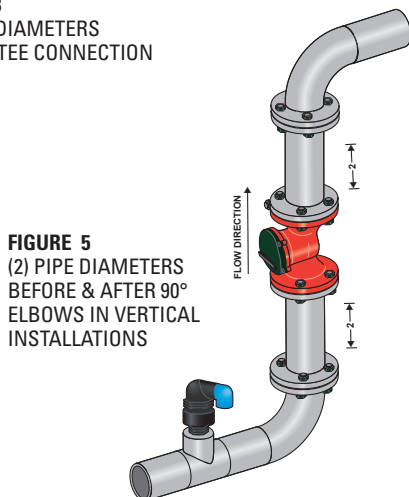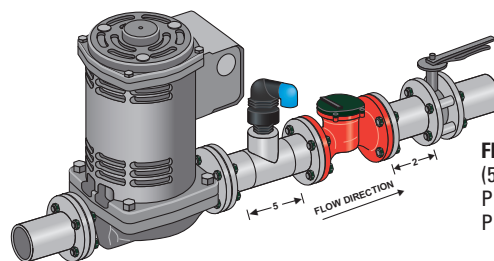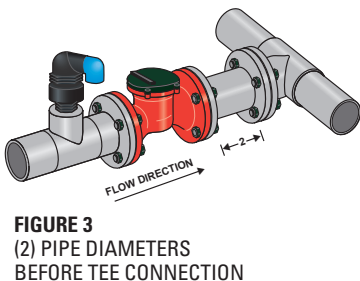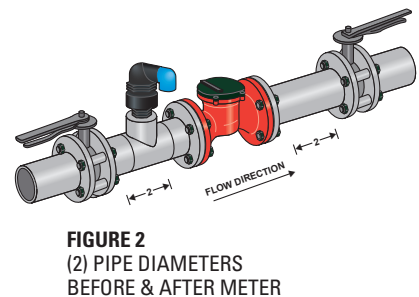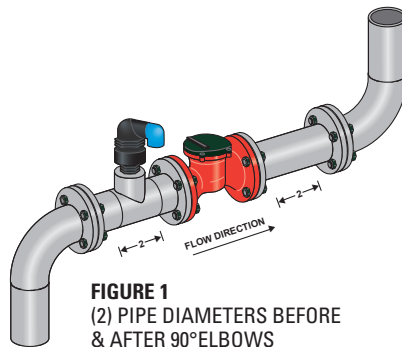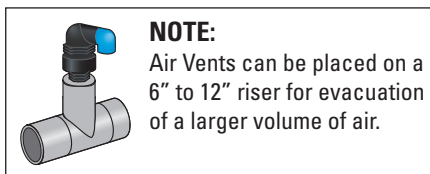- Permissible length deviation: Lmax - Lmin 0.5mm (0.02").

START-UP

- Check that the meter has been installed correctly.
- Check that the flow rate and volume units are correctly pre-programmed on the display.
- Check that the output module is correctly attached.
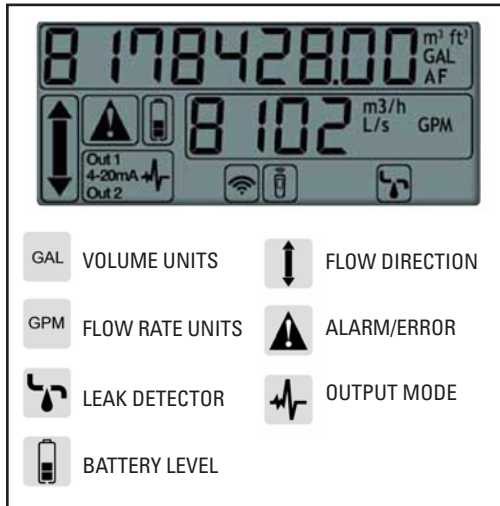
INSTALLATION

INSTALLATION EXAMPLES FOR ACHIEVING TOP PERFORMANCE

The following examples are recommendations for achieving top performance.

- Two (2) diameters of straight pipe are required when installing a 90° elbow before or after the meter. (See Figure 1)

- Two (2) diameters of straight pipe are required when installing the meter upstream or downstream of a valve, tee connection or other source of significant turbulence. (See Figures 2 and 3)
  NOTE: The installation of the meter upstream of a pump or large valve is not recommended due to potential cavitation issues.

