PLC MULTIPOINT, INC.

LCM-RO Series

Retail Outlet Photo Lighting Controller

DESCRIPTION

The LCM-RO photo sensor lighting control systems automatically switches lights in response to changes in natural daylight. The LCM-RO consists of a microprocessor controller, Hand/Off/Auto switches, terminal blocks and with 4 and 8 pole 20A lighting contactors all housed in a surface mount enclosure .The LCM-RO also comes with an outdoor photodiode sensor.

The standard LCM-RO has two outdoor control channels capable of switching groups of exterior sign and advertising lighting separately from site safety and security lighting. Indoor sensors are available for daylight harvesting

ADJUSTABILITY/OPERATION

The LCM is easily configured for the appropriate lighting level to optimize energy savings. The LCD Screen prompts you to enter photo sensor setpoint limits and lets you override the controller. Lights turn ON at the Low setpoint and Off at the High setpoint with digital precision. The deadband keeps the lights stable during changing conditions.

CONSTRUCTION

The LCM-RO controller has been designed with safety in mind. The processor is located in the low voltage compartment, ensuring safety during adjustment. The low voltage sensor housing meets flame retardant requirements of UL standard 94V-0. The sensor has a weatherproof visored housing. All products are factory tested and pre-calibrated to assure maximum reliability.

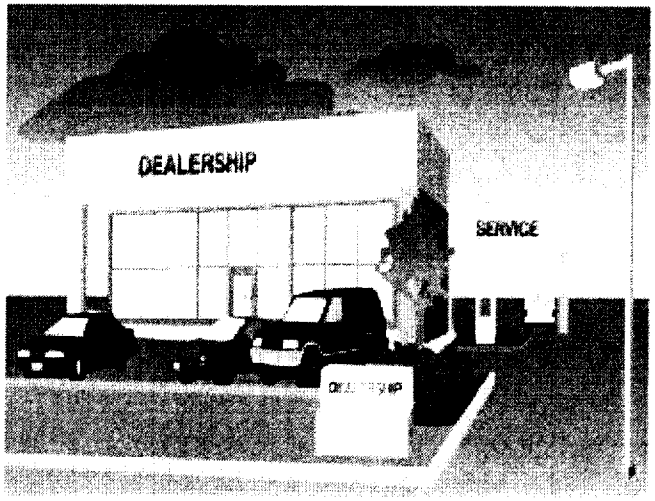
The entire assembly is mounted in a surface mount NEMA/EEMAC TYPE 1 enclosure with the high and low voltage components separated by a barrier. The LCM-RO is constructed to ANSI/UL 508 and CAN/CSAC22.2-14M91 standards and each unit carries an Electrical Testing Laboratories label.

APPLICATION

The LCM-RO is an ideal system for multiple circuit outdoor lighting control where two set points are required. Site and safety lighting is controlled with one channel. Signage is controlled by a second channel. The typical applications, convenience stores, fast food restaurants, gas stations, strip malls, and car dealerships, all have different requirements. (For more information on the differences between these applications, contact PLC-Multipoint.) Mixed lighting loads (HID and Fluorescent) can be both accomplished in a single unit.

COMMUNICATION

The LCM-RO communicates with a PC either through a modem, directly, or any of the other communication options. With the proper options, this system allows remote monitoring of the system and the ability to make remote changes.



FEATURES

The advantages of using the LCM-RO lighting control system are found in stability, versatility, quality and accuracy.

The LCM-RO offers a complete installation package. Once mounted, the sensor, power, and lighting loads need only to be wired, and the LCM-RO is ready to operate.

Other advantages are:

· Easy adjustment of On and Off set points using front buttons or optional PC software.

· Accumulated Run Time Hours are logged.

· 4 Modes of Operation : On Override, Off Override, Setup (No timers) and Auto (Full program).

· Standard 32 circuits, are expandable in groups of 4.

· Base system uses single outdoor linear photodiode sensor calibrated to 300 FC. Additional indoor or outdoor photodiode sensors can be calibrated as specified

· Footcandle readings shown on LCD.

· Optional timeclock available.

· Input time delay prevents intermittent or false switching.

· 1/2 Hour Hold On timer prevents High Intensity Discharge lighting from short cycling.

· Actual program saved in nonvolatile EEPROM. Operating data protected by non-battery 20 day power back up.

· A 2 Year Warranty assures the user of the highest standards of manufacture as well as customer service and satisfaction.

