Thru-Hull SeaLite®
150W-HID

U.S. Patent No. 7,044,623

Installation, Operation, Maintenance and Safety Instructions

150W HID Manual P/N 710-082-610-0A

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Congratulations on the purchase of your 150W HID Thru-Hull SeaLite®! DeepSea Power & Light has been supplying underwater lights for industrial and research applications for over 25 years, and our line of SeaLite® products have set the standard for durability and performance in every industry where they are used. Your 150W HID Thru-Hull SeaLite® has been rigorously tested, and the quality and performance of your light comes with the full confidence and backing of DeepSea Power & Light. As a measure of that confidence, your 150W HID Thru-Hull SeaLite® comes with a full one-year warranty against defects in workmanship and materials. A complete copy of the warranty statement can be found on page 24.

Unpacking and Inspection

Before the Thru-Hull SeaLite® is packaged for shipment it is rigorously tested and inspected. The product is then carefully packaged to withstand the rough handling that can be anticipated during shipment. DeepSea Power & Light engages only reputable shipping companies to handle our merchandise, so it is rare that a product is damaged in shipment. Upon arrival, carefully check the light and ballast for damage. If the product is damaged in any way, immediately file a damage claim with the carrier. In addition, mail or fax a copy of the claim to DeepSea Power & Light and notify your sales representative. We will do everything in our power to expedite processing of the claim.

Thru-Hull SeaLite® 150W-HID			
Record the Serial Numbers of your unit's components below, circle version, and retain for your records.			
Light Head Serial Number			
Ballast Serial Number			
Version	HID-X	HID-S	HID-O

Manual Information

The following symbols and terms are used throughout this manual to emphasize important safety information.

 is used to highlight important information.

 **Caution!** is used to indicate directions that, if not followed correctly, can result in equipment damage.

 **WARNING!** is used to indicate directions that, if not followed correctly, can result in personal injury and/or serious equipment damage.

 **DANGER!** is used to warn of directions that, if not followed correctly, can result in serious personal injury or death.

The 150W HID Thru-Hull SeaLite® is available in three versions. Each version utilizes the same thru-hull fitting and lamp, but offers ballast options to suit various installations and budgets.

The **HID-X** is the fully outfitted version of the 150W HID that includes automatic thermal and moisture sensors and integrated fault lights. This unit comes standard with a 15-foot interconnect cable and 15-foot power cable.

The **HID-S** version is very similar to the HID-X, except that it does not include the sensors and, therefore, utilizes a smaller housing for the ballast. This unit comes standard with a 15-foot interconnect cable and 15-foot power cable.

The **HID-O** is our OEM version intended for boat manufacturers that want to incorporate the unit into a boat design. This unit includes the ballast (without splash-proof enclosure box) and a 15-foot interconnect cable (no power cable).

All versions are available in stainless steel or optional titanium/stainless steel for superior corrosion resistance in seawater.

⚠ Read Before Using the Thru-Hull SeaLite®

1. Thru-Hull SeaLites® are designed for installation on fiberglass and wooden hulled boats only.

2. Thru-Hull SeaLites® should never be installed on a vessel while the vessel is in the water.

3. Once the Thru-Hull SeaLite® is installed on the vessel, the watertight end cap should only be removed during servicing or lamp replacement, and should be replaced immediately. Never operate the vessel while the Thru-Hull SeaLite® end cap is removed.

4. Thru-Hull SeaLites® should only be operated with the external sapphire port and flange fully submerged in water.

5. The wall thickness surrounding any part of the thru-hull fitting should not be less than 0.25 in (6.35 mm) nor more than 4 in (101.6 mm).

6. Only qualified technicians who have experience with the installation of thru-hull fixtures should install Thru-Hull SeaLites®.

7. Thru-Hull SeaLites® should be electrically joined to the vessel's grounding and cathodic protection system. Failure to properly ground this fixture may result in catastrophic failure due to CORROSION, which in turn may lead to injury, damage or loss of property and loss of life.

⚠ **WARNING!** It should be noted that all metal parts will corrode in salt water. Corrosion of any metal will be especially aggressive if installation is improper, if bonding is improper, or if stray currents are active in the vicinity of the boat. Thru-Hull SeaLites® are warranted to be free from defects in material and workmanship, but this does not extend to being completely free from corrosion since the primary factors affecting corrosion are outside of the scope of material and workmanship of the light itself.

⚠ **WARNING!** Titanium fixtures should not be used on vessels that employ an *impressed current* galvanic corrosion protection system. Attaching a titanium fixture to such a system will accelerate the corrosion of the fixture and may cause a catastrophic failure in a short time. This in turn may lead to injury, damage or loss of property and even loss of life. If you are not sure what type of corrosion protection system is installed on your vessel, consult a qualified technician before attaching your titanium fixtures to the system.

8. Once the fixtures have been installed on the vessel they should be inspected every 6 months for:

    a. Corrosion and damage. Any fixture showing signs of corrosion or other physical damage should be removed from service immediately.

    b. Signs of leakage and water entry. Any fixture showing signs of leakage or water entry should be removed from service immediately.

    c. Blackened or opaque sapphire ports. The light should never be operated with a blackened or opaque port. If the port is blackened the fixture should not be operated and should be inspected for internal damage.

    d. Marine growth on the sapphire port. Any marine growth should be removed from the port in order to allow heat and light to exit the fixture. Use of a soft brush or non-metallic household dishwashing scrubber is recommended to prevent damage to the fixture and port. If the growth cannot be removed using a soft brush, a professional hull cleaner should be consulted.

Thru-Hull SeaLite® Features

Every Thru-Hull SeaLite® comes with our custom engineered thru-hull fitting and light head. The thru-hull fitting includes several features designed to ensure your safety and enhance your enjoyment of your new Thru-Hull SeaLite®.

- **Sapphire Port** – Sapphire is one of the strongest and most abrasion resistant transparent materials available. It will withstand accidental impact better than glass, and is less likely to be damaged by hull cleaning equipment. In addition, sapphire transfers heat more efficiently than glass, allowing the light to run much cooler, resulting in longer lamp life.

- **Water-tight housing, Front & Back** – Front and rear seals provide an extra measure of safety since, in the unlikely event that the sapphire window is broken, the rear seal will contain flooding to the inside of the thru-hull fitting. No water is allowed into the vessel.

- **UL (Underwriters Laboratories) Recognized** – All components of your Thru-Hull SeaLite® have been tested for safety in the marine environment.

- **Titanium or 316 Stainless Steel Construction** – The thru-hull fitting is available in 316 Stainless Steel or in Titanium for enhanced corrosion protection.

- **High Color Temperature Lamp for Enhanced Effect** – Your Thru-Hull SeaLite® projects a whiter, brighter light from its 150 watt, 7500°K color temperature lamp. In addition, the light head's reflector is specially designed for a 60° beam angle that is wide enough to be useful near the surface, but tight enough beam to achieve good penetration.

The ballast on every Thru-Hull SeaLite® is specifically designed to run the light's 150 watt high intensity discharge (HID) lamp. The ballast on your 150W-HID includes the following features.

- **Splashproof Enclosure** – The ballast is mounted in a NEMA 4X (IP-65) enclosure. This enclosure allows the ballast to be mounted in damp or wet locations, and provides protection for the live ballast connections (HID-O version does not include a ballast enclosure).

- **AC Fused** – A fuse is included in the ballast enclosure to protect the ballast and the vessel's electrical system against accidental overloads.

- **Shielded Wiring** – Shielded cable is used for the AC input and between the ballast and the light head. The shield provides a grounded layer around all current carrying wires to reduce the chance of interference with other systems.

In addition to the features shown above, the HID-X version incorporates the following features:

- **Thermal Protect Circuit** – Automatically shuts off power if the internal temperature of the light head gets to high.

- **Flood Detect** - Automatically shuts off power in the unlikely event of a flooding.

- **Fault Indicator Light** – Illuminate in the event of a thermal or moisture issue.

Specifications

MECHANICAL (Light)	
Housing Material:	Titanium or 316 Stainless Steel
Pressure Tested To:	100 PSI
Size:	
Length:	8 3/8 in. (21.29 cm)
Diameter:	
Thru-Hull Fitting:	3 5/8 in. (9.22 cm) with Nylon insulators, 3 1/2 in. (8.89 cm) without
Outer Flange (1/4 in. thick):	5 1/2 in. (13.97 cm)
Weight:	10 lb (4.54 kg)
Lens:	Single crystal synthetic sapphire
Cable Length, Light to Ballast:	15' (4.57 m) standard (longer available on request)
Recommended Hull Thickness:	
Maximum:	4 in. (10.16 cm)
Minimum:	1/4 in. (6.35 mm)

