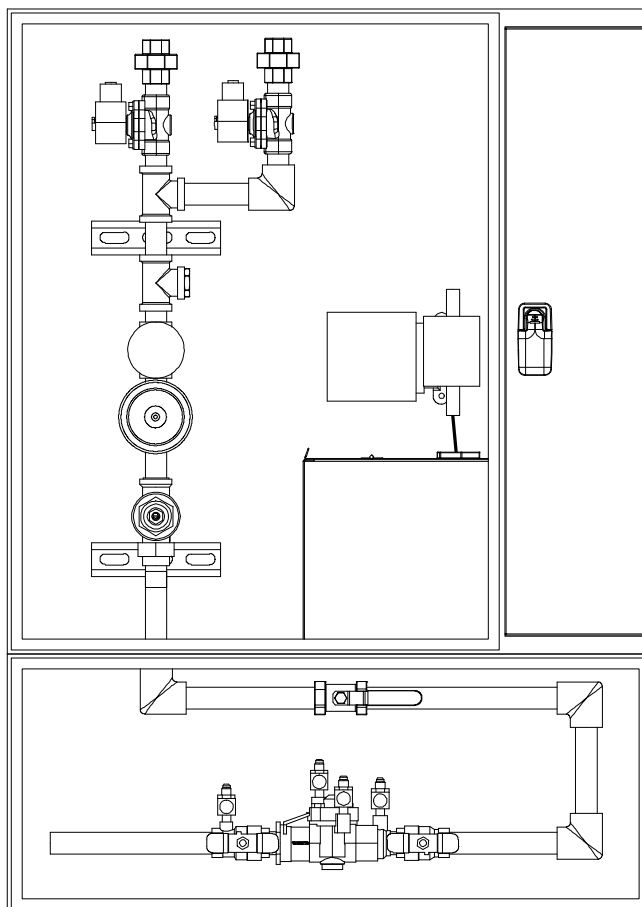


Self Cleaning System Control Panel Installation, Operation, and Maintenance Manual



RECEIVING AND INSPECTION

Check for any signs of damage upon receipt, and if found, report it immediately to the carrier. Check that all items are accounted for and damage free.

WARNING!!

Installation of this package 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, contact with rotating equipment, and other potential hazards. Read this manual thoroughly before installing or servicing this equipment. **ALWAYS** disconnect power prior to working on electrical equipment.

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.

Table of Contents

WARRANTY	3	Troubleshooting	50
INSTALLATION	4	MAINTENANCE	51
Plumbing	4	First Week of Operation	51
Site Preparation	4	Weekly	51
Assembly	4	Every 3 Months	51
Components	4	Every 6 Months	51
Piping Size Selection	10	Priming Surfactant Pump	51
Field Pipe Pressure Drop Calculation	11	Start-Up and Maintenance Documentation	52
Self Cleaning Tees and Duct Sump(s) Coverage ..	13		
Electrical	14		
ECPM03 Board	16		
Connector Descriptions	16		
OPERATION	19		
Wash Operation	20		
Local Wash	20		
Hot Water Wash	20		
Cold Water Mist	20		
Remote Wash	21		
Surfactant Control with Liquid Level Monitoring	21		
Fan Operation	22		
Fans On By Temperature/Schedule	22		
Fans On By Button	23		
Fans On By IO	23		
Fans On By BMS	23		
Fans On By Defrost	23		
Fans During Fire	23		
Contact Overload Monitoring	23		
Temperature Selection and Configuration	24		
Fire Operation	25		
Lighting Operation	25		
External Features	25		
Gas Operation	25		
Shunt Trip Activation	25		
Kill Tamper Switch (KTS) Activation	25		
PCUAFM/PCU Switch Integration	26		
ESP Dry Mode	26		
ESP Self Cleaning	26		
Network	27		
BACnet	27		
Device Instance, MAC Address, Baud Rate	28		
Changing the IP Address	29		
BACnet IP and BACnet MS/TP Points	30		
LonWorks	33		
LonWorks Points	34		
ECPM03 Configuration	38		
General Overview	38		
Changing Time Zone ID	39		
HMI Configuration	40		
Menu Options	41		
Factory Settings	42		
Fire Settings	44		
Diagnostics Menu	44		
Options	45		
Factory Settings	46		
Fire Options	47		
Prime Surfactant	47		
Schedule	48		
Diagnostic	48		
Fault List	49		

WARRANTY

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

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

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

NOTE: To receive warranty coverage for this product, copy and print out the "Start-Up and Maintenance Documentation" on page 52. Fill in all details required. Fax the page to 1-919-516-8710 or call 1-866-784-6900 for information on emailing forms.

INSTALLATION

Refer to project blueprints for proper plumbing and electrical connections located on the inside of the panel door.

CAUTION: Do not apply power before plumbing and electrical installation is complete on the panel.

Plumbing

Site Preparation

1. Provide clearance around installation site to safely install equipment into its final position.
2. Consider general service and installation space when locating unit.

Assembly

1. Locate where the panel will mount on the wall or recessed in the wall, use optional trim ring if ordered. The panel must be mounted a minimum of 3'-6" (42") from the finished floor to the bottom of the cabinet.
2. Open the cabinet and verify proper pipe size for the hot and cold water connections. Route and connect the hot/cold water supply piping to the manifold connection located at the bottom of the cabinet. If hot and cold piping are run to the same nozzles insert a check valve.
3. Cold Water Mist packages with Hot Water Wash will need to use a field-supplied backflow preventer and check valve. Refer to **Figure 2** and **Figure 3** for details.
4. Continue the pipe to the hood, and then connect to the wash manifold connection on the hood.
5. Prime the surfactant pump, refer to "**Priming Surfactant Pump**" on page 51.
6. If other Self Cleaning Packages are present, repeat steps 1-5.

Components

Refer to **Figure 1** through **Figure 7** for configuration options.

Manifold – Control center for how water is distributed in the system. The manifold includes a combination pressure/temperature gauge, shock absorber, pressure reducing valve with strainer, solenoid valve, surfactant pump, surfactant tank, and service (ball) valve.

Backflow Preventer – Prevents backflow of surfactant/water mixture back into the water system. Backflow preventer is not used on Cold Water Mist only panels.

Drain(s) – Allows water to drain from the cleaning system. Must be connected to a floor drain/grease trap. Periodically check the drain, and clean out to prevent clogging issues.

- **Backflow Preventer** – Connected to the backflow preventer.
- **Self Draining** – Dedicated drain line, with in-line solenoid, used on self draining package. The solenoid is normally open, and will close during wash.

Wash Solenoid – When the wash solenoid is activated, the water supply will flow through the wash system.

Surfactant Tank and Pump – Surfactant is used to aid during wash cycles to ensure proper cleaning of the system. The surfactant tank can hold up to 2 gallons of surfactant. A hose connects from the tank to the bottom of the surfactant pump. A line runs from the top of the surfactant pump to the injection point, located in the manifold. The injected surfactant mixes with the water supply.

Pressure and Temperature Gauge – The system uses a combination pressure and temperature gauge. The user may monitor the hot water temperature (140 to 170 degrees F) and pressure (30 to 70 PSI) while the system is washing.

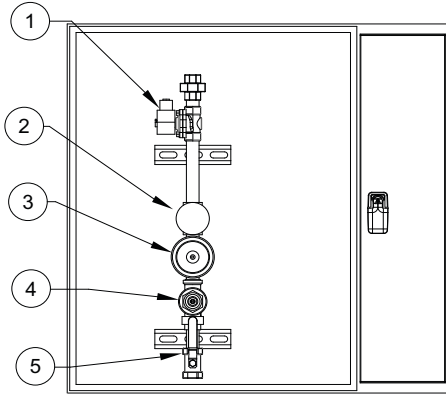
Enclosure – The enclosure contains all of the Self Cleaning System components. The components will vary by configuration options.

Field Piping – All piping external to the enclosure must be piped in the field.

Electrical Wiring – All electrical wiring external to the enclosure must be wired in the field.

Figure 1 - Cold Water Mist

1. Solenoid Valve
2. Combination Pressure and Temperature Gauge
3. Shock Absorber
4. Pressure Reducing Valve with Integral Strainer
5. Service Valve



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field

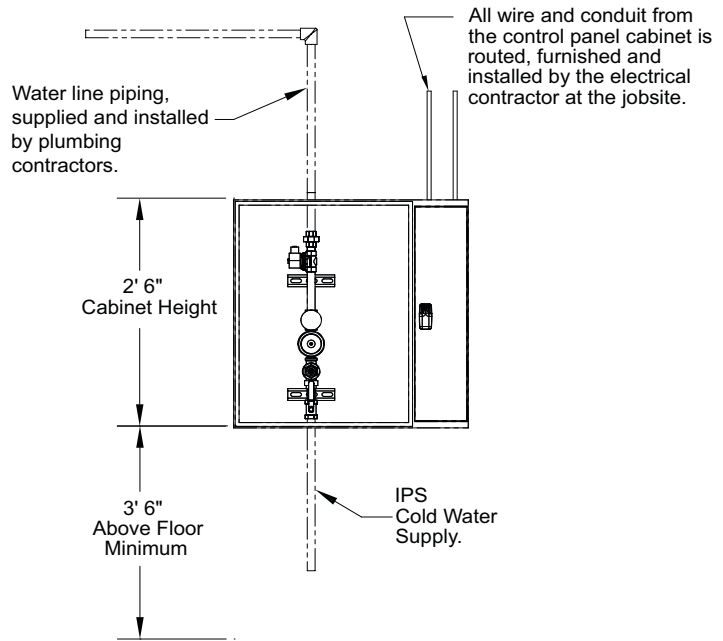
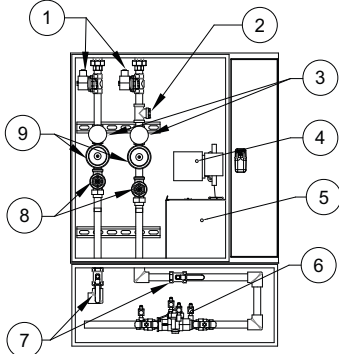


Figure 2 - Cold Water Mist, Hot Water Wash with Backflow Preventer

1. Solenoid Valves
2. Surfactant Injection Point
3. Combination Pressure and Temperature Gauge
4. Surfactant Pump
5. Surfactant Tank (2 Gallons)
6. Backflow Preventer
7. Service Valves
8. Pressure Reducing Valve with Integral Strainer
9. Shock Absorber



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field

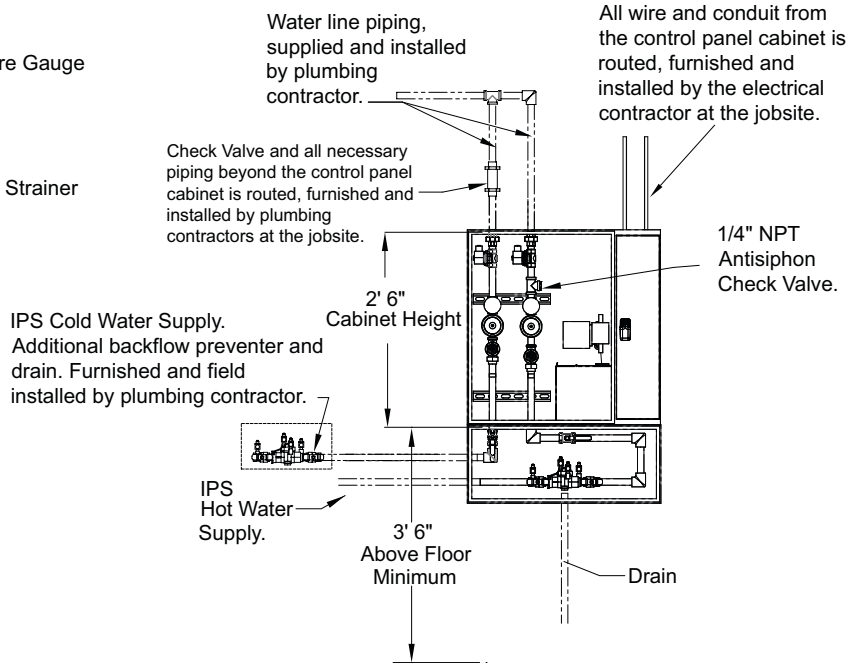
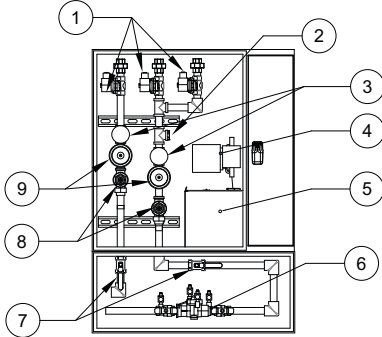


Figure 3 - One Cold Water Mist, Two Zone Hot Water Wash with Backflow Preventer

1. Solenoid Valves
2. Surfactant Injection Point
3. Combination Pressure and Temperature Gauge
4. Surfactant Pump
5. Surfactant Tank (2 Gallons)
6. Backflow Preventer
7. Service Valves
8. Pressure Reducing Valve with Integral Strainer
9. Shock Absorber



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field

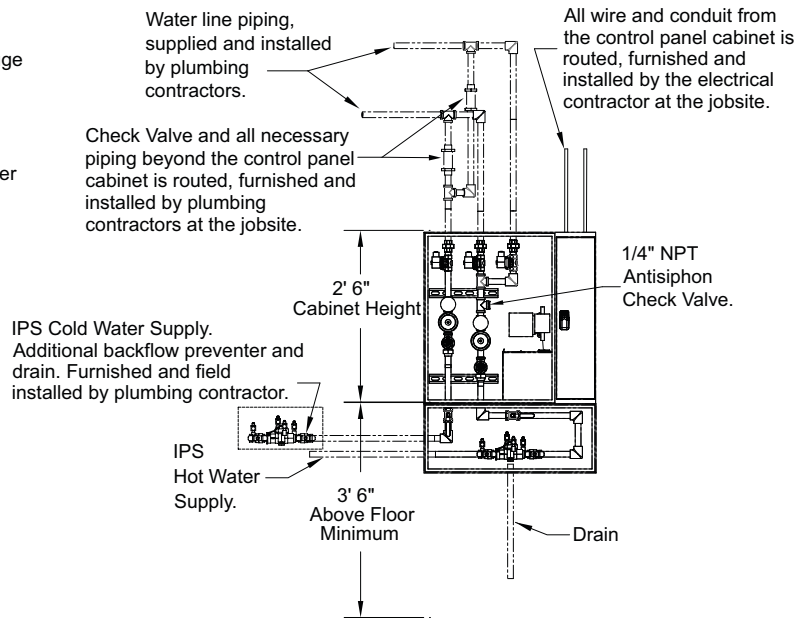
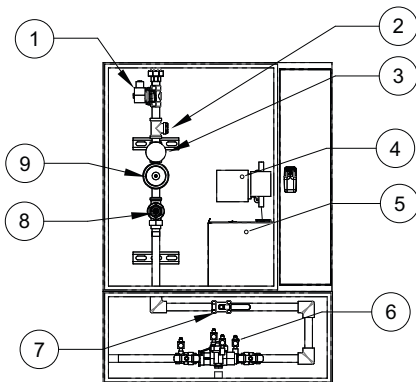


