



Innovative Photonics

# Illumination Technologies, Inc.

*Owner's Manual*

## Model 3900e

Light Feedback Regulated Tungsten Halogen source



- ✚ **Manual or Serial Control (RS-232, USB, or Ethernet options)**
- ✚ **Light Feedback Optical Stabilization (~0.1% short term)**
- ✚ **Compact Form Factor**
- ✚ **Sophisticated Full Operating Lamp Lifetime Algorithm**
- ✚ **Front Panel Lamp Lifetime Indicator LED (3 color)**
- ✚ **Analog Signal Gauge Lamp Lifetime Indicator (0-5VDC)**
- ✚ **Automatic Lamp Characterization and Calibration**



CAUTION:

To reduce risk of electric shock, do not operate in wet or damp areas. Disconnect power before relamping or servicing.



WARNING:

To prevent risk of fire or burns, replace only with fuses and lamps listed on rear of unit. Let lamp cool before relamping.

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### Safety Instructions

#### CAUTION:

- **Read all of these instructions before operating the unit.**
- **Follow all warnings and instructions on this piece of equipment**
- **Failure to use this equipment in the manner specified in this manual may cause the protection features of the unit to be impaired.**

1. **Retain Instructions** - All safety and operating instructions should be retained for future reference.
2. **Follow Instructions** - All operating and use instructions should be followed.
3. **Water and Moisture** - The unit should not be used near water, or in any area where excessive moisture may come in contact with the unit.  
  
**Eau Et Moisissure:** Le système ne doit pas être utilisé près de l'eau, ou dans un environnement où la moisissure pourrait venir en contact avec le système.
4. **Mounting** - The unit should be mounted horizontally on a surface or platform, or vertically via fixture only as recommended by the manufacturer. **Never mount with fiber receptacle pointing down.**
5. **Ventilation** - The unit should be positioned such that its surroundings do not interfere with its proper ventilation. **Ensure that there is adequate air flow below (intake) and in the rear (exhaust) of the unit.**
6. **Heat** - The unit produces heat and infrared radiation. Do not place flammable materials on or near the unit at any time. Keep unit away from other sources of heat. Always allow time for the lamp and all surfaces surrounding the bulb to cool before attempting to replace lamp.  
  
**Chaleur:** Le système développe de la chaleur et des radiations infrarouge. Ne pas placer de matériaux inflammables sur le système ou proche quelquesoit le moment. Toujours prévoir du temps pour la lampe et les surfaces avoisinant la lampe pour refroidir avant d'essayer de remplacer la lampe.
7. **Power Source** - The unit should be connected to a power source only of the type described in the operating instructions and as indicated by the power entry module.
8. **Grounding** - Precautions should be taken to ensure that proper grounding of the unit is assured.
9. **Power Cord** - Use only the approved power cord supplied with the unit, or an equivalent IEC 320 power cord with proper certifications. Power cord should be routed such that it will not be pinched, severed or walked on.
10. **Fuse** - DO NOT DEFEAT FUSE. Replace only with fuses as described in the operating manual and as marked on the unit for the operating voltage that the unit is set for.
11. **Cleaning** - The unit should be externally cleaned using only standard glass type cleaners. Do not use solvents, cleansers or petroleum distillates. Disconnect power cord before performing any cleaning operations.
12. **Liquid and Object Entry** - Care should be taken to avoid objects falling into, or liquids being spilled into the enclosure through openings.
13. **Nonuse Periods** - Disconnect power cord from outlet when unit will be left unused for a long period.
14. **Damage Requiring Service** - The unit should be serviced by qualified service personnel if it exhibits any marked change in performance; if the power cord or enclosure has been damaged; or if objects or moisture have entered the unit.
15. **Servicing** - The user should not service the unit beyond that described in this manual. All other servicing should be referred to qualified service personnel. Disconnect power cord before performing any service on the unit.
16. Cover must be removed to replace the lamp. Never remove cover before disconnecting the IEC 320 power cord.

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### Description

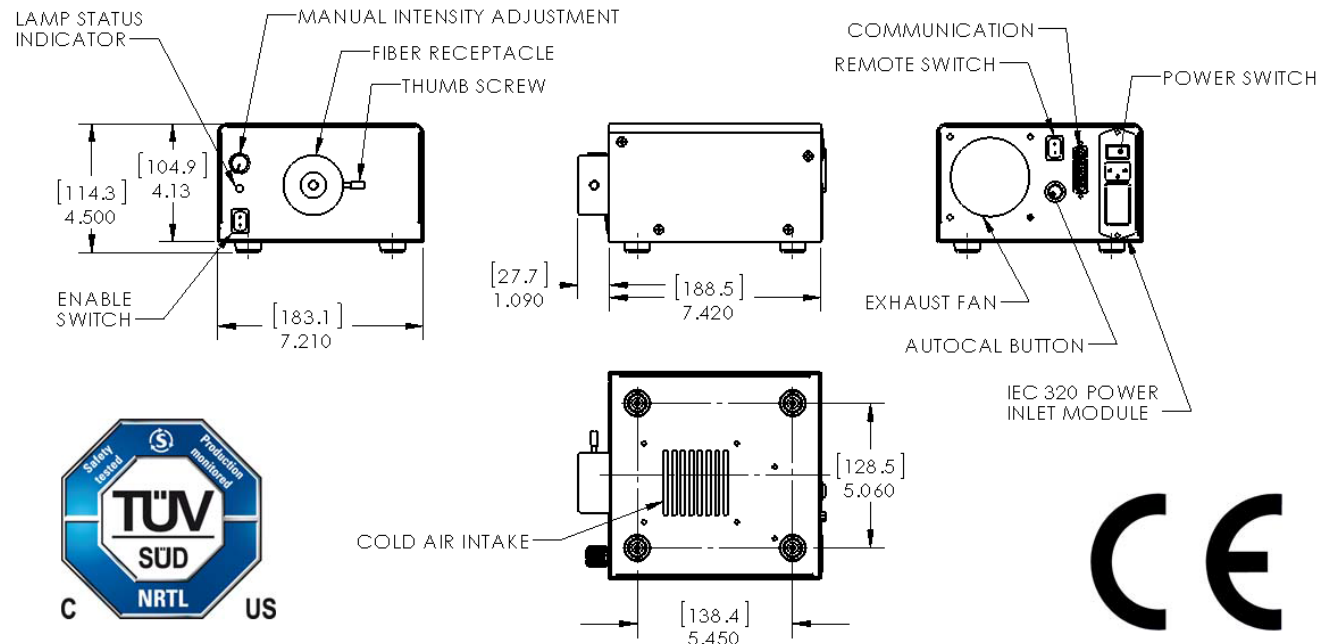
The figure below reveals the main features for this unit. On the front panel there is a fiber optic receptacle with a retaining thumbscrew that locks the fiberoptic accessories into the receptacle. In manual mode, the intensity of the lamp is controlled by the manual intensity adjustment potentiometer, and the power to the lamp is controlled by the front panel Lamp enable switch. When the Lamp Enable switch is in the “0” position, power to the lamp is removed, however the internal electronics and cooling systems are still powered. Since this unit is equipped with a remote interface controller, the rear panel will have the appropriate interface connector installed, along with a remote switch for selecting between manual operating mode (“0”) and remote operating mode (“1”). In the serial remote control mode the lamp enable and intensity control are adjusted by digital commands through the rear panel connector. In this mode, the front panel potentiometer and the front panel lamp switch are disabled. A lamp status indicator LED is visible on the middle left side.