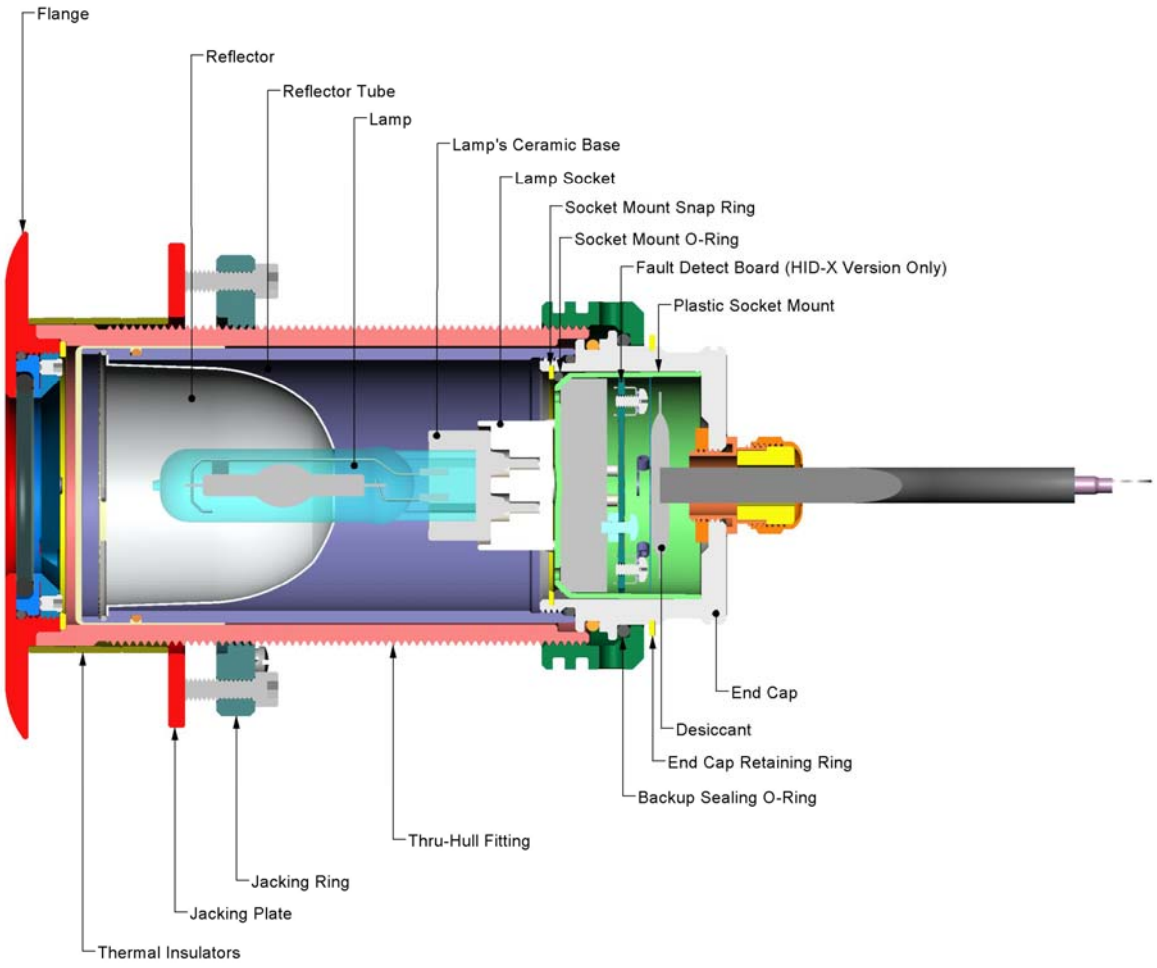
LAMP	
Type:	Metal Halide
Lamp Watts (nominal):	150 W
Rated Average Life:	6,000 hours
Color Temperature:	7,500° K
Actual Lumens (in water):	5,500 minimum

OPERATING	
Warm-up Time to 80% of Full Output:	2 minutes
Re-Strike Time for Hot Lamp:	20 minutes typical
Minimum Operating Temperature:	-22° F (-30° C)

MECHANICAL (Ballast)	HID-X	HID-S	HID-O
Housing Material:	Powder coated aluminum ballast box	Powder coated aluminum ballast box	Ballast (without splash-proof enclosure box)
Size:			
Length:	10.24 in. (26.01 cm)	8.70 in. (22.0 cm)	5.52 in. (13.3 cm)
Width:	6.30 in. (16.00 cm)	4.75 in. (12.0 cm)	3.62 in. (9.2 cm)
Depth:	3.71 in. (9.42 cm)	3.20 in. (8.0 cm)	1.61 in. (4.1 cm)
Weight:	11 lbs (4.99 kg)	5.6 lbs (2.54 kg)	15 oz. (0.43 kg)
Cable Length, AC Input:	15' (4.57 m) standard (longer available on request)	15' (4.57 m) standard (longer available on request)	No power cable

ELECTRICAL (All Versions)		
Input Voltage:		120V model: 108V - 132V 240V model: 216V - 305V
Input Current:	Running:	1.40A at 120V 0.70A at 240V
	Starting:	120V model: 3A peak for 5 seconds. 240V model: 1.6A peak for 5 seconds.
Input Power:		166 W

Parts of the Thru-Hull SeaLite®



Installation Instructions

Installing the Thru-Hull Fitting

Note: See Appendix B for additional tips and insight on installation

⚠ Your Thru-Hull SeaLite® is designed for installation in fiberglass and wooden hulled boats only.

⚠ **Caution!** For hulls constructed with Divinycell® or similar foam cores, please consult the boat manufacturer, a professional boat builder, or your boat dealer for specific procedures to use when installing hull-penetrating fixtures. In general, the exposed surfaces of the internal core must be protected using a fiberglass resin or an epoxy compatible with the hull material to form a solid, sealed surface from the outside to the inside of the hull. This material must be rated to no less than 176°F (80°C).

Thru-Hull SeaLites® are typically mounted horizontally in the transom, however, they have also been installed horizontally through the side of the hull and vertically down through the hull. Performance for vertical installations varies depending on the installation and water conditions. While vertical installations work successfully much of the time, there are conditions which can cause the light to run hotter than normal. In particular, down pointing lights in still water are apt to get air bubbles on the flange and window that degrade heat transfer. If a down pointing light is running hotter than normal, it should be turned off and allowed to cool. Once the light has cooled, it can be turned back on.

The HID-X version light head, mounted vertical, will in certain cases shut off because the fixture becomes too hot, activating the unit's thermal protect circuit.

1. The Thru-Hull SeaLite® should be mounted on a flat part of the hull with the center of the fitting at least 10" (254 mm) below the waterline. The depth of the fixture below the waterline should be adequate to ensure that the flange of the fixture does not extend above the waterline when the fixture is in use. This depth may vary from boat to boat and depend on the sea conditions. The fitting's flange should not extend beyond the flat surface on which it will be mounted.

2. Before cutting the hole, ensure that there will be a minimum clearance of 16" (406mm) on the inside of the hull, inboard of the hole. This clearance is necessary to allow enough room to remove the lamp assembly from the fixture during re-lamping.

3. The thru-hull fitting and light head internals are separately wrapped and sealed when leaving the factory. Do not remove the wrap until just before installing. The fitting and internals need to be kept clean and dry.

4. On the outside of the hull, mark the center of the hole to be made in the hull. Draw a 5-3/4" circle around the center mark. Verify that the area of the hull within is flat and completely below the water line.

5. Cut or drill a 3.625" (92 mm) diameter hole in the hull. (DSP&L recommends using the black plastic insulating rings supplied with the light in all installations. However, if the fixture is being installed without the insulating rings, the hole should be 3.50" (90 mm) in diameter.)

6. Test fit the thru-hull fitting in the hole by sliding the fitting in from the outside of the hull, being careful to keep the fitting clean and dry.

7. Using the circle drawn on the hull in step 4 as a guide, coat the area around the hole with 3M® 4200 sealant. Also, coat the flange and the portion of the body of the fixture that will extend thru the hull with 3M® 4200 sealant and slide the fixture into the hole.

⚠ **Caution!** Be careful not to over-tighten the bolts when installing the jacking ring. Doing so may squeeze the sealant out from under the fitting flange.

8. On the inside of the hull, slide the jacking plate over the thru-hull fitting to the inside of the hull. Back the six 1/4"-20 socket head bolts in the jacking ring out so that their ends do not extend beyond the face of the ring. Thread the jacking ring onto the fitting until it bottoms against the jacking plate. Hand-tighten the six 1/4"-20 socket head bolts to approximately 5 in.-lbs.

9. Slip the second, larger vinyl cap over the rear of the thru-hull fitting to keep out moisture and debris while the sealant is drying.

10. Allow the sealant to dry (according to its instructions) and remove any excess.

11. After the sealant has dried, tighten the six 1/4"-20 socket head bolts to 36 in.-lbs (4 Nm).

12. Use one or both of the screw terminals on the jacking ring to connect the fixture to the ship's bonding system.

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13. DSP&L recommends that the flange of the thru-hull fitting be painted with anti-fouling paint after installation. In addition, spraying the end cap and the portion of the fitting inside the hull with WD-40 every two months will help keep the fitting looking new and free of corrosion.

Important note for American Bureau of Shipping (ABS) Surveyed Vessels:

At least three of the six jacking ring bolts (machine screws), evenly distributed, are to be mechanically secured against loosening using locking nuts or other approved method.

The method that DeepSea Power & Light Inc. recommends is to safety wire all six machine bolts to prevent them from loosening (See figure 1). An *ABS Surveyed Vessel Safetying-Wire Kit* (DSPL part number 710-082-607-0A) is available from DeepSea Power & Light. This kit includes six replacement screws with cross-drilled heads and a length of safetying-wire. The following procedures regarding the safety wiring process - taken from the FAA document *AC 43.13-1B (9/8/98)* - are recommended:

- To prevent failure due to rubbing or vibration, safety wire must be tight after installation.
- Safety wire must be installed in a manner that will prevent the tendency of each bolt to loosen.
- Use six to eight turns per inch of twisted wire.
- Safety wire must never be overstressed. Safety wire will break under vibration if twisted too tightly. Safety wire must be pulled taut when being twisted and maintain a light tension when secure.
- Safety wire ends must be bent under and inward toward the part to avoid sharp or projecting ends, which might present a safety hazard.
- Check the bolts to be safety wired to make sure that they have been correctly torqued – 36 in.lb (4Nm) – and that the wiring holes are properly aligned to each other. It is desirable that the holes in the bolts be aligned to each other. Never overtorque or loosen to obtain proper alignment of the holes. It should be possible to align the wiring holes when the bolts are torqued within the specified limits. However, if it is impossible to obtain a proper alignment of the holes without undertorquing or overtorquing, another bolt may permit proper alignment within the specified torque limits.
- Safety wire must not be nicked, kinked, or mutilated. When using pliers, grasp the wires at the ends to prevent mutilation of the twisted section of wire.

