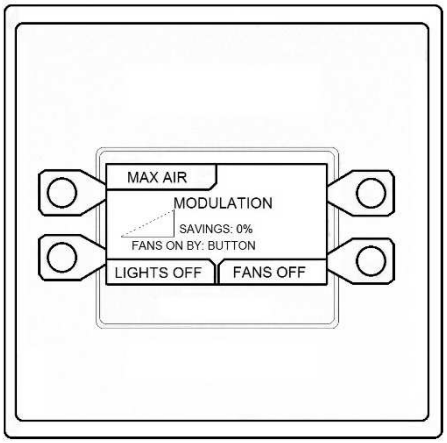
Demand Control Ventilation System

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. Also 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.

A0023662
November 2016 Rev. 10

TABLE OF CONTENTS

WARRANTY 4
CONTROL SPECIFICATIONS 5
INSTALLATION 5
- Mechanical 5
  - Site Preparation 5
- Assembly 5
- Room Sensor Installation 5
- Electrical 7
  - High Voltage Wiring 8
  - Low Voltage Wiring 9
- Component Description 10
  - ECPM03 board 10
  - Variable Frequency Drive 13
  - Faceplate (HMI) 15
  - Duct Temperature Sensor 15
  - Room Temperature Sensor 15
  - Contactor(s) 15
  - Overloads 16
  - Current Sensor 16
  - Dry Contacts 17
  - Cooling Panel Fan 17

OPERATION 18
- ECPM03 LCD Display 19
- HMI 20
  - Setting options on the HMI 20
  - Temperature Averaging 22
- Fan Control 23
  - Static Fan Zone 23
  - Dynamic Fan Zone 24
  - Scheduling (Fans) 25
  - Proving Enabled (Optional) 25
  - Electric Gas Valve Reset 25
  - Wash Self-Cleaning (Optional) 26
- Board Settings 27
- Options 27
- Changing Time Zone ID 27
- Factory Options 28
- Fire Options 33
- Interlock/Warnings 34
  - Make-Up Air Interlock 34
  - Appliances Pilot Check Warning 34
  - Building Management System (Dry Contact) (Optional) 34
- Prime Surfactant 34
- Scheduling 34
- System Bypass 34
- HMI Menu Tree 35
- Network 39
  - Communication Module (Optional) 39
  - BACNET 39
  - BACNET IP and BACNET MS/TP Points 43
  - LonWorks Module (Optional) 49
  - LonWorks Points 50

DIAGNOSTICS 56
- Troubleshooting 57

MAINTENANCE 59
  - Start-Up and Maintenance Documentation 60

WARRANTY

This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 12 months 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 or neglected.
4. The equipment is not operated within its published capacity.
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 12 month 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.

NOTE: To receive warranty coverage, register this product by filling out the Startup and Maintenance Document. Fax the form to 1-919-554-9374 or call 1-866-784-6900 for email information.

Please note that the following may or could void any or all of the above listed warranties.

1. Not following required installation procedures as in installation guide and all other documentation supplied with the lighting and related equipment supplied by manufacturers of individual lighting and control components.
2. Not following all relevant codes and ordinances, not limited to National Electrical Code, provincial or state and local building codes.
3. Not following electrical engineering industry standards regarding approved method of installing solid-state electrical equipment having characteristics of lights and all components included in this product.
4. Any modification to installation, product, controls without written authorization even if attempting to diagnose and/or repair a problem.
5. Misuse, abuse, accidents, unreasonable use or Acts of God.
6. Incorrect electrical current, voltage or supply.
7. Re-setting parameters of any control without prior approval.
8. Failure to use all installation and mounting hardware supplied.
9. Failure to perform periodic maintenance as detailed in the installation guide.

CONTROL SPECIFICATIONS

The Demand Control Ventilation (DCV) system is designed to control, activate, and operate the exhaust fan(s), supply fan(s), CORE system(s), and wash system dependent on the faceplate (HMI) and temperature sensors. The system can have up to two zones that the fans are assigned to. Each fan zone has several parameters that communicate to the system on how to operate.

INSTALLATION

It is imperative that this unit is installed and operated with the designed airflow and electrical supply in accordance with these manual and applicable codes. If there are any questions about any items, please call the service department at **1-866-784-6900** for warranty and technical support issues.

Mechanical

WARNING: DO NOT LIFT CONTROL PANEL BY WIRING COMPONENTS

Site Preparation

1. Provide clearance around installation site to safely install equipment into its final position. Supports must adequately support equipment. Refer to manufacturer's estimated weights.
2. Consider general service and installation space when locating unit.

Assembly

When the control panel is ordered in a utility cabinet installed on the hood, there is some field assembly required by the installer. If the control panel is ordered as a wall mounted panel, the enclosure must be secured to a fixed wall near the equipment. **Be certain to maintain adequate clearance from excessive heat sources such as appliances to prevent damage of the components**. Refer to local or national electrical code for clearance requirements in front of the panel, typically 36".

Room Sensor Installation

A room temperature sensor is provided with the panel. It should be installed in a safe location, free of influence from external heat sources. **Do not install on the ceiling**. It should be installed in a location indicative of the average kitchen temperature away from the appliances. The room sensor will always be wired to terminals **T1A**, **T1B** on the J10 connector of the ECPM03 board.

Reference **Figure 1** and **Figure 2** for a visual representation of the two common installation scenarios.

Figure 1 - Utility Cabinet Installation (Typical)

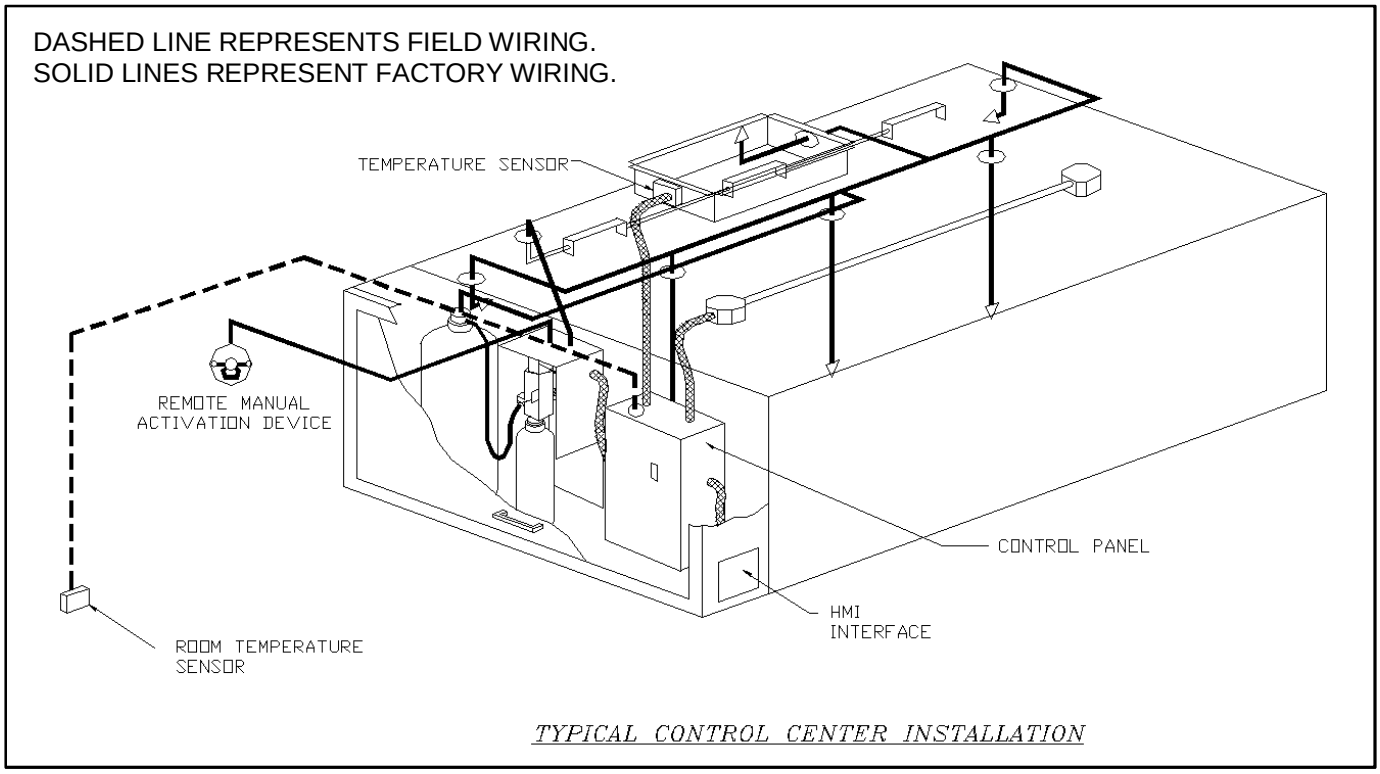
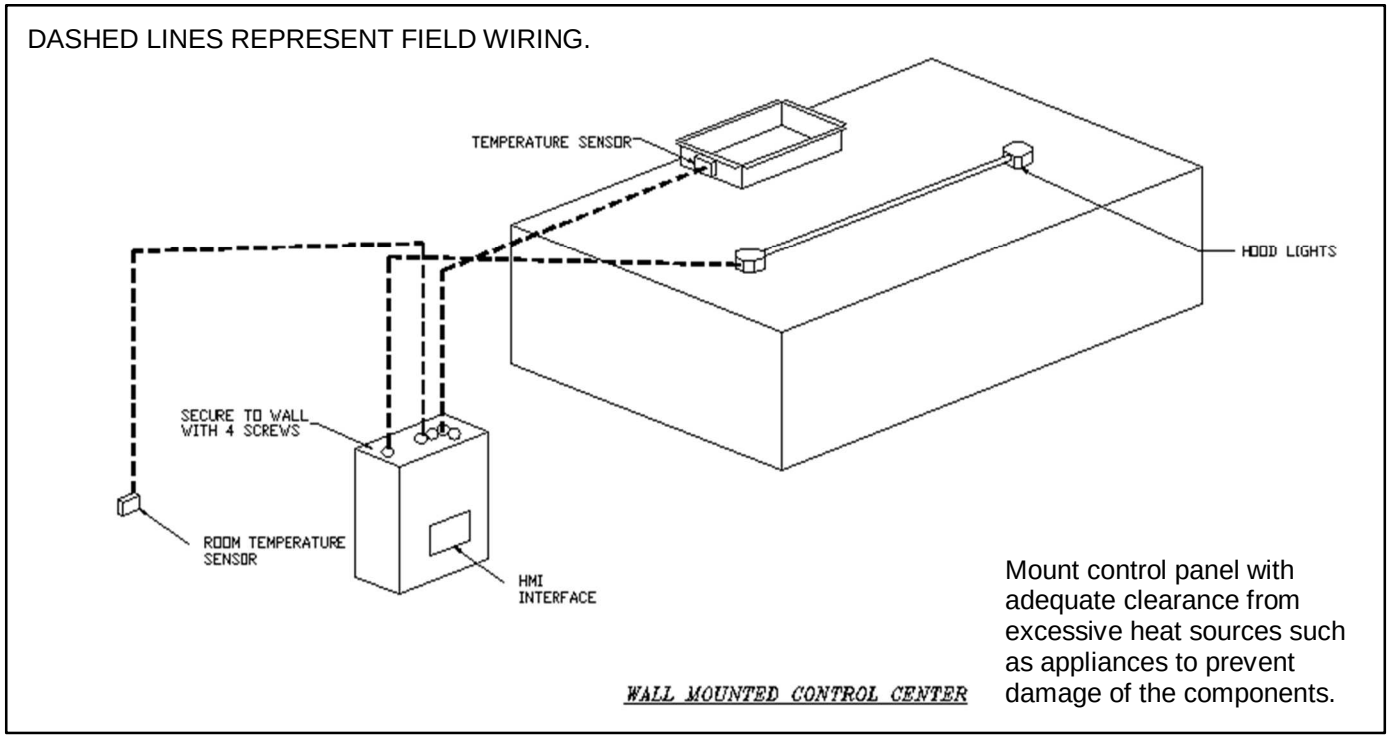


Figure 2 - Wall Mount Installation (Optional)



Electrical

WARNING!!

Disconnect power before installing or servicing control. High voltage electrical input is needed for this equipment. This work should be performed by a qualified electrician.

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

Electrical wiring and connections should be done in accordance with local ordinances and the National Electric Code, ANSI/NFPA70. Be sure the voltage and phase of the power supply and the wire amperage capacity is in accordance with the unit nameplate.

1. Always **disconnect power** before working on or near this equipment. Lock and tag the disconnect switch or breaker to prevent accidental power up. Make certain that the power source is compatible with the requirements of your equipment. The wiring schematic identifies the **proper phase and voltage** of the equipment.
2. Before connecting the control panel to a power source, verify power line wiring is de-energized.
3. Secure the power cable to prevent contact with sharp objects.
4. Do not kink power cable and never allow the cable to come in contact with oil, grease, hot surfaces or chemicals.
5. Before powering up the system, make sure that the interior of the control panel is free of loose debris or shipping materials. Of particular importance is protecting the electrical components from metal shavings.
6. If any of the original wire supplied with the system must be replaced, it must be replaced with type THHN wire or equivalent.

Table 1 - Copper Wire Ampacity @75˚C

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

High Voltage Wiring

- All high voltage wiring shall be connected on the open side of the vertical terminal blocks located on the right hand side of the panel. The right most knockouts should be utilized for high voltage connections.

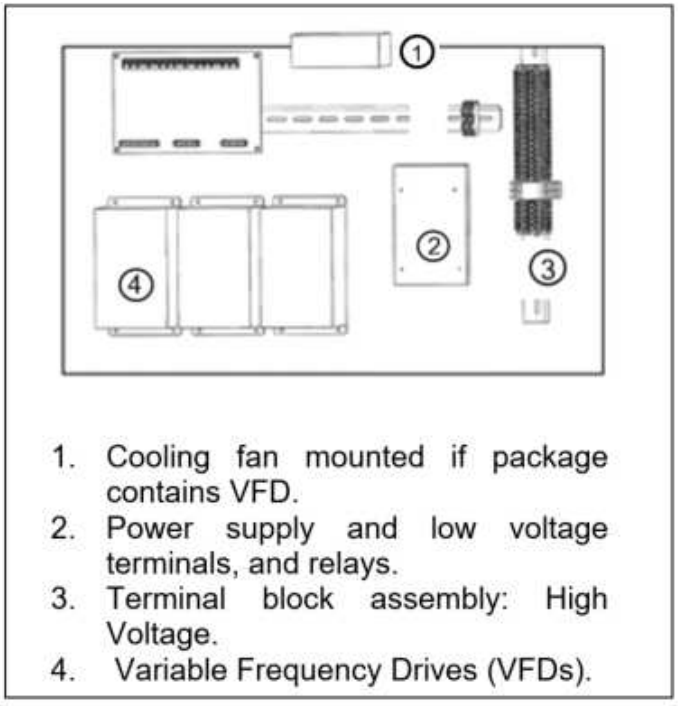
- Variable frequency drives will have quick connectors for their line and load power. The load wiring must not share conduit with other motor load wiring. Each motor must have its own conduit or the warranty is void.

- There are multiple electrical power sources required for this control panel. Refer to Installation diagrams inside panel for details.

- The hood light wiring will also need to be wired to terminals as indicated on the installation diagram.

- If an ANSUL fire system is present, the fire system micro-switch will need to be wired to terminals as indicated on the installation diagram, typically "**C1**" and "**AR1**". C1 is the common and connects to terminal 1 on the micro-switch. AR1 is the armed state and connects to terminal 2 on the micro-switch.

Figure 3 - Typical Cabinet Layout



1. Cooling fan mounted if package contains VFD.
2. Power supply and low voltage terminals, and relays.
3. Terminal block assembly: High Voltage.
4. Variable Frequency Drives (VFDs).

Low Voltage Wiring

Low voltage wiring should be run through the left most knockouts on the panel. Low voltage wiring shall not be run in the same conduit as high voltage wiring. Low voltage wiring typically terminates directly on the control board or components.

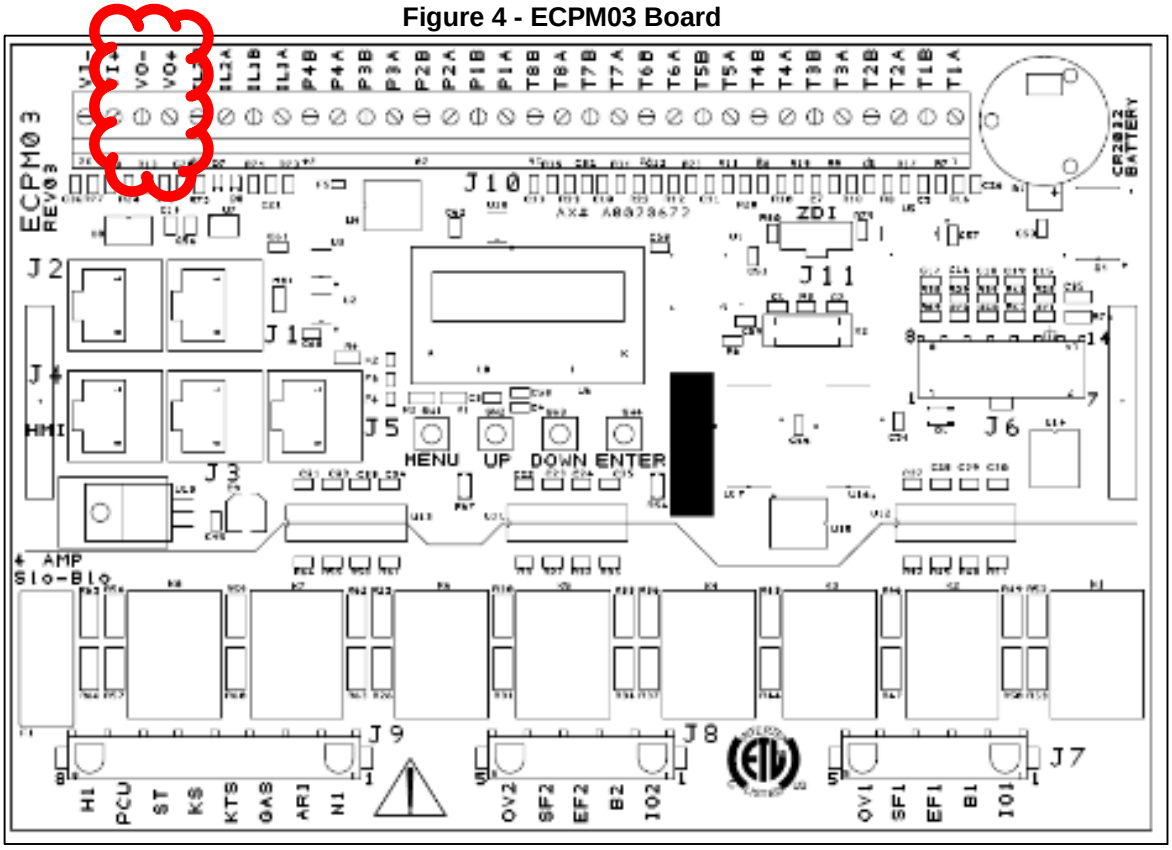
- **Room temperature sensor(s)**: For all installations, at least 1 room temperature sensor must be installed in a safe location, free from external heat sources that may affect the sensor readings. It should be indicative of the average kitchen temperature away from the appliances. 2-wire 18 AWG thermistor cable must be used. The room temperature sensor shall be wired according to the installation wiring schematic, terminals **T1A** and **T1B**. **Do not install the sensor on the ceiling.**
- **Duct temperature sensors**: For all installations which include the thermostatically controlled option, excluding a single hood with factory risers and a hood mounted panel, duct mounted temperature sensors will need to be wired in the field. 2-wire 18 AWG plenum rated thermistor cable must be used and is typically provided. The temperature sensor(s) should be wired to terminal blocks as indicated on the installation wiring schematic, typically T2A and T2B through TxA and TxB
- **HMI** is connected to the ECPM03 board through a **Cat-5** cable. The HMI has two RJ-45 connectors. The HMI connects to either 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 (Part # EOL120A). If more than one HMI is included, each HMI must be daisy chained together to form a loop, with the end-of-line terminator installed at the last HMI. Up to 4 HMIs are possible.
- **0-10V DC Output**: Provides 0-10VDC or 2-10VDC signal to provide a linear representation of exhaust or supply motor speed. This connection can be wired to a Variable Frequency Drive (VFD) that accepts 0-10V or 2-10V DC as an input. The 0-10v Output is generated directly on the control board at terminals VO+ and VO-.
- **Pulse Width Modulation (PWM) outputs**: Provides a 24VDC signal that can be used to drive an Electrically Commutated Motor (ECM) at a programmed duty cycle. The duty cycle determines the on and off time for the electrical signal which powers the motor. PWM outputs should be wired with 18 AWG shielded twisted pair cable. PWM outputs at terminals PxA, PxB and wire directly to the connector of an ECM fan motor harness. This is only compatible with select fan motors provided by the OEM.
- **MUA interlock** - When a VFD supply fan is included in the job, terminals **ILx1** and **ILx2** are required to ensure that the supply fan damper motor is proven open before activation of the blower. The ECPM03 control board monitors the connection between the **ILx1** and **ILx2** terminals depending on the number of supply VFDs. A closed connection is required to satisfy the system.
- **Lighting relay/Contactors** - Relay Output (RO) 1 through RO 6 provide a 24 VDC connection for lighting or auxiliary control circuits to be wired. Each output is wired to the zone relay/contactor controlling the light. The output will then be wired to lighting circuit attached to the hoods.
- **Two end-of-line terminators** (Part # EOL120A) - are included in each panel. They are typically plugged in at the factory on port J3 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.
- If other pieces of equipment such as PCU Advanced Filter Monitoring (AFM) 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 last device on the line.