Figure 4 - Hot Water Wash with Backflow Preventer

1. Solenoid Valve
2. Surfactant Injection Point
3. Combination Pressure and Temperature Gauge
4. Surfactant Pump
5. Surfactant Tank (2 Gallons)
6. Backflow Preventer
7. Service Valve
8. Pressure Reducing Valve with Integral Strainer
9. Shock Absorber



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field

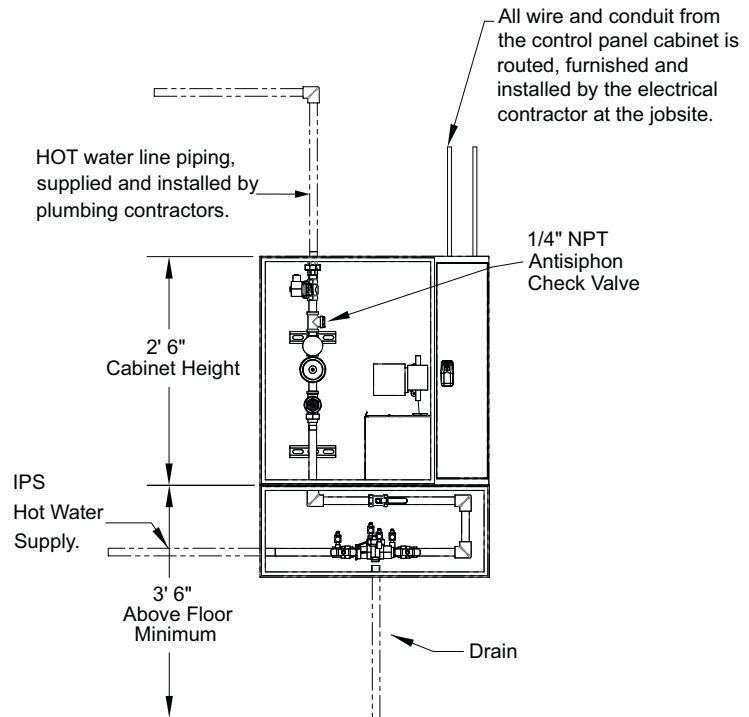
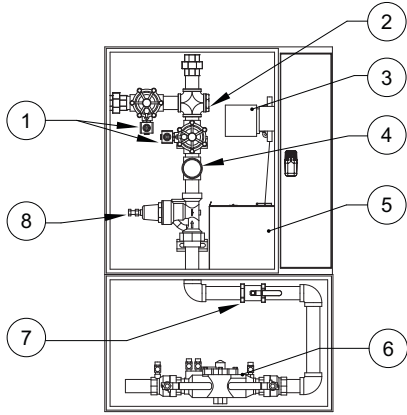


Figure 5 - Hot Water Wash with Backflow Preventer, Self-Draining

1. Solenoid Valve
2. Surfactant Injection Point
3. Surfactant Pump
4. Combination Pressure and Temperature Gauge
5. Surfactant Tank (2 Gallons)
6. Backflow Preventer
7. Service Valve
8. Pressure Reducing Valve with Integral Strainer



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field

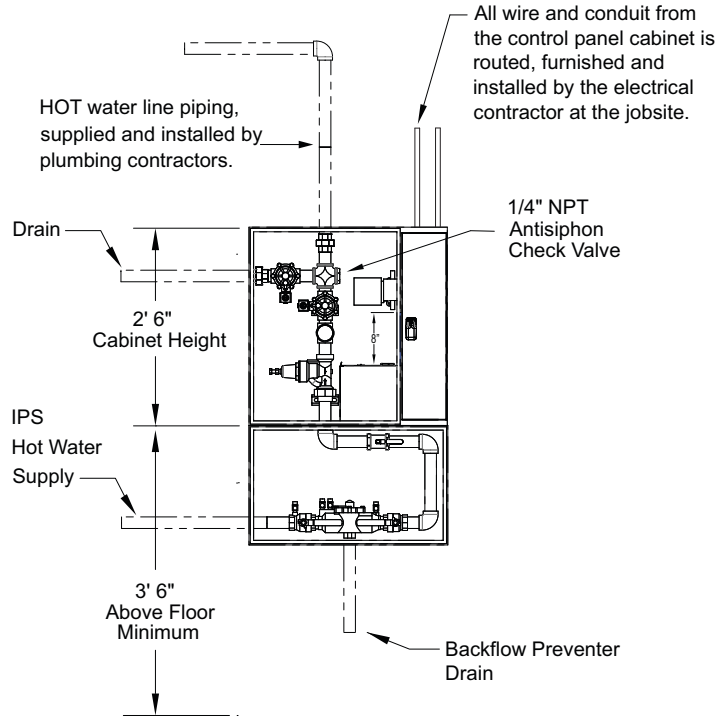
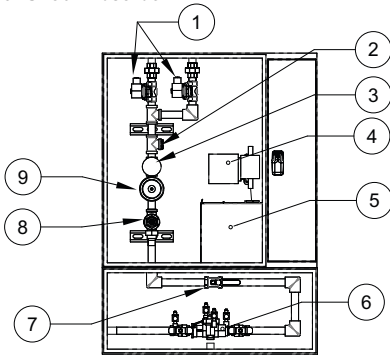


Figure 6 - Two Zone Hot Water Wash with Backflow Preventer

1. Solenoid Valve
2. Surfactant Injection Point
3. Combination Pressure and Temperature Gauge
4. Surfactant Pump
5. Surfactant Tank (2 Gallons)
6. Backflow Preventer
7. Service Valve
8. Pressure Reducing Valve with Integral Strainer
9. Shock Absorber



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field

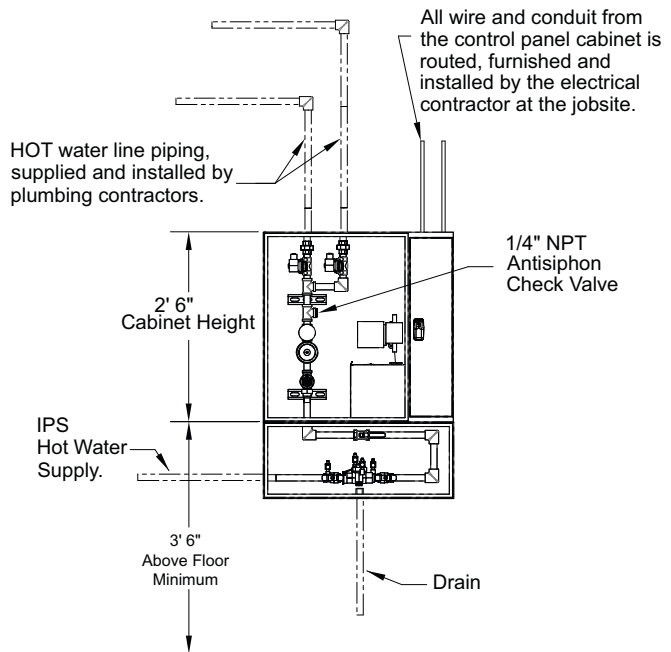
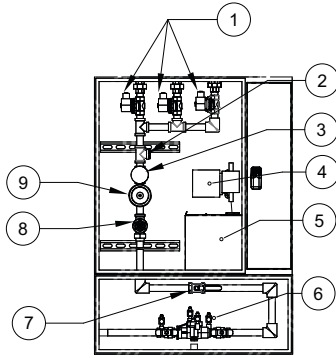
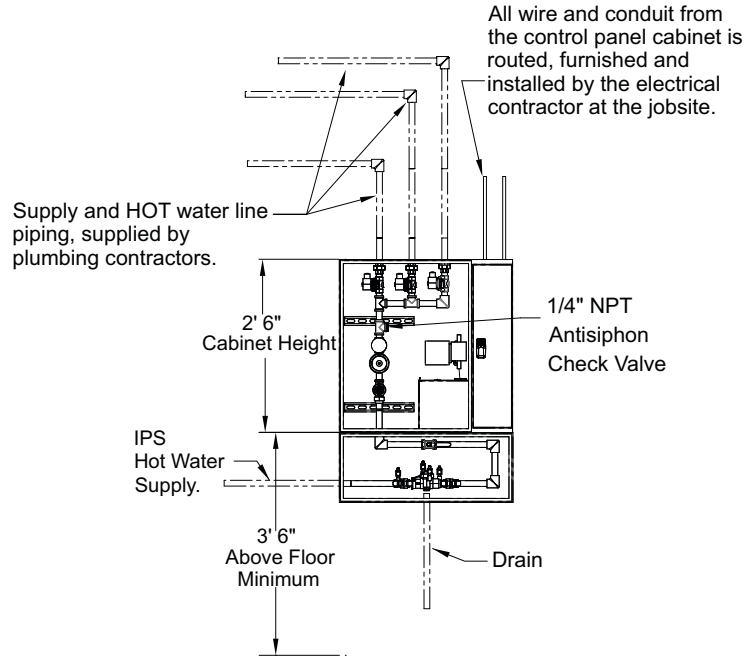


Figure 7 - Three Zone Hot Water Wash with Backflow Preventer

1. Solenoid Valves
2. Surfactant Injection Point
3. Combination Pressure and Temperature Gauge
4. Detergent Pump
5. Surfactant Reservoir (2 Gallons)
6. Backflow Preventer
7. Service Valve
8. Pressure Reducing Valve with Integral Strainer
9. Shock Absorber



Note: All Plumbing and Wiring External to the Enclosure Supplied by Others in the Field



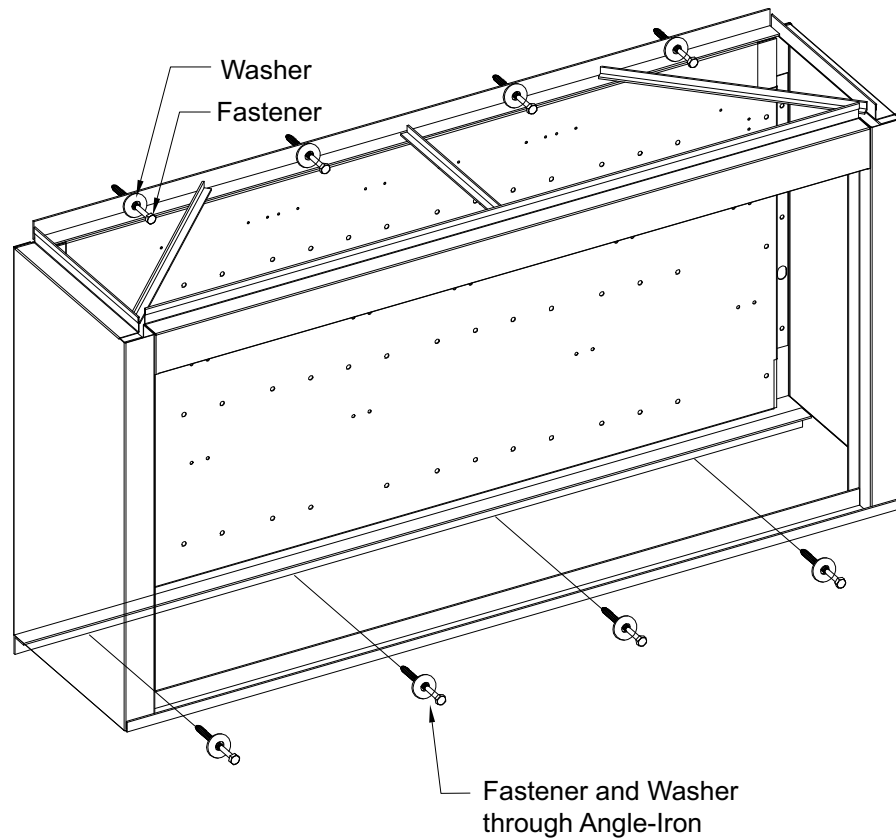
Wall-Mount Utility Cabinet Installation (Optional)

The utility cabinet must be secured to the wall using a minimum of eight fasteners and washers. Use four fasteners/washers on the top of the cabinet, and four fasteners/washers on the bottom, refer to **Figure 8**.

1. Mark locations in the top and bottom angle-iron of the utility cabinet.
2. Drill pilot holes for fasteners.
3. When installing to the wall:
 - Concrete/Masonry - use 5/16"x2-1/4" Tapcons.
 - Metal Studs - use 5/16"x1-1/2" Self Drilling Screws.
 - Wooden Studs - use 5/16"x3-1/2" Lag Bolts.
 - Drywall (only) - use 5/16"x4" Long Toggle Bolts.

NOTE: Wall-mounted utility cabinets up to 48" long, must be secured to 2 studs minimum (top and bottom of the utility cabinet). Wall-mounted utility cabinets over 48" long, must be secured to 3 studs minimum (top and bottom of the utility cabinet).

Figure 8 - Wall-Mount Utility Cabinet Details



Piping Size Selection

To ensure proper operation of the Self Cleaning System, a minimum of 30 PSI water operating pressure during spraying must be achieved at the hood nozzles. For this to occur, proper sizing of the water line is required. Use the following steps to calculate the minimum piping size.

