SunSonix™
Sonic Head & Water Quality Monitoring Land Based Solar
40SL-15V40-150 Series

General Product Specifications

Model Number	Product Description
40SL-15V60A150-01	SunSonix™ without transducers, probes, or telemetry
40SL-15V60M150-01	SunSonix™ with telemetry, without transducers or probes
40SL-15V60A150-02	SunSonix™ with Single Quattro
40SL-15V60A150-03	SunSonix™ with Single Mezzo
40SL-15V60A150-04	SunSonix™ with Dual Quattro
40SL-15V60A150-05	SunSonix™ with Dual Mezzo
40SL-15V60A150-06	SunSonix™ with Quattro/Mezzo Combo

'A' Telemetry/Communications package. Change to 'M' to add telemetry

For direct access to the latest copy of this manual, please scan this QR Code or refer to the *Product Manuals* section at: www.Hydro-Bioscience.com

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EPA Co. No. 95328

Patent No. 10399867

Printed material may not represent the latest information available. Please visit our website for updates to this manual or other manuals.

Manual P/N – MNUL0062-V001 Rev.2

SAFETY SYMBOLS AND TERMS

Safety Symbols

The following symbols may appear on the product:

⎓	Direct current (DC)	⚠	Caution, risk of danger
~	Alternating current (AC)		Warning, risk of electric shock
⎓~	Both direct & alternating current		Risk of explosion
⏚	Ground terminal		Recycle lithium-ion batteries
	Chassis ground		Do not incinerate
	Power on/off		Power port
	Battery/cell power connection		Battery/cell power connection
	Communication port		Solar panel port
	Repair/service		AC connection port
	Navigation light connection		MyQuattro App communication
CE	Conforms to European Union directives		
FC	Complies to the Federal Communications Commission		
RoHS	Complies with the Restriction of Hazardous Substances Directive (2002/95/EC)		
	This product complies with the WEEE Directive (2002/96/EC) marking equipment. The affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.		

Safety Terms

Terms in this manual:

⚠ Warning/Caution: 'BE ALERT – YOUR SAFETY IS INVOLVED'. If you do not follow these safety instructions, personal injury, loss of life, and/or property damage may occur.

Terms on the product:

Danger: Indicates an immediate hazard which will result in death or serious injury.

Warning: Indicates a hazard which may result in death or serious injury.

Caution: Indicates a hazard which may result in minor or moderate injury.

GENERAL SAFETY REQUIREMENTS

⚠ WARNING - Read this manual thoroughly before using the battery.

User Safety and General Product Precautions

1. Locate/route all cords where they will not be tripped over or damaged by vehicles or equipment with cutting blades such as lawn mowers and hedge clippers and away from vehicle/boat traffic to prevent being driven over.
2. When deploying, follow all equipment and vehicle (such as boats, rafts, etc.) operator safety manual instructions.
3. ⚠ Installation and working in and around water always requires 2 or more individuals for safety.
4. If wildlife such as beavers, minks, nutria, otters, muskrats, turtles, etc., present a problem, additional cable protection is recommended such as a nylon or polyester braided sheath from the surface down to about 2 meters (6 feet) depth.
5. Other manuals included with this manual, such as battery, solar controller/charger, Sonic Head, and SolaRaft manuals, must be read fully. Comply with all safety precautions in those manuals. This manual contains only assembly excerpts from these other manuals. **Visit our website www.hydro-bioscience.com to locate these manuals. Alternately, find and locate the white label affixed to the inner wall of the side panel and download the manuals using the QR Codes printed on that label.**

Precautions While Working with Batteries

1. Risk of fire, explosion, and burns. Do not subject the battery to heat above 100°C (212°F) or incinerate.
2. Keep away from children and pets. NEVER put batteries in your mouth.
3. Swallowing may lead to serious injury or death. If ingested, immediately contact your physician or a poison control center.
4. Use only DPI or HBS branded and approved battery chargers.
5. Do not touch or connect the terminals of the battery to each other.
6. Do not subject the battery to a short circuit.
7. Do not place the battery near fire, in direct sunlight, or in high temperature locations.
8. Do not disassemble or modify the battery.
9. Do not crush, step on, or subject the battery to strong impact.

10. Do not smoke around or near the battery.
11. Immediately discontinue use of the battery if it emits an unusual smell, feels hot, expands, or appears abnormal in any way.
12. Inspect battery for any damage before using. Do not use battery if it has been damaged in any way.
13. Dispose of used batteries promptly according to local recycling or waste regulations.

Personal Precautions While Working with Solar Panels

1. Follow all safety precautions recommended by the solar panel supplier including safe installation practices.
2. Solar panels can generate high voltages greater than 43.2Vdc.
3. Necessary precautions include:
   a. Avoid short circuits which can produce energy arcing which can cause severe burns and/or property damage.
   b. Avoid touching bare wires which can cause personal harm, and even death – DC currents can be lethal.
   c. Use a minimum of one-gauge larger conductor than the appropriate rated wire for solar panel's Short Circuit Ampacity rating.

Uses

The HBS Algae Remediation Products treat bodies of water such as lakes, ponds, etc. as an aid in preventing, reducing, and, in many cases, eradicating harmful algal blooms.