Component Description

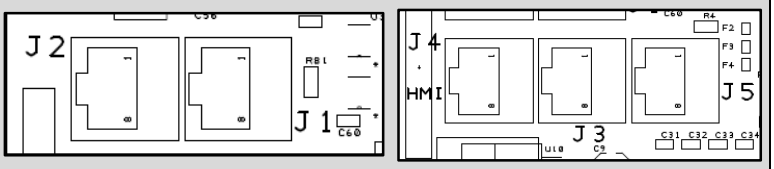
ECPM03 board

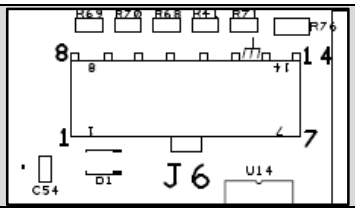
The ECPM03 is the main control of the system. It receives all of the digital and analog inputs, and delivers all of the digital outputs for external devices.

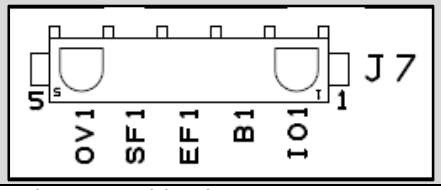
Figure 4 - ECPM03 Board

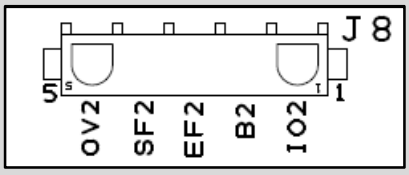


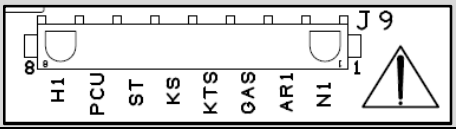
Connector Descriptions

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 external BMS interface only. 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 CORE network, PCU AFM, HMI, and VFDs report through J3, J4 and J5. The order of connection is irrelevant.

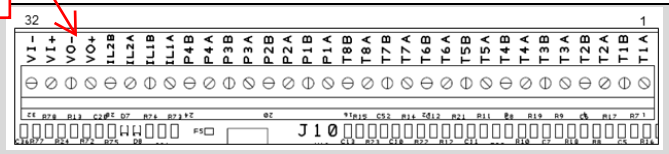
Connector J6 contains factory only wiring for low voltage connections	
Pin 1 - **24 Volt DC** input (positive side) to the board. Pin 2 through pin 7 - Open collector Relay Outputs (RO), **100ma** max each, suitable for driving **24VDC** relays or indicator lamps. Pin 8 through pin 12 - **4-20ma** current inputs. 150 Ohm impedance to **24VDC** ground pin 14.	Pin 13 - Chassis ground connection, this pin connects to the **24VDC** ground through a paralleled 1000pf **2000V** capacitor and a 100k Ohm 1/4W resistor. Pin 14 - **24VDC** power input (negative side) to the board. Ground or common side of the low voltage circuitry.

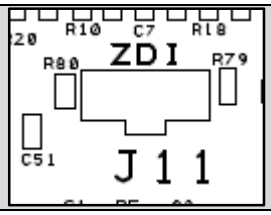
Connector J7 contains **120 Volt AC** control connector for factory only wiring	
Pin 1 - (IO1) output and input, this pin can source **120VAC** and detect the presence of **120VAC**. Pin 2 - (B1) input, this pin can detect the presence of **120VAC**. Pin 3 - (EF1) output and input, this pin can source **120VAC** and detect the presence of **120VAC**.	Pin 4 - (SF1) output, this pin can source **120VAC**. Pin 5 - (OV1) input, this pin can detect the presence of **120VAC**.

Connector J8 contains **120 VAC** control connector for factory wiring	
Pin 1 - (IO2) output and input, this pin can source **120VAC** and detect the presence of **120VAC.** Pin 2 - (B2) input, this pin can detect the presence of **120VAC.** Pin 3 - (EF2) output and input, this pin can source **120VAC** and detect the presence of **120VAC.**	Pin 4 - (SF2) output, this pin can source **120VAC.** Pin 5 - (OV2) input, this pin can detect the presence of **120VAC.**

Connector J9 contains **120 VAC** control connector for factory only wiring	
Pin 1 - (N1) this is the neutral or return path for the detection of **120VAC** by the input pins. It would be connected to the neutral side of the **120VAC** supply. Pin 2 - (AR1) input, this pin can detect the presence of **120VAC.** Pin 3 - (GAS) output, this pin can source **120VAC.** Pin 4 - (KTS) input, this pin can detect the presence of **120VAC.**	Pin 5 - (KS) output, this pin can source **120VAC.** Pin 6 - (ST) output, this pin can source **120VAC.** Pin 7 - (PCU) input, this pin can detect the presence of **120VAC.** Pin 8 - (H1) this is the **120VAC** 50/60Hz input to the board, it feeds through an on board 4 Amp Slo-Blo fuse and is used to source **120VAC** to all the pins described as **120VAC** outputs. The total current draw of all the **120VAC** outputs must not exceed 4 Amps.

terminals VO+ and VO-

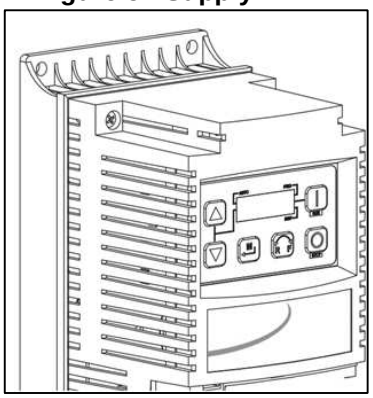
Connector J10 contains low voltage field wiring connections	
Pin 1 through pin 16 - thermistor probe inputs. 10k type B thermistors are connected to these inputs. Pin 17, 19, 21, 23, 25, and 27 - sources **24VDC** which is current limited through an on board **200ma** PTC Poly-Fuse. This is the high side of the pulse with modulated outputs, and low voltage inputs listed below. Pin 18, 20, 22, and 24 - Open collector PWM outputs, **100ma** max each. Suitable for driving the opto-isolated 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 - **0-10 Volt** output, **5ma** max, suitable for driving instrumentation inputs. Pin 30 - negative, common or ground side of the above **0-10 Volt** output. Pin 31 - **0-10 Volt** input, 10k Ohm impedance to ground or common. Pin 32 - negative, common or ground side of the above **0-10 Volt** output.

Connector J11 factory programming only, Zilog ZDI microcontroller debug/programming interface	
Pin 1 - 3.3VDC Pin 2 - reset Pin 3 - Gnd	Pin 4 - DBG input Pin 5 - Gnd Pin 6 - NC

Variable Frequency Drive

Variable frequency drives change the speed of 3 phase motors by changing the frequency signal sent to the motor. Refer to the factory wiring schematics to determine which fans are controlled by variable frequency drives. Two RJ-45 plugs are used to connect the drives to each other and to the ECPM03 controller through Cat-5 cables. **The load wiring from variable frequency drives must be run in its own conduit. Each motor should not share load wiring conduit with any other motor covered by a variable frequency drive.**

Figure 5 - Supply VFD



Variable Frequency Drive Parameters

Variable frequency drive parameters can be changed with the buttons on the face of the drive. Only parameters P107 (line voltage selection) and P108 (motor overload) should be adjusted in the field if needed. All other settings can be adjusted through the HMI.

P107 is set to 0 (Low) if motor voltage is **120 VAC**, **208 VAC** or **400 VAC**. P107 is set to 1 (High) if motor voltage is **230 VAC**, **480 VAC** or **575 VAC**.

P108 is calculated as Motor FLA x 100 / Drive Output Rating available in the below **Table 2 – VFD Cross-Reference**

Note: P108 should not be adjusted unless the motor FLA does not match the nameplate FLA as specified in the field wiring schematics.

To enter the PROGRAM mode to access the parameters:

1. Press the **Mode (M)** button.
2. The display will read “P100”. If it prompts for a password (PASS), use the **Up** and **Down** buttons to scroll to the password value (the factory default password is “0225”) and press the **Mode (M)** button. Once the correct password is entered, the display will read “P100”, which indicates that the PROGRAM mode has been accessed at the beginning of the parameter menu.
3. Use the **Up** and **Down** buttons to scroll to the desired parameter number.
4. Once the desired parameter is found, press the **Mode (M)** button to display the present parameter setting. The parameter value will begin blinking, indicating that the present parameter setting is being displayed. The value of the parameter can be changed by using the **Up** and **Down** buttons.
5. Pressing the **Mode (M)** button will store the new setting and exit the PROGRAM mode. To change another parameter, press the **Mode (M)** button again to re-enter the PROGRAM mode. If the **Mode (M)** button is pressed within 1 minute of exiting the PROGRAM mode, the password is not required to access the parameters. After one minute, the password must be re-entered in order to access the parameters again.

P500 parameter provides a history of the last 8 faults on the drive. It can be accessed without getting into PROGRAM mode.

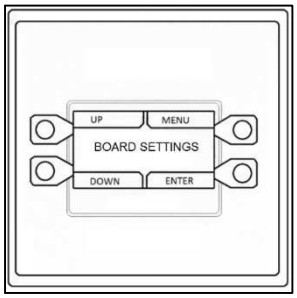
P100 is how the user sets the VFD start control. The user may set this to 0 (default) and may use the **RUN** button to start the drive. Setting 4 allows the start control to be switched between a terminal strip and local keypad.
P102 is the minimum frequency setting based off of motor and fan limitations.
P103 is the maximum frequency setting based off of motor and fan limitations. The hertz cannot go below the minimum frequency (P102).
P167 is the rated motor frequency for standard applications. The base frequency default setting is 60 Hz.
P194 = Password 0225
P410 = Modbus Address of the VFD.

Table 2 – VFD Cross-Reference Table

HP	Part Number	Volts	1Ø Input	3Ø Input	Input Amps 1Ø 120VAC	Input Amps 1Ø 240VAC	Output Amps	Breaker 1Ø 120VAC	Breaker 1Ø 240VAC
0.33	ESV251N01SXB571	120/240V	X		6.8	3.4	1.7	15	15
0.5	ESV371N01SXB571	120/240V	X		9.2	4.6	2.4	15	15
1	ESV751N01SXB571	120/240V	X		16.6	8.3	4.2	25	15
1.5	ESV112N01SXB571	120/240V	X		20	10	6	30	20
HP	**Part Number**	**Volts**	**1Ø Input**	**3Ø Input**	**Input Amps 1Ø**	**Input Amps 3Ø**	**Output Amps**	**Breaker 1Ø**	**Breaker 3Ø**
0.5	ESV371N02YXB571	240V	X	X	5.1	2.9	2.4	15	15
1	ESV751N02YXB571	240V	X	X	8.8	5	4.2	15	15
1.5	ESV112N02YXB571	240V	X	X	12	6.9	6	20	15
2	ESV152N02YXB571	240V	X	X	13.3	8.1	7	25	15
3	ESV222N02YXB571	240V	X	X	17.1	10.8	9.6	30	20
5	ESV402N02TXB571	240V		X		18.6	16.5		30
7.5	ESV552N02TXB571	240V		X		26	23		40
10	ESV752N02TXB571	240V		X		33	29		50
15	ESV113N02TXB571	240V		X		48	42		80
20	ESV153N02TXB571	240V		X		59	54		90
1	ESV751N04TXB571	480V		X		2.5	2.1		15
1.5	ESV112N04TXB571	480V		X		3.6	3		15
2	ESV152N04TXB571	480V		X		4.1	3.5		15
3	ESV222N04TXB571	480V		X		5.4	4.8		15
5	ESV402N04TXB571	480V		X		9.3	8.2		15
7.5	ESV552N04TXB571	480V		X		12.4	11		20
10	ESV752N04TXB571	480V		X		15.8	14		25
15	ESV113N04TXB571	480V		X		24	21		40
20	ESV153N04TXB571	480V		X		31	27		50
25	ESV183N04TXB571	480V		X		38	34		70
30	ESV223N04TXB571	480V		X		45	40		80
1	ESV751N06TXB571	600V		X		2	1.7		15
2	ESV152N06TXB571	600V		X		3.2	2.7		15
3	ESV222N06TXB571	600V		X		4.4	3.9		15
5	ESV402N06TXB571	600V		X		6.8	6.1		15
7.5	ESV552N06TXB571	600V		X		10.2	9		20
10	ESV752N06TXB571	600V		X		12.4	11		20
15	ESV113N06TXB571	600V		X		19.7	17		30
20	ESV153N06TXB571	600V		X		25	22		40
25	ESV183N06TXB571	600V		X		31	27		50
30	ESV223N06TXB571	600V		X		36	32		60

Faceplate (HMI)

Figure 6 - HMI



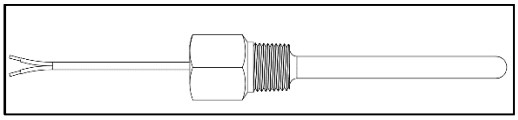
The HMI is designed to withstand grease and water when installed on the face of the hood or utility cabinet.

The interface is connected to the ECPM03 through a Cat-5 cable. If the interface is installed on the face of the hood, a high temperature Cat-5 cable is used.

The HMI can be mounted to a standard 2-gang junction box. Do not use junction boxes with rounded corners.

Duct Temperature Sensor

Figure 7 - Temperature Sensor

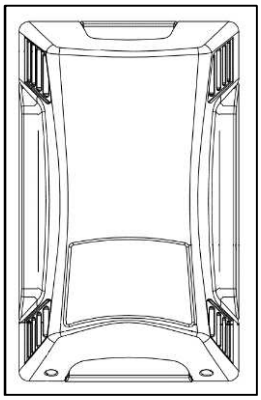


The temperature sensor is a 10K ohm thermistor. The sensor gives constant feedback to the control board. One sensor is installed in every exhaust riser for packages which include the thermostatically controlled fan option.

There can be a maximum of 31 sensors in the system. Only a maximum of 8 are connected to the ECPM03 board. If more than 7 duct temperature sensors are needed, an ECPM03EX board will need to be installed. Each ECPM03EX board can connect up to 8 additional duct temperature sensors.

Room Temperature Sensor

Figure 8 - Room Temperature Sensor



The temperature sensor is a 10K ohm type- 2 thermistor. The sensor provides a constant room temperature reading to the control board. The sensor should be installed on a wall somewhere in the space but not directly under the hood or close to an appliance. Sensor readings may be affected by heat.

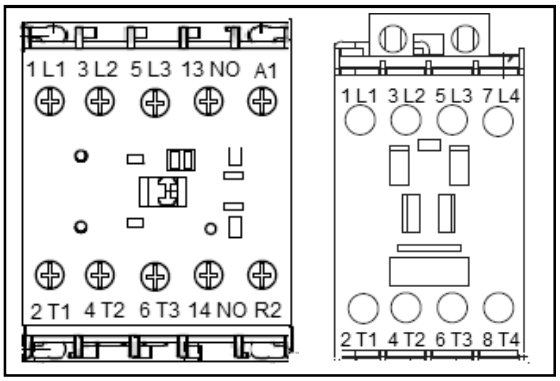
Typically, a system will have one room temperature sensor. However, systems configured with 2 fan zones have the option to be ordered with 2 room temperature sensors, one for each zone. They should be mounted in the space accordingly.

Do not install the sensor on the ceiling.

Contactor(s)

A contactor is an electrically controlled switch used for switching power for an electrical circuit. Contactors are used to control electric motors, lights, and other electrical loads.

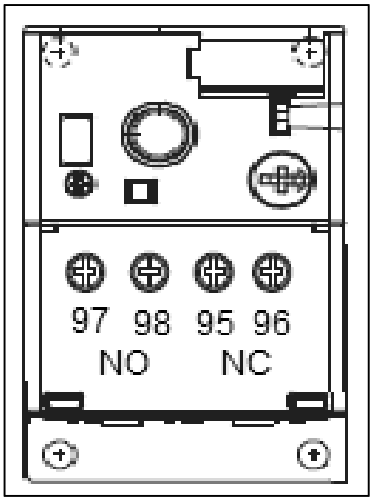
Figure 9 - Contactors



Overloads

Overload relays are devices that are generally connected to a contactor. These relays will trip a set of contacts if high current draw is detected on the power flowing through the contactor. They are required for all 3 phase motor applications, and all single phase motor applications 2 HP and above.

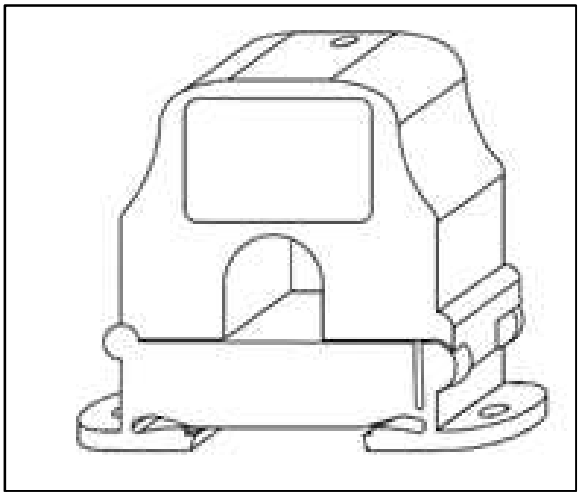
Figure 10 - Overload Relay



Current Sensor

The current sensor is used when fan proving is active on the control package. When the contactor actuates, the current sensor monitors the current to the fan(s). Current sensors are only required for non-VFD equipped fans. VFD equipped fans obtain their current directly from the VFD.

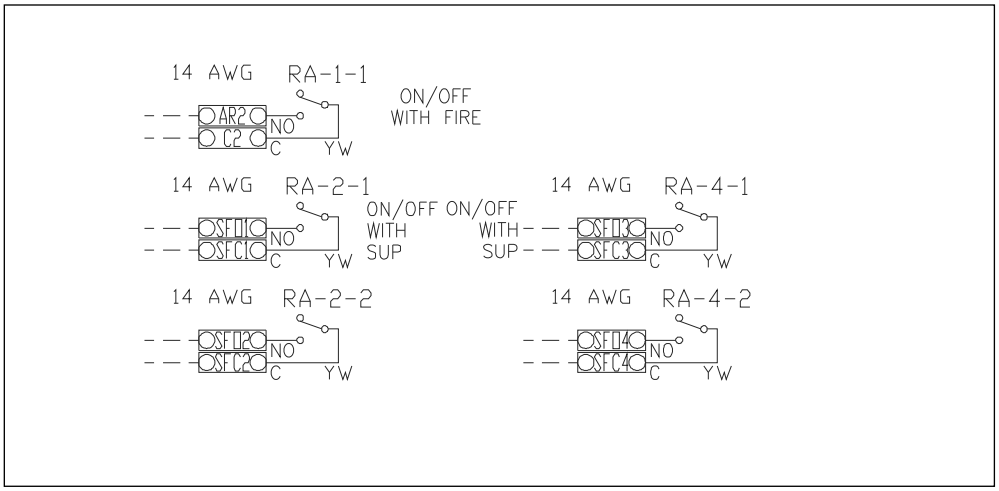
Figure 11 - Current Sensor



Dry Contacts

Dry contacts are used when other options are needed to be actuated. Depending on which options are included with the panel, it may be configured with dry contacts that turn ON/OFF with FIRE, ON/OFF with SUPPLY FAN, ON/OFF with EXHAUST FAN. There will be at least two contacts (a single relay) for single zone, or up to four contacts (two relays) for two zones.

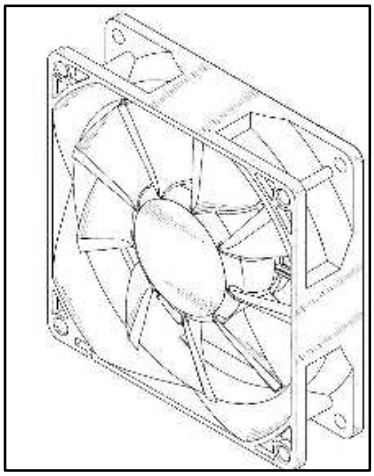
Figure 12 -
Dry Contacts Wiring Reference



Cooling Panel Fan

If the package is supplied with a VFD, there will be a cooling panel fan mounted in the electrical control enclosure. When the VFD is running, the cooling fan will be activated. If there is one zone the cooling panel fan will be connected to EF1. If there are two zones then the fan will run off of a 24V relay connected through dry contacts. When the relay coil is supplied with 24V, the switch contacts will close and supply 120V to the cooling fan. Connector J6 pin 2 supplies the 24VDC to the relay coil.