Never twist the wire ends off with pliers. When cutting off ends, leave at least four to six complete turns (1/2 to 5/8 inch long) after the loop. When removing safety wire, never twist the wire off with pliers. Cut the safety wire close to the hole, exercising caution. (See Figure 1)

- Install safety wire where practicable with the wire positioned around the head of the bolt and twisted in such a manner that the loop of the wires fits closely to the contour of the bolt head. (See Figure 2)
- Twisting with special tools (See Figure 3). Caution: when using wire twister, and the wire extends 3 inches beyond the jaws of the twister, loosely wrap the wire around the pliers to prevent whipping and possible personal injury. Excessive twisting of the wire will weaken the wire.
    - Grip the wire in the jaws of the wire twister and slide the outer sleeve down with your thumb to lock the handles or lock the spring-loaded pin.
    - Pull the knob to spin the spiral rod and twist the wire.
    - Squeeze handles together to release wire.

Fig. 1

Fig. 2

Fig. 3

Installing the Light Head Internals

Note: See Appendix B for additional tips and insight on installation

WARNING! Do not break the seal on the light head internals until you are ready to mount the internals inside the thru-hull fitting. There is a desiccant pouch that was installed at the factory just before sealing the light head. To retain its effectiveness, the desiccant should be exposed to air for no more than 30 minutes before being sealed in the thru-hull fitting. When properly installed, the desiccant will dry the air inside the thru-hull fitting to prevent lens fogging and corrosion of the internal components. **Failure to install in less than 30 minutes can significantly shorten the life of the light and may void the warranty.**

1. Remove the vinyl caps from the thru-hull fitting and the light head reflector. Install the light head into the thru-hull fitting and tighten the end cap retaining ring. The light head's sealing O-ring will engage the fitting near the end of tightening the retaining ring. When this happens, the retaining ring will become more difficult to turn. Be sure to fully engage the O-ring by tightening the retaining ring until the end cap bottoms solidly on the thru-hull fitting.

2. Route the cable from the light head to the ballast. Be sure to leave a sufficient service loop at the light head to allow the light head to be removed from the thru-hull fitting for relamping. Care should be taken to avoid routing the cable over sharp edges or around tight bends as these could damage the cable over time. The cable may be shortened if desired, or excess cable can be secured in a loop at either end or along the cable's run.

WARNING! The cable must only be shortened by cutting the end which connects to the ballast. Do not rewire the light head in order to shorten the cable.

Installing the Ballast

Note: See Appendix B for additional tips and insight on installation

Caution! While the ballast box provided with the HID-X and HID-S versions are splash proof, they are not waterproof and should never be submerged in water or placed in a location where it is likely to be even partially submerged in water.

1. Unscrew the four cover screws on the ballast box and remove the ballast box lid.

2. Using appropriate fasteners in the four mounting holes in the corners of the ballast box, attach the ballast box to a fixed wall or other secure structure. Ideally, the ballast should be mounted in a cool, dry, well ventilated location on the vessel, with the cable inlets pointing down.

Caution! If you remove the AC input cable from the ballast box, you must reconnect the ground properly to maintain UL recognition status of the product. See figure 8 for the stack up diagrams.

Caution! The original cable provided with this light has been specifically chosen for this application. Substituting another cable may cause improper operation, shock hazard, interference with other equipment on the vessel, and can result in **damage that may not be covered under warranty.** Additional cable is available from DeepSea Power & Light, Inc. by calling 1-800-ITS-DSPL (1-800-487-3775).

3. Connect the light head cable by inserting the cable through the cord grip. Connect the wires and ground as shown in the wiring diagrams on page 27. Tighten the nut on the cord grip to secure the light head cable.

4. Connect the input power cable to power. Verify that the ballast's voltage rating and the voltage available on the vessel are compatible. Ensure that the AC power is disconnected and locked out. Refer again to the wiring diagrams on page 27 and connect the ballast's AC cord to a protected circuit rated at no more than 30 amps. Each ballast should have its own separate on/off switch. Running two ballasts on one switch may result in a race condition, with both ballasts trying to start at the same time and the start signals not being adequate to arc over the lamp.

5. Replace the ballast box lid and tighten the four cover screws.

6. Attach the Warning labels reminding the user not to operate the lamps unless they are totally submerged to any switches or other points where the lamp may be energized by the end-user.

7. At this point, the light can be tested by energizing the ballast. Limit the total running time to 5 minutes when the fitting is not submerged. If at any time the thru-hull fitting becomes too hot to touch, discontinue testing and allow the fitting to cool.

Caution! The light must be run for at least 5 minutes to allow it to go thru all turn on and warm up phases. Failure to run this length of time will make the lamp harder to start and requires longer off time before it will restart.

Caution! Repeated testing with short on times will reduce the life of the lamp.

Replacing the Desiccant (When Required)

Replace the desiccant when replacing the lamp, if the light head is removed from the fitting, or if signs of internal condensation are observed. If the light head is removed from the thru-hull fitting after the desiccant is installed, the desiccant will have to be replaced. Additional desiccant can be obtained from DeepSea Power & Light, Inc. by calling 1-800-ITS-DSPL (1-800-487-3775).

1. Ensure the fitting is cool. The light head components inside the fitting are often much hotter than the fitting itself. These components must be handled to install the desiccant, so wait for the light head to cool completely before proceeding.

2. Prepare a clean surface near the thru-hull fitting. In the course of installing the desiccant several internal parts, including the lamp, will have to be removed. You will need a clean surface on which to set them. A pad made from several paper towels covering a dry, clean surface works well.

   Collect a small (1/8") flat blade screwdriver, and a pair of scissors within easy reach of where you will work. You will also need the larger of the two vinyl caps, the sealed desiccant bag and the reagent grade alcohol wipe that are supplied with the Thru-Hull SeaLite® replamp kit.

3. Unscrew the end cap retaining ring and remove the light head from the thru-hull fitting. Set the light head on the clean surface and slip the larger of the two vinyl caps over the end of the thru-hull fitting to keep it clean. If the vinyl cap is not available, a saran wrap cover over the fitting opening will help keep the fitting clean inside.

4. Retrieve the light head and grasp the end cap in one hand and the outside of the reflector tube in the other. Unscrew the reflector tube from the end cap.

5. Carefully slide the reflector tube off over the lamp and set it aside on the clean surface.

⚠ **Caution!** Do not pull on the lamp by the clear glass envelope.

6. Remove the lamp from the socket by pulling on the ceramic base of the lamp with one hand while using the other to release either of the metal retaining clips.

   It is usually only necessary to release one of the clips to extract the lamp. Wiggling the lamp slightly as you pull it out also helps. Try to touch only the ceramic base of the lamp. Once the lamp has been removed, slip it inside the reflector. This will protect the lamp until it is needed again.

7. Using the small flat blade screwdriver, remove the internal snap ring that holds the black plastic lamp socket mount in the metal end cap. Next, remove the O-ring that resides behind the snap ring.

8. Grab the lamp socket and gently pull until the lamp socket mount is clear of the rear end cap. Use caution because multiple wires are attached to the lamp socket.

9. Use the scissors to open the plastic bag containing the desiccant pouch. Remove the pouch and insert it in the cavity in the end cap that holds the lamp socket. The moisture indicator packed with the desiccant pouch can be discarded.

10. Remove the old desiccant pouch.

11. Begin reassembling the light by replacing the lamp socket in the end cap. The lamp socket mount has a semicircular cutout in its base that must be aligned over the ground screw at the rear of the end cap. This is most easily done by inserting the socket with the alignment approximately correct, then turning the end cap back and forth slightly until the cutout drops over the ground screw.

12. Place the O-ring onto the lamp socket mount and reinsert the snap ring. A flat-blade screwdriver is helpful, but use caution not to damage the lamp socket.

13. Hold the lamp by its ceramic base and insert it into the lamp socket. Be sure both of the metal retaining clips on the socket grip the base of the lamp. Clean the lamp with the reagent grade isopropyl alcohol wipe provided. Carefully remove any dirt, oil, and fingerprints from the glass portion of the lamp. Running the lamp with contaminants on the glass envelope can cause the glass to cloud and will significantly reduce lamp life.

14. Inspect the reflector for any fingerprints or debris and clean with the alcohol wipe if any contaminants are found. Slide the reflector tube carefully over the lamp and screw it onto the end cap. There is an O-ring that will engage the reflector for the last few turns, which will make turning the reflector tube significantly harder. Be sure to screw the reflector tube on past the O-ring until it bottoms against the end cap.

15. Inspect the O-ring on the end cap to ensure it is free of debris. If any debris is present, clean the O-ring as described in Cleaning the Backup Sealing O-Ring on page 21.

16. Set the assembled light head aside on the clean surface. Cover it with a clean tissue or paper towel if there is any chance of dirt or debris falling on it.

17. Remove the vinyl cover or saran wrap cover from the thru-hull fitting. Carefully clean any contaminants or debris from inside the fitting. As a final step, wipe the inside of the fitting with the alcohol wipe provided.

18. Wait 5 minutes for all of the alcohol on the light head and inside the thru-hull fitting to evaporate.

19. Install the light head into the thru-hull fitting and tighten the end cap retaining ring. The light head's sealing O-ring will engage the fitting near the end of tightening the retaining ring. When this happens, the retaining ring will become more difficult to turn. Be sure to fully engage the O-ring by tightening the retaining ring until the end cap bottoms solidly on the thru-hull fitting.

Operating Instructions

DANGER! Thru-Hull SeaLites® should only be operated with the external sapphire port and flange fully submerged in water. Operating the light while the flange is not fully submerged may result in fire, injury, damage, loss of property and even death.

Lights that are fully submerged while the vessel is at rest may lose direct contact with the water when the boat is underway. In addition, lights mounted on the stern of a vessel may tend to overheat while the boat is underway, even if they are fully submerged. This is due to the high concentration of bubbles in the water directly behind the stern of most vessels when they are underway. Exercise caution when operating the lights while the vessel is underway.

Thru-Hull SeaLites® should not be operated continuously over extended periods of time. The light should be turned off for at least 30 minutes once a week to ensure that the lamp fails passively at the end of its useful life.

Thru-Hull SeaLites® should always be turned on and off by applying and removing power from the ballast. No attempt should be made to disconnect the ballast from the lamp while the lamp is running.

