Innovative UV Measurement

EIT 2.0® UV Online Products User's Guide

EIT 2.0 LLC
900 Sycolin Rd Suite #300
Leesburg VA 20175 USA
Phone: 571-578-3075
Email: uv@eit20.com
Web: www.eit20.com

EIT 2.0 Part Number: SAL_M1002 REV. 1.1 June 8 2023

Table of Contents

Appendices

EIT 2.0 Trademarks

EIT2.0 LLC 900 Sycolin Rd Suite #300, Leesburg, VA 20175 USA
Phone (571) 578-3075 Email: uv@eit20.com Web: www.eit20.com

EIT2.0 Part Number: SAL_M1002 Rev. 1.1 June 8 2023

1. Introduction

EIT 2.0's Online Systems measure UV intensity to provide continuous, real-time, feedback on a UV system. The solution is electro-optic based and can be used to monitor the performance of UV processes in situations where:

- Space is limited and a conventional EIT 2.0 radiometer will not fit
- Arms, rollers and/or blades are present
- Lamps are enclosed, not easily accessed, or located high off the ground
- Multiple lamp modules (LED or microwave) are used to increase the width across a production line
- Fast production speeds make it difficult to use a logging radiometer accurately
- UV conditions change rapidly due to off-gassing and/or contamination
- High value products are manufactured and undetected changes in the UV cure process can quickly lead to high scrap levels
- The process window is narrow, requiring constant attention
- Validation of the UV conditions is required for recordkeeping (e.g. ISO- or QS-9000 SPC)

Applications for real-time process monitoring include web presses, fiber optic draw towers, hard drive manufacturing, print and medical applications.

The intensity measured by the Online System is a **relative** intensity (e.g. how the current value compares to prior measurements), versus an **absolute** value.

Absolute Irradiance/Energy Density Values: These values are obtained from instruments calibrated to a national standard such as NIST. They report Irradiance values in Watts (W/cm^2) and Energy Density values in Joules (J/cm^2).

Relative Intensity Values: These allow the user to track both gradual (e.g. bulbs aging) and/or sudden (e.g. equipment malfunction) changes to the UV intensity. Fast identification of unwanted or unexpected changes in the UV intensity allows the user to react quickly; before product quality and bottom line profitability are impacted.

When a UV source (LED or broadband lamp) is new and clean (quartz windows for LED and reflectors possibly quartz plates for a broadband lamp), the UV System is assumed to be performing at its peak intensity. The output (0-10V or 4-20 mA) can be measured and set to a value that indicates this peak performance. Subsequent readings over time are proportional to the UV conditions that were measured and used as a baseline when the system was performing under optimal conditions. The Online System can:

- Monitor, observe and display the UV intensity from a UV source
- Trigger alarms based on user-defined low limit thresholds
- Be interfaced with a PLC or other types of controllers

The system parameters and nature of the specific application may dictate where the online system's sensor should be physically installed in order to provide the best 'view' of the UV source. EIT 2.0 LLC's sensor is the Compact Sensor. It is not designed to report calibrated (W/cm^2) irradiance values in the way a calibrated instrument does, because often times the Compact Sensor is aimed at a location other than the product's cure surface.

The Compact Sensor has a narrow field of view compared to an absolute reading radiometer

where a cosine response has been optimized to measure UV arriving at all angles.

The Compact Sensor is ordinarily mounted in a fixed location and does not travel under/through the UV source in the same manner as the substrate. Thus, it does not provide a calibrated energy density (J/cm^2) value. Online measurement can be used as the sole means of UV process control or in conjunction with an EIT 2.0 LLC absolute reading NIST-traceable UV radiometer.

2. Online System Components

The EIT 2.0 LLC Online System consists of three main components:

1. **Compact Sensor:** The Sensor is designed to be extremely durable and solarization resistant. It has sealed optics designed to withstand harsh UV environments. The Compact Sensor receives UV through an optic window and generates a small electrical signal relative to the intensity of the incident UV source.

2. **Signal Conditioning Unit:** The output signal from the Compact Sensor requires conditioning in order to accurately track the intensity of a UV source. Signal conditioning allows the user to track real-time intensity data, set low-limit alarms and/or provide a relay closure if the pre-programmed limits are exceeded.

3. **Cable:** This connects the Compact Sensor to the Signal Conditioning Unit

2.1 Compact Sensor Description: Broadband Standard Sensor

The **Standard Compact Sensor** is extremely durable and its response has been designed to measure UV on broadband sources. The Standard Compact Sensor is available in EIT 2.0 LLC UVA, UVB, UVC or UVV. The Standard Compact Sensor housing is available with or without a purge.

2.2 Compact Sensor Description: Broadband EMI Sensor

The **Electro Magnetic Interference (EMI) Compact Sensor** is also extremely durable and its response (EIT 2.0 LLC UVA, UVB, UVC or UVV) has been designed to measure UV on broadband sources. The EMI Compact Sensor has added circuit protection to minimize 'electrical noise' associated with high-frequency power supplies, microwave sources, and/or power supplies mounted adjacent to a UV source.

The EMI Compact Sensor and EMI DIN Rail have been 'hardened' to make them less susceptible to electrical noise or EMI. The EMI version of the Compact Sensor can be identified by a "gold" circle on the electronics (Figure 2 in Section 3). To function properly, the EMI Compact Sensor must be grounded, used with an EMI DIN Rail and connected with a three wire EMI cable.

2.3 Compact Sensor Description: LED Compact Sensor

The **LED Compact Sensor** is extremely durable and its response has been designed to measure UV on LED sources. The LED Compact Sensor is available in EIT 2.0 L365, L385, L395 and L405 responses. The LED Compact Sensor housing is available with or without a purge.

More information on Compact Sensor selection and options are discussed in Section 3.

2.4 Compact Sensor Mounting Locations

Selecting a Sensor Mounting location is part science and part art. Select a location that allows the Compact Sensor to view the UV without interfering with the process while also keeping the Compact Sensor within the suggested operating temperatures.

On Broadband sources with a reflector, most of the UV energy delivered to the cure surface comes from the reflector. Installing the Compact Sensor in a location where it can monitor reflected UV is preferred to a location that only 'sees' the direct radiation below from the bulb (e.g., position 1 in Figure 1 below). If the UV system design includes a quartz plate, it is advisable to locate the Compact Sensor below the quartz plate.

1. Behind the Reflector from top
2. Behind the reflector from side
3. Below the reflector looking up
4. Under system and/or quartz plate
5. End of lamp housing
6. Use of EIT 2.0 Quartz Rod or other material

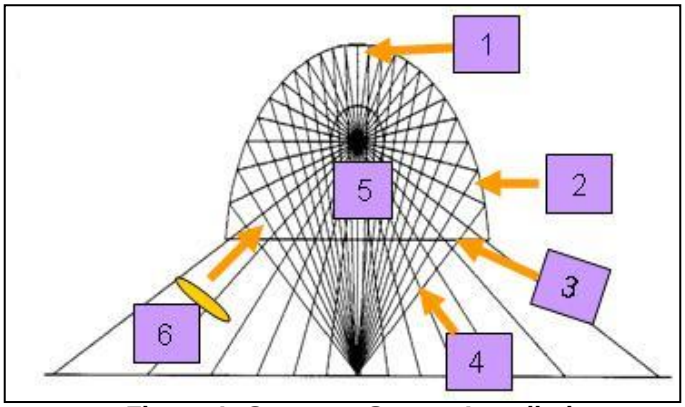


Figure 1: Compact Sensor Installation Locations

On LED sources, the Compact Sensor will need to be where it can see the UV generated by the LED. LED's typically have less heat than a broadband (mercury) UV source but they are not heat free.

On applications with limited space or high temperatures, consider the use of the EIT 2.0 LLC Quartz Rod. Information on this can be found in Section 6.

2.5 Signal Conditioning Unit Description

The output signal from the Compact Sensor requires conditioning in order to accurately track the intensity of a UV source. Signal conditioning allows the user to track or display real-time intensity data, set low-limit alarms and/or provide a relay closure if the pre-programmed limits are exceeded.

DIN Rail UV Intensity Monitor

- The DIN Rail UV Intensity Monitor is designed to monitor a single UV source.
- It is used with the Standard or LED Compact Sensor.
- This product converts the intensity signal received from the Compact Sensor into an analog signal and provides a 0-10 Volt or 4-20 milliAmp signal proportional to the UV intensity.
- The DIN Rail UV Intensity Monitor can be integrated into control systems with analog signal processing and shared display capabilities.
- An alarm relay closure circuit allows the DIN Rail UV Intensity Monitor to switch at a user-designated point if/when the signal drops below the set point.

- The DIN Rail uses a two-wire cable

EMI DIN Rail UV Intensity Monitor

- The EMI DIN Rail UV Intensity Monitor is designed to be used with the EMI Compact Sensor to monitor a single UV source.
- This product converts the intensity signal from the EMI Compact Sensor to an analog 0-10 Volt signal proportional to the UV intensity.
- This allows the EMI DIN Rail UV Intensity Monitor to be integrated into control systems with analog signal processing and shared display capabilities.
- An alarm relay closure circuit allows the EMI DIN Rail UV Intensity Monitor to switch at a user-designed point if/when the signal drops below the set point.
- The EMI DIN Rail uses a three-wire cable and the EMI Compact Sensor needs to be grounded.

Note: The EMI Compact Sensor works with the EMI DIN Rail UV Intensity Monitor

Online UV Intensity Display Module (Panel Mount)

The EIT 2.0 LLC Online UV Intensity Display Module (Panel Mount) supported one UV source with one Compact Sensor. The EIT 2.0 Online UV Intensity Display Module (Panel Mount) was discontinued due to obsolete components. Information on the Online UV Intensity Display Module (Panel Mount) can be found in Appendix E. Limited service is available for any Online UV Intensity Display Module (Panel Mount) units in use.

MultiBrite® Signal Conditioning Unit

The EIT 2.0 LLC MultiBrite® supported four Compact Sensors and monitored up to four UV sources or locations simultaneously. The EIT 2.0 LLC MultiBrite® was discontinued due to obsolete components. Information on the MultiBrite can be found in Appendix D. Limited service is available for any MultiBrite units in use.

3. Standard Compact Sensor / LED Compact Sensor/ EMI Compact Sensor

There are over 80 different versions of Standard, LED and EMI Compact Sensors available.

Choosing the 'best' Compact Sensor for your application requires a careful evaluation of your process and is a combination of science, art, and experience. Work through the evaluation steps below and consult with EIT 2.0 and your EIT 2.0 rep/distributor to help identify the Compact Sensor best suited to your application.

We suggest testing the Compact Sensor in your application before a large purchase is made.

Table 1 Summary of Online Products

Standard Products	Observe UV Intensity	Output Intensity Signal	Trigger Alarm
Standard Compact Sensor	Used 1:1 with an EIT 2.0 Signal Conditioning Unit	Sensor output is usually in the nano- or micro- Amp region	NA
LED Compact Sensor	Used 1:1 with an EIT 2.0 Signal Conditioning Unit	Sensor output is usually in the nano- or micro- Amp region	NA
DIN Rail	Used 1:1 ratio with Compact Sensor	0-10 Volt or 4-20 milliAmp Analog	Yes
EMI Products	**Observe UV Intensity**	**Output Intensity Signal**	**Trigger Alarm**
EMI Compact Sensor	Used 1:1 ratio with EMI DIN Rail	Sensor output is usually in the nano or micro Amp region	NA
EMI DIN Rail	Used 1:1 ratio with EMI Compact Sensor	0-10 Volt Analog	Yes

Evaluation Steps

3.1 Compact Sensor Type: Standard, LED or EMI?

What type of source do you have?

If you have a broadband (mercury) source, use a Standard Sensor or EMI Sensor with a UVA, UVB, UVC or UVV response for best results.

If your source is an LED, use and LED Compact Sensor matched to the Center Wave Length (CWL) of the LED.

A 365 nm LED would use an EIT 2.0 Compact Sensor with a L365 response. Other LED Compact Sensor response choices include L385, L395 or L405.

What is the potential for electrical noise from your source or power supply?
UV equipment has the potential to generate Electro-Magnetic Interference (EMI) or electrical noise. This can happen with a high-frequency power supply, power supply mounted in close proximity to the UV source, microwave source or when the Compact Sensor cable is run alongside a high voltage line.

If your application has the potential for generating electrical noise, you should use the EMI version of the Compact Sensor

The EMI Sensor is currently available for broadband mercury sources.

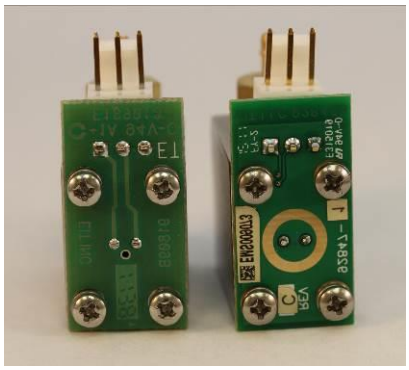


Figure 2:
Left: Standard Compact Sensor
Right: EMI Compact Sensor

3.2 Compact Sensor Housings/Installation Locations

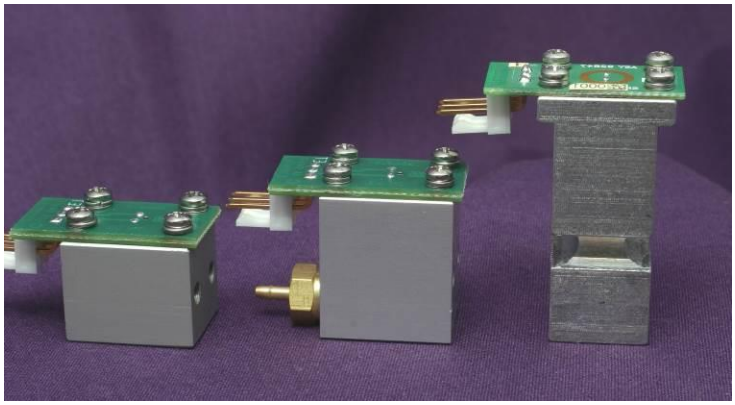


Figure 3 Compact Sensor Housing Shapes (Left to Right): CS-2, CS-1, BTR

- Standard and LED Compact Sensors are available with CS-1 or CS-2 housings
- EMI Compact Sensors are available with the CS-1, CS-2 or BTR housings

There are several considerations when selecting best Compact Sensor Housing and installation location.

Appendices B & C provide the dimensions for each of the different housings.

Will the Compact Sensor be installed in an application where coatings and/or off-gassing from your process could foul or block the optics in the Compact Sensor?
If so, the CS-1 Housing has been designed to support an air/nitrogen purge to keep the optics of the Sensor clean.

Instrument grade (i.e., oil-free) air or nitrogen should be used. The use of air/nitrogen may also help keep the Compact Sensor cool.

How much space is available to install the Compact Sensor? Are there any mechanical restrictions to consider such as shutters, quartz plates, cooling lines or moving parts?
If so, the CS-2 Housing offers reduced size and may fit in locations where the CS-1 housing will not properly fit.

The BTR (Behind-the-Reflector) Housing is only available in an EMI Compact Sensor. It is designed to mount behind the reflector in a microwave-powered lamp.

What is the best installation location?
Typical installation locations are shown in Figure 1 of Section 2. Installing the Compact Sensor so that it can 'see' reflected UV energy versus 'seeing' only direct energy from the bulb since this provides diagnostic information about the performance of both the lamp and the reflector. If your application incorporates a quartz plate between the UV source and substrate, we recommend installing the Compact Sensor below the quartz plate and aimed toward the reflected UV energy.

Keeping the Compact Sensor cool is the key to consistent performance. If space is limited or the temperature in the proposed installation location is too hot, consider using the EIT 2.0 LLC Quartz Rod with a CS-1 housing as shown in Figure 4 below. The Quartz Rod is further discussed in Section 6 of this User's Guide.

Figure 4: CS-1 Compact Sensor with EIT 2.0 LLC Quartz Rod

3.3 Compact Sensor Responsivity/UV Band

The band of each Compact Sensors is specified at the time of order. The response needed in the Compact Sensor is determined by the UV source type (LED, mercury, mercury-iron, mercury-gallium) and the region of UV emissions that are most relevant to process success.

- For broadband sources select from UVA, UVB, UVC, or UVV
- For LED sources select from EIT 2.0 LLC L365, L385, L395 or L405

See Appendix A for definition of EIT 2.0 LLC's LED (L365, L385, L395 or L405) or Broadband (UVA, UVB, UVC, or UVV) bandwidths.

Figure 5: The Compact Sensor on the left is stamped "A" for UVA. The Compact Sensor in the middle is stamped "L9" for L395. The Compact Sensor on the right is stamped "C" for UVC. The second stamped letter of "H" to indicates that it has a dynamic range of "High"

If the part numbers shown in Tables 2-4 are not available, the letters above are what is needed to match a current Sensor to a new Sensor. The characters screen printed on the green circuit board do not identify an individual sensor type.

3.4 Dynamic Range/Aperture Size/Part Numbers

EIT 2.0 LLC's Compact Sensors have been successfully used on broadband and LED sources ranging in intensity from thousands of milliWatts to tens of milliWatts of UV.

Most EIT 2.0 LLC Compact Sensors can be ordered in two-three different "Dynamic Range" versions. The dynamic range is determined by the internal aperture size installed at EIT 2.0 at the time of order.

To determine which Dynamic Range is needed for your specific application, consider the power/output rating of the UV source, mounting location and the distance to the UV source. A Compact Sensor with a small aperture is best for intense, high-power sources including microwave-powered and LED UV sources. Sensors used in systems that are less powerful and/or are further away from the source 'see' less UV and most often need a slightly larger aperture.

For applications with very low levels of UV irradiance (e.g., low-pressure fluorescent type lamps) or applications using an EIT 2.0 LLC Quartz Rod users should consider using a Compact Sensor with a bigger or no aperture.

Please contact EIT 2.0 or your local representative/distributor for more information.