An IEC 320 power inlet module is located on the rear panel. This IEC 320 module provides an internationally accepted power interface that can be used with a variety of power cords. The power entry module contains the main power switch and the fuse box. The fuse holder allows the use of dual European fuses (5x20mm). In order to access the fuses the power cord must be removed.

**Lamp Replacement:** Remove the 8 flat head screws on the cover and slide the cover towards the rear of the unit and upward to access the lamp for replacement.

**WARNING:** Cover must never be removed before disconnecting the IEC 320 power cord.

The unit can be permanently mounted by removing the feet. This can be done as long as adequate airflow below (intake) and in the rear (exhaust) of the unit is observed. Use M4 hardware and ensure a minimum of 10mm clearance under the base to allow for proper cooling. Never mount the receptacle pointing down.

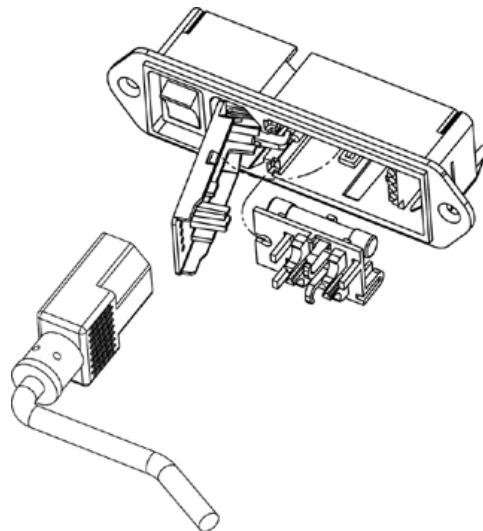


**Fig 1 – 3900e Lightsource**

### Power Supply

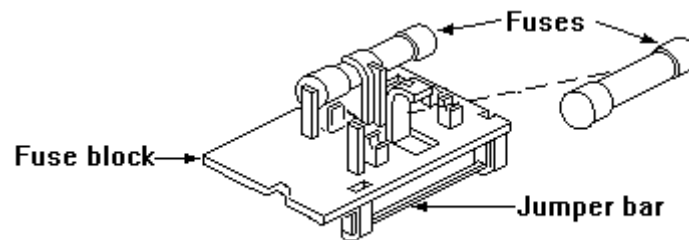
An IEC 320 power inlet module is located on the rear panel. This module provides an internationally accepted power interface that can be used with a variety of power cords. The power entry module contains the main power switch and the fuse box. The fuse holder allows the use of dual 5x20mm fuses. In order to access the fuses, the power cord must be removed.

To change the fuses, start by removing the power cord. Insert a small flat blade screwdriver into one of the notches near the socket and gently pry the door open. Pull the door straight out and swing it into the socket (see Figure 2). Lift the fuse holder out of the housing. Replace the fuses with T2.0 Amp, 5x20mm, size fuses. The fuses should be placed in the fuse holder as shown in Figure 2. Lift the fuse holder out of the housing.



**Fig 2 - IEC 320 Power Entry Module**

Replace fuses with T2.0 Amp, 5x20mm fuses. The fuses should be placed in the fuse holder as shown in Figure 3. Replace the holder in the housing such that the fuses enter first. Swing the door closed and snap it back into place.



**Fig 3 - Fuse Arrangement**



### Description

The unit uses a new high efficiency current controller which controls the current through the lamp filament, as opposed to the voltage drop across the lamp. This control method provides much longer lamp lifetimes, and virtually eliminates unexpected lamp burnout.

The current controller is regulated by an internal optical photometer that samples the light emitted from the lamp, and makes micro adjustments to the current controller every few seconds. This provides excellent photonic stability over the entire lifetime of the lamp. The photometer is temperature compensated to ensure stable and repeatable performance over a wide operating temperature range.

An embedded microcontroller controls all functions, including the light feedback system. This is the first full digital light feedback system – there are no longer any analog feedback loops to adjust or change with time. The microcontroller also makes precision real time measurements to assess the lifetime and/or operating condition of the lamp. As the lamps ages, sophisticated algorithms are able to accurately report the status of the lamp, and when it needs to be replaced.

This unit uses an EKE lamp (exact spectral output of which varies depending on the lamp option) which has been specifically designed to provide stable spectral envelope over its entire lifetime – which is about 500 hours. There are two indicators for the lamp lifetime. The first is a front panel tri-color LED. When the lamp is new and in good condition, the LED on the front panel will remain GREEN. As the lamp ages, it will eventually begin to show signs of aging. At about 250-350 hours the lamp will begin to exhibit measureable signs of aging and the LED will turn YELLOW. From around 450-600 hours of operations the lamp will begin to degrade further, and the LED will turn RED. After 600-700 hours the lamps may exhibit erratic behavior and the LED will flash RED.

Similarly, the analog lifetime signal provides a real time measure of the lamp condition. This continuous signal provides a better indicator gauge than the LED “idiot light” but is controlled by the same microprocessor algorithm. When the lamp is new the signal will generally be at or below 1.5 Volts. Once the signal rises above 3VDC the front panel indicator LED will be turned to YELLOW. Once the signal rises about 4VDC the front panel indicator LED will be turned to RED. Once the signal rises about 5VDC the front panel indicator LED will be turned to FLASHING RED.

Once the LED is RED, or FLASHING RED, or the Analog Signal has reached 5VDC, the user may want to change the lamp to ensure that the unit will still continue to meet the optical output specifications. To replace the lamp, remove the cover screws and take the cover off the unit. Eject the old lamp and put a new lamp in the lamp bracket, assuring that the lamp is fully seated in the bracket and the electrical socket. Replace the cover and the screws, and then power up the unit. Depress the “CAL” button on the rear of the unit. The microcontroller will perform a number of automated functions on the new lamp, including a characterization and a calibration. **This process will begin after a 90 minute “burn-in” of the new lamp, while the LED will flash YELLOW.**

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The unit will first characterize the new lamp, so that it has a good reference from which to make accurate lifetime predictions. During this process the indicator LED flashes YELLOW.