Figure 13 - Cooling Fan



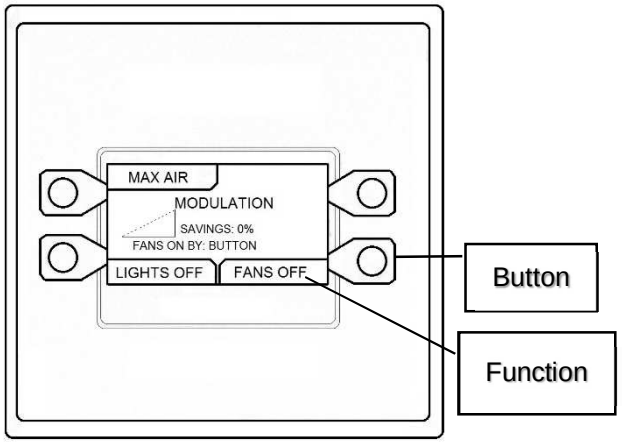
OPERATION

NOTE: FIRE system must be in ARMED state before proceeding. (C1 terminal block must have continuity with AR1 terminal block).

Once all required connections have been completed as indicated on the installation schematic, startup can begin. Apply power to the panel and fans. The ECPM03 board and the HMI(s) will power up. If that is not the case, check all power connections. Verify that there are no alarm message(s) displayed on any of the HMI screens. If there are alarms present, you can press the **MUTE** button to silence the alarm and then work to resolve them.

The HMI has 4 buttons; a function is displayed adjacent to each button on the LCD. These functions will change depending on the status of the panel. If no text is adjacent to the button, it does not have a function.

Figure 14 – HMI Button Reference



Typically **LIGHT** and **FAN** functions are shown on the bottom 2 buttons. The status of those elements is shown by the shading used inside the box associated with the function. An unshaded box around the **FAN** function means that the fans are turned off. A dark box around the **FAN** function means that the fans are turned on. The same applies to lights.

NOTE: For the rest of the document, the term button will be used to refer to either the actual button or the function associated with it.

The center four lines of the HMI are reserved for displaying informational or fault messages.

When a fault occurs, an audible alarm is triggered and a message is displayed on the HMI(s). The audible alarm can be silenced by pushing the **MUTE** button that appears on the top right corner.

Press the **LIGHTS ON** button to energize the hood lights. If the lights do not come on, make sure the light bulbs are installed and/or check the lighting circuit.

Press the **FANS ON** button to energize the fans. When dynamic mode and prep mode are enabled, pressing the **PREP OFF** button will turn prep mode off and put the system into modulation mode, see Dynamic Fan Zone.

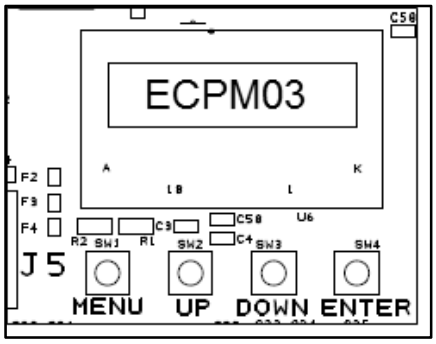
If cooking appliances are connected to an electric gas valve, then the electric gas valve is controlled by the control panel. The **GAS/GAS RESET** button will only show if the *Gas Valve Option* is set to Yes. The gas valve can be turned On by pressing the **GAS RESET** button on the top right corner of the HMI. If the control package includes the CORE Appliance Fire System, On Board wash, or Electric Wet Chemical with Self-Cleaning a **WASH** button will be displayed on the HMI. Push the button to start the wash cycle. Water will be sprayed in the plenum and duct of the hood and surfactant will be injected every minute during the wash. The wash cycle will stop when the wash timer expires or when the **Stop Wash** button is pressed. **Make sure Hood filters remain in place during the wash cycle.**

If the “Proving” option is enabled, a calibration step is required at initial startup. Please refer to the Proving Enabled (Optional) section for further details about this function. To perform the calibration, refer to Proving Calibration in the Configuration section.

ECPM03 LCD Display

The ECPM03 board allows the user to monitor the system and configure a broad range of options associated with the functionality of the system. Monitoring is done through the setup menus on the ECPM03 LCD as shown above. Configuration is done through the ECPM03 menu.

Figure 15 - LCD Display



Below the ECPM03 LCD are 4 buttons for navigation: **MENU**, **UP**, **DOWN**, **ENTER**. When in configuration mode, the four buttons on the HMI will be labeled the same.
The **MENU** button typically takes you up one level in the menu tree while the **ENTER** button takes you down one level. **UP** and **DOWN** navigate through the same level of the menu tree and also allow the user to change the value of a parameter.

NOTE: A reboot of the board will cause the electric gas valve (if equipped) to shut off. Confirm that gas/pilot lights are re-lit if necessary. It will also cause the VFDs to stop if not in Auto mode.

The items below can be accessed through the **ECPM03 LCD**:

- Temperature
  This allows you to view all temperatures measured by the room and duct temperature sensors.

- Faults
  This allows you to “View Faults” or “Clear Faults”.

- System Bypass (optional)
  This option is designed to bypass the system and have the fans running at their max designed CFM. This function can be utilized for Test and Balance purposes. Starting from the main menu, press the **DOWN** button until the screen displays “System Bypass”. Press the **ENTER** button. Press the **UP** or **DOWN** buttons to activate or deactivate the system bypass. Press enter to save the selection.

- Fan Monitoring: Fan Frequencies and Motor Amps
  Starting from the main menu, press the **DOWN** button until the screen displays “Fan Monitoring”. Press the **ENTER** button. Press the **UP** and **DOWN** buttons to alternate between “Fan Frequencies” and “Motor Amps”. Press **ENTER** for either one to view “Frequency” of each VFD or amps drawn by the motor on each fan.
  Note: Fans controlled by contactors or via PWM output will not have an amp or frequency value.

- Proving: Calibration
  If the Proving option is enabled, Calibration is required at startup. To perform calibration, make sure the Test and Balance has been performed on the entire system first. Filters should be in place.
  Starting from the main menu, press **DOWN** until the screen displays “Calibration”. Press **ENTER**. The screen should display “Proving Calib. Calibrate?” Press **ENTER** again to start the calibration process which may take up to five minutes. Press **MENU** once when calibration is complete.
  If calibration is unsuccessful, the message “Calibration Fail” will appear. Make sure the VFDs are running and the Make-Up Air (MUA) interlock signal is wired correctly to ILxA ILxB.

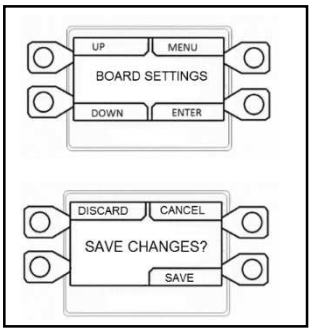
HMI

Configuration is done through the pressing the top two buttons on the HMI menu.

Passwords

To access the *Configuration / Factory*, the password 1111 must be used.
To access the *Configuration / Fire Options*, the password 1234 must be used.

Figure 16 - Setting and Saving Changes



After changing parameters in the configuration menus, the user needs to press MENU multiple times on the HMI until the screen displays the "SAVE CHANGES?". The screen will display:

- DISCARD – Pressing the **DISCARD** button will erase any parameter changes made in the HMI during this time. This will not erase parameter changes made previously.
- CANCEL – Pressing **CANCEL** will take you back to the options settings. This will not discard any parameter changes made.
- SAVE – Pressing **SAVE**, the screen will display "Saving…Wait for reboot". As indicated, the processor will reboot. This allows the board to correctly process the parameters changed.

All the items below are accessed by putting the **HMI into Configuration mode**. Press the two top buttons on the HMI to configure options.

Setting options on the HMI

Allows the user to set preferences for the system.

- Language (Factory default is English) - The user may set the language between English or Spanish.
- Temperature Units (Factory default is Fahrenheit) - The user may set the temperature units to Fahrenheit or Celsius.
- Hide Energy Savings? (Factory default is set to No) - The % savings graph on the HMI provides information on how much fan energy is saved by the system when running the fans at lower speed. It is calculated based on the actual kilowatts measured from each VFD controlling the fans. However, it does not include the additional savings resulting from the lower CFM of make-up air and HVAC air that require heating or cooling.
- HMI Dimming? (Factory default is set to No) - This option allows the backlight on all HMIs to turn off whenever a timer is satisfied. The timer is refreshed every time the HMI button is pressed.
- Fan Status Relay 4 / Fan Status Relay 5 (Factory default is Relay Output (R.O) Disabled) – Zone 2 offers the same status selections as Zone 1. When one of the status options are selected, the relay will output a signal to the fan status light.

- o RO Disabled
- o Zone 1 Proving Fault
- o Zone 1 Proving Calib
- o Zone 1 System Bypass
- o Zone 1 Max Air
- o Zone 1 Wash
- o Zone 1 External
- o Zone 1 Temperature
- o Zone 1 Occupied
- o Zone 1 BMS Fans
- o Zone 1 IO
- o Zone 1 Fans Button
- o Zone 1 BMS Prep
- o Zone 1 Prep Button
- o Zone 1 Prep Temp
- o Zone 2 (Same status as Zone 1)
- o Zone 1 Any
- o Zone 2 Any
- o Zone 1 and 2 Any
- o Zone 1 Any Prep
- o Zone 2 Any Prep
- o Zone 1 and 2 Any Non Prep

- Scheduling? (Factory default is set to No) – Allows the user to set the scheduling to be active.
- Occupied Fans On (Factory default is set to No) – Allows the user to set the fan zone to activate during the occupied time setting.
- Unoccupied Offset (Factory default is set to 15°F) – Allows the user to adjust the temperature difference (0-30.5°F) so that the fans do not operate during the unoccupied time period.
- Faceplates - This allows the user to select:
    - How many faceplates (HMI) are in use.
    - Zone Assignment – Assign the HMI to a fan zone.
    - Enable Light Control – Yes/No option. Default is set to Yes.
    - Disable Fans Button - Yes/No option. Default is set to No.
    - Disable Temperature Sensor (internal to HMI). Yes/No option. Default is set to Yes.
- Temp Sensor Options –Only a maximum of 8 sensors can be connected to the ECPM03 board. If more sensors are needed for the system, you will need to add the ECPM03EX board. Up to 32 sensors can be added to the system.

Each fan zone must have a room temperature setting which is used for temperature offset calculations.

- Preset Room Temperature: No temperature sensor is needed, the room temperature is set to the preset temperature.
- Room Temperature: A temperature sensor corresponding to the zone. The system calculates the temperature offset based on the temperature detected by the sensor.
- Faceplates (HMI): HMIs have a built-in temperature sensor, which is typically used to help monitor or control the automatic function of the unit. See Temperature Averaging on how the HMIs can be set up to average the readings.

Status sensors are only used to give a status of the temperature reading.

- Auxiliary Temperature Sensor – A thermistor sensor that may be externally or internally located in various locations.
- Hood Coil Input – A thermistor sensor that monitors incoming water temperature. Located in the hood inlet water piping.
- Hood Coil Output - A thermistor sensor that monitors outgoing water temperature. Located in the hood outlet water piping.
- PSP Discharge – A thermistor sensor that monitors the discharge temperature in the Perforated Supply Plenum (PSP) section of the hood for Make-Up Air (MUA).
- ACPSP Discharge - A thermistor sensor that monitors the AC discharge temperature in the ACPSP section of the hood for cooling the space.
- Contact Monitoring – The ECPM03 board will monitor when the contactor pulls to activate the load (i.e. appliance, fan, lighting, etc.).

Control sensors are used as a feedback to the system on how to operate based on the fan zone configuration.

- Contactor Zone ‘X’ – A ductstat that is connected to the ECPM03 board and activates contactor based on threshold. Once the contactor is actuated the assigned zone will be active.
- VFD Riser Exhaust ‘X’ – A ductstat that is connected to the ECPM03 board and activates VFD based on temperature. Located in the plenum riser.
- VFD Capture Exhaust ‘X’ – A ductstat that is connected to the ECPM03 board and activates VFD based on temperature. Located in the hood capture area.
- Electrically Commutated Motor (ECM) Riser Exhaust ‘X’ - A ductstat that is connected to the ECPM03 board and activates ECM based on temperature. Located in the plenum riser.

- For Temperature sensor 1, the options are either to follow the room sensor wired to terminal **T1A**, **T1B** (Room Temp 1) or to assign a preset room temperature (75°F by default). Press **UP** or **DOWN** to choose the proper option. Press **MENU** to confirm the selection. To change the default preset value, press the **ENTER** button when displaying the "Preset Temperature". Press **UP** or **DOWN** to change the preset value. Press **MENU** multiple times to get out to main menu.

- For Temperature sensor 2 and above, the options are either to control or monitor. To control the fan the choice should be capture volume or riser followed by the fan number. To monitor the temperature, the decision should be one out of the list: Auxiliary Temp, Hood Coil Input, Hood Coil Output, PSP Discharge, or ACPSP Discharge.

Press **MENU** multiple times to get back to the main menu or one more time to reboot the processor.

Monitoring

- Room Temp
- Preset Temp
- Aux Temp
- Hood Coil Input
- Hood Coil Output
- PSP Discharge
- ACPSP Discharge
- Contact Monitoring

Control

- Contactor Zone 1
- Contactor Zone 2
- VFD Riser Exhaust #1
- VFD Riser Exhaust #2
- Exhaust ECM #1

Each fan zone can have a room temperature sensor which is used to base temperature offset calculations.

- Preset Room Temperature: No temperature sensor is needed, the Room Temperature is set to the Preset Temperature.
- Room Temperature: A temperature sensor corresponding to the zone which the system calculates temperature offset based on the temperature detected by the sensor.

Temperature Averaging

The ECPM03 board can average HMI temperature sensors, along with other room tempering sensors connected to the board. To set the averaging, make sure that the HMI temperature sensor is enabled. Make sure there is a room temperature sensor connected.

- Board Settings > Options > Faceplates > Disable Temperature Sensor? > No

To view temperature averaging, use the ECPM03 screen. Scroll to "Temperatures". Use the **UP**/**DOWN** buttons to scroll through the sensor and averaging readings.

Fan Control

The control panel controls fans through outputs EF1, EF2, SF1, SF2, PWM outputs, 0-10v outputs, and VFDs. Each panel may be configured to utilize one or more of the above fan control methods.

Temperature definitions/calculations:

Modulation Activation Temperature = Room Temperature + Temperature Sensor Offset

Preparation Activation Temperature = Room Temperature + Temperature Sensor Prep Offset

Preparation Hysteresis Temperature = Room Temperature + Temperature Sensor Prep Offset – Fan Zone Hysteresis

Modulation Range Temperature = Modulation Activation Temperature to Fan Zone Modulation Range + Fan Zone Modulation Temp

Modulation Hysteresis Temperature = Modulation Activation – Hysteresis Temperature

Static Fan Zone

Fans will go into Modulation Mode when:

- The **FANS ON** button is pressed.
- If a temperature sensor assigned to the zone reads Modulation Activation Temperature.
- IO input, or Aux interlock is activated.

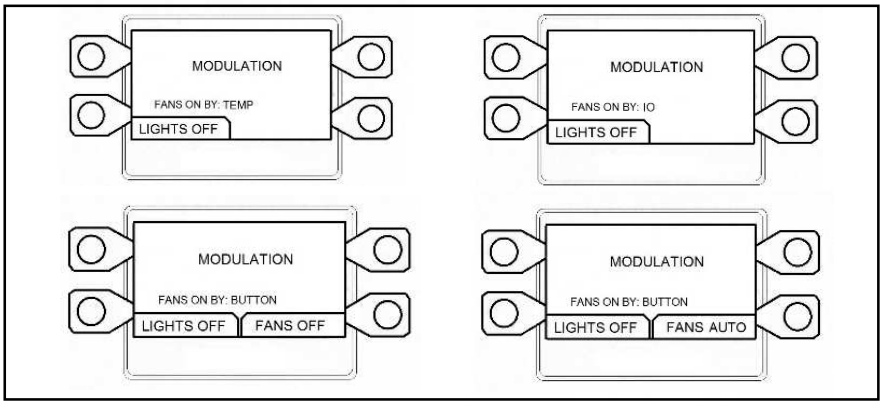
When fans are in Modulation Mode:

- Exhaust fans run at the constant motor speed defined. Fans will run at this constant speed as long as temperature is above the Modulation Hysteresis.
- The system will stay in modulation at a minimum for the defined hysteresis timer.

Fans will turn off when:

- Pressing the **FANS OFF** button, which is only available if the temperature is below Modulation Activation Temperature.
- The hysteresis timer is satisfied, and the temperature is below Modulation Hysteresis.
- Fan control can be turned to Auto Mode if fans were turned on manually (by button) and automatically (temperature is above the Modulation Activation Temperature).
- Fan Zone is in Auto Mode if there are no fan button visible. The fans will be turned on and off by sensor and hysteresis timers.

Figure 17 - Static Modulation Mode



Dynamic Fan Zone

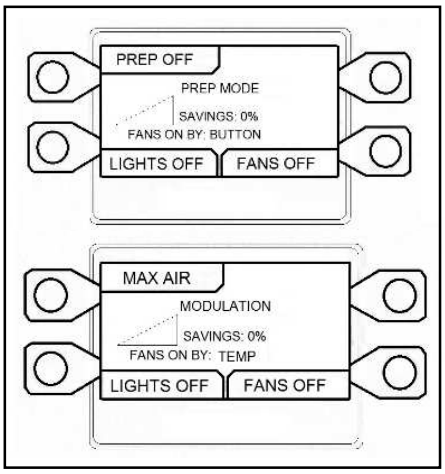
Fans will go into PREP MODE when:

- **FANS ON** button is pressed.
- Temperature sensor assigned to the zone reads Preparation Activation Temperature.

Fans Operation in PREP MODE:

- The system will stay in for the minimum hysteresis timer. After the hysteresis timer is satisfied, the system can drop down to Fans Off Mode, if the temperature is below Preparation Hysteresis Temperature.
- When fans are in Preparation Mode (Exhaust fans run at calculated Preparation Mode Frequency, Supply fans are turned off.) Any fans in the same zone controlled by a contactor will not activate.

Figure 18 - Prep Mode



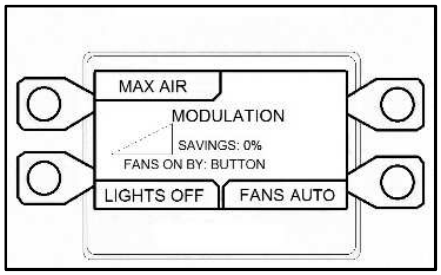
Fans will go into Modulation Mode when:

- Pressing **PREP OFF** sends the system into Modulation Mode.
- If Preparation Mode is disabled, and if a temperature sensor assigned to the zone reads Modulation Activation Temperature, the fans will go into Modulation Mode.
- IO input, or Aux interlock is activated.

Fans Operation in Modulation Mode:

Exhaust fans run at Dynamic Modulation Temperature Calculation as long as the temperature range is in between the Modulation Range.

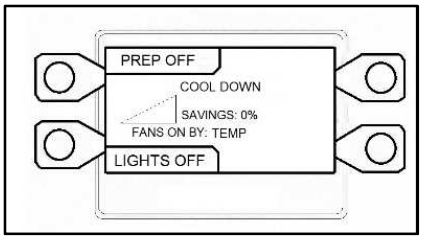
Figure 19 - Modulation Mode



Fans will go out of Modulation Mode when:

- After the hysteresis timer is satisfied, the system will drop down to Cool Down Mode (if Prep is enabled) or to **FANS OFF** Mode if the temperature is below Modulation Hysteresis Temperature.
- Fans can only be turned off in Modulation Mode if there is insufficient heat under the hood to maintain the fan activation temperatures. The **FANS OFF** button will be available.

Figure 20 - Cool Down Mode



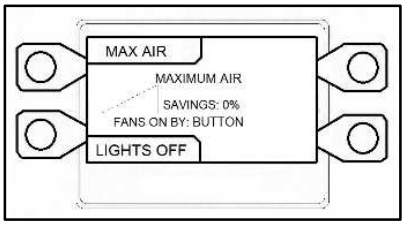
Fans in AUTO MODE when:

- Fans can be turned to **AUTO MODE** if fans were turned on manually (by button) and if the temperature is above the Modulation Activation Temperature.
- Fans are in Auto Mode if there is no fans button. Controlled by sensor should be used to describe fans adjusting speed by temp.

When fans are in Maximum Air Mode:

- If Max Air is enabled, a **MAX AIR** button will appear. If pressed, this will send the system into Maximum Air Mode.
- Exhaust and supply fans will run at high speed.

Figure 21 - Max Air



Scheduling (Fans)

Occupied Time

- The user may select between three different schedules (A, B, C).
- When the fans are set to operate in the "Occupied Time" setting, they will run in modulation mode if Occupied Fans On is enabled. When the "Occupied End Time" is reached the fans will stop.