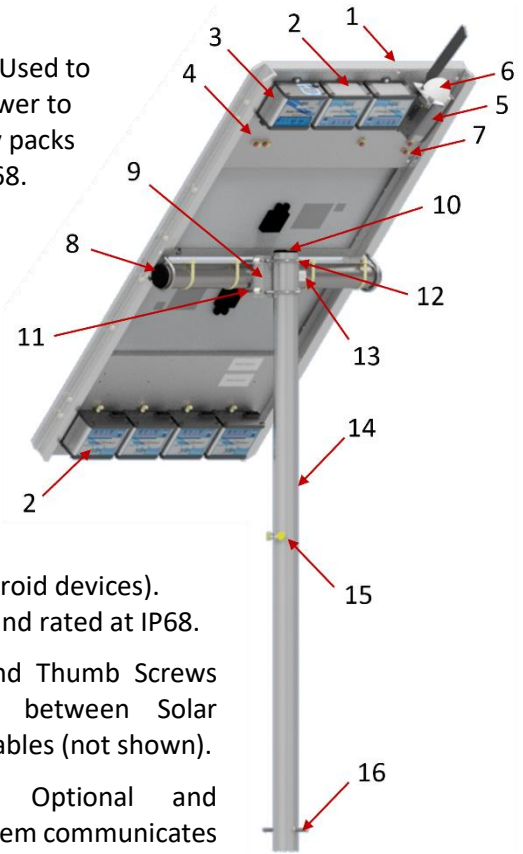
DOT Shipping Regulations

This battery ships Class 9. It cannot be carried by a passenger aircraft.

Limitations and Disclaimers

Due to environmental and manmade conditions contributing to excessive nutrient loading and many other factors, varying degrees of product efficacy should be expected and therefore, there is no guarantee regarding the total prevention or eradication of algae or algal blooms. HBS Algae Remediation products do not treat any body of water to produce potable or drinkable water. HBS Algae Remediation Products do not treat for other bacterium, pollution, viruses, toxins, micro-organisms, or other matter which may be present, and other methods of treatment may be needed to provide prevention, remediation, or elimination of such. HBS Algae Remediation Products are not a replacement for other water treatment methods, including, but not limited to, aeration, chlorination, oxidation, skimming, or other treatments meant to prevent, reduce, or eliminate other bacterium, pollution, viruses, toxins, micro-organisms, or other matter which may be present. HBS Algae Remediation Products are not to be utilized for off-label or unintended uses. Such off-label or unintended use may void the product's warranty and/or cause damage to persons or property.

PRODUCT FEATURES



1. Solar Panels (x2)
2. Lithium-Ion Battery Packs (x6): Used to store and provide continual power to the Solar Controller (7). Battery packs are waterproof and rated at IP68.
3. Solar Controller: Takes in solar power and charges battery packs (2), controls power to sonic heads (via Channel-1 and -2), controls power to the telemetry/ modem module (5) (via the COMMS port), and communicates via serial communications and Bluetooth for the MyQuattro™ app (currently available on Android devices). Solar Controller is waterproof and rated at IP68.
4. Strain Relief P-Clamps (x2) and Thumb Screws (x2): Provides strain relief between Solar Controller (3) and sonic head cables (not shown).
5. Telemetry/Modem Module: Optional and purchased separately. The modem communicates with the Solar Controller via its POWER/COMMS Port. It has three ports to also provide a connection to a SONDE Probe, or other serial devices via its additional ports Two to Four. The modem communicates with the cloud to provide cloud-based monitoring services and GPS position coordinates.
6. Telemetry/Modem Antennas: Communicates with GPS and Cellular. **DO NOT PROP SOLAR PANELS AGAINST ANTENNAS DURING INSTALLATION.**
7. Strain Relief P-Clamp and Thumb Screw: Provides strain relief between SONDE Probe cable (not shown) and Telemetry Modem (5).
8. Cross Mount Bar: comes pre-assembled to Solar Panel Assembly (1)
9. Mount Plate: comes pre-assembled to Solar Panel Assembly (1)
10. Vertical Pole Stop Bracket: prevents pole from extending beyond U-Bolts.
11. U-Bolt and Associated Nuts: used to tighten and secure the Solar Panel Assembly (1) up/down position.

12. U-Bolt and Associated Nuts: used to tighten and secure the Solar Panel Assembly (1) left/right rotation position.
13. Label: aids in centering Mount Plate (9) on Cross Mount Bar (8)
14. Solar Panel Vertical Pole
15. Strain Relief P-Clamps (x2) and Thumb Screws (x2): Provides strain relief for sonic head and SONDE probe cables.
16. Stabilization Bar: Stabilizes SunSonix during prep site hole step.

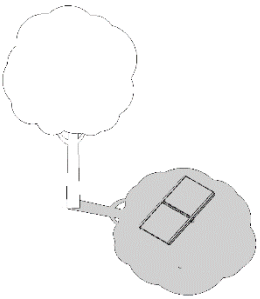
Product Set-Up

Installation follows these basic steps. Each step will be expanded upon with diagrams:

1. Site Preparation – Most important step that must be chosen, wisely.
2. Prep Site Hole – Dig a hole in the earth approximately 8in (20cm) diameter by 18in to 24in (46cm to 61cm) deep for vertical pole.
3. Solar Panel Assembly onto Vertical Pole – onto the top of the pole by sliding the pole through the two pre-assembled U-Bolts. Set the up/down and left to right movement by tightening the U-Bolt nuts.
4. Anchor And Sonic Head Placement – Place the Sonic Heads and their floats into the body of water to be treated and run the cable back to the solar panel assembly.
5. Solar Panel Cabling Install – Strain relief the Sonic Head cables to the vertical pole and connect to Solar Controller.
6. Powering Up the System – Energize Solar Panels and batteries.

