SAI BASIC LIGHT

WITH 300W TUNGSTEN HALOGEN LAMP

DESCRIPTION AND OPERATING INSTRUCTIONS

WARNING: ***This is a bright, intense light source. Read ALL of the instructions completely before operating and follow them carefully. Note: The Light can be used only with 115 Vac, 50/60 Hz Power.***

sai™ *HELIUM BUBBLE GENERATOR SYSTEMS*

BASIC LIGHT

General Description of the Basic Light

The SAI™ Basic Light has been developed as part of a system for visualizing complex airflows with neutrally-buoyant bubbles filled with helium. It provides a beam of uniform intensity to illuminate the trajectories of the helium bubbles. The Basic Light accomplishes this at a fraction of the cost of the arc lamp if velocity measurements are not required. Also, the smaller, compact design allows for more flexibility and quicker diagnosis of "large-scale" airflow patterns. Overall, the Basic Light is quite simple and rugged in design, easy to use and adjust, and relatively cool in operation. The complete assembly with a detachable tripod support weighs only 3.5 lbs. This support mounts to a full-size tripod.

Key Features:

Multiple Apertures - The SAI™ Basic Light comes with two apertures. An adjustable slit and an adjustable iris.

Ease of Operation - The SAI™ Basic Light is light weight and easy to use. All the components are easily adjusted and serviced.

Quality of Construction - Quality components and optics assure high reliability and durability.

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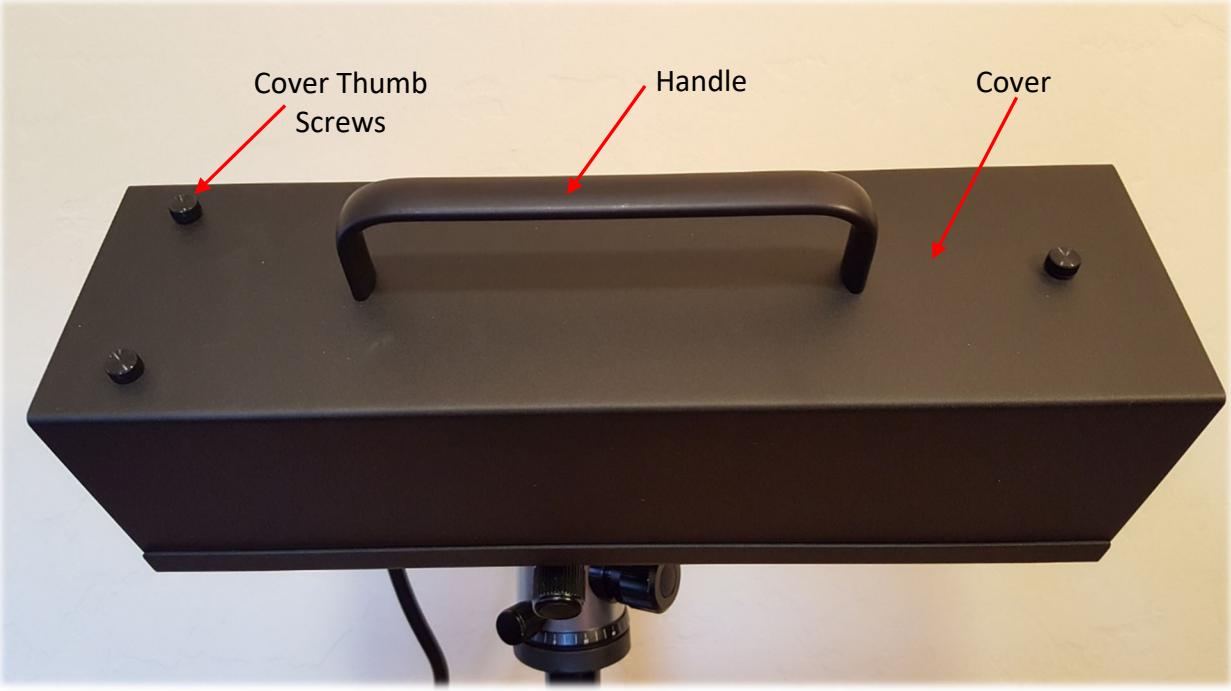
DESCRIPTION & COMPONENTS

