

## STBI-3000A Bi-color Illuminator & Viewing Hood Installation, Operating and Maintenance Manual

### INTRODUCTION

The Quest-Tec Solutions (QTS) STBI-3000A Bi-color Illuminator & Viewing Hood Assembly is designed for use with the QTS STB-3000A Steam Gage. The Illuminator & Viewing Hood Assembly has an aluminum alloy and stainless steel construction and employs bright, long-lasting light emitting diodes (LEDs) as the illumination source for direct viewing of the ported Steam Gage. The STB-3000A Steam Gage when equipped with the STBI-3000A Illuminator & Viewing Hood Assembly satisfies ASME Section I, Part PG-60 requirement that a direct-reading ported gage shall have a means of obvious discrimination between the steam and water phases.

Figure 1 below depicts a typical STB-3000A Steam Gage arrangement (a 5-port gage is shown) with the STBI-3000A Illuminator & Viewing Hood Assembly unattached to the Steam Gage. The Assembly attachment and fastening points are shown in Figure 1 below.

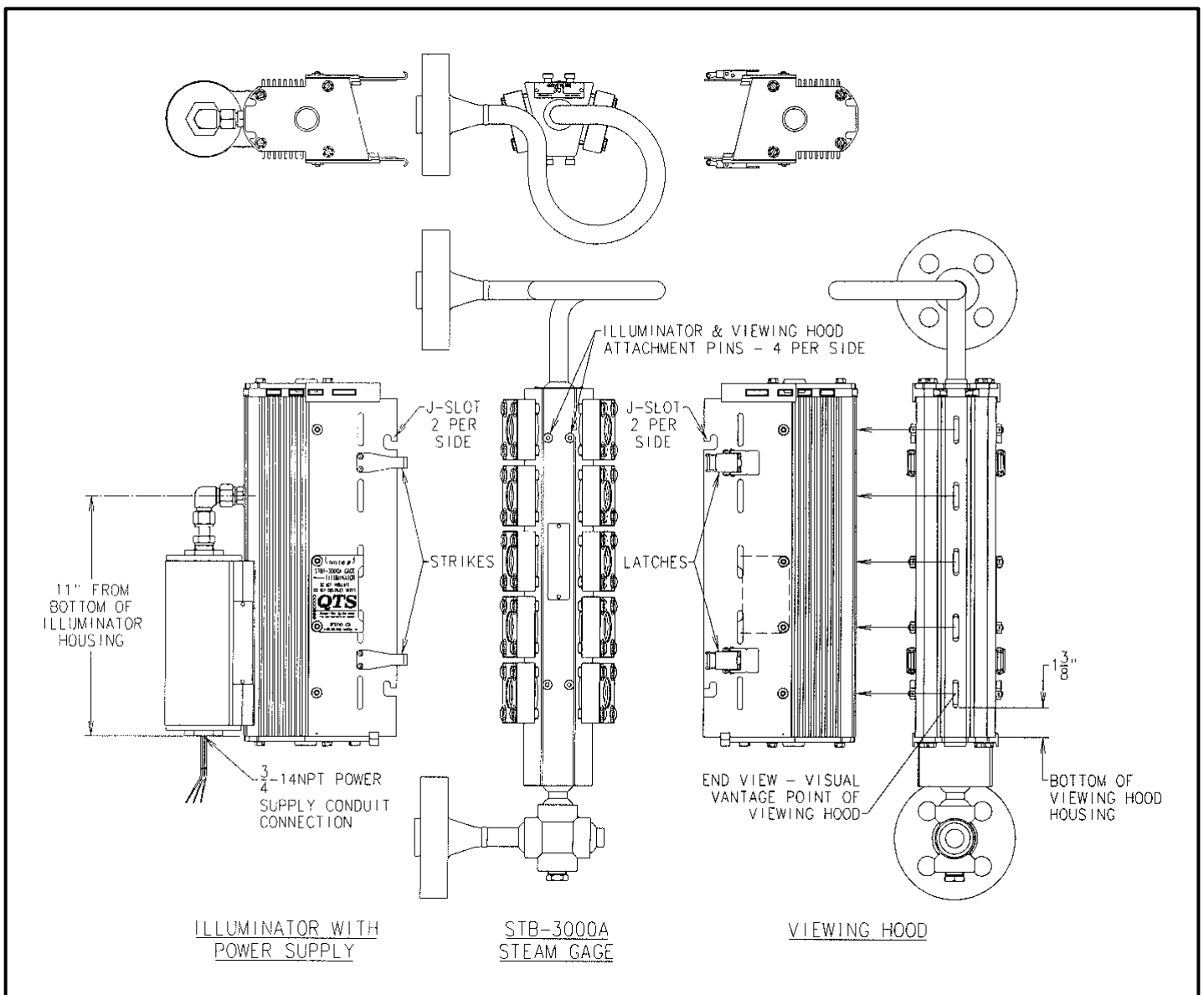


Figure 1. STBI-3000A Illuminator & Viewing Hood Attachment and Fastening Points to STB-3000A Steam Gage

## PRINCIPLE OF OPERATION

The STB-3000A Steam Gage Chamber has a central passageway through which steam and water can rise and fall. On opposing sides of the Chamber are flange-retained Glass Ports that are set at precise angles to cause refraction of the light emitted from the Red and Green LEDs inside of the Illuminator. The emitted light passes through the Illuminator-side Ports of the Gage, through the fluid in the Gage Chamber and exits through the Viewing Hood-side Ports of the Gage. The emitted light is visible through the Slots in the Viewing Hood from vantage point shown in Figure 1. The STBI-3000A Illuminator & Viewing Hood Assembly is designed such that through refraction, fluid in the steam phase will allow passage of only the light in the Red spectrum and, when in the water phase, will allow passage of only the light in the Green spectrum. Figure 2 shows this principle of refracted light through the Gage Chamber and the indication of fluid phase level.

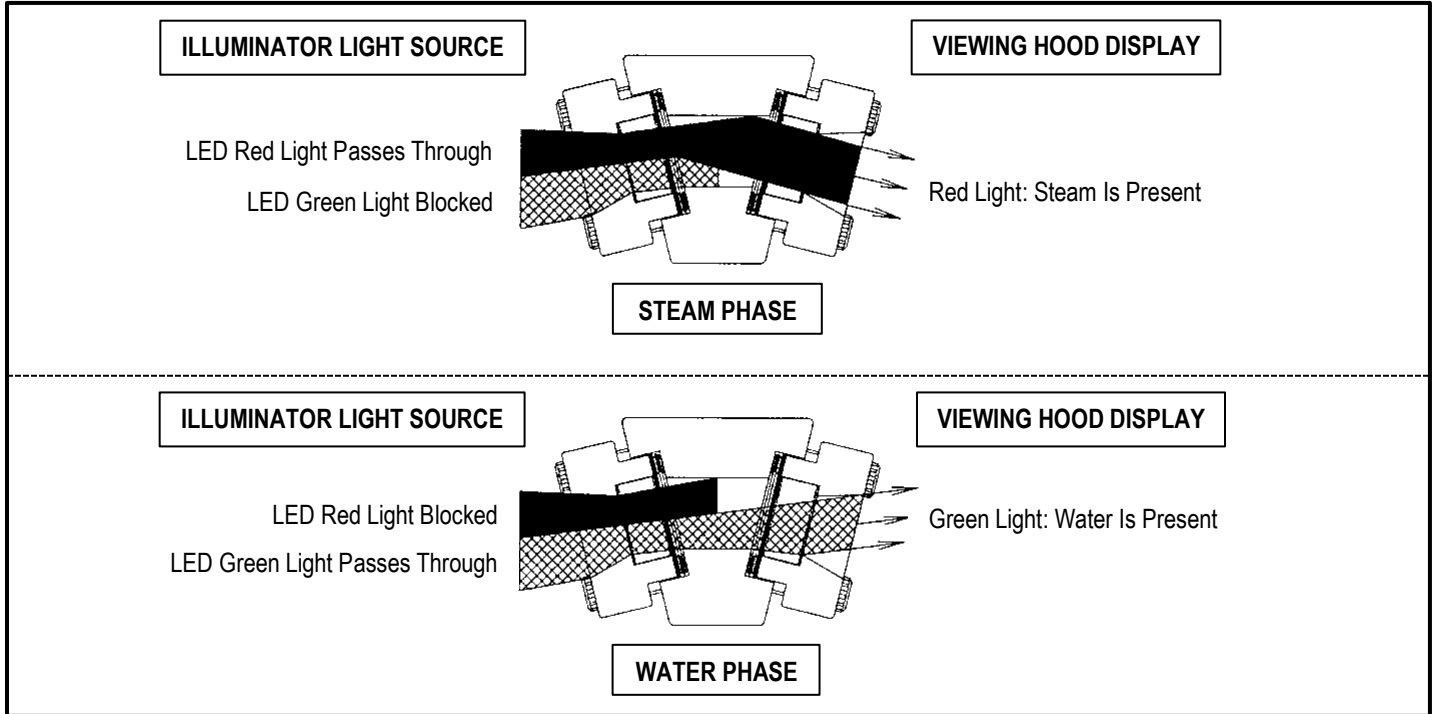


Figure 2. Diagram of Illuminator Light Refraction through Gage Chamber and Indicated Level Position of Fluid Phase

## PRODUCT VARIATIONS AND OPERATIONAL LIMITS

**Available Lengths** - The STB-3000A Steam Gage and Companion STBI-3000A Bi-color Illuminator & Viewing Hood Assembly is available in 27 standard lengths ranging from 4-Port to 30-Port. The external Housings of the Illuminator & Viewing Hood are continuous lengths whereas beyond 5-Port lengths, one or more of the Internal Components are stacked or coupled together. The LED Circuit Boards are electrically interconnected by means of Jumper Cables from one Circuit Board to the adjacent Circuit Board for Illuminators having multiple LED Circuit Boards.