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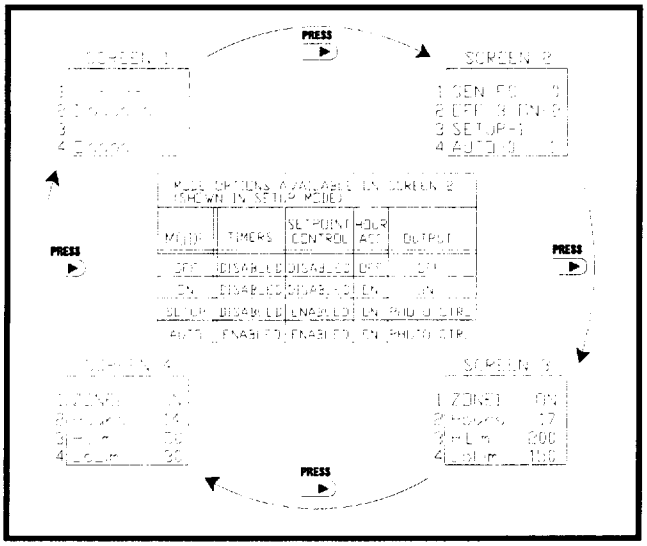
SPECIFICATION

LCM-RO TECHNICAL DATA

Input Voltage:	120VAC standard
Dead Band:	Adjustable - 0-100% of Sensor Range
Channels:	2 Standard, 4 or more available.
Input Delay:	Standard - 60 second (Setup mode override)
Output:	32 120V 20A expand in groups of 4
Load:	Incandescent, Fluorescent, & HID.
Enclosure	NEMA/EEMAC 1 24"H x 18"W x 6"D
Control Modes:	Displayed on LCD **Mode** Screen **OFF**: Force lights **OFF** **ON:** Force lights **ON** **SETUP:** Photo Setpoint control - no timers **AUTO:** Photo sensor control with timers (ON at **LOW**, OFF at **HIGH** set points)
Hold On Timer	30 Minutes. (Setup mode Override).
Control Inputs:	Photodiode Sensor
Indicators:	Control Outputs displayed on IO Screen Door: Red Relay On LED
Door Override	Hand & Off: Bypass Controller Auto: processor control
Sensor Information	
Sensor Accuracy:	+/-1% at 70 F (21 C) Derated to +/-5% above 120 F or below 0 F. (49 C /-18 C)
Sensor Temp:	-13 F. to +140 F. (-11 C to 60 C) Contact factory for lower temperature operation.
Sensor Type:	Compatible with any PLC-Multipoint Photodiode sensor.
Output Range	0-300 FC as standard. Consult PLC-Multipoint for other ranges



Typical LCM-RO Menu Sequence

CONTROLLER

Each Controller shall be powered by 120VAC and shall have a 40 character LCD to display current sensor readings, setpoint settings and relay status. The controller shall be enclosed in a NEMA/EEMAC 1 enclosure for surface mounting installation. Front door operators shall include a HAND/OFF/AUTO selector and LEDs to indicate each channel's contactor output.

Each of the two channels shall have a 60 second input time delay that shall keep the controller from responding from transient sensor signals, and a 1/2 hour hold on timer to prevent short cycling of HID fixtures. Individual channel high and low setpoint limits shall be adjustable from controller increment, decrement and pagination navigation keys, The run-time hours of each channel shall be accumulated and displayed and be capable of being reset..

The controller shall have an OFF/ON/SETUP/AUTO mode selection screen, whereby setup bypasses the timing functions and auto enables the full controller algorithm. The display shall indicate the on or off status of each output channel.. The program shall be stored in EEPROM. Setpoints, accumulated hours, and operating mode information is stored for 20 days using non-battery capacitive backup.

The relay output shall be capable of 20A current load at 120,277, 347,480, or 600V. Lighting contactors shall be assigned to channel outputs in groups of 4 circuits, The total number of poles shall be expandable to 48.

The controller shall be capable of 24 hour time of day schedule and seven day weekly schedule for each of the output channels. Daylight savings time shall be automatically adjusted.

OPTIONS

Communication options shall include direct serial RS232 interface to a PC, fiber optic communication, and local multi-drop communication bus.

Output options shall include: contrast lighting output, wiring to contactor poles to terminal block, latching mechanically held contactors, pulsed alternating output, duty cycle output, security night circuits, and warning flash on end of period.

The controller shall be capable of being overridden by momentary switch closure for either a fixed time period, or until the next scheduled event.