1. Use **Table 3** and find the minimum PSI required at the hood inlet. Subtract this value from the available PSI at the panel pressure gauge. Maximum panel operating pressure is 70 psi. This will be your maximum allowable pressure drop for field-installed pipes between the panel and the hood.
2. Most fittings add an equivalent pipe length to the total run. Use **Table 1** to calculate the equivalent pipe length for installed fittings. If you have multiple fittings of one type, simply multiply the number by the total number of the fitting and add to the total run length.
3. To calculate the total flowing pressure drop between the panel and the hood, take the total equivalent length found in step 2 and add the total linear field-installed pipe length. Multiply this number by the value found in **Table 2**. (Gallons per minute is calculated by multiplying the length of the hood by 0.7 gpm). This will be the friction pressure drop between the hood and the panel.
4. Add in the pressure drop due to gravity. This must be evaluated to overcome any rise in pipe elevation between the panel and the hood. There is 0.43 psi/ft of vertical rise of pressure drop.
5. Now, compare the maximum allowable pressure drop from step 1 to the calculated pressure drop from step 3. If the calculated pressure drop exceeds the maximum allowable pressure drop, increase the pipe size, and recalculate steps 2 and 3. Continue this step until the calculated pressure drop is below the maximum allowable.

Table 1 - Pressure Drop (PSI) per Equivalent Foot of Waterline - Pipe Size

Gallons per Minute	Waterline Pipe Size (PSI per foot of pipe)			
	3/4"	1"	1-1/2"	2"
5	0.028	0.008	0.001	0.000
10	0.102	0.029	0.004	0.001
15	0.216	0.062	0.008	0.001
20	0.368	0.105	0.014	0.002
25	0.556	0.159	0.022	0.003
30	0.779	0.223	0.030	0.004
35	1.036	0.296	0.040	0.006
40	1.327	0.379	0.052	0.008
45	1.650	0.472	0.064	0.009
50	2.005	0.573	0.078	0.011
55	2.391	0.684	0.093	0.014
60	2.809	0.803	0.110	0.016
65	3.257	0.931	0.127	0.019
70	3.736	1.068	0.146	0.021
75	4.244	1.213	0.166	0.024
80	4.782	1.367	0.187	0.027
85	5.350	1.529	0.209	0.030
90	5.946	1.700	0.232	0.034
95	6.572	1.879	0.256	0.037
100	7.226	2.066	0.282	0.041
105	7.909	2.261	0.309	0.045

Table 2 - Equivalent Pipe Length for Various Pipe Fittings

Pipe Size (Inches)	45° Elbow	90° Elbow	Tee thru Run	Tee thru Branch
3/4"	0.97	2.10	1.40	4.10
1"	1.23	2.60	1.80	5.30
1-1/2"	1.90	4.00	2.70	8.00
2"	2.40	5.20	3.50	10.40

Field Pipe Pressure Drop Calculation Example

Wall mount panel installed with 30 feet of 3/4 inch linear pipe between panel and hood. There are two 90 degree elbows installed in the pipe run, and the pipe run has a vertical rise of 5 feet. Length of end-to-end hood system is 32 feet.

Hood System = 32 feet. Flow rate = 32 feet * 0.7 gpm = 23 gpm

Pressure required at hood = 37 psi.

Pressure at panel gauge = 50 psi.

Allowable pressure drop between panel and hoods: 50 psi – 37 psi = 13 psi

3/4 inch pipe pressure drop calculations:

Equivalent length of pipe = 30 + 2 * 2.10 = 34.20 feet

Friction Pressure Drop through pipe = 34.20 * 0.556 = 19.02 psi

Gravitational Pressure = 0.43 psi/ft * 5 feet = 2.15 psi

Total Pressure Drop in Field Pipe between panel and hood = 19.02 psi + 2.15 psi = **21.17 psi**

Allowable Pressure Drop = 13 psi

This system will not work correctly because calculated Total Pressure Drop is greater than Allowable Pressure Drop.

Re-calculate with 1 inch pipe instead of 3/4 inch pipe:

Equivalent length of pipe = 30 + 2 * 2.60 = 35.20 feet

Friction Pressure Drop through pipe = 35.20 * 0.159 = 5.60 psi

Gravitational Pressure = 0.43 psi/ft * 5 feet = 2.15 psi

Total Pressure Drop in Field Pipe between panel and hood = 5.60 psi + 2.15 psi = 7.75 psi

Allowable Pressure Drop = 13 psi

This system will work correctly because calculated Total Pressure Drop is less then Allowable Pressure Drop. Pipe size will need to be change to 1 inch diameter.

Figure 9 - Pressure Loss through Typical Water Pipe Chart

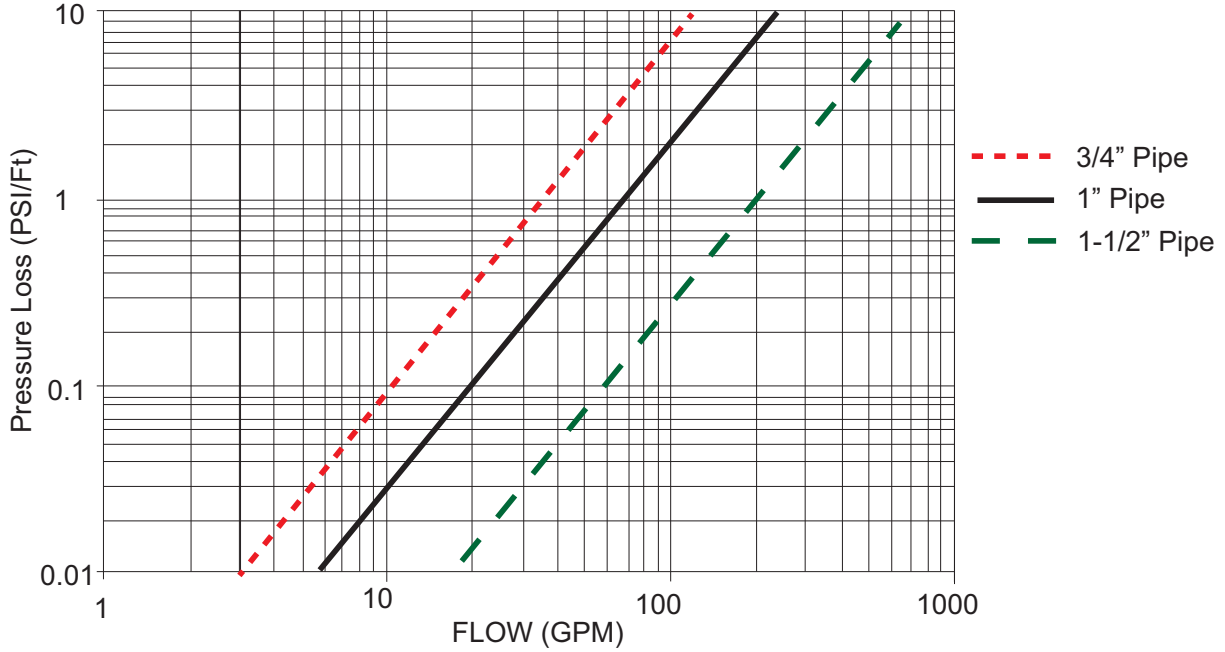


Table 3 - Manifold Minimum Operating Pressure Requirements for Hood Lengths

Minimum Inlet Water Pressure for Self Cleaning (PSI)			
Hood Length (Ft)	3/4" Manifold Minimum Operating Pressure	1" Manifold Minimum Operating Pressure	1-1/2" Manifold Minimum Operating Pressure
4	30	30	30
8	30	30	30
12	30	30	30
16	30	30	30
20	31	30	30
24	32	30	30
28	34	31	30
32	37	33	30
36	39	35	33
40	42	42	35
44	46	43	38
48	50	45	40

NOTE: Water pressure may not drop below 30 PSI while the hood is spraying hot water. Pressure may not rise above 70 PSI when the hood is spraying. If the pressure is greater than 70 PSI, a water regulator must be connected. The chart above is for continuous hood installations. If you exceed the lengths above, the water line must be branched for adequate water supply.

Self Cleaning Tees and Duct Sump(s) Coverage

Self-Cleaning System manifolds can also cover Duct Sumps and Self Cleaning tees within the duct run and will be connected to the hot water line coming from the control panel. These duct tee assemblies will be added to the total GPM required and added to the total equivalent hood length for pressure requirements. If combined with hood coverage, the duct tee assemblies will be washed with hot water and surfactant simultaneously with the exhaust hood during wash cycles. Duct runs with multiple self cleaning tees and/or duct sumps can be divided into zones. Each zone can be covered by a separate Self-Cleaning System manifold.

Round and rectangular Duct Sumps and Self Cleaning Tees require a minimum of 30 psi at the inlet of the tee. They have a 3/4" water inlet connection (and 1-1/2" drain size, if applicable) and require 140-170°F water temperature.

Water Requirements: Each Self Cleaning tee nozzle adds 2.6 GPM to the total flowrate. Each Self Cleaning tee can contain Qty (1) or Qty (2) Self Cleaning nozzles.

Each Duct Sump (round) adds 3.5 GPM to the total flowrate. Each Duct Sump has Qty (5) nozzles, each nozzle at 0.7 GPM for a total of 3.5 GPM.

Each Rectangular Duct Sump will use 1.2 GPM per 12" Width of Duct.

Each duct run covered by a Self Cleaning System manifold will add the total GPM of the duct run to the system requirements. The total GPM of the duct run is then divided by a factor of 0.7 to calculate the additional equivalent hood length to add to the system.

Equations for Duct Coverage: Additional Self Cleaning Equivalent Hood Length = Total Duct GPM / 0.7

Example: An 8 ft long hood covered by a Self Cleaning System, which also covers a duct run with Qty [1] Duct Sump (round) with a 2-nozzle Self Cleaning tee.

Self Cleaning Flowrate = (0.7 GPM/ft * 8 ft) + (2.6 GPM * 2) + (3.5 GPM * 1) = 14.3 GPM

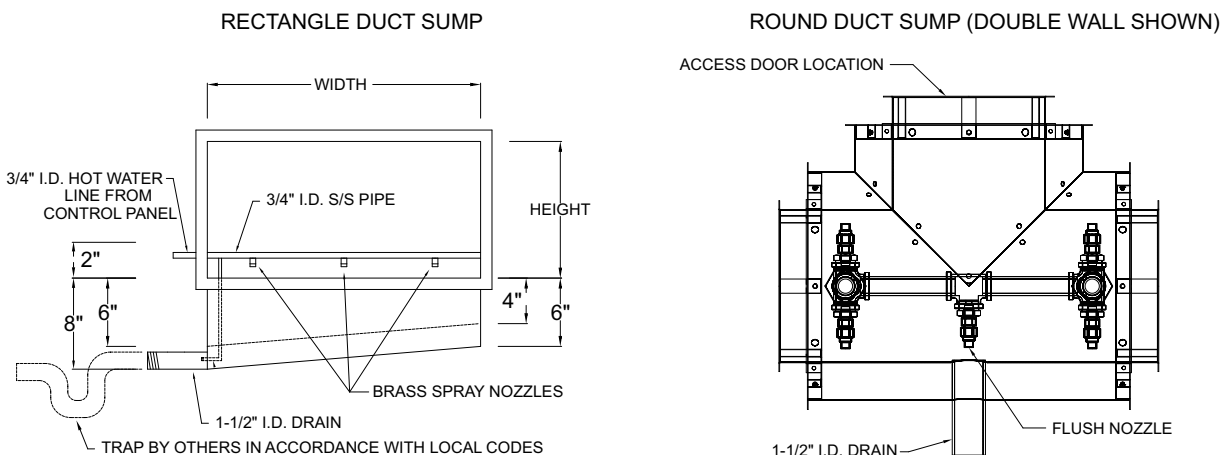
Self Cleaning Equivalent Hood Length = 8 ft + (2.6 GPM * 2 + 3.5 GPM * 1) / 0.7 GPM/ft = 20.4 ft

Refer to **Table 4** for an approximation of duct sump coverage per manifold size. Calculations are assuming that there is 0.1 psi/ft pressure loss.

Table 4 - Duct Sump Approximation Coverage

3/4" Manifold	1" Manifold	1-1/2" Manifold
One manifold covers up to 3 duct sumps	One manifold covers up to 6 duct sumps	One manifold covers up to 18 duct sumps

Figure 10 - Duct Sumps



Electrical

WARNING!!

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

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

Electrical wiring (**Table 5**) and connections must be made per local ordinances and the National Electric Code, ANSI/NFPA 70. Verify the voltage, phase of the power supply, and the wire amperage capacity is in accordance with the unit nameplate.

- **Always disconnect power before working on or near this equipment. Lock and tag the disconnect switch and/or breaker to prevent accidental power-up.**
- Electrical termination points are located on the right-hand side compartment of the panel. One side of these terminal blocks is internally wired. Field wiring is expected on the other side. Refer to the SCS Electrical Installation Diagram provided inside the panel.
 - 120V AC power to the panel on terminal blocks H1 and N1.
 - Hood Lights on terminal blocks B1 and W1. Depending on hood configurations, there may be other B and W terminals.
 - Exhaust fan starter coil on terminal blocks EF.
 - 1/EF2 and N1. Supply fan starter coil on terminal blocks SF1/SF2.
 - Electrical Gas Valve if present on terminal blocks GAS and N1.
 - Fire system micro-switch on terminal blocks C1, AR1, and TR1. C1 is common, AR1 is the armed state, and TR1 is the triggered state. Verify connections on wiring schematic. If a fire system is not required, place a jumper between terminals C1 and AR1.
 - PCU Pressure Switch, if present, on terminals H1 and PCU.

Table 5 - Copper Wire Ampacity

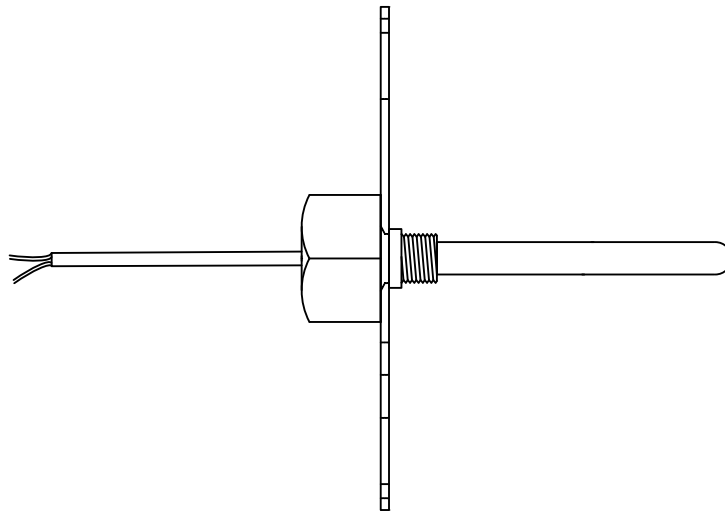
Wire Size AWG	Maximum Amps
14	15
12	20
10	30
8	50
6	65
4	85
3	100
2	115
1	130

Temperature Sensor

The temperature sensor (**Figure 11**) is a 10K ohm thermistor. The sensor gives constant feedback to the control board. One sensor is installed in every exhaust riser for packages that include the thermostatically controlled fan option. Temperature sensors can be used to monitor room temperature, PSP temperature, ACPSP temperature, and any other temperatures of interest.

