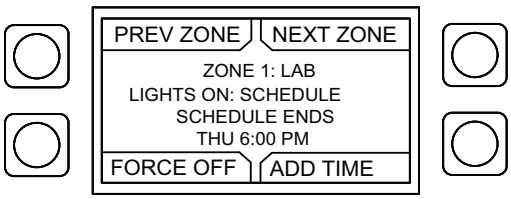
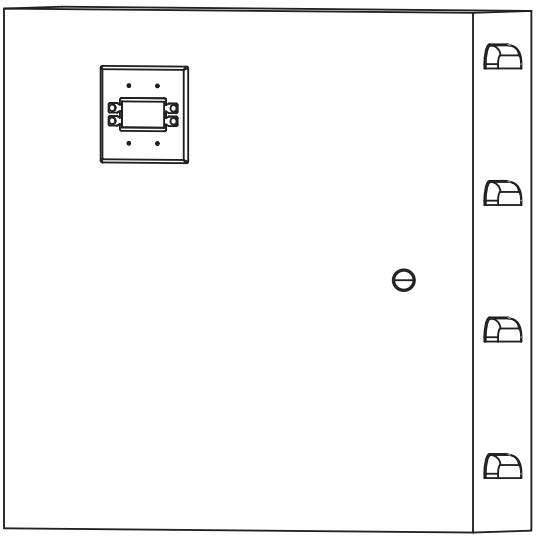
Lighting Control System

Installation, Operation, and Maintenance Manual





RECEIVING AND INSPECTION

Upon receiving unit, check for any interior and exterior damage, and if found, report it immediately to the carrier. Check that all accessory items are accounted for and are damage free.

WARNING!

Installation of this control panel should only be performed by a qualified professional who has read and understands these instructions and is familiar with proper safety precautions.

Improper installation poses serious risk of injury due to electric shock and other potential hazards.

Read this manual thoroughly before installing or servicing this equipment.

ALWAYS disconnect power prior to working on module.

Save these instructions: This document is the property of the owner of this equipment and is required for future maintenance. Leave this document with the owner when installation or service is complete.

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WARRANTY

This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 2-years from date of shipment. This warranty shall not apply if:

1. The equipment is not installed by a qualified installer per the MANUFACTURER'S installation instructions shipped with the product.
2. The equipment is not installed in accordance with Federal, State, and Local codes and regulations.
3. The equipment is misused, neglected, or not maintained per the MANUFACTURER'S maintenance instructions.
4. The equipment is not installed and operated within the limitations set forth in this manual.
5. The invoice is not paid within the terms of the sales agreement.

The MANUFACTURER shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 2-year warranty period, upon examination by the MANUFACTURER, such part will be repaired or replaced by MANUFACTURER at no charge. The BUYER shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without MANUFACTURER'S prior authorization, and all returned equipment shall be shipped by the BUYER, freight prepaid to a destination determined by the MANUFACTURER.

INSTALLATION

Panel Mounting

The Lighting Control system is mounted in a NEMA 1 enclosure. The panel should be mounted indoors in a dry, low dust area. There must be 3 feet of clearance in front of the panel to allow easy access for operation and maintenance. Install in accordance with the latest National Electric Code and/or local requirements.

Wiring

The Lighting Control panel is made of stainless steel, and has knockouts on the top and bottom of the panel.

Control Power

120V AC control power must be supplied to terminal H1 and a neutral to N1 from a maximum **20A** breaker.

Main Lighting Power

The panel can contain contactors and/or terminals to control external contactors. All power for the lights themselves must be supplied from external breakers. **The lighting panel contains no over-current or short circuit protection**. The breakers supplying the lighting contactors should be sized to keep the current draw from rising above the rating of the contactor.

Calculating wire size and voltage drop is the responsibility of the installer.

External Contactors

This system can control external contactors provided they have **120V AC** coils. A hot and neutral should be run from the lighting panel terminal blocks to the coil of the external contactors. No external power source or neutral should be connected to these wires.

Wiring for the contactor closure signal is required as well. Terminal CNC (Confirmation Common) and CN# must be wired through a Normally Open (NO) auxiliary contact on each contactor. These wires are low voltage signal wires that **must not be connected to any other voltage or electrical system**. The wire connected to CNC can be used as the common for multiple contactors. The CN# wires must be wired directly to each contactor.

Electrical

WARNING!
Disconnect power before installing or servicing unit. High voltage electrical input is needed for this equipment. A qualified electrician should perform this work.

Before connecting power to the control, read and understand the entire section of this document. As-built wiring diagrams are furnished with each unit by the factory and are attached to the control module's door or provided with paperwork packet.

Electrical wiring and connections must be made in accordance with local ordinances and the National Electric Code, ANSI/NFPA 70. Verify the voltage and phase of the power supply. Confirm the wire amperage capacity is in accordance with the unit nameplate. For additional safety information, refer to AMCA publication 410-96, *Recommended Safety Practices for Users and Installers of Industrial and Commercial Fans.*

1. **Always disconnect power before working on or near this equipment. Lock and tag the disconnect switch and/or breaker to prevent accidental power-up**.
2. Verify that the power source is compatible with the requirements of your equipment. The nameplate identifies the **proper phase and voltage** of the equipment.
3. Before connecting the unit to the building's power source, verify that the power source wiring is de-energized. Refer to schematics.
4. Secure the power cable to prevent contact with sharp objects. Verify ground connection is secure.
5. Do not kink power cable and never allow the cable to encounter oil, grease, hot surfaces, or chemicals.
6. Before powering up the unit, make sure that the interior of the unit is free of loose debris or shipping materials.
7. Electrically Commutated Motors (ECMs) and Variable Frequency Drives (VFDs) should not be powered through a Ground Fault Circuit Interrupter (GFCI) breaker/outlet. Unnecessary and intermittent tripping may occur.
8. If any of the original wire supplied with the unit must be replaced, it must be replaced with type THHN wire or equivalent.

Table 1 - Copper Wire Ampacity

Wire Size AWG	Maximum Amps
14	15
12	20
10	30
8	50
6	65
4	85

Low Voltage Wiring

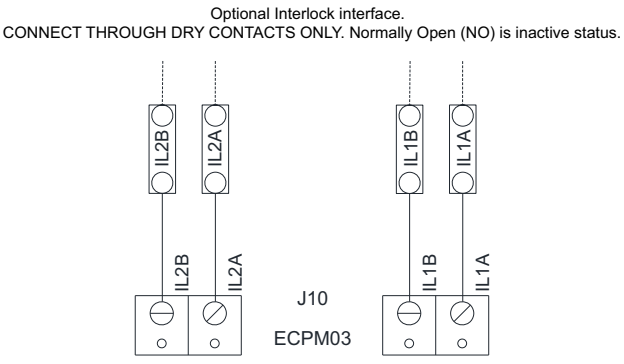
Modbus communication over CAT-5 cables for display(s) and remote equipment.

1. **HMIs** are connected to the ECPM03 board through a CAT-5 cable. The HMI has two RJ-45 connectors for Modbus communication. The HMI connects to port J4 or J5 (RJ-45) of the ECPM03 board. The other RJ-45 port of the HMI will typically be occupied by a RJ-45 end-of-line terminator or can be used as a connection point for another HMI.
2. **Two end-of-line terminators** are included in each panel. They are typically plugged in at the factory on port J3 and/or port J4, or in the back of the first HMI. If another HMI or other equipment needs to connect to a port occupied by an end-of-line terminator, it shall be removed and placed on the HMI or equipment that became connected at the end of the Modbus network.
3. **Modbus Communication:** If other pieces of equipment are connected to this panel, a CAT-5 cable will also be used to run the Modbus communication between these devices. The cable would be plugged in port J3 of the ECPM03 board. The end-of-line terminators should then be relocated from J3 to the device being added on.
4. **DDC (Direct Digital Control) Wiring:** For communications from a remote Building Management System (BMS), low voltage communication wiring is required. This wiring will plug into a gateway that is mounted in the Lighting Control panel, which then connects to J1 on the ECPM03 board via CAT-5 connection.

24V Interlock connections

There are four connections on the board that are for optional interlock connections. These connections connect through dry contacts only. The connections are IL1A, IL1B, 1L2A, and IL2B. Normally Open (NO) is the inactive status.

Figure 1 - Interlock Connections



Component Description

Contactors (C-x)

There are three options for lighting loads/contactors. Each panel can control up to 8 contactors:

- 40 amp ballast/tungsten/general load
- 70 amp ballast/tungsten; 50 amp general load
- Customer supplied contactor

Auto/Manual Switches (SW-x)

The Auto/Off/Manual switches electrically override the control board and allow full manual operation of the lighting contactors.

- **Auto**: In this position, the output of the control board is connected to the lighting contactor. If the board outputs a signal, the contactor will engage.
- **Off**: Placing the switch in the center "OFF" position will override the control board and keep the lighting contactor off.
- **Manual**: The manual position will turn the contactor ON and keep it ON, overriding inputs and the control board.

Power Supply (PS-01) - Converts input voltage of **100-240V AC** to an output voltage of **24V DC**.