The unit will then calibrate the lamp so that the optical output is very near the output level of the previous lamp. This helps keep the output similar to the analog control recipes used by the host computer or PLC. During this process the indicator LED flashes RED.

The unit will take a few moments to complete the above routines, and once completed the indicator LED will turn GREEN and the unit will be ready to operate. The "CAL" button should only be pressed when a new lamp is installed, to ensure that the lamp lifetime can be accurately reported.

Once the unit is calibrated, the intensity of the lamp may be controlled by the analog intensity potentiometer (if in manual mode). If the user wishes to control the unit via a computer, please see the section entitled "Operations".

The light output is highly linear with respect to both the analog and the remote signal (see lightsource certification document). The system is fully digital in its control scheme, and the analog intensity control signal actually sets a software intensity value which is then used by the microcontroller as the light feedback set point. For best performance, ensure that this analog control signal is free from noise and is shielded from external EMI or RFI.

During operation, the lamp may be shut down by simply turning off the enable (if in manual mode). If using the source in Remote mode, Please see the section entitled "Operations".

### RADIO AND TELEVISION INTERFERENCE

**NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.**

**In order to maintain compliance with FCC regulations shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.**



### Specifications

#### Physical:

- Overall Dimensions:
  - Height: 4.50" (114 mm)
  - Width: 7.21" (183 mm)
  - Length: 7.42" (189 mm)
- Weight/Mass: 4.4 pounds (2.0 kilograms)  
(excluding power cable)
- Standard Cable Length: 8.0 feet (2.4 meters)

#### Electrical:

- Input Power: 

100-120 VAC/1.2A	50/60 Hz
200-240 VAC/0.6A	
- Short Term **Light** Stability: 0.1 % (RMS)
- Long Term **Light** Stability: < 1 %
- Power Consumption: 225 Watts (Nominal)
- Standard Lamp Type: EKE, 150 Watt, 21 Volt
- Overvoltage Category: Category II

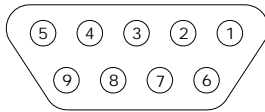
#### Environmental:

- Operating Temperature Range: 0 to 40°C
- Relative Humidity Range: 0 to 95% non-condensing
- Altitude Rating: 2000 Meters Maximum
- Pollution Rating: Pollution Degree 2



### COMMUNICATIONS

RS-232 is the standard serial interface, and it has provisions for controlling the light intensity and power to the LED lamp. The RS-232 interface is equipped with a DB-9 connection, and is wired as shown in Figure 5. It must be connected to a dedicated COM port. The USB option has a standard Mini USB receptacle (male), and creates its own COM port upon initialization, providing simple connection and multiple source control capabilities not limited by hardware.



Pin #	Description	Pin #	Description
1	Lifetime Gauge Common	6	Lifetime Gauge (0-5VDC)
2	Rx Remote Communications	7	N/A
3	Tx Remote Communications	8	N/A
4	N/A	9	N/A
5	Communications GND		

**Figure 4:** DB-9 Serial Interface as seen from Rear of Lightsource Chassis

To operate the unit in RS-232 mode, configure a serial interface cable as shown. Remember that TxD and RxD signals are reversed between devices. Plug the cable into any standard serial COM port. If your unit has been configured with the optional USB interface, connect the lightsource and computer with the enclosed USB cable. The device will automatically be configured and assigned a unique COM port. You do not need any additional drivers or installation procedures. To determine the COM port number that has been assigned to the lightsource, open 'Device Manager' and expand the 'Ports' folder and you will see the lightsource with its associated COM Port number, shown as (COMX) where "X" is the port number. The lightsource will now communicate exactly as in the RS-232 mode using this COM port.

If your unit has been configured with the optional Ethernet interface module, insert a standard RJ45 connector into the Ethernet port and connect the other end to a network switch or hub. When using the Ethernet option, a maximum of 255 units may be operated on a single network. To operate the unit in remote mode (either RS-232, USB, or Ethernet) the rear panel remote switch must be in the "1" position.

#### Software Protocols

The interface controls the light intensity and power to the LED lamp using simple ASCII character text strings. These commands are the same for the RS-232, USB, or Ethernet interface. The only difference is the way in which the ports are opened and assigned prior to issuing commands and queries. Commands tell the lightsource what to do, and are followed by the "=" character. Queries inquire about the status and are followed by the "?" character.

Query/Command	Response	Function
HEL?	Ver X.X	Retrieves Firmware Version
SSR0?	0 or 1	LED Enable is OFF (0) or ON (1)
INT0=XXXX	OK	where XXXX = 0 to 4000
SSR0=Y	OK	Where Y = 0 or 1
INP=1	OK	Sets the last INT value as the INT value at power up (Default =4000)

The intensity of the lightsource is precisely controlled in 4000 linear steps (0.25% increments) by assigning the Intensity value (INT0) an integer value from 1 to 4000. The LED may also be turned ON and OFF by assigning the SSR0 command of either "1" or "0" respectively. The default INT value at





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power up may be set by establishing the desired INT value, and then sending the command INP=1 prior to shut down. This saves the particular INT value which is then used on power up.

### COMMUNICATIONS

To test the lightsource (in either RS-232, USB, or Ethernet mode) the Microsoft® HyperTerminal software can be easily configured to test the lightsource functions. Make sure you set the program to “Echo Characters.”

For serial interface operation your COM port must be set to run at 9600 Baud Rate, No Parity, 8 data bits, 1 stop bit. Flow Control should be set to none. The port configuration command should read: 9600, N, 8, 1.

Configure the correct COM port in HyperTerminal and type the following commands (followed by a “↵” which is a carriage return) to test the unit’s communications interface and functionality.

#### Communications Test Routine

HEL?↵ (Opens communication with the device)

*Response is Ver X.X (where X.X is the firmware revision number)*

SSR0=1↵ (Enables the LED lamp)

INT0=4000 (Changes intensity to full scale setting)

*The LED should now be at full intensity*

INT0=1000↵ (Changes intensity to 25% of full scale output)

*The LED should now be at 25% full intensity*

SSR0=0↵ (Disables the LED lamp)

*The LED should shut off completely*

SSR0? ↵ (Queries the Solid State Relay Status)

*The response should be “0” since the SSR is OFF*

SSR0=1↵ (Enables the LED lamp again)

*The LED should now return to 25% full intensity (the unit will always return to the last INT value stored when the SSR is activated)*

You have now verified the communication interface and the LED driver electronics.