1. To turn the Thru-Hull SeaLite® on, apply power to the ballast. If the lamp is cool, it will light immediately, but will be quite dim until it warms up. It will take about 2 minutes for the lamp to reach full brightness.

2. The lamp should be allowed to run for at least 5 minutes each time it is turned on. Running the lamp for shorter periods may shorten the lamp's life.

3. To turn the lamp off, turn the power to the ballast off.

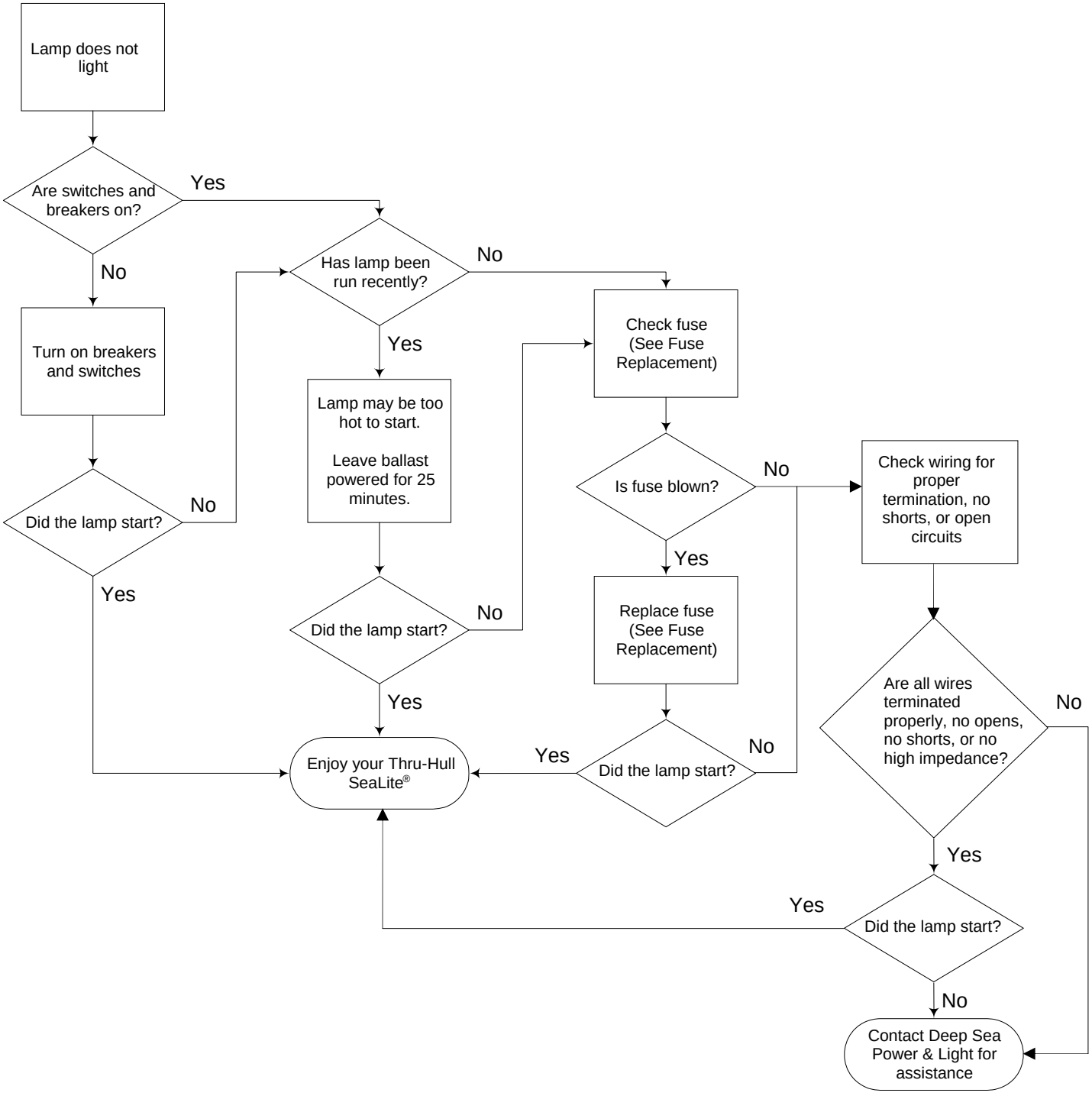
4. The HID lamp used in the Thru-Hull SeaLite® must be allowed to cool before it can be restarted. The ballast can safely be turned on at any time, however. If the lamp is too hot to start when the ballast is turned on, the ballast will enter a programmed restart sequence and will periodically attempt to restart the lamp over the next 25 minutes. Neither the ballast nor the lamp will be harmed by this action. The lamp may not start at all, and then has to wait at least an hour before relighting.

5. The HID-X version is equipped with a flood sensor and an overheat sensor. In the event that water enters the fixture, it will automatically shut off. If the temperature inside the fixture exceeds a predetermined temperature, it will automatically shut off. In either case, a fault will be indicated by the red light on the lid of the ballast box.

If the light does not operate properly, please refer to the Troubleshooting Guide on page 17 to determine the cause of the malfunction.

Maintenance and Troubleshooting

Troubleshooting Guide



Note: See Appendix B for additional tips and insight for troubleshooting.

Lamp Replacement

⚠ Important Safety Notes

1. Only those lamps specified by DeepSea Power & Light, Inc. should be used for the purpose of relamping the Thru-Hull SeaLite®. Please contact DeepSea Power & Light, Inc. at 1-800-ITS-DSPL (1-800-487-3775) for more information or to purchase a Lamp Replacement kit for your fixture.

2. The AC power should be off and locked out before any service of the Thru-Hull SeaLite® is undertaken.

3. Re-lamping should only be attempted when the existing lamp is cool. The High Intensity Discharge lamps used in the Thru-Hull SeaLite® can become very hot even after a short period of operation. They may remain hot enough to cause injury for an extended period after operation.

4. Dust, oils and other debris, including fingerprints on the glass surfaces will significantly reduce the life of the lamp and may cause damage to the fixture once the lamp is energized.

5. The desiccant pouch in the light head must be replaced with the new desiccant provided in the Lamp Replacement kit immediately prior to sealing the light head in the thru-hull fitting. To retain its effectiveness, the new desiccant should be exposed to air for no more than 30 minutes before being sealed in the thru-hull fitting. When properly installed, the desiccant will dry the air inside the thru-hull fitting to prevent lens fogging and corrosion of the internal components. **Failure to install the desiccant can significantly shorten the life of the light and may void the warranty.**

Instructions

1. Allow the fitting to cool if it is warm from operation. The light head components inside the fitting are often much hotter than the fitting itself. These components must be handled to replace the lamp, so wait for the light head to cool completely before proceeding.

2. Disconnect or lock out the AC power from the ballast.

3. Prepare a clean surface near the thru-hull fitting. In the course of replacing the lamp several internal parts will have to be removed. You will need a clean surface on which to set them. A pad made from several paper towels covering a dry, clean surface works well.

   Collect a small (1/8") flat blade screwdriver, and a pair of scissors and some paper towels within easy reach of where you will work. You will also need the new lamp, the sealed desiccant bag, and the reagent grade alcohol wipe that are supplied with the Lamp Replacement kit. Also collect the larger of the two vinyl caps that were originally supplied with the Thru-Hull SeaLite®, if it is available.

4. Unscrew the end cap retaining ring on the rear of the thru-hull fitting and remove the light head. Set the light head aside on the clean surface. If the vinyl cap is available, slip it over the end of the thru-hull fitting to keep it clean. Otherwise, cover the open end of the fitting with saran wrap secured by a rubber band.

5. Retrieve the light head and grasp the end cap in one hand and the outside of the reflector tube in the other. Unscrew the reflector from the end cap.

6. Carefully slide the reflector tube off over the lamp and set it aside on the clean surface.

Caution! Do not pull on the lamp by the clear glass envelope.

7. Remove the lamp from the socket by pulling on the ceramic base of the lamp with one hand while using the other to release either of the metal retaining clips.

   It is usually only necessary to release one of the clips to extract the lamp. Wiggling the lamp slightly as you pull it out also helps. The used lamp can be discarded.

8. Inspect the internal parts of the light head.

WARNING! Do not continue to use a light that has damaged internal parts. Doing so may result in damage to the light, overheating, fire, injury and even death. If damaged parts are found, contact your local distributor or DeepSea Power & Light for a replacement.

   a. Inspect the socket for any signs of damage. If the socket is damaged, do not use the light until a replacement is obtained.

   b. Inspect the reflector for any signs of damage. If the reflector is damaged, do not use the light until a replacement is obtained. If the reflector does not function properly, the thru-hull fitting can become very hot and could possibly damage the hull of the vessel.

   c. Inspect the O-ring on the rear end cap for any signs of debris and damage. If debris is present, clean the O-ring as described in Cleaning the Backup Sealing O-Ring on page 21. If the O-ring is damaged, do not use the light until a replacement is obtained.

9. Using the small (1/8”) flat blade screwdriver, remove the internal snap ring that holds the black plastic lamp socket mount in the metal end cap. Next, remove the O-ring that resides behind the snap ring.

10. Grab the lamp socket and gently pull until the lamp socket mount is clear of the rear end cap. Use caution because multiple wires are attached to the lamp socket.

11. Remove the used desiccant pouch and discard it.

12. Use the scissors to open the plastic bag containing the desiccant pouch. Remove the pouch and insert it in the cavity in the end cap that holds the lamp socket. The moisture indicator packed with the desiccant pouch can be discarded.

13. Begin reassembling the light by replacing the lamp socket in the end cap. The lamp socket mount has a semicircular cutout in its base that must be aligned over the ground screw at the rear of the end cap. This is most easily done by inserting the socket with the alignment approximately correct, then turning the end cap back and forth slightly until the cutout drops over the ground screw.

14. Place the O-ring onto the lamp socket mount and reinsert the snap ring. A flat-blade screwdriver is helpful, but use caution not to damage the lamp socket.