There can be a maximum of 32 sensors in the system (including the room temperature sensors). Only a maximum of 8 sensors are connected to the ECPM03 board, normally one room-temperature sensor and then other temperature sensors. If more temperature sensors are needed, an ECPM03EX board will need to be installed. Each ECPM03EX board can connect up to 8 additional temperature sensors.

Figure 11 - Duct Temperature

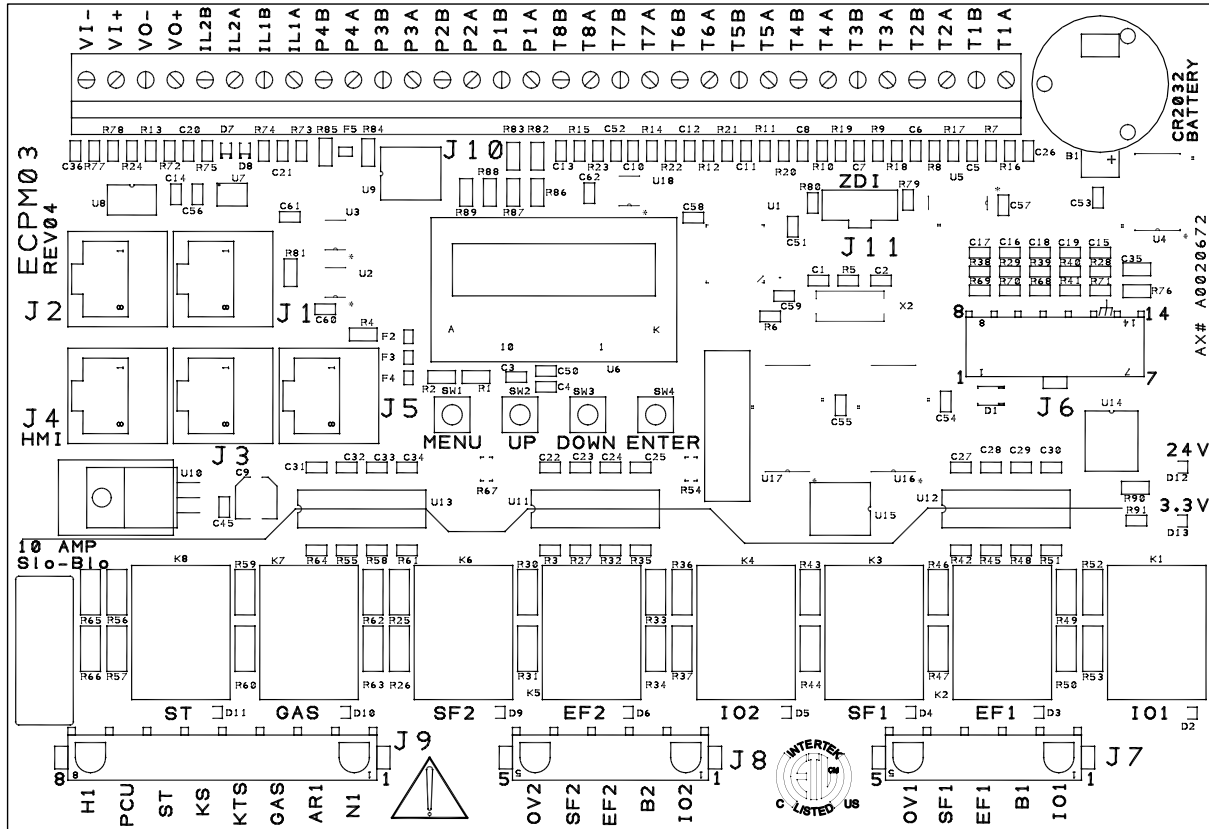


ECPM03 Board

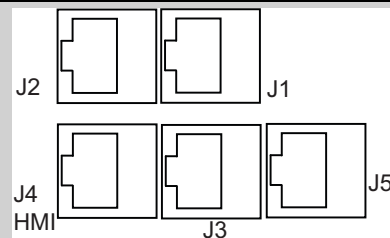
ECPM03 is the main control of the system. It receives all of the digital and analog inputs, and delivers all digital outputs for external devices.

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

Connector Descriptions



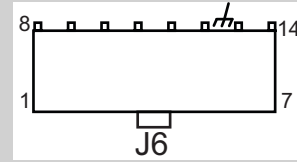
RJ45 Connectors



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 Comm Module and external BMS interface. No field wires should be connected to J1 or J2.

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

Connector J6 contains factory only wiring for low voltage connections



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

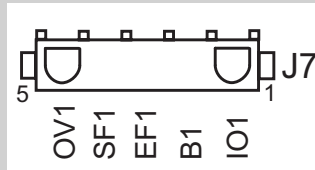
Pin 2 through pin 7 - Each open collector relay output (RO) sources **100 mA** max and is suitable for driving **24V DC** relays or indicator lamps.

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

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

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

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



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

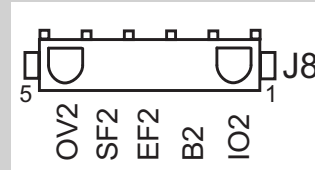
Pin 2 - (B1) input, this pin can detect the presence of **120V AC**.

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

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

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

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



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

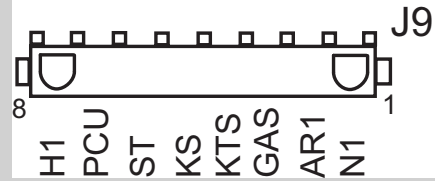
Pin 2 - (B2) input, this pin can detect the presence of **120V AC**.

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

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

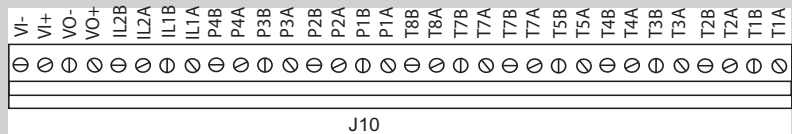
Pin 5 - (OV2) input, this pin can detect the presence of **120V AC**.

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



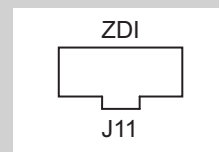
Pin 1 - (N1) this is the neutral or return path for the detection of **120V AC** by the input pins. It would be connected to the neutral side of the **120V AC** supply.
 Pin 2 - (AR1) input, this pin can detect the presence of **120V AC**.
 Pin 3 - (GAS) output, this pin can source **120V AC**.
 Pin 4 - (KTS) input, this pin can detect the presence of **120V AC**.
 Pin 5 - (KS) output, this pin can source **120V AC**.
 Pin 6 - (ST) output, this pin can source **120V AC**.
 Pin 7 - (PCU) input, this pin can detect the presence of **120V AC**.
 Pin 8 - (H1) this is the **120V AC** 50/60Hz input to the board, it feeds through an onboard 10 Amp Slow-Blow fuse and is used to source **120V AC** to all the pins described as **120V AC** outputs. The total current draw of all the **120V AC** outputs must not exceed 10 Amps.

Connector J10 contains low voltage field wiring connections



Pin 1 through pin 16 - thermistor probe inputs. 10k type B thermistors are connected to these inputs.
 Pin 17, 19, 21, 23, 25, and 27 - sources **24V DC** which is current limited through an onboard **200 mA** PTC Poly-Fuse. This is the high side of the pulse with modulated outputs, and low voltage inputs listed below.
 Pin 18, 20, 22, and 24 - Open collector PWM outputs, **100 mA** max each. Suitable for driving the optoisolated PWM speed control inputs of EC motors.
 Pin 26, 28 - low voltage inputs, suitable for detecting dry contact closures with pins 25, 27 above.
 Pin 29 - **0-10V DC** output, **5 mA** max, suitable for driving instrumentation inputs.
 Pin 30 - negative, common or ground side of the above **0-10V DC** output.
 Pin 31 - **0-10V DC** input, 10k Ohm impedance to ground or common.
 Pin 32 - negative, common or ground side of the above **0-10V DC** output.

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



Pin 1 - **3.3V DC**
 Pin 2 - reset
 Pin 3 - Gnd
 Pin 4 - DBG input
 Pin 5 - Gnd
 Pin 6 - NC

OPERATION

Before starting up or operating the Self Cleaning System, check all plumbing connections, fasteners, and wires for tightness.

Start-up Procedure

Tools required for start-up: AC Voltage Meter, Amperage Meter, and Standard Hand Tools.

1. Before applying power to the Self Cleaning System, verify that breaker CB-01 is turned off. Once all power, lights, inputs, and outputs are connected, start-up can begin. Turn breaker CB-01 on. The HMI screen will power up and beep. If the screen does not power up, check all power connections.
2. Verify the HMI is on and fully operational. If there is an issue, verify the CAT-5 cable going from the back of the HMI panel to the ECPM03 board is properly connected. If there is still no communication, cycle power to the package.
3. Check all nozzles to make sure they are installed and tight.
4. Install all hood filters per the filter installation configuration. There are drip blanks secured to the filters to prevent water from exiting the hood between the filters.
5. Open all water valves to the hood.
6. Fill surfactant tank with surfactant. Use the HMI to prime the surfactant pump.
7. The Wash Time Length and Surfactant Time(s) may be accessed through the HMI, **Factory Options > Wash Solenoid Config > Enter Config**. The wash timer will vary per job request, the factory default setting is 3 minutes. The surfactant timer is set at the factory for 1 second of injection during each minute of wash time. The default injection occurs at the start of each minute, this option is configurable. You may set this setting to inject 2x, 3x or 4x per minute. For more information, refer to **“Factory Settings” on page 42**.
8. Use the HMI to activate the fans, if the fan button is available. If the fans are operated by temperature, use equipment until the operating temperature is reached. The fans should go into operation. If they do not, check the wiring connections. If the hood has the cold water mist option, cold water should begin to spray.
9. To operate the wash cycle, use the wash button on the HMI or externally if remote wash. The wash cycle energizes automatically and will remain on for the duration of the wash timer setting. The wash cycle may not run if the minimum fan run time has not been met.
10. Verify the surfactant is injecting properly into the water stream.
11. Verify the pressure and temperature of the water via the pressure/temperature gauge. Self Cleaning pressure should be between the required minimum PSI and a maximum of 70 PSI operating pressure.
12. Check all manifold pipe connections to ensure there are no water leaks.
13. Check all filters to make sure that no water is leaking back through the filters.
14. Verify that the hood grease trough is draining properly and there are no clogs in the drain.

Wash Operation

Local Wash

The ECPM03 board will control when the system washes. The system may wash by schedule, user button interface, or by using a Building Management System (BMS). The wash operation may operate in Hot Water Wash or Cold Water Mist.

Hot Water Wash

Hot water wash is used to wash the plenum or other applications that require hot water wash with surfactant. There may be up to three wash solenoids that can be programmed as hot water wash controls. The options can be configured to control the surfactant injection frequency per minute, surfactant injection time length, the zone assignment, and the wash time of each solenoid. If there is a need to wait for the water heater to generate enough hot water, a delay time between each wash solenoid can be defined for this. Assigning a zone to a solenoid allows the system to activate when the fans turn off, and if a wash will be hidden during a fan activation. A hot water supply line is fed to a backflow preventer. Since the surfactant injection line is placed before the solenoid, a backflow preventer is required so the water supply line is not contaminated. The hot water wash may be activated by the following:

- **Activation By Schedule** – The user may set a specific start day and time when the wash should activate. The system will not allow for a wash when the fans are on during an occupied schedule time.
- **Activation By Button** – There are two button control options. This is controlled by the feature “Wash All Button.” If this feature is enabled, pressing 1 button will run all the wash solenoids at one time. If the feature is disabled, pressing the wash button will take you to a different screen where the wash solenoids can be run individually. Multiple wash solenoids can be queued to run. The system will run solenoid two if it is queued, then wash solenoid three if it is queued. With either setting configuration of “Wash All Button,” the wash will be skipped if the fans are activated. Wash solenoids that are not assigned to fan zones will be the only wash solenoids that run. If a fan zone is activated, the **WASH** button will only be available if there is no wash zone associated with a fan zone. This can be configured in “Wash Configuration.”
- **Activation When The Fan(s) Turn Off** – When the fans are activated by temperature, this signifies a cooking operation occurred. If “Wash After Fans Off” is enabled, the wash will activate after the fans have turned off.
- **Activation By BMS** – This will run a single wash at any time regardless of the state of the fans. It is assumed that the user knows whether the fans are running when activating a wash via BMS.

Cold Water Mist

The cold water mist option is used to reduce the number of particles that pass through hood filters. The solenoid has to be assigned to a fan zone. Once the supply fan is activated, the system will run the solenoid. The water supply should be a cold water line. The water line does not pass through a backflow preventer because it does not use a surfactant injection.

Remote Wash

This is primarily used for third party wash configurations or can be configured with onboard wash controls from Demand Control Ventilation (DCV) with WL option or Standard Control (SC) with WG or WM options. This feature does not support fan zones or light zones.

OV1, B1, B2 are 120V AC inputs for detecting when to wash and correspond to solenoid 1 (RO3), solenoid 2 (RO4), solenoid 3 (RO5). For example, when OV1 receives a 120V AC signal, RO3 is energized. Each wash solenoid may be configured as hot water wash or cold water mist. The user cannot specify surfactant injection interval and wash time. Signals sent through the ECPM03 board allow for CASlink monitoring of inputs, such as HMI feedback, and logging times of wash to track the water usage and length of wash.

IO2 is reserved for external surfactant injection. When IO2 is energized, RO6 is energized.

OV2 is reserved for liquid level fault detection. When OV2 is energized, or IL1 is closed, RO1 is energized. Both must be considered to allow for third-party surfactant controls to be used or in-house surfactant controls to be used. RO1 is used for an LED indication.

Only one solenoid will be active at a time. If any wash system is currently washing, then lock the others out.