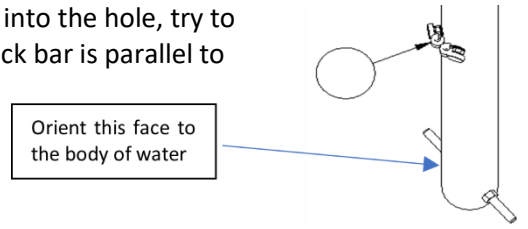
Site Preparation – IMPORTANT!!

Select the installation based on these criteria:



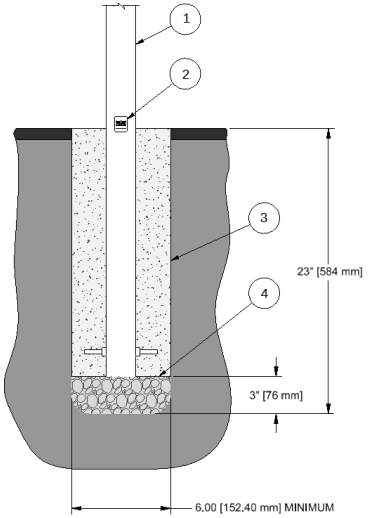
1. Review the travel of the sun from sunrise to sunset and ensure that the installation of the solar system NEVER sits in the shadow of trees, buildings, or other obstacles.
2. Refer to the figure to the left. The solar panel system should never sit in a shadow created by obstacles as the sun travels across the sky from sunrise to sunset.
3. Choose a location for the hole far enough away from the shore of the body of water to be unaffected by ground water from the body of water that is to be treated. When the hole is dug, it should be free of water.

4. As the vertical pole is placed into the hole, try to orient the pole so that the lock bar is parallel to the body of water and the two yellow cable strain relief knobs are facing the body of water as visualized by this figure:



Prep Site Hole

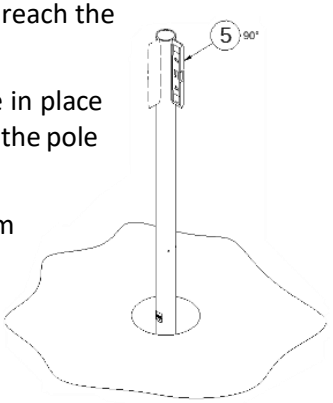
Refer to figures and ensure that the Site Preparation Details were followed!



Tools required (supplied by installer):

- Spade, shovel, or auger
- Levels
- Construction rope and 3 stakes
- ¾ stone aggregate
- Concrete dry mix or expanding foam fence post mix (follow all manufacturer's instructions)

1. Dig a hole approximately 8in (20cm) diameter by 23in (60cm) deep.
2. Fill bottom of hole with approximately 3in (76mm) of concrete or foam mix.
3. Place Vertical Pole into hole. The depth should reach the label on the pole as a minimum.
4. If using concrete mix, level the pole and secure in place using rope and stakes. If using foam mix, steady the pole until foam is set (approx. 3min).
5. Fill hole with concrete dry mix or expanding foam fence post mix.
6. If using concrete mix, remove rope and stakes that held the Vertical Pole in place after the concrete has set.



Solar Panel Assembly to Vertical Pole

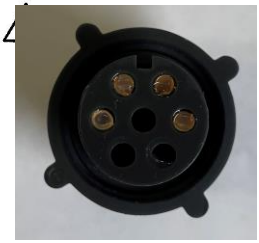
Refer to the PRODUCT FEATURES figure to assemble the Solar Panel Assembly (1) to the Vertical Pole (14).

Tools Required (supplied by installer):

- Box Wrench or Socket – 1/2in to tighten U-Bolt Nuts

1. A two person team is recommended. Raise the Solar Panel Assembly and slip the U-Bolts (12) onto the top of the Vertical Pole (14). The Vertical Pole Stop Bracket (10) prevents the Solar Panel Assembly from falling onto the top of the Vertical Pole (14).
2. Set and lock in the Left to Right movement first:
   a. As the sun travels east to west (sunrise to sunset), the panels need to be oriented such that they will always be exposed to sunlight as the sun makes the travel.
   b. Establish the movement of the sun from east to west and rotate the Solar Panel Assembly (1) until it is perpendicular to the sun's path.
   c. Then tighten the four U-Bolt nuts (11).
3. Set and lock in the Up/Down movement, next:
   a. Shift the panel left to right on the Cross Mount Bar (8) until the edge of the Mount Plate (9) lines up with the Label (13)
   b. With the Solar Panel Assembly horizontal, tilt it downwards till it is tilted downwards approximately 20 to 30 degrees.
   c. Then tighten the four U-Bolt nuts (11).
   d. If the Telemetry Modem (5) is installed, its antennas must point upwards.

SONIC HEAD CABLE CONNECTION



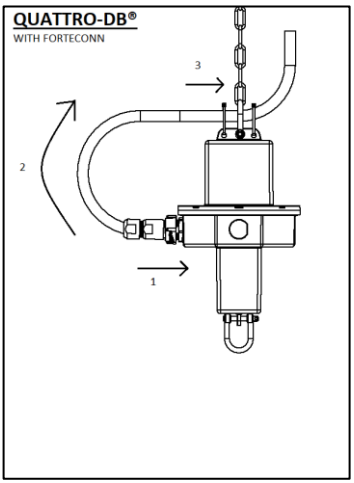
If a cable connector is supplied which connects to a power supply, apply a very small <u>3mm diameter</u> spot or less of dielectric grease to all socket contacts (as shown) – not pins. This protects from corrosion, moisture, and dirt when connectors are disconnected. Any dielectric grease or lubricant used must conform to NSF-61 Marine Grade standards.