- Five (5) diameters of straight pipe downstream of a pump (before the meter) and Two (2) diameters of straight pipe downstream of the meter are required. (See Figure 4)
  NOTE: When the meter is downstream of the pump, Netafim recommends additional straight pipe to ensure accurate measurements.

- Meter can be installed horizontally or vertically with the water flowing up. It is not recommended for installation where the direction of flow is below the horizontal plane. (See Figure 5)

- To eliminate air in the pipeline and maintain accuracy, use of and proper placement of Air Vents is required. We recommend a Combination Air/Vacuum Release Air Vent or the Pro Air Vent.

- Recommended Air Vent placement: 3" and 4" meters place air vent 12" to 18" before the meter; 6" and 8" meters place the air vent 18" to 24" before the meter; 10" and 12" meters place the air vent 30" to 36" before the meter.

- Installing a Check Valve downstream of the meter creates back pressure to aid in the meter filling with water.

NOTE:
Air Vents can be placed on a 6" to 12" riser for evacuation of a larger volume of air.

FIGURE 1
(2) PIPE DIAMETERS BEFORE & AFTER 90°ELBOWS

FIGURE 2
(2) PIPE DIAMETERS BEFORE & AFTER METER

FIGURE 3
(2) PIPE DIAMETERS BEFORE TEE CONNECTION

FIGURE 4
(5) PIPE DIAMETERS AFTER PUMP (BEFORE METER) & (2) PIPE DIAMETERS AFTER METER

FIGURE 5
(2) PIPE DIAMETERS BEFORE & AFTER 90° ELBOWS IN VERTICAL INSTALLATIONS

FIGURE 6
(2) PIPE DIAMETERS AFTER STRAINERS

GAL	VOLUME UNITS	↕	FLOW DIRECTION
GPM	FLOW RATE UNITS	⚠	ALARM/ERROR
💧	LEAK DETECTOR	∿	OUTPUT MODE
🔋	BATTERY LEVEL		

Each Octave is pre-programmed before shipment for an instantaneous flow rate in Gallons per Minute (GPM) and the specified user's requirements for:

• Output Resolution for Optional Pulsed Output

NOTE: Programming software is not available to the end user. Once the meter is programmed, it can only be reset by Netafim.
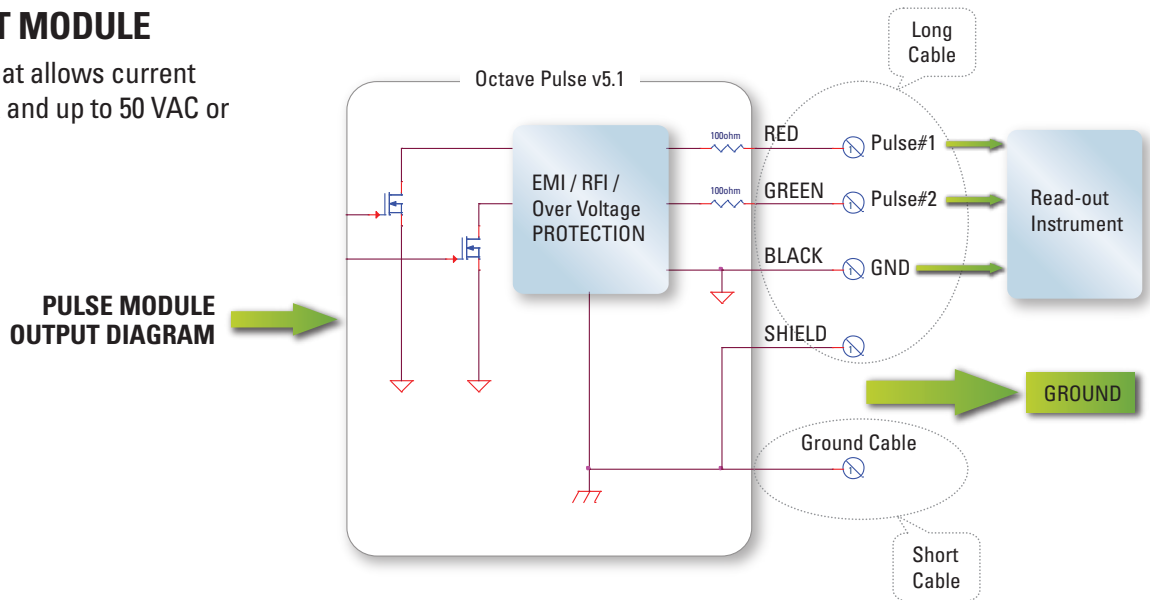
ELECTRICAL OUTPUTS