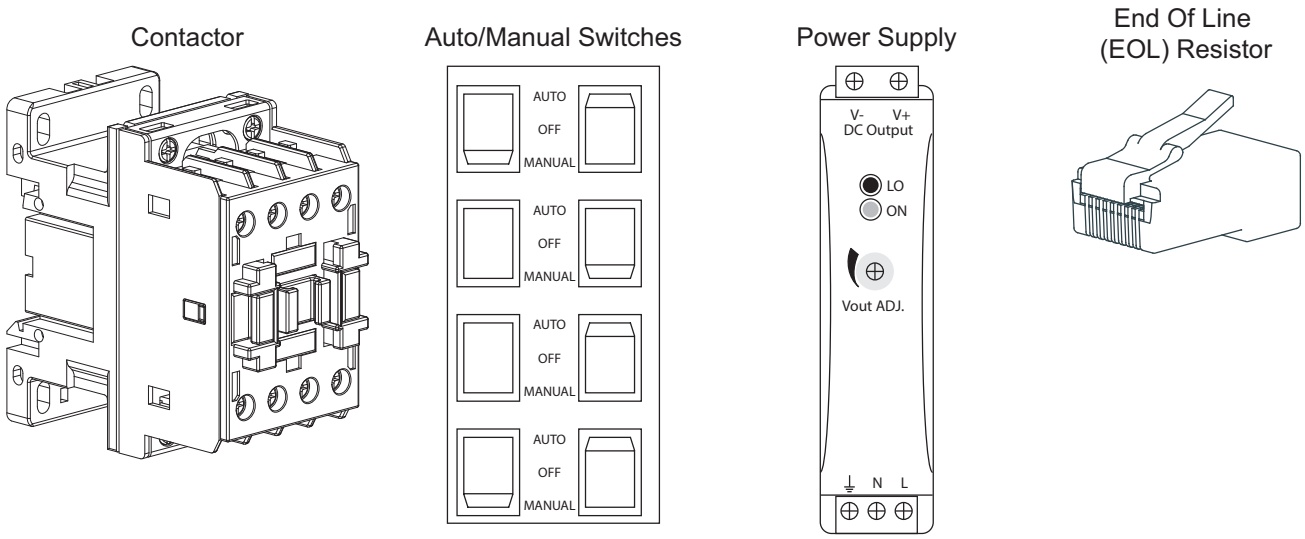
End Of Line Resistor (EOL120A) – Used for a termination point in Modbus network.

Inputs – Various inputs may be assigned depending on logic, and schedule settings. The most common inputs are:

- HMI switch – This can force the input in zones On/Off depending on occupied setting.
- Occupancy sensor – Detects motion in the area to activate the lights depending on Zone Config and Schedule Config.
- Photocell sensor – Detects lighting threshold. If the sensor detects daylight then lights will be off. If the sensor does not detect daylight then lights will be on.

NOTE: When installing the lighting sensors, it is recommended to set the sensor's internal timer to the lowest timer setting possible. Use the override control settings on the Lighting Control Package to control the amount of time for the sensor (light) to be ON.

Figure 2 - Components



OPERATION

HMI Configuration

The HMI allows the user to view operating information regarding lighting group assignments, HMI sensor group assignments, external sensor assignments, status and configurations.

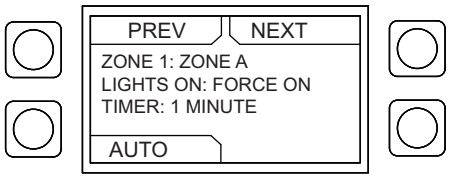
At any point in time the user can access the HMI configuration screen. This is achieved by simultaneously pressing both **top** buttons, and holding them for **1 second**. When this occurs, the screen will look similar to the image to the right. To exit this screen, simply press the MENU button.

Also, during initial HMI configuration, each HMI must have a unique Modbus address or HMI number. To assign this, simultaneously press both **bottom** buttons and hold them for **1 second**. When this occurs, the user will be able to assign a number to the HMI. Once the HMI number is assigned, press **MENU** to exit the screen. In this configuration setting, the user may adjust the contrast settings under “Advanced Options”. The user may adjust the setting from 0 to 10. Setting the contrast to 0 is the lowest setting available and 10 is the highest contrast setting available. The factory default contrast setting is 5.

The HMI menu system allows full access to every configurable parameter in the HMI. The parameters are factory configured to the specific application. Parameters may need to be modified to fine tune automatic operation or to add an HMI to a system after the original setup.

Normal Operation Screens

Figure 3 - Operation Screen



Prev = Moves to previous zone, if more than one is assigned.

Next = Moves toward next zone, if more than one is assigned.

Force Off = This option is available when in an “Occupied Schedule”. Pressing “Force Off” will enter the off state. It will stay in this state until “Auto” is pressed, then return back to the set schedule.

Force On = This option is available when the system is not within a scheduled setting. When “Force On” is pressed the Zone, Status, Forced On, and Timer are displayed. Once the override timer has expired or “Auto” is pressed, the setting will return to the previous function.

Auto = Appears when “Force On” or “Force Off” is selected.

Add Time = Appears when in an “Occupied Schedule” or if “Force On” is pressed. Pressing “Add Time” will extend the length of the override time setting to the end of the occupied schedule period.

Settings Menu

Simultaneously press both **top** buttons and hold them for **1 second** to enter the settings menu.

Up = Moves selection up

Menu = Returns to previous selection

Enter = Enters selection

Down = Moves selection down

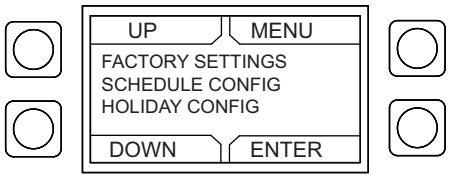
Factory Settings: Contains selection for inputs, outputs, zones, HMIs, zone configurations, and interlock configurations.

Schedule Config: Allows user to set a lighting schedule based on day and time.

Holiday Config: User may use this setting to create a holiday schedule to keep lights on or turn them off without editing the normal schedule.

Schedule Override: Allows user to override all schedule settings.

Figure 4 - HMI Menu Screen



Setting Changes

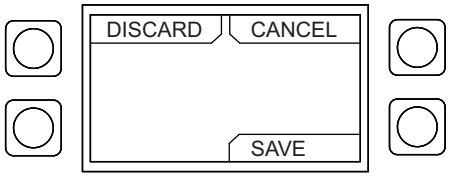
To **SAVE/DISCARD/CANCEL** changes made on the HMI for any of the settings, press “Menu” until **Figure 5** is displayed.

Pressing **Discard** will return you to the home screen, and will not save any of your changes.

Pressing **Cancel** will keep you in the setting options. It will not discard the changes you have made.

Pressing **Save** will save all of your changes. The “Firmware” screen will display, and then will return to the home screen.

Figure 5 - Exiting Options



Factory Settings

NOTE: If you are making changes in "Factory Setting" or to a schedule that is currently running in an Occupied Schedule, the board will go through a power cycle. Any lights that are active may turn off for a period of time.

Inputs: Up to seven (7) **120V AC** inputs can be assigned to the panel for photocells (light sensor), switches, and occupancy sensors per panel.

Outputs: There are eight (8) outputs per panel that can be assigned to control the lighting. Outputs must control lights through a relay or contactor. Multiple contactors may be assigned per zone.

Zones: The maximum number of zones that can be created per system are limited to the number of outputs that are used by the system. These zones can be viewed on the main menu screen.

HMIs: You may have a maximum of ten (10) HMI assigned to a lighting control system.

Assign Contactors: Assigning output number to assigned zone name. A zone name is assigned by using the Application Launcher program CAAL. There may be up to 8 Output assignments and they may be assigned None or 8 zone selections (A-H).

Zone Config: Zones are controlled by board inputs, user defined schedules, and HMI button presses. Multiple lights may be assigned to one zone. Refer to **"Zone Config Settings"** for more information.

Interlock Config: These interlocks can be used for fire systems, security systems, or other Building Management Systems (BMS). The two interlocks are labeled IL1 and IL2 on the ECPM03 circuit board. The interlocks can be assigned to turn all of the lights on or all of the lights off when the pins are jumped (closed). If IL1 and IL2 are activated, the IL1 interlock will take priority.

Zone Config Settings

Verify all "Inputs", "Outputs", "Zones", and "HMIs" have been assigned under "Factory Settings". This will ensure selected Zone settings are configured so you may create an "Occupied Schedule." The selected Zone A-H will correspond to the Outputs selection 1-8.

To edit zone(s), go to: *FACTORY SETTINGS > ZONE CONFIG > EDIT ZONE*.

Edit Zone Settings

Override Time: User can set timer for override function. Up to two hours can be programmed for the lights to stay on, and then the light setting will return to the previous lighting control.

Input 1: Each zone can contain two separate inputs (1/2). You may assign two independent inputs (1-7) to operate together.

Input Funct: The settings available are None, Override, and On While. Scheduling has priority over input functions.

- **None**: The lighting control will follow a scheduled setting or forced HMI control.
- **Override**: In this mode, the lighting control calls for the input to be on, and for the amount of the override time afterwards. The output will shut off when the override time has expired or the user has pressed the "OFF" button on the HMI.
- **On While**: In this mode the lighting control will call for the light to be on only while the input is on. The output will shut off when the override time has expired, or the user has pressed "OFF" button on the HMI.

Input 2: Each zone can contain two separate inputs (1/2). You may assign two independent inputs (1-7) to operate together.

NOTE: Some areas have adopted lighting codes that allow a maximum of 30 minute overrides. Verify local code requirements.