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### COMMUNICATIONS

#### USB Option

The USB module used in this controller is configured to work without any additional drivers for windows computers up to and including Windows XP. If you are running this version on a computer with a later release than this, you will need to download and install an additional driver for the module. It can be found at the following website:

<http://www.ftdichip.com/Drivers/VCP.htm>

At this website, you will see options for downloading drivers based upon the operation system that you are using. Click the link for the operating system, where it is shown in the comments as "Available as a setup executable":

Comments
<p>2.08.24 WHQL Certified  <a href="#">Available as setup executable</a> ←</p> <p><a href="#">Release Notes</a></p>
<p>All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19  Refer to <a href="#">TN-101</a> if you need a custom VCP VID/PID in Linux</p>
<p>Customers wishing to have a VID/PID combination added should contact <a href="#">FTDI Support</a></p>

This will download a setup executable file that will give your computer system the required drivers for recognizing the USB port as a new COM port in your computer system. You should save this file to a directory that you can easily access and remember in case you need to get to it in the future. Once this file download completes, open the directory in which that file resides, and double-click to execute it. You may get a warning about the security of the program due to the publisher not being shown. Click "Yes" as this file will not hurt your computer. You now have the drivers for the USB module.

You now have remote communication access to the controller for the motorized controller. You only need to do this one time for each computer that has a controller connected to it.

### COMMUNICATIONS

#### Ethernet Option

The command structure for the Ethernet interface is exactly the same. However, the unit's Ethernet module must be set to the proper IP address to communicate within your specific network.

To identify and update the IP address of the Ethernet device to your network, you will need to do the following:

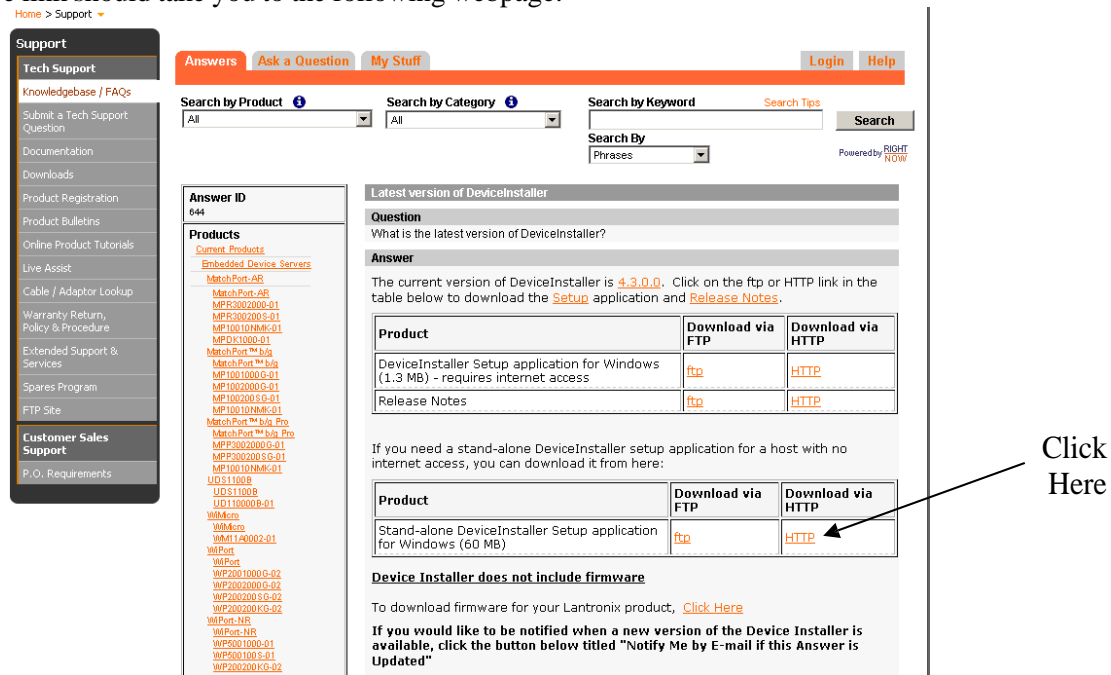
1. Download and installing the Lantronix Device Installer software
2. Check the current IP settings of your network and the lightsource
3. Changing the lightsource settings to match your network requirements

We use the Lantronix network interface module, which is supported by the Lantronix Device Installer software. Follow this link to download the latest version of the required software:

[http://ltxfaq.custhelp.com/app/answers/detail/a\\_id/644/session/L3NpZC9kWWlqWjRsaW%3D%3D](http://ltxfaq.custhelp.com/app/answers/detail/a_id/644/session/L3NpZC9kWWlqWjRsaW%3D%3D)

**\*Note: If your security settings do not allow downloading and installing software, please contact your network administrator for assistance.**

The above link should take you to the following webpage:



The screenshot shows a customer support portal with a search bar and a list of products. The search results for 'Latest version of DeviceInstaller' are displayed, including a table with download links for various products.

Product	Download via FTP	Download via HTTP
DeviceInstaller Setup application for Windows (1.3 MB) - requires internet access	<a href="#">ftp</a>	<a href="#">HTTP</a>
Release Notes	<a href="#">ftp</a>	<a href="#">HTTP</a>

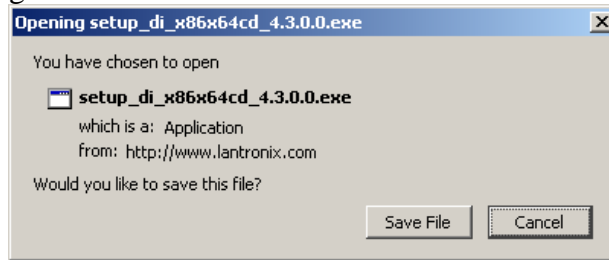
  

Product	Download via FTP	Download via HTTP
Stand-alone DeviceInstaller Setup application for Windows (60 MB)	<a href="#">ftp</a>	<a href="#">HTTP</a>

An arrow points to the 'HTTP' link in the second table with the text 'Click Here'.