Table 2 lists the available configurations and part numbers for EIT 2.0 LLC Standard Compact Sensors

CS-1 Housing					
Model	**Description**	**Range**	**Band**	**Part Number**	**Sensor "Stamp"**
Compact Sensor with Purge UVA, UVB, UVV	Small durable Sensor with Purge housing (CS-1)	High	UVA	CSA-1-X	AX
		Standard		CSA-1	A
		Low		CSA-1-LP	AL
		High	UVB	CSB-1-X	BX
		Standard		CSB-1	B
		Low		CSB-1-LP	BL
		High	UVV	CSV-1-X	VX
		Standard		CSV-1	V
		Low		CSV-1-LP	VL
Compact Sensor with Purge UVC	Small durable Sensor with Purge Housing (CS-1 /UVC)	Standard	UVC	CSCH-1-X	CHX
		Low		CSCH-1	CH
CS-2 Housing					
Compact Sensor without Purge UVA, UVB, UVV	Small durable Sensor without Purge housing (CS-2 UVA, UVB, UVV)	High	UVA	CSA-2-X	AX
		Standard		CSA-2	A
		Low		CSA-2-LP	AL
		High	UVB	CSB-2-X	BX
		Standard		CSB-2	B
		Low		CSB-2-LP	BL
		High	UVV	CSV-2-X	VX
		Standard		CSV-2	V
		Low		CSV-2-LP	VL
Compact Sensor without Purge UVC	Small durable Sensor with Purge Housing (CS-2/UVC)	Standard	UVC	CSCH-2	CHX
		Low		CSCH-2-LP	CH

Table 3 lists the available configurations and part numbers for EIT 2.0 LLC LED Compact Sensors

Model	Description	Range	Band	Part Number	Sensor "Stamp"
CS-1 Housing					
L-Band Compact Sensor with Purge	Small durable Sensor for UV LED with purge	Standard	L365	CL365-1	L6
		High		CL365-1-H	L6H
		TBD		CL365-1-X	L6X
		Standard	L385	CL385-1	L8
		High		CL385-1-H	L8H
		TBD		CL385-1-X	L8H
		Standard	L395	CL395-1	L9
		High		CL395-1-H	L9H
		TBD		CL395-1-X	L9X
		Standard	L405	CL405-1	L0
		High		CL405-1-H	L0H
		TBD		CL405-1-X	L0X
CS-2 Housing					
L-Band Compact Sensor without Purge	Small durable Sensor for UV LED without purge	Standard	L365	CL365-2	L6
		High		CL365-2-H	L6H
		TBD		CL365-2-X	L6X
		Standard	L385	CL385-2	L8
		High		CL385-2-H	L8H
		TBD		CL385-2-X	L8H
		Standard	L395	CL395-2	L9
		High		CL395-2-H	L9H
		TBD		CL395-2-X	L9X
		Standard	L405	CL405-2	L0
		High		CL405-2-H	L0H
		TBD		CL405-2-X	L0X

Table 4 lists the available configurations and part numbers for the EMI Compact Sensors

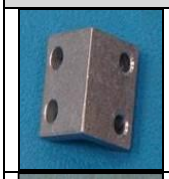
Model	Description	Range	Band	Part Number	Sensor "Stamp"
CS-1 Housing EMI					
EMI Compact Sensor with Purge UVA, UVB, UVV	Small durable RF Resistant Sensor with Purge (-1 housing UVA, UVB or UVV)	High	UVA	CRA-1-X	AX
		Standard		CRA-1	A
		Low		CRA-1-LP	AL
		High	UVB	CRB-1-X	BX
		Standard		CRB-1	B
		Low		CRB-1-LP	BL
		High	UVV	CRV-1-X	VX
		Standard		CRV-1	V
		Low		CRV-1-LP	VL
EMI Compact Sensor with Purge UVC	Small durable RF Resistant Sensor with Purge (-1 housing UVC)	High	UVC	CRC-1-X	CHX
		Standard		CRC-1-1	CH
		Low		CRC-1-LP	CHL
CS-2 Housing EMI					
EMI Compact Sensor without Purge UVA, UVB, UVV	Small durable RF Resistant Sensor without Purge (-2 housing UVA, UVB, UVV)	High	UVA	CRA-2-X	AX
		Standard		CRA-2	A
		Low		CRA-2-LP	AL
		High	UVB	CRB-2-X	BX
		Standard		CRB-2	B
		Low		CRB-2-LP	BL
		High	UVV	CRV-2-X	VX
		Standard		CRV-2	V
		Low		CRV-2-LP	VL
EMI Compact Sensor without Purge UVC	Small durable RF Resistant Sensor without Purge (-2 housing UVC)	High	UVC	CRC-2-X	CHX
		Standard		CRC-2-1	CH
		Low		CRC-2-LP	CHL
BTR Housing EMI					
EMI BTR Compact Sensor without Purge UVA, UVB, UVV	Behind the Reflector RF Resistant Sensor. BTR Housing UVA, UVB, UVV	High	UVA	CRA-3-X	AX
		Standard		CRA-3	A
		Low		CRA-3-LP	AL
		High	UVB	CRB-3-X	BX
		Standard		CRB-3	B
		Low		CRB-3-LP	BL
		High	UVV	CRV-3-X	VX
		Standard		CRV-3	V
		Low		CRV-3-LP	VL
EMI BTR Compact Sensor without Purge UVC	Behind the Reflector RF Resistant BTR Housing UVC	High	UVC	CRB-3-X	CHX
		Standard		CRB-3	CH
		Low		CRB-3-LP	CHL

3.5 Compact Sensor Accessories and Hardware

The Compact Sensor is delivered with an accessory kit containing: An L-shaped bracket, mounting screws, washers, and a 10-foot cable with the appropriate connector. Information on available cables is discussed in Section 5 of this User's Guide.

Table 5 lists provided hardware. Contact EIT 2.0 or your distributor for assistance with cable choices.

Table 5: Compact Sensor Supplied Hardware

Hardware	Supplied / Optional	Description	Purpose
	Supplied	L-Bracket	Use as needed to mount Compact Sensor to manufacturing equipment.
	Supplied	10-32 0.250L Pan Head Screw	CS-1 MODEL ONLY. Replace the purge fitting with the 10-32 screw when the purge assembly is not in use.
	Supplied	2x 4-40 0.250L Pan Head Screws	CS-1 MODEL ONLY. Mount Compact Sensor to manufacturing equipment or attach L-bracket to the Compact Sensor.
	Supplied	2x M3 x 5MM L Pan Head Screws	CS-2 MODEL ONLY. Mount Compact Sensor to manufacturing equipment or attach L-bracket to the Compact Sensor.
	Supplied	2x #4 Split Washers	Mount Compact Sensors to manufacturing equipment or attach bracket to the Compact Sensor.

3.6 Compact Sensor Installation

WARNING: USE EXTREME CAUTION WHEN INSTALLING THE COMPACT SENSOR. TURN OFF AND LOCK OUT ALL POWER TO THE EQUIPMENT. ALLOW THE EQUIPMENT TO COOL BEFORE ATTEMPTING THE INSTALLATION. USE LOCKOUT TAGS TO PREVENT INADVERTANT POWER-UP DURING INSTALLATION.

Figure 6: Sample Lockout Tags

Microwave powered UV Systems:
Check with the manufacturer of the microwave powered system before attempting to install a Compact Sensor inside the lamp housing cavity that contains the bulb, irradiator and magnetron.

Compact Sensors can be mounted to view any section of a lamp or reflector. Ideally, the Compact Sensor should monitor reflected UV. Due to "hot spots" in a bulb, monitoring the lamp directly is more susceptible to unintended intensity variances. Air flow and equipment vibrations during manufacturing can sometimes cause the Compact Sensor to move slightly and report erroneous changes in output. Measuring reflected UV provides a more representative assessment of UV process conditions. Monitoring reflected UV also allows the Online Monitoring System to detect intensity changes caused by dirty reflectors and/or aging bulbs. If using quartz plates in your application, mounting the Compact Sensor under the plates will allow the Online System to monitor the condition of the quartz plates as well as the passage of UV through them.

EIT 2.0 recommends the following guidelines to determine the location for sensor installation:

- Position the Compact Sensor so that a representative amount of UV light enters the Optic Window. The Compact Sensor's angle of view will vary based on the housing shape. CS-1 housings have a field of view of 5° and CS-2 housings 13°. The BTR housing has less than a 4° angle of view.

- Housing dimensions for the CS-1, CS-2 and BTR models are provided in Appendices B and C.

- The Compact Sensor and cable must not touch the lamp, lamp cabling, or end caps. Allow at least one inch (2.54 cm) of clearance between the sensor and these areas to prevent arcing or insulation damage.

- Check the Appendix for the temperature range of each Compact Sensor band. **The Compact Sensor must not be installed areas where the sustained temperature exceeds the suggested temperature range for the Sensor.** Consider the use of the Quartz Rod in applications where elevated temperature is a concern.

- Route the Compact Sensor cable away from sources of electrical noise.

3.7 Install Mounting Bracket

When the Compact Sensor cannot be mounted directly on the manufacturing equipment, the L-shaped bracket provided in the accessory kit may be used to position the Compact Sensor. The CS-1 side of the L-shaped bracket has two #4-40 screw holes positioned 0.375 inches apart and the CS-2 side has two M3xM5 screw holes positioned 0.321 inches apart. (See Figure 7)

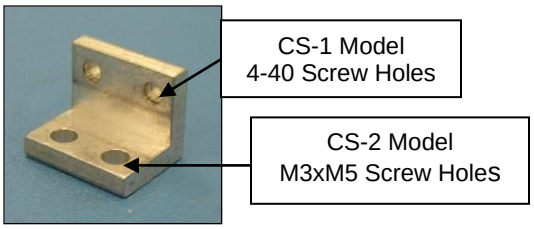


Figure 7: Compact Sensor L-Bracket

For the CS-1 Compact Sensor, fit the CS-1 side of the bracket onto the Compact Sensor and secure with the two 4-40 screws and two #4 washers provided in the kit. (See Figure 8).

For the CS-2 Compact Sensor, fit the CS-2 side of the bracket onto the Compact Sensor and secure with the two M3xM5 screws provided in the kit. (See Figure 9).

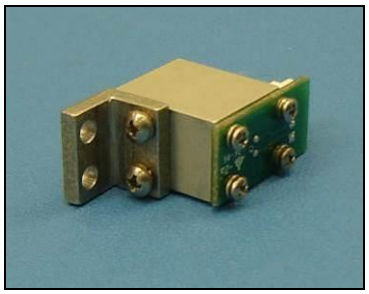


Figure 8: CS-1 Compact Sensor with L-Bracket

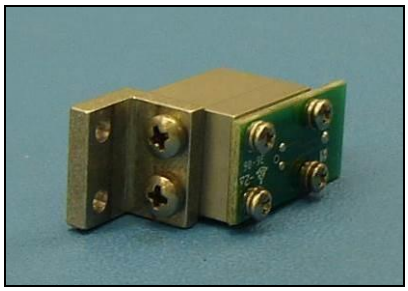


Figure 9: CS-2 Compact Sensor with L-Bracket

3.8 Install Flex Tube for Purge (Optional)

If the air/nitrogen purge is to be used, connect it to the sensor's brass fitting using flexible tubing with a 1/16" internal diameter. (See Figure 10) Only clean air/nitrogen (i.e., instrument quality) should be used to avoid depositing any contaminants and/or oil on the sensor. If the air purge is not to be used, remove the fitting and replace it with the #10-32 screw provided in the assembly kit. (See Figure 11)

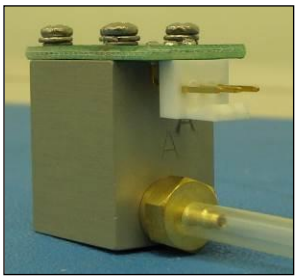
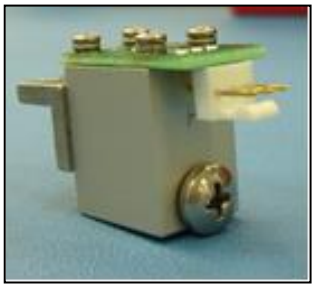


Figure 10: CS-1 Compact Sensor with Purge and Flex Tube

Figure 11: CS-1 Compact Sensor without Purge Fitting



3.9 Sensor and Connect Cable Installation

Figure 12 shows a CS-2 mounted behind the reflector of a microwave powered lamp. The CS-2 in Figure 13 is using a thermocouple to monitor sensor temperature.

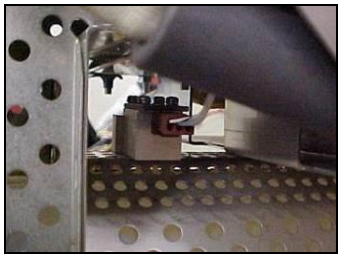


Figure 1: CS-2 Mounted Behind Reflector

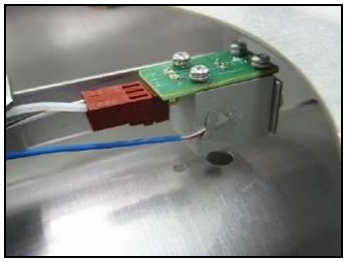


Figure 2: CS-2 with Thermocouple Mounted Behind Reflector

Figure 14 shows a CS-2 mounted in a fixture. This Compact Sensor in this example is used to monitor the UV in from a UV spot cure source. A portion of the UV is fed through a bi/trifurcated light guide with one leg of the light guide fed into the Compact Sensor.

Figure 15 shows the use of a CS-1 Sensor with a frosted quartz rod to monitor the UV intensity. The quartz rod is inserted into the optics opening of a CS-1 Compact Sensor. Use of the quartz rod allows the sensor to measure UV while keeping the Compact Sensor cool.

Figure 3: CS-2 Mounted on Fixture with spot source light guide

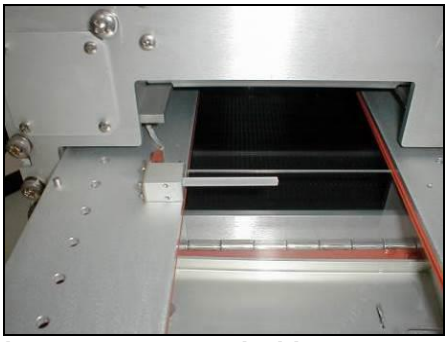


Figure 4: CS-1 Used with Quartz Rod

Connect the Molex® connector of the cable to the Compact Sensor as shown (Figures 16-17). Cable selection depends on the companion EIT 2.0 LLC alarm/monitor product. See Section 6 for more information on the Compact Sensor Cables. Contact EIT 2.0 or your distributor for assistance with cable selection.

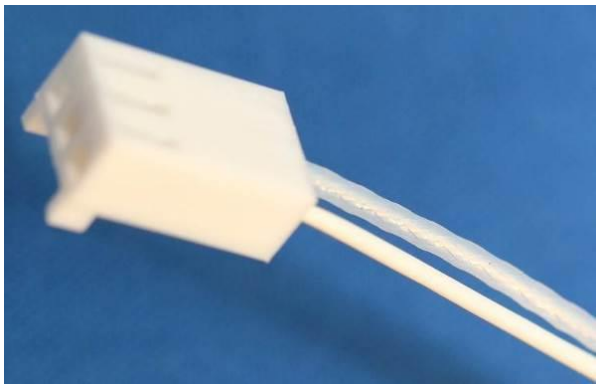


Figure 16: Two Wire Cable that connects to Standard Compact Sensor

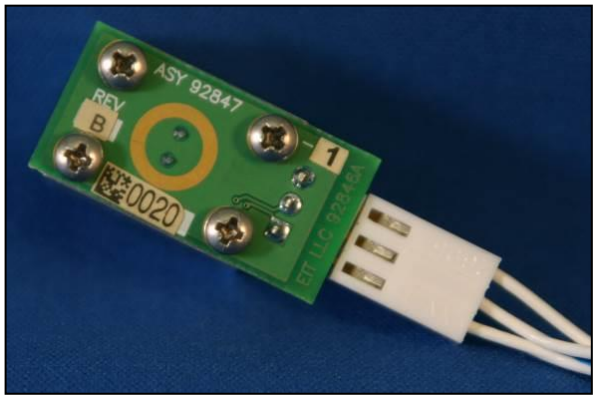


Figure 17: Three Wire Cable that connects to EMI Compact Sensor

4. DIN Rail UV Intensity Monitor/EMI DIN Rail UV Intensity Monitor

The **Standard** DIN Rail UV Intensity Monitor works with the **Standard** or **LED** Compact Sensor and a PLC or other control system to continuously monitor a single UV source. (Figure 18)

The **EMI** DIN Rail UV Intensity Monitor works with the **EMI** Compact Sensor and a PLC or other control system to continuously monitor a single UV source. (Figure 19)

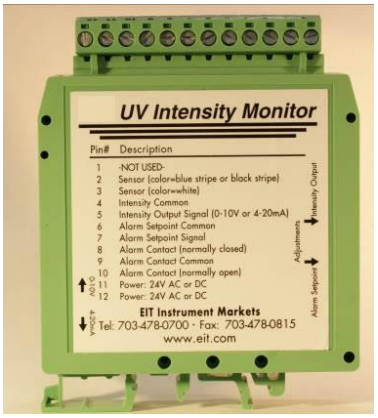
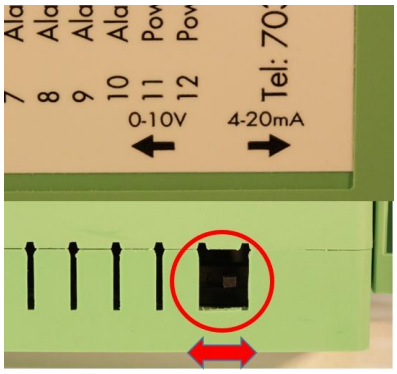


Figure 18: Standard DIN Rail

Figure 19: EMI DIN Rail

The PLC/Control System must have analog signal processing and display capabilities. During product setup, a 100% UV intensity baseline is established and an optional alarm threshold is set. The Compact Sensor delivers a signal proportional to the UV intensity to the DIN Rail UV Intensity Monitor.

New
The **Standard** DIN Rail UV Intensity Monitor (DRM-007) outputs a 0-10 Volt **or** 4-20 milliAmp (new) signal proportional to the intensity of the UV. (Figure 20). This value can be displayed on a PLC display or other appropriate system. Optional alarm points can be set and connections to the alarm relay allow the PLC/Control System to manage the monitor's alarm features.



The new DRM-007 started shipping in late 2019. It has an option to output either 0-10V **or** 4-20 mA with a user adjustable switch on the side of the DIN Rail.

Figure 20: Switch to adjust the output of the DIN Rail from 0-10 Volts or 4-20 milliAmps

The **EMI** DIN Rail UV Intensity Monitor outputs 0-10 Volts or 4-20 milliAmps.

NOTE: ***EMI Compact Sensors & EMI DIN Rails have additional circuitry to minimize interference. The EMI Compact Sensor is identified by the "gold" circle on the electronic circuit board. (Figure 2, 17). The EMI Compact Sensor must be grounded and connected to an EMI DIN Rail with a three wire EMI cable.***

If the EMI Compact Sensor is used with the Standard DIN Rail, Online Intensity Display Module, not grounded and/ or a two-wire cable, there is no added EMI protection.

4.1 DIN Rail UV Intensity Monitor Accessories

The DIN Rail UV Intensity Monitor is delivered with an adjustment tool (Figure 21) used to adjust the UV Intensity and alarm threshold. Cable Options are discussed in Section 6.

Figure 21: Adjustment Tool

4.2 DIN Rail UV Intensity Monitor Installation

The DIN Rail UV Intensity Monitor is easy to install. Either a "U" type or "G" type DIN rail purchased from any rail supplier can be used with the monitor. The DIN Rail may be mounted anywhere convenient on the UV system. The Monitor snaps onto the DIN rail and may be repositioned by sliding it up or down the rail.

Due to the monitor's small size, several units can be installed in a small area. Figures 22 and 23 show DIN Rail units installed on a rail.

Figure 22: DIN Rail UV Intensity Monitors mounted on "G" Type DIN Rail

Figure 23: Multiple DIN Rail UV Intensity Monitors installed in a cabinet. Note labels on each DIN Rail to identify sensor location.

Use the following guidelines to install the DIN Rail UV Intensity Monitor

- Mount the rail and DIN Rail Monitor in an area where the temperature does not exceed 50°C (122°F).
- Carefully snap the monitor onto the rail. Once it is attached, slide the monitor along the rail to the desired position.

Even though the UV Intensity Monitor has built-in noise rejection, position the monitor to minimize electrical interference. Mounting the DIN Rail in a small enclosed space with a power supply and UV source may make it more susceptible to electrical noise, especially with high frequency power supplies. Avoid routing the cable from the Compact Sensor near high voltage supply lines

4.3 DIN Rail UV Intensity Monitor Wiring

WARNING: USE EXTREME CAUTION WHEN INSTALLING THE DIN RAIL UV INTENSITY MONITOR. TURN OFF ALL POWER. USE LOCKOUT TAGS TO PREVENT INADVERTANT POWER-UP. SEE FIGURE 6 FOR SAMPLE LOCKOUT TAGS.

The DIN Rail UV Intensity Monitor must be connected to a Compact Sensor, a 24V AC or DC power supply, and an integrated monitoring and control system, such as a PLC. The control system must be equipped with analog signal processing and display capabilities. The remaining monitor connections (Alarm Setpoint and Alarm Contact) are optional. To assist with wiring, the monitor label provides a description of each terminal and the terminal strip may be removed and reattached after wiring (See Figure 24).