• The Octave has several output options:
  - Dual pulse output for volumes
  - Analog output (4-20mA) for flow

PULSE OUTPUT MODULE

• Open collector that allows current loading of 200mA and up to 50 VAC or 50VDC

PULSE MODULE OUTPUT DIAGRAM

PULSE OUTPUT CABLES

CABLE	WIRE	FUNCTION
LONG CABLE	RED	PULSE OUT #1
	GREEN	PULSE OUT #2
	BLACK	GROUND
	OPEN	GROUND / SHIELD
SHORT CABLE	RING TERMINAL	GROUND

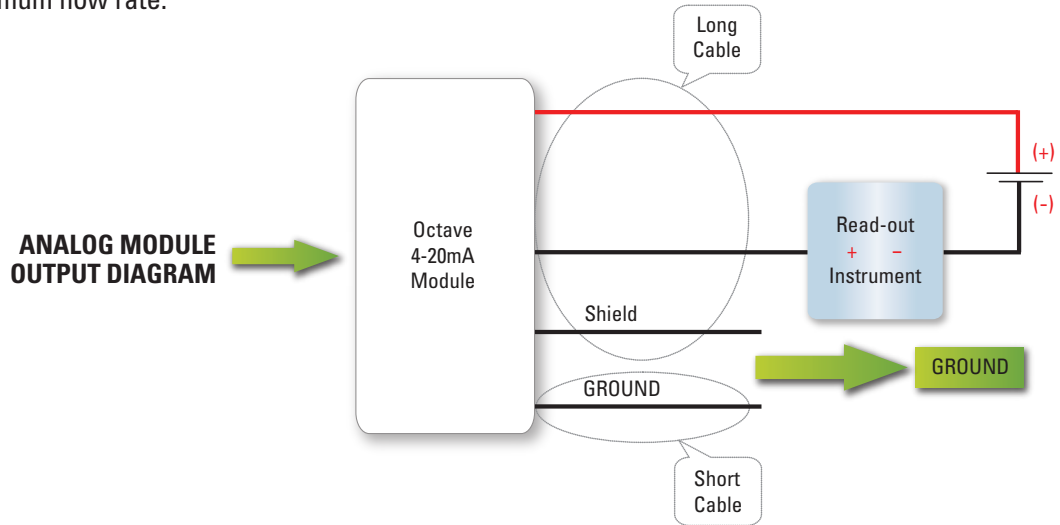WARNING: Signal connection polarity is mandatory.

PULSE OUTPUT CHARACTERISTICS

OUTPUTS TYPE	DRAIN
CABLE LENGTH - SUPPLIED	5 FEET
MAXIMUM CABLE LENGTH*	1,640 FEET
MAXIMUM APPLIED VOLTAGE	30 VDC

* The Maximum cable length depends on the cable type, controller and electrical noise level

OUTPUTS

ANALOG OUTPUT MODULE (4-20mA)

- The current output is a passive 4-20mA.
- 4mA is always '0' zero flow and the 20mA is factory programmable according to customer requirements. If the customer does not specify, 20mA will be the maximum flow rate.

ANALOG MODULE OUTPUT DIAGRAM

Long Cable

Octave 4-20mA Module

Shield

GROUND

Short Cable

(+)

(-)

Read-out
+ –
Instrument

GROUND

ANALOG MODULE OUTPUT CABLES

CABLE	WIRE	FUNCTION
LONG CABLE	RED	CURRENT LOOP +
	BLACK	CURRENT LOOP -
	OPEN	GROUND / SHIELD
SHORT CABLE	RING TERMINAL	GROUND

WARNING: Signal connection polarity is mandatory.