Unoccupied Time

- The user may select between three different schedules (A, B, C).
- During unoccupied time, the fans turn on at a higher offset to prohibit fans turning on during an unwanted time.
- To adjust the offset, see Unoccupied Offset

Proving Enabled (Optional)

(i.e. Loss of Load Interlock/Airflow Fault Interlock)

- If the "Proving Enabled" option is set to Yes, Calibration is required at startup. To perform the calibration process:
  - Make sure a "Test and Balance" has been performed on the entire system first.
  - Filters should be in place.
    - ECPM03 Board: Starting from the main menu, press **DOWN** until the screen displays "Proving". Press **ENTER**. The screen should display "Calibrate System?" Press **ENTER** to start the calibration process which can take five minutes. Press **MENU** once when calibration is complete.
    - HMI: Enter the configuration menu. Scroll to "Proving", press **ENTER**. "Calibrate System?" will be displayed, press **ENTER**. The calibration process will start. Monitor the screen.
- If calibration is unsuccessful, the message "Calibration Fail" will appear. Make sure the supply drives are running and the MUA interlock signal is wired correctly to ILxA ILxB.
- This function is designed to prevent exhaust fans from running if the supply fans are not running, therefore any cooking equipment connected to the ECPM03 control board will automatically shut off. In practical terms, this means that all fans will shut off along with cooking equipment if any of the exhaust or supply fans are not properly running. Examples of reasons why a fan would not be properly running are: overload tripped, broken fan belt, defective motor, disconnect switch off, etc.
- If this option is enabled, the load on all the exhaust and supply fans is constantly monitored. If the load for an exhaust fan or the load for a supply fan drops below the threshold calculated after calibration for up to five minutes, all exhaust and supply fans will shut down.
- If an electric gas valve and shunt trip are attached to the system, they will shut down as well.
- To reset the system after a proving fault, press the **Fault Reset** button on the HMI.

Electric Gas Valve Reset

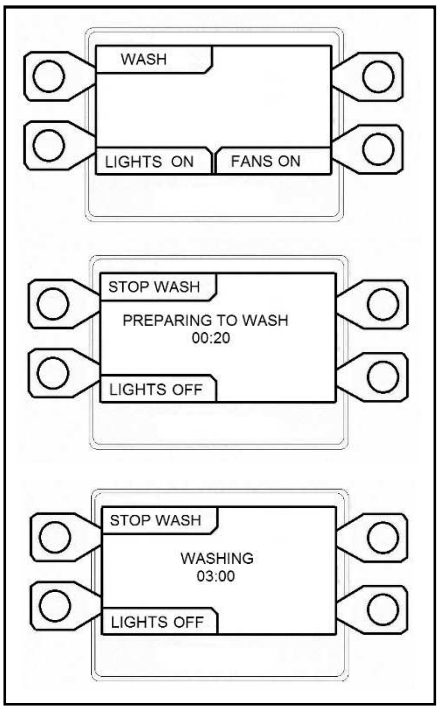
If the gas valve option is turned ON, an additional button (**GAS RESET**/**GAS ON**) will be displayed on the HMI to allow the user to reset or re-energize an electric gas valve connected to the panel. The gas valve is de-energized at initial startup, when the fire system is triggered or in other conditions as well.

If the gas valve is enabled then the **GAS RESET** button will be present. Once the **GAS RESET** is pressed, the **GAS ON** button will appear.

Wash Self-Cleaning (Optional)

The two types of self-cleaning options available are On Board, and CORE. On Board should only be utilized for W1, WL and SCS option panels.

Figure 22 - Wash



During the wash cycle, water will be sprayed in the plenum and duct. Surfactant is injected once per minute during the wash cycle. The wash frequency is the value at which all exhaust fans will run in a wash mode. The supply fan will be stopped during wash, when in static zone.

NOTE: The fan frequency will change when the Dynamic Fan Zone is set to YES. See Dynamic Fan Zone.

- The wash cycle will stop when the wash timer expires or when the **STOP WASH** button is pressed again.
- The wash timer is factory set to 3 minutes and is adjustable through the menu. The surfactant is injected for 1 second at the start of each minute of wash.
- **Hood filters MUST remain in place during the wash cycle**.
- The wash cycle can be initiated in several ways:
  a. Manually - When the **WASH** button is pressed on the HMI.
  b. Automatically - If all of these conditions are met:
     - Fans will need to go out of modulation mode either with the **FANS** button being pressed or by the duct temperature cooling down and the hysteresis value and timer are met.
     - The fans will need to have effectively run cumulatively for a period of time longer than the "Fan Runtime (H)". The (H) value is Hours for this option.
     - The amount of time elapsed since the previous wash cycle is greater than the "Interval Time" value. The (H) value is Hours for this option. That elapsed time is reset to zero when the wash cycle is active.
       NOTE: Preparation/Cool Down mode fan time does not count toward the runtime. The wash timers are reset to zero when the wash cycle is activated.
  c. Through a digital Building Management System. Refer to the Building Management Owner's Manual for more information.
  d. Through a scheduled wash. See **Setting a Wash schedule** below.
- If the surfactant level is too low, an alarm will be triggered on the HMI. If the wash cycle is initiated while this alarm is active, water will be sprayed but no surfactant will be injected. Refill surfactant as soon as possible for best results. (Refer to Self-Cleaning or CORE Manual for additional information).

Setting a wash schedule - When setting a scheduled wash, you may select the day and time for the wash cycle to start. Once the time is met, the wash cycle will start. You cannot set a wash time if the system during an occupied time setting. If a scheduled wash is active, automatic washing is disabled. Scheduled washes should ideally be set at a time just after cooking operations have completed, and the duct and plenum are still warm.

Board Settings

Options

Changing the following "**OPTIONS" will cause the control board to restart**:

- Enable/Disable CORE
- Enable/Disable PCU CORE
- Enable/Disable Core Type Ansul Will Not Wash
- Wash
- Sequential Wash
- Proving Enable
- Celsius/Fahrenheit
- No Lights Off In FIRE
- Supply In FIRE mode
- Gas Valve Enable
- Occupied Fans
- Kill Switch Enable
- Hide Savings Bar
- Gas Follow Fans
- Shunt Follow Fans
- Dim Enable
- AUX Interlock
- Low Surfactant Shut-down
- 2 Zone Multiple Speed
- 2 Zone Multiple Speed
- Supply Share – Static
- Supply Share – Static Speeds
- Supply Share – Dynamic
- Number Of Light Zones
- Wash Speed % Of Fan High Speed
- Fan Direction
- Dim Delay
- Fan Zone Assignments
- Number Of Duct Stats
- Number Of Faceplates
- Number Of Fan Zones
- VDC Output Type
- Number Of PCUAFM
- External Input
- Number Of EXH VFDs
- Number Of SUP VFDs
- Number Of EXH ECMs
- Number Of SUP ECMs
- VDC Output range
- Language
- Exhaust In FIRE mode
- Current Sensor Proving %
- Fan CFMs
- Fan Low Frequency
- Fan High Frequency
- Min Prep Frequency
- Fan Controller Type
- VFD Proving %
- IO Delay
- Fan Zone – Static/Dynamic
- Constant Transfer CFM
- Prep Enabled
- IO High Speed
- Independent Light Control
- Cool Timer
- Faceplate Fan Zone Assignment
- Faceplate Light Control
- Faceplate Fan Control

Changing the following "**OPTIONS" will NOT cause the control board to restart**:

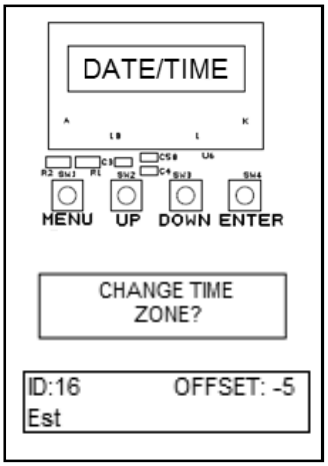
- Prep Offsets
- Duct Stat Offsets
- Duct Stat Assignments
- Fan Modulation
- Min Room Temp
- Preset Room Temp
- Enable Lights
- Hysteresis Temperature
- Hysteresis Time
- Manual To Auto Fans Time
- Max Air Time
- Wash Time
- Autowash Min Fan Runtime
- Autowash Min Interval Time
- Fan Status Relays
- CORE Zone Assignments
- Unoccupied Offset
- Sequential Wash Delay
- Number Of Light Zones
- Time Zone ID

Changing Time Zone ID

Use the ECPM03 board menu to change the time zone.

- Use the **UP** or **DOWN** to scroll to the "Date/Time" menu. Press **ENTER.**
- The current time zone parameter is shown. Press **UP** or **DOWN**.
- "Change Time Zone?" is now displayed. Press **ENTER.**
- Scroll until the correct time zone is found.

Figure 23 - Time Zone



The "Offset" parameter is based off of Universal Coordinated Time (UTC). Time zones that observe Daylight Savings Time (DST) are programmed to follow this schedule. Time zones that do not observe DST, are programmed to follow their standard time setting.

Most used time zones:

ID: 3 (UTC -10:00) Hawaii Time – (DST - No)
ID: 4 (UTC -09:00) Alaskan Time – (DST - Yes)
ID: 6 (UTC -08:00) Pacific Time – US & Canada (DST - Yes)
ID: 7 (UTC -07:00) Mountain Time – Arizona (DST - No)
ID: 9 (UTC -07:00) Mountain Time – US & Canada (DST - Yes)
ID: 11 (UTC -06:00) Central Time – US & Canada (DST - Yes)
ID: 16 (UTC -05:00) Eastern Time – US & Canada (DST - Yes)

Factory Options

This sub-menu is Password protected (1111).

Supply Share Static – Yes/No option. Default is set to No.

Setting up a 2 zone configuration: Usually 1 supply fan (up to two), and at least two exhaust fans. If the Zone 1 fan is turned on, then the exhaust fan will turn on, and the supply fan goes to speed one. If zone two is on, then exhaust fan Zone 2 will turn on, and the supply fan speed goes to speed 2. If both zone 1 and zone 2 are on, then the supply fan will go to speed 3. There will be three Zone Supply % options available. The exhaust fans will run at the single speed defined by job requirements.

- EF1 Only > 30% (default)
- EF2 Only > 60% (default)
- EF1 and EF2 > 100% (default)

Supply Share Dynamic - Yes/No option. Default is set to No.

Supply Share Dynamic allows the fans to modulate based on temperature.

Option # Assignments

Fan Zones – 1 or 2
Light Zones – 0 through 2
Exhaust VFD – 0 through 8
Supply VFD – 0 through 2
Exhaust ECM – 0 through 4 (Only 4 ECMs may be assigned between the Exhaust and Supply)
Supply ECM – 0 through 4 (Only 4 ECMs may be assigned between the Exhaust and Supply)
Temp Sensors – 1 through 8 for ECPM03. If more than 8 are used, 9 through 32 will be assigned on the ECPM03EX.
Faceplates – 1 through 4
PCU AFM – 0 through 5

VDC Output Type

Factory Default: None

The demand control system provides a **0-10VDC** analog output from terminal 30 and terminal 2 directly proportional to its Fan Speed Ratio (Fan Frequency / Fan High Frequency), the ECPM03 also offers a **0-10VDC** output from terminals VO- and VO+. This output can be configured depending on the type of signal needed by the building management system or the equipment receiving it.

The types of signal that are available:

- Total Exhaust CFM Ratio = Total Operating Exh CFM / Total Design Exh CFM
- Total Supply CFM Ratio = Total Operating Sup CFM / Total Design Sup CFM
- Total Transfer CFM Ratio = Total Operating Transfer CFM / Total Design Transfer CFM
- Zone 1 or Zone 2 Exhaust
- Zone 1 or Zone 2 Supply

Total Exhaust CFM Ratio could be sent to a Roof Top Unit providing make-up air to the hood.

Total Transfer CFM Ratio could be sent to a HVAC unit indicating how much transfer air is needed for the kitchen. This selection takes in consideration the Preparation Time Mode where the same amount of transfer air is used as when the fans are all running at maximum speed.

Total Supply CFM Ratio is only available if a supply fan is present in the DCV system. In Preparation Time, Total Supply CFM Ratio would be 0.

VDC Output Range - VDC output signal options are **0-10VDC** or **2-10VDC**.

Is Proving Enabled? – Yes/No option. Default is set to No. If set to Yes, the following CS1 Proving % through CS5 Proving % will be available. All of these options will have the same default of 80%.

Is On-board Wash Enabled? - Yes/No option. Default is set to No.

Fan Zones – Select Fan Zone 1 or Fan Zone 2. When setting up a Fan Zone, the following will be available:

- Is Dynamic? – Yes/No option. Default is set to Yes.

- Is Prep Enabled? - Yes/No option. Default is set to Yes.
  - Preparation mode is available for morning operation when appliances are off or when very light food preparation is performed. Dedicated make-up air will be locked out only allowing the use of transfer air during this mode. Exhaust fan(s) will run at low CFM while maintaining a balanced kitchen pressure.
  - The speed of the exhaust fan(s) in Preparation Time is calculated automatically and is equal to the speed that will produce the same amount of CFM than the Transfer CFM when the fans are running in full speed in normal operation. If there is no dedicated supply fan in the system, the exhaust fans will run at the set high frequency divided by 4 (typically 15 Hz).
    NOTE: If the calculated value falls below the set minimum frequency, then the value will be adjusted to the lowest allowable frequency.

- Constant Transfer CFM – Yes/No option. Default is set to No. This changes the calculation for supply frequency. It will make the difference between CFM's entering the building and CFM's leaving set to zero.
  The normal formula uses (Total Current Exhaust CFM / Total Exhaust Max CFM)
  CFM Balancing uses (Total Current Exhaust CFM / Total Supply Max CFM)

- Independent Light Control? - Yes/No option. Default is set to No. When this option is set to No, the lights will automatically come on when the fans start up.
  - Lights can only be controlled by pressing the **LIGHTS ON** button and pressing the **LIGHTS OFF** button.
  - A control panel can have 1 HMI light switch but potentially controls multiple light circuits. Each light circuit can feed with a maximum of 1400W. If more than 1400 watts of lights are needed, additional **15 amp** circuits can be added to the panel. Panel specific lighting limitations are indicated on the installation schematic.
  - When you use the manual light switch command on the HMI, it will always take priority over what is set in the HMI.

- IO Delay - 00:00:00 (default) - This option is intended for applications that require the fans to keep running for a specific amount of time after and external signal (BMS, machine, etc.) is turned off. The delay time value is set in minutes with a maximum value of 30 minutes. The fans will remain on for the set time after the external signal is de-energized.

- Preset Room Temp - 75.0°F (default). Allows the user to adjust Preset Room Temperature.

- Minimum Room Temperature - 50.0°F (default)
  - This option is designed to prevent unnecessary automatic fan activation due to excessively cold room temperatures. This value is adjustable between 50 degrees to 80 degrees.
  - As long as the room temperature reading is above the Min Room Temp set value, the package will use the actual room temperature sensor reading to calculate the duct thermostat offset. However, if the room temperature sensor reading is below the Min Room Temp set value, the package will ignore the actual room temp reading and use the Min Room Temp set value as a reference instead.

- This prevents a system from activating the fans unnecessarily, due to a large gap between room temperature and the hood duct temperature. This option can also help alleviate fan activation troubles with lower temperature appliances, which are not satisfying the minimum temperature requirements for fan activation.

o Temp (Temperature) Hysteresis - 2.0°F (default)
The hysteresis is used to prevent the fans from cycling on and off when the temperature in the duct is near the activation value. The fans will turn on when the duct temperature exceeds the activation value, but they will only turn off when the duct temperature goes below the activation temperature minus the temperature hysteresis. For example, if the activation Temperature is at 85°F and Temperature Hysteresis is set to 2°F, the fans will turn on at 85 °F and will turn off at 83°F.

o Hysteresis Timer - 00:30:00 (30 minutes default)
- The hysteresis is used to prevent the fans from cycling on and off too often due to small appliances generating just enough heat to turn on the fans but not enough to keep them on for a long time.
- The Hysteresis Timer will maintain the fans on after they have been activated by temperature for a minimum time set by this timer, even if the temperature in the duct cools back down.

o Is Max Air Enabled? - Yes/No option. Default is set to Yes.
If Max Air is enabled, a **MAX AIR** Button will appear. If pressed, this will send the system into Maximum Air Mode.

o Max Air Time - 00:30:00 (minutes default)
Max Air Timer maintains all exhaust and supply fans running at their maximum frequency for the configured time.

o Manual to Auto - Yes/No option. Default is set to No. Default is 12:00 (hours default)
When the system is turned on manually (by button) a timer will start that sends the system into automatic mode once the timer is completed (this is advised to be about the length of time the restaurant will be open).

o Exhaust Contactor CFM/Supply Contactor CFM (Only for dynamic mode) - The user can adjust the CFM from 0-65,000 CFM.

o Cool Time – Only available if “Is Dynamic?” enabled. Default time is set to 00:00:00.
The fans will go into Cool Down mode when the duct temperature goes below the activation point minus the temperature hysteresis of 2 degrees. For example, if the activation temperature is at 85 °F and the hysteresis is set to 2°F, Cool Down mode will start at 83°F.

o IO High Speed Mode: Yes/No option. Default is set to No.
This option is available when Dynamic mode is enabled. This option is disabled if AUX interlock is enabled. Enters High Speed once **120VAC** is detected on IO input. The fans stay on for as long as the IO High Speed Timer is set. The **120VAC** must be sourced from the same breaker as the control power, terminal H1.

o Wash time: 03:00 (minutes default)

o Autowash Min Fan Runtime (H): 08:00 (hours default). Adjustable between 0-24 hours. This timer is the minimum amount of time the fans must be running for this timer to be satisfied.

o Autowash Min Interval Time (H): 12:00 (hours default). Adjustable between 0-24 hours. This timer is the minimum amount of time between washes for this timer to be satisfied.

- Wash Speed % Of Fan High Speed: 30% (default) Fan speed for exhaust when the system is in self-cleaning. The adjustable value is 0-100%.

Aux Interlock - A safety sensor will send a signal when the interlock has been activated. If AUX Interlock is enabled, the IO High Speed option is disabled.

Modbus Address - The default address is 59. This parameter should never be adjusted.

Drives - The number of VFDs or ECMs assigned determine the selections under “Drives”.

EXH VFD #

- Min Prep Frequency (15 Hz default) Range 10-30 Hz
- High Frequency (60 Hz default) Range 48-80 Hz
- Low Frequency (48 Hz default) Range 30-80 Hz. If the External Control option is enabled Range 18-80.
- CFM (1000 default) Range 100-65,000
- Modulation (30°F default) Range 5-50°F
- Direction (Forward default) Reverse is available
- Drive Type (ACTech 571)

SUP VFD #

- High Frequency (60 Hz default) Range 15-80 Hz
- CFM (800 default) Range 100-65,000
- Direction (Forward default) Reverse is available
- Drive Type (ACTech 571)

EXH ECM #

- Min Prep Frequency (30% default) Range 30-50%
- High Frequency (100% default) Range 70-100%
- Low Frequency (70% default) Range 30-70%
- CFM (1000 default) Range 100-65,000
- Modulation (30°F default) Range 5-50°F

SUP ECM #

- High Frequency (100% default) Range 30-100%
- CFM (800 default) Range 100-65,000

VDC Output

- None
- Exhaust CFM Ratio Zone 1
- Supply CFM Ratio Zone 1
- Total Transfer Ratio Zone 1
- Exhaust Zone 1
- Exhaust Zone 1
  - Min Prep Frequency (30% default) Range 30-50%
  - High Frequency (100% default) Range 70-100%
  - Low Frequency (70% default) Range 30-70%
  - CFM (1000 default) Range 100-65,000
  - Modulation (30°F default) Range 5-50°F
- Supply Zone 1
  - High Frequency (100% default) Range 30-100%
  - CFM (800 default) Range 100-65,000

Low Surfactant Shut-Down – Yes/No option. Default is No.

External Control – When external control is enabled, only one fan zone is allowed. If the input is active, the user will be allowed to operate the fans from an external control device. The fans will modulate linearly from low frequency to high frequency based on the 0 (low) to 10 (high) volt input.

Disable Autowash – Allows the user to disable the autowash function. This function should be disabled if wash is controlled through a schedule. If no schedule is defined, autowash timers will need to be enabled.

Factory Reset – This will allow the system to be restored to original factory settings.

Fire Options

This sub-menu is Password protected (1234). **Changes should not be made after passing an inspection**.

Exhaust On in Fire (Factory default is Max Speed)

- When **Max Speed** is set, the exhaust fans will be turned On in a fire condition at their maximum speed.
- When **Continue** is set, the exhaust fans will stay in whatever state they were before the fire condition.
- When **Off** is set, the fans will be not be active during a fire condition.

Supply Off in Fire (Factory default is Off)

- When this option is turned Off, the Supply fans will be turned off in a fire condition.
- If the option is turned On, the Supply fans will turn on in a fire condition.

Disable Lights Out During Fire? (Factory default is No)

- When this option is set to Yes, the hood lights will be turned off in a fire condition.
- If the option is set to No, the hood lights will turn on.

Is Gas Valve Enabled? (Factory default is No) - This option will be enabled by default if the system is equipped with CORE Protection Fire system. This option provides a **120V** signal wired from the board to control an electric gas valve. Shuts off in “critical conditions” when having gas flowing through the system could be dangerous.

Does Gas Valve Follow Fans? (Factory default is Off) - This option is only available when Gas Valve is set to Yes or CORE is enabled. If this option is enabled, the gas valve is shut off whenever the fans are off and requires a reset when the fans are turned on. This is meant to prevent gas cooking appliances to run when the fans are off and is only required in some jurisdictions.
NOTE: Gas Valve Reset button on HMI must be pressed and Appliance pilots must be relit after each fan cycle when this option is enabled.