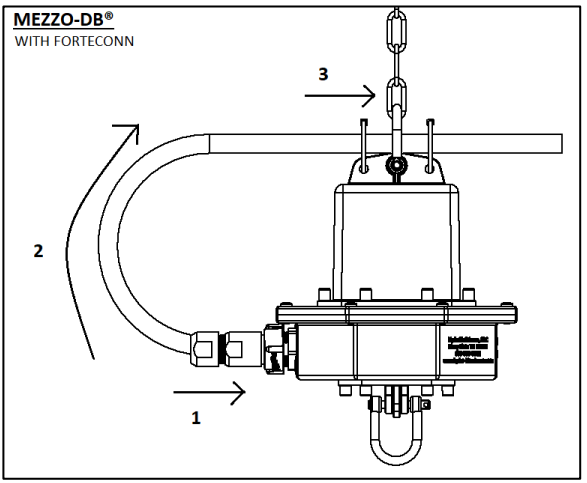
⚠ To avoid a non-warranty claim, follow the installation instructions below.

⚠ IMPORTANT

<u>NEVER</u> USE THE STRAIN RELIEF LOOP OR THE POWER CONNECTOR AS A HANDLE. <u>ALWAYS</u> USE THE CHAIN ON THE TOP OF THE UNIT WHEN LIFTING THE SONIC HEAD.

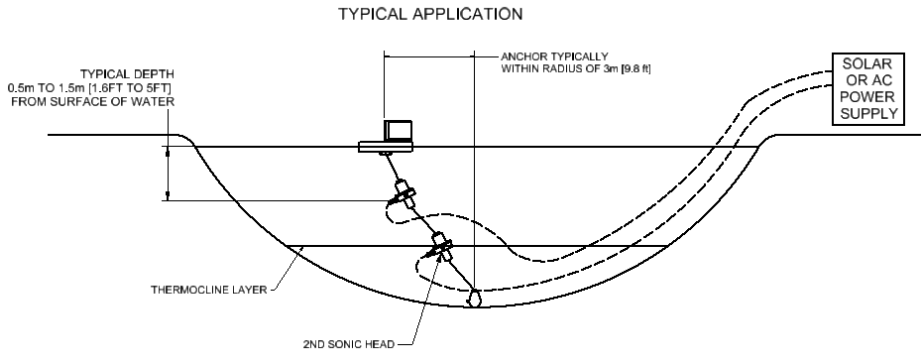
<u>Securing Cable to Sonic Heads:</u>





1. Use the supplied cable.
2. Apply 3mm diameter spot of dielectric grease to any contact socket (not pin) to aid in the resilience to moisture dirt and grime.
3. Make a strain relief loop for the Power Cable by making a radial bend and secure it to the top mounting tab holes of the Sonic Head with cable ties (as shown above). Clip off excess cable tie straps with flush cut trimmers or scissors.
4. **Always secure the cable to the Sonic Head using cable tie straps to prevent damage to the ForteConn connector.**

ANCHOR AND SONIC HEAD PLACEMENT



Shown is a typical application using one or two Sonic Heads.

Single Sonic Head

Where one Sonic Head is used, refer to the Sonic Head on the top:

1. A typical 2.27kg (5lb) anchor ball, available from many sources including marinas and retail stores, is needed to keep the system in place. The anchor is first tied to a marine grade rope, stainless-steel cable, or a chain and dropped until it rests on the lakebed. (Alternatively, cinder blocks or other heavy weights can be considered for the anchor.)
2. Adjust the anchor line so the anchor is resting on the lakebed with 2m [6.56ft] excess line above water surface, from where the anchor/system is to be placed.
3. The top end of the anchor line should then be secured to the bottom D-shackle (below sonic head for Float system or on the anchor chain for SolaRaft).
4. The top end of the rope or chain is connected to one of the three Float Hanger Holes.
5. Via the chain supplied, connect the top of the Sonic Head to one of the three Float Hanger Holes. Drop the Sonic Head until it is approximately 0.5m to 1.5m below the surface of the water.
6. The Sonic Head Cable MUST be secured to the holes of the Sonic Head using the supplied Cable Ties – refer to the section titled "SONIC HEAD CABLE CONNECTION".
7. The cable is typically allowed to lay along the bottom of the lakebed out to shore and connected to a power supply designed to drive the Sonic Head.

8. When laying the cable in shallow water less than 2m (6ft), and over shore ground it may be beneficial to sheath the cable or bury it to deter wildlife from biting and severing the cable or pulling the cable.
9. **IMPORTANT: At shore, it is important to secure the cable by tying it to tree or a stake to apply a stress relief so that wildlife pulling on the cable will not transmit that pull to the connector at the power supply on shore.**

Dual Sonic Heads

It is strongly recommended you contact HBS before proceeding to ensure optimal installation. HBS can also recommend an approved installer.

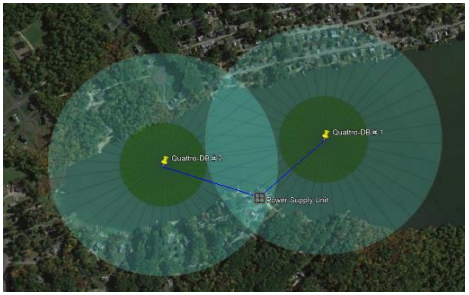
Alternate Layout One:
Refer to the bottom sonic head on the TYPICAL APPLICATION figure above.

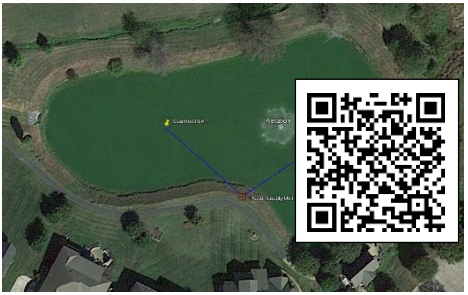
Consult a Limnologist to supply aid and understanding of the body of water to be treated, using this option.