**Power Source** - The Illuminator is equipped with an integrally-mounted Power Supply Unit that accepts an AC voltage electrical input that transforms it to a 12 VDC electrical output that is pre-wired to the Illuminator LED Circuit Board(s). Power consumption is 0.025 Amps per Gage/Illuminator Port. Two Power Supply Enclosure Units are available:

Standard - NEMA 4X (Weatherproof and corrosion resistant), 84-264 VAC Input, 50/60 Hz

Optional - Hazardous Locations (Intrinsically safe and explosion-proof, Cl. I, Div. 1, Groups B, C & D), 115 or 230 VAC Input, 50/60 Hz

**WARNING: Always abide to the design ratings of the Power Supply Unit as failure to do so can result in Unit failure or the development of excessive heat and the potential ignition of volatile liquids or gasses in the surrounding environment causing property damage, personal injury or death. The Power Supply Unit contains no user-serviceable internal parts.**

**LED Circuit Boards** - The Illuminator LED Circuit Board(s) utilize brilliant 4-cluster Red and Green LED Lamps for each Gage/Illuminator Port. The LED Lamps have a lifespan in excess of 100,000 hours; about 200 times greater than that of conventional incandescent bulbs. Applied to the LED Circuit Boards is an acrylic conformal coating to provide resistance to environmental corrosion.

Heat Protection – Steam at high pressure generates considerable heat within the Gage Chamber. Albeit at a reduced temperature, the heat is transferred to the Internal Components of the Illuminator and if not sufficiently dissipated, can reduce the lifespan of the LED Circuit Boards. UNDER NO CIRCUMSTANCES should the Illuminator or Viewing Hood be insulated or the Vent Openings in the Housing Panels and Top Vent Plates be otherwise obstructed. The LED Circuit Boards have a maximum continuous service temperature of -40 to 185° F. (-40 to 85° C.). Should a condition arise where sufficient heat dissipation cannot be achieved by normal (convection) air cooling, an optional Vortex Tube can be readily adapted to the Illuminator Housing to reduce the internal air temperature by as much as 50° F. (46° C.) using compressed “shop” air.

Handling & Storage – The Illuminator & Viewing Hood Assembly contain fragile Glass Panes and Bracket-mounted Circuit Boards whose LED Lamps have been factory aligned to achieve maximum light refraction and brightness when viewed. HANDLE WITH CARE to prevent damage to and misalignment of the Internal Components. Provide protection from moisture and atmospheric dust if storing the Illuminator & Viewing Hood Assembly for a prolonged time period prior to installation.

## UNCRATING AND INSPECTION

The STBI-3000A Illuminator & Viewing Hood are normally packaged separately and independently of the STB-3000A Steam Gage with which it is typically shipped; CAREFULLY remove crating and packaging material. Perform the following checks after unpacking:

Shipment Damage – Check the Exterior of the Assemblies for damage. There should be no evidence (audible rattling) of loose or broken Internal Components during handling. If damage is evident or suspected, notify the freight carrier immediately and request a damage inspection. Refer to the *DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY* Section of this Manual should it be necessary to partially or fully disassemble the Illuminator or Viewing Hood to inspect the Internal Components.

Purchasing Documentation & Product Markings – Verify to ensure that the Nameplate Markings on the STBI-3000A Illuminator & Viewing Hood Assembly and the STB-3000A Steam Gage (if shipped together) match those on the purchase order. Contact QTS Factory Service should a discrepancy be found.

Operating Conditions – Review all documents including the *PRODUCT VARIATIONS AND OPERATIONAL LIMITS* Section of this Manual for information that is descriptive of the operating conditions for which the Illuminator & Viewing Hood Assembly and the Steam Gage (if shipped together) were specified and subsequently configured. Compare the operating conditions stated in the documents to the ACTUAL field installation operating conditions. Should a discrepancy be discovered, DO NOT install the equipment until the issue has been investigated and resolved.

**WARNING: It is the user’s responsibility to ensure that the Illuminator & Viewing Hood Assembly (and the Steam Gage) are configured for and compatible with the actual field operating conditions. Consult the STB-3000A Steam Gage Installation, Operating and Maintenance Manual for information pertinent to the Steam Gage design operating limits. If unsure, have the Product Markings available and contact QTS Factory Service for assistance in determining product suitability for the operating conditions.**

## INSTALLATION

The installation of the of the STBI-3000A Illuminator & Viewing Hood Assembly as well as the STB-3000A Steam Gage shall only be performed by personnel whom are knowledgeable and safely capable of the procedure and have been qualified as such by the equipment user or their authorized representative.

**CAUTION: Illuminator installation requires the completion of electrical connections. It is the user’s responsibility to ensure that electrical installation is performed by a Qualified Electrician and complies with the applicable industrial electrical Codes (USA: Refer to National Electrical Code NFPA current edition; Canada: Refer to Canadian Electrical Code CSA C22) having jurisdictional authority for the installation type and location as applicable.**

STB-3000A Steam Gage Installation – Refer to the Installation, Operating and Maintenance Manual for the Steam Gage and install the Gage in its operating position SEPERATELY AND PRIOR TO attaching the Illuminator & Viewing Hood Assembly.

STBI-3000A Illuminator & Viewing Hood Installation – NOTE: Unless otherwise indicated, Component Names and Item Numbers in these instructions are in reference to Figure 5 Parts List located in this Manual.

**IMPORTANT: The configuration (type, size, length and position) of the STB-3000A Steam Gage vessel and drain connections were manufactured according to the Purchaser’s specifications. When installed, the Gage configuration establishes the mounting locations of the Illuminator and the Viewing Hood relative to other equipment and structures that may be present in the installation area. The Illuminator and Viewing Hood have ONE CORRECT ATTACHMENT POSITION ON THE STEAM GAGE; they are NOT reversible nor invertible. Figure 1 depicts the attachment locations relative to the Gage Chamber cross-sectional shape and Port locations.**

1. Attach Illuminator – Align the Horizontal Leg of the J-Slots in the Illuminator Side Panels (Items 7) with the Shoulder Screw Attachment Pins (Items 31) of the Gage Chamber; there are four (4) attachment points on each side of the Gage Chamber. Engage the J-Slots with the Pins, slide the Illuminator inward toward the Gage and allow the Illuminator to drop down slightly to engage the vertical “Hook” portion of the J-Slots. The Illuminator-to-Gage Attachment Points are shown in Figure 1.
2. Attach Viewing Hood – Swing the Levers of the Latches (Items 23) outward on both Viewing Hood Side Panels (Items 7) to unlock and allow free movement of the Latch Bales. Swing the Bales outward to prevent interference with the Illuminator Strikes (Item 24) when attaching the Viewing Hood. Attach the Viewing Hood the Gage Chamber as described for the Illuminator (above); refer to Figure 1.
3. Fasten Latches – Swing the Latches forward and engage the Latch Bales with the Strike Loops. Swing the Latch Levers away from the Bales and toward the Side Panels; press inward and lock the Latches in position.
4. Electrical Connection to Power Supply Unit

**CAUTION: DO NOT connect electrical power until, 1) the Illuminator has been attached and fastened to the Steam Gage Chamber according to the instructions above and, 2) has been externally grounded. It is the user’s responsibility to ensure that only Qualified Electricians versed in the applicable industrial electrical Codes route, secure and make connection of electrical conductors and install protective encasements. The specification of conductor type, material, size and the need for armoring, strain-relief and enclosure protection thereof is beyond the scope of this manual.**

- A. Referring to Figure 3, there are three (3) power input Conductor Wire Leads extending from the Bottom Cap of the Power Supply Unit Enclosure. Depending on the specific Illuminator, a Junction Box may have been installed into the Bottom Cap, which in such case, the Conductor Wire Leads are accessible by removing the Junction Box Cover. The Junction Box may contain a Terminal Block to which the Conductor Wire Leads are connected depending on the Illuminator specifications. Whether exposed (as shown) or inside a Junction Box, the Conductor Wire Leads from the Power Supply Unit are color coded as noted below.

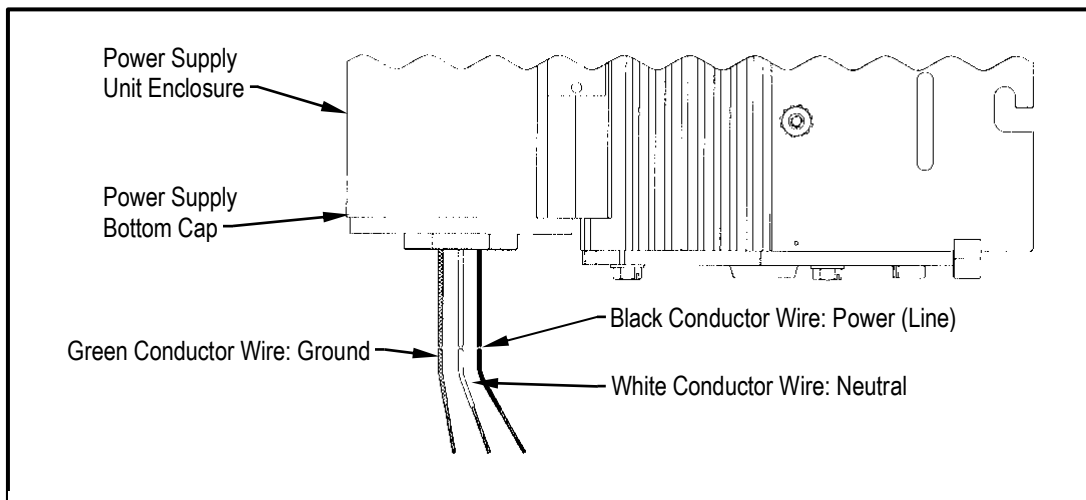


Figure 3. Power Supply Unit Input Conductor Wire Leads Identification

- B. Connect the electrical input power source to the Power Supply Unit Wire Leads in accordance with industrial electrical Code requirements. The input power must be within the limits stated in the *PRODUCT VARIATIONS AND OPERATIONAL LIMITS – Power Source* Section of this Manual. If installing additional electrical hardware such as a junction box, conduit or sealed fittings, be certain that the hardware selected for use does not compromise the Enclosure Rating of the Power Supply Unit. Two Power Supply Units are available for the Illuminator; the Unit installed can be determined as follows:

Standard Unit: NEMA 4X (Weatherproof and corrosion resistant) has only a Product Nameplate attached to its exterior

Optional Unit: Hazardous Locations (Intrinsically safe and explosion-proof, Class I, Div. 1, Groups B, C & D) has a Product Nameplate and an Electrical Certification Nameplate attached to its exterior

## PREVENTATIVE MAINTENANCE

When used within the Design Operational Limits, the STBI-3000A Illuminator & Viewing Hood Assembly will provide a long service life requiring little preventative maintenance other than periodically checking that the exterior fasteners are tight after many heating and cooling cycles, the Vent Openings in the Top Vent Plates (Items 3) and the Side Panels (Items 7) remain unobstructed and the Viewing Lens Glass (Item 17) in the Slotted Openings of the Viewing Hood (Item 2) are clean. Should the Illuminator & Viewing Hood Assembly be installed in an exceptionally dirty or dusty environment, periodic cleaning of the Viewing Lens Glass Pane(s) inside the Viewing Hood and the Thermal Barrier Glass Pane(s) (Item(s) 16) inside the Illuminator Housing (Item 1) may be required. See the *DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY* Section of this Manual for Glass Panes removal procedure. Any additional preventative maintenance must be determined by the user based on the operating conditions and installation environment.

## DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY

Assuming that none of the Internal Components of the Illuminator or Viewing Hood have become damaged due to mishandling or exposure to excessive heat, the only Components having a finite service life that may eventually require replacement are the LED Circuit Boards inside the Illuminator.

The externally mounted Power Supply Unit is designed to deliver a long service life and has built-in "hiccup" circuit such that if a short circuit occurs, the Power Supply Unit will shut-down then, once the fault has been corrected, restore itself to operation. Should the Power Supply Unit ever require replacement, it must be replaced as an entire Unit as it contains no user serviceable parts. Contact QTS Factory Service for refurbishment of field-returned Power Supply Units.

### WARNINGS:

1. The STB-3000A Steam Gage to which the Illuminator & Viewing Hood Assembly is attached is designed to contain steam at high pressure and temperature. NEVER attempt removal or servicing of any of the level indication equipment (Power Supply Unit, Illuminator, Viewing Hood or the Steam Gage itself) without first shutting down (or isolating the Gage from) the process, venting/draining the process fluid from the Gage and allowing sufficient time for the equipment to cool to ambient temperature.
2. NEVER attempt removal of the Power Supply Unit or removal/disassembly of the Illuminator until the input power source to the Power Supply Unit has been shut-off and locked-out such to prevent inadvertent electrical energizing.
3. If the Illuminator is being cooled with an optional Vortex Tube threaded into the Lower End Cap (Item 5B), shut-off/disconnect the compressed air source to the Vortex Tube prior to servicing the Illuminator.
4. The Internal Components of the Illuminator & Viewing Hood are retained and weight-supported by the Lower End Caps (Item 5A or 5B – Illuminator, Item 5A – Viewing Hood) fastened to the Bottom End of the Housings (Item 1 – Illuminator, Item 2 – Viewing Hood) by four (4) Cap Screws (Items 8). ALWAYS remove the Illuminator & Viewing Hood Assembly from the Steam Gage AND POSITION THEM HORIZONTALLY before removing the Cap Screws from the Lower End Caps.

**FAILURE TO ABIDE TO THESE WARNINGS CAN RESULT IN PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH.**

### IMPORTANT DISASSEMBLY/REASSEMBLY NOTES:

1. QTS OEM component parts are engineered specifically for the operating parameters of the STBI-3000A Illuminator & Viewing Hood and are not interchangeable with products of other manufacturers. Always use QTS replacement parts to ensure proper fit, operational function and factory-backed warranty coverage.
2. All threaded fasteners and connections of the STBI-3000A Illuminator & Viewing Hood Assembly (including the Power Supply Unit) are right-handed; turn clockwise to tighten, counter-clockwise to loosen.
3. Some fasteners will require the application of lubricant to their screw threads prior to reuse; this requirement is so noted in the applicable instruction. Generally, any thread lubricant having an ignition temperature above the actual operating temperature of the Illuminator & Viewing Hood Assembly is acceptable.
4. Instructions are provided for the complete disassembly/reassembly of the Illuminator & Viewing Hood Assembly, however, it is recommended that before beginning an inspection or repair, the pertinent instructions are read and reviewed in their entirety to avoid the removal of Components that are un-necessary to accomplish the desired inspection or repair.

Illuminator Components Disassembly – All of the Internal Illuminator Components are readily accessible and removed from the Bottom End of the Illuminator Housing (Item 1).

1. Unthread and remove the four (4) Cap Screws (Items 8) retaining the Lower End Cap (Item 5A or 5B) from the Bottom End of the Illuminator Housing (Item 1). Remove the Lower End Cap.
2. Remove the Thermal Barrier Glass Pane(s) (Item(s) 16) by GENTLY sliding them outward from the Illuminator Housing. Illuminators longer than 10-Port will contain multiple Glass Panes; slightly elevate the Top End of the Illuminator Housing to slide out the remaining Glass panes. Store the Glass Pane(s) such to protect them against inadvertent damage while removed from the Illuminator.
3. Remove the LED Circuit Board(s) (Item(s) 18) by GENTLY pulling the LED Board End Mounting Bracket (Item 12) straight outward from the Illuminator Housing JUST FAR ENOUGH to expose the Electrical Cable (Item 9) that is connected to the LED Circuit Board Terminal. Press the Locking Tab of the Electrical Cable End Connector inward while pulling the Cable Connector from the LED Circuit Board Terminal to disconnect.
4. GENTLY pull the LED Board End Mounting Bracket straight out and remove the LED Circuit Board(s)/Mounting Brackets Assembly from the Illuminator Housing. Illuminators longer than 5-Port will contain multiple LED Circuit Boards that are mechanically connected by Coupler Mounting Bracket(s) (Item(s) 19) and electrically connected by Jumper Cable(s) (Item(s) 20). PROVIDE ADEQUATE SUPPORT when removing the LED Circuit Board "String" from exceptionally long Illuminators to prevent Components damage.
5. Disassemble the LED Circuit Board(s) from the End Mounting Brackets (Items 12). Applicable only to Illuminators with multiple LED Boards, disconnect the Electrical Jumper Cables (Item(s) 20) from the LED Board Terminals as described in Step 3 above. Unthread and remove the Machine Screws (Items 22) and Lock Washers (Items 21) from the Mounting Brackets to detachment of the LED Boards.

6. With the LED Circuit Board(s)/Brackets Assembly removed, the condition of the Primary Electrical Cable (Item 9) can be examined. If the removal of the Electrical Cable is necessary, it first requires its disconnection from the Power Supply Unit; see the *POWER SUPPLY AND FITTINGS REMOVAL/ATTACHMENT* Section in this Manual for Primary Electrical Cable removal instructions.
7. Although usually unnecessary, removal of the NEMA 4X Enclosure Power Supply Unit Electrical Fittings (Items 10, 11, 15A1 & 15A2) or the Hazardous Locations (EX-P/IS) Power Supply Unit Cover and Cable Guard Fitting (Items 15B3 & 15B1) from the Illuminator Housing first requires the disconnection of the Primary Electrical Cable from the Power Supply Unit; see the *POWER SUPPLY AND FITTINGS REMOVAL/ATTACHMENT* Section in this Manual for Electrical Fittings and Cover removal instructions.
8. If required, remove the Upper End Cap (Item 4) and the Vent Plate (Item 3) from the Illuminator Housing (Item 1) by unthreading and removing the four (4) Cap Screws (Items 8) from the Upper End Cap; lift off the Upper End Cap and Vent Plate. NOTE: Beneath the Vent Plate are pieces of compressible Cushioning Cord (Items 29 & 30) that serve to remove all excess internal space between the LED Circuit Board(s), Thermal Barrier Glass Pane(s) and the Vent Plate resulting from unavoidable manufacturing tolerances. The Cushions are to prevent movement and greatly reduce the potential for damage to the Internal Components when handling the Illuminator Assembly; DO NOT LOSE THE CUSHIONS.
9. Remove the Side Panels (Items 7) having the permanently attached Latch Strikes (Items 24) from the Illuminator Housing by unthreading the Hex Nuts (Items 28) and removing the Lock Washers (Items 27). Lift off the Side Panels from the Cap Screws (Items 26) projecting from the Illuminator Housing. Remove the Cap Screws by sliding them along the length and out from the End of the Internal Channel of the Illuminator Housing.

Inspection/Cleaning/Replacement of Illuminator Components – Perform the following inspections of the Components; clean or replace Components as necessary according to the instructions. Should replacement parts be needed, they can be identified and ordered by part number from Figure 5 Parts List in this Manual.