ANALOG OUTPUT CHARACTERISTICS

OUTPUTS TYPE	4-20mA OUTPUT
CABLE LENGTH - SUPPLIED	5 FEET
MAXIMUM CABLE LENGTH*	1,640 FEET
LOOP SUPPLY VOLTAGE	12 - 24 VDC
OUTPUT IMPEDANCE	25 [M] TYP

OUTPUT MODULE INSTALLATION

All Octave meters are shipped with either a cover plate or communication module installed on the side of each meter. Even if the meter is not going to be read by radio or some other electronic unit, it is important to leave one of these devices installed on the Octave to prevent damage to the communication port. **Installing an Octave without a cover plate or communication module would void any warranty.**

If an output module was received separate from the Octave meter, please follow these steps to ensure proper installation of the module. Read through the instructions before attempting to remove the cover plate. The module came as a complete installation kit with the supplies shown in Picture 1.

OUTPUT MODULE INSTALLATION KIT

(2) Allen screws 3mm x 20 mm — Octave module

O-Ring —

3mm Allen key

PICTURE 1

STEP 1
Remove the Sealing Cap from the Cover Plate (see Picture 2).

STEP 2
Using the 3mm Allen Key provided, remove the Cover Plate (see Picture 3). Keep the Cover Plate and 3mm x 15mm screws for future use. The communication port is now exposed (see Picture 4).

STEP 3
Place O-Ring around the 4-prong plug of the Output Module (see Pictures 5 and 6).

STEP 4
Insert Output Module into the communication port (see Picture 7), with the cable pointing down. This will allow the slot inside the communication port to align with the groove on the module. Do not force the module into the communication port. This may cause damage to the pins. Secure into place using the 3mm x 20mm screws provided. Tighten until the screws stop (see Picture 8).

STEP 5
Push the Sealing Cap into the lower screw hole (see Picture 9). Lock the Sealing Cap in place by firmly pushing it into place or gently tapping it in with a small hammer.

NOTE:
If at any time the module needs to be removed, take caution not to allow dirt or water into the communication port. If the module is going to be removed for an extended period of time, reinstall the cover plate and the 3mm x 15mm screws.
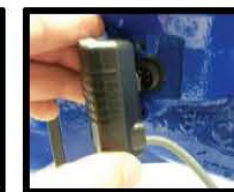
PICTURE 2 **PICTURE 3**

PICTURE 4 **PICTURE 5**

**PICTURE 6** **PICTURE 7**

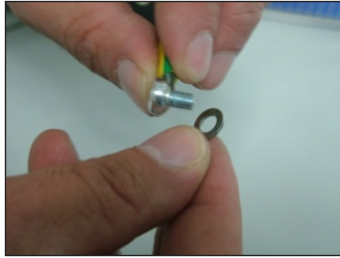**PICTURE 8** **PICTURE 9**

MODULE WIRE CONNECTIVITY

The following chart is designed to assist in wiring the Octave module to various AMR/AMI radios. Alternatively, at the time of purchase you may select to have either Nicor Connectors or Itron Connectors factory attached to the Octave module.

OCTAVE MODULE WIRE CONNECTIVITY

MANUFACTURER	MODEL	COMMUNICATION TYPE	OCTAVE RED WIRE	OCTAVE GREEN WIRE	OCTAVE BLACK WIRE
ACLARA	STAR 3000 SERIES	ENCODER	RED	WHITE	BLACK
	STAR 3000 SERIES	PULSE	RED	N/A	BLACK OR WHITE
BADGER	GALAXY	ENCODER	RED	GREEN	BLACK
	ORION	ENCODER	RED	GREEN	BLACK
DATAMATIC	FIREFLY	ENCODER	RED	WHITE	BLACK
	MOSAIC	ENCODER	RED	GREEN	BLACK
ELSTER	MTU	ENCODER	WHITE	RED	BLACK
	MTU	PULSE	RED	WHITE	GREEN
HERSEY	HOT ROD	ENCODER	RED	GREEN OR WHITE	BLACK
ITRON	60W	ENCODER	GREEN	RED	UNSHIELDED
	60WP	PULSE	RED	N/A	WHITE
	100W	ENCODER	GREY	BROWN	YELLOW
KEMP MEEKS	VISU-LINK VL-9	ENCODER	RED	GREEN	BLACK
	VISU-LINK VL-9S	PULSE	POLARITY DOES NOT MATTER - CONNECT RED AND BLACK WIRE TO EITHER TERMINAL, DISREGARD GREEN WIRE		
MASTER METER	UNIVERSAL XTR	ENCODER	RED	GREEN	BLACK
	FAST PULSE XTR	PULSE	RED	N/A	BLACK
	READPAD	-	RED	N.A	BLACK
METRON FARNIER (T2)	T2 M2W	ENCODER	RED	GREEN	BLACK
NEPTUNE	R900	ENCODER	BLACK	RED	GREEN
SENSUS	MXU PIT UNIT	ENCODER	RED	GREEN	BLACK
	MXU WALL UNIT	ENCODER	RED	GREEN	BLACK
	TOUCH PAD	ENCODER	RED	GREEN	BLACK

