

# On-line Measurement Product Overview Broadband & LED

EIT's On-Line Systems measure UV intensity to provide continuous, real-time, feedback on a system. The solution is electro-optic based and can be used to monitor the UV from LED or Broadband (mercury) sources in situations where:

- Space is limited and a radiometer will not fit
- Arms, rollers and/or blades are present
- Sources are enclosed, not easily accessed or high off the ground
- Multiple sources are used to increase production line width
- Fast production speeds make it hard to use a radiometer
- UV conditions change rapidly due to off-gassing and/or contamination
- High value products are manufactured and undetected changes in the UV can lead to high scrap levels
- Continuous validation of the UV conditions is required
- The process window is tight



**Top: EIT Compact Sensor**

**Above: EIT DIN Rail**

Applications include web presses, fiber optic draw towers, hard drive manufacturing, print and medical applications. The intensity measured by the On-Line Monitoring System is a relative intensity versus an absolute ( $W/cm^2$ ) value. The user is able to track both gradual (e.g. source aging) or sudden (equipment malfunction) changes to the UV intensity to take action before the changes impact product quality and bottom line profitability.

The On-Line System consists of two components: Compact Sensor and DIN Rail Signal-Conditioning Unit. The system can be used as the sole means of UV process control or in conjunction with an EIT NIST-traceable UV radiometer.

**EIT Compact Sensor:** An extremely durable sensor with sealed optics designed to withstand harsh UV environments. Sensors are available for LED or Broad-band based sources. EIT and our representative/distributor network will assist in selecting the optic re-sponse, housing shape, aperture size and mounting location based on the UV source type and application.



**An EIT Compact Sensor mounted behind a UV reflector can provide continuous information on the lamp condition.**

**EIT DIN Rail:** The Compact Sensor works with the EIT DIN Rail to provide a signal (0-10 volt or 4-20 milliAmp) proportional to the real time UV intensity. The signal from the DIN Rail allows the user to track the relative real-time intensity on a PLC or display. The DIN Rail also allows the user to set low limit alarms and/or close a relay if the pre-programmed limits are exceeded.

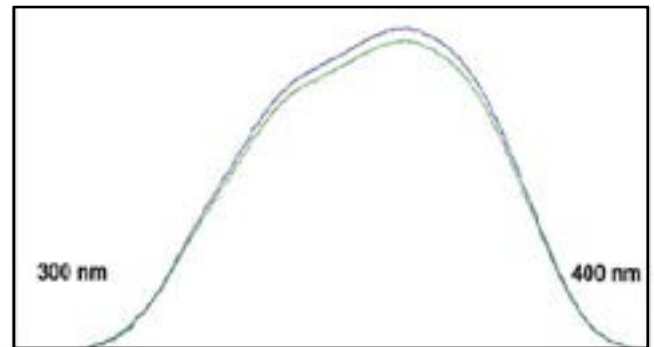


**EIT DIN Rail units installed in cabinet to support multiple Compact Sensors used in production.**

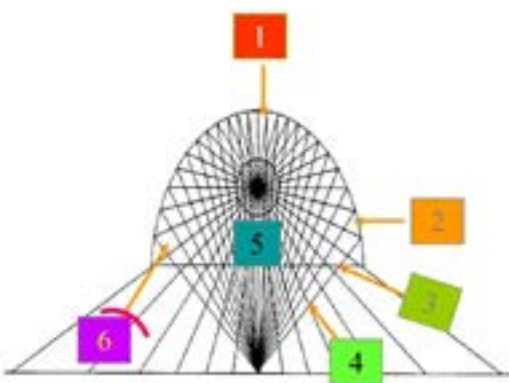
### EIT Compact Sensor Durability

The Compact Sensor uses an innovative optics design to increase durability and reduce solarization (degradation of optical components) caused by intense UV energy. An EIT UVA Compact Sensor was tested for over 6,700 hours in an intense high power microwave UV system. The optics were characterized before and after the test. Results showed a very small decrease (4%) in the optical transmission characteristics.

The EIT Compact Sensor also has over twenty years of real world monitoring experience, making it the choice to monitor even the most intense UV sources without perceptible solarization.