15. Open the package containing the new lamp. Hold the lamp by its ceramic base and insert it into the lamp socket. Be sure both of the metal retaining clips on the socket grip the base of the lamp. Clean the lamp with the reagent grade isopropyl alcohol wipe provided. Carefully remove any dirt, oil and fingerprints from the glass portion of the lamp. Running the lamp with contaminants on the glass envelope can cause the glass to cloud and will significantly reduce lamp life.

16. Inspect the reflector for any fingerprints or debris. Clean with the alcohol wipe if any contaminants are found. Slide the reflector tube carefully over the lamp and screw it onto the end cap. There is an O-ring that will engage the reflector tube for the last few turns, which will make turning the reflector tube significantly harder. Be sure to screw the reflector tube on past the O-ring until it bottoms against the end cap.

17. Set the assembled light head aside on the clean surface. Cover it with a clean tissue or paper towel if there is any chance of dirt or debris falling on it.

18. Remove the vinyl cover, or saran wrap, from the thru-hull fitting. Carefully clean any contaminants or debris from inside the fitting. As a final step, wipe the inside of the fitting with the alcohol wipe provided.

19. Wait 5 minutes for all of the alcohol on the light head and inside the thru-hull fitting to evaporate.

20. Install the light head into the thru-hull fitting and tighten the end cap retaining ring. The light head's sealing O-ring will engage the fitting near the end of tightening the retaining ring. When this happens, the retaining ring will become more difficult to turn. Be sure to fully engage the O-ring by tightening the retaining ring until the end cap bottoms solidly on the thru-hull fitting.

21. Reconnect and apply power to the ballast and return to many hours of enjoyment!

Fuse Replacement

HID-S Version

DANGER! Disconnect the AC power before attempting to service the ballast. Servicing a live ballast can result in electrocution, fire, personal injury and even death.

1. Disconnect or lock out the power to the ballast.
2. Loosen the four screws securing the cover of the ballast box and remove the cover. The screws will be retained in the cover.
3. Pull the fuse holder out of the terminal strip inside the ballast box.
4. Remove the blown fuse from the fuse holder.
5. Inspect the fuse or test with an ohmmeter, if available. If the condition of the fuse cannot be determined, replace it with a new fuse.

WARNING! A blown fuse must be replaced with a fuse of the same type and current rating. Substituting a different fuse may result in equipment damage, fire and personal injury.

6. Insert a new fuse of the same type and current rating.

   For 120 volt units, use a 3.15A, Fast Acting, 5X20 mm, 250V fuse such as
   Wickmann 1931315000, or
   Littlefuse 2173.15

   For 240 volt units, use a 1.6A, Fast Acting, 5X20 mm, 250V fuse such as
   Wickmann 1931160000, or
   Littelfuse 21701.6

7. Replace the fuse holder in the terminal block. Be sure the fuse holder is fully inserted.
8. Replace the ballast box cover and tighten the four cover screws.
9. Reconnect the power to the ballast.
10. Test light operation.

HID-X Version

DANGER! Disconnect the AC power before attempting to service the ballast. Servicing a live ballast can result in electrocution, fire, personal injury and even death.

1. Disconnect or lock out the power to the ballast.

Note: the fuse is located in a panel mount fuse holder that protrudes thru the ballast box in-between the two cable entry points.

2. Remove the fuse by rotating the fuse cap counter clockwise ¼ turn while pushing in the cap and then pulling straight out.
3. Inspect the fuse or test with an ohmmeter, if available. If the condition of the fuse cannot be determined, replace it with a new fuse.

WARNING! A blown fuse must be replaced with a fuse of the same type and current rating. Substituting a different fuse may result in equipment damage, fire and personal injury.

4. Insert a new fuse of the same type and current rating.

   For 120 volt units, use a 3.15A, Fast Acting, 5X20 mm, 250V fuse such as
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   For 240 volt units, use a 1.6A, Fast Acting, 5X20 mm, 250V fuse such as
   Wickmann 1931160000, or
   Littelfuse 21701.6

5. Place the fuse in the end cap and insert into fuse holder.
6. Rotate 1/3 turn clockwise to secure fuse cap to fuse holder.
7. Reconnect the power to the ballast.
8. Test light operation.

Cleaning the Backup Sealing O-Ring

The backup sealing O-ring forms a watertight junction where the light head is inserted into the thru-hull fitting. Having a watertight junction between the light head and the thru-hull fitting ensures that even if the front sapphire window is broken, water will be confined to the inside of the thru-hull fitting. It is a second layer of protection keeping water out of the vessel. The backup sealing O-ring should be inspected whenever the light head is removed from the thru-hull fitting.

WARNING! The backup sealing O-ring should only be serviced when the light head and thru-hull fitting are cool enough to handle comfortably. If the light head and thru-hull fitting are hot from use, turn the light off and allow it to cool before proceeding. Servicing the O-ring while the light head is hot can result in burns.

1. It is not necessary to remove the light head from the thru-hull fitting to service the O-ring, but it may be desirable so that the light head can be moved to a more convenient location. If you plan to remove the light head from the thru-hull fitting, prepare a clean surface within reach of the wire attached to the light head. A pad made from several paper towels covering a dry, clean surface works well.

   Collect a small (1/8") flat blade screwdriver and some paper towels within easy reach of where you will work. You will also need a small amount of suitable grease, such as Dow Corning valve lubricant and sealant (DC-111), to coat the O-ring after it is cleaned.

   If the two vinyl caps that were originally supplied with the Thru-Hull SeaLite® are available, collect them as well.

2. Disconnect and lock out the power to the ballast.

3. Unscrew the light head retaining ring. Doing so will disengage the sealing O-ring from the thru-hull fitting.

4. The O-ring can be serviced with the light head in place by sliding the light head about 1 inch out of the thru-hull fitting.

   If the light head is to be removed from the fitting, slide the light head out of the fitting and cover the reflector with the smaller of the two vinyl caps. If the vinyl cap is not available, a paper towel secured with a rubber band can also be used to keep the lamp and reflector from being contaminated.

   Set the light head aside on the clean surface and cover the open end of the thru-hull fitting with the larger vinyl cap, or a paper towel secured with a rubber band if the vinyl cap is not available.

5. Using the small screwdriver, remove the snap ring behind the end cap retaining ring. You will have to first move the snap ring from its groove up onto the end cap, then move the snap ring off of the end cap onto the light head wire.

6. Slide the retaining ring off of the light head end cap onto the wire.

Caution! Do not remove the sealing O-ring by prying beneath it with a screwdriver or any sharp object. Instead, pinch the O-ring on two sides of the fitting with your thumb and finger, then slide your thumb and finger toward each other. This will create a loop in the O-ring that you can grab and use to remove the O-ring from its groove. Prying under the O-ring can damage it and prevent it from sealing when the light head is reassembled in the thru-hull fitting.

7. Inspect the sealing O-Ring for any damage or signs of debris. If the O-ring is damaged, contact your local distributor or DeepSea Power & Light for a replacement. If debris is present, remove the O-ring and clean it with a lint free cloth. Apply a thin coating of Dow Corning valve lubricant and sealant (DC-111) and reinstall the O-ring onto the light head's end cap.

8. Slide the light head retaining ring back into place on the end cap.

9. Install the snap ring in the groove behind the retaining ring to secure the retaining ring in place. To do this, first work the snap ring up onto the end cap, then move it into its groove.

10. If the light head was removed from the thru-hull fitting, remove the covers from the fitting and from the lamp reflector and insert the light head into the fitting.

11. Screw the retaining ring onto the thru-hull fitting to seal the light. The light head's sealing O-ring will engage the fitting near the end of tightening the retaining ring. When this happens, the retaining ring will become more difficult to turn. Be sure to fully engage the O-ring by tightening the retaining ring until the end cap bottoms solidly on the thru-hull fitting.

12. Reconnect the power to the ballast.

How to Arrange for Repairs

Please contact DeepSea Power & Light, Inc. (DeepSea) at 1-800-ITS-DSPL (1-800-487-3775) to secure an RMA number prior to returning your light for repair. Mark the outside of the shipping container with the RMA number. This allows us to process your package as quickly as possible, and insures that the repair department is alerted of its arrival.

Warranty Repairs

Warranty repairs must be shipped to DeepSea freight prepaid. DeepSea will perform a full evaluation upon receipt. If the problem is determined to be a warranty issue, DeepSea will repair or replace the unit at no charge. DeepSea will also pay outgoing ground transportation. See limited warranty for exceptions.

Non-Warranty Repairs

A diagnostic charge will be assessed for all repair estimates. This fee will be applied against any repair charges that are approved by customer. If repairs are not approved then customer will be charged for 1 hour diagnostics and the shipping expense to return unit to them. The prices of component parts do not include labor charges. Labor is billed at a minimum of 1 hour, with additional labor billed in half-hour increments.

Limited Warranty

DeepSea warrants all of its products, unless otherwise noted, to be free from defects in workmanship and materials for a period of one year from the date of original purchase.

Internal electronic components are warranted for 90 days from the date of shipment from the factory, if they have been properly used.

Due to the fact that lamps/bulbs naturally wear out with usage, they are not covered by DeepSea's warranty. If your lamp fails to function the first time it is installed and tested, DeepSea may provide a free replacement lamp/bulb depending on available information, on a case-by-case basis.

DeepSea is not responsible for warranty service should the product fail to be properly maintained or fail to function properly as a result of misuse, abuse, improper installation, neglect, improper shipping, corrosion, damage caused by disasters such as fire, flood, and lightning, or unauthorized repair or modifications.

Should your DeepSea product prove defective during the warranty period, promptly notify DeepSea to obtain an RMA number, and return the product, freight prepaid (by Customer) with the RMA number noted on the outside of the box. DeepSea will, at its option, repair or replace the product or defective portion without charge for parts or labor, or, at DeepSea's option, refund the purchase price. DeepSea will pay for ground transportation to the customer on warranty repairs. Products repaired or replaced under this warranty shall be warranted for the unexpired portion of the warranty applying to the original product(s).