The Controller shall be PLC-MULTIPOINT LCM-RO Series

OUTDOOR PHOTODIODE SENSOR

The Photoelectric device shall be a Class 2, low voltage ambient light sensor designed to interface directly via 18 gauge wire to the controller. The sensor shall supply an analog input signal to the controller proportional to the light measured. The sensitivity adjustment shall be at the control panel enclosure, The sensor housing shall be flame retardant and meet UL 94 HB standards.

The outdoor sensor shall have a hood over the aperture to shield the photodiode from direct sunlight. The outdoor sensor circuitry shall be completely encased in optically clear epoxy resin. The sensor shall mount to a standard threaded 1/2" conduit or fit a 1/2" knockout. The Outdoor sensor shall be calibrated to a range of 300 FC full scale.

The Photoelectric device shall be PLC-MULTIPOINT PD5 sensor.

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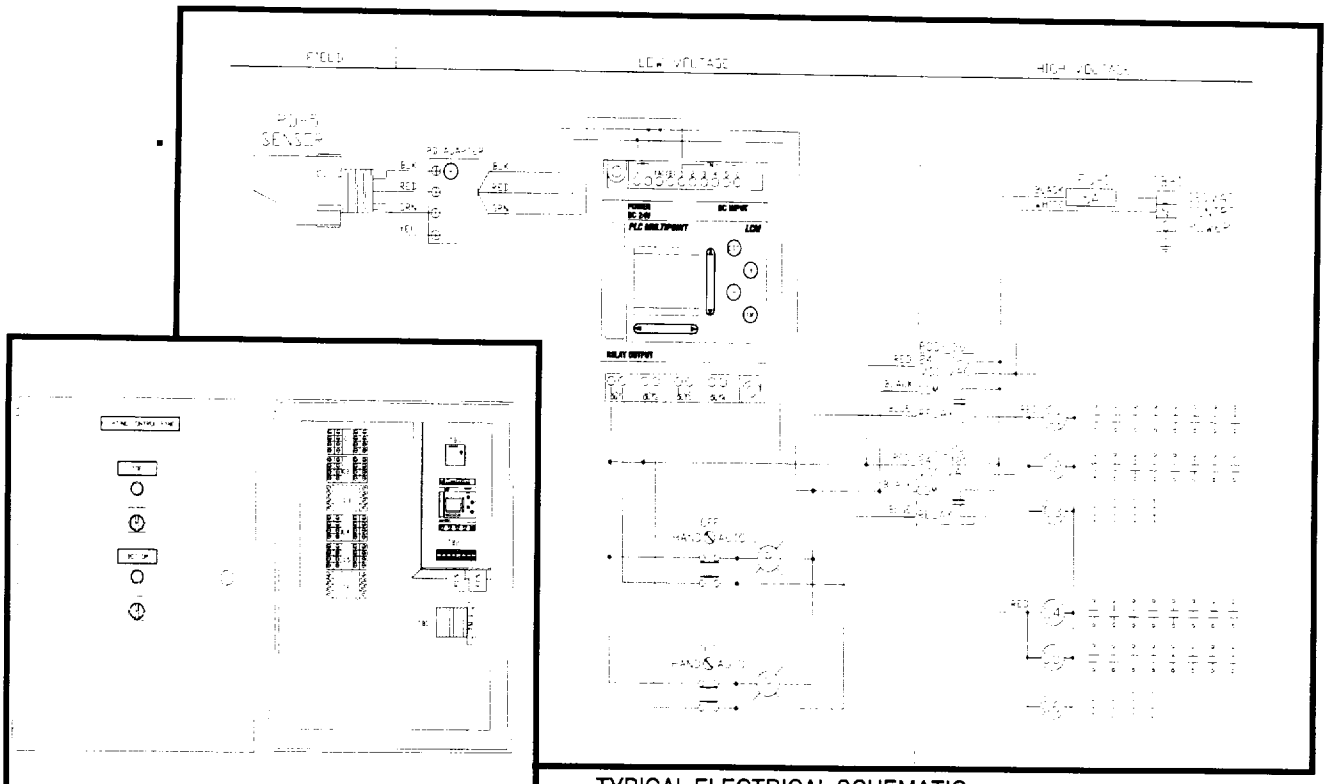

TYPICAL ELECTRICAL SCHEMATIC

LCM PANEL ASSEMBLY

ORDERING MODEL. Insert variables from numbered columns.