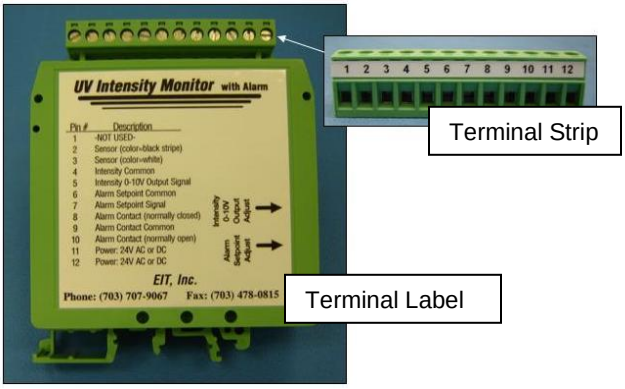


Figure 24: DIN Rail UV Intensity Monitor Terminal Label

Table 6 describes the monitor terminals and how they are used with a **Standard** DIN Rail and **Standard** **or** **LED** Compact Sensor

Table 6: DIN Rail UV Intensity Monitor Terminals-Standard/LED Compact Sensor

Terminal/ Pin #	Description	Optional/ Required	Use
1	Not Used	-	Not Used
2	Compact Sensor White Wire with Black Stripe	Required	Ground connection to Compact Sensor
3	Compact Sensor White Wire	Required	Signal connection to Compact Sensor
4	Intensity Common	Required	Ground connection to PLC /Control System
5	Intensity 0 to 10 Volt **or** 4-20 milliAmp Output Signal	Required	Intensity signal connection to customer's PLC/ Control System
6	Alarm Setpoint Common	Optional	Not Used when PLC or Control System provides alarm recognition
7	Alarm Setpoint Signal	Optional	Not Used when PLC or Control System provides alarm recognition
8	Alarm Contact (Normally Closed)	Optional	Not Used when PLC or Control System provides alarm response
9	Alarm Contact Common	Optional	Not Used when PLC or Control System provides alarm response
10	Alarm Contact (Normally Open)	Optional	Not Used when PLC or Control System provides alarm response.
11	Power: 24V AC or DC	Required	*Power In (+)
12	Power: 24V AC or DC	Required	*Power Out (–)

Table 6: DIN Rail UV Intensity Monitor Terminals-Standard/LED Compact Sensor			
Terminal/ Pin #	**Description**	**Optional/ Required**	**Use**
* Multiple monitors may be “chained” or wired to the same power supply as long as no other common terminals are chained.			

Table 7 describes the monitor terminals and how they are used with an **EMI** DIN Rail **and EMI Compact Sensor.**

Table 7: EMI DIN Rail UV Intensity Monitor Terminals-EMI DIN Rail			
Terminal/ Pin #	**Description**	**Optional/ Required**	**Use**
1	Not Used	-	Not Used
2	Compact Sensor White Wire with Black Stripe	Required	Ground connection to Compact Sensor
3	Compact Sensor White Wire	Required	Signal connection to Compact Sensor
4	Intensity Common	Required	Ground connection to PLC /Control System
5	Intensity 0 to 10 Volt Output Signal	Required	Intensity signal connection to customer’s PLC/ Control System
6	Alarm Setpoint Common	Optional	Not Used when PLC or Control System provides alarm recognition
7	Alarm Setpoint Signal	Optional	Not Used when PLC or Control System provides alarm recognition
8	Alarm Contact (Normally Closed)	Optional	Not Used when PLC or Control System provides alarm response
9	Alarm Contact Common	Optional	Not Used when PLC or Control System provides alarm response
10	Alarm Contact (Normally Open)	Optional	Not Used when PLC or Control System provides alarm response.
11	Power: 24V AC or DC	Required	*Power In (+)
12	Power: 24V AC or DC	Required	*Power Out (–)
* Multiple monitors may be “chained” or wired to the same power supply as long as no other common terminals are chained.			

4.3.1 Standard or LED Compact Sensor (Required) Connections

Connect a Standard EIT 2.0 LLC Compact Sensor to each DIN Rail UV Intensity Monitor as follows:

- Sensor ground wire at terminal 2. When using an EIT 2.0 LLC Compact Sensor Cable, the ground wire is white with black stripes. (See Figure 25)
- Sensor signal wire at terminal 3. When using an EIT 2.0 LLC Compact Sensor Cable, the signal wire is white. (See Figure 25)

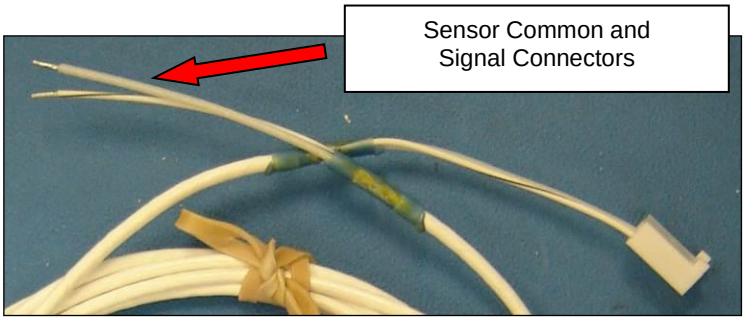


Figure 25: Compact Sensor Cable with DIN Rail 2 wire Termination

Use different color wires if installing multiple DIN Rails as shown below in Figure 26

Figure 26: Multiple DIN Rail UV Intensity Monitors installed in a cabinet with different color wires used to identify individual Monitors

4.3.2 PLC or Control System (Required) Interconnection

The PLC or Control System must have analog signal processing and display capabilities. Connect the PLC/control system to the monitor as follows:

- PLC/Control System ground wire at terminal 4. Figure 26 shows a grey ground wire for each monitor.

- PLC/Control System intensity signal wire at terminal 5. Figure 26 shows a black signal wire for each monitor.

DO NOT CHAIN THE INTENSITY SIGNAL GROUND TERMINAL IF USING A COMMON POWER SUPPLY FOR ALL MONITORS OR CHAINING ANY OTHER GROUND TERMINALS.

4.3.3 Power Supply (Required) Interconnection

The DIN Rail UV Intensity Monitor can operate with a supplied voltage in the range of 20 - 28 Volts AC or DC. Connecting to voltages greater than 28 Volts will damage the monitor and void all warranty claims.

NOTE: EIT 2.0 LLC IS NOT RESPONSIBLE FOR DAMAGES OR INJURY RESULTING FROM IMPROPER POWER SUPPLY CONNECTIONS OR IMPROPER VOLTAGES.

Connect the Power Supply to the DIN Rail UV Intensity Monitor as follows:

- Power in (+) to terminal 11
- Power out (–) to terminal 12

The power supply may serve multiple monitors by “daisy chaining” the Power In and Power Out terminals. Figure 26 shows Power In (+) and Power Out (–) wiring from the power supply to the left monitor. Power is “daisy chained” to the adjacent monitors.

DO NOT USE A COMMON POWER SUPPLY FOR MULTIPLE MONITORS IF YOU ARE DAISY CHAINING ANY OTHER GROUND TERMINALS.

4.3.4 Connect Alarm Relay (Optional)

The DIN Rail UV Intensity Monitor compares the UV intensity from the Compact Sensor to a preset low-level threshold. An alarm relay closure is activated and a red LED illuminates when the UV intensity drops below the threshold. The relay closure can be integrated with a PLC or Control System by connecting the following monitor terminals to the PLC/Control System:

- Alarm Relay Normally Open (terminal 8)
- Alarm Relay Common (terminal 9)
- Alarm Relay Normally Closed (terminal 10)

THE ALARM RELAY CONTACTS ARE NOT RATED FOR CAPACITIVE OR INDUCTIVE LOADS. USE AN INTERPOSING RELAY WITH APPROPRIATE ARC AND ENERGY SUPPRESSION FOR CAPACITIVE OR INDUCTIVE LOADS.

DO NOT CHAIN THE ALARM COMMON TERMINAL IF USING A SINGLE POWER SUPPLY FOR MULTIPLE MONITORS OR DAISY CHAINING ANY OTHER GROUND TERMINALS.

4.3.5 Alarm Setpoint (Optional) Interconnection

The Alarm Setpoint is used to establish the low-level threshold for a monitor's alarm relay. This threshold may be set manually on the DIN Rail UV Intensity Monitor or programmed using a PLC or other Control System. To use a PLC or Control System to manage the alarm threshold, connect the following monitor terminals to the PLC/Control System:

- Alarm Setpoint Common (terminal 6)
- Alarm Setpoint Signal (terminal 7)

DO NOT DAISY CHAIN THE ALARM SETPOINT COMMON TERMINAL IF USING A SINGLE POWER SUPPLY FOR MULTIPLE MONITORS OR CHAINING ANY OTHER GROUND TERMINALS.

4.4 DIN Rail UV Intensity Monitor Setup

Once the DIN Rail UV Intensity Monitors and Compact Sensors are installed, the UV Intensity 100% Baseline and Alarm Threshold are set. DIN Rail Modules (DRM-007) that started shipping in late 2019 have the ability to provide a voltage (0-10 Volts) or amperage (4-20 milliAmps) signal representing 100% efficiency. **Changing between 0-10 V and 4-20 mA is made via a switch shown in Figure 27 below when the DIN Rail is not connected to anything.**

Note: The EMI DIN Rail at the time of this User's Guide update is available only with a 0-10 Volt signal output

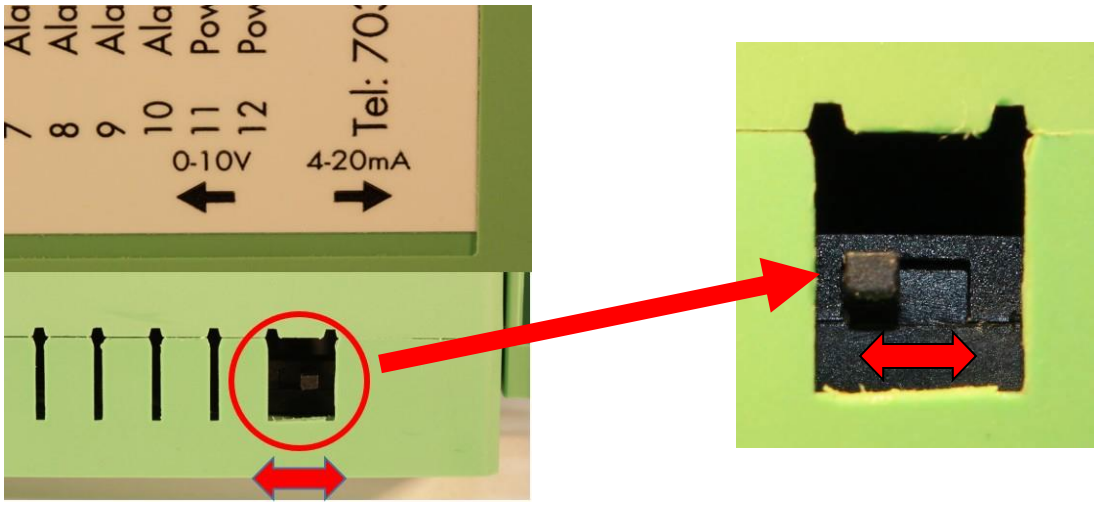


Figure 27: Switch when not connected to anything to allow the signal output to be set to either 0-10 volts or 4-20 milliAmps on the DRM-007 Standard DIN Rail Module

For example:

- If a system requires a 5V, 100% UV output voltage, the 100% efficiency baseline is set to 5V. When set to voltage output, the DIN Rail Monitor's 100% output may be set between 0 and 13 volts.

- If a system requires a 12 mA 100% UV output voltage, the 100% efficiency baseline is set to 12 mA When set to amperage output, the DIN Rail Monitor's 100% output may be set between 4 and 20 milliAmps.

The UV Intensity baseline is set by adjusting the Intensity Output Adjust Potentiometer or programmed using a PLC or Control System. Figure 28 shows the monitor's alarm set point and output intensity adjustment Potentiometers.

Figure 28: DIN Rail UV Intensity Monitor Alarm and Intensity Adjust Potentiometers

4.4.1 Equipment Warm-up

FOLLOW THESE STEPS BEFORE SETTING THE BASELINE VALUE OR ALARM THRESHOLD:

Broadband (Mercury) Sources

1. When using a mercury-based UV system, replace the existing UV lamps with new lamps and clean the reflectors and any other optical component (quartz plate) between the source and Compact Sensor. This allows the Compact Sensors to observe the lamp operating at its peak intensity.
2. Turn on power to the UV lamps and DIN Rail UV Intensity Monitors.
3. Allow sufficient time for the UV lamps to warm up and stabilize.
4. Check with your source manufacturer. EIT 2.0 suggests a minimum warm up time of 15 to 30 minutes based on the lamp type

LED Sources

1. When using an LED source, clean the quartz window of the LED and any other optical component between the source and Compact Sensor. This allows the Compact Sensors to observe the lamp operating at its peak intensity.
2. Turn on power to the UV LED and DIN Rail UV Intensity Monitors.
3. Allow sufficient time for the UV LED to stabilize.
4. Check with your LED manufacturer. EIT 2.0 suggests a minimum warm up time of 5-10 minutes based on the LED type

4.4.2 Intensity Output Potentiometer Adjustment

To set the 100% baseline, follow these steps:

1. Connect a multimeter to terminals 4 (Intensity Common) and 5 (Intensity 0 to 10 Volt **or** 4-20 milliAmp Output Signal). If the DRM-007 switch is set to volts you will measure volts. If the DRM-007 switch is set to milliAmps, you will measure milliAmps, Refer to Figure 28 below.

   Note: The EMI DIN Rail at the time of this User's Guide update is available only with a 0-10 Volt signal output

2. Use the adjustment tool to adjust the Intensity 0–10V or 4-20 mA Output Adjust Potentiometer until the voltmeter reads the required voltage (0 – 10V) or amperage (4-20 mA). This represents the 100% output reference point. The DIN Rail UV Intensity Monitor can output a voltage up to 13 volts and amperage 20 milliamps. This allows identification of power spike or an unusually bright lamp. If necessary, readjust the UV Intensity Potentiometer to represent 100% output.

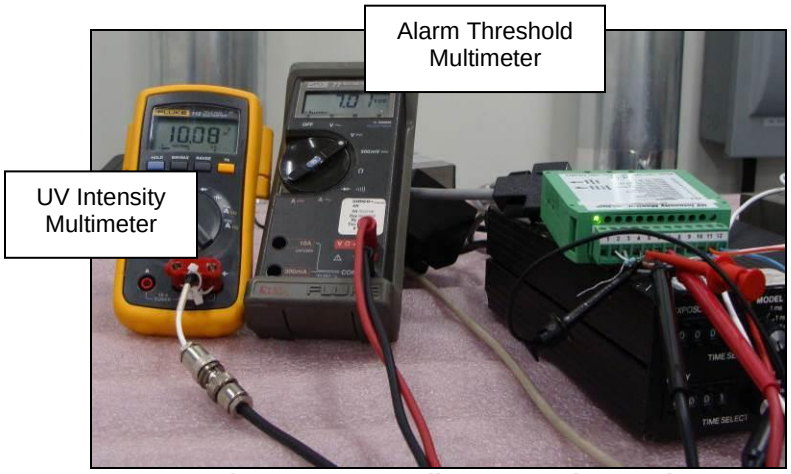


Figure 5: DIN Rail UV Intensity Monitor UV Intensity and Alarm Threshold Adjustment

If the output voltage or amperage cannot be adjusted to the desired value, the amount of light observed by the Compact Sensor must be increased or decreased by moving Compact Sensor closer to, or farther from the UV source or by adjusting the power supply of the UV system. If moving the Compact Sensor is not possible or other options that you try are not successful, contact EIT 2.0 or your Distributor for assistance.

4.4.3 Alarm Setpoint Potentiometer adjustment

The DIN Rail UV Intensity Monitor design incorporates a 3% noise immunity around the alarm threshold known as hysteresis. In other words, the UV intensity must drop 3% below the threshold before the alarm will be triggered.

Follow these steps to adjust the alarm set point:

1. Connect a multimeter to terminals 6 (Alarm Setpoint Common) and 7 (Alarm Setpoint Signal) as shown in Figure 28.

2. Adjust the Alarm Setpoint Adjustment Potentiometer until the multimeter reads the desired voltage or amperage. The Alarm Setpoint usually is determined by the application's lamp conditions that could cause an undesirable product.

3. To verify the Alarm Threshold, reduce the Intensity Output until it is lower than the Alarm Threshold plus hysteresis. The alarm LED should light. Then, reset the intensity output to the correct level.

If you have trouble with the UV Intensity or Alarm Threshold adjustments, please contact EIT 2.0 or your local representative/distributor for more information.

5. Compact Sensor Cable Guide

Note: This section references cable types, part numbers and connectors to legacy MultiBrite and Online UV Intensity Display Module signal conditioning units

An EIT 2.0 LLC Compact Sensor is connected to an EIT 2.0 LLC Signal Conditioning unit with Teflon shielded cable. The cable from the Compact Sensor carries a low signal level and should be kept as short as possible and away from high voltage power lines. If needed, EIT 2.0 suggests that longer cable runs be done after the EIT 2.0 LLC Signal Conditioning unit.

Compact Sensors are priced to include a 10-foot (3 meter) cable. We need to know the type of Compact Sensor (Standard, LED or EMI) and the type of Signal Conditioning unit (DIN Rail, EMI DIN Rail or Legacy Online UV Intensity Display Module/MultiBrite).

EIT 2.0 fabricates and stocks common cable lengths. Custom cable lengths and connectors are also available with delivery quoted at the time of order.

5.1 Cable Nomenclature

There are three things items needed to properly describe the cables that work with the EIT 2.0 LLC Compact Sensors. They are:

1. **Cable Type**
2. **Connector Options** (Number and Letter)
3. **Cable Length**

1. Cable Type
Standard* and *LED Compact Sensors utilize a standard two-wire cable ("C" type)

EMI Compact Sensors utilize a twisted ("T" type) three-wire cable as shown (See Figure 29)

The Cable type can also be identified by the number of wires going into the connector that connects to the Compact Sensor. The two-wire cable is for the Standard Compact Sensor and the three-wire cable for the EMI Compact Sensor as shown in Figure 30.

Figure 29
Top: Twisted (T-Type) three-wire cable used with the EMI Compact Sensor

Bottom: Two-wire (C-Type) cable used with Standard and LED Compact Sensor

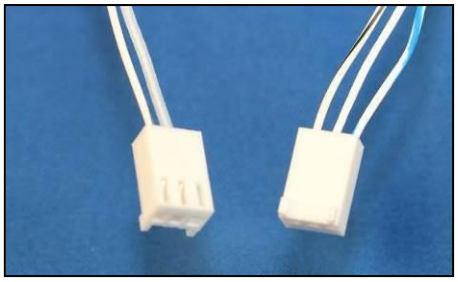


Figure 30
(Left) Two-wire cable used with Standard Compact Sensor ("Number 1" Type Connector)

(Right) Three-wire cable used with the EMI Compact Sensor ("Number 1" Type Connector)

2. Cable Connector Options

There are two ends on a Compact Sensor Cable. EIT 2.0 specifies one connector with a "number" designation and the other connector with a "letter" designation.

Options for "Number" Designation Terminations

EIT 2.0 currently uses the Numbers 1, 3 and 4 to specify the first connector type for the cable

- **Number 1** specifies the Molex connector used to attach the cable to the Compact Sensor. It may be a two wire or three wire connector based on the cable type used. See Figure 30 above.
- **Number 3** specifies a Female BNC connector. This connector is used when an extender cable is needed and also used on custom cables. See Figure 31 below
- **Number 4** specifies a Female Conxall connector that is used with bulkhead fittings. See Figure 32 below

Options for "Letter" Designation Terminations

EIT 2.0 currently uses the Letters A, B, D to specify the second connector type for the cable

- **Letter A** specifies a Male BNC connector. This connector is most often used to attach the cable to the back of the Online UV Intensity Display Monitor or MultiBrite Signal Conditioning units. See Figure 33 below
- **Letter B** specifies a two-wire connector. This is used to connect the cable to a DIN Rail or EMI DIN Rail. See Figure 34 below
- **Letter D** specifies a Male Conxall connector that is used with bulkhead fittings. See Figure 35 below.