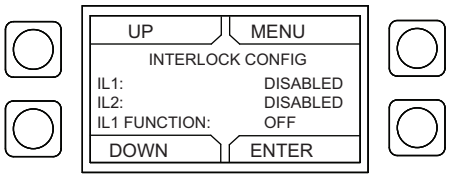
Input Sched: This setting determines how two inputs are handled to actuate the lights. There are two options which are **AND**/**OR**. Their functionality is:

- **AND**: The logic can be set that Input 1 **AND** Input 2 need to be satisfied to actuate the zone.
- **OR**: The logic can be set that Input 1 **OR** Input 2 needs to be satisfied to actuate the zone.

The zone must be assigned in schedule settings, and there must be an input assigned to the zone.

Interlock Config

Figure 6 - Interlock Screen



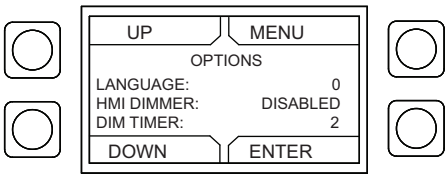
Verify the interlock wiring is connected to the correct board input. There are two interlocks available. The enabled and disabled setting tells the board whether or not to process the interlock.

The On/Off setting tells the board what to do when processing the interlocks. If the interlocks are set to **OFF**, then when the interlock is open, all lights will turn off. If the interlocks are set to **ON**, then when the interlock is open, all lights will turn on.

NOTE: If IL1 and IL2 are activated, the IL1 interlock will take priority.

Options

Figure 7 - Options Screen



User may change Language, HMI Dimmer, and Dim Timer.

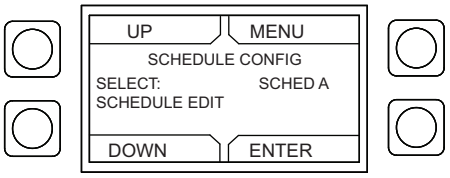
Language: 0 (English)/1

HMI Dimmer: Disabled/Enabled

Dim Timer: 0-10

Schedule Config Settings

Figure 8 - Schedule Config



Select “Schedule Config,” press **Enter**. Select “Schedule Edit.”

The following options will be available:

- Schedule Enable: Yes/No
- Repeat: No/Yes
- Start Day: Mon - Sun
- End Day: Mon - Sun
- Start Time: 00:00 AM/PM
- End Time: 00:00 AM/PM
- Assign Zones: User can assign a schedule to one of the zones listed.

To create a scheduled daily setting, go to ‘Enable’ and select ‘Yes’. If you need to have the same settings for consecutive days, select ‘Yes’ under ‘Repeat’. Select a ‘Start Day, ‘End Day’, ‘Start Time’, and ‘End Time’.

Select which zones you would like to follow this schedule.

Figure 9 - Schedule Example

SCHEDULE ENABLE:	YES
REPEAT:	YES
START DAY:	MON
END DAY:	FRI
START TIME:	7:00 AM
END TIME:	4:00 PM
ASSIGN ZONES	

An example of a set schedule is shown in **Figure 9**. This setting will control the lights ‘Zone 1’ and ‘Zone 2’ Monday – Friday, and will be active from 7:00 AM to 4:00 PM. There would not be a lighting schedule set for weekend, “Force On” would need to be used to turn on the lights.

Figure 10 is an example of a weekly custom setting.

Figure 10 - Weekly Custom Example

SCHEDULE ENABLE:	YES	SCHEDULE ENABLE:	YES	SCHEDULE ENABLE:	YES	SCHEDULE ENABLE:	YES	SCHEDULE ENABLE:	YES
REPEAT:	NO	REPEAT:	NO	REPEAT:	NO	REPEAT:	NO	REPEAT:	YES
START DAY:	MON	START DAY:	TUE	START DAY:	WED	START DAY:	THU	START DAY:	FRI
END DAY:	MON	END DAY:	TUE	END DAY:	WED	END DAY:	THU	END DAY:	SUN
START TIME:	10:00 AM	START TIME:	10:00 AM	START TIME:	10:00 AM	START TIME:	10:00 AM	START TIME:	10:00 AM
END TIME:	8:00 PM	END TIME:	5:00 PM	END TIME:	8:00 PM	END TIME:	5:00 PM	END TIME:	11:00 PM
ASSIGN ZONES		ASSIGN ZONES		ASSIGN ZONES		ASSIGN ZONES		ASSIGN ZONES	

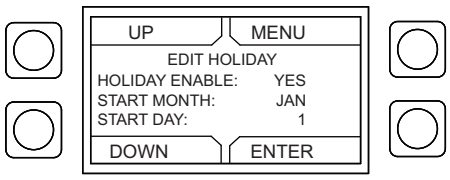
Holiday Settings

Select “Holiday Config,” press **Enter**. Select “Edit Holiday.”

- Holiday Enable: Set to ‘Yes’ is holiday settings are required.
- Start Month: Edit month the holiday will begin.
- Start Day: Edit date the holiday will begin.
- End Month: Edit month the holiday will end.
- End Day: Edit date the holiday will end.

If the lights need to be turned On/Off, you will need to press “Force On” / “Force Off”. The lights will stay On/Off for the programmed override time.

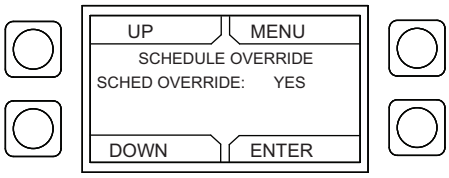
Figure 11 - Edit Holiday



Schedule Override

Using a “Schedule Override” will override the current schedule. The schedule will stay until the “Resume” is pressed.

Figure 12 - Schedule Override



Electrical

ECPM03 Installation

Make sure you properly handle the components, and avoid excessive mechanical stress. Do not bend any components during transport, handling, installation or maintenance. Do not touch any electronic components or contacts. This board contains electrostatically sensitive components, which can easily be damaged by inappropriate handling. Static control precautions must be adhered to during installation, testing, servicing and repairing of this board. Component damage may result if proper procedures are not followed.

To ensure proper operation, do not install the board where it is subjected to adverse environmental conditions such as combustible, oily, or hazardous vapors; corrosive chemicals; excessive dust, moisture or vibration; direct sunlight or extreme temperatures.

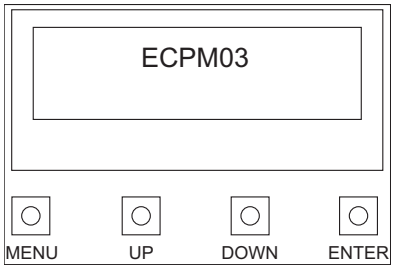
The ECPM03 board may be mounted by means of DIN rail clips and board standoffs or by standoffs alone. It will be mounted in a NEMA 1 enclosure for indoor use only.

When working on live panel controllers, applicable national safety regulations must be observed. The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross sections, circuit breaker, protective earth [PE] connection). While this document does make recommendations in regards to these items, national and local codes must be adhered to.

NOTE: The board's battery should be changed every 9-10 years.

General Overview

Figure 13 - ECPM03 Configuration Screen



The ECPM03 board allows the user to configure functionality of the system through the setup menus on its LCD. The ECPM03 LCD uses 4 buttons for navigation: MENU, UP, DOWN, ENTER (**Figure •**).

The **ENTER** button typically takes you up one level in the menu tree while the **MENU** button takes you down one level. **UP** and **DOWN** navigate through the same level of the menu tree and also allows the user to change the value of a parameter.

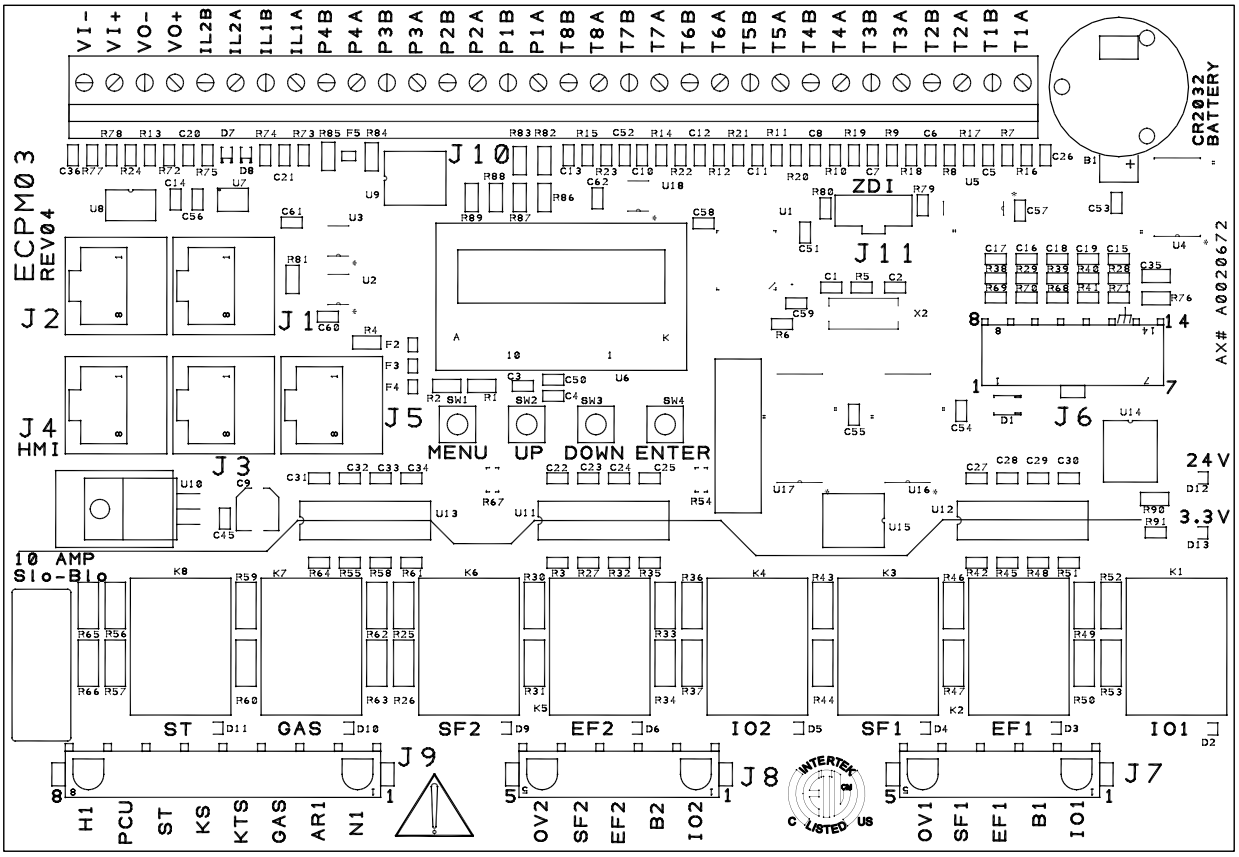
The following items may be accessed on the LCD screen:

- Software Version - Displays current software version. If updating software version, verify new version has uploaded to the board.
- Time Zone - This is the time zone setting the package will use. Verify that the time zone is set correctly to the region. If an incorrect time zone is used, the package settings will operate at incorrect time settings.
- Date and Time - Displays board's internal date and time settings
- Fault Info - Logs fault date and time activation.

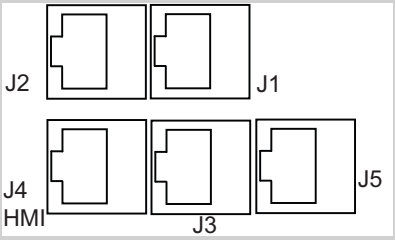
ECPM03 Board Connectors

ECPM03 is the main control of the system. It receives all of the digital and analog inputs, and delivers all digital outputs for external devices.

NOTE: Not all pins or electrical features may be used with your electrical control package. Verify with wiring schematics and/or HMI settings.



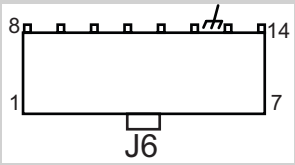
RJ45 Connectors



J1, J2 - Modbus master network connectors, feed through RJ45s, which conform to the Modbus pin-out for RS485 2 wire differential Modbus RTU standard. J1 and J2 are utilized for Comm Module and external BMS interface. No field wires should be connected to J1 or J2.

J3, J4, J5: Modbus slave network connectors feed through RJ45s, which conform to the Modbus pin-out for RS485 2 wire differential Modbus RTU standard. See http://www.modbus.org. Modbus communication is not configured for third party integration without additional components. All network, PCUAFM, HMI, and VFDs report through J3, J4 and J5. The order of connection is irrelevant.

Connector J6 contains factory only wiring for low voltage connections



Pin 1 - **24V DC** power input (positive side) to the board.

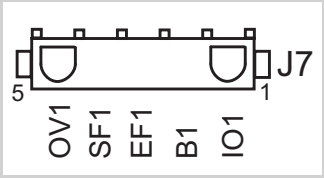
Pin 2 through pin 7 - Each open collector relay output (RO) sources **100 mA** max and is suitable for driving **24V DC** relays or indicator lamps.

Pin 8 through pin 12 - **4-20 mA** current inputs. 150 Ohm impedance to **24V DC** ground pin 14.

Pin 13 - Chassis ground connection, this pin connects to the **24V DC** ground through a paralleled 1000pf **2000V** capacitor and a 100k Ohm 1/4W resistor.

Pin 14 - **24V DC** power input (negative side) to the board. Ground or common side of the low voltage circuitry.

Connector J7 contains **120V AC** control connector for factory only wiring



Pin 1 - (IO1) output and input, this pin can source **120V AC** and detect the presence of **120V AC**.

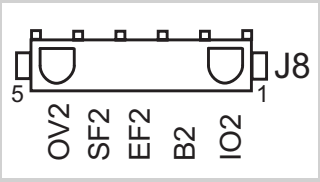
Pin 2 - (B1) input, this pin can detect the presence of **120V AC**.

Pin 3 - (EF1) output and input, this pin can source **120V AC** and detect the presence of **120V AC**.

Pin 4 - (SF1) output, this pin can source **120V AC**.

Pin 5 - (OV1) input, this pin can detect the presence of **120V AC**.

Connector J8 contains **120V AC** control connector for factory wiring



Pin 1 - (IO2) output and input, this pin can source **120V AC** and detect the presence of **120V AC.**

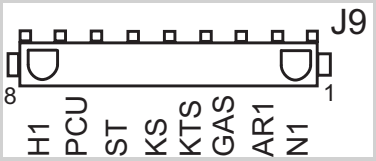
Pin 2 - (B2) input, this pin can detect the presence of **120V AC.**

Pin 3 - (EF2) output and input, this pin can source **120V AC** and detect the presence of **120V AC.**

Pin 4 - (SF2) output, this pin can source **120V AC.**

Pin 5 - (OV2) input, this pin can detect the presence of **120V AC.**

Connector J9 contains **120V AC** control connector for factory only wiring



Pin 1 - (N1) this is the neutral or return path for the detection of **120V AC** by the input pins. It would be connected to the neutral side of the **120V AC** supply.

Pin 2 - (AR1) input, this pin can detect the presence of **120V AC.**

Pin 3 - (GAS) output, this pin can source **120V AC.**

Pin 4 - (KTS) input, this pin can detect the presence of **120V AC.**

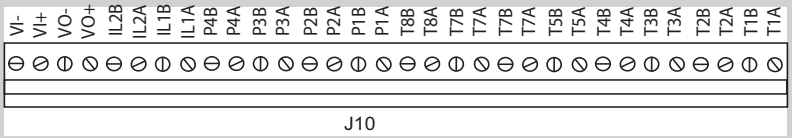
Pin 5 - (KS) output, this pin can source **120V AC.**

Pin 6 - (ST) output, this pin can source **120V AC.**

Pin 7 - (PCU) input, this pin can detect the presence of **120V AC.**

Pin 8 - (H1) this is the **120V AC** 50/60Hz input to the board, it feeds through an onboard 10 Amp Slow-Blow fuse and is used to source **120V AC** to all the pins described as **120V AC** outputs. The total current draw of all the **120V AC** outputs must not exceed 10 Amps.

Connector J10 contains low voltage field wiring connections



Pin 1 through pin 16 - thermistor probe inputs. 10k type B thermistors are connected to these inputs.

Pin 17, 19, 21, 23, 25, and 27 - sources **24V DC** which is current limited through an onboard **200 mA** PTC Poly-Fuse. This is the high side of the pulse with modulated outputs, and low voltage inputs listed below.

Pin 18, 20, 22, and 24 - Open collector PWM outputs, **100 mA** max each. Suitable for driving the optoisolated PWM speed control inputs of EC motors.

Pin 26, 28 - low voltage inputs, suitable for detecting dry contact closures with pins 25, 27 above.

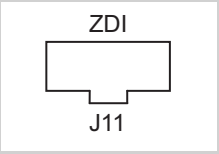
Pin 29 - **0-10V DC** output, **5 mA** max, suitable for driving instrumentation inputs.

Pin 30 - negative, common or ground side of the above **0-10V DC** output.

Pin 31 - **0-10V DC** input, 10k Ohm impedance to ground or common.

Pin 32 - negative, common or ground side of the above **0-10V DC** output.

Connector J11 factory programming only, Zilog ZDI micro-controller debug/programming interface



Pin 1 - **3.3V DC**

Pin 2 - reset

Pin 3 - Gnd

Pin 4 - DBG input

Pin 5 - Gnd

Pin 6 - NC

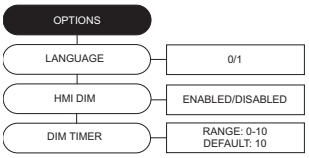
HMI Menu Configurations

Factory Settings: Refer to **"Factory Settings" on page 11** for more information.

- **Inputs** - Up to 7 inputs can be assigned in the system.
- **Outputs** - Up to 8 outputs can be assigned.
- **Zones** - Up to 8 zones can be assigned.
- **HMIs** - Up to 10 HMIs can be assigned.
- **Assign Contactors** - Outputs per contactor are based on Output selection. Assign outputs to Zone A-H.
- **Zone Config** - Refer to **"Zone Config Settings" on page 11** for more information.
  - **Edit Zone** - Refer to **"Edit Zone Settings" on page 11** for more information.
    - **Override Time** - User can set override timer.
    - **Input 1** - User can assign one independent input (1-7) to Input 1.
    - **Input Funct** - User can assign lighting mode functionality.
    - **Input 2** - User can assign one independent input (1-7) to Input 2.
    - **Input Sched** - User can assign how lighting Input 1/2 will operate.
- **Interlock Config** - Refer to **"Interlock Config" on page 12** for more information.
  - **IL1** - Interlock 1 enabling setting.
  - **IL2** - Interlock 2 enabling setting.
  - **IL1 Function** - Interlock 1 functionality setting.
  - **IL2 Function** - Interlock 2 functionality setting.