LCM-RO-__1__-__2__-__3__-__4__-__5__-__6__-__7__-

1 CONFIGURATION	2 INPUTS	3 ZONES	4 POLES/ ZONE	5 VOLTS	6 ENCL. (NEMA)	7 SENSOR	8(See Next Page)
1 = Fast Food	1 - 12	1 - 8	4,8,12	24VDC	1	PD1	= Indoor
2 = Gas Station			16,20,24	120	3R	PD5	= Outdoor low range
3 = Strip Mall				480	4X	PD5D	= Outdoor high range
4 = Design & Build				347	12	PD9	= Atrium
				600		PD9D	= Skylight
						MSW	= Warehouse motion
						MSC	= Corridor motion
						MSR	= Room motion
						MSC2	= 2 Way corridor motion
						MSR2	= 2 Way room motion

EXAMPLE: **LCM-RO -2 -1 -2 16,16-120-1-PD5 -SEH-ROE**
Configures LCM-RO for a gas station, with 1 PD-5 sensor input, 2 outputs with each controlling 16 poles. The control power is 120V and is housed in a NEMA 1 enclosure. The options include a heated sensor housing, and a remote event override pushbutton.

LCM Options Key

HEATER OPTIONS

PHR	Thermostatically LCM enclosure heater for low temperature or high humidity applications
SEH	Thermostatically controlled sensor enclosure and heater with swivel mounting bracket prevent snow/ice accumulation

TIMER OPTIONS

TC2	24-hour time switch program that repeats each day of the week without change.
TC7	7-day timers switch allows different time based events each day of the week.

COMMUNICATIONS OPTIONS

CMB	Standard modem communication for remote monitoring and changing of LCM program and status.
CFO	Fiber Optic communication module provides RS232 to 62.5/125 Multimode F.O. cable with ST connectors
CLB	Local Bus communication allows communication with existing BAS (Building Automation Systems) or other control systems. Type of system to communicate with must be specified.
SWC	LCM monitoring software with serial communication cable

OUTPUT OPTIONS

CLC	Contrast controls close contacts as light level becomes brighter.
MHC	Mechanically Held Contactor.
PLB	Contactor power poles connected to terminal blocks, reducing field-wiring time , and installation errors.
PZE	Alternately toggled ON and OFF pulsed single output . Pulse duration must be specified.
PZD	Duty cycle pulsed output .Pulse duration and cycle period must be specified. Uses 2 outputs, one each for ON and OFF.
SLC	Security circuits are programmed separately from general lighting requirements.
FLS	Warning flash indicates lights will turn off in 10 minutes. Use with options LOE, ROE, LOT, or ROT. Use only with fluorescent or incandescent lighting and not HID lighting
PLE	Enclosure mounted LED indicating output channel status.

OVERRIDE OPTIONS

HOA	Enclosure mounted Hand/Off/Auto maintained selector switch.
LOT	Enclosure mounted push-button to override off condition of system for one hour.
ROT	Remote low voltage push-button to override off condition of system for one hour.
LOE	Enclosure mounted push-button to override off condition of system until the next system event occurs.
ROE	Remote push-button to override off condition of system until the next system event occurs.

MISCELLANEOUS OPTIONS

Special	Design and build system not otherwise covered.
SSU	Factory start up, commissioning and training. Minimum 8 hours, contact factory for scheduling.

SENSOR STYLES

PD1	Indoor photodiode analog sensor with Fresnel lens . Maximum range 0 to 750 FC, adjustable at LCM panel.
PD5	Outdoor photodiode analog sensor with protective hood. Maximum range 0 to 750 FC, adjustable at LCM panel.
PD5D	Outdoor photodiode analog sensor with protective hood. Maximum range 5 to 2,500 FC, adjustable at LCM panel.
PD9	Atrium photodiode analog sensor with diffuse dome. Sensor reaction range 2 to 4,000 FC, adjustable at LCM panel.
PD9D	Skylight photodiode analog sensor with diffuse dome. Sensor reaction range 10 to 10,000 FC, adjustable at LCM panel
MSC	Single one-way ultrasonic motion sensor for corridors.
MSW	One-way ultrasonic warehouse motion sensor.
MSR	One-way ultrasonic large room motion sensor.
MSS	Ultrasonic wall box motion sensor.
MSC2	Single two-way ultrasonic motion sensor for corridors.
MSR2	Single two-way ultrasonic large room motion sensor.

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PLC MULTIPOINT, INC.

LCM-WH Series

Warehouse Photo Lighting Controller

DESCRIPTION

The **LCM-WH** photo sensor lighting control systems automatically switches lights in response to changes in natural daylight. The **LCM-WH** consists of a microprocessor controller, Hand/Off/Auto switches, terminal blocks with 4 and 8 pole 20A lighting contactors all housed in a surface mount enclosure .The **LCM-WH** also comes with an skylight photodiode sensor.