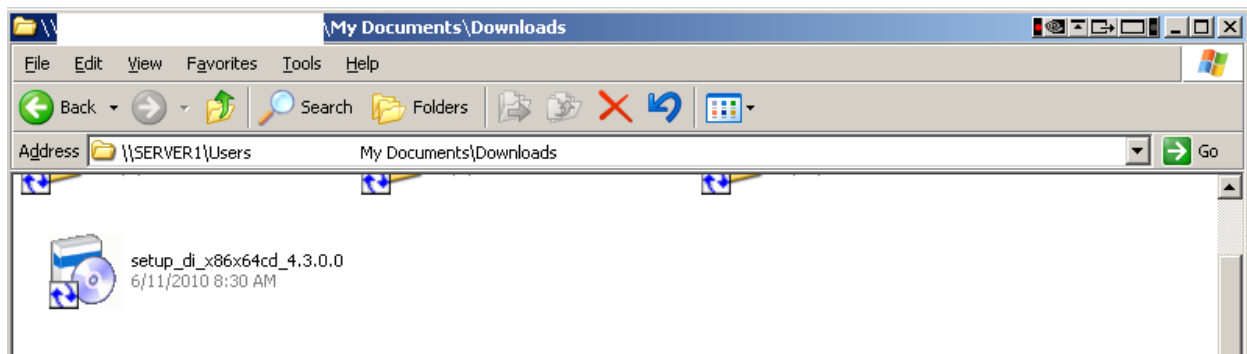
Click the link for “Standalone DeviceInstaller Setup application for Windows”. Download the application via HTTP.

This opens up the following window:

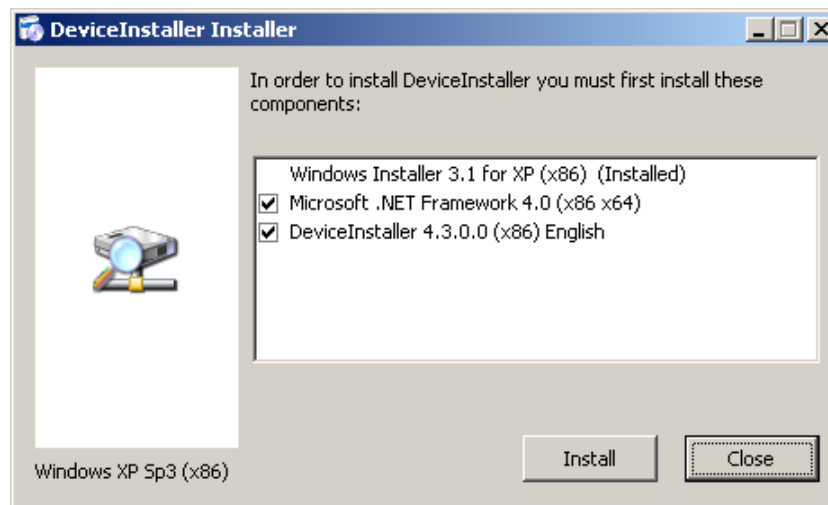


Click “Save File”. This may take a few minutes, depending on your download speed.

When the download is finished, go to the folder in which it downloaded to and double left-click the icon to begin the installation process.



Choose your preferred language, and then choose to install all required components listed in the window.





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If additional installation is needed, you will be required to restart your computer after completion.

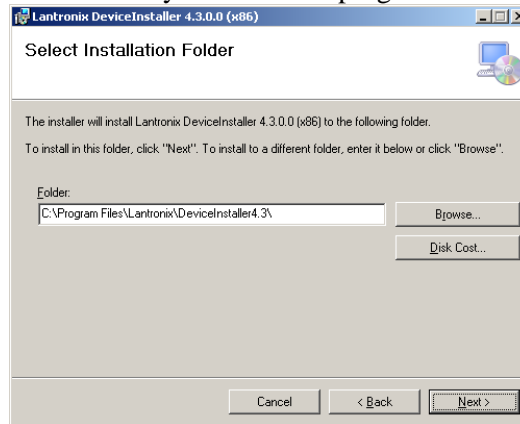
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Upon restart you will be asked to select a destination to save the program. By default, the Windows installer selects the path shown. You can accept the default or browse to find a more suitable location if you desire. You should make note of where you install this program to for future reference.



Select Next and Confirm the installation. Once the installation process is complete select Close and you will receive the successful installation window:



The DeviceInstaller is now installed on your computer and ready for you to use.

Connect the power to the device and power on. Connect an Ethernet cable from the lightsource to a network switch or hub into which this same computer is also attached. Ensure that the GREEN LED light on the lightsource Ethernet port is lit (indicates that the lightsource's Ethernet port is powered). The YELLOW LED should flash whenever a command is sent to the Ethernet port.

You can now launch DeviceInstaller in the "Start" Menu as shown under Programs/Lantronix/DeviceInstaller 4.3/DeviceInstaller (if you receive an error message from your firewall, you will need to allow the DeviceInstaller to have access to the Internet):