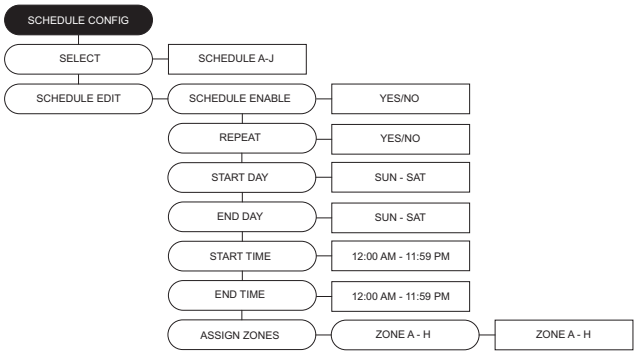
Options: Refer to **"Options" on page 12** for more information.

- **Language** - 0 = English, 1 = Spanish.
- **HMI Dim** - Enables dimming option.
- **Dim Timer** - If the dimmer is enabled, the DIM delay (seconds) can be set.



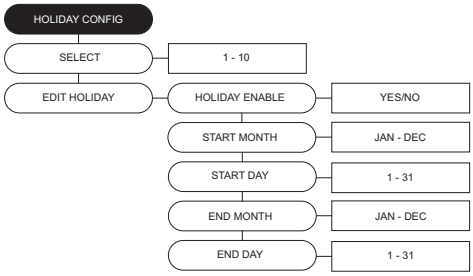
Schedule Config: Refer to **"Schedule Config Settings" on page 12**.

- **Select** - User may select up to 10 schedule configurations.
- **Schedule Edit** - Allows user to edit schedule configuration settings.
  - **Schedule Enable** - User must set to 'Yes' to enable schedule.
  - **Repeat** - User may repeat set schedule settings.
  - **Start Day** - Select day to start schedule.
  - **End Day** - Select day to end schedule.
  - **Start Time** - Select start time for the schedule.
  - **End Time** - Select end time for the schedule.
  - **Assign Zones** - 8 selectable zones.
    - **Zone A though H** - User must select 'Yes' to assign zone activation.

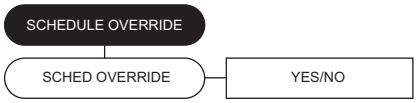


Holiday Config: Refer to **"Holiday Settings" on page 13**.

- **Select** - User may select up to 10 schedule configurations.
- **Holiday Enable**- Allows user to edit schedule configuration settings.
  - **Holiday Enable** - User must set to 'Yes' to enable holiday settings.
  - **Start Month** - Select month the holiday will start.
  - **Start Day** - Select day the holiday will start.
  - **End Month** - Select month the holiday will end.
  - **End Day** - Select day the holiday will end.

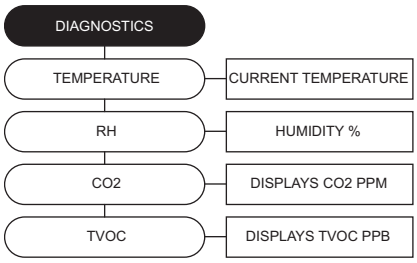


Schedule Override: Allows the user to override the current schedule settings.



Diagnostics: HMI diagnostic menus.

- **Temperature** - Allows the user to monitor temperature sensors in the system.
- **RH** - Displays current humidity percentage.
- **CO2** - Displays current Carbon Dioxide (CO2) Parts Per Million (PPM) readings.
- **TVOC** - Displays current Total Volatile Organic Compound (TVOC) Parts Per Billion (PPB) readings.



Network

NOTE: The board will reboot when altering certain factory settings.

Communication Module (Optional)

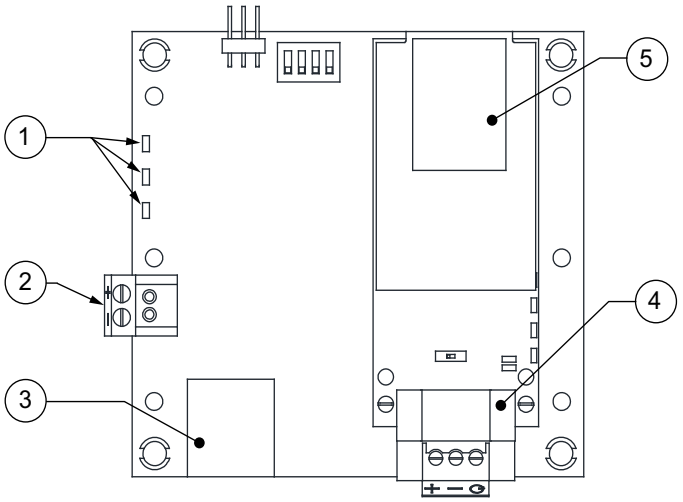
The Communication Module, PN: **SCADA**, is included in all CASlink equipped panels. It obtains operational data from various connected components. This communication wiring is either RS-485 shielded twisted pair wiring or RJ45 Cat 5 Ethernet wiring.

BACnet

BACnet IP or BACnet MS/TP (**Figure 14**) compatibility can be implemented with this package through a Protocessor, which is a BTL listed embedded Gateway configured to give a Building Management System access to monitor and/or control a list of BACnet objects. The Protocessor is mounted and factory pre-wired inside the Electrical Control Panel (ECP). Field connections to the Building Management System (BMS) are shown on wiring schematics.

The Protocessor is pre-configured at the factory to use the field protocol of the Building Management System in the specific jobsite. BACnet objects can only be accessed through the specified port and protocol.

Figure 14 - BACnet



1. Status LEDs
   - Green - Data Out
   - Yellow - Data In
   - Red - Power On
2. Power Supply 24V AC/DC
3. Cat 5 Cable to MUA Board.
4. Field RS485 Connection for BACnet MS/TP
5. Field Ethernet Connection for BACnet IP

Device Instance, MAC Address, Baud Rate

Some applications may require that the Protocessor have a specific Device Instance, the default device instance is 50,000. To change the Device Instance, you must access the Web Configurator by connecting a computer to the Ethernet port of the Protocessor. The computer used must be assigned a static IP address of 192.168.1.xxx and a subnet mask of 255.255.255.0.

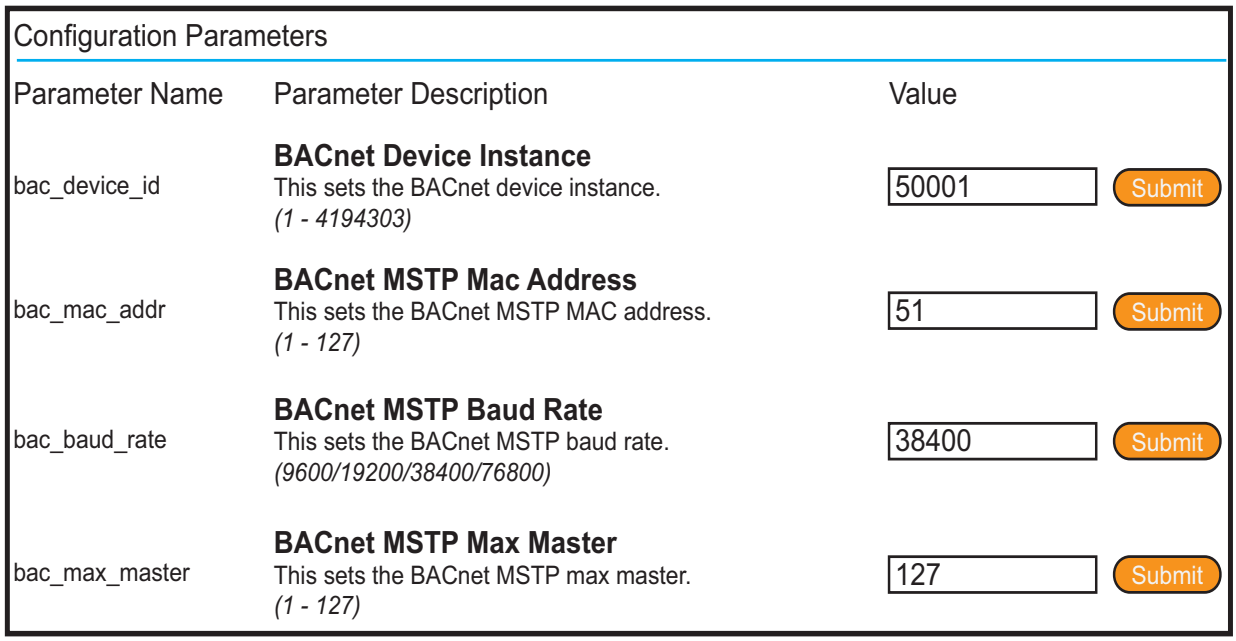
To access the Web Configurator, type the IP address of the Protocessor in the URL of any web browser. The default IP address of the Protocessor is 192.168.1.24. Once the landing page has loaded, if required, log in using “admin” for the username and password. If the default “admin” password does not work, the gateway should have a printed password on the module’s Ethernet port.