The standard **LCM-WH** has one skylight control channel capable of switching groups of fixtures in response to natural lighting provided by skylights. Motion sensors are available to work through the **LCM-WH** for combination daylight harvesting and occupancy monitoring. By allowing the lights to come on (or to the high level for HID bi-level) only when there is both inadequate natural light to operate and someone is in the zone, energy saviings are maximized.

ADJUSTABILITY/OPERATION

The **LCM-WH** is easily configured for the appropriate lighting level to optimize energy savings. The LCD Screen prompts you to enter photo sensor setpoint limits and lets you override the controller.

Lights turn ON at the Low setpoint and Off at the High setpoint with digital precision. The deadband keeps the lights stable during changing conditions. Bi-level ballasts are powered on to full level for a short warm up period. All products are factory tested and pre-calibrated to assure maximum reliability.

CONSTRUCTION

The **LCM-WH** controller has been designed with safety in mind. The processor is located in the low voltage compartment, ensuring safety during adjustment. The low voltage sensor housing meets flame retardant requirements of UL standard 94V-0. All products are factory tested and pre-calibrated to assure maximum reliability.

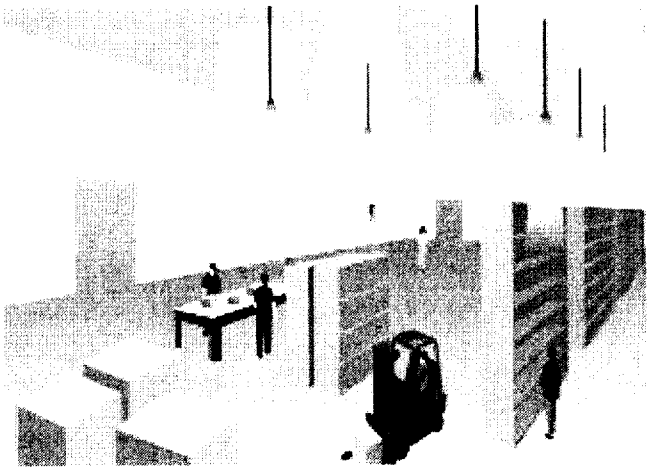
The entire assembly is mounted in a surface mount NEMA/EEMAC TYPE 1 enclosure with the high and low voltage components separated by a barrier. The **LCM-WH** is constructed to ANSI/UL 508 and CAN/CSAC22.2-14M91 standards and each unit carries an Electrical Testing Laboratories label.

APPLICATION

The **LCM-WH** is an ideal system for multiple circuit warehouse lighting control where operating cost reductions are required. The system can be configured for the different control requirements for high or low racked inventory, kit assembly areas, and shipping/ receiving. (For more information these applications, contact PLC-Multipoint.) Mixed lighting loads (HID, fluorescent and incandescent) can be all accommodated in a single unit.

COMMUNICATION

The **LCM-WH** communicates with a PC either through a modem, directly, or any of the other communication options. The software allows remote monitoring of the system and the ability to make remote changes from a remote location.



FEATURES

The advantages of using the **LCM-WH** lighting control system are found in stability, versatility, quality and accuracy.

The **LCM-WH** offers a complete installation package. Once mounted, the sensor, power, and lighting loads need only to be wired, and the **LCM-WH** is ready to operate.

Other advantages are:

- **Easy adjustment of On and Off set points using front buttons or optional PC software.**
- **Accumulated Run Time Hours are logged.**
- **4 Modes of Operation : OnOverride, Off Overrride, Setup (No timers) and Auto (Full program).**
- **Standard 32 circuits, are expandable in groups of 4.**
- **Base system uses single skylight linear photodiode sensor calibrated to 10,000 FC. Additional indoor or outdoor photo-diode sensors can be calibrated as specified.**
- **Footcandle readings shown on LCD.**
- **Optional timeclock available.**
- **Input time delay prevents intermittent or false switching.**
- **1/2 Hour Hold On timer prevents High Intensity Discharge lighting from short cycling. Bi-level ballast warm up period.**
- **Program saved in nonvolatile EEPROM. Operating data protected by non-battery 20 day power back up.**
- **A 2 Year Warranty assures the user of the highest standards of manufacture as well as customer service and satisfaction.**