Surfactant Control with Liquid Level Monitoring

Cold Water Mist only packages do not use this feature. Surfactant control is only available with packages that use Hot Water Wash.

Local Wash – Local wash operation allows for the ECPM03 board to control and monitor the wash solenoid. When the system is set as local wash, the user can configure wash solenoids, fan zones, light zones, and the interaction between all three. Output RO3, RO4, and RO5 are used for wash solenoids. RO6 is used for the surfactant pump. Input IL1 is used for liquid level detection. There is no external control of wash solenoids and surfactant pump when using local wash. Surfactant duration allows the user to increase the length of time the surfactant is injected into wash. Surfactant interval is the frequency at which the system will inject surfactant. For more information on settings and adjustments, refer to **“Factory Settings” on page 42.**

Remote wash – Remote wash operation allows for an external wash controller to interface with the SCS system. The ECPM03 is used for monitoring of systems with no control. The configuration of this system is only related to the wash solenoids. IO2 is an input signal for surfactant activation. When IO2 is energized, surfactant pump control (RO6) is also energized. OV2 is an input for liquid level sensor fault detection. When OV2 is energized, a liquid level fault will be shown. RO1 is used for liquid level sensor indication fault. The LED will illuminate surfactant when OV2 is energized. Input IL1 is used for liquid level detection.

Fan Operation

The ECPM03 board can be used to control exhaust and supply contactors and starters. Fan operation is only configurable when the wash operation is defined as local. EF1 and SF1 correspond to the control zone one fans. EF2 and SF2 correspond to the control zone two fans. A cold water mist solenoid can be integrated that will run wash when the supply fan is activated in normal cooking operation. A hot water wash zone solenoid can be integrated with a fan zone that will allow for activation after the temperature activation of the fan zones. Temperature sensors and schedules can also be assigned to a fan zone. The fan(s) may be activated by temperature/schedule, button, IO, BMS, defrost, during fire, or contact overload.

Fans On By Temperature/Schedule

Fans on by Temperature: A temperature sensor should be installed in riser or capture volume area. When a temperature sensor assigned to the zone reads “Activation Temperature” setting, the fan(s) will be activated. Once activation is reached, the system will be in operation for the hysteresis timer setting. Fan operation will shut off when the hysteresis timer is satisfied, and all associated zone sensors are below “Hysteresis Temperature” setting.

- Activation Temperature = Room Temperature + Temperature Offset
- Hysteresis Temperature = Room Temperature + Temperature Offset - Hysteresis Temperature

Fans on by Schedule: The schedule can be used for two different purposes. First, the schedule can be used to activate the fans during assigned time. “Fans On During Occupied” option should be enabled. Second, the schedule can be used to ensure the fans do not cycle during an unoccupied time because of heat being trapped in the plenum. An additional unoccupied offset is added to the Activation Temperature and Hysteresis Temperature equations.

Unoccupied Sensor Activation = Room Temperature + Temperature Offset + Unoccupied Temperature Offset

Sample Temperature calculations:

If the Room Temperature is set to 75°F and the Temperature Sensor Offset is set to 10°F, if the user then sets an Unoccupied Offset of 15°F, the fans will turn on at 100°F in an unoccupied time range. If the hysteresis value is set to 2°F, the fans will shut off when the temperature drops to 98°F, and the hysteresis timer has expired.

An example of a typical application that the system will use to operate.

Example Temperature Values	Example Temperature Calculations
Room Temperature: 75°F	Activation Temperature: $75+10 = 85^{\circ}\text{F}$
Temperature Sensor Offset: 10°F	Hysteresis Temperature: $85-2 = 83^{\circ}\text{F}$
Hysteresis Temperature: 2°F	Unoccupied Sensor Activation: $75 + 10 + 15 = 100^{\circ}\text{F}$
Unoccupied Temperature Offset = 15°F	Unoccupied Hysteresis Temperature: $100-2 = 98^{\circ}\text{F}$

Fans On By Button

Each HMI fan button will correspond to their appropriate fan zone. The user may activate the fan(s) by pressing the HMI button.

Fans On By IO

The IO input is activated by a **120V AC** signal. After the IO input is deactivated, the IO delay timer will begin. The zone will stay in operation until the IO delay timer is satisfied. 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 thermostat sensors are hot or if the fans are energized through the fan button on the HMI, then the fans will continue to run.

Fans On By BMS

Fan(s) may be activated via BACnet/LonWorks/CASlink.

Fans On By Defrost

You must verify temperature sensors are installed and assigned properly when using the defrost mode feature. The system will go into defrost mode when the fans are not operating, and either the hood input or hood output coil detects a temperature reading below the defrost temperature set point. During defrost mode, the system's hysteresis timer will activate the fan(s). After the hysteresis timer has completed, if the hood recovery coil temperature is not above the defrost temperature setting, the process is repeated.

Fans During Fire

This is meant to assign specific fan operation to run if a fire event is to occur when the fans are off. Exhaust fan(s) have three options to select from On/Off/Continue, supply fan(s) have two options On/Off. Refer to **"Fire Settings" on page 44**.

Contact Overload Monitoring

Overload relays are devices used with contactors to monitor and trigger when a motor amperage reaches its full load amperage. The overload relay will actuate a set of contacts if a high current draw is detected. If OV1 or OV2 input(s) are energized, a fault will display on the HMI screen.

Temperature Selection and Configuration

Each fan zone must have a room temperature setting used for temperature offset calculations. The ECPM03 board can average HMI temperature sensors, along with other room tempering sensors that are assigned to a zone (**Table 6 on page 24**).

- **Room Temperature Zone** – A temperature sensor corresponding to the zone. The system calculates the temperature offset based on the temperature detected by the sensor.
- **Preset Temperature Zone** – No temperature sensor required. Room temp is set to the Preset Temp.

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

- **Auxiliary Monitoring** – A thermistor sensor that may be externally or internally located in various locations.
- **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 feedback to the system on how to operate based on the fan zone configuration. The riser and capture sensor name will correspond to its location in the hood or plenum. These sensors are assigned to a contactor zone. Multiple sensors can be assigned to a specific motor or zone. The highest temperature reading will activate all the fans on in that particular zone. If the zone is dynamic, the fan assigned to the variable controlled fan will modulate based on temperature associated with the assigned temperature sensor. Additional Control Sensors for Defrost Control Activation:

- **Zone Riser** – A factory or field mounted thermistor sensor. Monitors the temperature in the hood riser.
- **Zone Capture** – factory mounted thermistor sensor. Monitors the temperature in the hood capture area.
- **Hood Input Coil** – A factory mounted thermistor sensor. Monitors incoming water temperature on a hood recovery coil. If this temperature reaches a set point the system will go into Defrost Mode.
- **Hood Output Coil** – A factory mounted thermistor sensor. Monitors outgoing water temperature on a hood recovery coil. If this temperature reaches a set point the system will go into Defrost Mode.
- **Sensor Number** – is the assignment in the HMI. This setting is bound by which sensor type is used.
- **Function** – Monitoring sensors give a status of temperature reading. Control sensors are used for feedback on how to operate based on the configuration.
- **Name** – Sensor assignment naming.
- **Secondary Configuration Settings** – Adjustable configuration settings based on sensor's settings.

Table 6 - Temperature Selection and Configuration

Sensor Number	Function	Name	Secondary Configuration Settings
1	Monitoring	Room Temp Z1	Room Temp Averaging Assignment
		Preset Temp Z1	Preset Temp
2	Monitoring	Room Temp Z2	Room Temp Averaging Assignment
		Preset Temp Z2	Preset Temp
2-32	Monitoring	Auxiliary Monitoring	N/A
		PSP Discharge	
		ACPSP Discharge	
		Contact Monitoring	
2-32	Monitoring	Zone 1 Riser	Temp Offset
		Zone 2 Riser	
		Zone 1 Capture	
		Zone 2 Capture	
2-32	Monitoring	Hood Input Coil	N/A
		Hood Output Coil	

Fire Operation

In a normal state of operation, the AR1 terminal will have 120V AC present. When there is a fire condition, the AR1 terminal will not have 120V AC present. Normally the system will be armed with a micro-switch that triggers when the system is in a fire state. The HMI screen will display "FIRE." When a fire condition is present, gas to the appliances will be deactivated. Lights, exhaust, and supply fans will follow their system settings. The shunt will be activated, and the kill switch output is deactivated. If the system is washing, whether it is cold water mist or hot water wash, the solenoid will deactivate in a fire condition. If a fire system monitoring is not present, AR1 can be fed a constant 120V AC signal by connecting a jumper wire between C1 and AR1.

Lighting Operation

The lighting system may be activated/deactivated by fans, button, or by an emergency setting. When the system lights for Zone 1 are activated, RO1 will be energized. When the system lights for Zone 2 are activated, RO2 will be energized. When the lights are deactivated their respective RO output will be de-energized. If the lighting system is energized, but the ECPM03 board does not receive a 120V AC signal, a fault will be displayed on the HMI. If the lighting system is de-energized, but the ECPM03 board still senses a 120V AC signal, a fault will be displayed on the HMI.

Lights With Fan: The lighting system will activate when the fan(s) are active during normal operation by the following: Fans on by temp, HMI button, IO, Schedule, BMS. When the lighting system is tied to one of these options, the lights can only be turned on by the HMI button. The lighting system will de-energize when the fans are no longer active. If the "Lights With Fan" option is disabled, the lights can be activated and deactivated by the HMI button or through BMS.

Lights During Wash: Lights may be active during initial call for a hot water wash. The lights will deactivate 30 minutes after the hot water wash cycle.

External Features

Gas Operation

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 the initial start-up when the fire system is triggered, or the KTS input is energized.

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. The **GAS ON** button does not respond to being pressed.

"Gas Follow Fans?" is an option that is visible when "Gas Valve" is set to "ON." If this option is enabled, the gas valve is shut off whenever the fans are off and require a reset when the fans are turned on. This is meant to prevent gas cooking appliances from running when the fans are off and only required in some jurisdictions.

Shunt Trip Activation

The shunt trip output can trigger a device that accepts 120V AC to trigger a shunt breaker. If "Shunt Follow Fans" is disabled, the shunt trip will activate when there is a fire condition detected or the Kill Tamper Switch (KTS) input is activated. If "Shunt Follow Fans" is enabled, the shunt trip will activate when the fans are inactive and will be active when the fans are active. Gas will also de-energize when "Shunt Follow Fans" is activated and the fans are inactive.

Kill Tamper Switch (KTS) Activation

This feature enables the KTS to activate as a kill switch or tamper switch input. The KTS input detects 120V AC, which will de-energize the Kill Switch output (KS), de-energize the gas valve output and energizes the 120V AC shunt trip.

PCUAFM/PCU Switch Integration

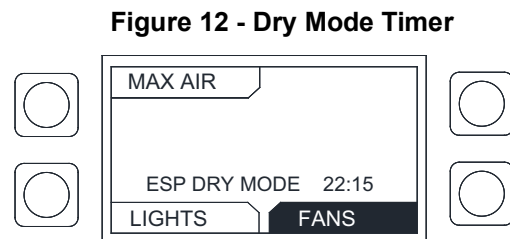
The ECPM03 is capable of 100% monitoring of the Pollution Control Unit (PCU). If the PCU input on the ECPM03 board receives a 120V signal, a fault will be displayed on the HMI.

Air pressure switches are preset from plant to 0.15" w.c. above the internal static pressure of the PCU with clean filters. Air pressure switch is located in the downstream filter module. Route wiring from the hood control panel to PCU using 1/2" conduit through quick seal located near the lower right area of the filter module that contains the air pressure switch. Use existing conduit in the module to route wires from the exterior of module to the pressure switch. Install wiring according to the label located above the switch. Verify all conduit fittings are tight. Once filters become clogged, a fault will be displayed on the HMI. User should then clean or replace filters as required.

- The PCU Advanced Filter Monitoring Module (PCUAFM) utilizes proprietary algorithms to make determinations about filter loading percentages as well as fault conditions, such as missing filters and missing doors. These algorithms take into consideration known characteristics and interactions of many specific filter combinations, stored calibration values derived from measurements taken at the time of test and balance, and measurements of the dynamically changing current operating conditions such as demand ventilation. Personnel servicing the PCU will have direct access to operating characteristics and fault conditions through the use of an LCD screen, which is conveniently located directly on the PCUAFM board. All faults from the PCUAFM will be displayed on the HMI. There may be up to 5 PCUAFM boards that can be monitored by SCS.

ESP Dry Mode

Following an ESP self cleaning cycle, the PCUAFM board will force the fans on for the duration of the ESP dry mode timer. The time will be displayed on the DCV home screen (**Figure 12**). The Wash button will be hidden while the dry mode timer is active.



ESP Self Cleaning

When using an SCS panel to cover an ESP for self-cleaning, refer to **Table 7**.

Table 7 - Maximum Supply in GPM

3/4" Manifold	1" Manifold	1-1/2" Manifold
10	15	60

Table 8 is based on the ESP's minimum operating pressure of 20 psi. Refer to the PCU OIM for exact water consumption of your ESP model based on field conditions.

Table 8 - Self Cleaning Water Consumption Based on PCU Size in GPM

PCU Size	# of ESP Modules	
	1 Module	2 Modules
PCU 1	2.3	4.6
PCU 2	5.3	10.6
PCU 3	7.6	15.2
PCU 4	10.6	21.3
PCU 5	10.6	21.3
PCU 6	16.7	33.4
PCU 7	25.1	50.1

Network

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

Communication Module (Optional)

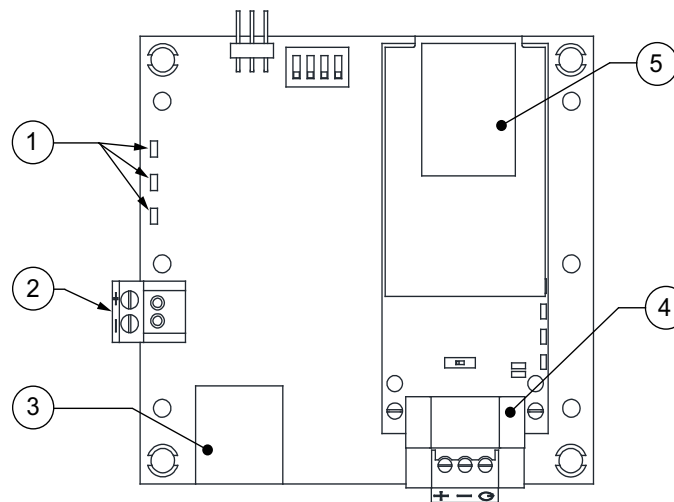
The Communication Module, PN: **SCADA**, is included in all CASlink equipped panels. It obtains operational data from various connected components. This communication wiring is either RS-485 shielded twisted pair wiring or RJ45 Cat 5 Ethernet wiring.