1. Thermal Barrier Glass Pane(s) – Inspect the Thermal Barrier Glass Pane(s) (Item(s) 16) for damage; if damage is evident or fractures are observed replace the Pane(s). If the Pane(s) are intact, clean them using common non-abrasive household glass cleaning solution and a cloth or paper towels. Take care not to saturate the Protective Tape affixed to the perimeter of the Pane(s) with the glass cleaning solution. Should the Protective Tape be missing, damaged or no longer adhering to Glass Edges, it can be replaced with a SINGLE LAYER of THIN masking-type tape suitable for a continuous exposure temperature of 185° F. (85° C.).
2. LED Circuit Board(s) – An LED Circuit Board (Item(s) 18) that has failed obviously requires replacement. Closely inspect all of the LED Boards for signs of excessive heat exposure, cracks near or across the Electrical Path Tracings and cracked or broken LED Lamps and Cable Terminals. Relative to the normal working position of the Illuminator, the LED Board(s) nearest to the Top of the Illuminator Housing (Item 1) are the most susceptible to damage/failure due to overheating as the internal temperature is the highest in this location. If chronic failure of the LED Circuit Boards due to overheating is experienced, contact QTS Factory Service for possible solutions.
3. Electrical Cables - Inspect the Primary Electrical Cable (Item 9) and (if applicable) the Jumper Cable(s) (Item(s) 20) for signs of overheating, cracked or missing Wire Insulation and damaged End Connectors; replace if damaged. If reusing, clean the Electrical Cables with a damp cloth; use clean, dry compressed air to blow out dust from the Cable End Connectors.
4. Mounting Brackets – Inspect the Mounting Brackets (Items 12 &, as applicable, Item(s) 19); they must be flat (not bent) with the pressed-in Threaded Nuts tight and the screw threads undamaged. Replace if necessary; clean if being reused.
5. Illuminator Housing, Side Panels, Vent Plate & End Caps – To maximize heat dissipation, use a cloth and a benign cleaning solution to remove a heavy accumulation of dirt, grime, oil, etc., from the Illuminator Housing (Item 1), Side Panels (Items 7), Vent Plate (Item 3) and Upper and Lower End Caps (Items 4 & 5A or 5B). Use clean, dry compressed air to blow out dust/debris from all Vent Openings.

Illuminator Components Reassembly – The following instructions assume that the entire Illuminator is to be reassembled; skip over the instructions that are not pertinent to the inspection or repair being completed.

1. Attach Side Panels to Illuminator Housing - Align Hex Flats of the Cap Screws (Items 26) with the Internal Channel Slot in the End of the Illuminator Housing (Item 1) and slide-in the quantity of screws corresponding to the quantity of Bolt Holes in the Side Panel (Item 7). Orient the first Side Panel being attached as shown in Figure 1, place it against the Side of the Illuminator Housing next to where the Cap Screws are projecting from the Housing and align the Bottom Edge of the Side Panel with the Bottom Edge of the Illuminator Housing. Reposition the Cap Screws to line-up with the Panel Bolt Holes. Engage the Panel Bolt Holes with the Cap Screws then install Lock Washers (Items 27) onto the Cap Screws. Thread Hex Nuts (Items 28) onto the Cap Screws. While maintaining alignment of the Bottom Edges of the Side Panel and the Housing, tighten the Hex Nuts to 30 in-lbs. applied torque – DO NOT OVER-TIGHTEN. Repeat this process for the attaching the remaining Side Panel to the Opposite Side of the Illuminator Housing.

2. Install Electrical Cable Fittings/Power Supply Unit Cover – The assembly procedure differs depending on which Power Supply Unit will be attached to the Illuminator; follow the instructions pertinent to Unit being used.
  - A. Standard NEMA 4X Weatherproof and Corrosion Resistant Enclosure:
 

Place Flat Washer (Item 11) onto the Threaded End of the Tube Adapter Fitting (Item 15A1) and set aside. Align the Hex Flats of Pipe Nut (Item 10) with the Internal T-Slot Channel of the Illuminator Housing (Item 1) then slide the Nut inward along the Channel until aligned with the Side Hole in the Illuminator Housing. While holding the Pipe Nut in position, insert the Tube Adapter with Flat Washer thru the Side Hole of the Illuminator Housing from the exterior and thread it into the Hex Pipe Nut. Tighten the Tube Adapter hand-tight. DO NOT yet install Item 15A2 Union Elbow.
  - B. Optional Hazardous Locations (Cl. I, Div. 1, Gr. B, C & D) Enclosure:
 

Fully retract but do not completely unthread the Set Screw (Item 15B2) that is threaded into the Power Supply Unit Cover (Item 15B3). Orient the Cover such that the Open End is facing toward the Bottom End of the Illuminator Housing (Item 1), engage the Cover Side Rails with Channels in the Side of the Illuminator Housing then slide the Cover along the Illuminator Housing until the Cover is positioned past the Housing Side Hole. Temporarily tighten the Cover Set Screw to hold Cover in this position. Place Flat Washer (Item 11) onto the Threaded End of the Cable Guard Fitting (Item 15B1) and set aside. Align the Hex Flats of Pipe Nut (Item 10) with the Internal T-Slot Channel of the Illuminator Housing (Item 1) then slide the Nut inward along the Channel until aligned with the Side Hole in the Illuminator Housing. While holding the Pipe Nut in position, insert the Cable Guard Fitting with Flat Washer thru the Side Hole of the Illuminator Housing from the exterior and thread it into the Hex Pipe Nut. Tighten the Cable Guard Fitting hand-tight. Loosen the Cover Set Screw, slide the Cover against the Cable Guard Fitting and retighten the Set Screw snug.
3. Assemble LED Circuit Board(s) to Mounting Brackets – An Illuminator longer than 5-Port will contain multiple LED Circuit Boards and use Coupler Mounting Bracket(s); follow the instructions pertinent to the quantity of LED Circuit Boards contained in the Illuminator.

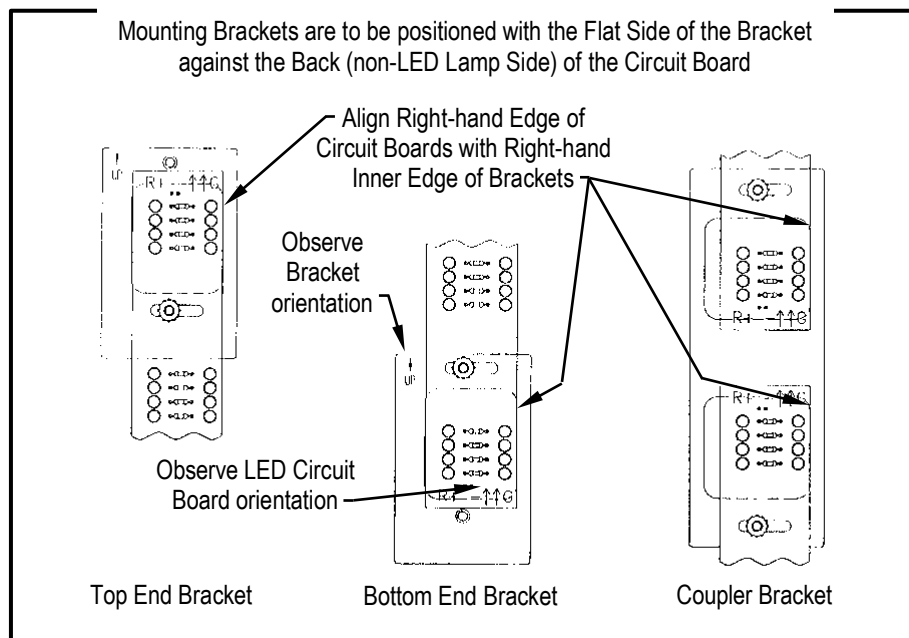


Figure 4. Orientation of LED Circuit Boards and Mounting Brackets Prior to Assembly

**IMPORTANT: IT IS CRITICAL TO THE PROPER REFRACTION OF THE LIGHT EMITTED BY THE ILLUMINATOR THAT THE LED CIRCUIT BOARD(S) AND MOUNTING BRACKETS ARE ASSEMBLED TOGETHER EXACTLY AS SHOWN IN FIGURE 4 ABOVE.**

- A. Illuminator with a Single LED Circuit Board:
 

Place the LED Circuit Board (Item 18) on a flat horizontal surface and orient the Board with LED Lamps facing outward and the Printed Arrows on the Board pointing upward. Beneath the Bottom End of the LED Board, position the Bottom End Mounting Bracket (Item 12) with Engraved Arrow pointing upward and the Flat Side of the Mounting Bracket against the Back (Non-Lamp) Side of the LED Board. Align the Upper Threaded Hole of the Mounting Bracket with Slot in the LED Board as shown in Figure 4. Place Lock Washer (Item 21) on Machine Screw (Item 22), install thru the LED Board Slot and thread into the Upper Threaded Hole in the Mounting Bracket; do not yet fully tighten. Repeat this process for the Top End of the LED Circuit Board and the Top End Mounting Bracket. NOTE: The Top and Bottom Mounting Brackets (Items 12) are identical however the Top End of the LED Board is fastened to the Lower Threaded Hole of the Top End Mounting Bracket as shown in Figure 4. With both Brackets attached, align the Right-hand Edge of the LED Board with the Inner Right-hand Edges of the Mounting Brackets and fully tighten the Machine Screws.

