



CELESTIAL CES

Light Sensors for Energy Management Systems

DESCRIPTION

The **CES** belongs to a family of sensors that monitor either task or ambient light levels precisely. The light level measured is converted to an analog signal that is sent to the controller of the Energy Management System (EMS).

The **CES** allows the Heating Ventilation Air Conditioning Energy Management System (HVAC/EMS) to control area lighting by switching banks of lights on and off, or provide continuous signals to electronic dimming ballasts for fluorescent fixtures.

ADJUSTABILITY

The sensor sensitivity is adjustable. The maximum output voltage can be matched to the maximum light level, in order to provide the highest resolution signal to the EMS. Model measurement ranges include 0 to 20, 2,500, or 7,500 FC. The **CES** sensor is available in several input voltages (Class 2 Low Voltage Power Supply providing 5,10,12,& 24VDC). The voltage output is available in either 5 or 10VDC, and can be ordered with a zero or one volt minimum. (See selector table).

CONSTRUCTION

The electronic circuit for all exterior domes and lens for PLC-Multipoint sensor models is encased in a Lexan housing, ultrasonically welded to ASA LI-912; Acrylate Styrene Acrylonitrile (ASA) and meets flame retardant requirements of UL Standard 94HB.

SENSORS FOR ALL APPLICATIONS

All indoor sensors have a flat Fresnel lens that looks downward in a 60 degree cone of reference to measure actual light on the work surface. The Fresnel lens is used to reduce the influence of stray light striking the sensor from nearby windows or incidental side lighting.

The Outdoor sensor is enclosed in a weatherproof housing with a visor for shading and lens protection. The Atrium and Skylight sensors both use diffusing dome lenses to provide a 180 degree angle of photodiode response.



FEATURES

- Adjustable maximum output voltage for high resolution in 20-7,500 FC range.
- Output minimum voltage selection of zero or offset.
- Indoor sensor with 60 degree clear Fresnel Lens, Adhesive mounting to ceiling, facing down. Sensor range 0-750 FC. Low range indoor 0-20 FC.
- Outdoor sensor with flat clear lens. Sensor range: 0/5-75FC. 1/2" IPT connection for horizontal mounting. Weather proof housing.
- Atrium sensor with opaque dome lens filters 33% of light level in upper atrium. Sensor range 2/200-2,500 FC. 1/2" IPT connection for horizontal mounting.
- Skylight sensor with dark dome lens filters 90% of light level in skylight. Sensor range: 10/1,000-7,500 FC in skylight. 1/2" IPT connection to for upward vertical mounting.
- Interfaces with any EMS equipment.
- Sensor matched to human eye response range.
- New high temperature suturing process combines LEAD FREE parts & premium circuit boards offers same level of performance.
- Fully patented technology.
- 2 year warranty.

DATA SHEET



PLC-MULTIPOINT, INC.

PHOTO LIGHTING CONTROL & SYSTEMS

DATA SHEET

CES TECHNICAL DATA

Accuracy:	+/-1% at 70 F (21 C) Derated to +/-5% at 120 F or at 0 F (-18 C to 49 C)
Operating Temp:	13 F to +140 F. (-11 C to 60 C)
Sensor Type:	Blue-enhanced Photo Diode
Sensor Ranges:	<u>Minimum</u> <u>Maximum</u>
CES/I	0 Fc 50 - 750 Fc
CES/O	0 Fc 50 - 750 Fc
CES/A	2 Fc 200 - 2,500 Fc
CES/S	10Fc 1,000 - 7,500 Fc
CES/IL	0 Fc 20/40 Fc
Input Voltage:	5,10,12,24VDC. (See order ex.)
Output Voltage:	5VDC or 10VDC full output
Output Offset:	0VDC or 1VDC total Darkness
Wiring:	(3) Conductor 22 ga. stranded cable
Red:	Pos. DC input
Black:	DC common
Yellow:	Output to EMS
ROHS:	Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equip-ment (RoHs)

CES SENSOR SELECTOR

<u>SENSOR</u>	<u>LENS</u>	<u>FILTER</u>	<u>MOUNTING</u>	<u>ORIENT</u>	<u>Height</u>	<u>Dia.</u>
CES/I	Fresnel	Clear	Ceiling	Down	2.00"	1.23"
CES/O	Flat	Clear	1/2" IPT	Horiz.	1.85"	1.28"
CES/A	Dome	Opaque	1/2" IPT	Horiz	2.25"	1.28"
CES/S	Dome	Dark	1/2" IPT	Up	2.25"	1.28"
CES/IL	Fresnel	Clear	Ceiling	Down	2.00"	1.23"

ORDERING EXAMPLE

CES	/A	-12	-1	-5
	<u>Housing</u>	<u>Input</u>	<u>Min Output</u>	<u>Max Output</u>
Indoor=	I	5V	0	5
Outdoor=	O	10V	1	10
Atrium=	A	12V		
Skylight=	S	24V		
Indoor Low=	IL	5V		

*N.I.S.T. Calibration upon request \$150.00 fee applies.
All documentation included.