Is Kill Switch Enabled? (Factory default is No) - This option determines if a kill switch is connected to the system. If this option is enabled, the kill switch input will stay energized for normal cooking operations. If the kill switch is de-energized, an electric gas valve connected to the system would drop and the shunt trip output will be energized.

Shunt Follows Fans? (Factory default setting is Off) - If this option is On, the shunt trip will be energized whenever the fans are off. This is meant to prevent electric cooking appliances from running when the fans are off and is only required in some jurisdictions.

Is CORE Enabled? (Factory default setting is No) - If a CORE Protection Fire System is connected to the control panel, alarms from the CORE system will automatically be displayed on the HMI. Multiple CORE systems can be connected to the same control panel. Refer to the CORE Manual for setup of CORE Interlock Network addressing to prevent communication conflicts.

CORE Type Ansul Will Not Wash? (Factory default setting is No) – If CORE is enabled, then this option will be available. This option is based on whether an Electric Wet Chemical system includes self-cleaning. If the Electric Wet Chemical package with the self-cleaning option is available, enable this option to Yes. If the Electric Wet Chemical package does not include self-cleaning, this option is set to No.

CORE Zone Assignment (Factory default setting is 1) - Available if CORE is enabled. Up to 15 CORE boards can be assigned. The zones are configurable through on the CORE Board. Refer to the CORE manual for setup.

Interlock/Warnings

Make-Up Air Interlock

- When the dedicated supply fan is a tempered make-up air unit, the blower inside the supply unit can be interlocked. The unit will not run unless the safety controls (Freezestat, Smoke Detector etc.) inside the supply fan are armed, and the internal motorized damper has reached its end limit switch.
- If the signal from the make-up air is not received by the ECPM03 in ninety seconds (factory default) after the start signal is sent to the supply fan, an alarm will appear on the HMI. The panel ships with a jumper between terminals IL1A and IL1B for supply #1 and IL2A and IL2B for supply #2, if present. The jumper has to be removed first before wiring the interlock from a make-up air unit.

Appliances Pilot Check Warning

Every time an electronic gas valve is reset, a warning message will be displayed on the HMI for 1 minute. A **CLEAR** button will be displayed on the HMI to clear the warning message and stop the beeps. If after 1 minute, the clear button is not pressed, the message disappears. This message is normal and provided as a reminder only. There is no need to take any action.

Building Management System (Dry Contact) (Optional)

- All controls are equipped with the ability to control the fans via a dry contact BMS interlock. Terminal IO1 should be energized by closing a dry contact placed between terminals H1 and IO1.
  Removing the signal from IO1 will typically cause the fans to turn off. However, if the duct thermostat sensors are hot or if the fans are energized through the fan button on the HMI, then the fans will continue to run.

NOTE: If the panel is ordered with a digital building management option, such as CASlink, BACnet, or Lonworks, please refer to the Building Management Owner's Manual for alternative fan interlock scheduling.

Prime Surfactant

The prime surfactant option is only available when on-board wash is enabled to Yes. When using the surfactant prime option, the surfactant pump will operate for 15 seconds. This will allow the user to test that the pump is operating properly.

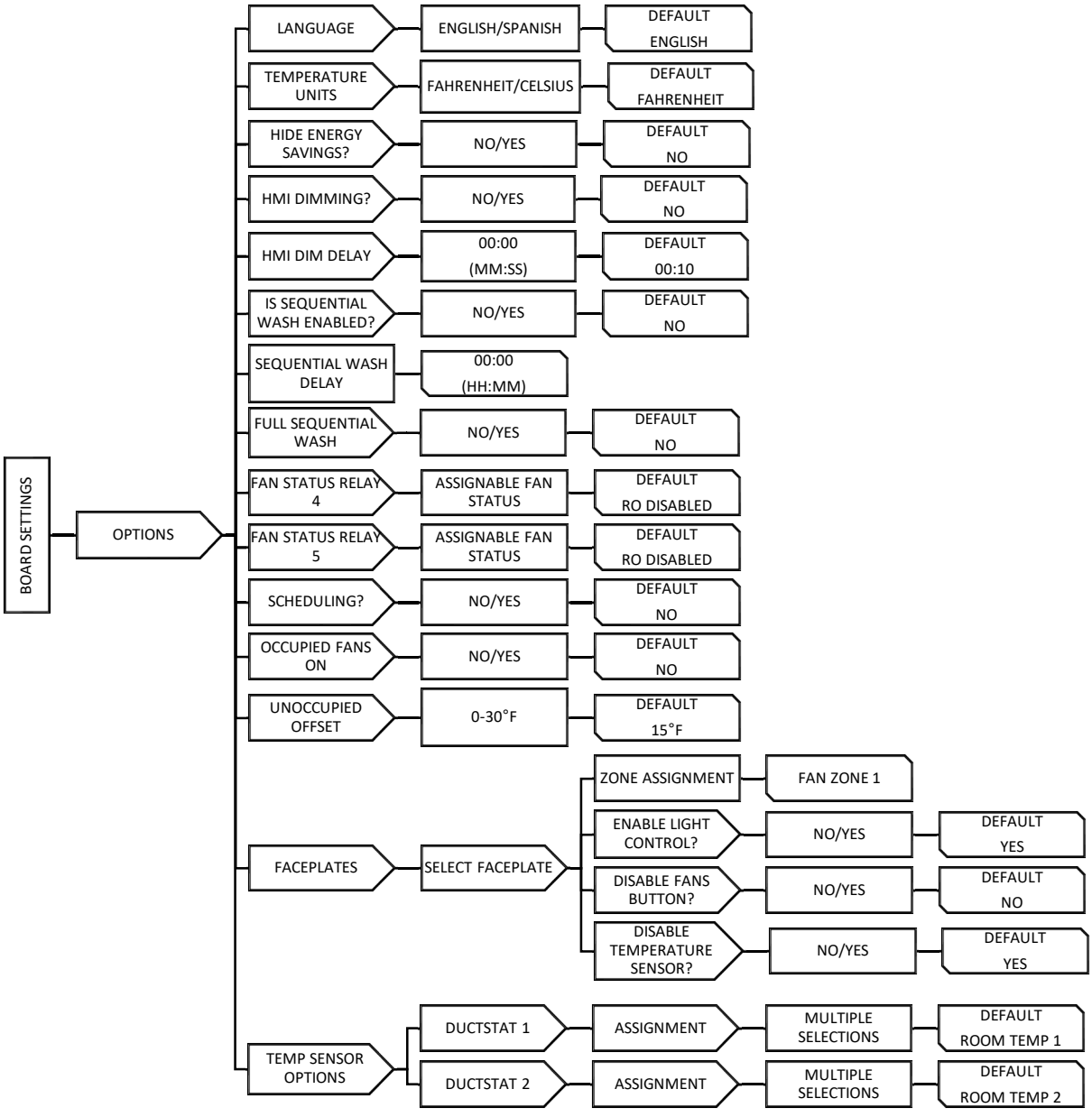
Scheduling

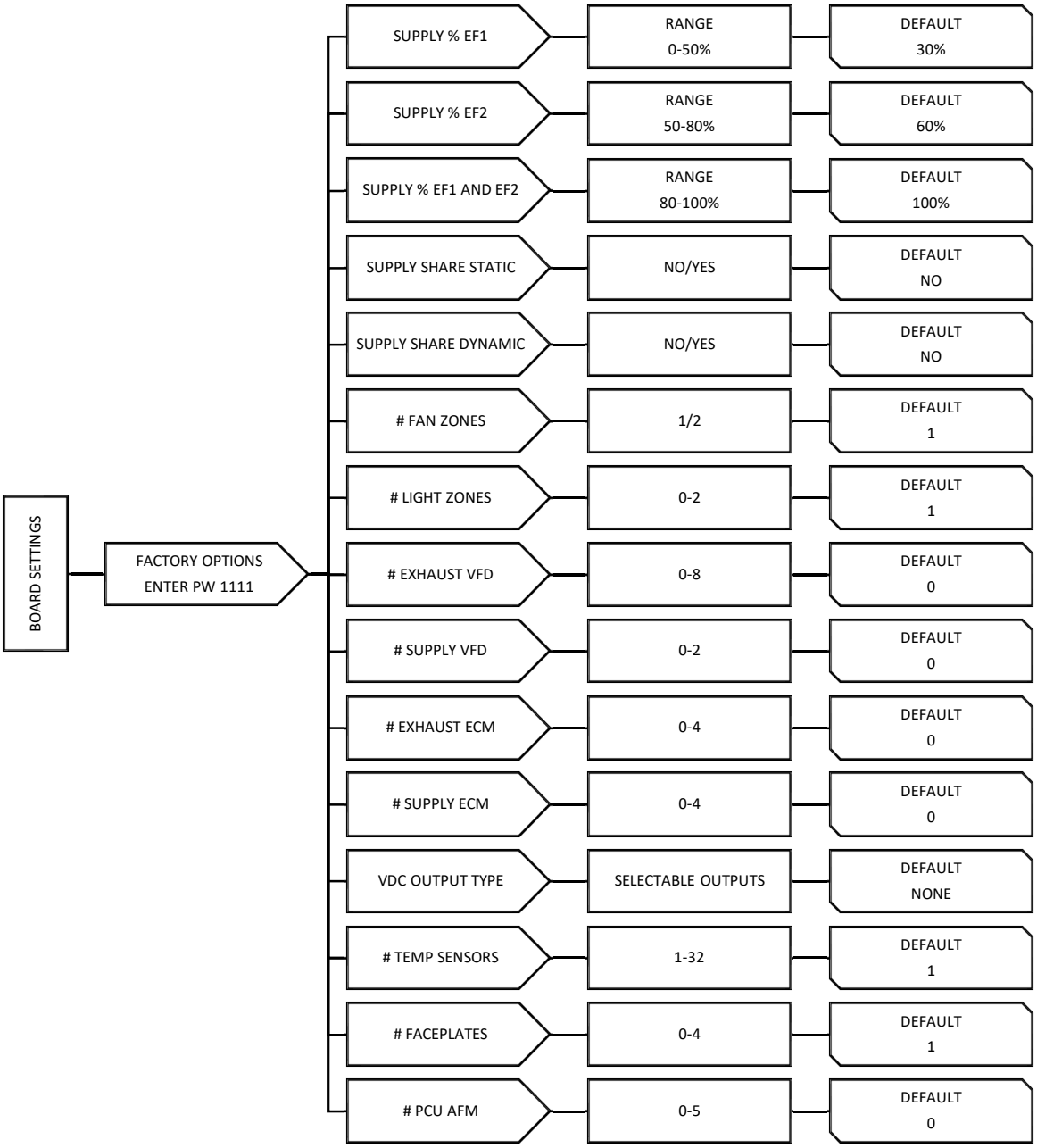
When scheduling is enabled, this will allow the user to set a schedule for the fans and wash system to run on various days and at various time settings. The selectable settings are Wash Time/Occupied Start Time/Occupied End Time/Copy Schedule. First select a day to start your schedule. Occupied Start Time and Occupied End Time will have three schedules available.

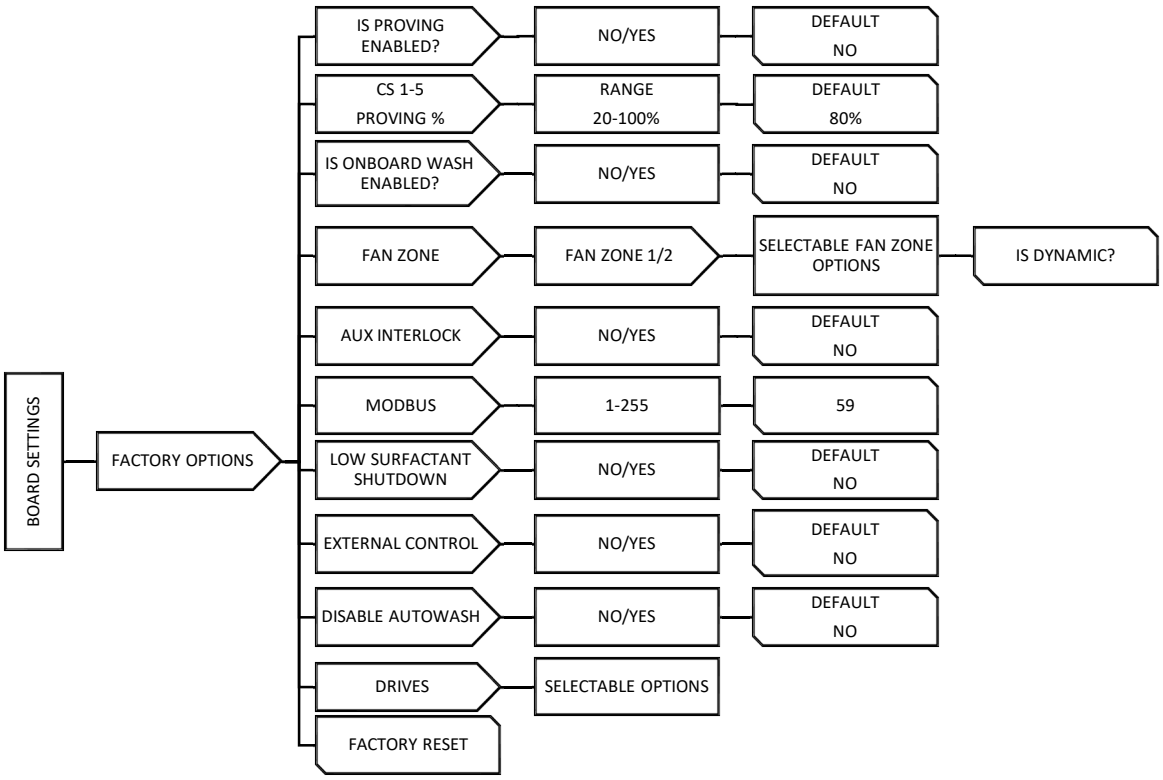
- **Wash Time** – The settings are Disable or a setting a time (12:00AM-11:55PM). When creating a scheduled wash, start your wash time for when the appliance(s) are not in use.
- **Occupied Start Time** – Set your start time for when the appliance(s) will be in use. The settings available are Disable or a setting a time (12:00AM-11:55PM).
- **Occupied End Time** – Set your end time for when the appliance(s) will no longer be in use. The settings available are Disable, a time (this range is based off of the start time, you cannot set this time before the Occupied Start Time), or Next Day. If setting a schedule past 11:55PM, use Next Day to continue the schedule overnight.
- **Copy Schedule** – This allows the user to copy a set schedule from one day to the next, set a schedule to weekdays or to all days.

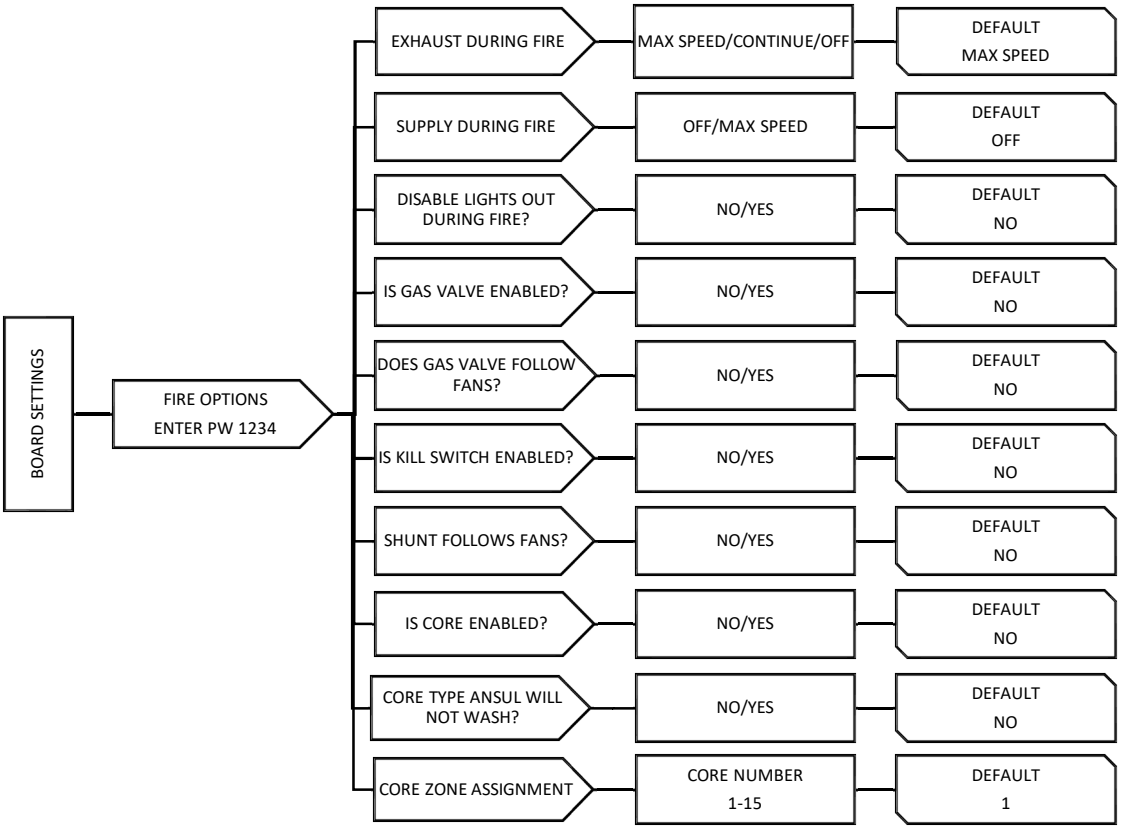
System Bypass - See System Bypass in "Options".

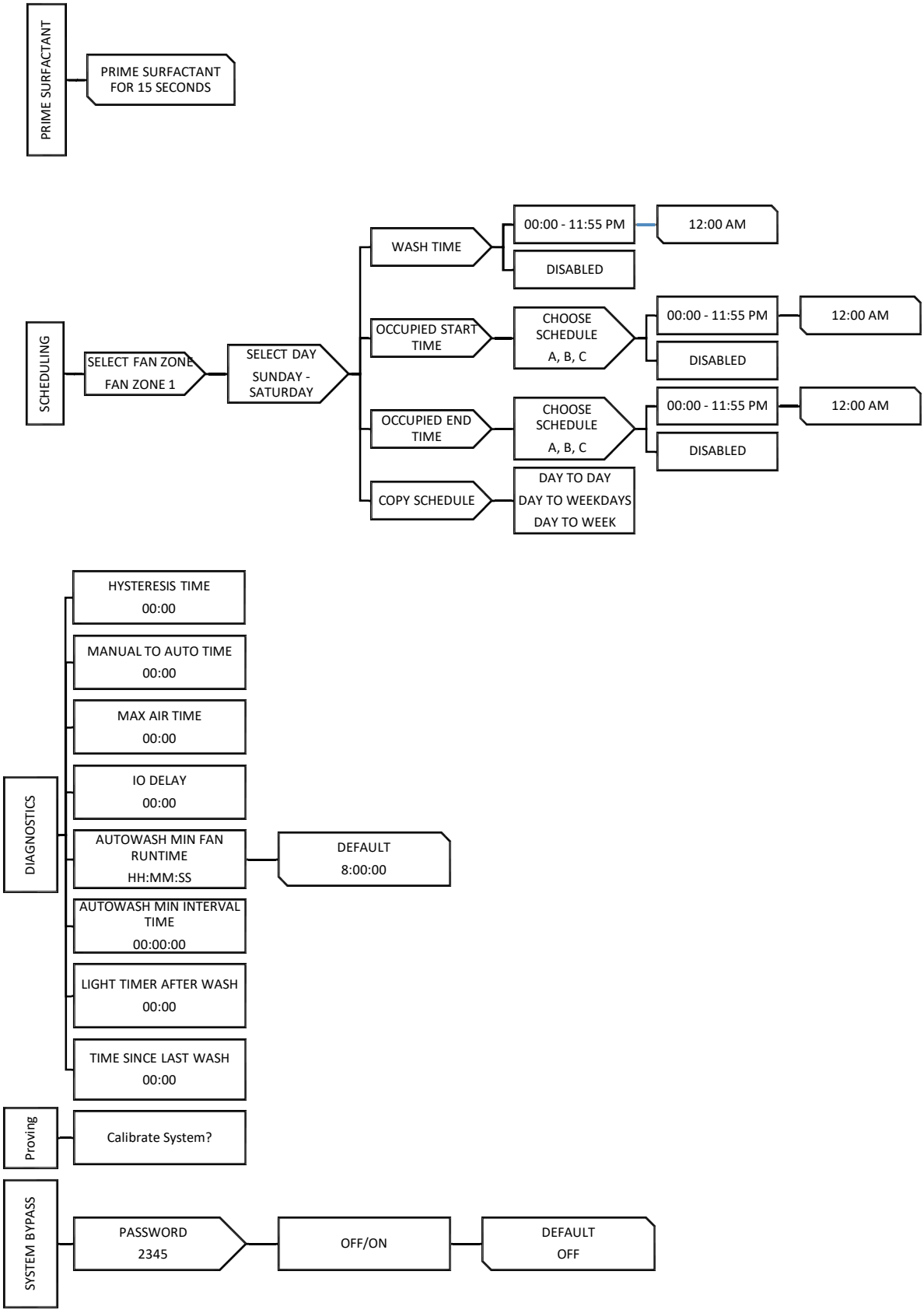
HMI Menu Tree




BOARD SETTINGS
FACTORY OPTIONS
ENTER PW 1111
SUPPLY % EF1
RANGE
0-50%
DEFAULT
30%
SUPPLY % EF2
RANGE
50-80%
DEFAULT
60%
SUPPLY % EF1 AND EF2
RANGE
80-100%
DEFAULT
100%
SUPPLY SHARE STATIC
NO/YES
DEFAULT
NO
SUPPLY SHARE DYNAMIC
NO/YES
DEFAULT
NO
FAN ZONES
1/2
DEFAULT
1
LIGHT ZONES
0-2
DEFAULT
1
EXHAUST VFD
0-8
DEFAULT
0
SUPPLY VFD
0-2
DEFAULT
0
EXHAUST ECM
0-4
DEFAULT
0
SUPPLY ECM
0-4
DEFAULT
0
VDC OUTPUT TYPE
SELECTABLE OUTPUTS
DEFAULT
NONE
TEMP SENSORS
1-32
DEFAULT
1
FACEPLATES
0-4
DEFAULT
1
PCU AFM
0-5
DEFAULT
0