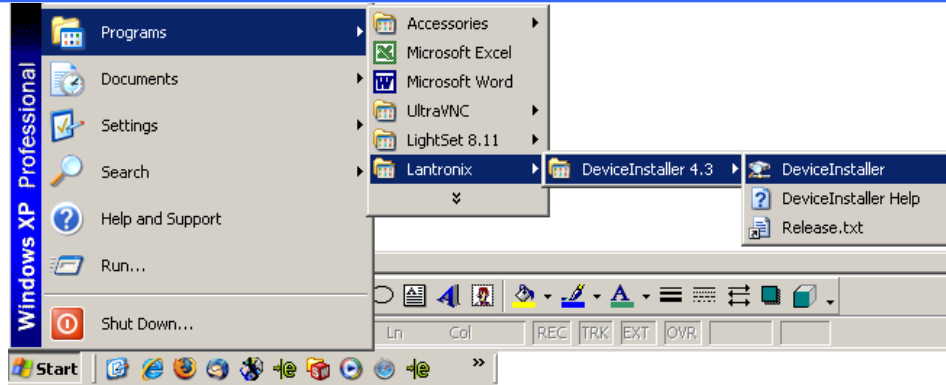




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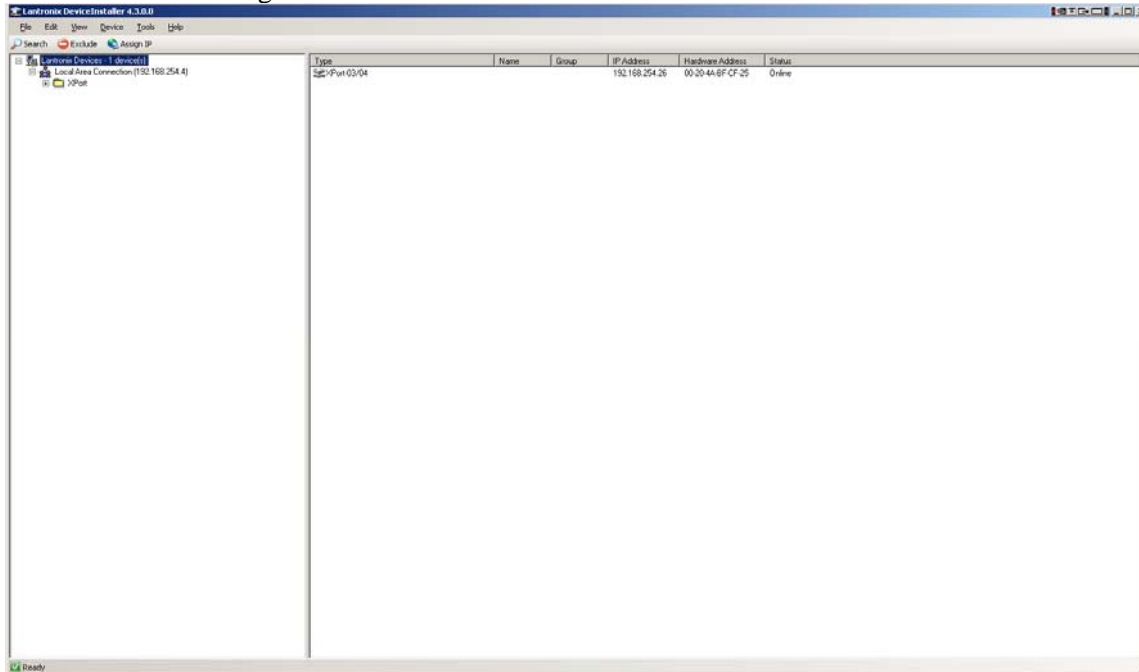


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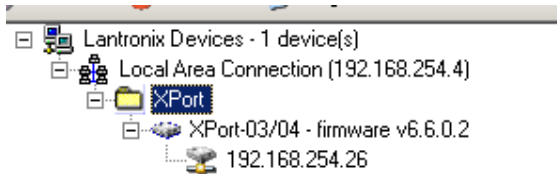
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Once the installer launches, it will search the entire network and identify every lightsource attached. You should see the following screen:



Expand the “Xport” folder on the left side to see the current IP address of the lightsource:



To assign a new IP address, you must first find out your network IP addresses and the subnet mask information using the following procedures:

Open C:/Command Prompt by going thru the Start Menu/Programs/ and looking under Accessories.

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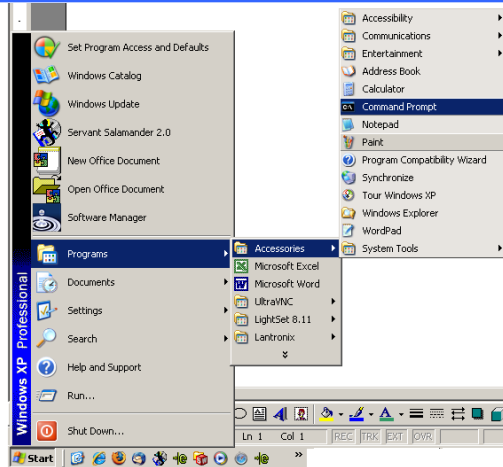
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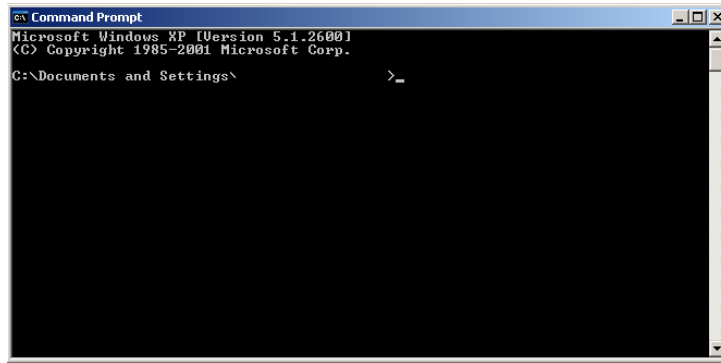
[www.illuminationtech.com](http://www.illuminationtech.com)



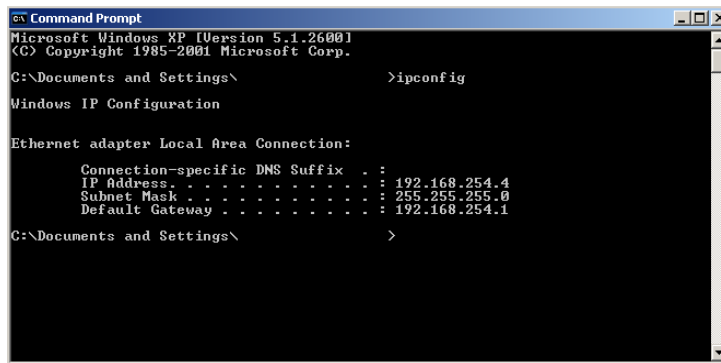
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The following window will open:



At the command prompt, type “ipconfig” and then Enter



The IP address of your computer is listed in the first line. When assigning the new IP address to the lightsource, the first 3 “blocks” of the IP address must match your network’s IP address (in this example 192.168.254) The last “block” however must be different than any other device on the network. This number must be unique.

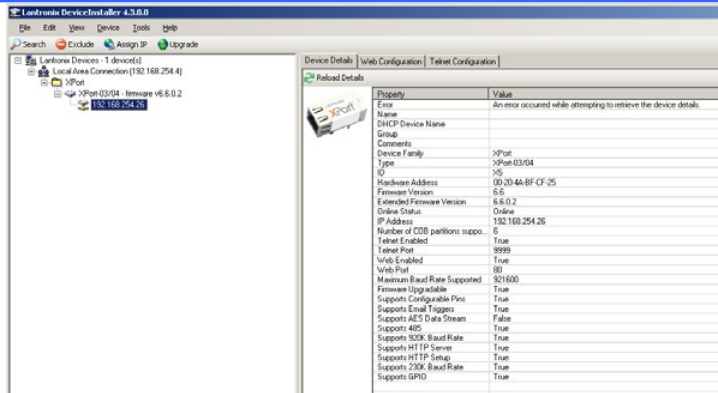
When assigning the new Subnet Mask and Default Gateway to the lightsource, they both must match your network’s Subnet Mask and Default Gateway exactly (in this example 255.255.255.0 and 192.168.254.1 respectively).

Returning to the DeviceInstaller, double click on the lightsource's current IP address to see all of the parameters associated with the lightsource Ethernet port.