For deeper lakes, a thermocline layer exists at the bottom of the lake. Algae tends to rest at this layer. By making available a second Sonic Head, positioned at this layer, it affects that algae by forcing them to transcend down into colder water where its life cycle may be affected and shortened.

Alternate Layout Two:
Refer to the four pictures below.

The Sonic Head technology is a line-of-sight technology much like radar. From an arial view, where the shape of the lake is a 'V' (or bent and not straight, i.e., a point) or an obstruction such as a fountain or aerator is used, or a land patch exists between two bodies of water, two Sonic Heads, driven from one power supply such as an HBS AC Power Supply or HBS Solar Power, layout placements are shown. Refer to these figures below. The one figure with the circled areas represents coverage – approximately 100 to 120acres for Blue Green Algae.



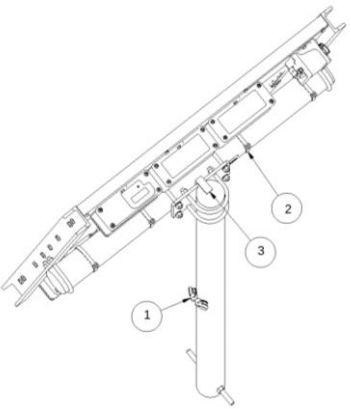


These layouts require a float kit which may require them to be purchased separately. Use manual MNUL0064-A001 to deploy the float kit with the second Sonic Head.

Solar Panel Cabling Install

IMPORTANT – SONIC HEADS DEPLOYED INTO A BODY OF WATER CAN MOVE TRANSMITTING GREAT STRESS BACK TO THE SUNSONIX™ System. STRAIN RELIEF ALL CABLES!!

Refer to this figure and locate the two Strain Reliefs (1) on the Vertical Pole held in place with two yellow Thumb Screws. Use these strain reliefs to route the cable along with cable ties (3) to route cables along the frame of the Solar Panel System.



Using Cable Ties found in the Hardware Kit, strap the cables up the pole and connect the cable connector ends to the Solar Controller channels One and/or two labeled ‘Sonic1’ or ‘Sonic2’.

1. Route the Sonic Head Power Cable to the Solar Controller (3) and connect to first Channel One labeled 'SONIC 1' or if a second Sonic Head cable is used then connect the channel labeled 'SONIC 2'.
2. Secure the cable with the 'P-Clamp' using the second P-Clamp (4) and its Thumb Screw. **IMPORTANT: Route cables through the supplied P-clamps for strain relief. Never allow stress to reach plug connections at the electronic modules.**

Powering Up the System

1. Locate the Solar Controller (3). During shipping, the SunSonix™ is powered off by one of three methods as mandated by shipping couriers and/or country importation codes.
   a. Method 1: Two wires may not be connected to the Solar Controller – the Solar Panel Positive and Battery Pack Positive. These are identified by the printed heat shrink on the terminals. Plug these two wires into the Solar Controller Tabs.
   b. Method 2: Locate Channel Three Output on the Solar Controller (3). This Channel is labeled 'Comms'. Remove the Plug labeled 'Lockout' from the receptacle.
      i. If the Telemetry/Modem Module (11) was purchased and accompanied the product, the same 'Comms' port is used.
      ii. In this case the Telemetry plug will be found near the Comms port. Plug the connector into the Comms port.
      iii. The Telemetry/Modem Module installation is found below.
   c. Method 3: Remove the fuse taped to solar panel. Locate the fuse holder on the back of solar panel and insert the fuse. Close the attached cap.
2. If a Telemetry/Modem Module Option was purchased, there are Two Options:
   a. Option 1: Uses a Steven's Water Telemetry/Modem not shown in the PRODUCT FEATURES figure. Refer to the section titled "STEVEN'S WATER TELEMETRY/MODEM" and install.

b. Option 2: Uses an HBS Telemetry/Modem. Refer to these steps to mechanically attach to the Vertical Pole frame:
   i. Locate the Solar Controller (3) and identify the port labeled 'Comms'. If the connector on the Telemetry Power Cable is installed, the modem is good to go. If not connected, plug the connector into the port. If the system shipped to you and it is a first-time deployment, and the Lockout was installed into this Comms port, then this modem Power Cable would have been left disconnected. Simply remove the Lockout plug, first.
   ii. Refer to the Telemetry/Modem manual located at www.hydro-bioscience.com for a full list of operating instructions.

3. If a SONDE Probe Option was Purchased, refer to the section titled "SONDE PROBE" and install the probe's power cable wiring now. Referring to the PRODUCT FEATURES, locate the Strain Relief and Thumb Screw (7) and use this strain relief to secure the SONDE probe's cable.
4. The SONDE Probe deploys out to a location in the body of water much like the Sonic Heads.

SONDE PROBE & TELEMETRY

If a Telemetry/Modem Module option was purchased, there are two options:

1. HBS Telemetry/Modem: Locate the modem power cable and plug the connector into the Solar Controller's Channel-3, COMMS port. Refer to the Telemetry/Modem manual located at www.hydro-bioscience.com for a full list of operating instructions.
2. Steven's Water Steelhead: Refer to the section titled "STEVEN'S WATER TELEMETRY/MODUM" for instructions.

Eureka's Manta Probe Installation

Follow Eureka SONDE probe Install and operating instructions. The following steps serve as a quick guide to installing the probe into SunSonix™. The full Manta Probe manual can be found at https://www.waterprobes.com/support-for-water-quality-monitoring.