**The before and after scans of Compact Sensor optics after 6,700 hours of exposure to a high intensity microwave system**



### Sensor Installation Locations

Selecting a location to install your Compact Sensor depends on your application and source. The Compact Sensor needs to remain clean and cool (< 100°C for UVA, UVB & UVV and < 70°C for UVC and LED Compact Sensors).

Installing the Compact Sensor where it 'sees' reflected energy is preferred to a location where it only 'sees' direct energy. Consider using the EIT Quartz Rod if physical access or high temperatures are a concern.

### Suggested Sensor Installation Locations:

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 quartz rod or other material

## Compact Sensor Internal Aperture Size

The Compact Sensor internal aperture size is specified at the time of order and is determined by the type/power of the source, mounting location, angle of view to the source, housing type and whether or not an EIT Quartz Rod is used. EIT and our rep & dis-tributor team will work to determine the best Compact Sensor for your application. We suggest testing Compact Sensors prior to placing a large order to insure optimal Compact Sensor performance and longevity.

### EIT Compact Sensor

#### **Features**

- Optics are extremely resistant to solarization and hermetically sealed to prevent contamination
- Small form factor, squared body for easy installation
- ◆ The CS-1 (above left) housing has an optional air/nitrogen purge to keep the optics clean
- ◆ The CS-2 (above right) housing is height reduced
- Available in LED (EIT L-365, L-385, L-395 or L-405) or mercury (EIT UVA, UVB, UVC or UVV) bands, specified at the time of order
- Internal aperture size determined by source type and Sensor mounting location
- Each Compact Sensor is supplied with 10 foot (3m) cable



### EIT DIN Rail

#### **Features**

- Signal conditioning unit used with Compact Sensor
- Continuously monitors the output of a single UV LED or lamp
- Provides 0-10 Volt or 4-20 milliAmp analog output with user-settable alarm points and relay closure output connections
- Snap-in DIN Rail mounting convenience
- Powered by 24 volts AC/DC



## Electro Magnetic Interference (EMI)

UV equipment (e.g., high-frequency power supply, power supply mounted in with the UV source, microwave source) has the potential to generate Electro Magnetic Interference (EMI) or electrical noise. A Compact Sensor cable, even with its shield, can also pick up electrical noise if it is run alongside a high voltage line. This electrical noise can make it appear that either the sensor and/or the source is unstable. The EMI Compact Sensor and EMI DIN Rail have been 'hardened' with additional circuitry to make them less susceptible to electrical noise or interference.

## EMI Compact Sensor & EMI DIN Rail

The EMI Compact Sensor is identified by the "gold" circle on the electronics. The EMI Compact Sensor must be grounded and connected to an EMI DIN Rail with a three wire EMI cable for it to work. Note: If the EMI Compact Sensor is used with the Standard DIN Rail and/ or two wire cable, there is no added EMI protection. EMI Compact Sensors are currently available in UVA, UVB, UVC and UVV versions. In addition to the CS-1 and CS-2 housings, the EMI Compact Sensor is also available in a "BTR" (Behind The Reflector) housing which mounts behind the reflector of a lamp.



Left to Right: EMI Compact Sensor with "gold" circle; EMI Sensor with 3 wire cable; EMI DIN Rail; EMI Housings (BTR , CS-1, CS-2)



Feature	CS-1 With purge	CS-2 Without Purge	BTR (Behind the Reflector)	Standard DIN Rail DRM-007	EMI DIN Rail DRM-006
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)	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)	3.6 oz (101 g)
Material	Aluminum Housing	Aluminum Housing	Aluminum Housing	DIN Rail Housing	DIN Rail Housing
Available sensor	Standard, LED or EMI	Standard, LED or EMI	EMI Only	Used with Standard or LED Sensor	Used with EMI Sensor Only
UV Bands/ Power Source	UVA/UVB/UVC or UVV L365/L385/ L395 or L405	UVA/UVB/UVC or UVV L365/L385/ L395 or L405	UVA/UVB/UVC or UVV	20-28 Volts AC or DC 70 mA maximum	20-28 Volts AC or DC 70 mA maximum
Operating Range (Temp °C)	UVA, UVB, UVV: 0-100°C UVC & L-Bands: 0-70°C	UVA, UVB, UVV: 0-100°C UVC & L-Bands: 0-70°C	UVA, UVB, UVV: 0-100°C UVC: 0-70°C	0-50°C	0-50°C
Sensor Aperture/ Output	Sensors are available in multiple aperture sizes, specified at time of order Aperture size used dependent on lamp power & mounting location			0-10 VDC or 4-20 milli- Amp propor- tional to UV intensity	0-10 VDC or 4-20 milli- Amp proportional to UV intensity
Cable Type	Standard or LED Sensor: 2 wire, Teflon shielded, 10' (3 m) standard EMI Sensor: 3 wire twisted, Teflon shielded, 10' (3 m) standard			At DIN: Two Wire	At DIN: Two Wire + EMI Sensor Grounded
Acceptance Angle/Accuracy	Approximate ac- ceptance angle of 5° degrees	Approximate acceptance angle of 13° degrees	Approximate ac- ceptance angle of 4° degrees	+/- 3% of full scale (10 Volts), Alarm Set Points +/- 5% from threshold setting	+/- 3% of full scale (10 Volts), Alarm Set Points +/- 5% from threshold setting