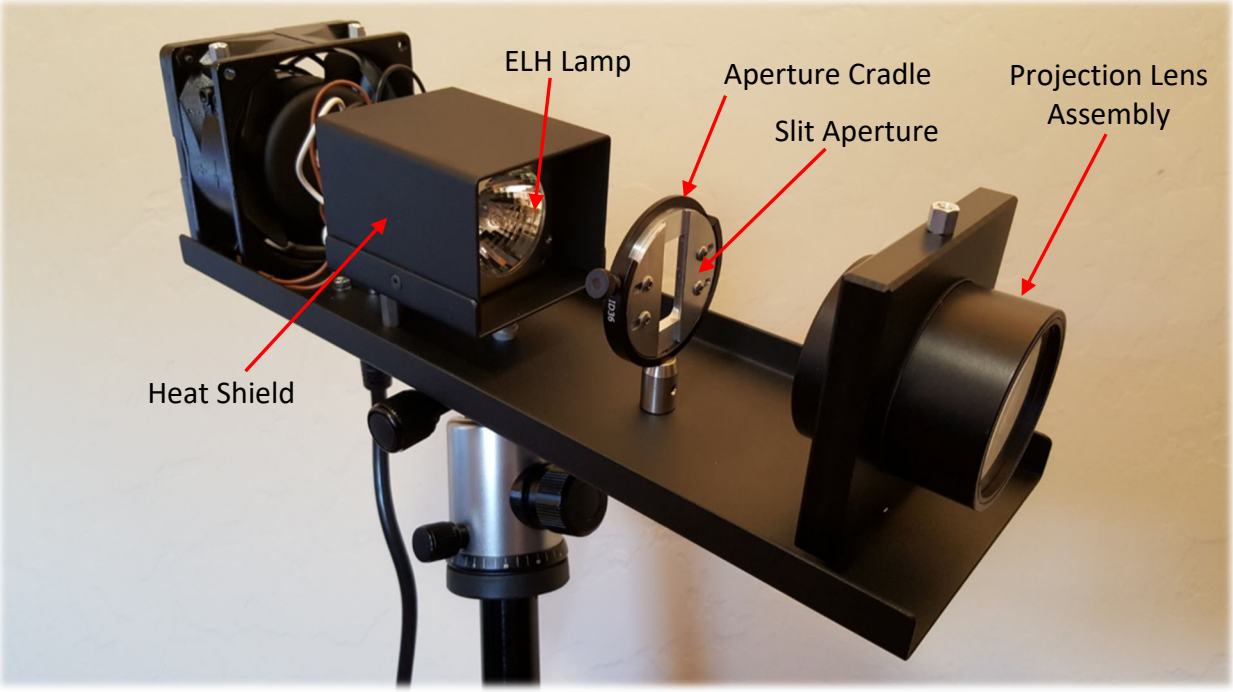
The SAI™ Basic Light has been developed as part of a system for visualizing complex airflows with neutrally-buoyant bubbles filled with helium. Like our Xenon Arc Light, it provides a beam of uniform intensity to illuminate the trajectories of the helium bubbles. The Basic Light accomplishes this at a fraction of the cost of the Xenon unit if velocity measurements are not required. Also, the smaller, compact design allows for more flexibility and quicker diagnosis of "large-scale" airflow patterns.