BACnet

BACnet IP or BACnet MS/TP (**Figure 13**) compatibility can be implemented with this package through a Protoceptor, which is a BTL listed embedded Gateway configured to give a Building Management System access to monitor and/or control a list of BACnet objects. The Protoceptor is mounted and factory pre-wired inside the Electrical Control Panel (ECP). Field connections to the Building Management System (BMS) are shown on wiring schematics.

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

Figure 13 - BACnet



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

Device Instance, MAC Address, Baud Rate

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

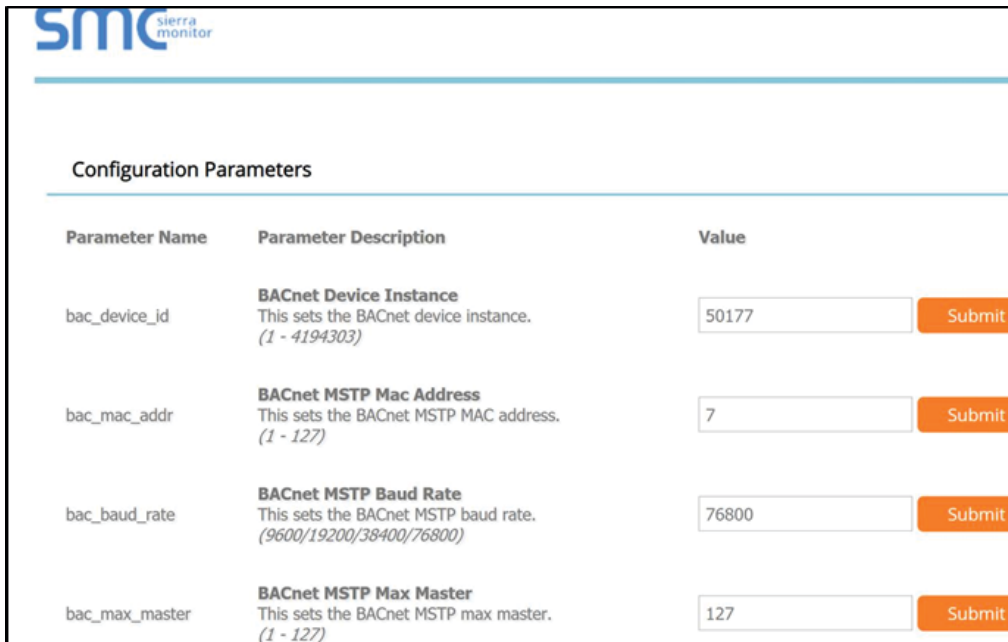
To access the Web Configurator, type the IP address of the Protoceptor in the URL of any web browser. The default IP address of the Protoceptor is 192.168.1.24. Once the landing page has loaded, if required, log in using “admin” for the username and password. If the default “admin” password does not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

Go to the main configuration page, select “Configure” from the left-hand menu. Select “Profile Configuration,” the following window shown in **Figure 14** should appear.

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

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

Figure 14 - Configuration Parameters Page



Parameter Name	Parameter Description	Value	
bac_device_id	BACnet Device Instance This sets the BACnet device instance. (1 - 4194303)	50177	Submit
bac_mac_addr	BACnet MSTP Mac Address This sets the BACnet MSTP MAC address. (1 - 127)	7	Submit
bac_baud_rate	BACnet MSTP Baud Rate This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)	76800	Submit
bac_max_master	BACnet MSTP Max Master This sets the BACnet MSTP max master. (1 - 127)	127	Submit

Changing the IP Address

Some BACnet IP applications may require changing the IP address of the Protoceptor. To change the IP address, go to the internal server by typing the default IP address of the Protoceptor, 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 15** appears. Click on the “Diagnostics and Debugging” button on the lower right corner.

Click on “Setup” from the left-hand side menu and select “Network Settings.” The window shown in **Figure 15** 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 15 - Network Settings Page

The screenshot shows the 'Network Settings' page in the Sierra Monitor web interface. On the left is a navigation menu with 'Network Settings' selected. The main content area is titled 'Network Settings' and contains an 'IP Settings' tab. A note states: 'Updated settings only take effect after a System Restart. If the IP Address is changed you will need to direct your browser to the new IP Address after the System Restart.' Below the note are input fields for: N1 IP Address (192.168.1.24), N1 Netmask (255.255.255.0), N1 DHCP Client State (DISABLED), N1 DHCP Server State (DISABLED), Default Gateway (192.168.1.1), Domain Name Server1 (0.0.0.0), and Domain Name Server2 (0.0.0.0). There are 'Cancel' and 'Update IP Settings' buttons. Below the IP settings is a 'MAC Address' section showing 'N1 MAC Address: 00:50:4E:10:07:27'. At the bottom of the page are buttons for 'Home', 'HELP (F1)', 'Contact Us', and 'System Restart'.

BACnet IP and BACnet MS/TP Points

Object Name	BACnet Type	Object ID	Function	Units
Temperature Sensor 1	AI	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
FanZoneONbyFire1	AI	39	Monitor	No-Units
FanZoneONbyBypass1	AI	40	Monitor	No-Units
FanZoneONbyTemperature1	AI	41	Monitor	No-Units
FanZoneONbyFansButton1	AI	42	Monitor	No-Units
FanZoneONbyOccupied1	BI	43	Monitor	No-Units
FanZoneONbyBMS1	BI	44	Monitor	Hz
FanZoneONbyIO1	BI	45	Monitor	Hz
FanZoneONbyDefrost1	BI	46	Monitor	Hz
LightONbyWash1	BI	47	Monitor	Hz
LightONbyBypass1	BI	48	Monitor	Hz
LightONbyBMS1	BI	49	Monitor	Hz

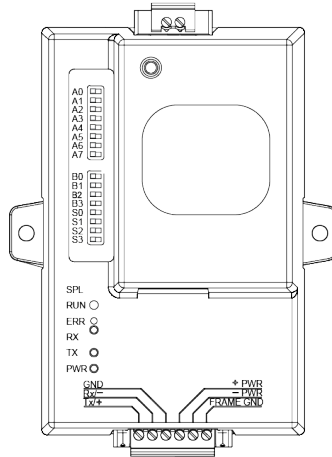
Object Name	BACnet Type	Object ID	Function	Units
LightONbyButton1	BI	50	Monitor	Hz
LightONbyOccupied1	BI	51	Monitor	Hz
LightONbyIO1	BI	52	Monitor	Hz
LightONbyFansButton1	BI	53	Monitor	Hz
LightONbyAutomatic1	BI	54	Monitor	Amps
FanZoneONbyFire2	BI	55	Monitor	Amps
FanZoneONbyBypass2	BI	56	Monitor	Amps
FanZoneONbyTemperature2	BI	57	Monitor	Amps
FanZoneONbyFansButton2	BI	58	Monitor	Amps
FanZoneONbyOccupied2	BI	59	Monitor	Amps
FanZoneONbyBMS2	BI	60	Monitor	Amps
FanZoneONbyIO2	BI	61	Monitor	Amps
FanZoneONbyDefrost2	BI	62	Monitor	Amps
LightONbyWash2	BI	63	Monitor	Amps
LightONbyBypass2	BI	64	Monitor	KW
LightONbyBMS2	BI	65	Monitor	KW
LightONbyButton2	BI	66	Monitor	KW
LightONbyOccupied2	BI	67	Monitor	KW
LightONbyIO2	BI	68	Monitor	KW
LightONbyFansButton2	BI	69	Monitor	KW
LightONbyAutomatic2	BI	70	Monitor	KW
FaultFireZ1	BI	71	Monitor	KW
FaultFuseZ1	BI	72	Monitor	KW
FaultKTSZ1	BI	73	Monitor	KW
FaultOverloadZoneOneZ1	BI	74	Monitor	No-Units
FaultOverloadZoneTwoZ1	BI	75	Monitor	No-Units
FaultSurfactantLowZ1	BI	76	Monitor	No-Units
FaultPCUInputZ1	BI	77	Monitor	No-Units
FaultBrokenTempSensorZ1	BI	78	Monitor	No-Units
FaultMissingTempSensorZ1	BI	79	Monitor	No-Units
FaultB1EnergizedZ1	BI	80	Monitor	No-Units
FaultB1DeEnergizedZ1	BI	81	Monitor	No-Units
FaultB2EnergizedZ1	BI	82	Monitor	No-Units
FaultB2DeEnergizedZ1	BI	83	Monitor	No-Units
FaultFireZ2	BI	84	Monitor	No-Units
FaultFuseZ2	BI	85	Monitor	No-Units
FaultKTSZ2	BI	86	Monitor	No-Units
FaultOverloadZoneOneZ2	BI	87	Monitor	No-Units
FaultOverloadZoneTwoZ2	BI	88	Monitor	No-Units
FaultSurfactantLowZ2	BI	89	Monitor	No-Units
FaultPCUInputZ2	BI	90	Monitor	No-Units
FaultBrokenTempSensorZ2	BI	91	Monitor	No-Units
FaultMissingTempSensorZ2	BI	92	Monitor	No-Units
FaultB1EnergizedZ2	BI	93	Monitor	No-Units

Object Name	BACnet Type	Object ID	Function	Units
FaultB1DeEnergizedZ2	BI	94	Monitor	No-Units
FaultB2EnergizedZ2	BI	95	Monitor	No-Units
FaultB2DeEnergizedZ2	BI	96	Monitor	No-Units
ModbusFaultCode	BI	97	Monitor	No-Units
CloggedFilter_PCU1	BI	98	Monitor	No-Units
MissingFilter_PCU1	BI	99	Monitor	No-Units
72HourCloggedFilter_PCU1	BI	100	Monitor	No-Units
CloggedPCU_PCU1	BI	101	Monitor	No-Units
DoorMissing_PCU1	BI	102	Monitor	No-Units
NeedCalibration_PCU1	BI	103	Monitor	No-Units
24HourCloggedFilter_PCU1	BI	104	Monitor	No-Units
ESPDoorMissing_PCU1	BI	105	Monitor	No-Units
ESPDrainClogged_PCU1	BI	106	Monitor	No-Units
CloggedFilter_PCU2	BI	107	Monitor	No-Units
MissingFilter_PCU2	BI	108	Monitor	No-Units
72HourCloggedFilter_PCU2	BI	109	Monitor	No-Units
CloggedPCU_PCU2	BI	110	Monitor	No-Units
DoorMissing_PCU2	BI	111	Monitor	No-Units
NeedCalibration_PCU2	BI	112	Monitor	No-Units
24HourCloggedFilter_PCU2	BI	113	Monitor	No-Units
ESPDoorMissing_PCU2	BI	114	Monitor	No-Units
ESPDrainClogged_PCU2	BI	115	Monitor	No-Units
CloggedFilter_PCU3	BI	116	Monitor	No-Units
MissingFilter_PCU3	BI	117	Monitor	No-Units
72HourCloggedFilter_PCU3	BI	118	Monitor	No-Units
CloggedPCU_PCU3	BI	119	Monitor	No-Units
DoorMissing_PCU3	BI	120	Monitor	No-Units
NeedCalibration_PCU3	BI	121	Monitor	No-Units
24HourCloggedFilter_PCU3	BI	122	Monitor	No-Units
ESPDoorMissing_PCU3	BI	123	Monitor	No-Units
ESPDrainClogged_PCU3	BI	124	Monitor	No-Units
FansONButtonZone1	BV	125	Monitor	No-Units
LightsButtonZone1	BV	126	Monitor	No-Units
FansONButtonZone2	BV	127	Monitor	No-Units
LightsButtonZone2	BV	128	Monitor	No-Units
WashButtonZone1	BV	129	Monitor	No-Units
WashButtonZone2	BV	130	Monitor	No-Units
WashButtonZone3	BV	131	Monitor	No-Units

LonWorks

LonWorks compatibility (**Figure 16**) can be implemented on control packages through the ProtoNode, a LonMark certified external Gateway configured to give a Building Management System access to monitor and/or control a list of Network Variables. The ProtoNode is mounted and factory pre-wired inside the Electrical Control Panel. Refer to schematics connections to the Building Management System are shown.

Figure 16 - LonWorks



Commissioning on a LonWorks Network

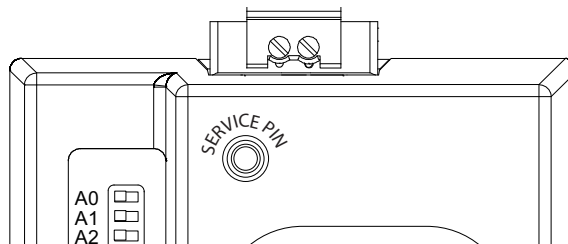
During the commissioning process by the LonWorks administrator (using a LonWorks Network Management Tool), the user will be prompted to hit the Service Pin in the ProtoNode. This pin is located in the front face, and it can be pressed by inserting a small screwdriver and tilting it towards the LonWorks Port. Refer to **Figure 17** for location of the “Service Pin.”