## EIT Quartz Rod

Some UV applications/sources have limited physical space and/or high temperatures which make it difficult to find a suitable location to install the Compact Sensor. The EIT Quartz Rod solves this challenge and allows the user to track the UV conditions while keeping the Compact Sensor cool. The EIT Quartz Rod is made of high quality quartz and is four inches (10 cm) long with a diffuse outer surface. The 0.2" (0.5 cm) diameter of the Quartz Rod allows it to fit into CS-1 housing with a set screw.



**Top Left: Compact Sensor with Quartz Rod installed**



**Bottom Left: Quartz Rod illuminated with UV**

**Right: Close up of set screw holding the Quartz Rod into a CS-1 Sensor housing**



## Cabling

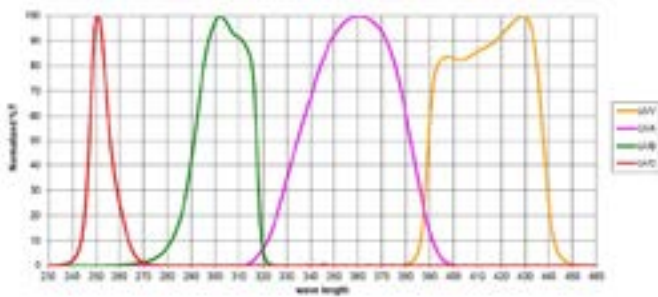
A Compact Sensor is connected to the DIN Rail with a supplied 10 foot (3 meter) Teflon shielded cable. Standard & LED Compact Sensors utilize a two-wire cable while EMI Compact Sensors utilize a three-wire cable. The cable from the Compact Sensor carries a low signal level and should be kept as short as possible and away from high voltage power lines. Longer cable runs should be done after the DIN Rail Signal Conditioning. Contact EIT to discuss stock/custom cable lengths and/or bulkhead connector options.

## Mercury Compact Sensor Response

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

UVA (320-390 nm) UVB (280-320 nm)

UVC\* (240-260 nm) UVV (395-445 nm)



**EIT Mercury (Broadband) Responses: UVC, UVB, UVA, UVV**

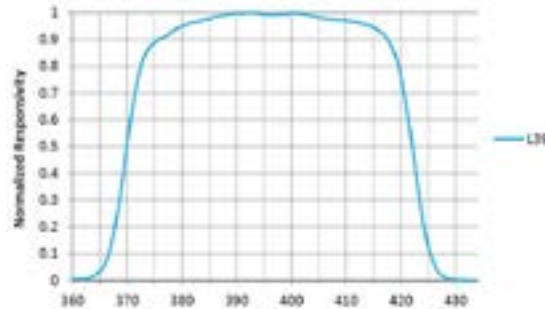
**\*The Compact Sensor UVC Response is 240-260 nm**

## LED Compact Sensor Response

The 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)



**EIT L-395 Response shown as an example**



® Designed and manufactured in the USA

This equipment is in conformity with the following standards and therefore bears CE marking: IEC 61326-1:2005, EN55011: 1998, EN61000-4-2: 1995, A1: 1998, A2: 2001; EN 61000-4-3: 2002, A1: 2002, following the provisions of the applicable directives: 98/34/EEC and amendments, 89/336/EEC and amendments.

EFSEN UV & EB TECHNOLOGY

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