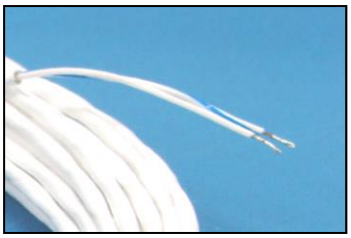
Figure 31 Left Top: “3” Female BNC Connector

Figure 32 Left-Bottom: “4” Female Conxall Connector

Figure 33 Right Top: “A” Male BNC Connector

Figure 34 Right Middle: “B” Two-wire Connector

Figure 35 Right Bottom: “D” Male Conxall Connector



3. Cable Length

The length of the cable must also be specified. All Compact Sensors are supplied with a 10 foot (3 meter) as the standard length. EIT 2.0 suggests keeping the cable length between the Compact Sensor and EIT 2.0 LLC Signal Conditioning as short as practical. Longer runs of cable, if needed should be made after the Signal Conditioning unit.

Please see Section 5.3 below for information cable lengths other than 10 feet (3 meters) that EIT 2.0 works to stock.

Custom cable lengths are also available. See Section 5.4 below

5.2 Cable Part Number Decoder
EIT 2.0 uses the following part number system to describe the cables used for Online Products

There are five characters in the first part of the cable part number

1. Each Cable part number starts with the letters CS for Compact Sensor
2. The third character is either a letter “C” or a letter “T” to designate the cable type
   - “C” is used for the Standard or LED Compact Sensor
   - “T” is used for the twisted cable used with EMI Compact Sensor
3. The fourth character is a number (1, 3 or 4) which designates the first connector type
4. The fifth character is a letter (A, B, D) which designates the second connector type

The second part of the cable part number following a dash is used to designate the cable length in feet (ft.)

Examples
EIT 2.0 LLC Cable Part Number CSC1A-10 would translate to a cable that is:

Letter or Number	Translation
CS	Compact Sensor
C	Standard Two Wire Cable
1	First Connector is terminated with a connector that attaches to the Compact Sensor
A	Second Connector is terminated with a Male BNC that is used with the Online UV Intensity Display Module Signal Conditioning Unit
-10	Signifies a cable length of 10 feet

EIT 2.0 LLC Cable Part Number CST1B-20 would translate to a cable that is:

Letter or Number	Translation
CS	Compact Sensor
T	Twisted Three Wire Cable for EMI Compact Sensor
1	First Connector is terminated with a connector that attaches to the Compact Sensor
B	Second Connector is terminated with a two-wire connector that is used with the DIN Rail Signal Conditioning Unit
-20	Signifies a cable length of 20 feet

Figure 36: Cable CST4B-20

Letter or Number	Translation of Figure 36
CS	Compact Sensor
T	Twisted Three Wire Cable for EMI Compact Sensor
4	First Connector is terminated with a female Conxall connector that attaches to the male Conxall connector. This allows the cable to have a bulkhead fitting to easily remove the lamp from the system
B	Second Connector is terminated with a two-wire connector that is used with the DIN Rail Signal Conditioning Unit
-20	Signifies a cable length of 20 feet

Note: Part number of cable shrink wrapped onto the cable. See Figure 38 & 39 below for another example

Figure 37: Cable CST1D-1.25

Letter or Number	Translation of Figure 37
CS	Compact Sensor
T	Twisted Three Wire Cable for EMI Compact Sensor
1	First Connector is terminated with a connector that attaches to the Compact Sensor
D	Second Connector is terminated with male Conxall connector. This connector is usually mounted on the bulkhead wall
-1.25	Signifies a cable length of 1.25 feet (15 inches total)

Cable Part Numbers are now marked indicated on the bag (Figure 38) and also with a shrink wrap sleeve over the cable (Figure 39)

Figure 38: Marking on the outside of the cable bag

Figure 39: Example of cable part number shrink wrap

5.3 Stocked Cables Lengths

A 10-foot (3 Meter) cable is included with each Compact Sensor. For longer lengths, EIT 2.0 works to keep the following cables in stock. Please check availability with EIT 2.0, especially for large orders.

For Standard or LED Compact Sensor to 2 Wire Termination (DIN Rail)

- CSC1B-10 Length = 10 feet (3.05 meters)
- CSC1B-20 Length = 20 feet (6.1 meters)
- CSC1B-25 Length = 25 feet (7.6 meters)

For Standard or LED Compact Sensor to BNC Termination (Legacy Online UV Intensity Display or MultiBrite)

- CSC1A-10 Length = 10 feet (3.05 meters)
- CSC1A-25 Length = 25 feet (7.6 meters)

For EMI Compact Sensor to 2 Wire Termination (EMI DIN Rail)

- CST1B-10

5.4 Custom Cables

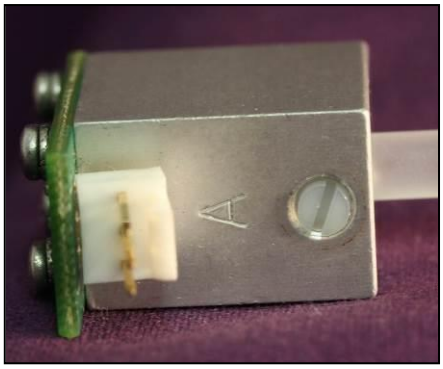
Custom cable lengths along with cables with bulk head connectors are available from EIT 2.0. Please contact EIT 2.0 for pricing and lead times.

6. EIT 2.0 LLC Quartz Rod

For applications with limited space and/or high temperatures, the EIT 2.0 LLC Quartz Rod along with a CS-1 Compact Sensor can be used to monitor the UV intensity. The Quartz Rod will allow the Compact Sensor to stay cool and/or be installed where there is available space.

The Quartz Rod is four inches (10 cm) long with a diameter of 0.2” (0.5 cm). It is made of high-quality quartz and has a diffuse outer surface. It fits into opening of a Compact Sensor CS-1 housing and is held in place with a supplied set screw that fits into the opening when the air/nitrogen purge is normally installed.

Figure 40: CS-1 Compact Sensor with Quartz Rod



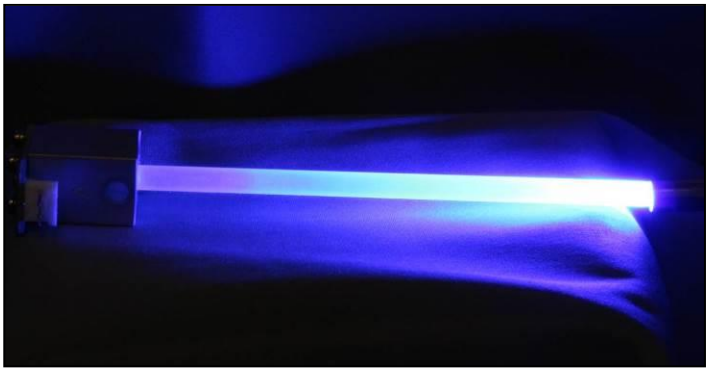
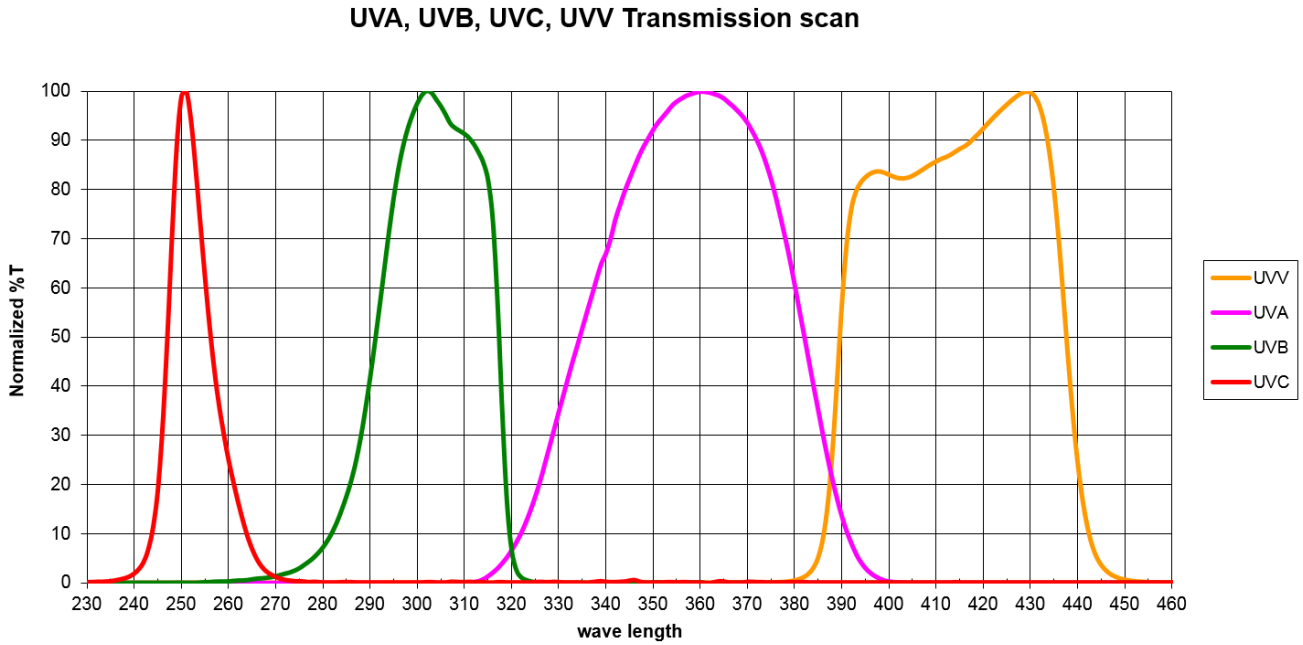


Figure 41 (Above Left): Close up showing the set screw holding the Quartz Rod in place.

Figure 42 (Above Right): Illumination of Quartz Rod with a UV source

Appendix A. EIT 2.0 LLC UV Bandwidth Definition

The broadband spectral responses of the filters used in the Compact Sensors for mercury sources are shown below



Appendix A Figure 1: EIT 2.0 LLC Filter Responses

Broad Band
UVA (320-390 nm) / UVB (280-320 nm)
UVC (250-260 nm) / UVV (395-445 nm)

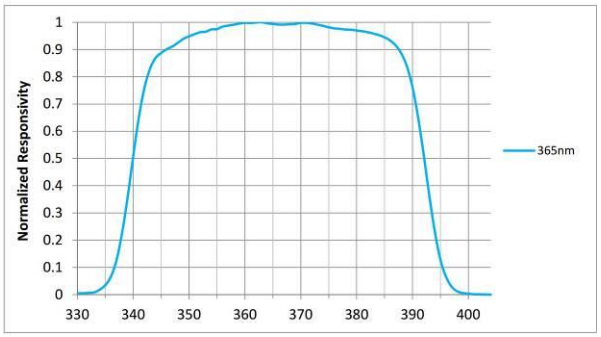
EIT 2.0 LLC Spectral Responses
UVA: 320-390 nm
UVB: 280-320 nm
UVC: 250-260 nm
UVV: 395-445 nm

Note: The UVC filter response in the Compact Sensors is 240-260 nm

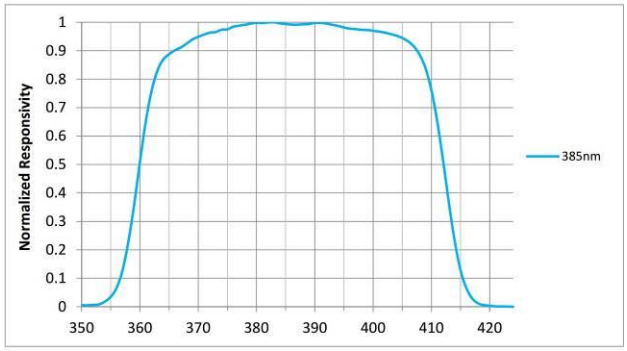
EIT2.0 LLC 900 Sycolin Rd Suite #300, Leesburg, VA 20175 USA
Phone (571) 578-3075 Email: uv@eit20.com Web: www.eit20.com

EIT2.0 Part Number: SAL_M1002 Rev. 1.1 June 8 2023

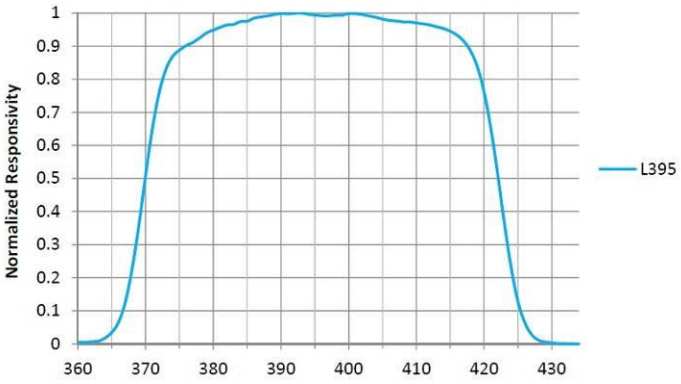
The spectral responses of the LED Compact Sensors are shown below



Appendix A Figure 2: L365 Response



Appendix A Figure 3: L385 Response



Appendix A Figure 3: L395 Response

L405 Response: 380-432 nm

Appendix A Figure 4: L405 Response

The LED Compact Sensor response for **LED** sources is specified at the time of order from the choices below:

- **L365 (340-392 nm)**
- **L385 (360-412 nm)**
- **L395 (370-422 nm)**
- **L405 (380-432 nm)**

Appendix B. Standard/LED Compact Sensor, DIN Rail and Online UV Intensity Display Module

Feature	CS-1 With purge	CS-2 Without Purge	Standard DIN Rail DRM-007	Online UV Intensity Display Module (Legacy Unit, No Longer Available)
Size	0.57 x 1.10 x 0.75” (1.45 x 2.78 x 1.91 cm)	0.57 x 0.60 x 0.75” (1.45 x 1.52 x 1.91 cm)	3.56 x 3.11 x 0.98” (9.04 x 7.90 x 2.29 cm)	Front Plate: 6.5 x 5” (16.51 x 12.70 cm)
Weight	0.8 oz (22.68 g)	0.7 oz (19.86 g)	3.6 oz (101 g)	4.60 oz (115 g)
Material	Aluminum Housing	Aluminum Housing	DIN Rail Housing	Front Plate & Metal housing
Connector & Cable Type	2 wire, Teflon Shielded 10’ (3 m) standard	2 wire, Teflon Shielded 10’ (3 m) standard	Two Wire (Type B)	BNC (Type A)
Operating Temperature Range	UVA, UVB, UVV: 0-100°C UVC & L-Bands: 0-70°C	UVA, UVB, UVV: 0-100°C UVC & L-Bands: 0-70°C	0-50°C	0-50°C
UV Bands & Power Source	UVA, UVB, UVC or UVV L365, L385. L395 or L405 Specified when ordered	UVA, UVB, UVC or UVV L365, L385. L395 or L405 Specified when ordered	20-28 Volts AC or DC 70 mA maximum	20-28 Volts AC or DC 500 mA maximum
Sensor Options / Display, Output & Indicators	Sensors are available in multiple aperture sizes, specified at time of order. Aperture size used dependent on source power & mounting location		No Display 0-10 VDC or 4-20 mA proportional to UV intensity	Display: 0-199% 2½ digit 0-10 VDC proportional to UV intensity; display indication of 100% = 5V, Green/Red limit indicator lamps to indicate above or below set point
Acceptance Angle Accuracy	Approximate acceptance angle of 5° degrees	Approximate acceptance angle of 13° degrees	+/- 3% of full scale (10 Volts), Alarm Set Points +/- 5% from threshold setting	+/- 3% of full scale (10 Volts, 200%), Alarm Set Points +/- 5% from threshold setting as compared to 200%
Tubing Size	Use tubing with an Internal Diameter of 1/16”	NA	NA	NA

Appendix C. EMI Compact Sensor and EMI DIN Rail Specifications

Feature	CS-1 With purge	CS-2 Without Purge	BTR Housing Behind The Reflector	EMI DIN Rail
Size	0.57 x 1.10 x 0.75” (1.45 x 2.78 x 1.91 cm)	0.57 x 0.60 x 0.75” (1.45 x 1.52 x 1.91 cm)	0.55 x 0.55 x 1.55” (1.40 x 1.40 x 3.90 cm)	3.56 x 3.11 x 0.98” (9.04 x 7.90 x 2.29 cm)
Weight	0.8 oz (22.68 g)	0.7 oz (19.86 g)	1.0 oz (28.35 g)	3.6 oz (101 g)
Material	Aluminum Housing	Aluminum Housing	Aluminum Housing	DIN Rail Housing
Connector & Cable Type	3 wire, Teflon Shielded 10’ (3 m) standard	3 wire, Teflon Shielded 10’ (3 m) standard	3 wire, Teflon Shielded 10’ (3 m) standard	Two Wire (Type B)
Operating Temperature Range	UVA, UVB, UVV: 0-100°C UVC: 0-70°C	UVA, UVB, UVV: 0-100°C UVC: 0-70°C	0-100°C	0-50°C
UV Bands & Power Source	UVA, UVB, UVC, UVV Specified when ordered	UVA, UVB, UVC, UVV Specified when ordered	UVA, UVB, UVC, UVV Specified when ordered	20-28 Volts AC or DC 70 mA maximum
Sensor Options / Display, Output & Indicators	Sensors are available in multiple aperture sizes, specified at time of order. Aperture size used dependent on source power & mounting location			No Display 0-10 VDC proportional to UV intensity
Acceptance Angle Accuracy	Approximate acceptance angle of 5° degrees	Approximate acceptance angle of 13° degrees	Approximate acceptance angle of 4° degrees	+/- 3% of full scale (10 Volts), Alarm Set Points +/- 5% from threshold setting
Tubing Size	Use tubing with an Internal Diameter of 1/16”	NA	NA	NA

Appendix D. MultiBrite® Information

MultiBrite

MultiBrite Signal Conditioning Unit

Information on the EIT 2.0 LLC MultiBrite can be found in this section. The unit was discontinued due to obsolete components. Service is extremely limited on any MultiBrite units still in use.

The tense used in this original Online Products User's Guide has not been changed to reflect that the MultiBrite is obsolete.

The MultiBrite is designed to monitor up to four UV sources simultaneously and sound an alarm when any of the lamps falls below a user-defined threshold. In curing systems with more than four UV sources or where monitoring of different UV bandwidths (i.e. UVA and UVC) is required, multiple MultiBrite units can be linked to provide a centralized alarm system. During setup, a low-level threshold is set. This threshold is applicable to all UV sources in the system. If any of the intensity signals drop below the threshold, an alarm sounds, and a red alarm indicator is visible.

Output signals (0-10V or 4-20 mA) are also generated for each Compact Sensor intensity signal. These output signals can be interfaced to a PLC or other control system equipped with analog signal processing.

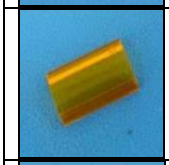
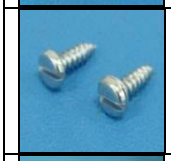
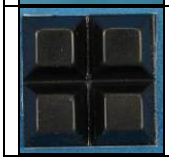
The MultiBrite is available in two models, the Model MB100AC1 for use in 110V environments and the MB240AC1 for use with 220V power.

Appendix D Figure 1: MultiBrite with Four Compact Sensors

Appendix D Section 1.1 MultiBrite Accessories

The MultiBrite® is delivered with an accessory kit containing four strain relief kits, a screw driver adjustment tool, and four black rubber feet. Appendix D Table 1 lists each supplied item.