The sole obligation of DeepSea shall be to repair, replace, or refund parts which have been proved defective. This does not include any other associated costs, such as the cost of removal of the defective part(s), installation costs, labor costs, travel costs, or consequential damages of any kind. Under no circumstances shall the Buyer be entitled to recover any incidental damages as that term is defined in Commercial Code §2715.

No warranty or affirmation of fact, express or implied, other than as set forth in the limited warranty statement above is made or authorized by DeepSea. DeepSea disclaims any liability for product defect claims that are due to product misuse, improper product selection, or misapplication. Any liability for consequential and incidental damages is expressly disclaimed. DeepSea's liability in all events is limited to, and shall not exceed, the purchase price paid.

Appendix A – Drawings

List of Figures

Figure 1 - Thru-Hull SealLite® 150W-HID Complete Assembly

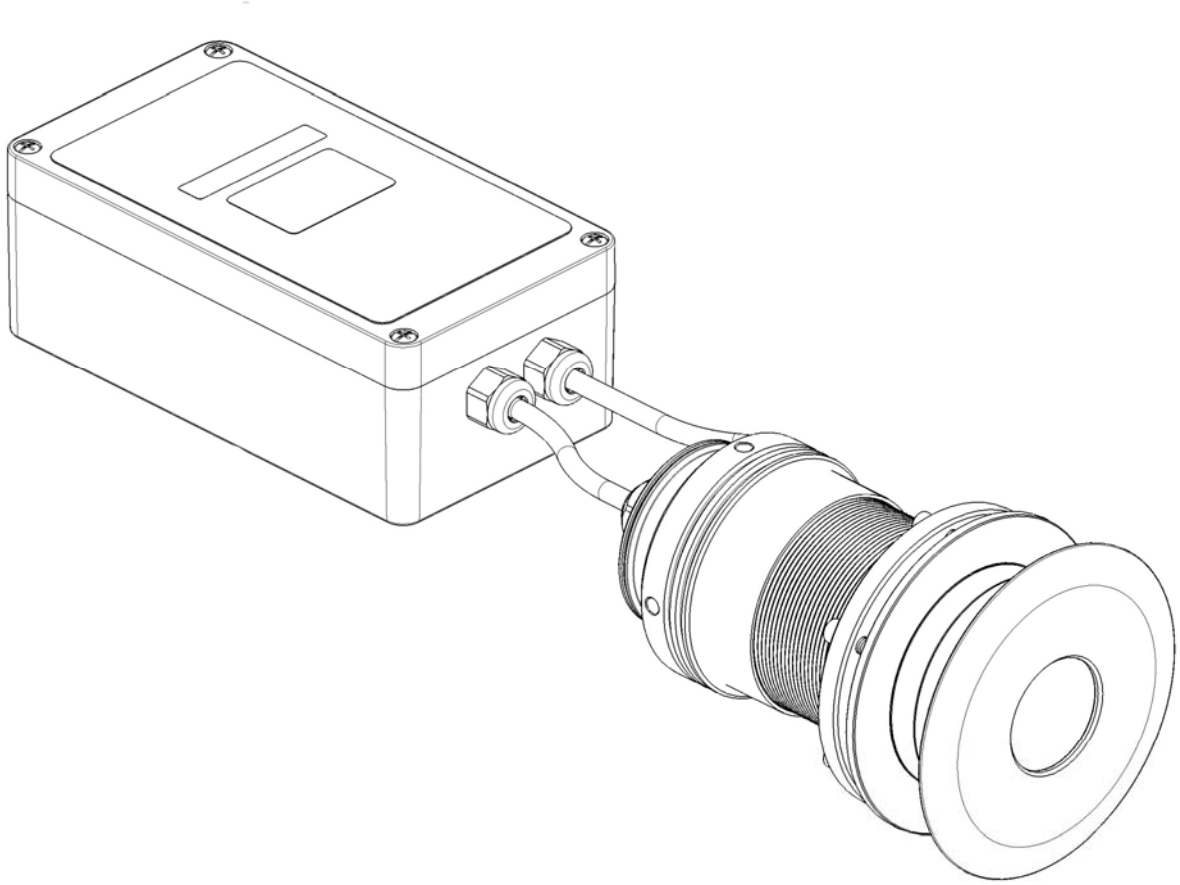


Figure 2 - Light Head Wiring

HID-S shown - Lamp socket wires are interchangeable.

Lamp Socket Holder with Thermal Stop Tape on "X" versioin the Thermal Stop Tape is between the PCB and housing

HID-X Version has a Sensor Board inside the lamp socket holder – 4 wires connect as shown here

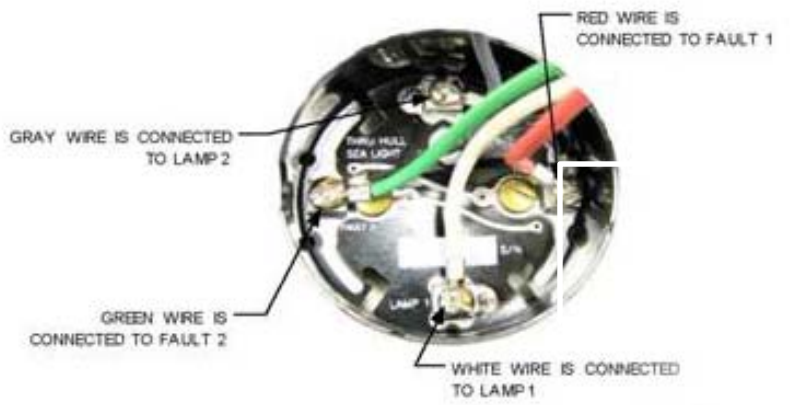
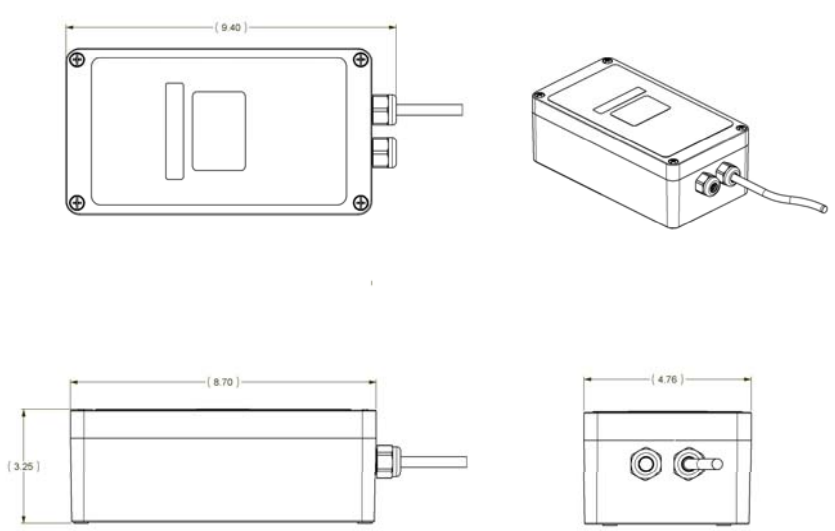


Figure 3 – Ballast Box Overall Dimensions

HID-S Version



HID-X Version

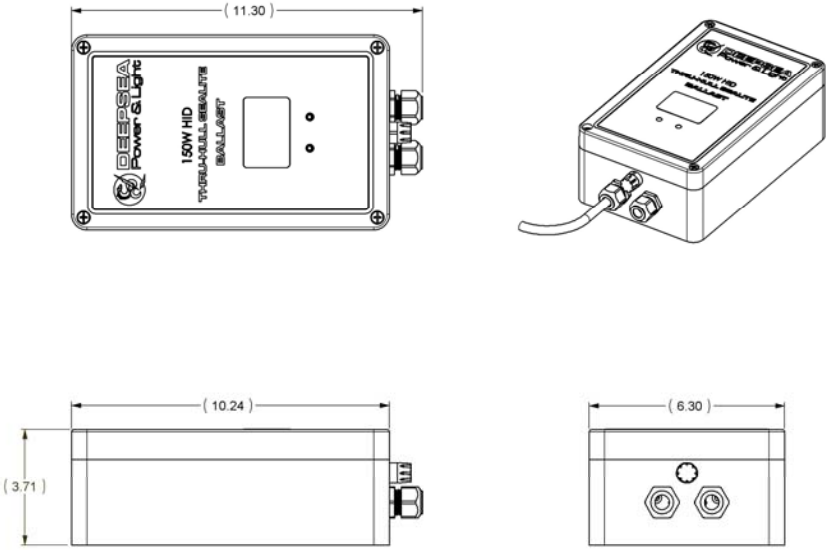
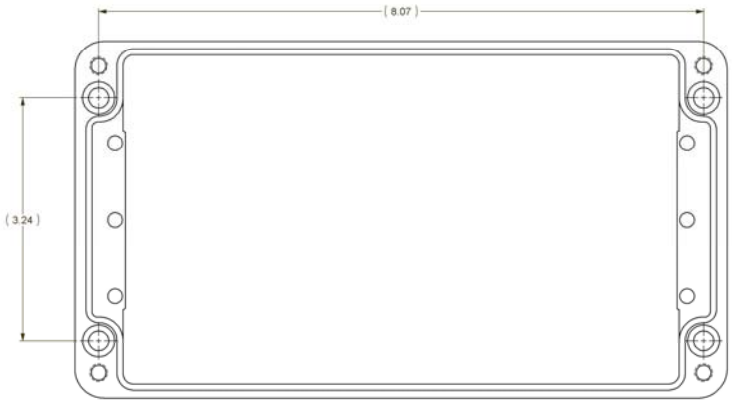