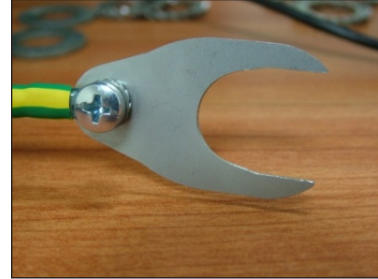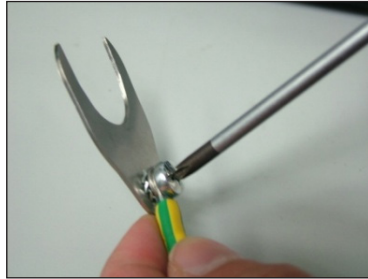# GROUNDING INSTRUCTIONS
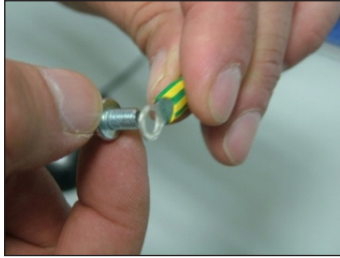
STEP 1
Insert the M5 screw through the pre-assembled Ring Terminal Lug.

STEP 2
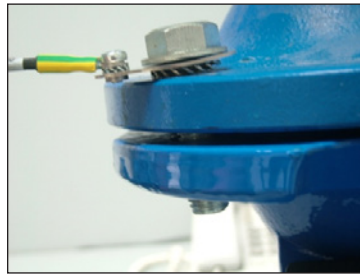Insert the flat washer on top of the Ring Terminal Lug.

STEP 3
Insert the serrated washer on the flat washer.

STEP 4
Attach to the Fork Terminal Lug and tighten (as shown in all three pictures).

STEP 5
Insert flat washer and serrated washer on bolt - use the correct washers per bolt size (M16 or M20 respectively). Insert the bolt in the hole of the pipe's flange - do not insert on meter's flange.
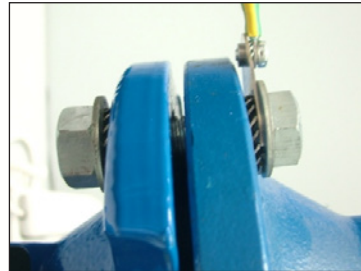
STEP 6
Slide the Fork Terminal Lug between the flat washer and serrated washer.

STEP 7
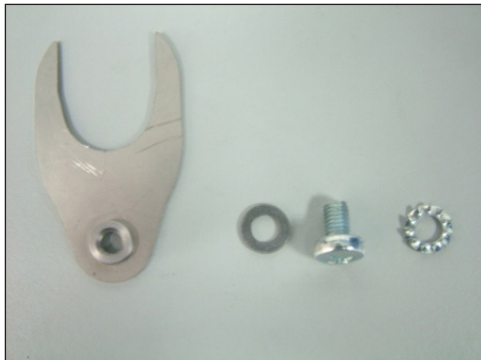Add serrated washer to the other side of the bolt (on meter's flange side).

STEP 8
Add the flat washer on top of the serrated washer.

STEP 9
Add nut and tighten. Make sure the Fork Terminal Lug is in position.

GROUNDING PARTS

PARTS KIT FOR RING TERMINAL LUG

PARTS KIT FOR FORK TERMINAL LUG CONNECTION TO PIPE

PICTURED LEFT TO RIGHT

- Fork Terminal Lug
- Flat Washer
- M5 Screw
- Serrated Washer

PICTURED TOP TO BOTTOM

- M16 or M20 Bolt (not included in kit)
- Flat Washer in M16 and M20 size (2 each included in kit)
- Serrated Washer in M16 and M20 sizes (2 each included in kit)
- M16 or M20 Nut (not included in kit)