Appendix D Table 1: MultiBrite Supplied Hardware

Hardware	Description	Use
	4x Strain Relief Shell	Contained in the Strain Relief Kits. Encloses terminal strips for pullout protection
	4x Strain Relief Clamp	Contained in the Strain Relief Kits. Used with two Flat Head Screws to secure terminal strip to Strain Relief Shell
	4x Strain Relief Shield	Contained in the Strain Relief Kits. Prevents Strain Relief Shell top and bottom from separating
	8x Flat Head Screws	Contained in the Strain Relief Kits. Used with Strain Relief Clamp to secure terminal strip to Strain Relief Shell
	Screw Driver Adjustment Tool	Adjust UV intensity and alarm threshold
	4x Rubber Feet	Prevents MultiBrite® from accidentally moving during operation.

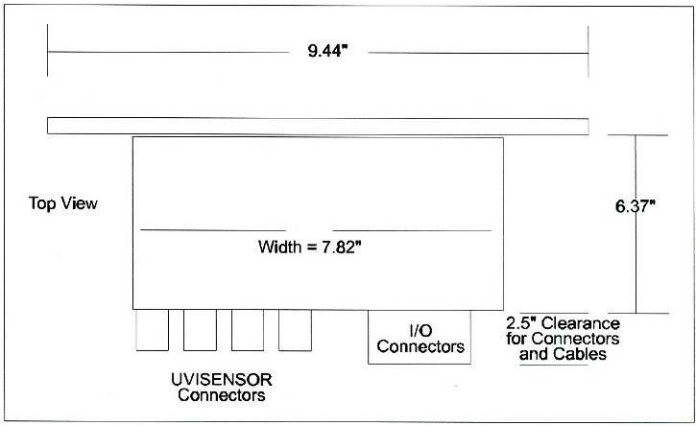
Appendix D 1.2 MultiBrite Installation

The MultiBrite offers multiple options for installation. This unit may be wall, panel, or rack mounted or simply set on a surface. Use these guidelines to determine the location for installation:

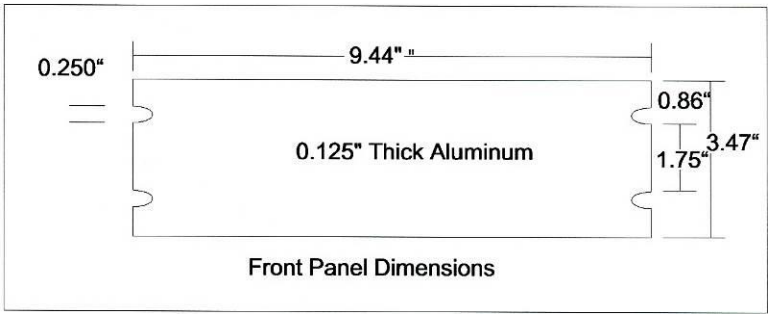
- Select an area where the temperature does not exceed 50° C (122° F).
- Even though the MultiBrite has built-in noise reduction, position the unit to avoid electrical noise.

- Ensure that the Compact Sensor cable(s) can reach the MultiBrite and are free from electrical interference.
- *Note: See Section 6 for Compact Sensor Cable Discussion. The MultiBrite used BNC connectors like the Online UV Intensity Display Module.*

The MultiBrite is designed with ½ rack dimensions and is delivered with a top and back enclosure and a front panel. The total area utilized by the MultiBrite is 9.44 in (23.98 cm) wide x 3.5 in (8.89 cm) high x 8.42 in (21.39 cm) deep. Appendix D Figure 2 provides the MultiBrite top view dimensions and Appendix D Figure 3 provides the front view dimensions. When installation space is tight, remove the strain relief shells to reduce the 2.5-inch clearance needed for the I/O Connectors to 1.5 inches.



Appendix D Figure 2: MultiBrite® Top View Dimensions



Appendix D Figure 3: MultiBrite® Front View Dimensions

Appendix D 1.3 MultiBrite Configuration

The MultiBrite is easily configurable to meet customer and PLC/Control System requirements. Switches on the Front Panel allow the customer to select one of four intensity signals or the low-level threshold for display, place any of the four UV sources (channels 1 – 4) in standby mode, and to disable the audible alarm. Internal switches allow the customer to select an intensity range (0 – 100% or 0 – 200%) and a voltage output range (0 – 10 Volts or 0 – 5 Volts). Time Delay switches on the rear of the MultiBrite allow the customer to define a length of time before

the low intensity alarm is triggered. This option allows the UV curing system to power up without triggering a low intensity alarm.

If you have questions on MultiBrite configuration, please contact EIT 2.0 or your local distributor for additional information.

Appendix D 1.3.1 Intensity, Voltage, and Current Output Range

The intensity range and voltage output range for each lamp (channels 1 to 4) may be user-adjusted, allowing the MultiBrite® to interface with a wide range of process control and monitoring equipment. Switches (S1, S2, S3, and S4 corresponding to UV channels 1 to 4) are located inside the enclosure. Each switch may be placed in one of three positions. Appendix D Table 2 specifies the intensity range, voltage output range, and current output range for each position.

Appendix D Table 2: MultiBrite Intensity, Voltage, and Current Output Range

Switch Position	Intensity Range	Voltage Output Range	Current Output Range
1	0 – 100%	0 – 10 V	4 – 20 mA
2	0 – 200%	0 – 10 V	4 – 20 mA
3	0 – 100%	0 – 5 V	4 – 20 mA

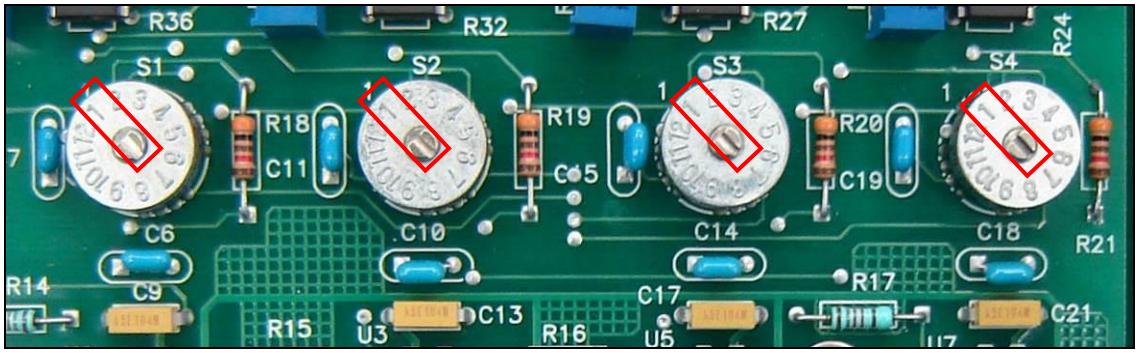
USE ESD (Electro Static Discharge) SAFE PROCEDURES WHEN OPENING THE MULTIBRITE ASSEMBLY HOUSING.

The MultiBrite is delivered with all four switches in position 1. Follow these instructions to adjust the switches.

- Remove the top and back cover. RESERVE THE SCREWS FOR REINSTALLATION. Appendix D Figure 4 highlights the screws to be removed.

Appendix D Figure 4: MultiBrite Top and Back Cover Screws

- Use the screwdriver adjustment tool provided in the accessory kit to adjust switches S1 (channel 1), S2 (channel 2), S3 (channel 3), or S4 (channel 4) to positions 1, 2 or 3 as needed. Appendix D Figure 5 shows all switches in position 1.

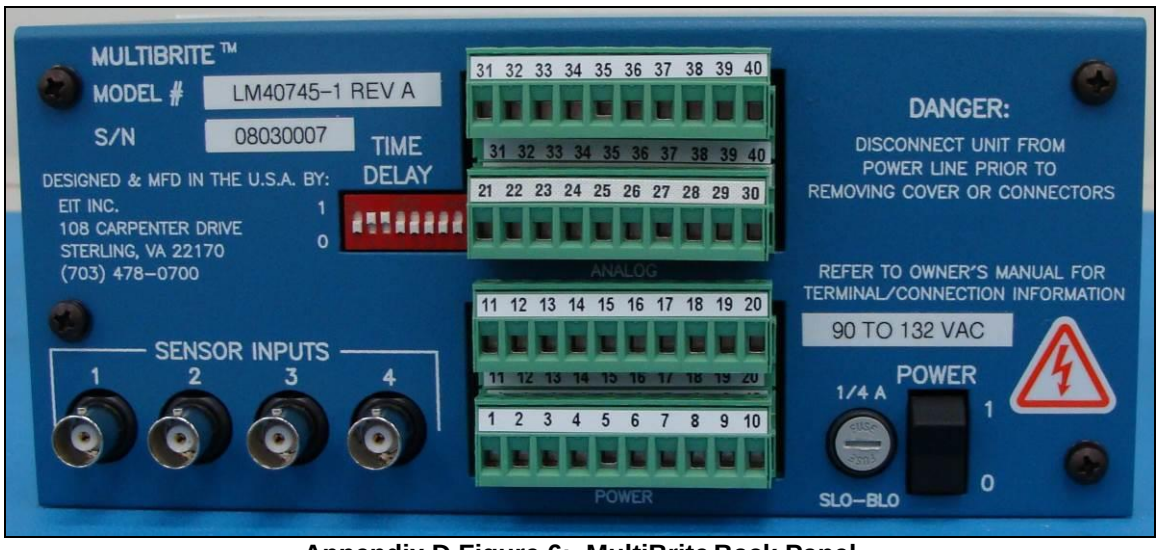


Appendix D Figure 5: MultiBrite Intensity and Voltage Output Adjustment Switches

- Reinstall the top and back cover.

Appendix D 1.3.2 Time Delay Switch Configuration

The MultiBrite uses a Lamp Power Detection Control to determine when power has been applied to the lamps in the curing system. This control receives signal from the PLC/Control System (See Appendix D Section 1.4 MultiBrite Wiring). When lamp power is detected, the control initiates a time delay to the alarm circuit to prevent premature low intensity alarms during lamp warm-up. The length of the delay is user-adjustable using the eight Time Delay switches on the back of the MultiBrite (see Appendix D Figure 6 MultiBrite Back Panel). A switch is "ON" in the up or "1" position and "OFF" in the down or "0" position. Appendix D Table 3 provides the length of delay in seconds provided by each "ON" switch.



Appendix D Figure 6: MultiBrite Back Panel

Appendix D Table 3: Time Delay Switch Values in Seconds							
Switch 1	**Switch 2**	**Switch 3**	**Switch 4**	**Switch 5**	**Switch 6**	**Switch 7**	**Switch 8**
5	10	20	40	80	160	320	640

The Time Delay switches in Appendix D Figure 6 show Switches 2 and 3 on and Switches 1, 4, 5, 6, 7, and 8 off. Using the delay values in Appendix D Table 3, the Low Intensity alarm will be enabled 10 + 20 or 30 total seconds after lamp power is detected.

Appendix D 1.3.3 MultiBrite Display Selection

The MultiBrite can display the relative intensity of any of the lamps (channels 1 to 4) or the low intensity threshold setting. Use the switch on the front panel to select lamp 1 (position 1), lamp 2 (position 2), lamp 3 (position 3), lamp 4 (position 4), or the low intensity threshold (Lower Limit position). See Appendix D Section 1.5 to adjust the low intensity threshold. Appendix D Figure 7 shows Channel 4 selected for display.

Appendix D Figure 7: MultiBrite Front Panel

Appendix D 1.3.4 Audible Alarm

The MultiBrite sounds an audible alarm and lights the Alarm LED when a Low Intensity or Power Alarm condition occurs for any of the four channels. The audible alarm may be disabled by adjusting the Audible Alarm On/Off switch. Appendix D Figure 7 shows the audible alarm off (down).

Appendix D 1.3.5 Channel Standby

When maintenance is required on a UV lamp, the input channel may be placed in standby mode to prevent inadvertent alarms. Switch any of the Channel On/Off switches in the off (down) position to place them in standby mode. Appendix D Figure 7 shows all channels in the on (up) position.

If you have questions on MultiBrite configuration, please contact EIT 2.0 or your local representative/distributor for more information.

Appendix D 1.4 MultiBrite Wiring

WARNING: USE EXTREME CAUTION WHEN WIRING THE MULTIBRITE. TURN OFF ALL POWER. USE LOCKOUT TAGS TO PREVENT INADVERTANT POWER-UP. SEE FIGURE 6 IN SECTION 3.6 OF THE PPRODUCT USER's GUIDE FOR SAMPLE LOCKOUT TAGS.

The MultiBrite uses four pluggable terminal blocks to connect to power and a PLC or Control System. These terminal blocks are removed for wiring, enclosed in a strain relief shell, labeled, and reinserted into the MultiBrite mating connectors.

If you have any questions on MultiBrite wiring, please contact EIT 2.0 or your local distributor for additional information.

Appendix D 1.4.1 Terminal Block 1

The terminals in Block 1 receive 24V AC or DC signals from a PLC or Control System. Signal is required on terminals 1 and 2 to make the MultiBrite operational and to enable the MultiBrite alarm detection circuitry. Power received on terminals 3 through 10 disables channels 1 through 4 for MultiBrite systems that are not using all four channels. Wiring for the MB100AC1 and MB240AC1 models is identical.

Appendix D Table 4 provides a description of the Block 1 terminals.

Appendix D Table 4: MultiBrite Terminal Block 1

Terminal #	Description	Optional / Required	Use
1	24V Lamp Power Detection Input	Required	Enable MultiBrite System operation. Initiate alarm delay timer when curing lamps are powered on. Trigger Lamp Power Detection Alarm when power is interrupted.
2	24V Lamp Power Detection Input	Required	Enable MultiBrite System operation. Initiate alarm delay timer when curing lamps are powered on. Trigger Lamp Power Detection Alarm when power is interrupted.
3	Channel 1 24V Power Input	Optional	Disable channel 1 through PLC/Control System
4	Channel 1 24V Power Input	Optional	Disable channel 1 through PLC/Control System
5	Channel 2 24V Power Input	Optional	Disable channel 2 through PLC/Control System
6	Channel 2 24V Power Input	Optional	Disable channel 2 through PLC/Control System

Appendix D Table 4: MultiBrite Terminal Block 1			
Terminal #	**Description**	**Optional / Required**	**Use**
7	Channel 3 24V Power Input	Optional	Disable channel 3 through PLC/Control System
8	Channel 3 24V Power Input	Optional	Disable channel 3 through PLC/Control System
9	Channel 4 24V Power Input	Optional	Disable channel 4 through PLC/Control System
10	Channel 4 24V Power Input	Optional	Disable channel 4 through PLC/Control System

Lamp Power Detection (Required)
Connect the AC or DC power input from the PLC or Control System with Lamp Detection capabilities to the MultiBrite as follows.

- 24V Lamp Power Detection input at terminal 1
- 24V Lamp Power Detection input at terminal 2

Channels 1 – 4 24V Power Input (Optional)
Power from the PLC/Control System may be used to disable a channel from the MultiBrite System. When the channel is disabled, the relative intensity is not monitored for Low Intensity or Lamp Failure alarms.

To disable Channel 1, connect the PLC/Control System to the MultiBrite as follows:

- 24V Power Input at terminal 3
- 24V Power Input at terminal 4

To disable channel 2, connect the PLC/Control System to the MultiBrite as follows:

- 24V Power Input at terminal 5
- 24V Power Input at terminal 6

To disable Channel 3, connect the PLC/Control System to the MultiBrite as follows:

- 24V Power Input at terminal 7
- 24V Power Input at terminal 8

To disable Channel 4, connect the PLC/Control System to the MultiBrite as follows:

- 24V Power Input at terminal 9
- 24V Power Input at terminal 10

Appendix D 1.4.2 Terminal Block 2

Block 2 contains the terminals used to power on the MultiBrite and to output low intensity and power failure alarm signals to the PLC/Control System or external alarm device. Power on requirements for the MB100AC1 and MB240AC1 models are:

- MB100AC1: 90 to 132 Volts AC, 47 to 440 HZ, 0.20 Amperes

- MB240AC1: 180 to 264 Volts AC, 47 to 440 HZ, 0.20 Amperes

To successfully use the MultiBrite low intensity and lamp power alarm signals, the PLC/Control System or external alarm device must operate within the following parameters:

- Voltage less than 125V AC with a resistive load less than 0.5 Amperes
- Voltage less than 110V DC with a resistive load less than 0.3 Amperes

Appendix D Table 5 provides a description of each terminal in Block 2.

Appendix D Table 5: MultiBrite Terminal Block 2

Terminal #	Description	Optional / Required	Use
11	AC Power Line 1 (L1)	Required	Connect MultiBrite to 110 or 220 AC Power
12	AC Power Line 2 (L2)	Required	Connect MultiBrite to 110 or 220 AC Power
13	AC Power Ground	Required	Ground connection to 110 or 220 AC Power
14	Not Used	Not Used	Not Used
15	Low Intensity Alarm Normally Open (NO) Contact	Optional	Used when PLC or Control System provides low intensity alarm response.
16	Low Intensity Alarm Common	Optional	Used when PLC or Control System provides low intensity alarm response.
17	Low Intensity Alarm Normally Closed (NC) Contact	Optional	Used when PLC or Control System provides low intensity alarm response.
18	Lamp Power Alarm Normally Open (NO) Contact	Optional	Used when PLC or Control System provides lamp failure alarm response.
19	Lamp Power Alarm Common	Optional	Used when PLC or Control System provides lamp failure alarm response.
20	Lamp Power Alarm Normally Closed (NC) Contact	Optional	Used when PLC or Control System provides lamp failure alarm response.

AC Power (Required)

Wiring for the MB100AC1 and MB240AC1 power supply is identical. Connect the power source to the MultiBrite as follows.

- AC Power Line 1 at terminal 11
- AC Power Line 2 at terminal 12
- AC Power Common at terminal 13

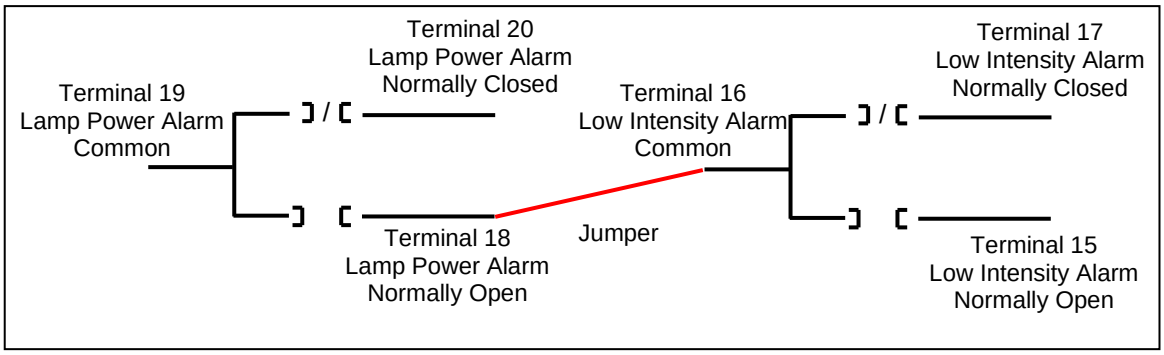
Low Intensity and Lamp Power Detection Alarm Relays (Optional)
The MultiBrite provides two alarm relays to monitor Low Lamp Intensity and Power Failure. The UV intensity from the 1 to 4 lamps is compared to a common low-level threshold. The Low Intensity Alarm relay is activated when any of the intensity signals (lamps 1 to 4) drops below the threshold. The Lamp Power Detection Alarm is activated when power to the MultiBrite or power to the 1 to 4 UV lamps is disrupted. When either alarm is activated, the MultiBrite Alarm LED turns red and an audible alarm sounds. See Appendix D Section 1.3.4 to disable the audible alarm. Connect the following terminals to the PLC/Control System or external alarm device as follows:

- Low Intensity Alarm Normally Open (NO) Contact at terminal 15
- Low Intensity Alarm Common at terminal 16
- Low Intensity Alarm Normally Closed (NC) Contact at terminal 17
- Lamp Power Detection Normally Open (NO) Contact at terminal 18
- Lamp Power Detection Common at terminal 19
- Lamp Power Detection Normally Closed (NC) Contact at terminal 20

Integrate Low Intensity and Lamp Power Alarms (optional)
To determine that an alarm condition exists because of a power failure rather than a lamp failure, the Low Intensity Alarm may be disabled when the Lamp Power Detection relay indicates a loss of lamp power. In this case, the two relays are wired in series as follows:

- Low Intensity Alarm Normally Open (NO) Contact at terminal 15
- Low Intensity Alarm Normally Closed (NC) Contact at terminal 17
- Lamp Power Detection Common at terminal 19
- Lamp Power Detection Normally Closed (NC) Contact at terminal 20
- Connect the Low intensity Alarm Common (terminal 16) to the Lamp Power Detection Alarm Normally Open Contact (terminal 18) using jumper wire.