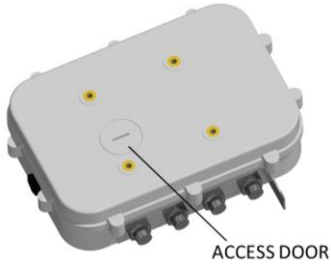
1. Unpackage Manta Probe.
2. Unscrew the protective cap on the top of the probe and connect the Underwater Cable by threading and hand tightening the cable plug.
3. Remove the Storage/Calibration Cup from the bottom of the probe and replace with the Weighted Sensor Guard.

4. Follow the manufacturer's cleaning and calibration routine before deploying.
5. Hang SONDE from a safe and secure area such as a personal dock.

STEVEN'S WATER STEELHEAD MODEM

The following instructions are solely for the mechanical and electrical connection to the SunSonix™ product. For operation, refer to the Steven's Water Telemetry System (SWTs) Instruction Manual found on our website www.hydro-bioscience.com.

1. Due to shipping regulations, all Bluetooth devices must be turned off. The Steelhead must first be powered on in the back of the unit.
2. Locate the Power Cover Unlocking Disk provided in the hardware bag and use it to open the access door by rotating and lifting it out of the way.



3. Flip the switch in the access door to the 'ON' position.
4. Reinstall the access door.
5. Using the 4 screws, mount the Telemetry module onto the Solar Panel Back Panel.
6. There are two cables that plug into the bottom ports of the Telemetry module. The cable with two circuits threads into the Power Input on the Steelhead while the other end connects to the Solar Controller COMMS port. Route this cable through the round hole to the right of the Telemetry module.

7. The second, 4-circuit cable electrically connects the SONDE probe to the Telemetry module. Thread this cable into the SDI-12 input on the Steelhead. Route this cable through the round hole to the right of the Telemetry module and plug into the SONDE Probe.

POWER SUPPLY

Solar Powered Systems

Solar Charger and Controller Power Supply

For operation of Sonic Heads using the Solar Controller, please refer to the Solar Charger/Controller User's Manual (MNUL0059-A001) or visit the resources → manual section at https://www.hydro-bioscience.com/. The third port also accepts a Lockout Key Connector used to shut down the system for shipping or storage reasons.

Each sonic powered output connector port is labeled 'Sonic1' and 'Sonic2':

Sonic1 Connector does not ship with a dust cover, but Sonic2 Connector must have its dust cover popped off if a second sonic head cable is connected to it.

WHAT TO EXPECT AFTER INSTALLATION

Blue-Green Algae (Cyanobacteria)

Most blue-green algae (cyanobacteria) will have lost their buoyancy and should be on, or settling, to the pond bottom within 3-4 days. The cells can be re-suspended via aeration bringing them up to the light which may prolong the time it takes for them to fully die off. Therefore, please note that a subsequent "bloom" is not uncommon, and it could take multiple cycles before a thorough algae remediation can occur.

Green Algae

Green algae (filamentous types) and colonial types require up to 3+ weeks before the damage results in them turning brown, depending on the kind (genus/species) of algae. They will normally float to the surface at this time due to the bacterial digestion process breaking them down. It takes about 7-10 days from that point before they are sufficiently digested to lose buoyancy and sink. Some users rake them out as the die-off begins or you may just let them settle to the bottom. If you do the latter, bioaugmentation can speed up the digestion process and help remove the biomass.

Diatoms

Diatoms react similarly to green algae but lose mobility quickly which hastens their dying process.

Biofilm

For biofilm control and prevention, ultrasonic frequencies mimic turbulent water which prevents the colonization of microorganisms in biofilm forms.

Affected Algae Species

Achnanthidium minutissimum, Anabaena spp., Ankistrodesmus falcatus, Aphanizomenon spp., Aphanochaete spp., Botryococcus braunii, Chlamydomonas spp., Chlorella spp., Chloromonas botrys, Chroococcus spp., Closterium spp., Cocconeis placentula, Coelastrum spp., Cosmarium spp., Crucigenia spp., Cryptomonas erosa, Cryptomonas spp., Cyanobium sp., Cyclotella spp., Desmodesmus abundans, Dictyosphaerium spp., Fragilaria capucina, Fragilaria spp., Gloeocystis spp., Gomphonema parvulum, Gomphonema spp., Heteroleibleinia spp., Lagerheimia spp., Leptolyngbya spp., Lyngbya spp., Merismopedia tenuissima, Micractinium spp., Microcystis spp.*, Navicula minima, Nitzschia spp., Oedogonium spp., Oocystis pusilla, Oocystis spp., Phacus spp., Pinnularia spp., Pithophora spp.*, Plagioselmis nannoplanctica, Planktothrix spp., Planothidium lanceolatum, Polycystis sp., Pseudanabaena spp., Raphidiopsis raciborskii*, Scenedesmus quadricauda, Sphaerocystis schroeteri, Spirogyra spp., Staurastrum spp., Stigeoclonium spp., Tabellaria spp., Tetradesmus lagerheimii, Tribonema spp., Ulnaria ulna, Ulothrix spp.

*Only partial control

(This is not a complete list of algae that is affected by HBS Ultrasonic systems)

Important Note: Certain species of plants and foliage rely on the presence of biofilm to survive and may be adversely affected. One known affected species is water hyacinth (Pontederia crassipes). Therefore, the sonic head devices are registered with the EPA.