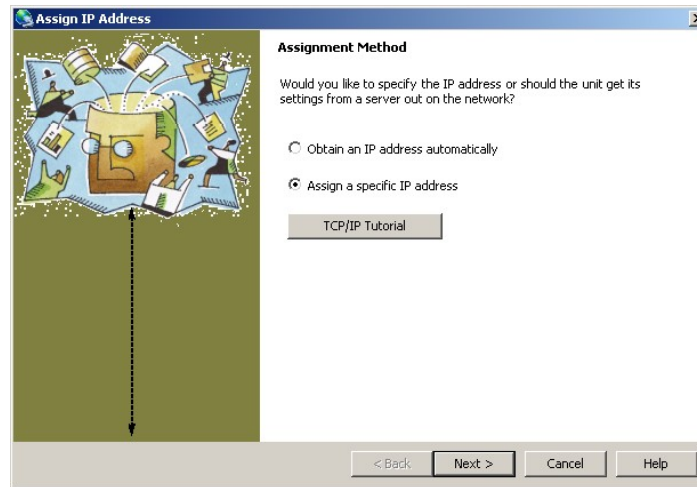
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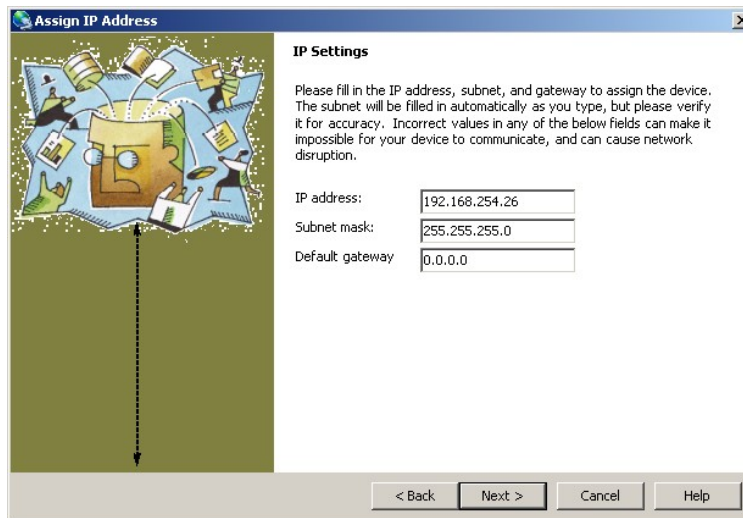
In the below the toolbar below the menu bar, click on the “Assign IP” button and the following window appears:



If you know the address you want to change the module to, keep the “Assign a specific IP Address” checked (RECOMMENDED). However, before you do this you should verify that the address is not used by any other device on the network.

To verify that this is an available address, return to the C:/ Command prompt and type “ping XXX.XXX.XXX.XXX” where “XXX.XXX.XXX.XXX” is the IP address you wish to assign. If a device responds, do not use that address. If the ping returns a ‘timeout’ then this address is available.

If the address is available, then click Next and this will open the following window:





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Change the IP address, Subnet Mask, and Default Gateway to your required network settings and click "Next".

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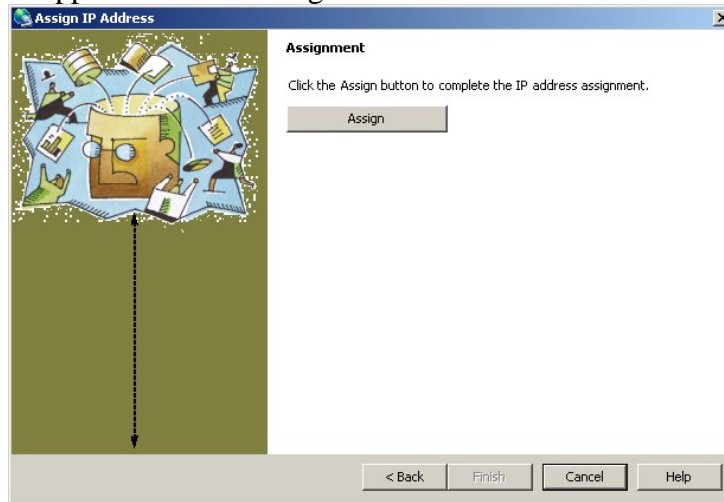
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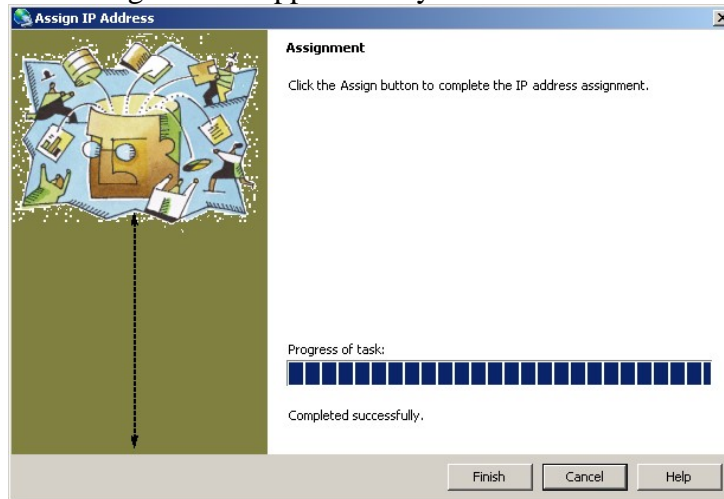
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The following window appears. Click “Assign”.



Once complete, the following window appears and you are done.



You have now successfully changed your IP address of the Ethernet enabled device. Make note of the IP address of this device for future reference.

You can run a quick test of the lightsource using Microsoft® HyperTerminal.

- Open a HyperTerminal session and go to File/Properties.
- In the “Host Address” line, type in the IP address that you just assigned
- Set the “Port Number” to 10001
- Click: “OK”.



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- Go to “Call” and click on “Call” in the menu

You are now ready to control the lightsource using HyperTerminal. Make sure you set the program to “Echo Characters.”

To begin type the following commands (followed by a “↵” which is a carriage return) to test the unit’s Ethernet communications interface and functionality:

HEL?↵ (Opens communication with the device)

*Response is Ver X.X (where X.X is the firmware revision number)*

SSR0=1↵ (Enables the LED lamp)

INT0=4000↵ (Changes intensity to full scale setting)

*The LED should now be at full intensity*

INT0=1000↵ (Changes intensity to 25% of full scale output)

*The LED should now be at 25% full intensity*

SSR0=0↵ (Disables the LED lamp)

*The LED should shut off completely*

SSR0? (Queries the Solid State Relay Status)

*The response should be “0” since the SSR is OFF*

SSR0=1↵ (Enables the LED lamp again)

*The LED should now return to 25% full intensity (the unit will always return to the last INT value stored when the SSR is activated)*

You have now verified the Ethernet interface and the LED driver electronics.