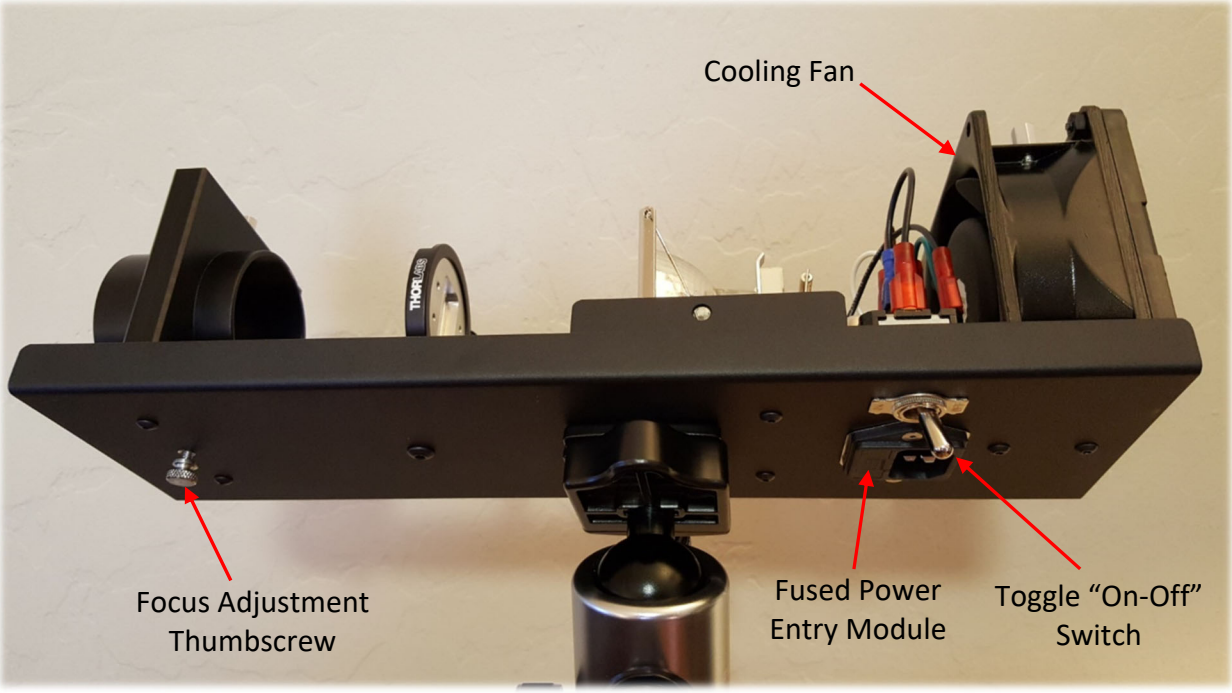
This SAI™ Light uses a ELH 300W tungsten-halogen lamp, generally available from many camera supply stores. Lamp life is rated at 35 hours. Power for the lamp and cooling fan is supplied directly through a grounded, plug-in power cord and a toggle "ON-OFF" switch mounted in the bottom cover, along with a general-purpose power entry module. The projection lens and a unique aperture assembly allow focusing of the light beam on any flow from 24" to infinity. Two apertures are included with the SAI™ Basic Light, an iris and an adjustable slit. The iris provides a circular beam spread that can vary from 2” – 24” in diameter at 6’, while the slit provides a rectangular beam spread from 0” by 22” to 8” by 22” at the same distance.

Overall, the SAI™ Basic Light is quite simple and rugged in design, easy to use and adjust, and cool in operation. The complete assembly when detached from the tripod, weighs only 3.5 lbs. On the tripod, the light can be set at any elevation from 0-65”.



GENERAL COMPONENT LAYOUT OF THE SAI™ BASIC LIGHT





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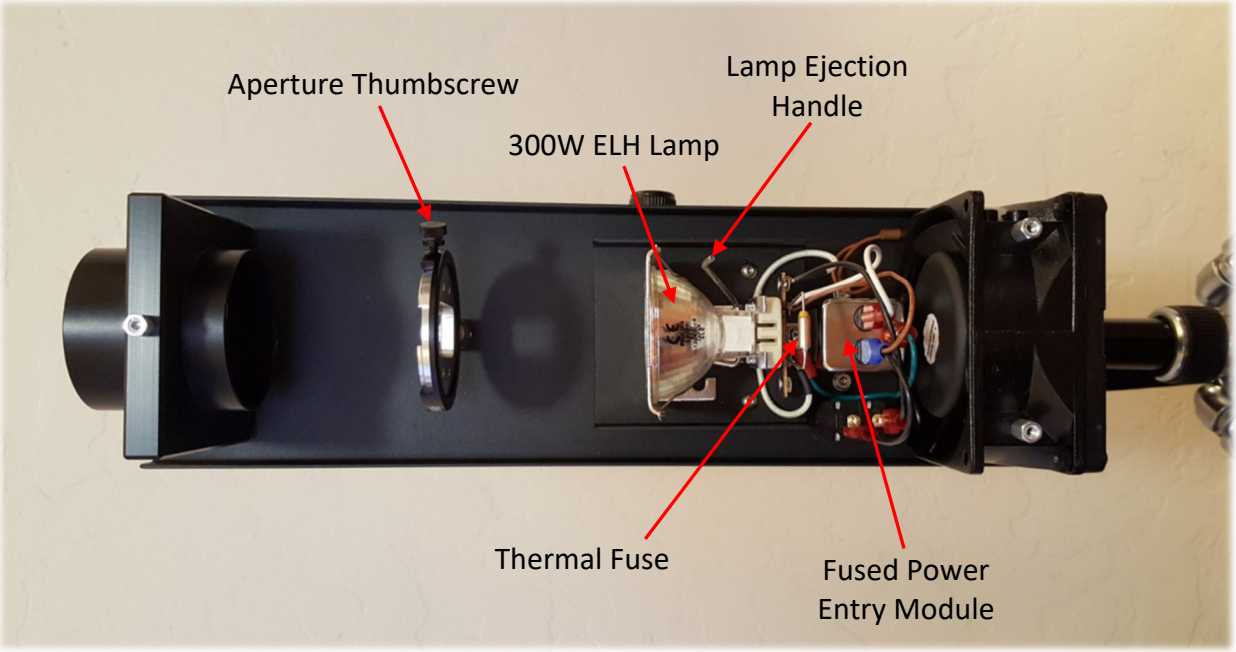

SETUP & OPERATION

1. Familiarize yourself with the features of the Tripod supplied. Once these are understood, mount the Light to the Tripod. To do this, insert the quick release plate located on the bottom of the Light into the top of the tripod Head. Make sure that the quick release plate is fully locked in place.