- B. Illuminator with multiple LED Circuit Boards:

1. Place the LED Circuit Boards (Items 18) on a flat horizontal surface. Position the LED Boards in a “String” in the order in which they are to be attached to each other. NOTE: When connecting LED Boards having unequal overall lengths, their relative positioning has no effect on the Illuminator function. However, it is recommended that the Longer LED Boards be positioned at the Bottom of the Board String such that when installed, they will be nearest to the Bottom of the Assembled Illuminator. Orient the Boards with LED Lamps facing outward and the Printed Arrows on the Boards pointing upward. Beneath the Bottom End of the Lowest LED Board in the String, position the Bottom End Mounting Bracket (Item 12) with Engraved Arrow pointing upward and the Flat Side of the Mounting Bracket against the Back (Non-Lamp) Side of the LED Board. Align the Upper Threaded Hole of the Mounting Bracket with Slot in the LED Board as shown in Figure 4. Place Lock Washer (Item 21) on Machine Screw (Item 22), install thru the LED Board Slot and thread into the Upper Threaded Hole in the Bottom Mounting Bracket; do not yet fully tighten. Repeat this process for the Top End of the Uppermost LED Board in the String and the Top End Mounting Bracket. NOTE: The Top and Bottom Mounting Brackets are identical however the Uppermost LED Board is fastened to the Lower Threaded Hole of the Top End Mounting Bracket as shown in Figure 4.
2. Space the String of the LED Circuit Boards apart such that that Endmost Slots in the un-bracketed Ends of the LED Boards are approximately the same distance apart as the Threaded Holes spacing in the Coupler Mounting Bracket (Item 19). Position the Coupler Bracket beneath the Ends of the LED Boards with the Flat Side of the Bracket against the Backside of the Boards as previously done for the End Mounting Brackets. NOTE: The Ends of the Coupler Mounting Bracket are symmetric; there is no “orientation” other than the Flat Side of the Bracket must be beneath and against the LED Boards. Align the LED Board Slots with the Threaded Holes in the Coupler Bracket. Place Lock Washer (Item 21) on Machine Screw (Item 22) and install thru the LED Board Slot and thread into the Threaded Hole of the Coupler Mounting Bracket. Do not yet fully tighten. Repeat the fastening process for the opposite End of the LED Board and Coupler Bracket as well as the remaining LED Board/Coupler Bracket Junctions. With all Brackets attached, align the Right-hand Edges of all of the LED Circuit Boards with the Inner Right-hand Edges of the Ends and Coupler Mounting Brackets and fully tighten the Machine Screws.
4. Connect/Install Electrical Cables – The End Connectors of the Electrical Cables are directional and have ONE correct orientation to fully engage and lock into the LED Circuit Board Terminals. If the End Connector does not initially fully engage and lock with the LED Board Terminal, rotate it 90° and retry. Only an Illuminator with multiple LED Circuit Boards will use Electrical Jumper Cables.
  - A. Connect Electrical Jumper Cable(s): At the junction where the LED Circuit Boards (Items 18) are connected together with a Coupler Mounting Bracket (Item 19), connect the Jumper Cable (Item 20) to the Terminals of the LED Board to electrically connect adjacent Boards. Repeat this process for the remaining LED Board coupled junctions.
  - B. Install Electrical Primary Cable: From the exterior of the Illuminator Housing (Item 1), insert the SMALL FEMALE CONNECTOR END of the Primary Electrical Cable (Item 9) thru the previously installed Tube Adapter Fitting (Item 15A1). Gently pull the Cable through the Tube Adapter and into the Interior of the Illuminator Housing until about 3” of Cable (including the length of the Male End Connector) remains exposed from the End of the Tube Adapter. Where the Cable enters the Interior of the Illuminator Housing (just beyond the Hex Pipe Nut (10)), make a small bend in the Cable then route the Cable along the Inside of the Illuminator Housing Wall Channel and to the Bottom End and out of the Illuminator Housing.
5. Install the LED Circuit Board(s)/Mounting Brackets Assembly – Exercise CARE to ensure that BOTH edges of EACH Mounting Bracket is aligned and engaged with the Retaining Slots of the Illuminator Housing when inserting the LED Board/Brackets Assembly.
  - A. Orient the LED Circuit Board(s)/Mounting Brackets Assembly (Item(s) 18, 12 &, as applicable Item(s) 19) such that the Printed Arrows are pointing upward toward the Top of the Illuminator Assembly when installed and the Terminals of the LED Board(s) are facing the previously installed Primary Electrical Cable (Item 9). GENTLY insert the LED Board/Brackets Assembly into the Narrow Slots of the Illuminator Housing (Item 1) that are located CLOSEST to the Primary Electrical Cable; Use CAUTION to avoid tangling Jumper Cables (Item(s) 20 if present) with the Primary Cable. Leave about 3” of the LED Board/Brackets Assembly exposed from the End of the Illuminator Housing such that the Lowermost Electrical Connection Terminal is accessible.
  - B. Connect the exposed End of the Primary Electrical Cable to the LED Circuit Board Terminal. GENTLY push the LED Board/Brackets Assembly the remaining distance into the Illuminator Housing. Tuck excess Primary Cable inward into the Illuminator Housing and away from the Backside of the LED Board and the Lower Edge of the Bottom Mounting Bracket (Item 12). When correctly installed, the Lower Edge of the Bottom Mounting Bracket will be near flush with the End of the Illuminator Housing.
6. Install Thermal Barrier Glass Pane(s) Having Tape-Protected Edges – An Illuminator longer than 10-Port with contain multiple Thermal Barrier Glass Panes. NOTE: When installing Thermal Barrier Glass Panes having unequal lengths, their relative positioning has no effect on the Illuminator function. However, it is recommended that the Longer Glass Panes are installed such that they are positioned nearest to the Bottom of the Assembled Illuminator. GENTLY insert the Thermal Barrier Glass Panes (Item(s) 16) into the Wide Slots of the Illuminator Housing (Item 1). When correctly installed, the Lower Edge of the Lowermost Glass Pane will be near flush with the End of the Illuminator Housing.
7. Fasten Lower End Cap to Illuminator Housing – Apply lubricant to the four (4) Cap Screws (Items 8) according to *DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY – Important Disassembly/Reassembly Notes* Section in this Manual; set Cap Screws aside for later use.
  - A. The Diagonal Edge of the Lower End Cap (Item 5A or 5B) MUST be oriented the direction shown in the Top View of Figure 1 (the Upper End Cap (Item 4), Vent Plate (Item 3) and the Lower End Cap are all positioned with their Diagonal Edge oriented in the same direction). When correctly oriented, the Longer Side of the Lower End Cap will be positioned on the “Front Side” of the Illuminator Housing (Item 1) relative to the previously installed Electrical Fitting (Items 15A1) or, as applicable, the Power Supply Unit Cover (Item 15B3) being on the “Left Side” of the Housing; refer to Figure 1.

- B. Align the Bolt Holes of the Lower End Cap with those in the End of the Illuminator Housing and engage the Lower End Cap Panel Guide Slots with the Bottom Edges of the Side Panels (Items 7); VERIFY that the Primary Electrical Cable (Item 9) will not be pinched



by the Lower End Cap when attached. Install the for (4) previously lubricated Cap Screws (Items 8) thru the Lower End Cap Bolt Holes and thread into the Illuminator Housing. Tighten the Cap Screws hand-tight.

8. Install Cushion Cords, Vent Plate and Upper End Cap – It is highly recommended that the Illuminator Sub-assembly to be oriented upright in its normal operating position when installing these Components. Apply lubricant to the four (4) Cap Screws (Items 8) according to *DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY – Important Disassembly/Reassembly Notes* Section in this Manual; set Cap Screws aside for later use.
  - A. Apply finger-pressure to the Top End of the LED Circuit Board(s)/Brackets Assembly (Items 18 & 12) and also to the Thermal Barrier Glass Pane(s) (Item(s) 16) to ensure that they are firmly resting against the Inside Surface of the Lower End Cap (Item 5A or 5B).
  - B. Insert the Cushioning Cord Strips (Items 29 & 30) into the Slots of the Illuminator Housing (Item 1) and against, 1) the Top Edge of the LED Board Top Mounting Bracket and, 2) the Top Edge of the Glass Pane. Generally, shorter length Illuminators require more than one Cushioning Strip to be inserted into each Slot. When correctly installed, the top of the Cushioning Strip(s) will be approximately flush with the Top End of the Illuminator Housing. The objective is to fill all or most of the void (empty space) between the Top Ends of the Internal Components and, when fastened in place, the Underside of Upper End Cap (Item 4) to prevent movement and potential damage to the Internal Components during shipping and handling.
  - C. The Diagonal Edges of the Vent Plate (Item 3) and Upper End Cap (Item 4) MUST be oriented the direction shown in the Top View of Figure 1. When correctly oriented, the Longer Side of both Parts will be positioned on the “Front Side” of the Illuminator Housing relative to the previously installed Electrical Fitting (Items 15A1) or, as applicable, the Power Supply Unit Cover (Item 15B3) being on the “Left Side” of the Housing; refer to Figure 1.
  - D. Align the Bolt Holes of the Vent Plate with those in the End of the Illuminator Housing and engage the Panel Guide Slots of the Vent Plate with the Top Edges of the Side Panels (Items 7). Place the Upper End Cap on top of the Vent Plate and align the Bolt Holes. Install the four (4) previously lubricated Cap Screws (Items 8) thru the Bolt Holes of the Upper End Cap and Vent Plate and thread into the Illuminator Housing. Tighten the Cap Screws hand-tight.

Viewing Hood Components Disassembly – All of the Internal Viewing Hood Components are readily accessible and removed from the Bottom End of the Viewing Hood Housing (Item 2).

1. Unthread and remove the four (4) Cap Screws (Items 8) retaining the Lower End Cap (Item 5A) from the Bottom End of the Viewing Hood Housing (Item 2). Remove the Lower End Cap.
2. Remove the Viewing Lens Glass Pane(s) (Item(s) 17) by GENTLY sliding them outward from the Viewing Hood Housing. Viewing Hoods longer than 10-Port will contain multiple Glass Panes; slightly elevate the Top End of the Viewing Hood Housing to slide out the remaining Glass Panes. Store the Glass Pane(s) such to protect them against inadvertent damage while removed from the Viewing Hood.
3. Remove the Viewing Alignment Sight (Item 6) by GENTLY pulling the Alignment Sight straight outward from the Viewing Hood.
4. If required, remove the Upper End Cap (Item 4) and the Vent Plate (Item 3) from the Viewing Hood Housing by unthreading and removing the four (4) Cap Screws (Items 8) from the Upper End Cap; lift off the Upper End Cap and Vent Plate. NOTE: Beneath the Vent Plate are pieces of compressible Cushioning Cord (Items 29 & 30) that serve to remove all excess internal space between the Viewing Alignment Sight, Viewing Lens Glass Pane(s) and the Vent Plate resulting from unavoidable manufacturing tolerances. The Cushions are to prevent movement and greatly reduce the potential for damage to the Internal Components when handling the Viewing Hood Assembly; DO NOT LOSE THE CUSHIONS.
5. Remove the Side Panels (Items 7) having the permanently attached Latches (Items 23) from the Viewing Hood Housing by unthreading the Hex Nuts (Items 28) and removing the Lock Washers (Items 27). Lift off the Side Panels from the Cap Screws (Items 26) projecting from the Viewing Hood Housing. Remove the Cap Screws by sliding them along the length and out from the End of the Internal Channel of the Viewing Hood Housing.