BOARD SETTINGS
FACTORY OPTIONS
IS PROVING ENABLED?
NO/YES
DEFAULT NO
CS 1-5 PROVING %
RANGE 20-100%
DEFAULT 80%
IS ONBOARD WASH ENABLED?
NO/YES
DEFAULT NO
FAN ZONE
FAN ZONE 1/2
SELECTABLE FAN ZONE OPTIONS
IS DYNAMIC?
AUX INTERLOCK
NO/YES
DEFAULT NO
MODBUS
1-255
59
LOW SURFACTANT SHUTDOWN
NO/YES
DEFAULT NO
EXTERNAL CONTROL
NO/YES
DEFAULT NO
DISABLE AUTOWASH
NO/YES
DEFAULT NO
DRIVES
SELECTABLE OPTIONS
FACTORY RESET


BOARD SETTINGS
FIRE OPTIONS ENTER PW 1234
EXHAUST DURING FIRE
MAX SPEED/CONTINUE/OFF
DEFAULT MAX SPEED
SUPPLY DURING FIRE
OFF/MAX SPEED
DEFAULT OFF
DISABLE LIGHTS OUT DURING FIRE?
NO/YES
DEFAULT NO
IS GAS VALVE ENABLED?
NO/YES
DEFAULT NO
DOES GAS VALVE FOLLOW FANS?
NO/YES
DEFAULT NO
IS KILL SWITCH ENABLED?
NO/YES
DEFAULT NO
SHUNT FOLLOWS FANS?
NO/YES
DEFAULT NO
IS CORE ENABLED?
NO/YES
DEFAULT NO
CORE TYPE ANSUL WILL NOT WASH?
NO/YES
DEFAULT NO
CORE ZONE ASSIGNMENT
CORE NUMBER 1-15
DEFAULT 1


PRIME SURFACTANT
PRIME SURFACTANT FOR 15 SECONDS
SCHEDULING
SELECT FAN ZONE
FAN ZONE 1
SELECT DAY
SUNDAY - SATURDAY
WASH TIME
00:00 - 11:55 PM
12:00 AM
DISABLED
OCCUPIED START TIME
CHOOSE SCHEDULE
A, B, C
00:00 - 11:55 PM
12:00 AM
DISABLED
OCCUPIED END TIME
CHOOSE SCHEDULE
A, B, C
00:00 - 11:55 PM
12:00 AM
DISABLED
COPY SCHEDULE
DAY TO DAY
DAY TO WEEKDAYS
DAY TO WEEK
DIAGNOSTICS
HYSTERESIS TIME
00:00
MANUAL TO AUTO TIME
00:00
MAX AIR TIME
00:00
IO DELAY
00:00
AUTOWASH MIN FAN RUNTIME
HH:MM:SS
DEFAULT
8:00:00
AUTOWASH MIN INTERVAL TIME
00:00:00
LIGHT TIMER AFTER WASH
00:00
TIME SINCE LAST WASH
00:00
Proving
Calibrate System?
SYSTEM BYPASS
PASSWORD
2345
OFF/ON
DEFAULT
OFF

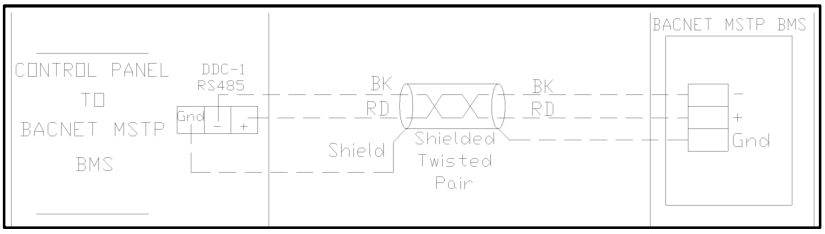
Network

Communication Module (Optional)

The Communication Module, PN: **COMM01**, 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

Figure 24 - B ACNET Wiring Reference

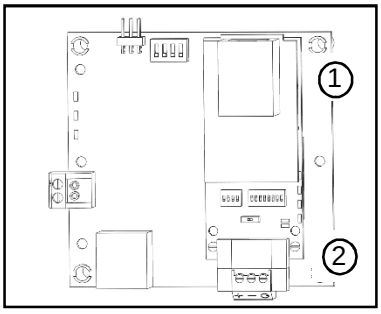


BACNET IP or BACNET MS/TP compatibility can be implemented in this package through a Protocessor, which is a BTL listed embedded Gateway configured to give a Building Management System (BMS) access to monitor and/or control a list of BACNET objects. The Protocessor is mounted and factory pre-wired inside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

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.

1. Field Ethernet Connection for BACNET IP
2. Field RS485 Connection for BACNET MS/TP

Figure 25 - BACNET Connections



Internal Configuration

The "A" Bank of Dip Switches can be used to set the MAC address of the Protocessor for BACNET MS/TP networks (where A1 is the least significant digit and A8 is the most significant digit of an 8-digit binary number).

1. The A-bank of DIP switches is used to set the MAC address of the unit for BACNET MS/TP.
2. End Of Line termination switch for RS485 line.
3. The B-bank of DIP switches is used to set the Baud Rate for BACNET MS/TP.

DIP Switch Settings for BACNET MS/TP Baud Rates.

If the RS485 field output is used (for BACNET MS/TP), the Protocessor is also equipped with an End of Line (EOL) termination switch that can be used if the Protocessor is the last device on the trunk. The default EOL switch position is OFF. The "B" bank of DIP switches is used to set the **baud rate** if using BACNET MS/TP as the field protocol. The default baud rate from the factory is 38400.

Figure 26 - DIP Switch Settings

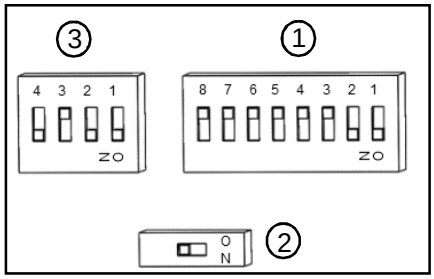


Table 3 – Baud DIP Switch Settings

Baud	B1	B2	B3	B4
9600	On	On	On	Off
19200	Off	Off	Off	On
38400	On	On	Off	On
57600	Off	Off	On	On
76800	On	Off	On	On

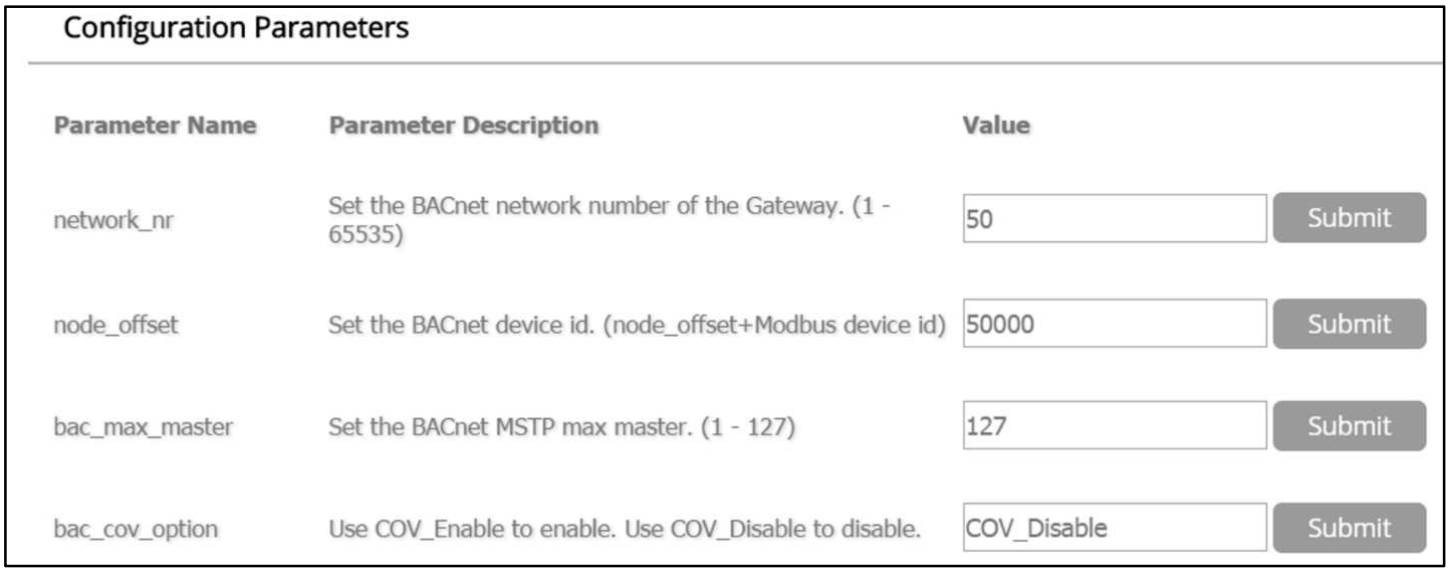
Changing Network Number and Device Instance

Some applications may require that the Protocessor have a specific Network Number or Device Instance. To change the Network Number or 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. The window shown in **Figure 27** should appear. The network_nr field can be changed in order to apply a new network number. **The default network number for BACNET IP is 50**. **The network number for BACNET MS/TP is 0 (this is non-editable).**

Similarly, changing the node_offset field will change the Device Instance. The Device Instance is calculated by adding the node_offset and the Node ID (always 59 for DCV and SC Packages). **The default Device Instance is 50,059**.

Figure 27 - Configuration Parameters Page



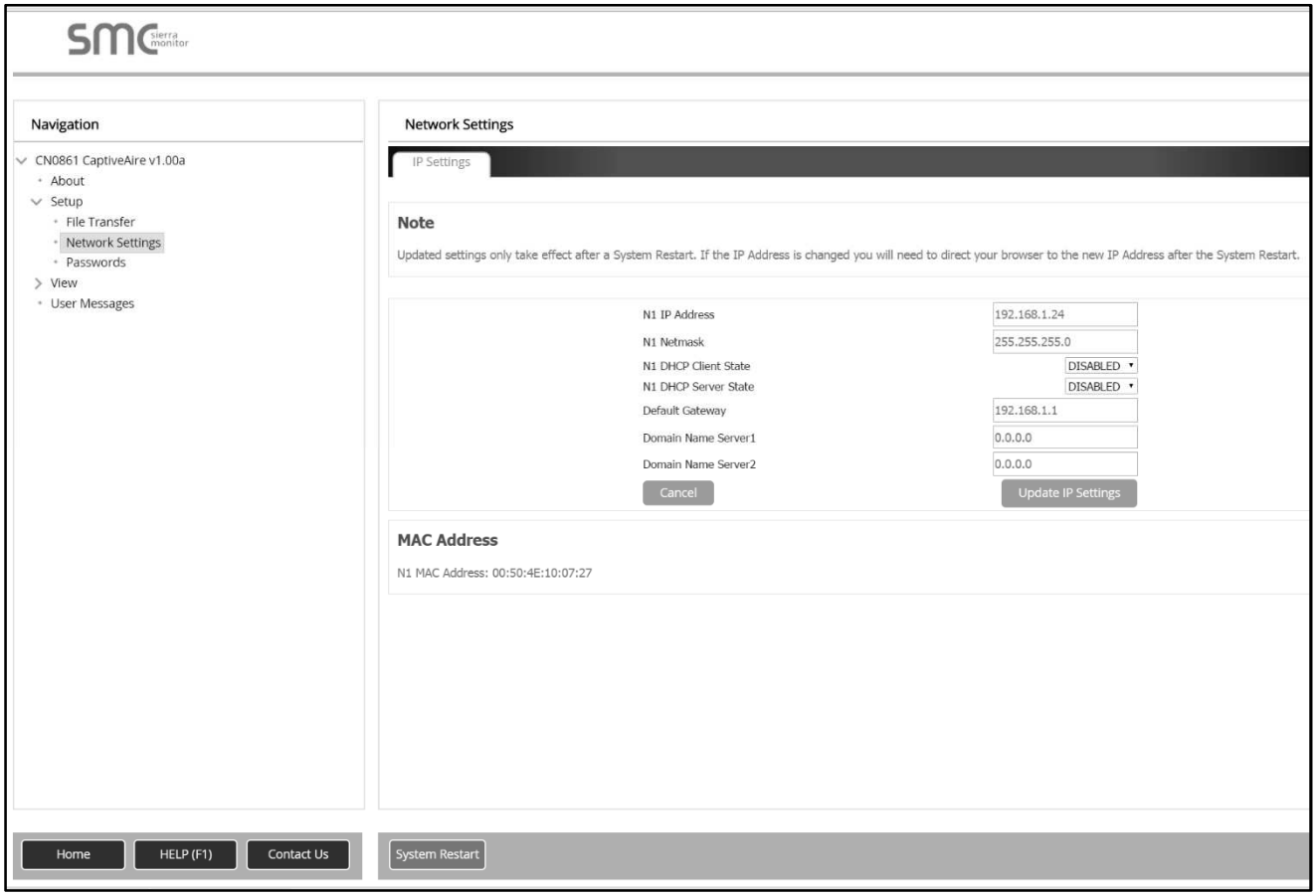
If any changes are made, **click on the submit button for each individual change.** Once all changes have been made, click on "**System Restart**" at the bottom of the screen (DO NOT CLICK ON "CLEAR PROFILES AND RESTART")

Changing the IP Address

Some BACNET IP applications may require changing the IP address of the Protocessor. In order 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 28** appears. Click on the "Diagnostics and Debugging" button on the lower right corner.

Then, click on "Setup" from the left hand side menu, and select "Network Settings." The window shown in **Figure 28** 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 28 - Network Settings Page



After you have updated the IP settings, you will be prompted to restart the system. You can do so by clicking on the "System Restart" button at the bottom of the screen. Any time after this, you will have to type the new IP address of the Protocessor on the URL to gain access to the Web Configurator.

The MAC address must be set between 0 and 127 so that the BMS can detect the Protocessor via BACNET auto discovery. **The default MAC address from the factory is 03**. A list of A Bank DIP switch settings for MAC addresses from 0 to 127 are shown.

Table 4 – MAC Address

Address	A1	A2	A3	A4	A5	A6	A7	A8
0	Off	Off	Off	Off	Off	Off	Off	Off
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off
7	On	On	On	Off	Off	Off	Off	Off
8	Off	Off	Off	On	Off	Off	Off	Off
9	On	Off	Off	On	Off	Off	Off	Off
10	Off	On	Off	On	Off	Off	Off	Off
11	On	On	Off	On	Off	Off	Off	Off
12	Off	Off	On	On	Off	Off	Off	Off
13	On	Off	On	On	Off	Off	Off	Off
14	Off	On	On	On	Off	Off	Off	Off
15	On	On	On	On	Off	Off	Off	Off
16	Off	Off	Off	Off	On	Off	Off	Off
17	On	Off	Off	Off	On	Off	Off	Off
18	Off	On	Off	Off	On	Off	Off	Off
19	On	On	Off	Off	On	Off	Off	Off
20	Off	Off	On	Off	On	Off	Off	Off
21	On	Off	On	Off	On	Off	Off	Off
22	Off	On	On	Off	On	Off	Off	Off
23	On	On	On	Off	On	Off	Off	Off
24	Off	Off	Off	On	On	Off	Off	Off
25	On	Off	Off	On	On	Off	Off	Off
26	Off	On	Off	On	On	Off	Off	Off
27	On	On	Off	On	On	Off	Off	Off
28	Off	Off	On	On	On	Off	Off	Off
29	On	Off	On	On	On	Off	Off	Off
30	Off	On	On	On	On	Off	Off	Off
31	On	On	On	On	On	Off	Off	Off
32	Off	Off	Off	Off	Off	On	Off	Off
33	On	Off	Off	Off	Off	On	Off	Off
34	Off	On	Off	Off	Off	On	Off	Off
35	On	On	Off	Off	Off	On	Off	Off
36	Off	Off	On	Off	Off	On	Off	Off
37	On	Off	On	Off	Off	On	Off	Off
38	Off	On	On	Off	Off	On	Off	Off
39	On	On	On	Off	Off	On	Off	Off
40	Off	Off	Off	On	Off	On	Off	Off
41	On	Off	Off	On	Off	On	Off	Off
42	Off	On	Off	On	Off	On	Off	Off
43	On	On	Off	On	Off	On	Off	Off
44	Off	Off	On	On	Off	On	Off	Off
45	On	Off	On	On	Off	On	Off	Off
46	Off	On	On	On	Off	On	Off	Off
47	On	On	On	On	Off	On	Off	Off
48	Off	Off	Off	Off	On	On	Off	Off
49	On	Off	Off	Off	On	On	Off	Off
50	Off	On	Off	Off	On	On	Off	Off
51	On	On	Off	Off	On	On	Off	Off
52	Off	Off	On	Off	On	On	Off	Off
53	On	Off	On	Off	On	On	Off	Off
54	Off	On	On	Off	On	On	Off	Off
55	On	On	On	Off	On	On	Off	Off
56	Off	Off	Off	On	On	On	Off	Off
57	On	Off	Off	On	On	On	Off	Off
58	Off	On	Off	On	On	On	Off	Off
59	On	On	Off	On	On	On	Off	Off
60	Off	Off	On	On	On	On	Off	Off
61	On	Off	On	On	On	On	Off	Off
62	Off	On	On	On	On	On	Off	Off
63	On	On	On	On	On	On	Off	Off
64	Off	Off	Off	Off	Off	Off	On	Off
65	On	Off	Off	Off	Off	Off	On	Off
66	Off	On	Off	Off	Off	Off	On	Off
67	On	On	Off	Off	Off	Off	On	Off
68	Off	Off	On	Off	Off	Off	On	Off
69	On	Off	On	Off	Off	Off	On	Off
70	Off	On	On	Off	Off	Off	On	Off
71	On	On	On	Off	Off	Off	On	Off
72	Off	Off	Off	On	Off	Off	On	Off
73	On	Off	Off	On	Off	Off	On	Off
74	Off	On	Off	On	Off	Off	On	Off
75	On	On	Off	On	Off	Off	On	Off
76	Off	Off	On	On	Off	Off	On	Off
77	On	Off	On	On	Off	Off	On	Off
78	Off	On	On	On	Off	Off	On	Off
79	On	On	On	On	Off	Off	On	Off
80	Off	Off	Off	Off	On	Off	On	Off
81	On	Off	Off	Off	On	Off	On	Off
82	Off	On	Off	Off	On	Off	On	Off
83	On	On	Off	Off	On	Off	On	Off
84	Off	Off	On	Off	On	Off	On	Off
85	On	Off	On	Off	On	Off	On	Off
86	Off	On	On	Off	On	Off	On	Off
87	On	On	On	Off	On	Off	On	Off
88	Off	Off	Off	On	On	Off	On	Off
89	On	Off	Off	On	On	Off	On	Off
90	Off	On	Off	On	On	Off	On	Off
91	On	On	Off	On	On	Off	On	Off
92	Off	Off	On	On	On	Off	On	Off
93	On	Off	On	On	On	Off	On	Off
94	Off	On	On	On	On	Off	On	Off
95	On	On	On	On	On	Off	On	Off
96	Off	Off	Off	Off	Off	On	On	Off
97	On	Off	Off	Off	Off	On	On	Off
98	Off	On	Off	Off	Off	On	On	Off
99	On	On	Off	Off	Off	On	On	Off
100	Off	Off	On	Off	Off	On	On	Off
101	On	Off	On	Off	Off	On	On	Off
102	Off	On	On	Off	Off	On	On	Off
103	On	On	On	Off	Off	On	On	Off
104	Off	Off	Off	On	Off	On	On	Off
105	On	Off	Off	On	Off	On	On	Off
106	Off	On	Off	On	Off	On	On	Off
107	On	On	Off	On	Off	On	On	Off
108	Off	Off	On	On	Off	On	On	Off
109	On	Off	On	On	Off	On	On	Off
110	Off	On	On	On	Off	On	On	Off
111	On	On	On	On	Off	On	On	Off
112	Off	Off	Off	Off	On	On	On	Off
113	On	Off	Off	Off	On	On	On	Off
114	Off	On	Off	Off	On	On	On	Off
115	On	On	Off	Off	On	On	On	Off
116	Off	Off	On	Off	On	On	On	Off
117	On	Off	On	Off	On	On	On	Off
118	Off	On	On	Off	On	On	On	Off
119	On	On	On	Off	On	On	On	Off
120	Off	Off	Off	On	On	On	On	Off
121	On	Off	Off	On	On	On	On	Off
122	Off	On	Off	On	On	On	On	Off
123	On	On	Off	On	On	On	On	Off
124	Off	Off	On	On	On	On	On	Off
125	On	Off	On	On	On	On	On	Off
126	Off	On	On	On	On	On	On	Off
127	On	On	On	On	On	On	On	Off