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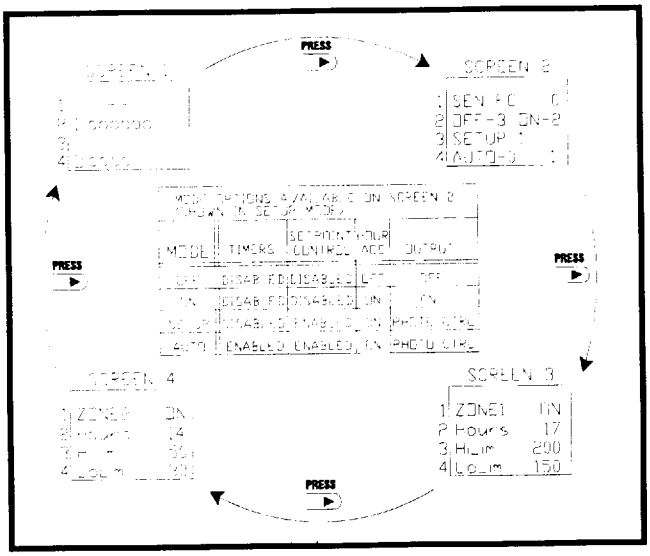
LCM-WH TECHNICAL DATA

Input Voltage:	120VAC standard
Dead Band:	Adjustable - 0-100% of Sensor Range
Channels:	1 Standard, 4 or more available.
Input Delay:	Standard - 60 second (Setup mode override)
Output:	32 120V 20A expand in groups of 4
Load:	Incandescent, Fluorescent, & HID.
Enclosure	NEMA/EEMAC 1 24"H x 18"W x 6"D
Control Modes:	Displayed on LCD **Mode** Screen **OFF:** Force lights **OFF** **ON:** Force lights **ON** **SETUP:** Photo Setpoint control - no timers **AUTO:** Photo sensor control wit Timers (ON at **LOW**, OFF at **HIGH** set points)
Hold On Timer	30 Minutes. (Setup mode Override).
Control Inputs:	Photodiode Sensor Optional Motion Sensors
Indicators:	Control Outputs displayed on IO Screen Door: Red Relay On LED
Door Override	Hand & Off: Bypass Controller Auto: processor control
Sensor Information	
Sensor Accuracy:	+/-1% at 70 F (21 C) Derated to +/-5% above 120 F or below 0 F. (49 C /-18 C)
Sensor Temp:	-13 F. to +140 F. (-11 C to 60 C) Contact factory for lower temperature operation.
Sensor Type:	Compatible with PLC-Multipoint Photodiode sensor. Motion sensors are Ultrasonic type.
Output Range	10-10,000 FC as standard. Consult PLC-Multipoint for other ranges



Typical **LCM-WH** Menu Sequence

SPECIFICATION

CONTROLLER

Each Controller shall be powered by 120VAC and shall have a 40 character LCD to display current sensor readings, setpoint settings and relay status. The controller shall be enclosed in a NEMA/EEMAC 1 enclosure for surface mounting installation. Front door operators shall include a HAND/OFF/AUTO selector and LEDs to indicate each channel's contactor output.

Each of the two channels shall have a 60 second input time delay that shall keep the controller from responding from transient sensor signals, and a 1/2 hour hold on timer to prevent short cycling of HID fixtures and to allow bi-level fixtures to warm up.. Individual channel high and low setpoint limits shall be adjustable from controller increment, decrement and pagination navigation keys, The run-time hours of each channel shall be accumulated and displayed and be capable of being reset..

The controller shall have an OFF/ON/SETUP/AUTO mode selection screen, whereby setup bypasses the timing functions and auto enables the full controller algorithm. The display shall indicate the on or off status of each output channel.. The program shall be stored in EEPROM. Setpoints, accumulated hours, and operating mode information is stored for 20 days using non-battery capacitive backup.

The relay output shall be capable of 20A current load at 120,277, 347,480, or 600V. Lighting contactors shall be assigned to channel outputs in groups of 4 circuits, The total number of poles shall be expandable to 48.

The controller shall be capable of 24 hour time of day schedule and seven day weekly schedule for each of the output channels. Daylight savings time shall be automatically adjusted.

OPTIONS

Communication options shall include direct serial RS232 interface to a PC, fiber optic communication, and local multi-drop communication bus.

Output options shall include: contrast lighting output, wiring to contactor poles to terminal block, latching mechanically held contactors, pulsed alternating output, duty cycle output, security night circuits, and warning flash on end of period.

The controller shall be capable of being overridden by momentary switch closure for either a fixed time period, or until the next scheduled event.