2. The unit is for use only with 115 Vac, 50/60 Hz. For use with 230 Vac 50/60 Hz, a suitable transformer is necessary. *Note: See appended instructions if a Transformer provided with your Basic Light(s).*

3. Remove the three top Cover Thumb Screws and lift the Top Cover off and set it aside. Now select either the adjustable slit or iris aperture and mount it in the Aperture Cradle. Secure the aperture in place with the Aperture Thumbscrew. Do not overtighten this screw when using the iris, otherwise the iris will not open or close properly. Replace the Top Cover and Cover Thumb Screws.

4. Set up the Light as desired for the tests and check the Toggle “On-Off” Switch. It should be in the "Off" position. Now plug the power cord into a power outlet and turn the Toggle Switch to “On”. The Light is wired so the fan is always on when the unit is plugged in.

5. This is a VERY BRIGHT, INTENSE LIGHT SOURCE. NEVER LOOK DIRECTLY INTO THE LIGHT BEAM.

6. Aim the Light toward the general area to be visualized. Adjust the Light into the final shooting position you desire. When in the proper position, lock the Light in place.

7. Focus the beam as needed using the Focus Adjustment Thumbscrew. Loosen the screw slightly and slide the lens holder forward or backward until the beam is focused, then lightly retighten the screw to lock the holder in place. Backward movement brings the focus closer and forward movement, farther away.

8. Angle the beam to minimize light spillage on the background, any window surfaces and "out of view" model parts.

USE OF APERTURES

1. Both an Adjustable Slit and an Iris Aperture are included with this unit. The adjustable slit provides a rectangular beam or "slab" of light varying in width. This is particularly helpful to visualize 2-D airflows or to study 2-D sections of a complex 3-D airflow. On the other hand, the Iris Aperture provides a round beam varying in diameter. This is useful for examination of axisymmetric airflows or the overall examination of any airflow.

2. To adjust or change either aperture, **shut the light off** if it has been running to let it cool down. If needed, use the cotton gloves provided to handle surfaces.

3. To change apertures, loosen the black Thumb Knob on the side of the Aperture Cradle and slide the Aperture forward to remove it from the Cradle. Put the "new" Aperture back into the Cradle and lightly re-tighten the black Thumb Knob to hold it in place.

4. To change the width of the slit in the Slit Aperture, remove it from the Cradle and loosen the four 4-40 screws that hold the two leaves in place and reset as desired. The orientation of the slit may be changed just by changing the orientation of the light itself using the ball head of the tripod.

5. To adjust the beam diameter of the Iris, simply move the chrome lever on the side of the Iris. The Iris should be set in the Cradle so that the opening on the side of the Iris for the Iris Handle is aligned with the open notch in the Cradle.

LAMP REPLACEMENT SEQUENCE

1. SHUT THE LIGHT OFF and UNPLUG the power cord to avoid any possibility of electrical shock. Then let the Light cool down for 6 to 8 minutes.

2. Remove the Cover. Be certain that the Light has had sufficient time to cool before going any further. Use the pair of cloth gloves provided.

3. Remove the two flat socket head screws on either side of the Heat Shield. In turn, lift this Shield of its base. If it is still hot, set it down on some suitable surface.

4. Unseat the blown ELH Lamp from the Lamp Socket by pulling the ejection lever on the right-hand side of the lamp backward, slowly and firmly, as far as possible. CARE should be taken not to damage the thermal fuse near the ceramic base of the Lamp Socket. Complete removal of the blown lamp by lifting it upward carefully.

5. RETURN THE EJECTION LEVER fully forward and replace the blown Lamp with a new ELH 300W, 12OV Lamp. *Do not touch the new Lamp with bare hands since this will shorten the Lamp life. Use either a tissue or the cloth gloves when handling the Lamp*. Set the Lamp into the Lamp Socket so that the wire ears hold it near the top of the Socket. Now make sure its pins are horizontal and aligned with the Socket. Continue to push the Lamp straight down, again slowly and firmly, until it is completely seated and snaps into place.