BACNET IP and BACNET MS/TP Points

Object Name	BACNET Type	Object ID	Function	Units
Temperature Sensor 1	AI (Analog Input)	1	Monitor	Deg_F
Temperature Sensor 2	AI	2	Monitor	Deg_F
Temperature Sensor 3	AI	3	Monitor	Deg_F
Temperature Sensor 4	AI	4	Monitor	Deg_F
Temperature Sensor 5	AI	5	Monitor	Deg_F
Temperature Sensor 6	AI	6	Monitor	Deg_F
Temperature Sensor 7	AI	7	Monitor	Deg_F
Temperature Sensor 8	AI	8	Monitor	Deg_F
Temperature Sensor 9	AI	9	Monitor	Deg_F
Temperature Sensor 10	AI	10	Monitor	Deg_F
Temperature Sensor 11	AI	11	Monitor	Deg_F
Temperature Sensor 12	AI	12	Monitor	Deg_F
Temperature Sensor 13	AI	13	Monitor	Deg_F
Temperature Sensor 14	AI	14	Monitor	Deg_F
Temperature Sensor 15	AI	15	Monitor	Deg_F
Temperature Sensor 16	AI	16	Monitor	Deg_F
Temperature Sensor 17	AI	17	Monitor	Deg_F
Temperature Sensor 18	AI	18	Monitor	Deg_F
Temperature Sensor 19	AI	19	Monitor	Deg_F
Temperature Sensor 20	AI	20	Monitor	Deg_F
Temperature Sensor 21	AI	21	Monitor	Deg_F
Temperature Sensor 22	AI	22	Monitor	Deg_F
Temperature Sensor 23	AI	23	Monitor	Deg_F
Temperature Sensor 24	AI	24	Monitor	Deg_F
Temperature Sensor 25	AI	25	Monitor	Deg_F
Temperature Sensor 26	AI	26	Monitor	Deg_F
Temperature Sensor 27	AI	27	Monitor	Deg_F
Temperature Sensor 28	AI	28	Monitor	Deg_F
Temperature Sensor 29	AI	29	Monitor	Deg_F
Temperature Sensor 30	AI	30	Monitor	Deg_F
Temperature Sensor 31	AI	31	Monitor	Deg_F
Temperature Sensor 32	AI	32	Monitor	Deg_F
Temperature Zone 1	AI	33	Monitor	Deg_F
Temperature Zone 2	AI	34	Monitor	Deg_F
Temperature HMI 1	AI	35	Monitor	Deg_F
Temperature HMI 2	AI	36	Monitor	Deg_F
Temperature HMI 3	AI	37	Monitor	Deg_F
Temperature HMI 4	AI	38	Monitor	Deg_F
ECMOutput1	AI	39	Monitor	No-Units
ECMOutput2	AI	40	Monitor	No-Units

Object Name	BACNET Type	Object ID	Function	Units
ECMOutput3	AI	41	Monitor	No-Units
ECMOutput4	AI	42	Monitor	No-Units
VDCOutput	AI	43	Monitor	No-Units
VFD Frequency Exhaust 1	AI	44	Monitor	Hz
VFD Frequency Exhaust 2	AI	45	Monitor	Hz
VFD Frequency Exhaust 3	AI	46	Monitor	Hz
VFD Frequency Exhaust 4	AI	47	Monitor	Hz
VFD Frequency Exhaust 5	AI	48	Monitor	Hz
VFD Frequency Exhaust 6	AI	49	Monitor	Hz
VFD Frequency Exhaust 7	AI	50	Monitor	Hz
VFD Frequency Exhaust 8	AI	51	Monitor	Hz
VFD Frequency Supply 1	AI	52	Monitor	Hz
VFD Frequency Supply 2	AI	53	Monitor	Hz
VFD Amperage Exhaust 1	AI	54	Monitor	Amps
VFD Amperage Exhaust 2	AI	55	Monitor	Amps
VFD Amperage Exhaust 3	AI	56	Monitor	Amps
VFD Amperage Exhaust 4	AI	57	Monitor	Amps
VFD Amperage Exhaust 5	AI	58	Monitor	Amps
VFD Amperage Exhaust 6	AI	59	Monitor	Amps
VFD Amperage Exhaust 7	AI	60	Monitor	Amps
VFD Amperage Exhaust 8	AI	61	Monitor	Amps
VFD Amperage Supply 1	AI	62	Monitor	Amps
VFD Amperage Supply 2	AI	63	Monitor	Amps
VFD Power Usage Exhaust 1	AI	64	Monitor	KW
VFD Power Usage Exhaust 2	AI	65	Monitor	KW
VFD Power Usage Exhaust 3	AI	66	Monitor	KW
VFD Power Usage Exhaust 4	AI	67	Monitor	KW
VFD Power Usage Exhaust 5	AI	68	Monitor	KW
VFD Power Usage Exhaust 6	AI	69	Monitor	KW
VFD Power Usage Exhaust 7	AI	70	Monitor	KW
VFD Power Usage Exhaust 8	AI	71	Monitor	KW
VFD Power Usage Supply 1	AI	72	Monitor	KW
VFD Power Usage Supply 2	AI	73	Monitor	KW
VFD Fault Exhaust 1	AI	74	Monitor	No-Units
VFD Fault Exhaust 2	AI	75	Monitor	No-Units
VFD Fault Exhaust 3	AI	76	Monitor	No-Units
VFD Fault Exhaust 4	AI	77	Monitor	No-Units
VFD Fault Exhaust 5	AI	78	Monitor	No-Units
VFD Fault Exhaust 6	AI	79	Monitor	No-Units
VFD Fault Exhaust 7	AI	80	Monitor	No-Units
VFD Fault Exhaust 8	AI	81	Monitor	No-Units
VFD Fault Supply 1	AI	82	Monitor	No-Units
VFD Fault Supply 2	AI	83	Monitor	No-Units

Object Name	BACNET Type	Object ID	Function	Units
Zone1-FansONbyProving	BI (Binary Input)	84	Monitor	No-Units
Zone1-FansONbyBypass	BI	85	Monitor	No-Units
Zone1-FansONbyIO1HighSpeed	BI	86	Monitor	No-Units
Zone1-FansONbyMaxAir	BI	87	Monitor	No-Units
Zone1-FansONbyTemperature	BI	88	Monitor	No-Units
Zone1-FansONbyOccupancy	BI	89	Monitor	No-Units
Zone1-FansONbyBMS	BI	90	Monitor	No-Units
Zone1-FansONbyIO1	BI	91	Monitor	No-Units
Zone1-FansONbyButton	BI	92	Monitor	No-Units
Zone1-FansONbyWash	BI	93	Monitor	No-Units
Zone1-FansONbyExternal	BI	94	Monitor	No-Units
Zone1-FansONbyBMSPrep	BI	95	Monitor	No-Units
Zone1-FansONbyButtonPrep	BI	96	Monitor	No-Units
Zone1-FansONbyTemperaturePrep	BI	97	Monitor	No-Units
Zone2-FansONbyProving	BI	98	Monitor	No-Units
Zone2-FansONbyBypass	BI	99	Monitor	No-Units
Zone2-FansONbyIO1HighSpeed	BI	100	Monitor	No-Units
Zone2-FansONbyMaxAir	BI	101	Monitor	No-Units
Zone2-FansONbyTemperature	BI	102	Monitor	No-Units
Zone2-FansONbyOccupancy	BI	103	Monitor	No-Units
Zone2-FansONbyBMS	BI	104	Monitor	No-Units
Zone2-FansONbyIO1	BI	105	Monitor	No-Units
Zone2-FansONbyButton	BI	106	Monitor	No-Units
Zone2-FansONbyWash	BI	107	Monitor	No-Units
Zone2-FansONbyExternal	BI	108	Monitor	No-Units
Zone2-FansONbyBMSPrep	BI	109	Monitor	No-Units
Zone2-FansONbyButtonPrep	BI	110	Monitor	No-Units
Zone2-FansONbyTemperaturePrep	BI	111	Monitor	No-Units
Zone1-LightsONbyWash	BI	112	Monitor	No-Units
Zone1-LightsONbyBypass	BI	113	Monitor	No-Units
Zone1-LightsONbyBMS	BI	114	Monitor	No-Units
Zone1-LightsONbyButton	BI	115	Monitor	No-Units
Zone1-LightsONbyOccupied	BI	116	Monitor	No-Units
Zone1-LightsONbyIO	BI	117	Monitor	No-Units
Zone1-LightsONbyExternal	BI	118	Monitor	No-Units
Zone1-LightsONbyFansButton	BI	119	Monitor	No-Units
Zone1-LightsONbyFansAutomatic	BI	120	Monitor	No-Units
Zone2-LightsONbyWash	BI	121	Monitor	No-Units
Zone2-LightsONbyBypass	BI	122	Monitor	No-Units
Zone2-LightsONbyBMS	BI	123	Monitor	No-Units
Zone2-LightsONbyButton	BI	124	Monitor	No-Units

Object Name	BACNET Type	Object ID	Function	Units
Zone2-LightsONbyOccupied	BI	125	Monitor	No-Units
Zone2-LightsONbyIO	BI	126	Monitor	No-Units
Zone2-LightsONbyExternal	BI	127	Monitor	No-Units
Zone2-LightsONbyFansButton	BI	128	Monitor	No-Units
Zone2-LightsONbyAutomatic	BI	129	Monitor	No-Units
ErrorCOREBoard1	AI	130	Monitor	No-Units
ErrorCOREBoard2	AI	131	Monitor	No-Units
ErrorCOREBoard3	AI	132	Monitor	No-Units
ErrorCOREBoard4	AI	133	Monitor	No-Units
ErrorCOREBoard5	AI	134	Monitor	No-Units
ErrorCOREBoard6	AI	135	Monitor	No-Units
ErrorCOREBoard7	AI	136	Monitor	No-Units
ErrorCOREBoard8	AI	137	Monitor	No-Units
ErrorCOREBoard9	AI	138	Monitor	No-Units
ErrorCOREBoard10	AI	139	Monitor	No-Units
ErrorCOREBoard11	AI	140	Monitor	No-Units
ErrorCOREBoard12	AI	141	Monitor	No-Units
ErrorCOREBoard13	AI	142	Monitor	No-Units
ErrorCOREBoard14	AI	143	Monitor	No-Units
ErrorCOREBoard15	AI	144	Monitor	No-Units
PercentClogged_PCU1_Filter1	AI	145	Monitor	No-Units
PercentClogged_PCU1_Filter2	AI	146	Monitor	No-Units
PercentClogged_PCU1_Filter3	AI	147	Monitor	No-Units
PercentClogged_PCU1_Filter4	AI	148	Monitor	No-Units
PercentClogged_PCU1_Filter5	AI	149	Monitor	No-Units
InternalFault_PCU1	BI	150	Monitor	No-Units
CloggedFilter_PCU1	BI	151	Monitor	No-Units
MissingFilter_PCU1	BI	152	Monitor	No-Units
72HourCloggedFilter_PCU1	BI	153	Monitor	No-Units
CloggedPCU_PCU1	BI	154	Monitor	No-Units
DoorMissing_PCU1	BI	155	Monitor	No-Units
NeedCalibration_PCU1	BI	156	Monitor	No-Units
24HourCloggedFilter_PCU1	BI	157	Monitor	No-Units
PercentClogged_PCU2_Filter1	AI	158	Monitor	No-Units
PercentClogged_PCU2_Filter2	AI	159	Monitor	No-Units
PercentClogged_PCU2_Filter3	AI	160	Monitor	No-Units
PercentClogged_PCU2_Filter4	AI	161	Monitor	No-Units
PercentClogged_PCU2_Filter5	AI	162	Monitor	No-Units
InternalFault_PCU2	BI	163	Monitor	No-Units
CloggedFilter_PCU2	BI	164	Monitor	No-Units
MissingFilter_PCU2	BI	165	Monitor	No-Units

Object Name	BACNET Type	Object ID	Function	Units
72HourCloggedFilter_PCU2	BI	166	Monitor	No-Units
CloggedPCU_PCU2	BI	167	Monitor	No-Units
DoorMissing_PCU2	BI	168	Monitor	No-Units
NeedCalibration_PCU2	BI	169	Monitor	No-Units
24HourCloggedFilter_PCU2	BI	170	Monitor	No-Units
PercentClogged_PCU3_Filter1	AI	171	Monitor	No-Units
PercentClogged_PCU3_Filter2	AI	172	Monitor	No-Units
PercentClogged_PCU3_Filter3	AI	173	Monitor	No-Units
PercentClogged_PCU3_Filter4	AI	174	Monitor	No-Units
PercentClogged_PCU3_Filter5	AI	175	Monitor	No-Units
InternalFault_PCU3	BI	176	Monitor	No-Units
CloggedFilter_PCU3	BI	177	Monitor	No-Units
MissingFilter_PCU3	BI	178	Monitor	No-Units
72HourCloggedFilter_PCU3	BI	179	Monitor	No-Units
CloggedPCU_PCU3	BI	180	Monitor	No-Units
DoorMissing_PCU3	BI	181	Monitor	No-Units
NeedCalibration_PCU3	BI	182	Monitor	No-Units
24HourCloggedFilter_PCU3	BI	183	Monitor	No-Units
DCVFireZone1	BI	184	Monitor	No-Units
DCVAuxFaultZone1	BI	185	Monitor	No-Units
DCVFuseFaultZone1	BI	186	Monitor	No-Units
DCVKTSZone1	BI	187	Monitor	No-Units
DCVProvingFaultZone1	BI	188	Monitor	No-Units
DCVMUAInterlockErr1Zone1	BI	189	Monitor	No-Units
DCVMUAInterlockErr2Zone1	BI	190	Monitor	No-Units
DCVBrokenTempSensorZone1	BI	191	Monitor	No-Units
DCVMissingTempSensorZone1	BI	192	Monitor	No-Units
DCVOverloadZone1	BI	193	Monitor	No-Units
DCVPCUFaultZone1	BI	194	Monitor	No-Units
DCVLightsEnergizedFaultZone1	BI	195	Monitor	No-Units
DCVLightsDeenergizedFaultZone1	BI	196	Monitor	No-Units
DCVSurfactantLowZone1	BI	197	Monitor	No-Units
DCVCheckAppliancePilotsZone1	BI	198	Monitor	No-Units
DCVFireZone2	BI	199	Monitor	No-Units
DCVAuxFaultZone2	BI	200	Monitor	No-Units
DCVFuseFaultZone2	BI	201	Monitor	No-Units
DCVKTSZone2	BI	202	Monitor	No-Units
DCVProvingFaultZone2	BI	203	Monitor	No-Units
DCVMUAInterlockErr1Zone2	BI	204	Monitor	No-Units
DCVMUAInterlockErr2Zone2	BI	205	Monitor	No-Units
DCVBrokenTempSensorZone2	BI	206	Monitor	No-Units

Object Name	BACNET Type	Object ID	Function	Units
DCVMissingTempSensorZone2	BI	207	Monitor	No-Units
DCVOverloadZone2	BI	208	Monitor	No-Units
DCVPCUFaultZone2	BI	209	Monitor	No-Units
DCVLightsEnergizedFaultZone2	BI	210	Monitor	No-Units
DCVLightsDeenergizedFaultZone2	BI	211	Monitor	No-Units
DCVSurfactantLowZone2	BI	212	Monitor	No-Units
DCVCheckAppliancePilotsZone2	BI	213	Monitor	No-Units
ModbusFaultCode	AI	214	Monitor	No-Units
PrepTimeButtonZone1	BV (Binary Value)	215	Monitor/Control	No-Units
FansONButtonZone1	BV	216	Monitor/Control	No-Units
WashButtonZone1	BV	217	Monitor/Control	No-Units
LightsButtonZone1	BV	218	Monitor/Control	No-Units
PrepTimeButtonZone2	BV	219	Monitor/Control	No-Units
FansONButtonZone2	BV	220	Monitor/Control	No-Units
WashButtonZone2	BV	221	Monitor/Control	No-Units
LightsButtonZone2	BV	222	Monitor/Control	No-Units

LonWorks Module (Optional)

LonWorks compatibility 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. Field connections to the Building Management System is shown in **Figure 30**.

Figure 29 - LonWorks Adapter

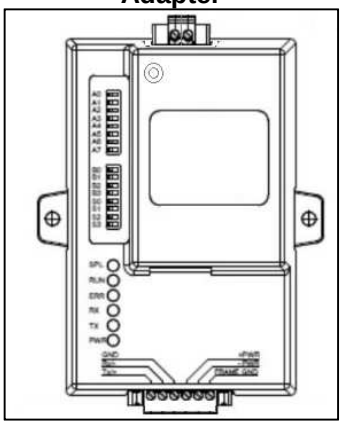
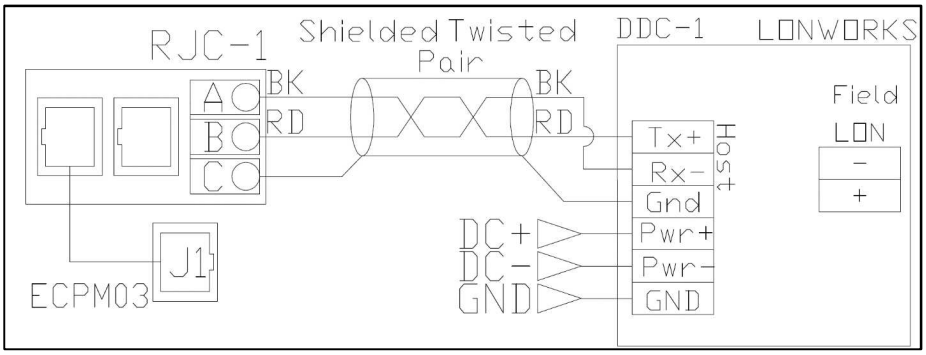


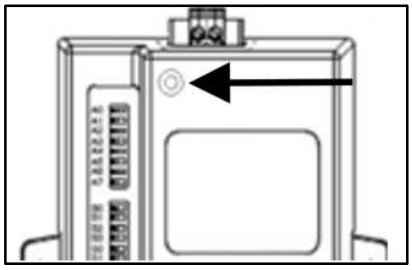
Figure 30 - LonWorks Wiring Reference



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. The location of the "Service Pin" is shown in **Figure 31**.