Figure 4 - Ballast Box Mounting Dimensions

HID-S Version



HID-X Version

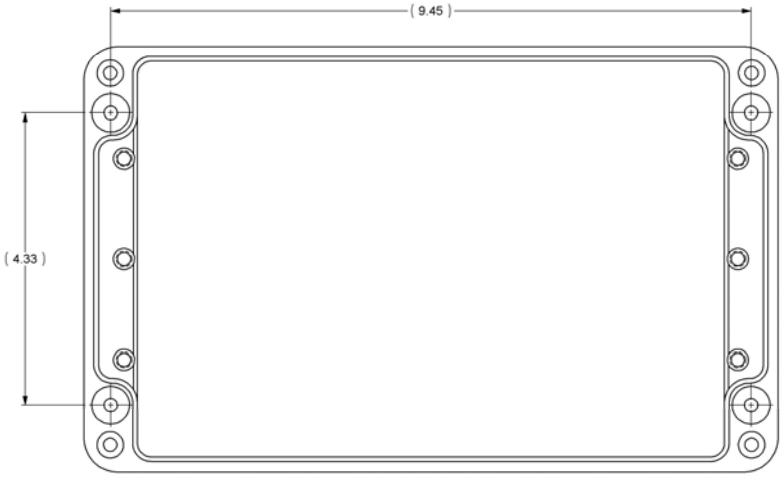
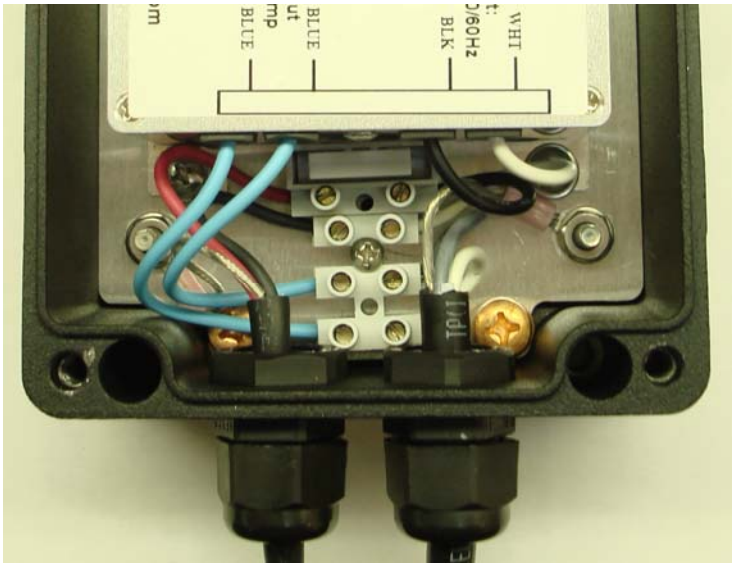


Figure 5 - Ballast Box Wiring

HID-S Version



HID-X Version

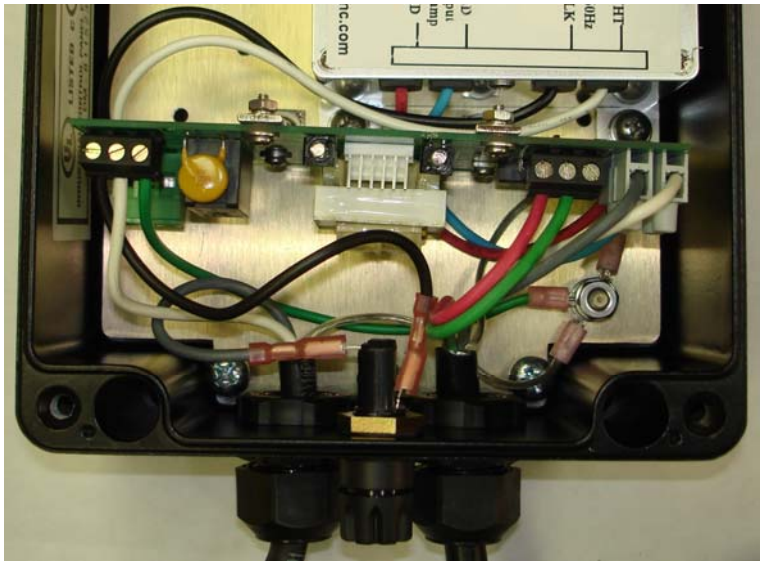
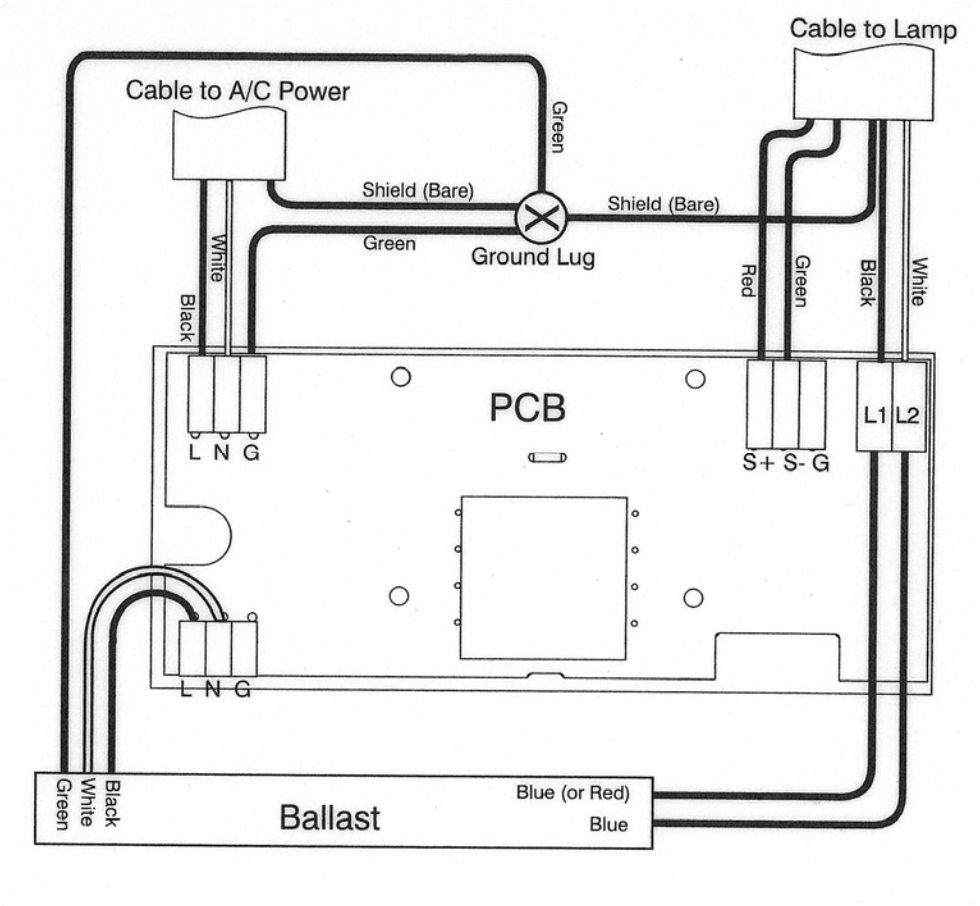
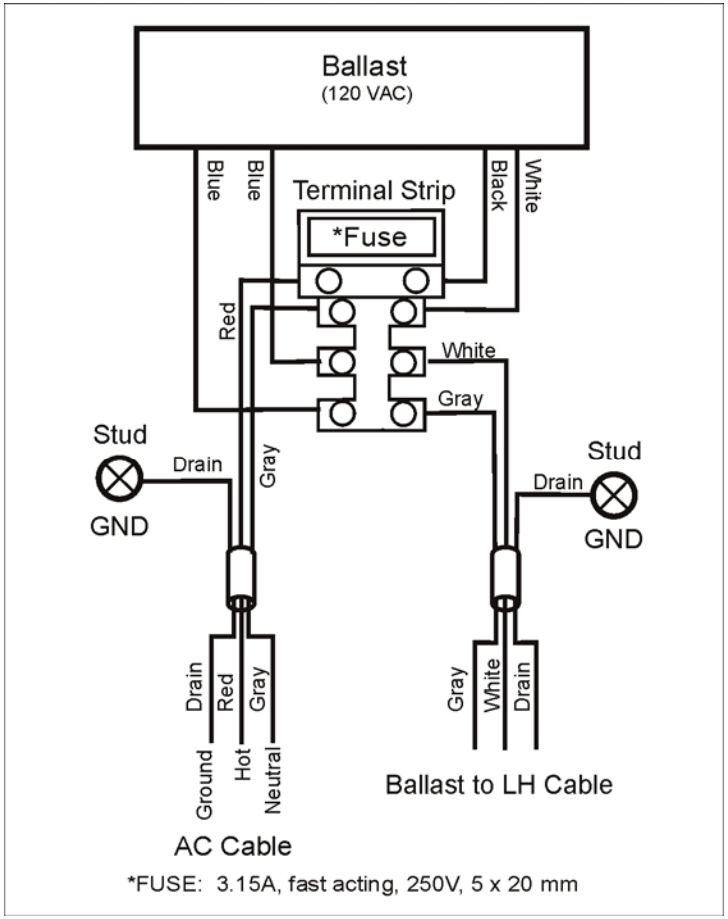