Appendix D Figure 8 illustrates this configuration.



Appendix D Figure 8: MultiBrite Integrated Alarm Configuration

Multiple MultiBrite with a Common Alarm
To connect a second MultiBrite for a common alarm configuration, connect terminal 18 from the second MultiBrite to terminal 18 of the first MultiBrite.

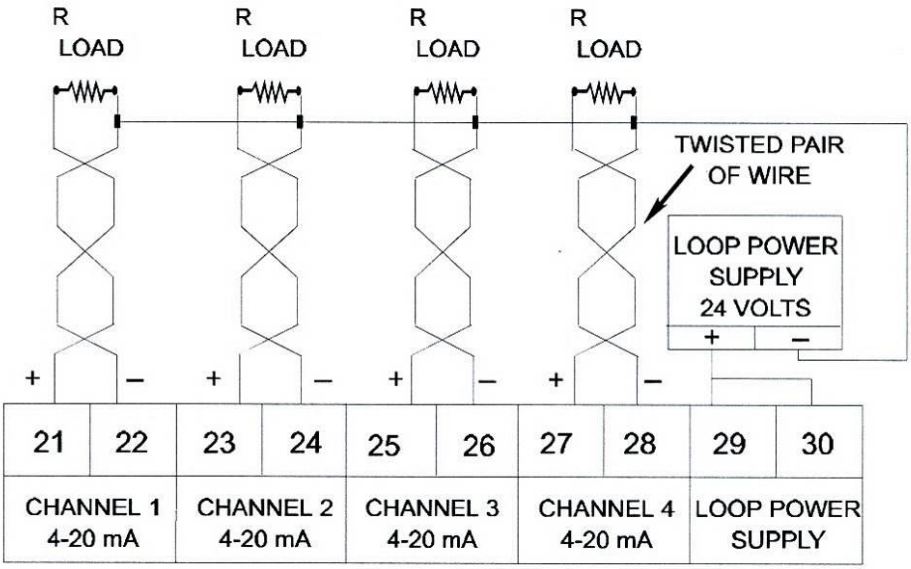
Appendix D 1.4.3 Terminal Block 3

The MultiBrite uses an external 24V AC or DC power supply to transmit a continuous 4 – 20 mA analog current loop for each of the system's active channels (1 – 4). Signal strength is relative to the intensity of the observed lamps and is capable of driving resistive loads up to 250 Ohms. If the relative intensity is at peak conditions (display shows 100%), the current output is 20mA. When the relative intensity is 0%, the current output is 4mA. See Appendix D Section 1.3.1 for information relating to intensity range configuration.

Appendix D Table 6 provides a description of the Block 3 terminals and Appendix D Figure 9 provides a Block 3 wiring diagram.

Appendix D Table 6: MultiBrite Terminal Block 3

Terminal #	Description	Optional / Required	Use
21	Channel 1 Current Output (mA) +	Optional	Output Channel 1 4-20mA signal to PLC/Control System
22	Channel 1 Current Output (mA) -	Optional	Output Channel 1 4-20mA signal to PLC/Control System
23	Channel 2 Current Output (mA) +	Optional	Output Channel 2 4-20mA signal to PLC/Control System
24	Channel 2 Current Output (mA) -	Optional	Output Channel 2 4-20mA signal to PLC/Control System
25	Channel 3 Current Output (mA) +	Optional	Output Channel 3 4-20mA signal to PLC/Control System
26	Channel 3 Current Output (mA) -	Optional	Output Channel 3 4-20mA signal to PLC/Control System
27	Channel 4 Current Output (mA) +	Optional	Output Channel 4 4-20mA signal to PLC/Control System
28	Channel 4 Current Output (mA) -	Optional	Output Channel 4 4-20mA signal to PLC/Control System
29	Local Loop Power Supply +	Required	Connect to 24V Power Source
30	Local Loop Power Supply +	Required	Connect to 24V Power Source



Appendix D Figure 9: Terminal Block 3 Wiring Diagram

Twisted pair cables should be used to connect the Terminal Block 3 terminals to the PLC/Control System. Wiring for the MB100AC1 and MB240AC1 models is identical.

Channels 1 – 4 Current Output (Optional)
Connections to channels 1 through 4 are noted as optional, but at least one of the four channels must be active.

Connect Channel 1 of the MultiBrite to the PLC/Control System as follows:

- Channel 1 Input (+) at terminal 21
- Channel 1 Output (-) at terminal 22 and Loop Power Supply Output (-)

Connect Channel 2 of the MultiBrite to the PLC/Control System as follows:

- Channel 2 Input (+) at terminal 23
- Channel 2 Output (-) at terminal 24 and Loop Power Supply Output (-)

Connect Channel 3 of the MultiBrite to the PLC/Control System as follows:

- Channel 3 Input (+) at terminal 25
- Channel 3 Output (-) at terminal 26 and Loop Power Supply Output (-)

Connect Channel 4 of the MultiBrite to the PLC/Control System as follows:

- Channel 4 Input (+) at terminal 27
- Channel 4 Output (-) at terminal 28 and Loop Power Supply Output (-)

Loop Power Supply (Required)
Connect the MultiBrite to a PLC/Control System or battery as follows:

- PLC/Control System or battery power input (+) at terminals 29 and 30.

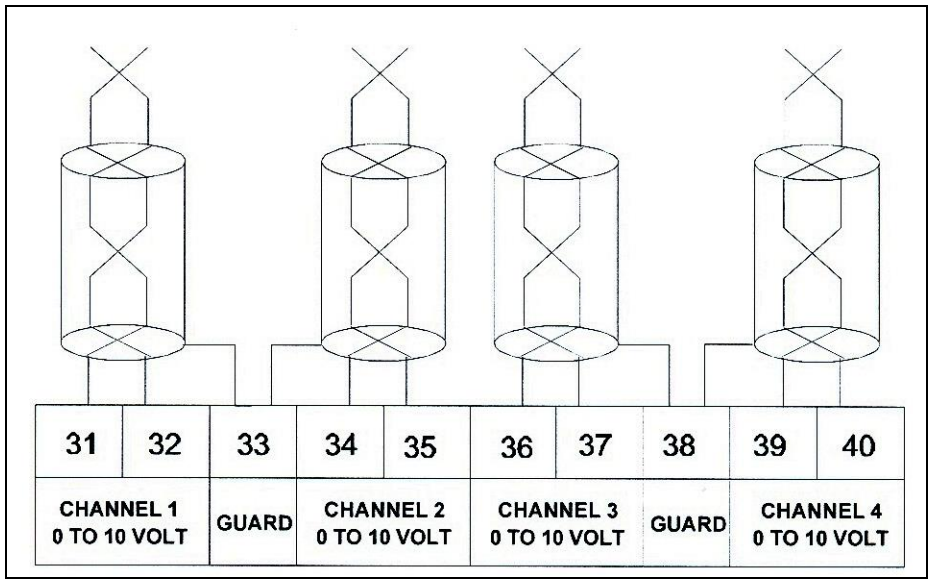
Appendix D 1.4.4 Terminal Block 4

The MultiBrite provides a continuous 0 – 10 Volt analog output signal for each of the system's active channels. The output voltage is relative to the intensity of the observed lamps and is capable of driving resistive loads greater than 10K Ohms (10V output option) or 5K Ohms (5V output option). If the relative intensity is at peak conditions (100%), the voltage output is 10V or 5V. When the relative intensity is 0%, the voltage output is 0V. See Appendix Section 1.3.1 for information relating to intensity range and voltage output range configuration.

Appendix D Table 7 provides a description of the Block 4 terminals and Appendix D Figure 10 provides a Block 4 wiring diagram.

Appendix D Table 7: MultiBrite Terminal Block 4

Terminal #	Description	Optional / Required	Use
31	Channel 1 Voltage Output (+)	Optional	Output Channel 1 0 – 10V signal to PLC/Control System
32	Channel 1 Voltage Output (-)	Optional	Output Channel 1 0 – 10V signal to PLC/Control System
33	Channel 1 and Channel 2 Ground	Optional	Connect Channel 1 and/or Channel 2 ground to PLC/Control System
34	Channel 2 Voltage Output (+)	Optional	Output Channel 2 0 – 10V signal to PLC/Control System
35	Channel 2 Voltage Output (-)	Optional	Output Channel 2 0 – 10V signal to PLC/Control System
36	Channel 3 Voltage Output (+)	Optional	Output Channel 3 0 – 10V signal to PLC/Control System
37	Channel 3 Voltage Output (-)	Optional	Output Channel 3 0 – 10V signal to PLC/Control System
38	Channel 3 and Channel 4 Ground	Optional	Connect Channel 3 and/or Channel 4 ground to PLC/Control System
39	Channel 4 Voltage Output (+)	Optional	Output Channel 4 (lamp 4) 0 – 10V signal to PLC/Control System
40	Channel 4 Voltage Output (-)	Optional	Output Channel 4 (lamp 4) 0 – 10V signal to PLC/Control System



Appendix D Figure 10: Terminal Block 4 Wiring Diagram

Twisted pair shielded cables should be used to connect the Terminal Block 4 terminals to the PLC/Control System. Wiring for the MB100AC1 and MB240AC1 models is identical.

Voltage Output (Optional)
Connections to channels 1 through 4 are optional, as noted, however, one of the four channels must be active.

Connect Channel 1 of the MultiBrite to the PLC/Control System as follows:

- Channel 1 Input (+) to terminal 31
- Channel 1 Output (-) to terminal 32
- Channel 1 Ground to terminal 33

Connect the Channel 2 of the MultiBrite to the PLC/Control System as follows:

- Channel 2 Ground to terminal 33
- Channel 2 Input (+) to terminal 34
- Channel 2 Output (-) to terminal 35

Connect channel 3 of the MultiBrite to the PLC/Control System as follows:

- Channel 3 Input (+) to terminal 36
- Channel 3 Output (-) to terminal 37
- Channel 3 Ground to terminal 38

Connect Channel 4 of the MultiBrite to the PLC/Control System as follows:

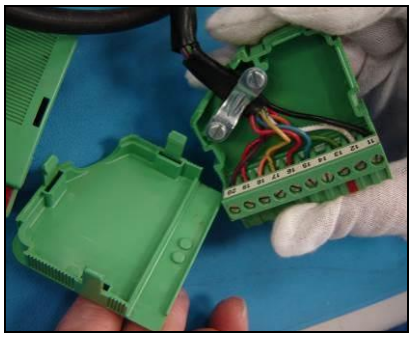
- Channel 4 Ground to terminal 38
- Channel 4 Input (+) to terminal 39
- Channel 4 Output (-) to terminal 40

Appendix D 1.4.5 Installing the Terminal Blocks in Strain Relief Shells

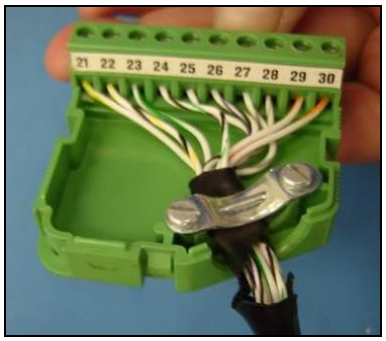
Four strain relief kits are provided in the MultiBrite Hardware Kit. Each Strain Relief Kit has a top and a bottom shell, a strain relief clamp, two flat head screws, and a Strain Relief Shield. Follow these steps to install each terminal block into a Strain Relief Shell.

1. Fit each terminal block into the bottom half of a strain relief shell as shown in Appendix D, Figure 11.

2. Secure the terminal block wires to the bottom shell with the Strain Relief Clamp and two Flat Head Screws as shown in Appendix D, Figure 12.



Appendix D Figure 11: Terminal Block in Strain Relief Shell



Appendix D Figure 12: Strain Relief Clamp

3. Fit the Strain Relief Shell top onto the bottom as shown in Appendix D Figure 13.

4. Snap the top into place.

5. Once the Strain Relief Shell is closed, install the Strain Relief Shield as shown in Appendix D, Figure 14 to prevent the top and bottom from separating.

Appendix D Figure 13: Strain Relief Shell Top

Appendix D Figure 14: Strain Relief Shell with Shield

- Identify each terminal block by writing the block number on the Strain Relief Shells as shown in Appendix D Figure 15.

Appendix D Figure 15: Labeled Strain Relief Shells

Appendix D 5.4.6 Terminal Block Installation

Reconnect the terminal blocks to the MultiBrite. Match the terminal block to its matching connectors at the back of the MultiBrite (See Appendix D, Figure 16). Verify the following:

1. Terminal Block 1 is connected to terminals 1 through 10. This is the bottom connector on the MultiBrite.

2. Terminal Block 2 is connected to terminals 11 through 20. This connector is located second from the bottom.

3. Terminal Block 3 is connected to terminals 21 through 30. This connector is located second from the top.

4. Terminal Block 4 is connected to terminals 31 through 40. This connector is the top connector on the MultiBrite.

Appendix D Figure 16: MultiBrite with Compact Sensors and Terminal Blocks

Appendix D 1.4.7 Compact Sensor Interconnection

Appendix D, Figure 16 shows four sensor input connectors on the back of the MultiBrite. These connectors are used to link the Compact Sensors to the MultiBrite.

Sensor Input 1 corresponds to channel 1. Similarly, Sensor Input 2 through 4 correspond to channels 2 through 4. Follow these steps to install the Compact Sensors.

Label each Compact Sensor with the appropriate channel number. See Appendix D, Figure 17 for an example.

Appendix D Figure 17: Compact Sensors Labeled with Channel Numbers

- Connect each Compact Sensor to the correct Sensor Input as shown in Appendix D, Figure 16.

Appendix D 1.5 MultiBrite® Setup

After the MultiBrite® is installed and wired correctly, the baseline UV intensity for each channel (usually 100%) and the Alarm Threshold (process dependent) are set. Follow the Equipment Setup procedure before adjusting the UV Intensity Baselines or setting the Alarm Threshold.

Appendix D 1.5.1 Equipment Setup

FOLLOW THESE STEPS BEFORE SETTING THE BASELINE INTENSITY OR ALARM THRESHOLD:

1. Replace the existing UV lamps with new lamps and clean the reflectors. This allows the Compact Sensors to observe 100% UV output.

2. Turn on power to the UV lamps, PLC/Control System, and the MultiBrite.

3. Allow the UV lamps to warm up and stabilize for 15 to 30 minutes.

Appendix D 1.5.2 UV Intensity Baseline Adjustment

To establish the baseline setting, follow these steps:

Appendix D Figure 18: Display Selection for Channel 1

1. Turn the Display Selector switch to select the first active channel. Appendix D, Figure 18 shows Channel 1 selected.

2. Set the Channel On/Off switch for the selected channel to the on (up) position. Appendix D, Figure 18 shows all four channels in the on (up) position.

3. Use the adjustment tool from the Hardware Kit to adjust the channel's Calibrate Potentiometer until the display reads 100% for the desired channel. Appendix D, Figure 19 shows how to adjust the channel 1 Calibration Potentiometer.

4. The MultiBrite LCD is capable of displaying 0 – 199 to report power surge or brighter than normal bulbs. Reset the baseline reading as necessary.

Appendix D Figure 19: Channel 1 100% Baseline Calibrate POT

5. Repeat these steps for the remaining channels.

Appendix D 1.5.3 Alarm Threshold Settings

The MultiBrite design incorporates a 2% noise immunity around the alarm threshold known as hysteresis. The UV intensity must drop 2% below the threshold before the alarm is triggered. To adjust the Alarm Threshold, follow these steps:

1. Turn the Display Selector switch to select Low Level (LL) as shown in Appendix D, Figure 20.

2. Use the adjustment tool from the Hardware Kit to adjust the LL Calibrate Potentiometer until the display reads the desired Alarm Threshold for your specific process. The Low Level is set to 70% in Appendix D Figure 20 below.

Appendix D Figure 20: Low Level Threshold

MultiBrite Technical Specifications

Display	Source selected by turning switch to different channels
Display Range	0 – 199%
Input Power Requirements	MB100AC1: 90 to 132 Volts AC; 47 to 440 HZ, 0.20 Amperes MB240AC1: 180 to 264 Volts AC; 47 to 440 HZ, 0.20 Amperes
Input Current Requirements	0.2 – 2.0 microampere for 100% full scale reading. Adjustable via 20 turn “Calibrate” adjustment
Output Current Range	4 – 20 mA into a maximum impedance of 250 ohms

Output Voltage Range	0 – 10 VDC into a minimum impedance of 10K ohms 0 – 5 VDC into a minimum impedance of 5K ohms
Alarm Outputs	Dry contacts rated for 0.5A at 125 VAC driving a resistive load
Dimensions	Enclosure 7.0” W x 3.5”H x 5.9” D / 17.78 x 8.89 x 14.98cm Front Plate 9.4” W” x 3.5”H” / 23.88cm x 8.89cm
Weight	3 lbs / 1.36 kg
Construction	Painted aluminum with integral mounting flanges
Mounting	Panel mounted (1/2 rack dimensions)
Operating Temperature	0 - 122° F / 0 – 50° C

Appendix E. Online UV Intensity Display Module (Panel Mount)

Online UV Intensity Display Module (Panel Mount)
Information on the EIT 2.0 LLC Online UV Intensity Display Module (Panel Mount) can be found in this section. The unit was discontinued due to obsolete components. Service is limited on Display Modules units still in use.

The tense used in this original Online Products User's Guide has not been changed to reflect that the Online UV Intensity Display Module (Panel Mount) is obsolete.

Appendix E Online UV Intensity Display Module

The Online UV Intensity Display Module is intended for use with the Standard Compact Sensor. Using it with the EMI Compact Sensor will not provide added noise or EMI Protection.

EIT 2.0 LLC's Online UV Intensity Display Module works in combination with a Compact Sensor to monitor and display the intensity from a single UV source. During Display Module setup, a 100% UV intensity baseline is established and an alarm threshold is set. The Compact Sensor delivers a signal proportional to the UV intensity Display Module. The Module displays the relative signal and also has the option to produce a 0–10 volt output signal, in the same manner as the DIN Rail UV Intensity Monitor described above. Alarm conditions can be set to be displayed on the Display Module. Alarm relay closures can be set to trigger when the signal falls below the user set threshold.

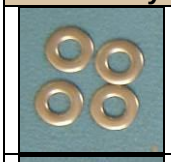
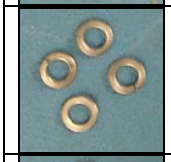
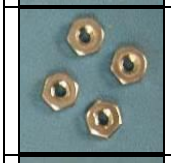
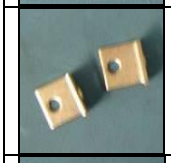
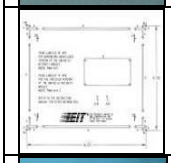
The Online UV Intensity Display Module is intended for applications requiring a front panel display. Cutouts for the monitor are easily made in a UV curing system's control panel or the module may be installed onto the control panel using L-shaped brackets provided in the hardware kit. One Online UV Intensity Display Module and one Compact Sensor are installed for each lamp in the application.