Figure 31 - The Service Pin Location



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

LonWorks Points

SVNT Name	Lon Function	SNVT Type	Index
nvoTempSensor1	NVUOIMT	SNVT_temp_f	0
nvoTempSensor2	NVUOIMT	SNVT_temp_f	1
nvoTempSensor3	NVUOIMT	SNVT_temp_f	2
nvoTempSensor4	NVUOIMT	SNVT_temp_f	3
nvoTempSensor5	NVUOIMT	SNVT_temp_f	4
nvoTempSensor6	NVUOIMT	SNVT_temp_f	5
nvoTempSensor7	NVUOIMT	SNVT_temp_f	6
nvoTempSensor8	NVUOIMT	SNVT_temp_f	7
nvoTempSensor9	NVUOIMT	SNVT_temp_f	8
nvoTempSensor10	NVUOIMT	SNVT_temp_f	9
nvoTempSensor11	NVUOIMT	SNVT_temp_f	10
nvoTempSensor12	NVUOIMT	SNVT_temp_f	11
nvoTempSensor13	NVUOIMT	SNVT_temp_f	12
nvoTempSensor14	NVUOIMT	SNVT_temp_f	13
nvoTempSensor15	NVUOIMT	SNVT_temp_f	14
nvoTempSensor16	NVUOIMT	SNVT_temp_f	15
nvoTempSensor17	NVUOIMT	SNVT_temp_f	16
nvoTempSensor18	NVUOIMT	SNVT_temp_f	17
nvoTempSensor19	NVUOIMT	SNVT_temp_f	18
nvoTempSensor20	NVUOIMT	SNVT_temp_f	19
nvoTempSensor21	NVUOIMT	SNVT_temp_f	20
nvoTempSensor22	NVUOIMT	SNVT_temp_f	21
nvoTempSensor23	NVUOIMT	SNVT_temp_f	22
nvoTempSensor24	NVUOIMT	SNVT_temp_f	23
nvoTempSensor25	NVUOIMT	SNVT_temp_f	24
nvoTempSensor26	NVUOIMT	SNVT_temp_f	25
nvoTempSensor27	NVUOIMT	SNVT_temp_f	26
nvoTempSensor28	NVUOIMT	SNVT_temp_f	27
nvoTempSensor29	NVUOIMT	SNVT_temp_f	28
nvoTempSensor30	NVUOIMT	SNVT_temp_f	29
nvoTempSensor31	NVUOIMT	SNVT_temp_f	30
nvoTempSensor32	NVUOIMT	SNVT_temp_f	31
nvoTempZone1	NVUOIMT	SNVT_temp_f	32
nvoTempZone2	NVUOIMT	SNVT_temp_f	33
nvoTempHMI1	NVUOIMT	SNVT_temp_f	34
nvoTempHMI2	NVUOIMT	SNVT_temp_f	35
nvoTempHMI3	NVUOIMT	SNVT_temp_f	36
nvoTempHMI4	NVUOIMT	SNVT_temp_f	37
nvoECMOutput1	NVUOIMT	SNVT_count	38
nvoECMOutput2	NVUOIMT	SNVT_count	39

SVNT	Lon Function	SNVT Type	Index
nvoECMOutput3	NVUOIMT	SNVT_count	40
nvoECMOutput4	NVUOIMT	SNVT_count	41
nvoVDCOutput	NVUOIMT	SNVT_count_f	42
nvoFreq_Exh1	NVUOIMT	SNVT_freq_f	43
nvoFreq_Exh2	NVUOIMT	SNVT_freq_f	44
nvoFreq_Exh3	NVUOIMT	SNVT_freq_f	45
nvoFreq_Exh4	NVUOIMT	SNVT_freq_f	46
nvoFreq_Exh5	NVUOIMT	SNVT_freq_f	47
nvoFreq_Exh6	NVUOIMT	SNVT_freq_f	48
nvoFreq_Exh7	NVUOIMT	SNVT_freq_f	49
nvoFreq_Exh8	NVUOIMT	SNVT_freq_f	50
nvoFreq_Sup1	NVUOIMT	SNVT_freq_f	51
nvoFreq_Sup2	NVUOIMT	SNVT_freq_f	52
nvoAmps_Exh1	NVUOIMT	SNVT_amp_f	53
nvoAmps_Exh2	NVUOIMT	SNVT_amp_f	54
nvoAmps_Exh3	NVUOIMT	SNVT_amp_f	55
nvoAmps_Exh4	NVUOIMT	SNVT_amp_f	56
nvoAmps_Exh5	NVUOIMT	SNVT_amp_f	57
nvoAmps_Exh6	NVUOIMT	SNVT_amp_f	58
nvoAmps_Exh7	NVUOIMT	SNVT_amp_f	59
nvoAmps_Exh8	NVUOIMT	SNVT_amp_f	60
nvoAmps_Sup1	NVUOIMT	SNVT_amp_f	61
nvoAmps_Sup2	NVUOIMT	SNVT_amp_f	62
nvoKWs_Exh1	NVUOIMT	SNVT_count_f	63
nvoKWs_Exh2	NVUOIMT	SNVT_count_f	64
nvoKWs_Exh3	NVUOIMT	SNVT_count_f	65
nvoKWs_Exh4	NVUOIMT	SNVT_count_f	66
nvoKWs_Exh5	NVUOIMT	SNVT_count_f	67
nvoKWs_Exh6	NVUOIMT	SNVT_count_f	68
nvoKWs_Exh7	NVUOIMT	SNVT_count_f	69
nvoKWs_Exh8	NVUOIMT	SNVT_count_f	70
nvoKWs_Sup1	NVUOIMT	SNVT_count_f	71
nvoKWs_Sup2	NVUOIMT	SNVT_count_f	72
nvoVFDFaultExh1	NVUOIMT	SNVT_count	73
nvoVFDFaultExh2	NVUOIMT	SNVT_count	74
nvoVFDFaultExh3	NVUOIMT	SNVT_count	75
nvoVFDFaultExh4	NVUOIMT	SNVT_count	76
nvoVFDFaultExh5	NVUOIMT	SNVT_count	77
nvoVFDFaultExh6	NVUOIMT	SNVT_count	78
nvoVFDFaultExh7	NVUOIMT	SNVT_count	79
nvoVFDFaultExh8	NVUOIMT	SNVT_count	80

SVNT	Lon Function	SNVT Type	Index
nvoVFDFaultSup1	NVUOIMT	SNVT_count	81
nvoVFDFaultSup2	NVUOIMT	SNVT_count	82
nvoZ1ONbyProving	NVUOIMT	SNVT_count	83
nvoZ1ONbyBypass	NVUOIMT	SNVT_count	84
nvoZ1ONbyIO1High	NVUOIMT	SNVT_count	85
nvoZ1ONbyMaxAir	NVUOIMT	SNVT_count	86
nvoZ1ONbyTemp	NVUOIMT	SNVT_count	87
nvoZ1ONbyOcc	NVUOIMT	SNVT_count	88
nvoZ1ONbyBMS	NVUOIMT	SNVT_count	89
nvoZ1ONbyIO1	NVUOIMT	SNVT_count	90
nvoZ1ONbyButton	NVUOIMT	SNVT_count	91
nvoZ1ONbyWash	NVUOIMT	SNVT_count	92
nvoZ1ONbyExt	NVUOIMT	SNVT_count	93
nvoZ1ONbyBMSPrep	NVUOIMT	SNVT_count	94
nvoZ1ONbyBuPrep	NVUOIMT	SNVT_count	95
nvoZ1ONbyTePrep	NVUOIMT	SNVT_count	96
nvoZ2ONbyProving	NVUOIMT	SNVT_count	97
nvoZ2ONbyBypass	NVUOIMT	SNVT_count	98
nvoZ2ONbyIO1High	NVUOIMT	SNVT_count	99
nvoZ2ONbyMaxAir	NVUOIMT	SNVT_count	100
nvoZ2ONbyTemp	NVUOIMT	SNVT_count	101
nvoZ2ONbyOcc	NVUOIMT	SNVT_count	102
nvoZ2ONbyBMS	NVUOIMT	SNVT_count	103
nvoZ2ONbyIO1	NVUOIMT	SNVT_count	104
nvoZ2ONbyButton	NVUOIMT	SNVT_count	105
nvoZ2ONbyWash	NVUOIMT	SNVT_count	106
nvoZ2ONbyExt	NVUOIMT	SNVT_count	107
nvoZ2ONbyBMSPrep	NVUOIMT	SNVT_count	108
nvoZ2ONbyBuPrep	NVUOIMT	SNVT_count	109
nvoZ2ONbyTePrep	NVUOIMT	SNVT_count	110
nvoZ1L_ONbyWash	NVUOIMT	SNVT_count	111
nvoZ1L_ONbyBypas	NVUOIMT	SNVT_count	112
nvoZ1L_ONbyBMS	NVUOIMT	SNVT_count	113
nvoZ1L_ONButton	NVUOIMT	SNVT_count	114
nvoZ1L_ONbyOcc	NVUOIMT	SNVT_count	115
nvoZ1L_ONbyIO1	NVUOIMT	SNVT_count	116
nvoZ1L_ONbyExt	NVUOIMT	SNVT_count	117
nvoZ1L_ONbyFansB	NVUOIMT	SNVT_count	118
nvoZ1L_ONbyAuto	NVUOIMT	SNVT_count	119
nvoZ2L_ONbyWash	NVUOIMT	SNVT_count	120
nvoZ2L_ONbyBypas	NVUOIMT	SNVT_count	121

SVNT	Lon Function	SNVT Type	Index
nvoZ2L_ONbyBMS	NVUOIMT	SNVT_count	122
nvoZ2L_ONButton	NVUOIMT	SNVT_count	123
nvoZ2L_ONbyOcc	NVUOIMT	SNVT_count	124
nvoZ2L_ONbyIO1	NVUOIMT	SNVT_count	125
nvoZ2L_ONbyExt	NVUOIMT	SNVT_count	126
nvoZ2L_ONbyFansB	NVUOIMT	SNVT_count	127
nvoZ2L_ONbyAuto	NVUOIMT	SNVT_count	128
nvoErrCORE1	NVUOIMT	SNVT_count	129
nvoErrCORE2	NVUOIMT	SNVT_count	130
nvoErrCORE3	NVUOIMT	SNVT_count	131
nvoErrCORE4	NVUOIMT	SNVT_count	132
nvoErrCORE5	NVUOIMT	SNVT_count	133
nvoErrCORE6	NVUOIMT	SNVT_count	134
nvoErrCORE7	NVUOIMT	SNVT_count	135
nvoErrCORE8	NVUOIMT	SNVT_count	136
nvoErrCORE9	NVUOIMT	SNVT_count	137
nvoErrCORE10	NVUOIMT	SNVT_count	138
nvoErrCORE11	NVUOIMT	SNVT_count	139
nvoErrCORE12	NVUOIMT	SNVT_count	140
nvoErrCORE13	NVUOIMT	SNVT_count	141
nvoErrCORE14	NVUOIMT	SNVT_count	142
nvoErrCORE15	NVUOIMT	SNVT_count	143
nvoPcntClgF1PCU1	NVUOIMT	SNVT_count	144
nvoPcntClgF2PCU1	NVUOIMT	SNVT_count	145
nvoPcntClgF3PCU1	NVUOIMT	SNVT_count	146
nvoPcntClgF4PCU1	NVUOIMT	SNVT_count	147
nvoPcntClgF5PCU1	NVUOIMT	SNVT_count	148
nvoCLogFiltPCU1	NVUOIMT	SNVT_count	149
nvoMissFiltPCU1	NVUOIMT	SNVT_count	150
nvo72hrClogPCU1	NVUOIMT	SNVT_count	151
nvoClogPCU1	NVUOIMT	SNVT_count	152
nvoMissDoorPCU1	NVUOIMT	SNVT_count	153
nvoNeedCalibPCU1	NVUOIMT	SNVT_count	154
nvo24HrClogPCU1	NVUOIMT	SNVT_count	155
nvoPcntClgF1PCU2	NVUOIMT	SNVT_count	156
nvoPcntClgF2PCU2	NVUOIMT	SNVT_count	157
nvoPcntClgF3PCU2	NVUOIMT	SNVT_count	158
nvoPcntClgF4PCU2	NVUOIMT	SNVT_count	159
nvoPcntClgF5PCU2	NVUOIMT	SNVT_count	160
nvoCLogFiltPCU2	NVUOIMT	SNVT_count	161
nvoMissFiltPCU2	NVUOIMT	SNVT_count	162

SVNT	Lon Function	SNVT Type	Index
nvo72hrClogPCU2	NVUOIMT	SNVT_count	163
nvoClogPCU2	NVUOIMT	SNVT_count	164
nvoMissDoorPCU2	NVUOIMT	SNVT_count	165
nvoNeedCalibPCU2	NVUOIMT	SNVT_count	166
nvoPcntClgF1PCU3	NVUOIMT	SNVT_count	167
nvoPcntClgF2PCU3	NVUOIMT	SNVT_count	168
nvoPcntClgF3PCU3	NVUOIMT	SNVT_count	169
nvoPcntClgF4PCU3	NVUOIMT	SNVT_count	170
nvoPcntClgF5PCU3	NVUOIMT	SNVT_count	171
nvoCLogFiltPCU3	NVUOIMT	SNVT_count	172
nvoMissFiltPCU3	NVUOIMT	SNVT_count	173
nvo72hrClogPCU3	NVUOIMT	SNVT_count	174
nvoClogPCU3	NVUOIMT	SNVT_count	175
nvoMissDoorPCU3	NVUOIMT	SNVT_count	176
nvoNeedCalibPCU3	NVUOIMT	SNVT_count	177
nvo24HrClogPCU3	NVUOIMT	SNVT_count	178
nvoDCVFireZ1	NVUOIMT	SNVT_count	179
nvoDCVAuxFaultZ1	NVUOIMT	SNVT_count	180
nvoDCVFuseZ1	NVUOIMT	SNVT_count	181
nvoDCVKTSZ1	NVUOIMT	SNVT_count	182
nvoDCVPrvngFltZ1	NVUOIMT	SNVT_count	183
nvoDCVIntlk1ErZ1	NVUOIMT	SNVT_count	184
nvoDCVIntlk2ErZ1	NVUOIMT	SNVT_count	185
nvoDCVBrokSensZ1	NVUOIMT	SNVT_count	186
nvoDCVMisSensZ1	NVUOIMT	SNVT_count	187
nvoDCVOvloadZ1	NVUOIMT	SNVT_count	188
nvoDCVPCUFaultZ1	NVUOIMT	SNVT_count	189
nvoDCVLigEnFltZ1	NVUOIMT	SNVT_count	190
nvoDCVLigDnFltZ1	NVUOIMT	SNVT_count	191
nvoDCVSurfLowZ1	NVUOIMT	SNVT_count	192
nvoDCVChkPltsZ1	NVUOIMT	SNVT_count	193
nvoDCVFireZ2	NVUOIMT	SNVT_count	194
nvoDCVAuxFaultZ2	NVUOIMT	SNVT_count	195
nvoDCVFuseZ2	NVUOIMT	SNVT_count	196
nvoDCVKTSZ2	NVUOIMT	SNVT_count	197
nvoDCVPrvngFltZ2	NVUOIMT	SNVT_count	198
nvoDCVIntlk1ErZ2	NVUOIMT	SNVT_count	199
nvoDCVIntlk2ErZ2	NVUOIMT	SNVT_count	200
nvoDCVBrokSensZ2	NVUOIMT	SNVT_count	201
nvoDCVMisSensZ2	NVUOIMT	SNVT_count	202
nvoDCVOvloadZ2	NVUOIMT	SNVT_count	203

SVNT	Lon Function	SNVT Type	Index
nvoDCVPCUFaultZ2	NVUOIMT	SNVT_count	204
nvoDCVLigEnFltZ2	NVUOIMT	SNVT_count	205
nvoDCVLigDnFltZ2	NVUOIMT	SNVT_count	206
nvoDCVSurfLowZ2	NVUOIMT	SNVT_count	207
nvoDCVChkPltsZ2	NVUOIMT	SNVT_count	208
nvoModbusFltCode	NVUOIMT	SNVT_count	209
nvoPrepButtonZ1	NVUOIMT	SNVT_count	210
nvoFansButtonZ1	NVUOIMT	SNVT_count	211
nvoWashButtonZ1	NVUOIMT	SNVT_count	212
nvoLightButtonZ1	NVUOIMT	SNVT_count	213
nvoPrepButtonZ2	NVUOIMT	SNVT_count	214
nvoFansButtonZ2	NVUOIMT	SNVT_count	215
nvoWashButtonZ2	NVUOIMT	SNVT_count	216
nvoLightButtonZ2	NVUOIMT	SNVT_count	217
nviPrepButtonZ1	NVUI	SNVT_count	218
nviFansButtonZ1	NVUI	SNVT_count	219
nviWashButtonZ1	NVUI	SNVT_count	220
nviLightButtonZ1	NVUI	SNVT_count	221
nviPrepButtonZ2	NVUI	SNVT_count	222
nviFansButtonZ2	NVUI	SNVT_count	223
nviWashButtonZ2	NVUI	SNVT_count	224
nviLightButtonZ2	NVUI	SNVT_count	225

DIAGNOSTICS

If there is an issue with the system or certain parameters, use the HMI diagnostic menu to help determine why or why not certain functions are working when they should not be or why certain functions will not work. Timers and system settings will override certain functions depending on the settings.

- Hysteresis Timer
- Manual to Auto Time
- Max Air Time
- IO Delay
- Autowash Min Fan Runtime
- Autowash Min Interval Time
- Light Timer After Wash
- Time Since Last Wash

Refer to VFD manufacturer manual for further details

Table 5 - VFD Fault List

0	No Fault	12	Phase Lost
1	IGBT Temperature Fault	13	External Fault
2	Output Fault	14	Control Fault
3	Ground Fault	15	Start Fault
4	Temperature Fault	16	Incompatible Parameter Set
5	Flying Start Fault	17	EPM Hardware Fault
6	High DC BUS	18 - 27	Internal Fault
7	Low DC BUS	28	Remote Keypad Lost
8	Overload Fault	29	Assertion Level Fault
9	OEM Fault	30 - 33	Internal Fault
10	Illegal Setup Fault	34	Comm. Module Failure
11	Dynamic Brake Fault	35 - 44	Network Fault

Troubleshooting

The following table lists causes and corrective actions for possible problems with this control. Review this list prior to consulting manufacturer.

Problem	Potential Cause	Corrective Action
Smoke rollout of hood – Fans don't start-up when appliances are ON	Dirty temperature sensor	Clean grease and dirt from sensor.
	Poor Heat detection	Decrease duct temperature offset values.
	Improper hood installation	Check for proper hood overhang, cross drafts or improper hood design.
Fans Spin Wrong Direction	3 phase Motor output wired backwards	Swap 2 of the 3 phase wires on the output of the starter feeding the motor.
No "FANS OFF" button in modulation	HMI sensor, and hysteresis timer are not satisfied.	Refer to OPERATION for proper procedure.
VFDs start On, then shut Off	Modbus fault	Check Modbus connections, and VFDs.
Gas valve reset does not show.	Settings not configured properly in HMI.	See Electric Gas Valve Reset
Current Sensor	No reading	• Confirm that you have +12 to 30VDC in series with the current sensor output terminals and the analog input of the control panel. • Check the polarity of the circuit. • Verify that the terminals are screwed down, wires are firmly in place. • Disconnect the input to the control panel and then insert a current meter (mA range) in series with the current sensor output to verify that the circuit is working properly.
	Erratic readings	• Verify that the wires are terminated properly. • Check that the +12 to 30VDC input is clean. In areas of high RF interference, shielded cable may be necessary to stabilize signal.

The following table lists fault messages displayed on the HMI and corrective actions. Review this list prior to consulting manufacturer.

Fault Message on HMI	Potential Cause	Corrective Action
“Fire”	FIRE or fire circuit not wired properly.	If no fire, verify connection between terminal blocks C1 and AR1.
“Light Fault Zone 1 Bx De-energized”	Light output is energized but no power is detected on terminal B1.	Verify that the light relay is not damaged and that the light circuit breaker is not tripped.
“Light Fault Zone x B1 energized”	Light output is de-energized but power is detected on terminal B1.	Verify that the light relay contact is not welded in the close position.
“Overload Trip Zone 1”	One of the overload relays for fans associated with zone 1 is tripped.	Reset overload relay. Monitor fan to see why overload tripped.
“Surfactant Low”	Surfactant level is low.	Refill surfactant into the tank. Refer to Self-Cleaning or CORE manual.
“PCU Fault”	PCU filters are clogged or missing.	Verify PCU filters and replace if needed.
“Proving Fault”	Proving enabled. Exhaust fan not meeting its minimum calibrated load.	-Verify fans are running properly. -Verify proving calibration. Refer to Proving Calibration section.
“Fuse F1 Blown”	Fuse F1 is blown or missing.	Replace fuse and verify there is no short-circuit and load is below 4 amps.
“Temp Sensor x Not Connected”	Temperature sensor x is not wired to the ECPM03 board.	-Verify proper wiring to terminals TxA and TxB on the board and wiring to the sensor. -Check for broken wiring or sensor.
“Modbus Communication Fault”	One or several components on the Modbus network are not responding.	-Verify HMIs are plugged in. -Verify CORE or PCU AFM is plugged in. -Verify the configurations are set correct. -Verify the Cat-5 connections. Check for damaged wiring or ends.
“CORE x Fault” Fault description	Specific fault is present on the CORE fire system.	-Verify the CORE DIP switch settings are correct. -Refer to the CORE manual for specific fault description.
“PCU x Fault” Fault description	Specific fault is present on the PCU AFM x connected to the system.	Refer to the PCU AFM manual for specific fault description.
"Sup 1 Interlock" "Check MUA-1 Controls "	Interlock signal was not received back from the MUA.	-Verify MUA is not faulted and damper is fully open. -Verify Interlock is properly wired.
"Exh" or “Sup” "VFD Fault"	VFD fault on exhaust or supply.	Refer to the VFD manual for details.
“Temp Sensor x Bad Sensor”	Bad temp sensor due to overheating or internal failure.	Replace the temperature sensor.
“Communications fault Check Configuration”	ECPM03 board and HMI not communicating due to: • Software incompatible • Switchplate # doesn’t match number of zones	-Re-flash the HMI -Change switchplate # -Replace Cat-5 cable -Replace EOL

MAINTENANCE

To guarantee 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

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 10 Years. Use CR2032 or equivalent.

Every Month

1. Temperature sensor(s) in exhaust hood riser(s) need to be cleaned by wiping any grease or dust build-up from probe with a clean cloth. A clean sensor ensures that the temperature switch will quickly respond to changes in exhaust air temperature.
2. Check all fasteners, sensors, and electrical connections for proper tightness and continuity.

Enclosure Fan Filter Inspection (Wall Mounted Enclosures Only).

- Remove outer black plastic housing of the enclosure fan to gain access to the fan filter. The cover is held in place by frictional clips, simply pry on it to remove.
- Inspect the fan filter for grease/debris. If the filter is dirty, clean or replace.

  Replacement fan filter part number: MC32658 (pack of 5)

  WARNING: If fan filter cleaning is not performed, grease/debris buildup may occur resulting in VFD failure due to overheating. VFD warranty may be denied if filter inspection is not performed on a monthly basis and logged on the maintenance record.

Self-Cleaning

Please refer to the Self-Cleaning, Electric Wet Chemical or CORE Manual for Installation, Operation, and Maintenance of the self-cleaning system.

Start-Up and Maintenance Documentation

START-UP AND MEASUREMENTS SHOULD BE PERFORMED AFTER THE SYSTEM HAS BEEN AIR BALANCED (Warranty will be void without completion of this form)

Job Information

Job Name	
Address	
City	
State	
Zip	
Phone Number	
Fax Number	
Contact	
Purchase Date	

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

Maintenance Record

Date	Service Performed

Factory Service Department
Phone: 1-866-784-6900
Fax: 1-919-554-9374