Go to the main configuration page, select “Configure” from the left-hand menu. Select “Profile Configuration,” the following window shown in **Figure 15** should appear.

The MAC address and Baud Rate, used by BACnet MTSP, are editable. The MAC address default is 127, and the Baud Rate default is 38400.

If any changes are made, **click on the submit button for each individual change.** Each individual change will require the system to restart.

Figure 15 - Configuration Parameters Page

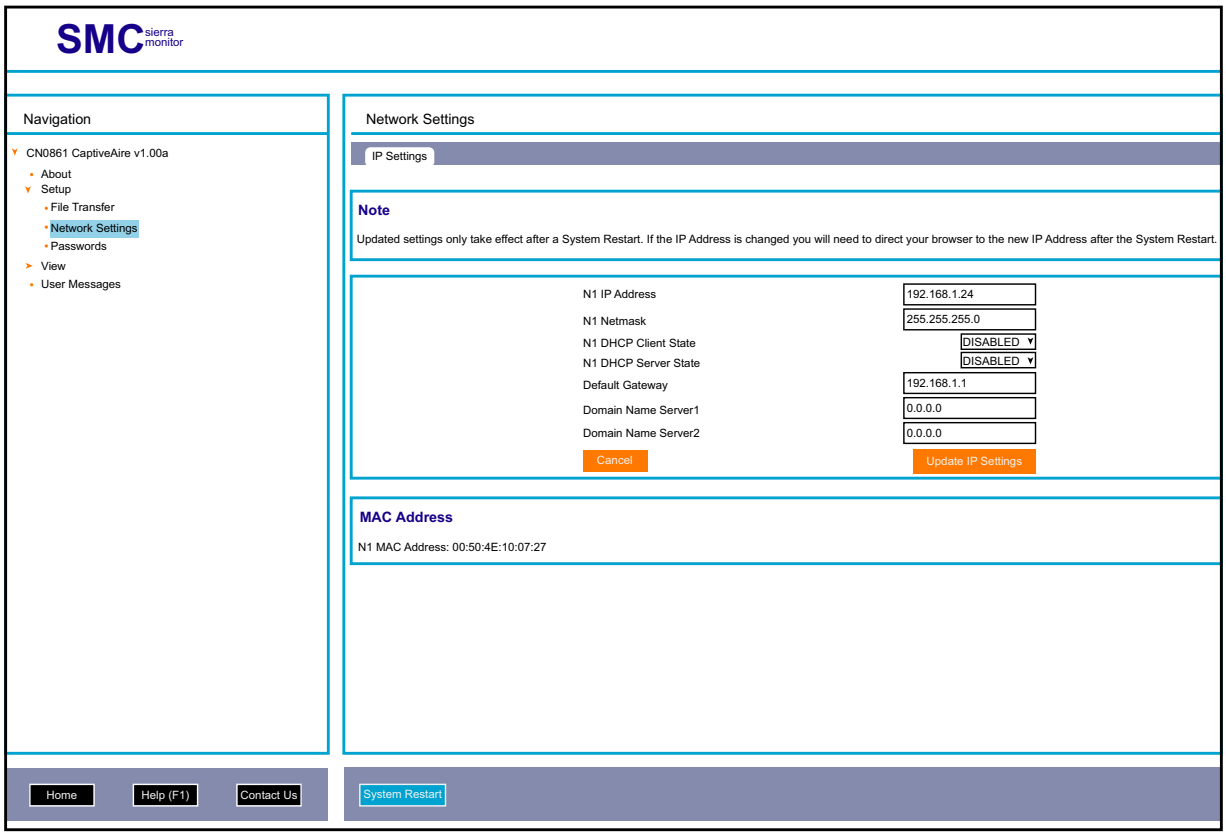


Changing the IP Address

Some BACnet IP applications may require changing the IP address of the Protocessor. To change the IP address, go to the internal server by typing the default IP address of the Protocessor, 192.168.1.24, in the URL field of any web browser. The computer used must have a static IP address of 192.168.1.xxx. The window shown in **Figure 16** appears. Click on the “Diagnostics and Debugging” button in the lower right corner.

Click on “Setup” from the left-hand side menu and select “Network Settings.” The window shown in **Figure 16** will appear. You can now modify the IP address to whatever is required in the application. Once the IP address has been modified, click on “Update IP Settings.”

Figure 16 - Network Settings Page



BACnet IP and BACnet MS/TP Points

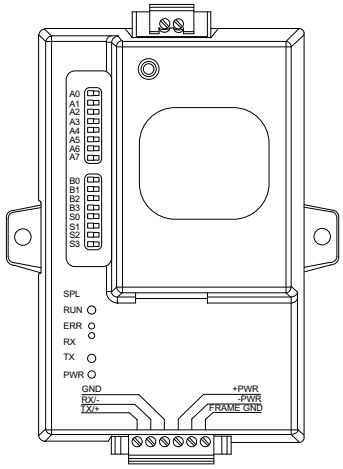
Object Name	BACnet Type	Description	Object ID
Zone 1 Override	Binary Value (BV)	1 = Zone ON for Override Time, 0 = OFF	1
Zone 2 Override	BV	2 = Zone ON for Override Time, 0 = OFF	2
Zone 3 Override	BV	3 = Zone ON for Override Time, 0 = OFF	3
Zone 4 Override	BV	4 = Zone ON for Override Time, 0 = OFF	4
Zone 5 Override	BV	5 = Zone ON for Override Time, 0 = OFF	5
Zone 6 Override	BV	6 = Zone ON for Override Time, 0 = OFF	6
Zone 7 Override	BV	7 = Zone ON for Override Time, 0 = OFF	7
Zone 8 Override	BV	8 = Zone ON for Override Time, 0 = OFF	8
Zone 1 Auto	BV	1 = Enable Board Control ON, 0 = OFF	9
Zone 2 Auto	BV	2 = Enable Board Control ON, 0 = OFF	10
Zone 3 Auto	BV	3 = Enable Board Control ON, 0 = OFF	11
Zone 4 Auto	BV	4 = Enable Board Control ON, 0 = OFF	12
Zone 5 Auto	BV	5 = Enable Board Control ON, 0 = OFF	13
Zone 6 Auto	BV	6 = Enable Board Control ON, 0 = OFF	14
Zone 7 Auto	BV	7 = Enable Board Control ON, 0 = OFF	15
Zone 8 Auto	BV	8 = Enable Board Control ON, 0 = OFF	16
Zone 1 Force Off	BV	1 Force Off Zone = ON, 0 = OFF	17
Zone 2 Force Off	BV	2 Force Off Zone = ON, 0 = OFF	18
Zone 3 Force Off	BV	3 Force Off Zone = ON, 0 = OFF	19
Zone 4 Force Off	BV	4 Force Off Zone = ON, 0 = OFF	20
Zone 5 Force Off	BV	5 Force Off Zone = ON, 0 = OFF	21
Zone 6 Force Off	BV	6 Force Off Zone = ON, 0 = OFF	22
Zone 7 Force Off	BV	7 Force Off Zone = ON, 0 = OFF	23
Zone 8 Force Off	BV	8 Force Off Zone = ON, 0 = OFF	24
Zone 1 Add Time	BV	1 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	25
Zone 2 Add Time	BV	2 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	26
Zone 3 Add Time	BV	3 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	27
Zone 4 Add Time	BV	4 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	28
Zone 5 Add Time	BV	5 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	29
Zone 6 Add Time	BV	6 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	30
Zone 7 Add Time	BV	7 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	31
Zone 8 Add Time	BV	8 Extend Zone Schedule by 2 Hours = ON, 0 = OFF	32
OverrideAllowed Zone 1	BI	OverrideAllowed Zone 1	33
OverrideAllowed Zone 2	BI	OverrideAllowed Zone 2	34
OverrideAllowed Zone 3	BI	OverrideAllowed Zone 3	35
OverrideAllowed Zone 4	BI	OverrideAllowed Zone 4	36
OverrideAllowed Zone 5	BI	OverrideAllowed Zone 5	37
OverrideAllowed Zone 6	BI	OverrideAllowed Zone 6	38
OverrideAllowed Zone 7	BI	OverrideAllowed Zone 7	39
OverrideAllowed Zone 8	BI	OverrideAllowed Zone 8	40
AutoAllowed Zone 1	BI	AutoAllowed Zone 1	41
AutoAllowed Zone 2	BI	AutoAllowed Zone 2	42
AutoAllowed Zone 3	BI	AutoAllowed Zone 3	43
AutoAllowed Zone 4	BI	AutoAllowed Zone 4	44