Appendix E Figure 1: Online UV Intensity Display Module and Compact Sensor

Appendix E 1.1 Online UV Intensity Display Module Accessories

The Online UV Intensity Display Module is delivered with an assembly kit and a hardware kit. The assembly kit contains a drill template and an adjustment tool. The hardware kit contains L-shaped brackets, screws, washers, and hex nuts used to mount the module onto the control panel. Appendix E Table 1 provides a description of each item in the accessory and hardware kits.

Appendix E Table 1: Online UV Intensity Display Module Accessories and Hardware

Hardware / Accessory	Description	Use
	4x #6 Flat Washers	Install the monitor directly onto the control panel or to attach the monitor onto the bottom, top, or side of the control panel using the L-shaped brackets.
	4x #6 Lock Washers	Install the monitor directly onto the control panel or to attach the monitor onto the bottom, top, or side of the control panel using the L-shaped brackets.
	4x #6-32 Hex Nuts	Install the monitor directly onto the control panel or to attach the monitor onto the bottom, top, or side of the control panel using the L-shaped brackets.
	2x L-shaped Brackets	Attach the monitor to the bottom, top, or side of the control panel.
	2x #6-32 x 0.600L Pan Head Screws	Attach the L-shaped bracket to the top, bottom, or side of the control panel.
	Drill Template	Use the template to mark the cutout and drill holes needed to install the monitor.
	Screw Driver Adjustment Tool	Adjust UV intensity and alarm threshold

Appendix E 1.2 Online UV Intensity Display Module Installation

WARNING: USE EXTREME CAUTION WHEN INSTALLING THE ONLINE UV INTENSITY DISPLAY MODULE. TURN OFF ALL POWER. USE LOCKOUT TAGS TO PREVENT UNINTENDED POWER-UP. SEE FIGURE 6 IN USER'S GUIDE FOR SAMPLE LOCKOUT TAGS.

EIT 2.0 LLC's Online UV Intensity Display Module may be mounted in a suitable location on the curing system's control panel. Follow these guidelines to determine a desirable location for installation:

- Select an area where the temperature does not exceed 50°C (122°F).
- Even though the Online UV Intensity Display Module has built-in noise rejection, position the module to avoid electrical noise.
- Ensure that the Compact Sensor cable can reach the module and is free from electrical interference.
- Cable extensions and custom-length cables are available from EIT 2.0.
- See Section 5 of the User's Guide for information on Compact Sensor Cables.

The Online UV Intensity Display Module is delivered with a front and rear enclosure. The module may be installed in the curing system's control panel with or without the enclosure. Both methods require creating a cutout in the control panel. The L-shaped brackets from the hardware kit allow the enclosed module to be attached to the top, bottom, or side of the control panel without creating a cutout. The following sections provide instructions for all three installation methods.

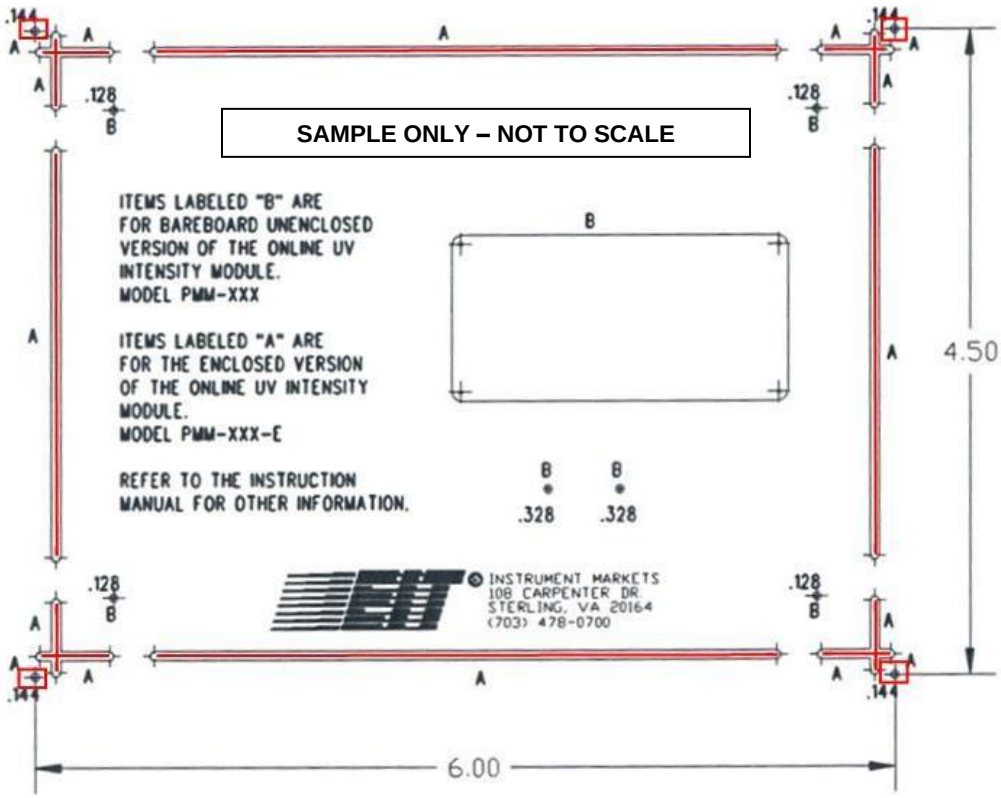
Appendix E 1.2.1 Enclosed Module Installation

To install the enclosed module, cut a 4.12" x 5.62" rectangle and four 0.144" diameter screw holes in the control panel. EIT 2.0 provides a template (part number 92332A) in the accessory kit (See Appendix E Figure 2) for this purpose. Appendix E Figure 3 provides the required cutout and drill dimensions.

Creating the Cutout using the Drill Template

- The drill template (Part #92332A) shows cut lines and drill holes marked "A" and "B". USE ONLY THE CUT LINES AND DRILL HOLES MARKED "A". Appendix E Figure 2 identifies the "A" cut lines and drill holes in red.
- Using a knife or similar tool, open the template's cut lines and drill holes marked "A".

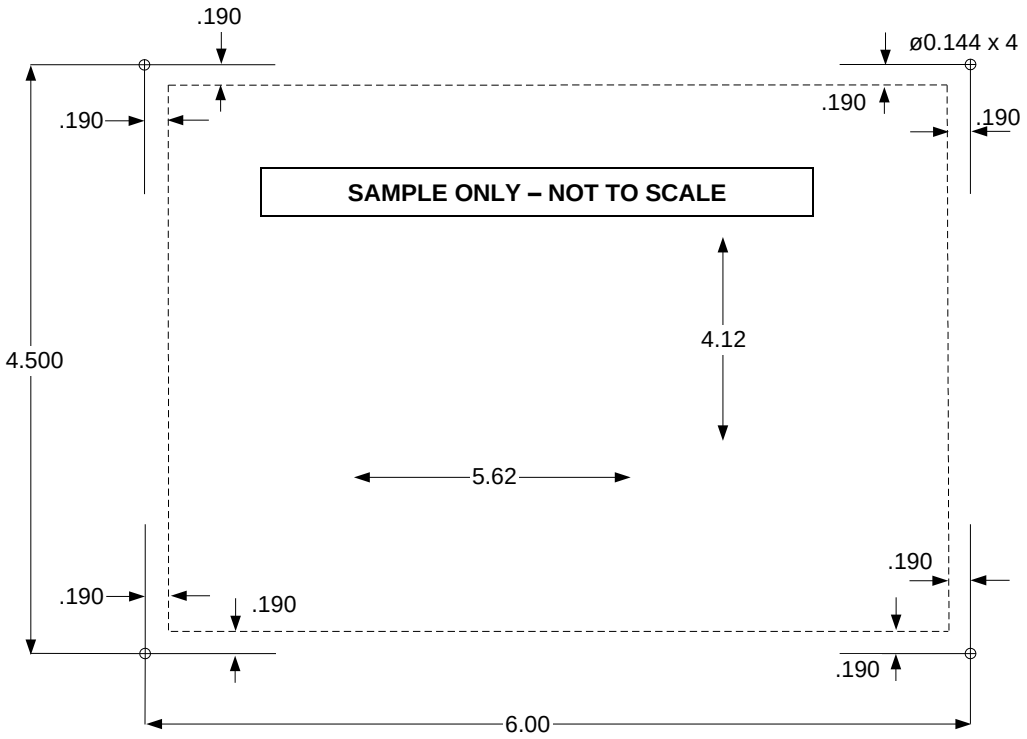
- Using masking tape or other means, secure the drill template to the control panel in the location where the module will be installed.
- Mark the cut lines and drill holes onto the control panel.
- Remove the template and verify that the marked cut lines and drill holes are correct.
- Carefully cut the four cut lines and drill the four screw holes.



Appendix E Figure 2: Enclosed Module "A" Cut Lines and Drill Holes

Create Cutout using Mechanical Drawing

- Mark a 4.12” x 5.62” rectangle on the control panel.
- Mark the four 0.144” diameter drill holes.
- See Figure 30 for drill locations and line cutout dimensions.
- Carefully cut the rectangle and drill the screw holes.



Appendix E Figure 3: Enclosed Module Installation Mechanical Drawing

Install Module

- Fit the module into the cutout, making sure the module's four mounting studs fit into the drilled screw holes.
- Appendix E Figure 4 shows the mounting studs marked in red
- Secure the module to the panel using the four #6 Lock Washers, #6 Flat Washers, and #6 Hex Nuts provided in the hardware kit.

Appendix E Figure 4: Online UV Intensity Display Module Mounting Studs

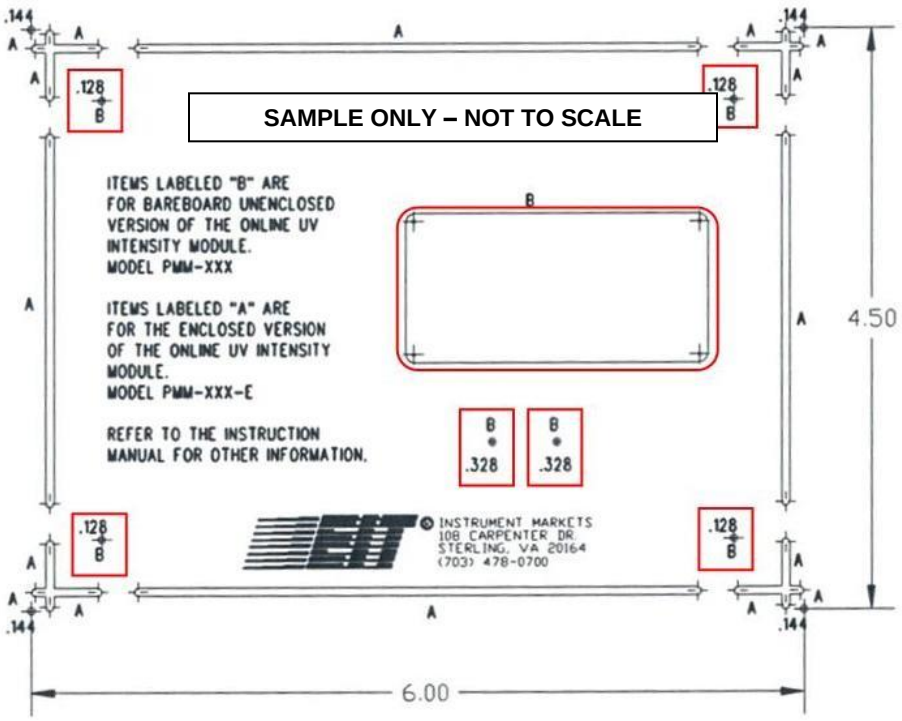
Appendix E 1.2.2 Unenclosed Module/Bare PCBA (Printed Circuit Board) Installation

USE ESD (Electro Static Discharge) SAFE PROCEDURES INCLUDING A GROUND STRAP WHEN HANDLING the Online UV Intensity Display Module PCBA OUTSIDE OF THE ASSEMBLY HOUSING.

To install the unenclosed PCBA in a control panel, the front and back enclosure must be removed and cutouts for the LCD, two LEDs, and four screws must be cut from the control panel. EIT 2.0 provides a cut and drill template (part number 92332A) in the accessory kit (See Appendix E Figure 5). Appendix E Figure 6 provides the required cutout dimensions.

Create Cutout using Drill Template

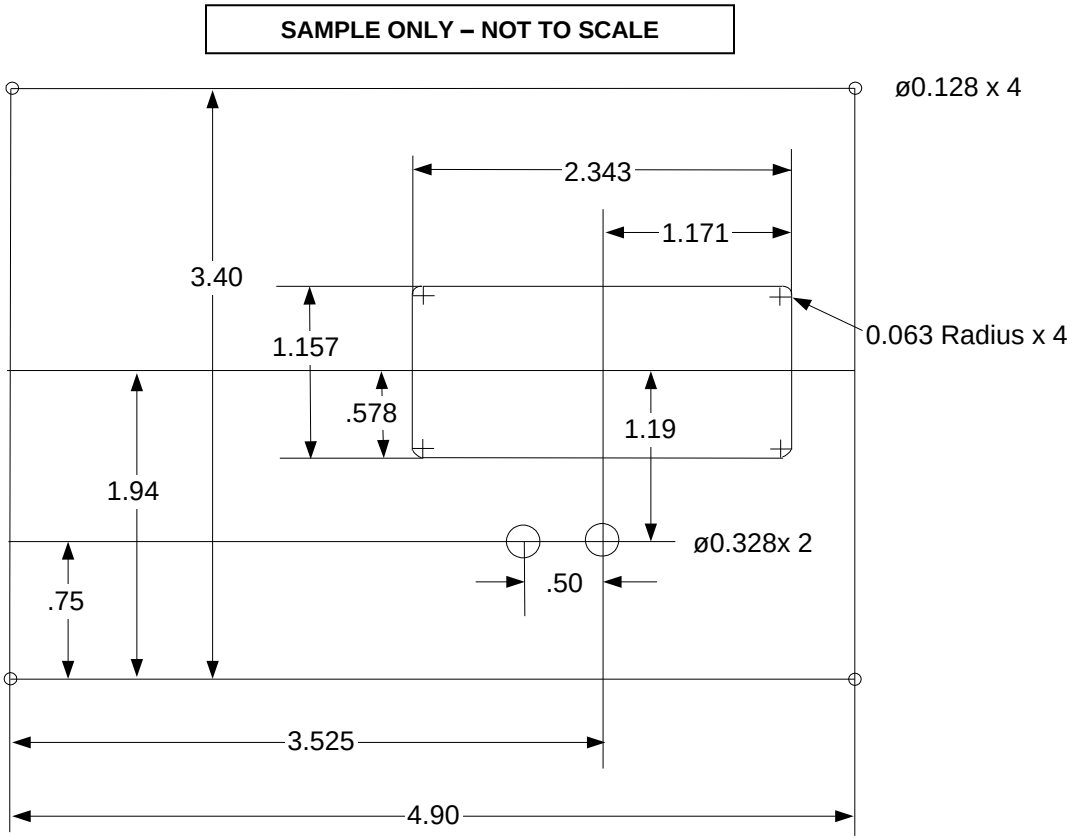
- The drill template (part number 92332A) shows cut lines and drill holes marked “A” and “B”. USE ONLY THE CUT LINES AND DRILL HOLES MARKED “B”. See Appendix E Figure 5marks the cut lines and drill holes in red.
- Using an Exacto knife or similar tool, open the template’s cut lines and drill holes marked “B”.
- With masking tape or other means, secure the drill template to the control panel in the location where the module will be installed.
- Mark the cut lines and drill holes onto the control panel.
- Remove the template and verify that the marked cut lines and drill holes are correct.
- Carefully cut through the four cut lines and drill through the four screw holes and two LED holes.



Appendix E Figure 5: Unenclosed Module "B" Cut Lines and Drill Holes

Create Cutout using Mechanical Drawing

- Mark the LCD cutout using the dimensions in Appendix E Figure 6.
- Mark the two 0.328" diameter drill holes for the LEDs. See Figure 33 for drill locations.
- Mark the four 0.128" diameter drill holes for the 4-40 screws.
- See Appendix E Figure 6 for drill locations.
- Carefully cut the LCD location and drill the LED and screw holes.



Appendix E Figure 6: Unenclosed Module Installation Mechanical Drawing

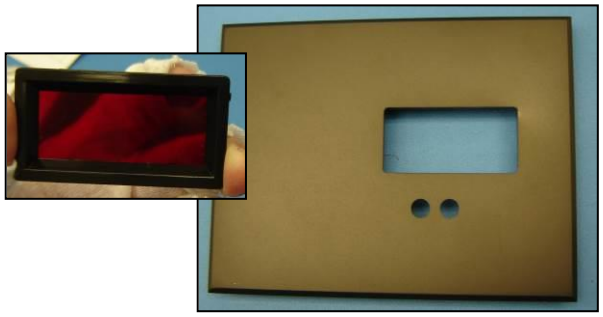
USE ESD (Electro Static Discharge) SAFE PROCEDURES INCLUDING A GROUND STRAP WHEN HANDLING THE Online UV Intensity Display Module PCBA OUTSIDE OF THE ASSEMBLY HOUSING.

Remove PCBA from Enclosure

- Remove the back enclosure from the PCBA. RESERVE THE FOUR 4-40 x .250L PAN HEAD SCREWS, FOUR #4 FLAT WASHERS, and FOUR #4 SPLIT WASHERS FOR REINSTALLATION.

Appendix E Figure 7: Online UV Intensity Display Module without Back Enclosure

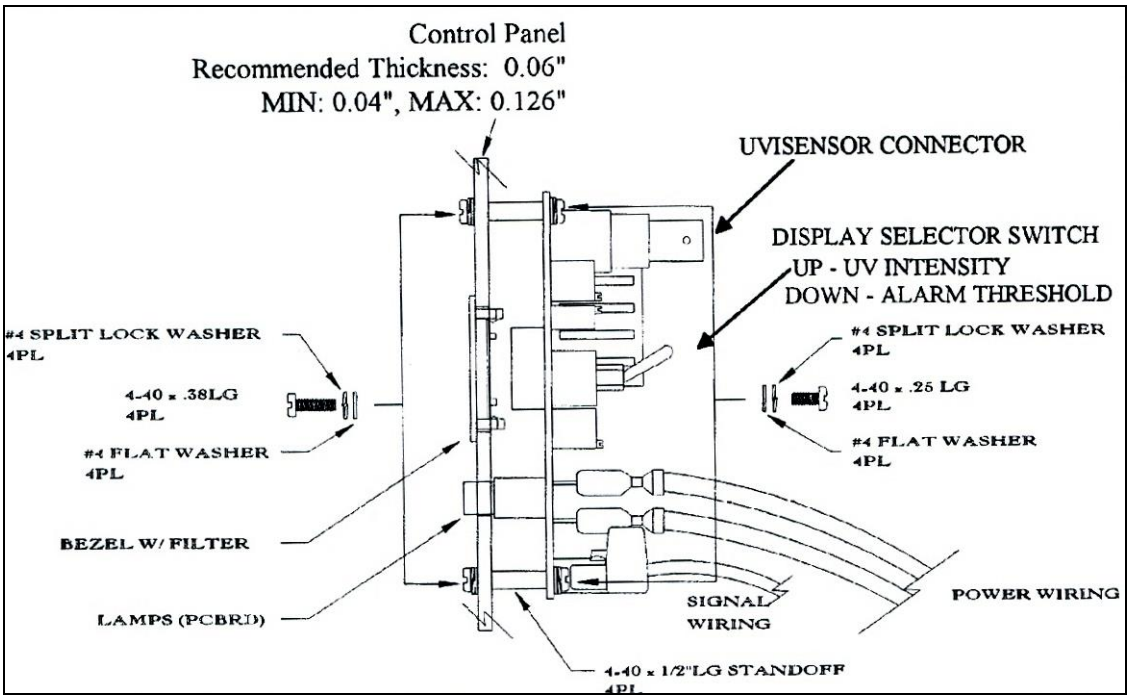
- Remove the four standoffs and RESERVE FOR REINSTALLATION.
- Carefully lift the PCBA from the front panel.
- Carefully remove the Bezel with filter from the front panel. Bezel snaps in and must be removed with caution.