SPECIFICATION

PHOTODIODE SENSOR

The photoelectric device shall be a Class 2, low voltage, ambient light sensor designed to interface directly with the analog input of the Energy Management System. The sensor shall supply an analog signal to the EMS system proportional to the light measured. The sensor output shall provide for zero or offset based signal. The sensor shall be capable of a fully adjustable response in the range between 0 and 10,000 footcandles with a +/-1% accuracy at 70 degrees F (21 deg.C).

The sensitivity adjustment shall be at the sensor body, and outside of the sensor's viewing angle. The sensor housing shall be constructed from GE Cycloc (R) ABS, shall be flame retardant and meet UL 94 HB standards.

INDOOR

Indoor sensors shall have a Fresnel lens, with a 60 degree cone of response. Indoor sensors shall only require a penetration hole in the ceiling of 3/8" dia., and the sensor shall mount to the ceiling using adhesive tape. The indoor sensor range shall be between 0 and 750 FC. The indoor sensor shall be **PLC-MULTIPOINT CES/I**.

Low Range sensor selectable 20 or 40 FC range. Sensor shall be **PLC-MULTIPOINT CES/IL**.

OUTDOOR

Outdoor models shall have a hood over the aperture to shield the sensor from direct sunlight. The outdoor sensor circuitry shall be completely encased in an optically clear epoxy resin. Outdoor sensors shall mount to a standard threaded 1/2" conduit or fit a 1/2" knockout. The Outdoor sensor range shall be between 0 and 750 FC. The outdoor sensor shall be **PLC-MULTIPOINT CES/O**.

ATRIUM or SKYLIGHT

The Atrium or Skylight sensors shall have a translucent dome with a 180 degree field of view. Atrium or Skylight sensors shall mount to standard threaded 1/2" conduit or fit a 1/2" knockout. Atrium sensor range shall be from 2 to 2,500 FC. Skylight sensor range shall be between 10 and 7,500 FC. The Atrium or Skylight sensors shall be **PLC-MULTIPOINT CES/A or CES/S**.



CES/O APPLICATION NOTE

ENERGY MANAGEMENT SYSTEM

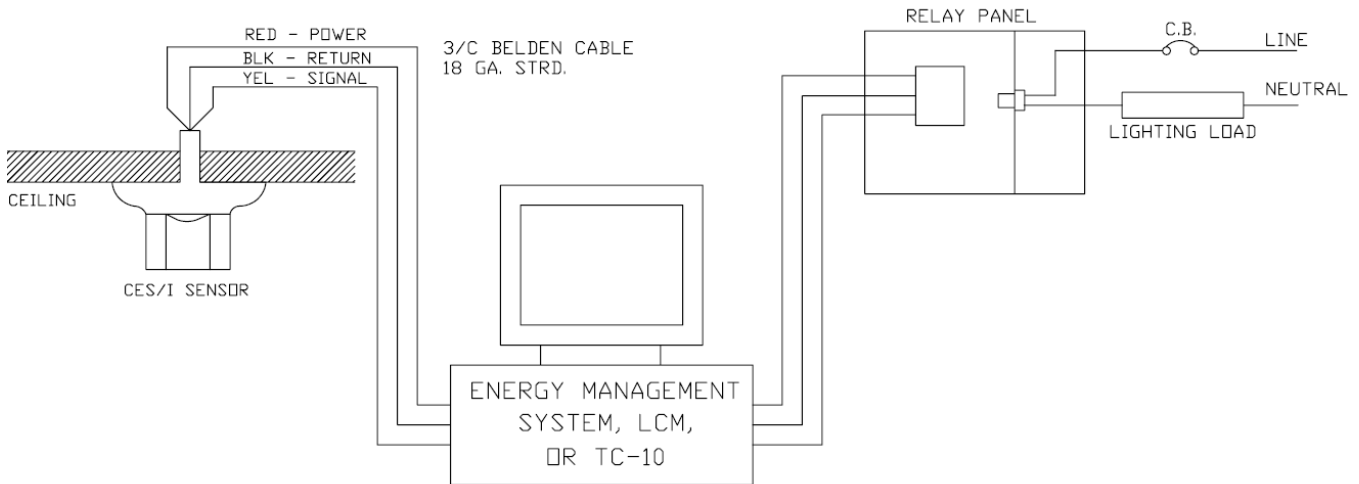
A building energy management system needed to control outdoor security and safety lighting. The lighting systems were required to turn on and off at different light levels using the building energy management system.

Photocells and mechanical timers were considered, but didn't provide the precise switching level controls required. The mechanical timers didn't allow for easy changes in schedules and daylight/standard time changes.

The **PLC-MULTIPOINT CES/O SENSOR** provided the energy management system with the lighting level signal required to control the outdoor safety and security lighting. The sensor was powered by the energy management system's 12VDC power supply source. The sensor signal provided a linear light level input into the energy management system. The **CES/O SENSOR'S** input range was set at 750 FC and the output was 0 to 10VDC providing a resolution of 13.3mv/FC or (75 FC/V) which was sufficient for the energy management system to control the lighting levels.

The ON and OFF switching setpoints were entered into the energy management system via the operator terminal. The minimum Hold-On-Time, transient filtering and output control was all handled through the energy management system. All of the above were displayed on the operator terminal, including the current light level from the **CES/O SENSOR**.

APPLICATION NOTES



Note: Best practice for application only.