Inspection/Cleaning/Replacement of Viewing Hood Components – Perform the following inspections of the Components; clean or replace Components as necessary according to the instructions. Should replacement parts be needed, they can be identified and ordered by part number from Figure 5 Parts List in this Manual.

1. Viewing Lens Glass Pane(s) – Inspect the Viewing Lens Glass Pane(s) (Item(s) 17) for damage; if damage is evident or fractures are observed replace the Pane(s). If the Pane(s) are intact, clean them using common non-abrasive household glass cleaning solution and a cloth or paper towels. Take care not to saturate the Protective Tape affixed to the perimeter of the Pane(s) with the glass cleaning solution. Should the Protective Tape be missing, damaged or no longer adhering to Glass Edges, it can be replaced with a SINGLE LAYER of THIN masking-type tape suitable for a continuous exposure temperature of 185° F. (85° C.).
2. Viewing Alignment Sight - Inspect the Viewing Alignment Sight (Item 6); it must be flat (not bent). Clean away dust or debris that may have collected on the surface and in the Slot Openings using a cloth and a benign cleaning solution. Clean, dry compressed can be used to blow away dust.
3. Viewing Hood Housing, Side Panels, Vent Plate & End Caps – To maximize heat dissipation, use a cloth and a benign cleaning solution to remove a heavy accumulation of dirt, grime, oil, etc., from the Viewing Hood Housing, Side Panels (Items 7), Vent Plate (Item 3) and Upper and Lower End Caps (Items 4 & 5A). Use clean, dry compressed air to blow out dust/debris from all Vent Openings.

Viewing Hood Components Reassembly – The following instructions assume that the entire Viewing Hood is to be reassembled; skip over the instructions that are not pertinent to the inspection or repair being completed.

1. Attach Side Panels to Viewing Hood Housing - Align Hex Flats of the Cap Screws (Items 26) with the Internal Channel Slot in the End of the Viewing Hood Housing (Item 2) and slide-in the quantity of screws corresponding to the quantity of Bolt Holes in the Side Panel (Item 7). Orient the first Side Panel being attached as shown in Figure 1, place it against the Side of the Viewing Hood Housing next to where the Cap Screws are projecting from the Housing and align the Bottom Edge of the Side Panel with the Bottom Edge of the Viewing Hood Housing. Reposition the Cap Screws to line-up with the Panel Bolt Holes. Engage the Panel Bolt Holes with the Cap Screws then install Lock Washers (Items 27) onto the Cap Screws. Thread Hex Nuts (Items 28) onto the Cap Screws. While maintaining alignment of the Bottom Edges of the Side Panel and the Housing, tighten the Hex Nuts to 30 in-lbs. applied torque – DO NOT OVER-TIGHTEN. Repeat this process for the attaching the remaining Side Panel to the Opposite Side of the Viewing Hood Housing.
2. Install Viewing Alignment Sight – Orient the Viewing Alignment Sight (Item 6) with the Notched End facing downward toward the Bottom of the Viewing Hood; the Notch is so that the End of the Alignment Sight clears the Raised Boss in the Center of the Lower End Cap (Item 5A) when attached. Align the Edges of the Alignment Sight with the Narrow Slots located NEAR THE CENTER of the Viewing Hood Housing as shown in Figure 5 Parts List and carefully slide it completely into the Housing.
3. Install Viewing Lens Glass Pane(s) Having Taped-Protected Edges – A Viewing Hood longer than 10-Port will have multiple Viewing Lens Glass Panes (Items 17) that may be of unequal lengths. When installed, the relative positioning of the unequal length Glass Pane(s) has no effect on the Viewing Hood function however it is recommended that the longer Panes be installed such that they will be nearest to the Bottom End of the Viewing Hood Assembly.
  - A. NOTICE that one Side of the Viewing Lens Glass Pane is clear and the other is “frosted” (grit-blasted). For proper Viewing Hood function, the Glass Pane(s) MUST be oriented with the Frosted Side facing the Viewing Slots in the Viewing Hood Housing.
  - B. CAREFULLY align and install the Glass Pane(s) into the Slots located next to the machined Slotted Openings in the Wall of the Viewing Hood as shown in Figure 5 Parts List.
4. Fasten Lower End Cap to Viewing Hood Housing – Apply lubricant to the four (4) Cap Screws (Items 8) according to *DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY – Important Disassembly/Reassembly Notes* Section in this Manual; set Cap Screws aside for later use.
  - A. The Diagonal Edge of the Lower End Cap (Item 5A) MUST be oriented the direction shown in the Top View of Figure 1 (the Upper End Cap (Item 4), Vent Plate (Item 3) and the Lower End Cap are all positioned with their Diagonal Edge oriented in the same direction). When correctly oriented, the Longer Side of the Lower End Cap will be positioned on the “Front Side” of the Viewing Hood Housing (Item 2); this is the Side OPPOSITE that having the Viewing Hood Nameplate (Item 14) (refer to Figure 1).
  - B. Align the Bolt Holes of the Lower End Cap with those in the End of the Viewing Hood Housing and engage the Lower End Cap Panel Guide Slots with the Bottom Edges of the Side Panels (Items 7). Install the for (4) previously lubricated Cap Screws (Items 8) thru the Lower End Cap Bolt Holes and thread into the Viewing Hood Housing. Tighten the Cap Screws hand-tight.
5. Install Cushion Cords, Vent Plate and Upper End Cap – It is highly recommended that the Viewing Hood Sub-assembly to be oriented upright in its normal operating position when installing these Components. Apply lubricant to the four (4) Cap Screws (Items 8) according to *DISASSEMBLY/PARTS REPLACEMENT/REASSEMBLY – Important Disassembly/Reassembly Notes* Section in this Manual; set Cap Screws aside for later use.
  - A. Apply finger-pressure to the Top End of the Viewing Alignment Sight (Item 6) and also to the Viewing Lens Glass Pane(s) (Item(s) 17) to ensure that they are firmly resting against the Inside Surface of the Lower End Cap (Item 5A).
  - B. Insert the Cushioning Cord Strips (Items 29 & 30) into the Slots of the Viewing Hood Housing (Item 2) and against, 1) the Top Edge of the Viewing Alignment Sight (Item 6) and, 2) the Top Edge of the Glass Pane. Generally, shorter length illuminators/viewing hoods require more than one Cushioning Strip to be inserted into each Slot. When correctly installed, the top of the Cushioning Strip(s) will be approximately flush with the Top End of the Viewing Hood Housing. The objective is to fill all or most of the void (empty space) between the Top Ends of the Internal Components and, when fastened in place, the Underside of Upper End Cap (Item 4) to prevent movement and potential damage to the Internal Components during shipping and handling.
  - C. The Diagonal Edges of the Vent Plate (Item 3) and Upper End Cap (Item 4) MUST be oriented the direction shown in the Top View of Figure 1. When correctly oriented, the Longer Side of both Parts will be positioned on the “Front Side” of the Viewing Hood Housing; this is the Side OPPOSITE that having the Viewing Hood Nameplate (Item 14) (refer to Figure 1).
  - D. Align the Bolt Holes of the Vent Plate with those in the End of the Viewing Hood Housing and engage the Panel Guide Slots of the Vent Plate with the Top Edges of the Side Panels (Items 7). Place the Upper End Cap on top of the Vent Plate and align the Bolt Holes. Install the four (4) previously lubricated Cap Screws (Items 8) thru the Bolt Holes of the Upper End Cap and Vent Plate and thread into the Viewing Hood Housing. Tighten the Cap Screws hand-tight.

## POWER SUPPLY AND FITTINGS REMOVAL/REATTACHMENT

The STBI-3000A Illuminator has two (2) available Power Supplies; the Standard NEMA 4X (Weatherproof and corrosion resistant) Unit and the Optional Hazardous Locations (Intrinsically safe and explosion-proof, Class I, Division 1, Groups B, C & D) Unit. As shown in Figure 5 Parts List, the

Electrical Cable Fittings arrangements are different. If unsure which Unit is installed, refer to “STBI-3000A Illuminator & Viewing Hood”, Para. 4.B on Page 4 of this Manual that explains how to determine Power Supply Unit identification.

There are no user serviceable Components inside the Power Supply Units. In the event of a failure, the entire Power Supply Unit must be replaced. The following instructions describe the procedures for removal and reattachment of the Power Supply Unit and Primary Electrical Cable. See *INSTALLATION*, Para. 4 on Page 4 of this Manual for instructions on connecting the input power source to the Power Supply Unit

**CAUTION: NEVER remove, attach, service or repair the Power Supply Unit or its associated Hardware (Electrical Cable, Conductor Wire Leads, Fittings, Cover, etc.), without first shutting-off and locking-out the input power source to the Power Supply Unit to prevent inadvertent electrical energizing. Failure to abide to this warning can result in serious personal injury or death. Depending on the specific configuration of the wiring (connections and encasements) external to the Power Supply Unit, it may be necessary to disconnect/reconnect electrical hardware connections. It is the user's responsibility to ensure that electrical servicing procedures are performed by a Qualified Electrician and complies with applicable industrial electrical Codes (USA: Refer to National Electrical Code NFPA current edition; Canada: Refer to Canadian Electrical Code CSA C22) having jurisdictional authority for the installation type and location as applicable.**

The following procedures assume that all rigidly-mounted electrical encasements have been removed such that the Power Supply Unit is being held in its position by only the Power Supply Enclosure/Illuminator Fasteners and is free to move when Fasteners are loosened/removed.