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

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

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

Figure 17 - LonWorks Service Pin



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

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

SVNT	Lon Function	SNVT Type	Index
nvoTempHMI2	NVUOIMT	SNVT_temp_f	35
nvoTempHMI3	NVUOIMT	SNVT_temp_f	36
nvoTempHMI4	NVUOIMT	SNVT_temp_f	37
nvoONbyFireZ1	NVUOIMT	SNVT_count	38
nvoONbyBypassZ1	NVUOIMT	SNVT_count	39
nvoONbyTempZ1	NVUOIMT	SNVT_count	40
nvoONbyButtonZ1	NVUOIMT	SNVT_count	41
nvoONbyOccZ1	NVUOIMT	SNVT_count_f	42
nvoONbyBMSZ1	NVUOIMT	SNVT_freq_f	43
nvoONbyIO1Z1	NVUOIMT	SNVT_freq_f	44
nvoONbyDefrostZ1	NVUOIMT	SNVT_freq_f	45
nvoLiONbyWashZ1	NVUOIMT	SNVT_freq_f	46
nvoLiONbyBypZ1	NVUOIMT	SNVT_freq_f	47
nvoLiONbyBMSZ1	NVUOIMT	SNVT_freq_f	48
nvoLiONbyBttnZ1	NVUOIMT	SNVT_freq_f	49
nvoLiONbyOccZ1	NVUOIMT	SNVT_freq_f	50
nvoLiONbyIO1Z1	NVUOIMT	SNVT_freq_f	51
nvoLiONbyFBttnZ1	NVUOIMT	SNVT_freq_f	52
nvoLiONbyAutoZ1	NVUOIMT	SNVT_amp_f	53
nvoONbyFireZ2	NVUOIMT	SNVT_amp_f	54
nvoONbyBypassZ2	NVUOIMT	SNVT_amp_f	55
nvoONbyTempZ2	NVUOIMT	SNVT_amp_f	56
nvoONbyButtonZ2	NVUOIMT	SNVT_amp_f	57
nvoONbyOccZ2	NVUOIMT	SNVT_amp_f	58
nvoONbyBMSZ2	NVUOIMT	SNVT_amp_f	59
nvoONbyIO1Z2	NVUOIMT	SNVT_amp_f	60
nvoONbyDefrostZ2	NVUOIMT	SNVT_amp_f	61
nvoLiONbyWashZ2	NVUOIMT	SNVT_amp_f	62
nvoLiONbyBypZ2	NVUOIMT	SNVT_count_f	63
nvoLiONbyBMSZ2	NVUOIMT	SNVT_count_f	64
nvoLiONbyBttnZ2	NVUOIMT	SNVT_count_f	65
nvoLiONbyOccZ2	NVUOIMT	SNVT_count_f	66
nvoLiONbyIO1Z2	NVUOIMT	SNVT_count_f	67
nvoLiONbyFBttnZ2	NVUOIMT	SNVT_count_f	68
nvoLiONbyAutoZ2	NVUOIMT	SNVT_count_f	69
nvoFaultFireZ1	NVUOIMT	SNVT_count_f	70

SVNT	Lon Function	SNVT Type	Index
nvoFaultFuseZ1	NVUOIMT	SNVT_count_f	71
nvoFaultKTSZ1	NVUOIMT	SNVT_count_f	72
nvoFaultOL1Z1	NVUOIMT	SNVT_count	73
nvoFaultOL2Z1	NVUOIMT	SNVT_count	74
nvoFaultSuLowZ1	NVUOIMT	SNVT_count	75
nvoFaultPCUZ1	NVUOIMT	SNVT_count	76
nvoFaultBrokeTZ1	NVUOIMT	SNVT_count	77
nvoFaultMissTZ1	NVUOIMT	SNVT_count	78
nvoFaultB1EngZ1	NVUOIMT	SNVT_count	79
nvoFaultB1DEngZ1	NVUOIMT	SNVT_count	80
nvoFaultB2EngZ1	NVUOIMT	SNVT_count	81
nvoFaultB2DEngZ1	NVUOIMT	SNVT_count	82
nvoFaultFireZ2	NVUOIMT	SNVT_count	83
nvoFaultFuseZ2	NVUOIMT	SNVT_count	84
nvoFaultKTSZ2	NVUOIMT	SNVT_count	85
nvoFaultOL1Z2	NVUOIMT	SNVT_count	86
nvoFaultOL2Z2	NVUOIMT	SNVT_count	87
nvoFaultSuLowZ2	NVUOIMT	SNVT_count	88
nvoFaultPCUZ2	NVUOIMT	SNVT_count	89
nvoFaultBrokeTZ2	NVUOIMT	SNVT_count	90
nvoFaultMissTZ2	NVUOIMT	SNVT_count	91
nvoFaultB1EngZ2	NVUOIMT	SNVT_count	92
nvoFaultB1DEngZ2	NVUOIMT	SNVT_count	93
nvoFaultB2EngZ2	NVUOIMT	SNVT_count	94
nvoFaultB2DEngZ2	NVUOIMT	SNVT_count	95
nvoMBFaultCode	NVUOIMT	SNVT_count	96
nvoClgFiltr_PCU1	NVUOIMT	SNVT_count	97
nvoMissFiltr_PCU1	NVUOIMT	SNVT_count	98
nvo72HrClg_PCU1	NVUOIMT	SNVT_count	99
nvoClgPCU_PCU1	NVUOIMT	SNVT_count	100
nvoDoorMiss_PCU1	NVUOIMT	SNVT_count	101
nvoCalibr_PCU1	NVUOIMT	SNVT_count	102
nvo24HrClg_PCU1	NVUOIMT	SNVT_count	103
nvoESPDoorPCU1	NVUOIMT	SNVT_count	104
nvoESPDrainPCU1	NVUOIMT	SNVT_count	105
nvoClgFiltr_PCU2	NVUOIMT	SNVT_count	106

SVNT	Lon Function	SNVT Type	Index
nvoMissFltr_PCU2	NVUOIMT	SNVT_count	107
nvo72HrClg_PCU2	NVUOIMT	SNVT_count	108
nvoClgPCU_PCU2	NVUOIMT	SNVT_count	109
nvoDoorMiss_PCU2	NVUOIMT	SNVT_count	110
nvoCalibr_PCU2	NVUOIMT	SNVT_count	111
nvo24HrClg_PCU2	NVUOIMT	SNVT_count	112
nvoESPDoorPCU2	NVUOIMT	SNVT_count	113
nvoESPDrainPCU2	NVUOIMT	SNVT_count	114
nvoClgFltr_PCU3	NVUOIMT	SNVT_count	115
nvoMissFltr_PCU3	NVUOIMT	SNVT_count	116
nvo72HrClg_PCU3	NVUOIMT	SNVT_count	117
nvoClgPCU_PCU3	NVUOIMT	SNVT_count	118
nvoDoorMiss_PCU3	NVUOIMT	SNVT_count	119
nvoCalibr_PCU3	NVUOIMT	SNVT_count	120
nvo24HrClg_PCU3	NVUOIMT	SNVT_count	121
nvoESPDoorPCU3	NVUOIMT	SNVT_count	122
nvoESPDrainPCU3	NVUOIMT	SNVT_count	123
nvoFansButtonZ1	NVUOIMT	SNVT_count	124
nvoLightButtonZ1	NVUOIMT	SNVT_count	125
nvoFansButtonZ2	NVUOIMT	SNVT_count	126
nvoLightButtonZ2	NVUOIMT	SNVT_count	127
nvoWashButtonZ1	NVUOIMT	SNVT_count	128
nvoWashButtonZ2	NVUOIMT	SNVT_count	129
nvoWashButtonZ3	NVUOIMT	SNVT_count	130
nviFansButtonZ1	NVUOIMT	SNVT_count	131
nviLightButtonZ1	NVUOIMT	SNVT_count	132
nviFansButtonZ2	NVUOIMT	SNVT_count	133
nviLightButtonZ2	NVUOIMT	SNVT_count	134
nviWashButtonZ1	NVUOIMT	SNVT_count	135
nviWashButtonZ2	NVUOIMT	SNVT_count	136
nviWashButtonZ3	NVUOIMT	SNVT_count	137

ECPM03 Configuration

General Overview

The ECPM03 board allows the user to configure functionality of the system through the setup menus on its LCD. The ECPM03 LCD uses 4 buttons for navigation: MENU, UP, DOWN, ENTER (**Figure 18**).

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.

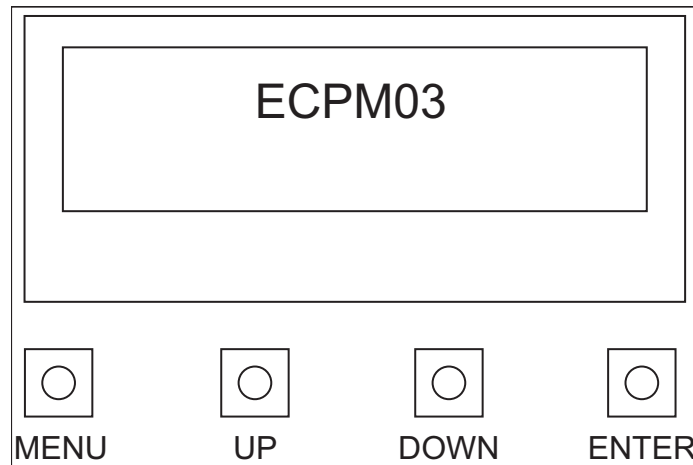
The MENU button typically takes you up one level in the menu tree while the ENTER button takes you down one level. UP and DOWN navigate through the same level of the menu tree and also allows the user to change the value of a parameter.

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 following items may be accessed on the LCD screen:

- Temperature - This allows the user to view all temperatures measured by the room, duct, and temperature sensors.
- Faults - This allows the user to “View Faults” or “Clear Faults.”
- Software Version – User may access what version of software is currently in use. If updating software version, verify new version has uploaded to the board.
- Time Zone – This is the time zone setting the package will use. Verify that the time zone is set correctly to the region. If an incorrect time zone is used, the package settings will operate at incorrect time settings.

Figure 18 - ECPM03 Configuration Screen



Changing Time Zone ID

Use the ECPM03 board menu to change the time zone (**Figure 19**).

- Use the **UP** or **DOWN** buttons 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.

The “Offset” parameter is based on 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.

The most common time zones used are:

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)

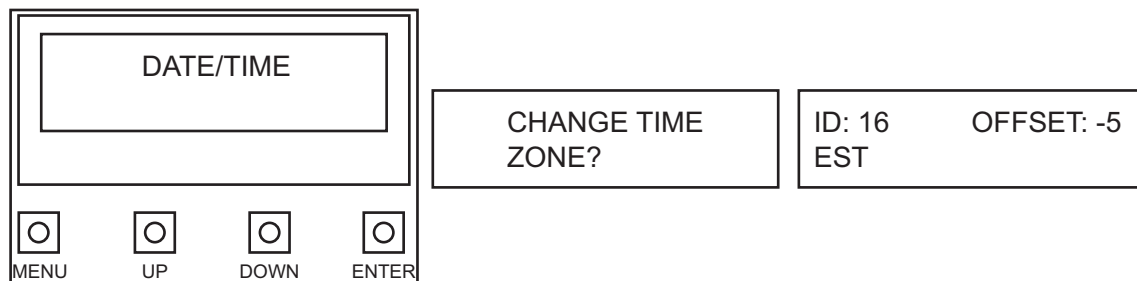
ID: 7 (UTC -07:00) Mountain Time – Arizona (DST - No)

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)

Figure 19 - Time Zone



HMI Configuration

Setting system configurations are done through the HMI by pressing the top two buttons on the HMI.

To set the HMI number or to adjust the screen contrast, press the bottom two buttons simultaneously on the HMI faceplate. Use the Up and Down buttons to select the parameter that will be adjusted. Press Enter to select the highlighted parameter.

Setting the HMI number configures the Modbus address for that HMI.

To change the contrast, select “Advanced Options.” The user may adjust the setting from 0 to 10. Setting the contrast to 0 is the lowest setting available, and 10 is the highest contrast setting available. The factory default contrast setting is 5.

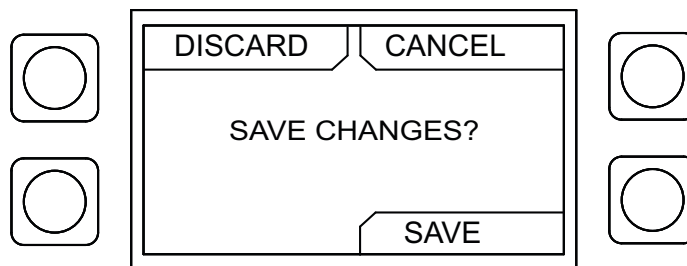
Passwords

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

After changing parameters in the configuration menus, the user needs to press MENU multiple times on the HMI until the screen displays “SAVE CHANGES?” (**Figure 20**). 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.

Figure 20 - HMI Save Screen



Menu Options

Settings are accessed by putting the **HMI into Configuration mode**.

Wash All Button – Default set to On. This setting determines wash operation between sequential wash and individual wash. If this feature is On, the system will queue all hot wash zones when the **WASH** button is pressed once. Each wash zone will delay starting the next wash by the “Wash Delay” time setting. If only one wash solenoid is available, the default will always be On. If this feature is Off, pressing the wash button will allow the user to select a particular wash zone and queue consecutive washes.

Wash Delay – Default set to 0 seconds. If there are multiple hot water wash solenoids, this allows the user to set a time delay between activation of wash solenoids. This option allows the hot water heater extra time between washes to heat up if the hot water heater is not capable of providing enough hot water during wash activations. Range is 0 - 10 minutes.

Scheduling – Default set to On. Allows user to enable scheduling. A scheduling screen will be available on the configuration menu when the option is set to On. If scheduling is enabled, the temperature taken to reach cooking operation is Unoccupied Sensor Activation. Refer to “**Fans On By Temperature/ Schedule**” on page 22 for more information.

Unoccupied Temp Offset Zone 1/2 – Default set to 15°F. This option is available when “Schedule Enable” is set to On. Use this setting to prevent false fan activation during an unoccupied time range. Range is 0-30°F.

- EF1 and SF1 are energized if a temperature sensor on zone 1 is activated.
- EF2 and SF2 are energized if a temperature sensor on zone 2 is activated.

Occupied Fans On Zone 1/2 – Default set to On. Allows user to set the exhaust and/or supply fan zone to activate during the occupied time setting.

IO1/IO2 Delay Time - Default set to 30 minutes. Delay time to run fans after receiving activation and deactivation on IO1/IO2. The exhaust and/or supply fans will remain on for the set time after the external signal is de-energized. This option is intended for applications that require the fans to keep running for a specific amount of time after an external signal (BMS, machine, etc.) is turned off. Range is 0 seconds to 18 hours.

Defrost Enable – Default set to Off. Allows user to enable the defrost mode option. When the appliances are not in use, and this option is enabled, the defrost temperature setting is used to operate the exhaust fan and supply fan based on temperature at a recovery coil. The exhaust fans will remove cold air preventing damage to the appliances/hood recovery coil.