The Controller shall be PLC-MULTIPOINT **LCM-WH** Series

SKYLIGHT PHOTODIODE SENSOR

The Photoelectric device shall be a Class 2, low voltage ambient light sensor designed to interface directly via 18 gauge wire to the controller. The sensor shall supply an analog input signal to the controller proportional to the light measured. The sensitivity adjustment shall be at the controller, The sensor housing shall be flame retardant and meet UL 94V-O standards.

The skylight sensor shall have a dome over the aperture to diffuse the photodiode field of view. The sensor shall mount to 1/2" NPT conduit or fit a 1/2" knockout. The Skylight sensor shall be calibrated to a 10,000 FC full scale.

The Photoelectric device shall be **PLC-MULTIPOINT PD9D** sensor.

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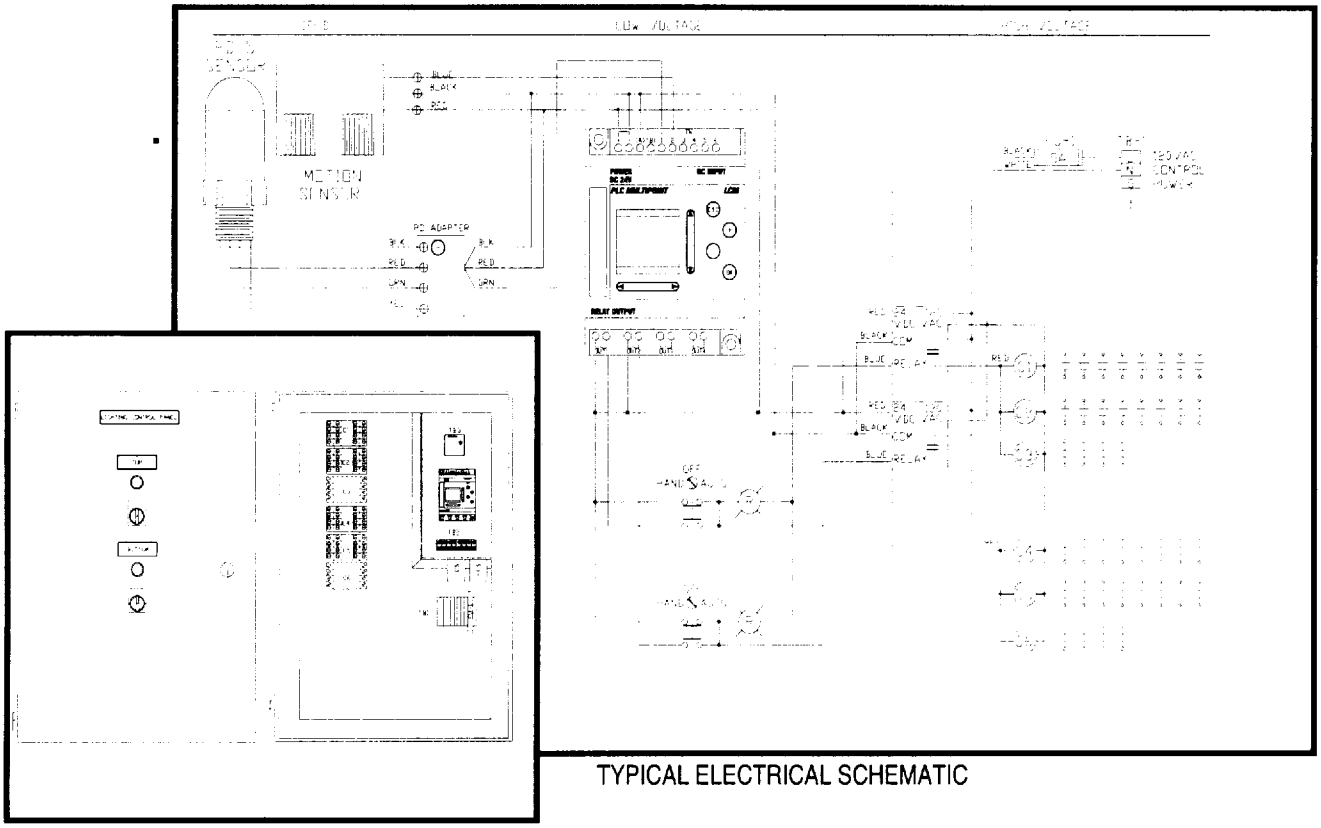

TYPICAL ELECTRICAL SCHEMATIC

LCM PANEL ASSEMBLY

ORDERING MODEL. Insert variables from numbered columns.