6. Check the alignment of the Lamp after replacement. The Lamp should be centered on the circular opening at the front of the Lamp Socket, i.e. the optical axis. Also, check the coiled lamp filament to see that it is still intact.

7. Replace all the other components, reversing the above procedures.

MAINTENANCE

1. Clean the front surface of the projection lens often to remove any dust and/or bubble film solution. Accumulation of deposits on the lens will cause diffusion of the light beam and result in poor illumination of the bubbles. Do this and all other maintenance ONLY when the Light is UNPLUGGED and COOL.

2. Care must be taken when cleaning the lens since it is coated to provide maximum transmission of visible light. Simply wiping with water and lens tissue will remove most major deposits of bubble film solution. Commercial optical cleaning fluids and a soft haired brush may be used to remove any additional dust or deposits, if necessary. No detergents or ordinary glass cleaning solutions should be used because they will abrade the surface of the lens.

3. Inspect all the internal surfaces for deposits of bubble film solution and dust from time to time whenever the Cover of the Light is off. Examine the fan blades and adjoining surfaces and clean as necessary with water and paper towels or Q-tips.

4. Every so often, wipe the outside surfaces with a damp cloth and dry with paper towels.

5. Usually the Iris Diaphragm will not become stiff unless it is abused. If it does become stiff, try a graphite lubricant on the leaves.

SUGGESTIONS

1. Painting the background areas flat black will diffuse any stray light. This will improve the contrast of the bubbles and make them more visible. All model parts receiving direct illumination should be painted glossy black unless they reflect the light directly.

2. Aligning the light beam with the general direction of the flow or the bubble motion will help to increase the intensity of the bubble trace. That is, the two highlights of the bubble trace will thus travel over the same path for the most part and form a brighter trace.

3. If a beam pattern other than the rectangular or circular is required, a metal cutout of the appropriate shape can be made up and suitably attached to the adjustable slit in place of the leaves.

4. For applications where variation in the height of the Light is necessary, the full-size tripod with pan head is the best solution. For more than one Light, the preferred mounting solution is the SAI™ Rolling Stand, which can accommodate up to four Lights to a total height of 9’.

5. Maximum visibility of the flow is obtained by aiming the beam at a 90° angle from the direction of view. This keeps light from reflecting off the background of the object being studied or any clear plastic for viewing purposes in the foreground.

6. If the Light is in a wind tunnel downstream of the point where bubbles are implanted, it should be positioned somewhat above or below this point, or slightly off to either side. This will minimize any buildup of bubble film solution on the Light.

7. Care should be taken not to bump or jar the Light excessively because this can cause Lamp failure. The Lamp is especially SUSCEPTIBLE TO SHOCK right after it is turned off.

HAZARDS & PRECAUTIONS

1. As stated earlier, this is a **BRIGHT, INTENSE LIGHT SOURCE. NEVER** look directly at the operating lamp or into the light beam.

2. Also, always shut off the Light and let it cool down for 6 to 8 minutes before the Cover is removed.

3. Also, unplug the Light whenever working inside the unit except to focus the beam and/or change the aperture.

4. Do not operate the Light with either the cover or the heat shield, or both, removed at any time. There are several hazards to avoid, including (i) the intensity of the Light, (ii) the possibility that the Lamp may shatter, (iii) the high temperature of certain inner surfaces, (iv) the "electrical" exposure to the lamp wiring and (v) the movement of the fan blades. Also, the Lamp may overheat, causing the thermal fuse to blow.

5. Care should be taken that the Light is not focused on any material too near which is readily combustible since the radiant heat may ignite it. Care should be taken, too, to keep the air inlet area around the Projection Lens Assembly free from any obstruction that would block the incoming air.

SPECIFICATIONS

Circular Beam Spread: 5 cm – 60 cm Dia @ 180 cm

Iris Diaphragm Diameter: 2.5 mm - 37.0 mm

Rectangular Beam Spread: 1 mm x 56 cm – 20 cm x 56 cm @ 180 cm

Adjustable Slit Width: 0.1 mm – 1.1 cm

Focusing Range: 61 cm - Infinity

Projection Lens Focal Length (Each): 200 mm

Lamp: ELH 300W, 120V

Cooling: Forced Convection

Average Bulb Life: 35 Hrs.

Main Light Dimensions: 10.2 cm H x 10.2 cm W x 34.3 cm L

Overall Height: 16.5 cm

Stand: Ball Head Tripod

Unit Weight: 1.6 kg without the Power Cord or Tripod

Input Voltage: 115Vac, 50/60Hz

Thermal Fuse: 286°F - 306°F