Figure 6 - Ballast Box Wiring Diagrams HID-X Version

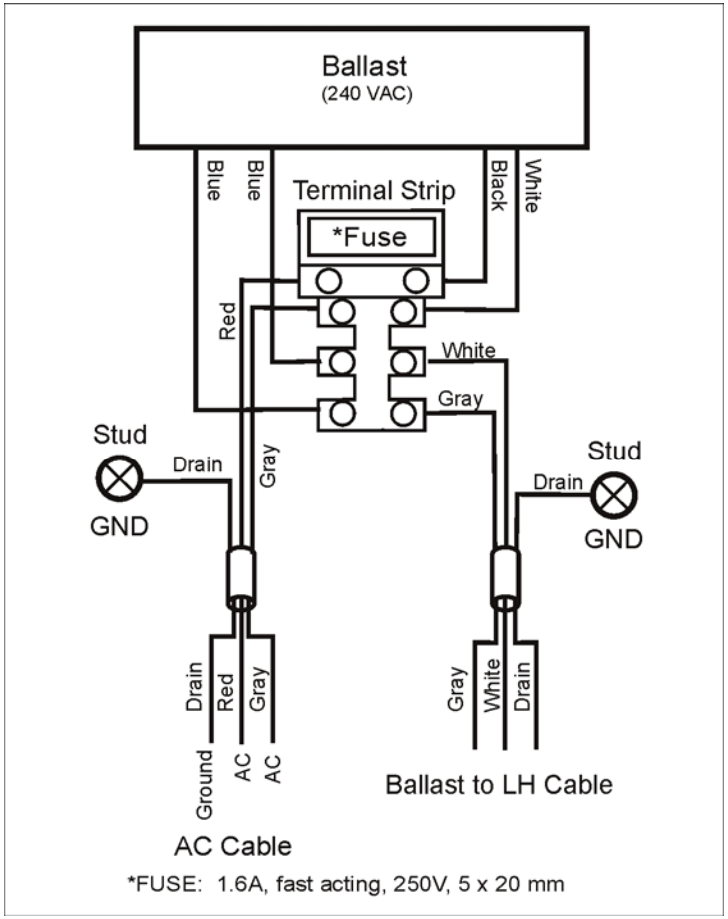


Input Voltage	L is	N is	G is
120VAC	AC (hot)	ACC (Common)	Ground
220/240VAC	AC (hot)	AC (hot)	Ground

Figure 7 - Ballast Box Wiring Diagrams HID-S Version



Wiring Diagram for 120 Volt Lights

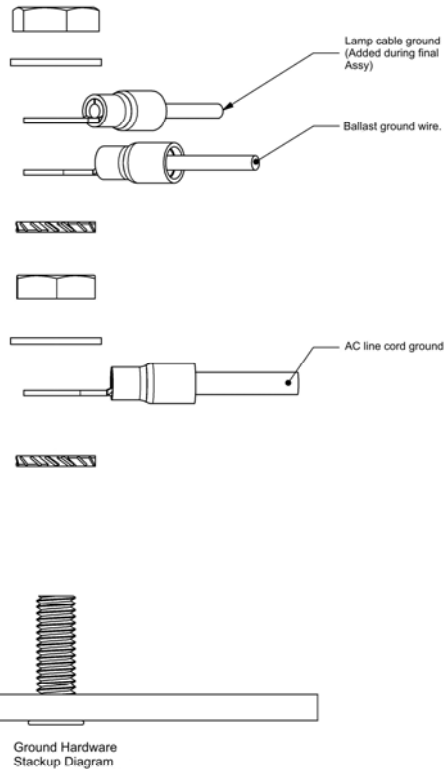


Wiring Diagram for 240 Volt Lights

Figure 8 - Ballast Box Ground Hardware Stack Up Diagram

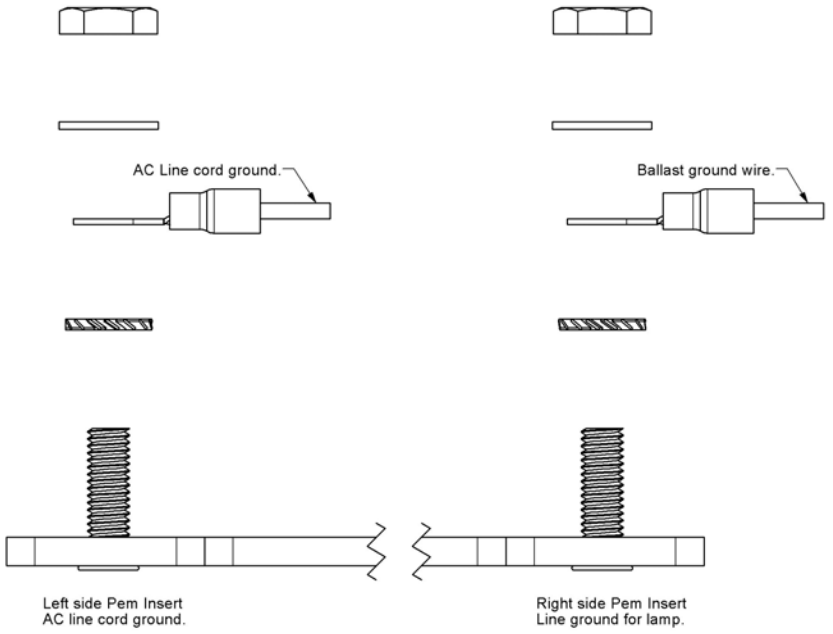
Ground Stack Up will be either single or dual posts configuration (both shown)

Single Post



The AC line cord ground must be installed on the ground post first and secured with hardware as shown before the next ground wire is connected. Failure to do this will void the UL recognition of the product for safety.

Dual Posts



6. Ground wire for lamp cable connects to right side pem insert.

3. AC Line cord ground must be connect to left side pem insert and no other wires may be connected to it.

Appendix B – Tips and Insight for Installers

The 150W HID Thru-Hull SeaLite® is a complete system, which ships as 3 components comprised of the ballast with the AC power cable attached, the light head internals with the interconnect cable attached, and the thru-hull fitting.

The thru-hull fitting and the light head internals have caps over the openings and are wrapped in saran wrap to keep them clean and dry. Each should be left wrapped with the caps on as long as possible. After the fitting is installed in the boat the cap should be on and removed just before the light head internals are installed. Keeping these parts clean and dry is crucial to a successful install.

The AC power cable that comes with the ballast is a shielded cable. The shielded cable reduces the chance of interference with other electronic equipment when the lamp starts up and is running. Changing this cable to use a ships AC power cable that is not shielded reduces noise immunity, and may cause interference to radios, DVD players, etc. (We have received calls from installers where this did in fact happen and when they switched back to the provided cable the interference went away.)

It is highly recommended that each light have its own on/off switch. While several lights can be connected to a single 15 Amp circuit, there is a high possibility of interference occurring when more than one light is started (turned on) at the same time on the same power line (source), which results in lamps not starting as expected. This is due to the complex starting requirements of each light and a race condition for adequate power to complete the cycle being available at the input to the ballast.

The light head internals come with cable attached that is critical to proper operation of the system. This cable has to be able to pass the 4,000 volt high frequency lamp firing signal with minimum attenuation, then has to have a low voltage drop during the high current lamp warm up period when voltage is low, and finally, properly carry the normal running voltage and current. The cable has been carefully selected to accomplish all of this and no other cables may be substituted.

The connections inside the light head internals and the lamp socket have also been carefully selected and connected at the factory to insure the lamp gets the correct voltage for starting, sufficient current for warm up and then voltage and current to stay running. The light head internals should not need to be opened on new installs and it is highly recommended that you do not open them. They should only be opened when troubleshooting indicates it is necessary.

The standard light head to ballast interconnect cable length is 15 feet. We also offer interconnect cable assemblies in 35 and 50 foot cable lengths, when longer runs are needed. The cables can be shorted by cutting and prepping the end that will connect to the ballast. They should never be shortened by cutting the end that connects to the light head, as this would require reworking the light head internals and the opportunity to inadvertently introduce problems is much higher than connecting the cable to the ballast end.

The HID-S and HID-O version light heads have a 2 conductor shielded cable and the HID-X version light head has a 4 conductor shielded cable. The two additional wires in the HID-X cable are for the temperature and moisture detection circuits to communicate to the ballast.

All connections to AC power source and light head internals to ballast must be high quality, low resistance connections. The connectors inside the ballast have been selected and tested to meet the necessary requirements. It is up to the installer of an HID-O version light system to connect the ballast to power and the light head cable with connections that meet all requirements.

When connecting the light head internals cable to the ballast, insure that no loose strands of wire are outside of the connector housing, as all it takes to blow-up the ballast is one strand to stick out and touch the grounded chassis and have power turned on. Also, insure that each wire is securely tightened for a

low resistance connection, a high resistance connection will cause the ballast to sense that the lamp is not operating in its safe range, and will turn off.

When connecting the ballast cable to AC power it is recommended that you do not crimp multiple wires in one lug for connection, as a good electrical connection is not assured when this is done.

The ballast is a smart ballast with many rules programmed into it for proper and safe operation of the HID lamp. Because of this, all wiring from the ballast to AC power and from the ballast to the light head internals is critical for proper operation (i.e. getting the lamp started, getting it thru the warm-up period, normal running, and end of bulb life protection). Minor wiring issues that have no effect on traditional halogen lights can have an undesired effect on HID system.

Connecting the ballast to AC circuits that have Ground Fault Interrupters (GFI or GFCI) is not recommended as the ballast will normally trip the GFI and not work. We have had reports where they did installs on GFI circuits and did not have a problem. We have also had reports of units installed on boats causing GFI's on other circuits to trip (when this happens, it is typically a result of a shared return path that is un-expected.) In one case, the problem was solved by re-running the shielded wires to the main distribution switch. In another case, it was solved by using DeepSea provided shielded AC power cable.

If you mount an HID-X version fitting with the light pointing down, it is highly likely that at some time in the use of the light that the water under the fitting will be still and not carry heat away from the fixture causing the internal temperature to rise above the trip point of the sensor, and the light will turn off. If one looks at the two indicator lights on the ballast both the green and red will be on indicating that power is applied, but a protection circuit has activated removing power to the ballast. When this happens, the unit is functioning as it was designed. Simply allow the light to cool before re-starting.

Whenever the lights are turned on, they must be allowed to run long enough to complete their warm-up and transition to full output (usually within 5 minutes). If they are not allowed to do so, they require a higher starting voltage which the ballast will not provide, so lamp will not start again. Leaving the lamp off for 12 hours will allow the lamp to recover and return to normal thresholds for starting (sometimes it only takes 30 minutes to recover).

Life expectancy of the HID lamp is affected by the length of time the lamp is run each time it is turned on. For maximum life, it is recommended to run a lamp for at least one hour each time. Running lamps continuously is also not good, and lamps should be turned off for 1 hour each week.