LCM-WH-__1__-__2__-__3__-__4__-__5__-__6__-__7__-__8__

1 CONFIGURATION	2 INPUTS	3 ZONES	4 POLES/ ZONE	5 VOLTS	6 ENCL. (NEMA)	7 SENSOR	8(See Next Page)
1 = Fluorescent	1 - 12	1 - 8	4,8,12	24VDC	1	PD1	= Indoor
2 = HID			16,20,24	120	3R	PD5	= Outdoor low range
3 = Bi-Level HID				480	4X	PD5D	= Outdoor high range
4 = Bi-Level Fluorescent				347	12	PD9	= Atrium
5 = Tri-Level HID				600		PD9D	=Skylight
6 = Design Build						MSW	= Warehouse motion
						MSC	= Corridor motion
						MSR	= Room motion
						MSC2	= 2 Way corridor motion
						MSR2	= 2 Way room motion

EXAMPLE: **LCM-WH -3 -1 -2 16,16-120--1-PD9D -(3)MSW-TC7**
Configures **LCM-WH** for a warehouse, with 1 PD9D sensor input, 2 outputs with each controlling 16 poles. The control program coordinates bi-level HID ballasts with 3 motion detectors.The control power is 120V and is housed in a NEMA 1 enclosure. The options includes a 7 day timeclock.

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LCM Options Key

HEATER OPTIONS

PHR	Thermostatically LCM enclosure heater for low temperature or high humidity applications
SEH	Thermostatically controlled sensor enclosure and heater with swivel mounting bracket prevent snow/ice accumulation

TIMER OPTIONS

TC2	24-hour time switch program that repeats each day of the week without change.
TC7	7-day timers switch allows different time based events each day of the week.

COMMUNICATIONS OPTIONS

CMB	Standard modem communication for remote monitoring and changing of LCM program and status.
CFO	Fiber Optic communication module provides RS232 to 62.5/125 Multimode F.O. cable with ST connectors
CLB	Local Bus communication allows communication with existing BAS (Building Automation Systems) or other control systems. Type of system to communicate with must be specified.
SWC	LCM monitoring software with serial communication cable

OUTPUT OPTIONS

CLC	Contrast controls close contacts as light level becomes brighter.
MHC	Mechanically Held Contactor.
PLB	Contactor power poles connected to terminal blocks, reducing field-wiring time , and installation errors.
PZE	Alternately toggled ON and OFF pulsed single output . Pulse duration must be specified.
PZD	Duty cycle pulsed output .Pulse duration and cycle period must be specified. Uses 2 outputs, one each for ON and OFF.
SLC	Security circuits are programmed separately from general lighting requirements.
FLS	Warning flash indicates lights will turn off in 10 minutes. Use with options LOE, ROE, LOT, or ROT. Use only with fluorescent or incandescent lighting and not HID lighting
PLE	Enclosure mounted LED indicating output channel status.

OVERRIDE OPTIONS

HOA	Enclosure mounted Hand/Off/Auto maintained selector switch.
LOT	Enclosure mounted push-button to override off condition of system for one hour.
ROT	Remote low voltage push-button to override off condition of system for one hour.
LOE	Enclosure mounted push-button to override off condition of system until the next system event occurs.
ROE	Remote push-button to override off condition of system until the next system event occurs.

MISCELLANEOUS OPTIONS

Special	Design and build system not otherwise covered.
SSU	Factory start up, commissioning and training. Minimum 8 hours, contact factory for scheduling.

SENSOR STYLES

PD1	Indoor photodiode analog sensor with Fresnel lens . Maximum range 0 to 750 FC, adjustable at LCM panel.
PD5	Outdoor photodiode analog sensor with protective hood. Maximum range 0 to 750 FC, adjustable at LCM panel.
PD5D	Outdoor photodiode analog sensor with protective hood. Maximum range 5 to 2,500 FC, adjustable at LCM panel.
PD9	Atrium photodiode analog sensor with diffuse dome. Sensor reaction range 2 to 4,000 FC, adjustable at LCM panel.
PD9D	Skylight photodiode analog sensor with diffuse dome. Sensor reaction range 10 to 10,000 FC, adjustable at LCM panel
MSC	Single one-way ultrasonic motion sensor for corridors.
MSW	One-way ultrasonic warehouse motion sensor.
MSR	One-way ultrasonic large room motion sensor.
MSS	Ultrasonic wall box motion sensor.
MSC2	Single two-way ultrasonic motion sensor for corridors.
MSR2	Single two-way ultrasonic large room motion sensor.

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