Appendix E Figure 8: Online UV Intensity Display Module Front Panel and Bezel

Install PCBA

- Fit the Bezel into the cutout of the control panel. Bezel should snap into place.
- Using the four 4-40 screws, four split washers, and four flat washers removed above, reinstall the four standoffs to the front side of the PCBA (Appendix E Figure 9).
- Fit the PCBA to the control panel. Make sure the LCD fits in front of the Bezel, the two LEDS fit into the cutouts, and the threaded end of the standoffs fit through the four screw holes.
- From outside the control panel, secure the PCBA with four 4-40 x .38LG screws, four #4 flat washers, and four #4 split washers. These components are not included in the hardware kit (Appendix E Figure 9).

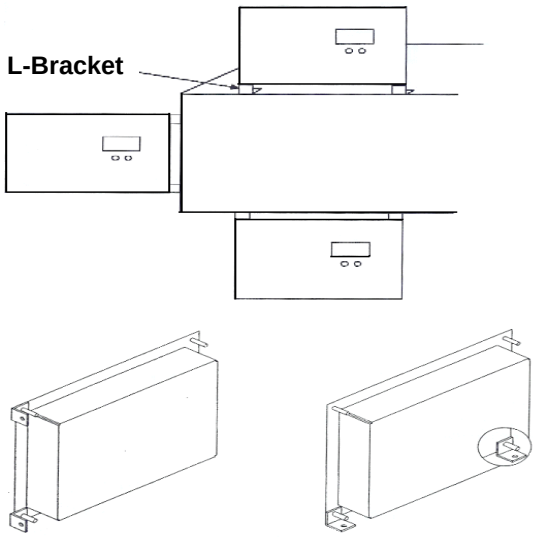


Appendix E Figure 9: Unenclosed Module (PCBA) Installation

Appendix E 1.2.3 L-Bracket with Enclosed Module Installation

The L-shaped brackets provided in the hardware kit allow the enclosed monitor to be installed on the top, bottom, or side of the control panel. Appendix E Figure 10 shows sample locations where the module may be installed.

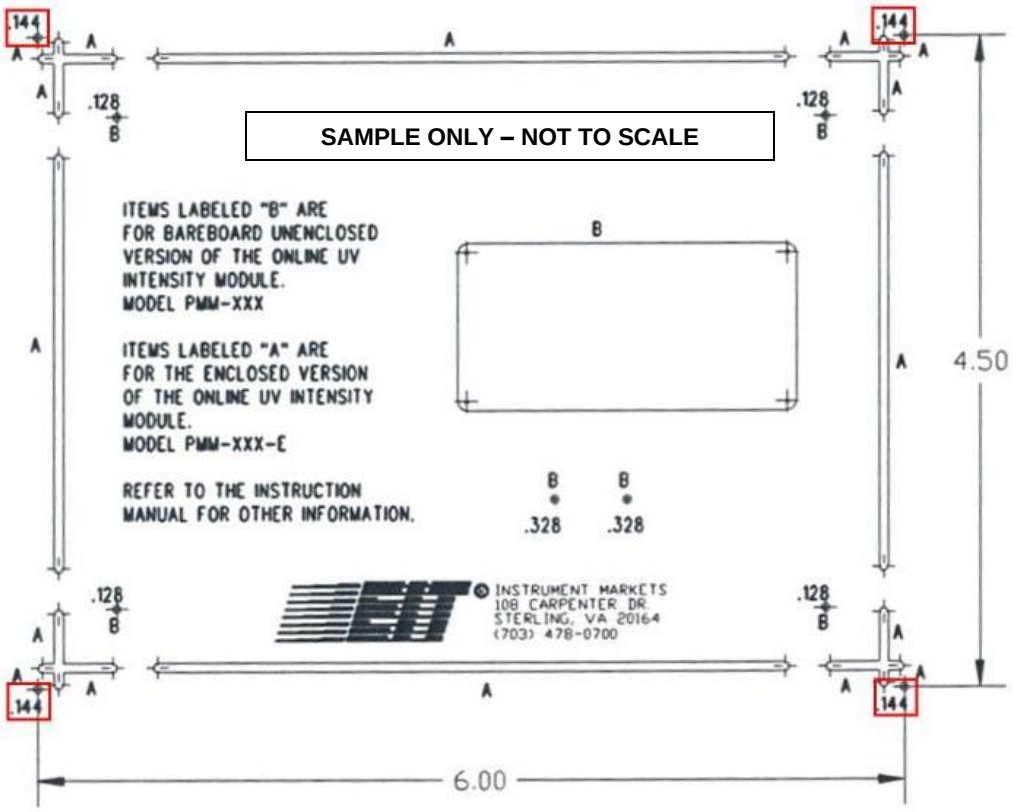
To use the brackets, two 0.144” diameter screw holes must be drilled into the control panel. EIT 2.0 provides a drill template (part number 92332A) in the accessory kit. Appendix E Figure 11 provides the required drill locations and dimensions.



Appendix E Figure 10: Online UV Intensity Display Module L-Bracket Placement

Create Screw Holes using Drill Template

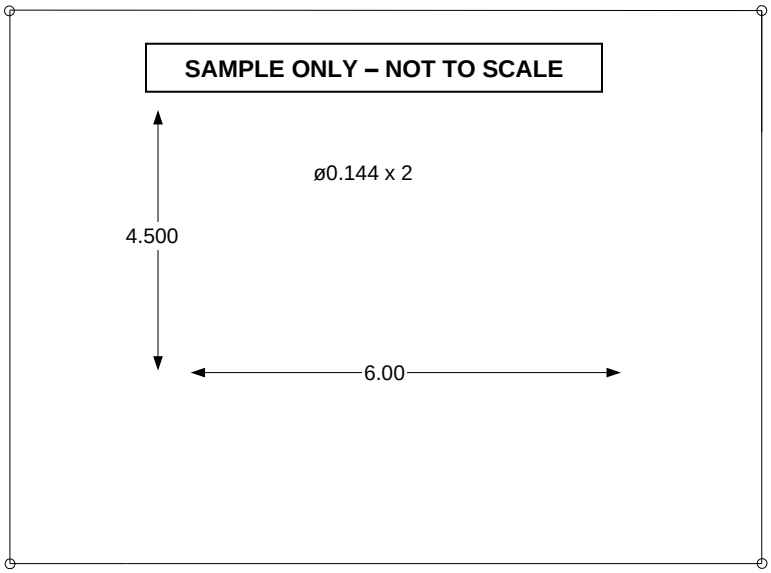
- The drill template (part number 92332A) provides cut lines and drill holes marked “A” and “B”. USE ONLY THE DRILL HOLES MARKED “A”. Figure 38 marks the drill holes in red.
- Based on the installation location, use an Exacto knife or other tool to open two of the four holes marked “A”.
- With masking tape or other means, secure the drill template to the control panel in the location where the module will be installed.
- Mark the drill holes onto the control panel.
- Carefully drill the two 0.144” screw holes.



Appendix E Figure 11: Enclosed Module Drill Holes for L-Bracket

Create Cutout using Mechanical Drawing

- Mark the two 0.144” diameter drill holes. See Appendix E Figure 12 for drill locations and dimensions.
- Carefully drill the screw holes.



See Appendix E Figure 12: Drill Hole Dimensions for L-Bracket

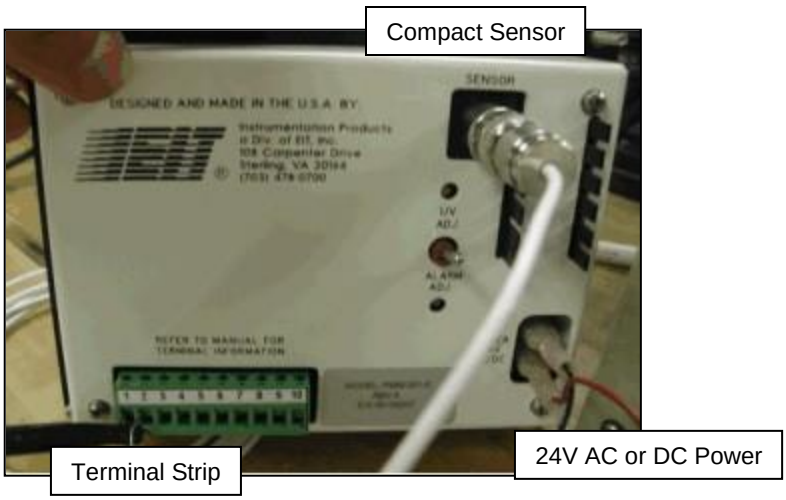
Install Brackets and Module

- Install the L-shaped brackets onto the control panel using two 6-32 pan head screws, two #6 split washers, two #6 flat washers, and two #6 hex huts from the hardware kit.
- Fit the module to the brackets. Make sure that two of the modules mounting studs fit through the brackets.
- Secure the module to the brackets using the remaining two #6 split washers, two #6 flat washers, and two #6 hex nuts.

TIP: Install the brackets onto the control panel before mounting the module. The pan head screws are difficult to insert if the bracket is already installed on the module.

Appendix E 1.3 Online UV Intensity Display Module Wiring

To operate, the Online UV Intensity Display Module must be connected to a Compact Sensor and a 24V AD or DC power supply. A terminal strip allows the module to optionally be connected to an integrated monitoring and control system, such as a PLC, and two user-defined alarm systems. The control alarm systems must be cable of processing a 0–10V analog signal. See Appendix E Figure 13 shows the Compact Sensor and Power Supply connections as well as the terminal strip.



See Appendix E Figure 136: Enclosed Module Connected to Sensor and Power

Appendix E 1.3.1 Connect Compact Sensor (Required)

Use a Compact Sensor cable with a BNC connector to connect the Compact Sensor to the module. A ten-foot cable is provided with the Compact Sensor. See Section 5 of the User's Guide for more information on Compact Sensor cables and options.

Appendix E 1.3.2 Connect Power Supply (Required)

The Online UV Intensity Display Monitor can operate within a range of 20 - 28 Volts AC or DC. Connecting to voltages greater than 28 will destroy the Module and void any and all warranty claims. Use a power supply with female "Faston" connectors.

EIT 2.0 LLC IS NOT RESPONSIBLE FOR ANY DAMAGES OR INJURY RESULTING FROM IMPROPER POWER SUPPLY CONNECTIONS OR IMPROPER VOLTAGES.

Appendix E 1.3.3 Connect Terminal Strip (Optional)

The monitor's terminal strip allows the monitor to be integrated with a PLC or other Control System and to two user-defined Alarm Systems. The PLC/Control System and Alarm Systems must be capable of processing 0-10V analog signal. To assist with wiring, the terminal strip may be removed and reattached after wiring. See Appendix E Table 2 provides a list of the terminal strip pins.

Appendix E Table 2: Online UV Intensity Display Module Terminals		
Terminal/ Pin #	**Description**	**Use**
1	Intensity Common	Ground connection to PLC or other System Control
2	Intensity 0 to 10 Volt Output Signal	Intensity signal connection to PLC / Control System
3	Not Used	Not Used
4	Not Used	Not Used
5	Alarm Relay Contact Normally Open (First Set)	Alarm normally open connection to PLC / Control System
6	Alarm Contact Common (First Set)	Alarm ground connection to PLC / Control System
7	Alarm Relay Contact Normally Closed (First Set)	Alarm normally closed connection to PLC / Control System
8	Alarm Relay Contact Normally Open (Second Set)	Alarm normally open connection to Alarm System
9	Alarm Relay Contact Common (Second Set)	Alarm ground connection to Alarm System
10	Alarm Relay Contact Normally Closed (Second Set)	Alarm normally closed connection to Alarm System

Appendix E 1.4 Online UV Intensity Display Monitor Setup

After the Online UV Intensity Display Monitor and Compact Sensor are installed, the UV Intensity baseline signal (usually 100%) and Alarm Threshold are set. Follow the Equipment Setup procedure before adjusting the UV Intensity Baseline or setting the Alarm Threshold.

Appendix E 1.4.1 Equipment Setup

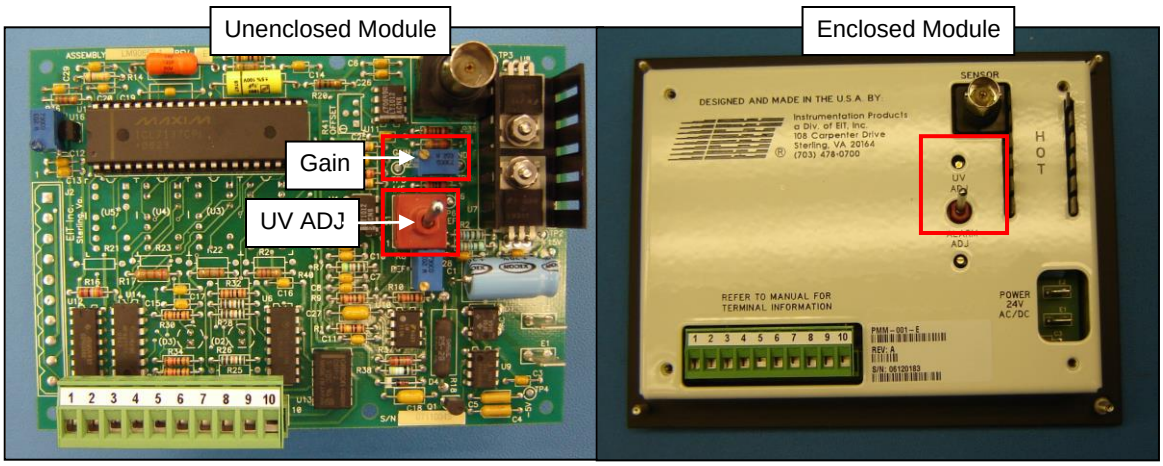
FOLLOW THESE STEPS BEFORE SETTING THE BASELINE VALUE OR ALARM THRESHOLD:

- Replace the existing UV lamps with new lamps and clean the reflectors. This allows the Compact Sensors to observe the lamp operating at its peak intensity.
- Turn on power to the UV lamp and Online UV Intensity Display Monitor
- Allow the UV lamp to warm up and stabilize
- EIT 2.0 suggests a warm up time of 15 to 30 minutes based on the lamp type

Appendix E 1.4.2 Adjust UV Intensity Baseline

To establish the baseline, follow these steps:

- Place the display selector switch in the up (UV ADJ) position. (See Appendix E Figure 14)



Appendix E Figure 14: Online UV Intensity Display Module Intensity Adjustment

- Use the Screw Driver Adjustment Tool from the accessories kit to adjust the UV ADJ POT (Gain POT on Unenclosed Module) until the display shows 100% (Appendix E Figure 15).

Appendix E Figure 15: Online UV Intensity Display Module 100% UV Intensity

Over Range Condition

If the Online UV Intensity Display Monitor shows the number 1 to the extreme left with no other digits, the monitor is in an over range condition. See Appendix E Figure 16 below. Decrease the intensity adjustment by turning the UV ADJ POT counterclockwise. If the monitor continues to show number 1, the Compact Sensor is receiving too much UV. If possible, move the Compact Sensor further away from the UV lamp. Please contact EIT 2.0 or your local representative/distributor for more information.

Appendix E Figure 16: Online UV Intensity Display Module UV Intensity Over Range Condition

Under Range Condition

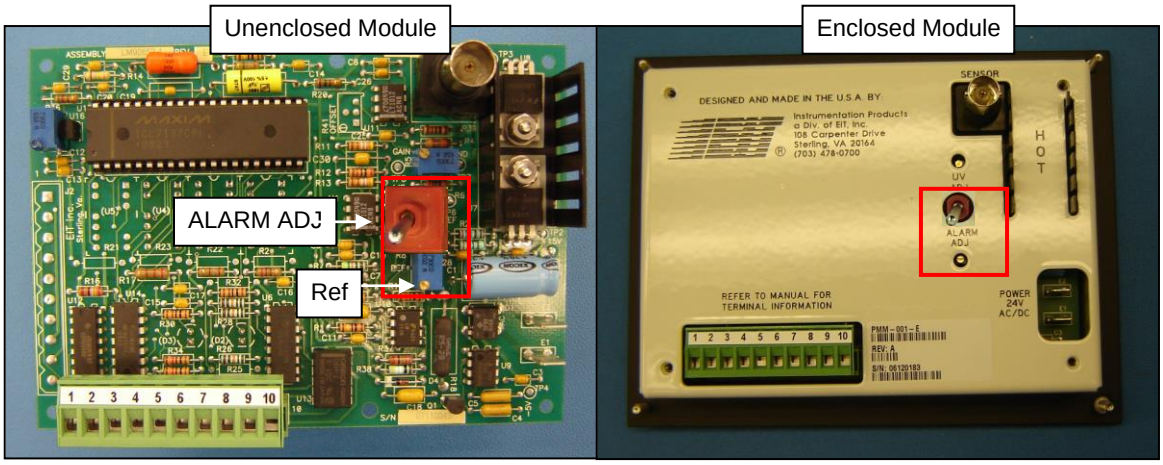
If the Online UV Intensity Display Monitor cannot be increased to 100% or is very sensitive to adjustments, the Monitor is in an under-range condition. Move the Compact Sensor closer to the monitor or increase the power applied to the lamp. Please contact EIT 2.0 or your local representative/distributor for more information.

Appendix E 1.4.3 Adjust Alarm Threshold

The Online UV Intensity Display Module design incorporates a 5% noise immunity around the alarm threshold known as hysteresis. The UV intensity must drop 5% less than the threshold before the alarm is triggered.

To adjust the Alarm Threshold, follow these steps:

- Place the display selector in the down (Alarm ADJ) position (See Appendix E Figure 17).



Appendix E Figure 17: Online UV Intensity Display Module Alarm Threshold Adjustment

- When adjusting the alarm threshold, the Online UV Intensity Display Module shows a small line in the left side of the LCD and displays the alarm threshold value (Appendix E Figure 18).

Appendix E Figure 18: Online UV Intensity Display Module Alarm Threshold Value

- Use the Screw Driver Adjustment Tool from the accessories kit to adjust the ALARM ADJ POT (REF POT on Unenclosed Module) until the module shows the desired alarm threshold.
- To verify the Alarm Threshold, lower the UV Intensity until it is lower than the Alarm Threshold minus hysteresis. The alarm LED should be lit. RETURN THE UV INTENSITY TO THE CORRECT VALUE.

Appendix E 1.5 Optional Set up of 0-10 volt Signal and Alarm Outputs

Intensity Common and 0 – 10V Signal (Optional)

The Online UV Intensity Display Module outputs a 0–10 Volt intensity signal proportional to the lamp intensity. This signal may be processed by a PLC or other Control System. Connect the PLC/Control System to the module terminal strip as follows:

- PLC/Control System ground wire at terminal 1.
- PLC/Control System intensity signal wire at terminal 2.

Alarm Relays (Optional)

The Online UV Intensity Display Module compares the UV intensity from the Compact Sensor to a preset low-level threshold. Two alarm relays are activated and a red LED becomes visible when the UV intensity drops below the threshold. Both relays may be integrated with external Alarm Systems. Connect the Alarm Systems to the module terminal strip as follows:

- First Alarm System normally open at terminal 5.
- First Alarm System common at terminal 6.
- First Alarm System normally closed at terminal 7.
- Second Alarm System normally open at terminal 8.
- Second Alarm System common at terminal 9.
- Second Alarm System normally closed at terminal 10.