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### Maintenance

#### General:

This product has been designed, and tested to provide a lifetime of reliable performance. As with all electronic component assemblies, there is the possibility of failure. If for any reason the unit does not operate as outlined, follow the procedures below. If problems persist, refer to qualified service personnel.

#### Routine Maintenance:

The interior of the unit must be clean of dust and debris to ensure proper operation of the unit. Periodic cleaning of the unit using pressurized air to remove particles that have accumulated is strongly recommended. At this time, the filter located on the lamp bracket should be cleaned with a glass cleaner to ensure the proper light throughput. **If the environment that the unit is operating in is a severe industrial environment, please contact a factory representative or visit our website at [www.illuminationtech.com](http://www.illuminationtech.com) for the information regarding our lightsource in an NEMA enclosure.**

#### Troubleshooting:

Basic troubleshooting of this unit is similar to the troubleshooting of any other electrical or electronic equipment. Check the most obvious possible cause(s) first. The following troubleshooting guide gives a description of possible solutions for a unit that is not operating.

*If the fan is operating, but the lamp fails to operate, check the following in sequence:*

**Lamp -** The primary reason for light failure is that the lamp has burned out. Allow the lamp and bracket cool before opening the lightsource cover. To change the lamp, disconnect the power cord from the unit. Open the cover by removing the 8 flat head screws that attach the cover to the chassis base. Slide the cover backward and upward. The cover is connected to the base by a ground wire so you cannot fully remove the cover. The lamp housing is located in the front of the unit. You will see the lamp in its bracket towards the front of the unit. Push lever back into the forward position and slide a new lamp into ceramic socket. Ensure that the lamp is seated into the base of the bracket. **Using an incompatible lamp or failure to properly seat the lamp in bracket may cause erratic behavior or damage to the unit.**

**Socket -** If the unit still fails to operate, examine lamp socket for damaged or carbonized contacts, for a cracked ceramic base and frayed or damaged wiring. If any of these conditions are evident, consult the factory for replacement assembly. Do not attempt to repair this part for risk of fire and electric shock hazard.

**OverTemp -** This unit is equipped with an internal thermal cut-off mechanism. It will remove power to the lamp upon an over temperature situation. Ensure that there is adequate airflow below (intake) and in the rear (exhaust) of the unit. Once the cause of the over temperature condition is rectified the unit must be reset by turning the power off. **The unit will not operate until it has been reset.**

*If neither the lamp nor the fan is operational, check the following items in sequence:*



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- Power -** Ensure that the power cord is inserted completely into the IEC connector on the back of the unit, and is connected to a power supply as specified on the rear panel. Check power cord for damaged or severed areas. Replace if defective.
- Parts-** Inspect the unit for burned or damaged components. Contact the factory if visible damage has been done to any of the components on the printed circuit board or any other components in the case.
- Fuse -** Remove power cord from IEC connector. Check fuse(s) using the procedure in this manual. Replace with spare fuse(s) as required. **REPLACE ONLY WITH FUSE TYPE DESCRIBED ON THE REAR PANEL OF THE UNIT.** If unit blows another fuse, consult factory for service.

*If unit cannot be made operational using above procedures, call factory for servicing.*

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**Spare Parts/Accessories**

**Spare Parts:**

Description	P/N
EKE Lamp, 3200°K 150 Watt, 21V	9596
EKE-HC Lamp, 4200°K 150 Watt, 21V	9596HC <sup>1</sup>
EKE-ER Lamp, 150 Watt, 21 Volt	9596ER <sup>2</sup>
Fuse, T2.0 Amp, 5x20mm (pack of 10)	1010-307

<sup>1</sup> Must be used in –HC lightsource only

<sup>2</sup> Must be used in –ER lightsource only

**Accessories:**

**Quick Change Color Filters w/ Holders**

Color	Spectral Range	Part Number
Red Filter	$\lambda > 610\text{nm}$	9541
Green Filter	$500\text{nm} < \lambda < 590\text{nm}$	9542
Orange Filter	$\lambda > 580\text{nm}$	9547
Yellow Filter	$\lambda > 520\text{nm}$	9543
Blue Filter	$\lambda < 510\text{nm}$	9544
Blue -Green Filter	$\lambda < 570\text{nm}$	9548
Day Light Filter	Color Balancing	9545
IR Filter (KG3)*	Longwave Cutoff	9546
Color Filter Set	All 7 Filters Listed Above	9540
Customer Supplied	Filter Holder Blank - 20mm OD x 3mm Thick Filters	954x

**Computer Setup Cables**

Interface	Total Cable Length	Part Number
RS-232	6 ft.	
USB	6 ft.	



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### **Warranty Statement:**

The Illumination Technologies products are warranted to the original purchaser to be free from defect for one year from the date of purchase of the product. Illumination Technologies, Inc. will repair or replace, at its discretion, any defective unit within two (2) weeks of its receipt. This warranty is void if the unit in question has been visibly damaged by accident or misuse, if the unit has been serviced or modified by anyone other than an authorized representative of Illumination Technologies, Inc., or if any warranty seal has been broken. This is the only warranty expressed or implied by Illumination Technologies, Inc. Specifically excluded from this warranty is damage resulting from improper installation or neglect in the operation of the unit or misunderstanding of the properties of the unit.

### **Service Statement:**

To return this product for service or repair, an RMA number (Return Materials Authorization number) must be obtained from Illumination Technologies. To receive the RMA number, visit our website at [www.illuminationtech.com/support](http://www.illuminationtech.com/support) and fill out the RMA form. You will then receive an email with the RMA number and the shipping information. The RMA number must be affixed to the shipping label in plain sight, and the shipper must prepay all shipping. Illumination Technologies, Inc. or an Illumination Technologies Authorized Service Representative must perform any service required. All service outside the warranty period will be performed upon the purchaser's request according to normal service charges in affect at the time. Illumination Technologies, Inc. guarantees all repairs to be completed within two (2) weeks of receiving the approval of the customer. All shipping charges will be the responsibility of the purchaser.

### **Liabilities:**

Any warranty implied under State Law shall be limited to one year from original delivery to the original purchaser. Specifically excluded from Illumination Technologies, Inc. liability is damage resulting from acts of any deity, malicious mischief, vandalism, riots, wars, improper installation or neglect in the operation or maintenance of the unit or misunderstanding of the properties of the unit. Under no circumstances shall Illumination Technologies, Inc. be obligated for consequential or other damages of any kind or description, losses or expenses in connection with or by reason of the use of, or inability to use this unit for any reason. The stated warranty provides the purchaser with specific legal rights, and there may be additional rights which vary from state to state. Some states, for example, do not allow exclusion of consequential damage.

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