#### Standard NEMA 4X Power Supply Unit and Electrical Cable Removal

1. Loosen both Nuts of the Union Elbow (Item 15A2). While providing hand-support to the Bottom of the Power Supply Enclosure, loosen the retaining Set Screw threaded into its Enclosure. Slide the Power Supply Unit along the side of the Illuminator Housing (Item 1) away from the Elbow far enough to disengage the Tube Fitting installed in the Top Cap of the Power Supply Housing from the Union Elbow and expose the Electrical Cables Connection Junction. While holding the Power Supply in this position, temporarily retighten the Set Screw. Disconnect the Electrical Cables by pressing inward the Locking Tab of the Connector on the End of the Cable coming from the Power Supply while pulling apart the End Connectors of both Cables. Loosen the Enclosure Set Screw and slide the Power Supply Unit along the Side of and off of the Illuminator Housing.
2. To remove the Primary Electrical Cable, the Illuminator must be partially disassembled; Cap Screws (Item 8), Lower End Cap (Item 5A or 5B) and LED Circuit Board(s)/Brackets Assembly (Items 18, 12 &, as applicable, Item 19) must be removed from the Illuminator Housing (Item 1). See “Illuminator Components Disassembly” Section in this Manual for instructions. With these Components removed, remove the Union Elbow (Item 15A2) from the Tube Adapter (Item 15A1) while GENTLY simultaneously pulling out the Cable; reach inside the Illuminator Housing to access Cable to help feed it back thru the Tube Adapter. GENTLY pull the SMALL FEMALE CONNECTOR END of the Cable thru the Elbow to remove (the large Male Connector End of the Cable will NOT pass thru the Elbow).

#### Inspect Primary Electrical Cable

Inspect the Primary Electrical Cable (Item 9) for abrasion, cracks and missing insulation (exposed Bare Wires). Inspect the End Connectors for cracks and loose wire insertions; replace Cable if necessary. If reusing the Cable, be certain that the End Connectors are free of dust/debris; use clean, dry compressed air to clean. Should replacement parts be needed, they can be identified and ordered by part number from Figure 5 Parts List in this Manual.

#### Standard NEMA 4X Power Supply Unit and Electrical Cable Installation

1. About 1” beyond the End of the SMALL FEMALE CONNECTOR, bend the Primary Electrical Cable (Item 9) approximately 90° then GENTLY push it thru the Union Elbow (Item 15A2), and from the Elbow thru the Tube Adapter (Item 15A1) installed in the Side of the Illuminator Housing (Item 1). Slide the Elbow onto the Tube Adapter. GENTLY pull the Cable the remaining distance thru the fittings and into the Illuminator Housing Interior until only the Full Length of the LONG MALE CONNECTOR END remains exposed from the End of the Elbow as shown in Figure 5 Parts List. Where the Cable enters the Interior of the Illuminator Housing (just beyond the Hex Pipe Nut (Item 10)), make a small bend in the Cable then route the Cable along the Inside of the Illuminator Housing Wall Channel to the Bottom End and out of the Illuminator Housing. See “Illuminator Components Assembly” Section in this Manual for connecting the Cable to the Illuminator.
2. Orient the Power Supply Unit with its Tube Adapter Fitting (threaded into the Enclosure Upper Cap) facing toward the Union Elbow (Item 15A2) of the Illuminator and engage the Rails of the Power Supply Enclosure with the Slots on the Side of the Illuminator Housing. Slide the Power Supply Enclosure along the Side of the Housing until about 2” from the End Connector of the Primary Electrical Cable (Item 9) projecting from the Elbow; temporarily tighten the Set Screw in the Power Supply Enclosure to maintain this position.

3. Bring the Connector Ends of the Primary Electrical Cable and the Power Supply Cable together and connect the two Cables. NOTE: The End Connectors of the Electrical Cables are directional and have ONE correct orientation to fully engage and lock into each other. If the End Connectors do not initially fully engage and lock, rotate one of them 90° and retry.
4. While providing hand-support to the Bottom of the Power Supply Enclosure, loosen the retaining Set Screw threaded into the Enclosure. Slide the Power Supply Unit along the side of the Illuminator Housing and engage the Tube Adapter Fitting of the Power Unit about 1/2 of

its length with the Union Elbow (thereby concealing the Cables Connection Junction). Hold the Power Supply Unit in this position and tighten the Enclosure Set Screw snug. Tighten both Nuts of the Union Elbow.

#### Optional Hazardous Locations Power Supply Unit and Electrical Cable Removable

1. While providing hand-support to the Bottom of the Power Supply Enclosure, loosen the retaining Set Screw threaded into the Enclosure. Slide the Power Supply Unit along the side of the Illuminator Housing (Item 1) until several inches away from Power Supply Cover (Item 15B3) to expose the Electrical Cables Connection Junction. While holding the Power Supply in this position, temporarily retighten the Set Screw. Disconnect the Electrical Cables by pressing inward the Locking Tab of the Connector on the End of the Cable coming from the Power Supply while pulling apart the End Connectors of both Cables. Loosen the Enclosure Set Screw and slide the Power Supply Unit along the Side of and off of the Illuminator Housing.
2. To remove the Primary Electrical Cable, the Illuminator must be partially disassembled; Cap Screws (Item 8), Lower End Cap (Item 5A or 5B) and LED Circuit Board(s)/Brackets Assembly (Items 18, 12 &, as applicable, Item 19) must be removed from the Illuminator Housing (Item 1). See "Illuminator Components Disassembly" Section in this Manual for instructions. With these Components removed, GENTLY feed the LARGE MALE CONNECTOR END of the Cable (Item 9) thru the Cable Guard Fitting (Item 15B1) located inside the Power Supply Cover on the side of the Illuminator Housing (Item 1). Reach inside the Illuminator Housing and remove the Cable from the Illuminator.

#### Inspect Primary Electrical Cable

Inspect the Cable Insulation for abrasion, cracks and missing insulation (exposed Bare Wires). Inspect the End Connectors for cracks and loose wire insertions; replace Cable if necessary. If reusing be certain that the End Connectors are free of dust/debris; use clean, dry compressed to clean. Should replacement parts be needed, they can be identified and ordered by part number from Figure 5 Parts List at the end of this Manual.

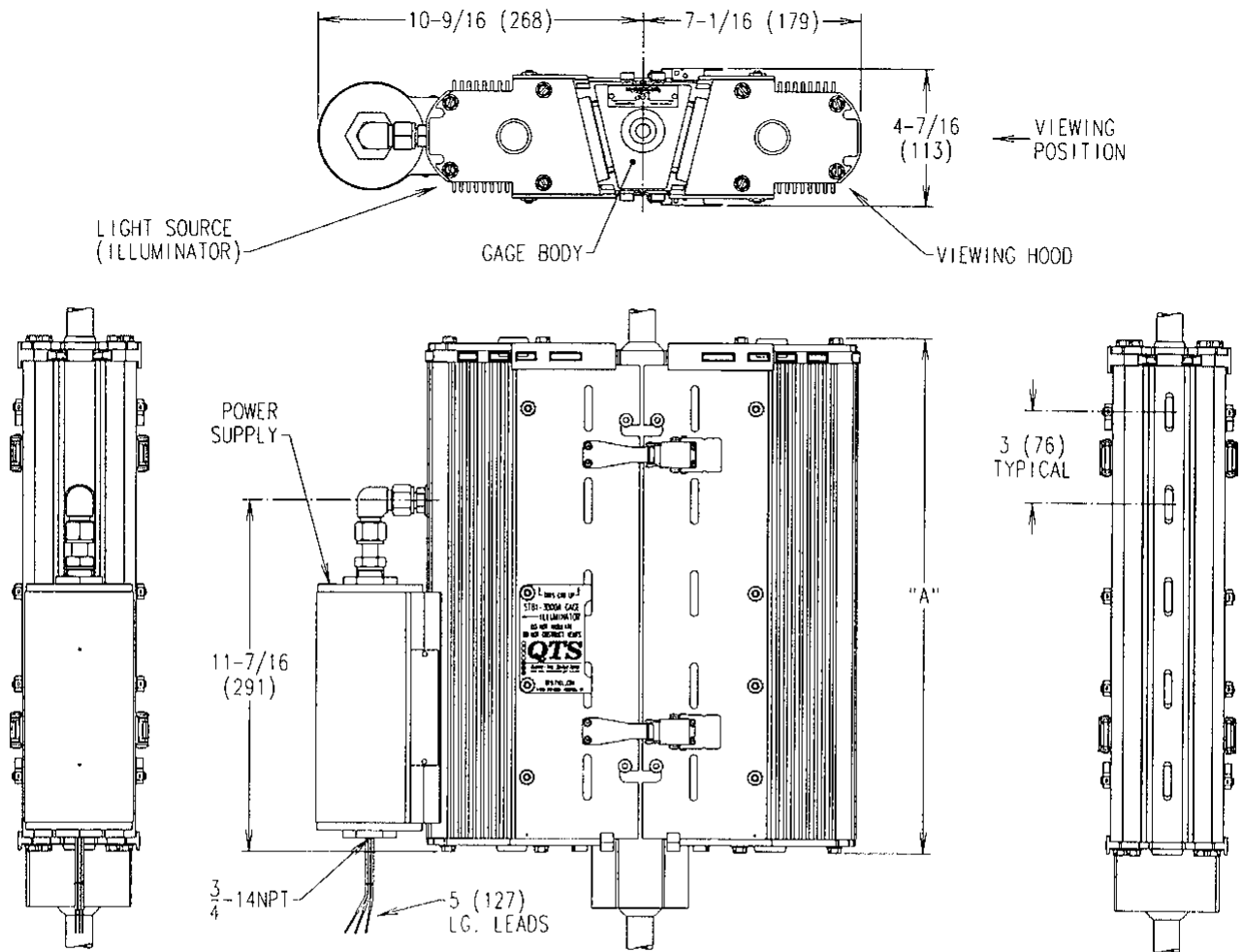
#### Optional Hazardous Locations Power Supply Unit and Electrical Cable Installation