Object Name	BACnet Type	Description	Object ID
AutoAllowed Zone 5	BI	AutoAllowed Zone 5	45
AutoAllowed Zone 6	BI	AutoAllowed Zone 6	46
AutoAllowed Zone 7	BI	AutoAllowed Zone 7	47
AutoAllowed Zone 8	BI	AutoAllowed Zone 8	48
ForceOFFAllowed Zone 1	BI	ForceOFFAllowed Zone 1	49
ForceOFFAllowed Zone 2	BI	ForceOFFAllowed Zone 2	50
ForceOFFAllowed Zone 3	BI	ForceOFFAllowed Zone 3	51
ForceOFFAllowed Zone 4	BI	ForceOFFAllowed Zone 4	52
ForceOFFAllowed Zone 5	BI	ForceOFFAllowed Zone 5	53
ForceOFFAllowed Zone 6	BI	ForceOFFAllowed Zone 6	54
ForceOFFAllowed Zone 7	BI	ForceOFFAllowed Zone 7	55
ForceOFFAllowed Zone 8	BI	ForceOFFAllowed Zone 8	56
AddTimeAllowed Zone 1	BI	AddTimeAllowed Zone 1	57
AddTimeAllowed Zone 2	BI	AddTimeAllowed Zone 2	58
AddTimeAllowed Zone 3	BI	AddTimeAllowed Zone 3	59
AddTimeAllowed Zone 4	BI	AddTimeAllowed Zone 4	60
AddTimeAllowed Zone 5	BI	AddTimeAllowed Zone 5	61
AddTimeAllowed Zone 6	BI	AddTimeAllowed Zone 6	62
AddTimeAllowed Zone 7	BI	AddTimeAllowed Zone 7	63
AddTimeAllowed Zone 8	BI	AddTimeAllowed Zone 8	64
Board Fuse Blown	Binary Input (BI)	Fuse = OA, 0 = OFF	65
Check Panel Switch 1	BI	1 = Panel Switch Off, 0 = OFF	66
Check Panel Switch 2	BI	2 = Panel Switch Off, 0 = OFF	67
Check Panel Switch 3	BI	3 = Panel Switch Off, 0 = OFF	68
Check Panel Switch 4	BI	4 = Panel Switch Off, 0 = OFF	69
Check Panel Switch 5	BI	5 = Panel Switch Off, 0 = OFF	70
Check Panel Switch 6	BI	6 = Panel Switch Off, 0 = OFF	71
Check Panel Switch 7	BI	7 = Panel Switch Off, 0 = OFF	72
Check Panel Switch 8	BI	8 = Panel Switch Off, 0 = OFF	73
Output On by Panel Switch 1	BI	1 = Panel Switch Manually On, 0 = OFF	74
Output On by Panel Switch 2	BI	2 = Panel Switch Manually On, 0 = OFF	75
Output On by Panel Switch 3	BI	3 = Panel Switch Manually On, 0 = OFF	76
Output On by Panel Switch 4	BI	4 = Panel Switch Manually On, 0 = OFF	77
Output On by Panel Switch 5	BI	5 = Panel Switch Manually On, 0 = OFF	78
Output On by Panel Switch 6	BI	6 = Panel Switch Manually On, 0 = OFF	79
Output On by Panel Switch 7	BI	7 = Panel Switch Manually On, 0 = OFF	80
Output On by Panel Switch 8	BI	8 = Panel Switch Manually On, 0 = OFF	81

LonWorks

LonWorks compatibility (**Figure 17**) can be implemented on control packages through the ProtoNode, a LonMark certified external Gateway configured to give a Building Management System access to monitor and/or control a list of Network Variables. The ProtoNode is mounted and factory pre-wired inside the Electrical Control Panel. Refer to schematics connections to the Building Management System are shown.

Figure 17 - LonWorks



Commissioning on a LonWorks Network

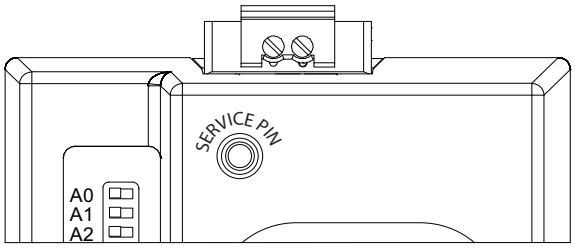
During the commissioning process by the LonWorks administrator (using a LonWorks Network Management Tool), the user will be prompted to hit the Service Pin in the ProtoNode. This pin is located in the front face, and it can be pressed by inserting a small screwdriver and tilting it towards the LonWorks Port. Refer to **Figure 18** for location of the “Service Pin.”

If an XIF file is required, it can be obtained by following these steps:

1. Set your computer’s static IP address to 192.168.1.xxx with a subnet mask of 255.255.255.0.
2. Run a Cat 5 connection from the ProtoNode’s Ethernet port to your computer.
3. On any web browser’s URL field, type 192.168.1.24/fserver.xif.

The web browser should automatically download the fserver.xif file or let you save it on your computer. Save it as fserver.xif.

Figure 18 - LonWorks Service Pin



NOTE: **Insert Small Screwdriver. Tilt Toward LonWorks Port To Activate Service Pin.**

LonWorks Points

SVNT	LON Function	SNVT Type	Index
nvoOverrideZ1	NVUOIMT	SNVT_count	0
nvoOverrideZ2	NVUOIMT	SNVT_count	1
nvoOverrideZ3	NVUOIMT	SNVT_count	2
nvoOverrideZ4	NVUOIMT	SNVT_count	3
nvoOverrideZ5	NVUOIMT	SNVT_count	4
nvoOverrideZ6	NVUOIMT	SNVT_count	5
nvoOverrideZ7	NVUOIMT	SNVT_count	6
nvoOverrideZ8	NVUOIMT	SNVT_count	7
nvoAutoZ1	NVUOIMT	SNVT_count	8
nvoAutoZ2	NVUOIMT	SNVT_count	9
nvoAutoZ3	NVUOIMT	SNVT_count	10
nvoAutoZ4	NVUOIMT	SNVT_count	11
nvoAutoZ5	NVUOIMT	SNVT_count	12
nvoAutoZ6	NVUOIMT	SNVT_count	13
nvoAutoZ7	NVUOIMT	SNVT_count	14
nvoAutoZ8	NVUOIMT	SNVT_count	15
nvoForceOFFZ1	NVUOIMT	SNVT_count	16
nvoForceOFFZ2	NVUOIMT	SNVT_count	17
nvoForceOFFZ3	NVUOIMT	SNVT_count	18
nvoForceOFFZ4	NVUOIMT	SNVT_count	19
nvoForceOFFZ5	NVUOIMT	SNVT_count	20
nvoForceOFFZ6	NVUOIMT	SNVT_count	21
nvoForceOFFZ7	NVUOIMT	SNVT_count	22
nvoForceOFFZ8	NVUOIMT	SNVT_count	23
nvoAddTimeZ1	NVUOIMT	SNVT_count	24
nvoAddTimeZ2	NVUOIMT	SNVT_count	25
nvoAddTimeZ3	NVUOIMT	SNVT_count	26
nvoAddTimeZ4	NVUOIMT	SNVT_count	27
nvoAddTimeZ5	NVUOIMT	SNVT_count	28
nvoAddTimeZ6	NVUOIMT	SNVT_count	29
nvoAddTimeZ7	NVUOIMT	SNVT_count	30
nvoAddTimeZ8	NVUOIMT	SNVT_count	31
nvoCanOverrideZ1	NVUOIMT	SNVT_count	32
nvoCanOverrideZ2	NVUOIMT	SNVT_count	33
nvoCanOverrideZ3	NVUOIMT	SNVT_count	34
nvoCanOverrideZ4	NVUOIMT	SNVT_count	35
nvoCanOverrideZ5	NVUOIMT	SNVT_count	36
nvoCanOverrideZ6	NVUOIMT	SNVT_count	37
nvoCanOverrideZ7	NVUOIMT	SNVT_count	38
nvoCanOverrideZ8	NVUOIMT	SNVT_count	39
nvoCanAutoZ1	NVUOIMT	SNVT_count	40
nvoCanAutoZ2	NVUOIMT	SNVT_count	41
nvoCanAutoZ3	NVUOIMT	SNVT_count	42
nvoCanAutoZ4	NVUOIMT	SNVT_count	43

SVNT	LON Function	SNVT Type	Index
nvoCanAutoZ5	NVUOIMT	SNVT_count	44
nvoCanAutoZ6	NVUOIMT	SNVT_count	45
nvoCanAutoZ7	NVUOIMT	SNVT_count	46
nvoCanAutoZ8	NVUOIMT	SNVT_count	47
nvoCanForceOFFZ1	NVUOIMT	SNVT_count	48
nvoCanForceOFFZ2	NVUOIMT	SNVT_count	49
nvoCanForceOFFZ3	NVUOIMT	SNVT_count	50
nvoCanForceOFFZ4	NVUOIMT	SNVT_count	51
nvoCanForceOFFZ5	NVUOIMT	SNVT_count	52
nvoCanForceOFFZ6	NVUOIMT	SNVT_count	53
nvoCanForceOFFZ7	NVUOIMT	SNVT_count	54
nvoCanForceOFFZ8	NVUOIMT	SNVT_count	55
nvoCanAddTimeZ1	NVUOIMT	SNVT_count	56
nvoCanAddTimeZ2	NVUOIMT	SNVT_count	57
nvoCanAddTimeZ3	NVUOIMT	SNVT_count	58
nvoCanAddTimeZ4	NVUOIMT	SNVT_count	59
nvoCanAddTimeZ5	NVUOIMT	SNVT_count	60
nvoCanAddTimeZ6	NVUOIMT	SNVT_count	61
nvoCanAddTimeZ7	NVUOIMT	SNVT_count	62
nvoCanAddTimeZ8	NVUOIMT	SNVT_count	63
nvoBoardFuseFlt	NVUOIMT	SNVT_count	64
nvoCheckPanelSw1	NVUOIMT	SNVT_count	65
nvoCheckPanelSw2	NVUOIMT	SNVT_count	66
nvoCheckPanelSw3	NVUOIMT	SNVT_count	67
nvoCheckPanelSw4	NVUOIMT	SNVT_count	68
nvoCheckPanelSw5	NVUOIMT	SNVT_count	69
nvoCheckPanelSw6	NVUOIMT	SNVT_count	70
nvoCheckPanelSw7	NVUOIMT	SNVT_count	71
nvoCheckPanelSw8	NVUOIMT	SNVT_count	72
nvoOutONbySw1	NVUOIMT	SNVT_count	73
nvoOutONbySw2	NVUOIMT	SNVT_count	74
nvoOutONbySw3	NVUOIMT	SNVT_count	75
nvoOutONbySw4	NVUOIMT	SNVT_count	76
nvoOutONbySw5	NVUOIMT	SNVT_count	77
nvoOutONbySw6	NVUOIMT	SNVT_count	78
nvoOutONbySw7	NVUOIMT	SNVT_count	79
nvoOutONbySw8	NVUOIMT	SNVT_count	80
nviOverrideZ1	NVUI	SNVT_count	81
nviOverrideZ2	NVUI	SNVT_count	82
nviOverrideZ3	NVUI	SNVT_count	83
nviOverrideZ4	NVUI	SNVT_count	84
nviOverrideZ5	NVUI	SNVT_count	85
nviOverrideZ6	NVUI	SNVT_count	86
nviOverrideZ7	NVUI	SNVT_count	87
nviOverrideZ8	NVUI	SNVT_count	88
nviAutoZ1	NVUI	SNVT_count	89