Typical Area Coverage:

Blue-Green Algae:	approximately 120 acres
Green Algae:	approximately 17 acres
Biofilm/Diatoms:	approximately 3 acres

SONIC HEAD MAINTENANCE

The HBS ultrasonic algae management system is designed to limit calcium carbonate crystal formation on the sound emitting surfaces, so it forms slowly. Over time, buildup will occur depending on how hard the water is where you live. Check the system for any calcium carbonate buildup after the first month of operation. If you see significant crystalline formation, use a calcium lime rust remover to wipe it away. Adjust your cleaning cycle based on how quickly the buildup returns.

Early field results show that biofilm formation on the device is likely. This has been seen on other ultrasonic devices. This is due to ultrasonic frequencies mimicking turbulent water and preventing biofilm colonization everywhere except for directly on the device (ground zero for the sound emission). For water treatment facilities, it is recommended that the sonic head gets wiped or brushed off monthly to remove any accumulated biofilm. Small accumulation of biofilm has not been shown to cause loss of output from the sonic head because ultrasound seems to easily pass through the film (since it is about 99% water), but if left uncleaned, large buildup of biofilm will cause dampening of ultrasonic frequencies and limit the effectiveness of the device.

Storage

Winterization: If your pond ices over during the winter or if temperatures drop to less than 5°C (40°F) over an extended period of time, it becomes necessary to store the sonic head and float assembly to prevent ice buildup from damaging the cable or other system components.

1. Pull Sonic Heads and SONDE Probes (if equipped) and Cabling from water body. Frozen lakes can stress and break cabling.
2. Sonic Heads and their cabling can be coiled neatly and placed at the base of the Vertical Pole – they do not need to be stored in a shelter.
3. SONDE Probes and cabling should be disconnected from the system and stored in a weatherized shelter.
4. Battery Packs and solar panels may be left outdoors.
5. If a SONDE Probe is used, follow the manufacturer's cleaning and calibration routine before moving into storage.

Redeployment

1. From storage and prior to redeployment, clean the Solar Panels. Gently spray off dirt and debris using a water hose.

2. Wipe the solar panels using a common household window cleaner and a soft cloth.
3. Reverse the procedure from ‘Storage’ above by redeploying Sonic Heads

Cable Splice Connector

Cable Splice Connector used on ‘T65’ Sonic Head models only.

This connector is an IP68 rated cable splice that can be used in field repair or upgrading to newer sonic heads. This connector may be ordered as a kit – KITM0262. Go to www.Hydro-Bioscience.com to contact the RMA department to place order.

Figure 1

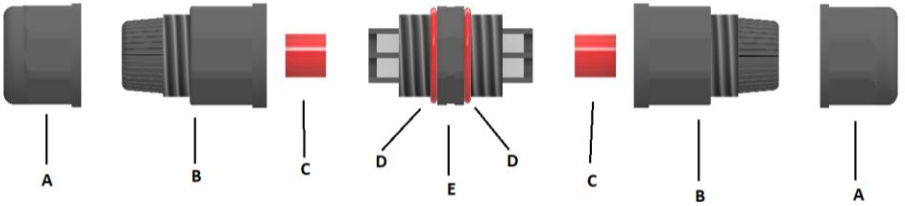
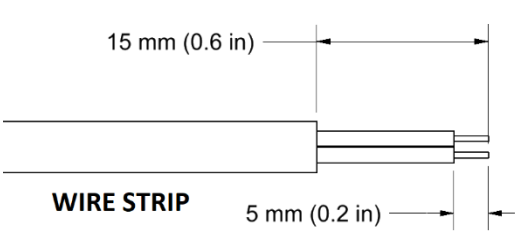
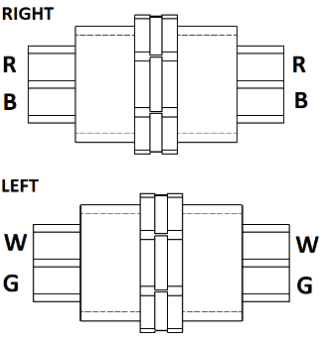


Figure-1 Parts Description

A. Cable Sealing Cap – one for each side
B. Connector Housing – one for each side
C. Cable Sealing Cap Grommet – one for each side
D. Red O-ring for sealing – one for each side
E. Connector Splice Terminal – 4 circuit for 4 wires