1. From the Interior of the Illuminator Housing (Item 1), insert the LARGE MALE CONNECTOR END of the Primary Electrical Cable (Item 9) thru the Cable Guard Fitting (Item 15B1) and into the Power Supply Unit Cover (Item 15B3). GENTLY pull about 3" of Cable (that includes the length of the End Connector) into the Cover. From the inside of the Illuminator Housing where the Cable enters the Interior just beyond the Hex Pipe Nut (Item 10), make a small bend in the Cable then route the Cable along the Inside of the Illuminator Housing Wall Channel to the Bottom End and out of the Illuminator Housing. See "Illuminator Components Assembly" Section in this Manual for connecting the Cable to the Illuminator.
2. Orient the Power Supply Unit with its Electrical Cable facing toward the Power Supply Cover on the Illuminator and engage the Rails of the Power Supply Enclosure with the Slots on the Side of the Illuminator Housing. Slide the Power Supply Enclosure along the Side of the Housing until about 2" from the Cover and temporarily tighten the retaining Set Screw threaded into the Power Supply Enclosure.
3. Bring the Connector Ends of the Primary Electrical Cable and the Power Supply Cable together and connect the two Cables. NOTE: The End Connectors of the Electrical Cables are directional and have ONE correct orientation to fully engage and lock into each other. If the End Connectors do not initially fully engage and lock, rotate one of them 90° and retry. Tuck excess Cable up inside the Center of the Cover such that the Cable will not be pinched when the power Supply Unit is positioned against the Cover.
4. While providing hand-support to the Bottom of the Power Supply Enclosure, loosen the retaining Set Screw threaded into the Enclosure. Slide the Power Supply Unit along the side of the Illuminator Housing and engage the Top Cap of the Power Supply Enclosure with the Cover. Hold the Power Supply Unit in this position and tighten the Enclosure Set Screw snug.

ITEM	DESCRIPTION & MATERIAL	PART NO. - QTY	ITEM	DESCRIPTION & MATERIAL	PART NO. - QTY	
1	HOUSING ILLUMINATOR 6061-T6 ALUMINUM ALLOY/ANODIZED	4-PART 1-306-63-040 - P100-3 5-PART 1-306-63-050 - P100-3 6-PART 1-306-63-060 - P100-3 7-PART 1-306-63-070 - P100-3 8-PART 1-306-63-080 - P100-3 9-PART 1-306-63-090 - P100-3 10-PART 1-306-63-100 - P100-3 11-PART 1-306-63-110 - P100-3 12-PART 1-306-63-120 - P100-3 13-PART 1-306-63-130 - P100-3 14-PART 1-306-63-140 - P100-3 15-PART 1-306-63-150 - P100-3 16-PART 1-306-63-160 - P100-3 17-PART 1-306-63-170 - P100-3 18-PART 1-306-63-180 - P100-3 19-PART 1-306-63-190 - P100-3 20-PART 1-306-63-200 - P100-3 21-PART 1-306-63-210 - P100-3 22-PART 1-306-63-220 - P100-3 23-PART 1-306-63-230 - P100-3 24-PART 1-306-63-240 - P100-3 25-PART 1-306-63-250 - P100-3 26-PART 1-306-63-260 - P100-3 27-PART 1-306-63-270 - P100-3 28-PART 1-306-63-280 - P100-3 29-PART 1-306-63-290 - P100-3 30-PART 1-306-63-300 - P100-3	1	6	STIFF VIEWING ALUMINUM 6061-T6 ALUMINUM ALLOY	4-PART 1-306-63-042 - P100-15 5-PART 1-306-63-052 - P100-15 6-PART 1-306-63-062 - P100-15 7-PART 1-306-63-072 - P100-15 8-PART 1-306-63-082 - P100-15 9-PART 1-306-63-092 - P100-15 10-PART 1-306-63-102 - P100-15 11-PART 1-306-63-112 - P100-15 12-PART 1-306-63-122 - P100-15 13-PART 1-306-63-132 - P100-15 14-PART 1-306-63-142 - P100-15 15-PART 1-306-63-152 - P100-15 16-PART 1-306-63-162 - P100-15 17-PART 1-306-63-172 - P100-15 18-PART 1-306-63-182 - P100-15 19-PART 1-306-63-192 - P100-15 20-PART 1-306-63-202 - P100-15 21-PART 1-306-63-212 - P100-15 22-PART 1-306-63-222 - P100-15 23-PART 1-306-63-232 - P100-15 24-PART 1-306-63-242 - P100-15 25-PART 1-306-63-252 - P100-15 26-PART 1-306-63-262 - P100-15 27-PART 1-306-63-272 - P100-15 28-PART 1-306-63-282 - P100-15 29-PART 1-306-63-292 - P100-15 30-PART 1-306-63-302 - P100-15
2	HOUSING VIEWING HOOD 6061-T6 ALUMINUM ALLOY/ANODIZED	4-PART 1-306-63-041 - P100-4 5-PART 1-306-63-051 - P100-4 6-PART 1-306-63-061 - P100-4 7-PART 1-306-63-071 - P100-4 8-PART 1-306-63-081 - P100-4 9-PART 1-306-63-091 - P100-4 10-PART 1-306-63-101 - P100-4 11-PART 1-306-63-111 - P100-4 12-PART 1-306-63-121 - P100-4 13-PART 1-306-63-131 - P100-4 14-PART 1-306-63-141 - P100-4 15-PART 1-306-63-151 - P100-4 16-PART 1-306-63-161 - P100-4 17-PART 1-306-63-171 - P100-4 18-PART 1-306-63-181 - P100-4 19-PART 1-306-63-191 - P100-4 20-PART 1-306-63-201 - P100-4 21-PART 1-306-63-211 - P100-4 22-PART 1-306-63-221 - P100-4 23-PART 1-306-63-231 - P100-4 24-PART 1-306-63-241 - P100-4 25-PART 1-306-63-251 - P100-4 26-PART 1-306-63-261 - P100-4 27-PART 1-306-63-271 - P100-4 28-PART 1-306-63-281 - P100-4 29-PART 1-306-63-291 - P100-4 30-PART 1-306-63-301 - P100-4	1	7	PANEL SIDE ILLUMINATOR & VIEWING HOOD 6061-T6 ALUMINUM ALLOY	4-PART 1-306-63-043 - P100-8-4 5-PART 1-306-63-053 - P100-8-5 6-PART 1-306-63-063 - P100-8-6 7-PART 1-306-63-073 - P100-8-7 8-PART 1-306-63-083 - P100-8-8 9-PART 1-306-63-093 - P100-8-9 10-PART 1-306-63-103 - P100-8-10 11-PART 1-306-63-113 - P100-8-11 12-PART 1-306-63-123 - P100-8-12 13-PART 1-306-63-133 - P100-8-13 14-PART 1-306-63-143 - P100-8-14 15-PART 1-306-63-153 - P100-8-15 16-PART 1-306-63-163 - P100-8-16 17-PART 1-306-63-173 - P100-8-17 18-PART 1-306-63-183 - P100-8-18 19-PART 1-306-63-193 - P100-8-19 20-PART 1-306-63-203 - P100-8-20 21-PART 1-306-63-213 - P100-8-21 22-PART 1-306-63-223 - P100-8-22 23-PART 1-306-63-233 - P100-8-23 24-PART 1-306-63-243 - P100-8-24 25-PART 1-306-63-253 - P100-8-25 26-PART 1-306-63-263 - P100-8-26 27-PART 1-306-63-273 - P100-8-27 28-PART 1-306-63-283 - P100-8-28 29-PART 1-306-63-293 - P100-8-29 30-PART 1-306-63-303 - P100-8-30
3	CASTING VENT PLATE A356-T6 ALUMINUM ALLOY/PAINTE	1-306-63-016 - P100-10	2			
4	CAP END UPPER SOLID W/O PANEL COUDES A356-T6 ALUMINUM ALLOY/PAINTE	1-306-63-020 - P100-7	2			

Figure 5. (Page 2 of 3) STBI-3000A Bi-color Illuminator & Viewing Hood Parts List





ILLUMINATOR SIZE		DIMENSION A		ILLUMINATOR SIZE		DIMENSION A		ILLUMINATOR SIZE		DIMENSION A	
Model No.	Ports	inches	mm	Model No.	Ports	inches	mm	Model No.	Ports	inches	mm
STBI-3000A-04	4	13-3/4	349	STBI-3000A-13	13	40-3/4	1035	STBI-3000A-22	22	67-3/4	1721
STBI-3000A-05	5	16-3/4	425	STBI-3000A-14	14	43-3/4	1111	STBI-3000A-23	23	70-3/4	1797
STBI-3000A-06	6	19-3/4	502	STBI-3000A-15	15	46-3/4	1187	STBI-3000A-24	24	73-3/4	1873
STBI-3000A-07	7	22-3/4	578	STBI-3000A-16	16	49-3/4	1264	STBI-3000A-25	25	76-3/4	1949
STBI-3000A-08	8	25-3/4	654	STBI-3000A-17	17	52-3/4	1340	STBI-3000A-26	26	79-3/4	2026
STBI-3000A-09	9	28-3/4	730	STBI-3000A-18	18	55-3/4	1416	STBI-3000A-27	27	82-3/4	2102
STBI-3000A-10	10	31-3/4	806	STBI-3000A-19	19	58-3/4	1492	STBI-3000A-28	28	85-3/4	2178
STBI-3000A-11	11	34-3/4	883	STBI-3000A-20	20	61-3/4	1568	STBI-3000A-29	29	88-3/4	2254
STBI-3000A-12	12	37-3/4	959	STBI-3000A-21	21	64-3/4	1645	STBI-3000A-30	30	91-3/4	2330

Figure 6. Installation Dimensions - STBI-3000A Bi-color Illuminator & Viewing Hood Assembly with Standard NEMA 4X Power Supply Unit

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