SVNT	LON Function	SNVT Type	Index
nviAutoZ2	NVUI	SNVT_count	90
nviAutoZ3	NVUI	SNVT_count	91
nviAutoZ4	NVUI	SNVT_count	92
nviAutoZ5	NVUI	SNVT_count	93
nviAutoZ6	NVUI	SNVT_count	94
nviAutoZ7	NVUI	SNVT_count	95
nviAutoZ8	NVUI	SNVT_count	96
nviForceOFFZ1	NVUI	SNVT_count	97
nviForceOFFZ2	NVUI	SNVT_count	98
nviForceOFFZ3	NVUI	SNVT_count	99
nviForceOFFZ4	NVUI	SNVT_count	100
nviForceOFFZ5	NVUI	SNVT_count	101
nviForceOFFZ6	NVUI	SNVT_count	102
nviForceOFFZ7	NVUI	SNVT_count	103
nviForceOFFZ8	NVUI	SNVT_count	104
nviAddTimeZ1	NVUI	SNVT_count	105
nviAddTimeZ2	NVUI	SNVT_count	106
nviAddTimeZ3	NVUI	SNVT_count	107
nviAddTimeZ4	NVUI	SNVT_count	108
nviAddTimeZ5	NVUI	SNVT_count	109
nviAddTimeZ6	NVUI	SNVT_count	110
nviAddTimeZ7	NVUI	SNVT_count	111
nviAddTimeZ8	NVUI	SNVT_count	112

TROUBLESHOOTING

HMI Fault Warnings

Problem	Potential Cause	Corrective Action
Is Fuse Blown	Excessive Current	Check the fuse located on the ECPM03 Board. Check the system for a short circuit. Verify load is below 10 Amps. Replace fuse if blown.
Contactor Mismatch	Incorrect Wiring	Check wiring to the contactor.
	Incorrect Panel Switch	Check the internal panel switches are set properly.
Panel Switch ‘x’ Manual	Panel switch is in the manual position, when the lighting logic is set to be OFF.	Correct switch position in the Lighting Control Panel.
Panel Switch ‘x’ Off	Panel switch is in the OFF position, when the lighting logic is set to be ON.	Correct switch position in the Lighting Control Panel.

Common Troubleshooting

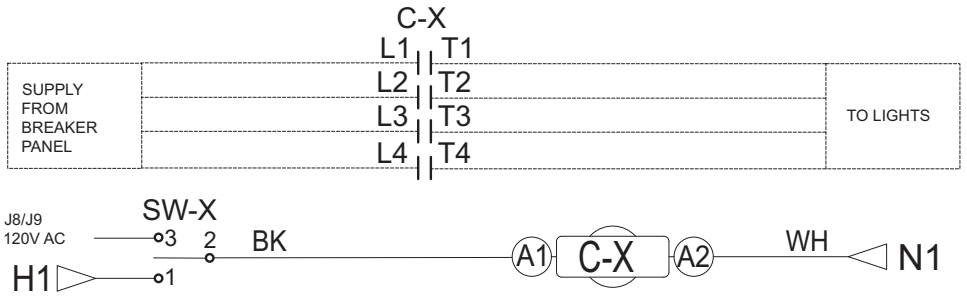
Problem	Potential Cause	Corrective Action
Unit not activating lights	Power Issue	Check for voltage at H1 and N1 on the terminal block. There should be **120V AC**.
	Loose Wiring	Check wiring to terminal block.
	Incorrect panel switch wiring/position	Check wiring to the Auto/Manual switches. Check the internal panel switches are set properly.
	Missing voltage at board	Check for voltage between J6 pin 1 and pin 14. There should be **24V DC.**
	Contactor	Check wiring to the contactor. Verify contactor coil.
HMI screen is blank	Loose connection	Check the connection between the HMI, and the ECPM03 board connection J4. If more than one HMI is used, verify they are connected together. Make sure the last HMI has an end of line resistor installed.
	Power Supply	
Lighting not working properly	Incorrect control settings	
	Incorrect panel switch wiring/position	Check wiring to the Auto/Manual switches. Check the internal panel switches are set properly.
	Loose connection/wiring	Check wiring to terminal block, contactors. Check connections to the ECPM03 board.
	Contactor	Check wiring to the contactor Verify contactor coil
	Possible sensor failure	Sensor not configured properly. Sensor wiring issue. Defective sensor.
	Issue with fixture or bulb	Check for issues with light fixture or bulb

Component Check/Testing

Contactor (C-x)

1. Make sure all connections are secure, and connected properly. Verify connections to the schematic.
2. Check for voltage at the contactor when the lighting control is ON:
   - There should be approximately **120V AC** from terminal A1 to ground.
   - There should be approximately **120V AC** from terminal A1 to terminal A2.
     - If the voltage reading is incorrect when checking terminal A1 to ground, check the switch input and wiring.
     - If the voltage reading is incorrect when checking terminal A1 to terminal A2, continue to step 3.
     - If the voltage reading is correct, verify the field wiring to the contactor and the light source.
3. Turn the Auto/Off/Manual switch for that contactor to the off position. Verify the coil resistance from terminal A1 to terminal A2. There should be a nominal resistance value. The ohm value will vary depending on the contactor.
   - If the resistance value is **0 ohms** or **OL** (Infinite), the coil has failed. Replace the contactor.
   - If the resistance reading is correct, verify the field wiring to the contactor and the light source.

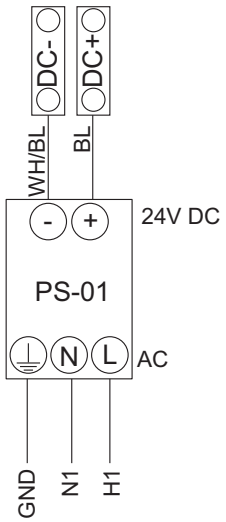
Figure 19 - Contactor Wiring Reference



Power Supply (PS-01)

Figure 20 - Power Supply Wiring Reference

1. Make sure all connections are secure, and connected properly. Verify connections to the schematic.
2. Check for DC voltage from the power supply between V- to V+ when the unit is ON. There should be approximately **24V DC**.
3. Check for AC voltage from the power supply between N to L when the unit is ON. There should be approximately **120V AC**.
   - If any of the readings are incorrect, check the wiring for open or short circuits. Try adjusting the output voltage, if the DC voltage is incorrect.
   - If all of the wiring is correct, the power supply may have failed.



MAINTENANCE

To ensure trouble free operation of this control, the manufacturer suggests following these guidelines. Most problems associated with unit failures are directly related to poor service and maintenance.

Please record any maintenance or service performed on this equipment in the documentation section located at the end of this manual.

WARNING: DO NOT ATTEMPT MAINTENANCE ON THIS CONTROL UNTIL THE ELECTRICAL SUPPLY HAS BEEN COMPLETELY DISCONNECTED, LOCKED OUT AND TAGGED OUT.

General Maintenance

1. Control enclosure should be kept clean and free from any grease or dirt build-up.
2. All fasteners should be checked for tightness each time maintenance checks are preformed prior to restarting unit.
3. Control enclosure door panel should be securely closed after maintenance to prevent tampering or electrical shock.
4. Real Time Clock (RTC) battery should be replaced every 9-10 Years. Use CR2032 or equivalent.

Notes

Start-Up and Maintenance Documentation

Job Information

Job Name		Service Company	
Address		Address	
City		City	
State		State	
Zip		Zip	
Phone Number		Phone Number	
Fax Number		Fax Number	
Contact		Contact	
Purchase Date		Start-Up Date	

Cleaning and Maintenance Record

Date	Service Performed

As a result of our dedication to constant improvements and quality, the MANUFACTURER reserves the right to update specifications without notice. Please refer to MANUFACTURER'S website for up to date documentation.

Technical Support Information

CASLink

Technical Support

Parts Store