Figure-2 Connecting Cables to Splice

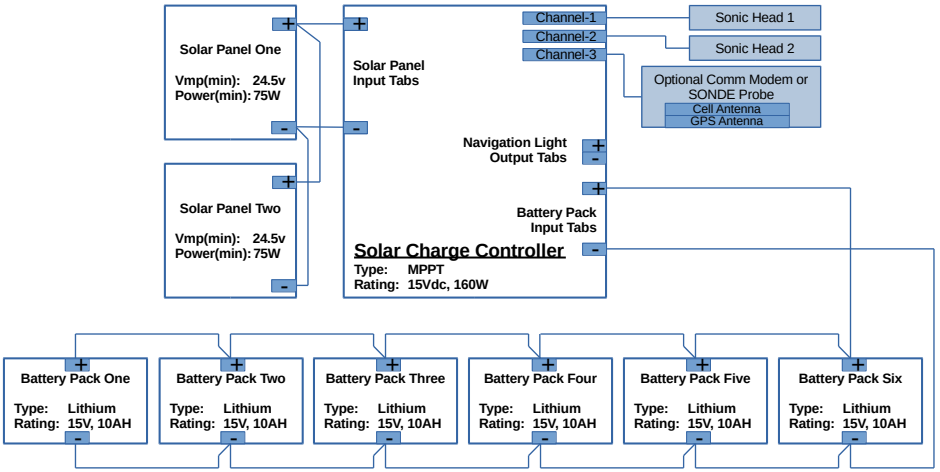




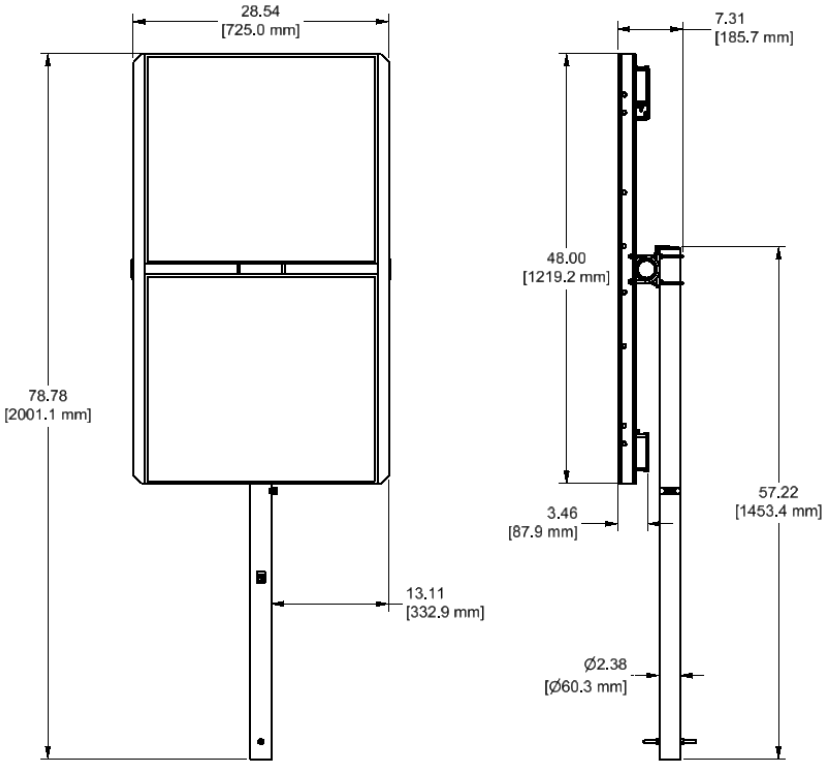
1. Slide Cable Sealing Cap (A) and Connector Housing (B) and Cable Sealing Cap Grommet (C) onto each cable.
2. Optional adhesive lined Heat Shrink tube. For very deep or high integrity protection, a heat shrink tube may be used. For most typical applications, the heat shrink tube is not necessary. If using the heat shrink tube, slide the cable through it before joining the cables together.
3. Prepare the ends of each cable to be joined by stripping the outer cable jacket to 0.60in (15mm) and each conductor stripped to 0.20in (5mm). Refer to the WIRE STRIP diagram in **Figure-2.**
4. To join one cable to the next, align the cable colors of each cable. Red aligns with red (R-R), black to black (B-B), green to green (G-G), and white to white (W-W). Refer to the RIGHT and LEFT (which is also the front and rear view) figure of the Connector Splice Terminal (E) shown in **Figure-2**.
5. Align the color of each conductor into each circuit of the Connector Splice Terminal (E). Use a #1 Philips screwdriver to tighten each circuit. Pull on each conductor to verify each terminal is tight in its contact circuit.
6. Thread the left side Connector Housing (B) onto the Connector Splice Terminal (E) fully until the red O-ring gasket (D) is fully covered.
7. Thread the left side Cable Sealing Cap (A) onto the Connector Housing (B) and hand tighten until fully seated.
8. Repeat these above steps for the connector parts and cable shown on the right side.

The finished assembly is shown here, without the optional adhesive lined heat shrink tubing that can be added over top of the connector.

TYPICAL SUNSONIX™ CIRCUIT CONNECTION



PRODUCT DIMENSIONS



GENERAL WARRANTY

Hydro BioScience, LLC (HBS) warrants that the product will be free from defects in materials and workmanship for a period of 3 years (1 year for accessories) from the date of purchase of the product by the original purchaser from HBS. This warranty only applies to the original purchaser and is not transferable to a third party.

If the product proves defective during the warranty period, HBS either will repair the defective product without charge for parts and labor or will provide a replacement in exchange for the defective product. Parts, modules, and replacement products used by HBS for warranty work may be new or reconditioned like new performance. All replaced parts, modules and products become the property of HBS.

To obtain service under this warranty, customer must notify HBS of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to the service center designated by HBS, and with a copy of customer proof of purchase. Customer must ensure that an RMA (Return Material Authorization) number has been received from HBS. This RMA number must be printed on outside of the return packaging.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. HBS shall not be obligated to furnish service under this warranty:

a) to repair damage resulting from attempts by personnel other than HBS representatives to install, repair or service the product;
b) to repair damage resulting from improper use or connection to incompatible equipment;
c) to repair any damage or malfunction caused by the use of non-HBS supplies;
d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest HBS's Sales and Service Offices for services. For better after-sales service, please visit www.hydro-bioscience.com and register the purchased product online. Warranty may also be requested on-line, along with obtaining an RMA, automatically.

Excepting the after-sales services provided in this summary or the applicable warranty statements, HBS will not offer any guarantee for maintenance declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. HBS should not take any responsibility for any indirect, special, or consequent damages.

For Customer Service, and to request an RMA or obtain Return Information, please call Hydro Bioscience, LLC at 888-500-5011.

For all returns, clearly mark the RMA # on the outside of the packaging and send to:

Hydro Bioscience, LLC
414 Century Court
Piney Flats, TN 37686
RMA Number: _____

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Eco Driven Solutions®