Defrost Temp – Default set to 40.0°F. This is an adjustable setting that allows the user to set the defrost temperature set point. The hood input coil and hood output coil temperature sensor monitors the temperature in the recovery coil system. When the temperature drops below the set point, the exhaust fans will turn on and remove cold air from the duct and plenum. Since these temperatures are used as reference points, you may want to set the temperature threshold higher as the temperature may be colder near the hood recovery coil. Range is 35-50°F.

Dim Enable – Default set to Off. This option allows the backlight on all HMIs to turn off whenever a timer is satisfied. The timer is refreshed every time an HMI button is pressed.

Dim Delay(s) – Default set to 10 seconds. Available if HMI dimming is set to On. Allows user to set dimming time preference for HMI. Range is 0-180 seconds.

Language – Default set to English. The user may set the language between English or Spanish.

Temperature Scale – Default is set to Fahrenheit. The user may set temperature units to Fahrenheit or Celsius.

Has ESP? – Default set to No. If an ESP is intended to be connected to the SCS package, set the menu to Yes.

Enable Graphics – Default set to Off. Allows user to specify fan graphic/light graphic display when the fans or lights are activated.

Factory Settings

Wash Control – Default set to Local. Allows user to access remote wash controls from a third party system or set up controls through the ECPM03 board. The remote setting is designed to be configured with the Onboard Wash signals from a DCV or SC system by accepting 120VAC signals to start a wash or to trigger the surfactant pump. If remote is selected, fan control cannot be controlled through SCS software. The local wash setting will allow for wash, lights, and fan control through the HMI and ECPM03 board. Options are Local or Remote.

of Wash Zones – Default set to 1. Allows user to select wash zone settings to configure within the system. Range is 1-3.

Wash Solenoid Config

- **Solenoid Select** – Default set to 1. Allows user to configure number of solenoids in the system. Range is 1-3.
- **Enter Config** – The user may adjust the following settings:
 - **Wash Type** – Options are Cold Water Mist or Hot Water Wash. This determines how the wash solenoid will be used.
 - **Cold water option:** When the hood is in operation, cold water mist cools exhaust gases within the duct. This helps aid in the removal of grease vapor.
 - **Hot water option:** Automatically cleans the hood plenum after the cooking operations are completed for the day. By washing the plenum while the hood is hot, wash and cleaning effectiveness increases. Surfactant will be injected into the wash for one second, every one minute of the cycle. The wash time is adjustable to meet the needs of every application.
 - **Fan Zone Assignment** – This option links fan zones to wash solenoid for cold water mist or hot water wash to determine which zone triggers the wash solenoid. Fan (EF) should be activated or deactivated appropriately when assigned in the system. If wash solenoid is set to cold water mist, selectable range is zone 1 and zone 2. If wash solenoid is set to hot water wash, the selectable zone range is none/zone 1/zone 2.
 - **Surfactant Time(s)** – Default set to 1 second. This option is visible when wash is set to hot water wash. Allows the user to increase the length of time surfactant is injected into wash. For heavy duty grease applications, increase the injection duration during wash cycles. Range is 1-15 seconds.
 - **Surfactant Interval(s)** - Default 1 minute. Option is visible when wash is set to hot water wash. This is the frequency at which the system will inject surfactant. Range is 1 sec, 5 sec, 10 sec, 15 sec, 30 sec, 1 min.
 - **Wash Time Length** - Default set to 3 minutes. Option is visible when wash is set to hot water wash. Allows user to set length of wash time. Range is 1-15 minutes.

of Fan Zones – Default set to 0. This function allows the user to set the number of fan zones in the system. This can be configured to fan zone 1 (connector J7) or fan zone 2 (connector J8). Range is 0-2.

Hysteresis Zone 1/2 – Default is 2°F. The hysteresis is used to prevent the fans from cycling on and off when the temperature in the tempering space 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. Range is 1-15°F.

Hysteresis Timer Zone 1/2 – Default set to 30 minutes. 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. Range is 5 seconds to 60 minutes.

Wash After Fans Off Zone 1/2 – Default set to Disable. If the system detects the fans were active thermostatically, the system will initiate a wash once the fans have deactivated. Disable/Enable option.

Light Zones – Default set to 0. This allows the user to set the number of light zones. This feature allows for the light zones to be independent of the number of fan zones. RO1 is used to activate a 24V DC relay to control light zone 1. RO2 is used to activate a 24V DC relay to control light zone 2. Range is 0-2.

Zone 1/2 Lights Follow Fans – Default set to Off. The user may set that the lights in Zone 1/2 activate when the fan(s) turn on. Fan zone 1/2 and a light zone must be defined.

Temp Sensors – This menu is where the number of temperature sensors in the system can be set. 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.

Temp Sensor Config – This allows the user to set various configurations for the temperature sensors. Refer to “**Temperature Selection and Configuration**” on page 24 for more information.

of HMI – This allows the user to set the number of HMI(s) in the system. Each package should have at least one HMI in the system to easily access features. The system can operate without an HMI connected.

HMI Config – This allows the user to select:

- **Fan Zone Assignment** – Default set to None. Assign the HMI to a fan zone. Range is 1, 2, None.
- **Wash Button** – Default set to On. Wash button selection. Wash button either begins the wash sequence or there is a secondary screen that will allow user to specify which zone to wash.
- **Light Button** – Default set to On. Available if a light zone is defined.
- **Fan Button** - Default set to On. Available if a fan zone is defined and the fan has been assigned on the HMI.

Minimum Room Temperature – 50.0°F (default). When the room temperature sensor reading is below the minimum room temperature set point, the system will use the minimum room temperature set point overriding the room temperature reading. This prevents poor operation when a room temperature sensor receives a false low-temperature reading that is not a true representation of the space room temperature. Range is 50-80°F.

Maximum Room Temperature – 120.0°F (default). When the room temperature sensor reading is above the maximum room temperature set point, the system will use the maximum room temperature set point overriding the room temperature reading. This will prevent poor operation when a room temperature sensor receives a false high-temperature reading that is not a true representation of the space room temperature. Range is 80-120°F.

Fire Settings

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

Gas Valve Control – Default set to Off. This option provides a **120V AC** signal, which is 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.

Gas Follow Fans – Default set to Off. If this option is enabled, the gas valve will activate when the fans are activated. This is meant to prevent gas cooking appliances to run when the fans are off and are only required in some jurisdictions.

Kill Switch Enabled – Default set to Off. This feature enables the KTS to activate as a kill switch or tamper switch input. The KTS input detects **120V AC**, which will de-energize the Kill Switch output (KS), de-energize the gas valve output, and energizes the **120V AC** shunt trip.

Shunt Follows Fans – Default set to Off. If this option is enabled, the shunt trip will be energized whenever the fans are off. When the shunt trip is energized, the kill switch will be de-energized. This is meant to prevent electric cooking appliances from running when the fans are off and are only required in some jurisdictions.

Exhaust During Fire – Default set to On. When set to On, the exhaust fans will be turned on in a fire condition. 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 not be active during a fire condition. On/Off/Continue option.

Supply During Fire – Default set to Off. When this option is turned off, the supply fans will be turned off in a fire condition. When set to On, the supply fans will turn on in a fire condition. SF1/SF2 is controlled by this option.

Lights During Fire – Default set to Off. When this option is set to Continue, the lights will continue their state during a fire. If the option is set to Off, the lights will turn off during a fire. RO1/RO2 is controlled by this option. Off/Continue option.

of PCUAFM – Default set to 0. Defines the number of PCUAFM boards that communicate back to ECPM03. This allows for the SCS system to display any PCUAFM errors on the HMI. Range is 0-5.

Diagnostics Menu

If there is an issue with the system or certain parameters, use the HMI diagnostic menu to check settings. Using the diagnostic menu will 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.

Temperature – Allows the user to monitor temperature sensors in the system. Faceplate, Zone 1 Average and Zone 2 Average will be available. Other temperature sensor readings will be available on sensors assigned in the system.

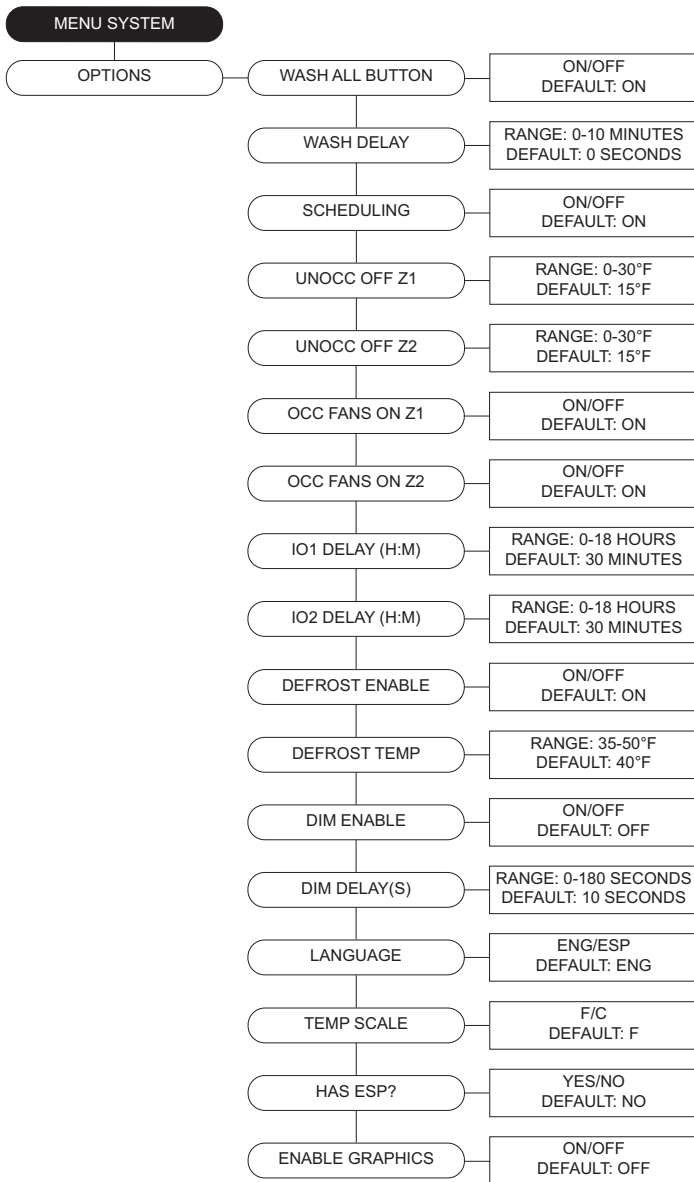
Timer – User may monitor if there are any active hysteresis or delay timers active.

Fault History – This is a log of active faults or faults that were present in the system.

Maintenance Log – When Remote Wash Option is enabled, there is a maintenance log that will keep track of previous wash cycles.

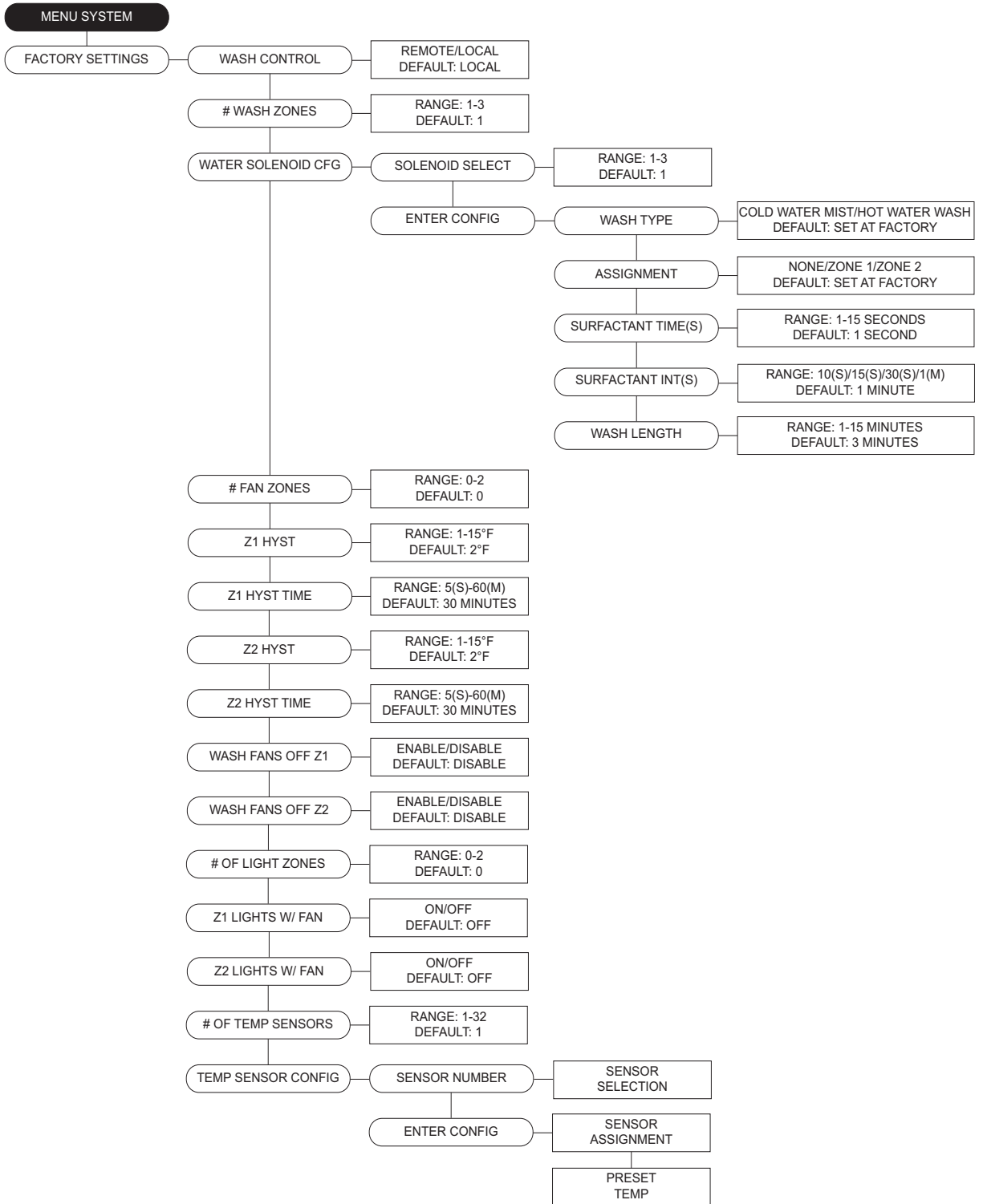
Menu System

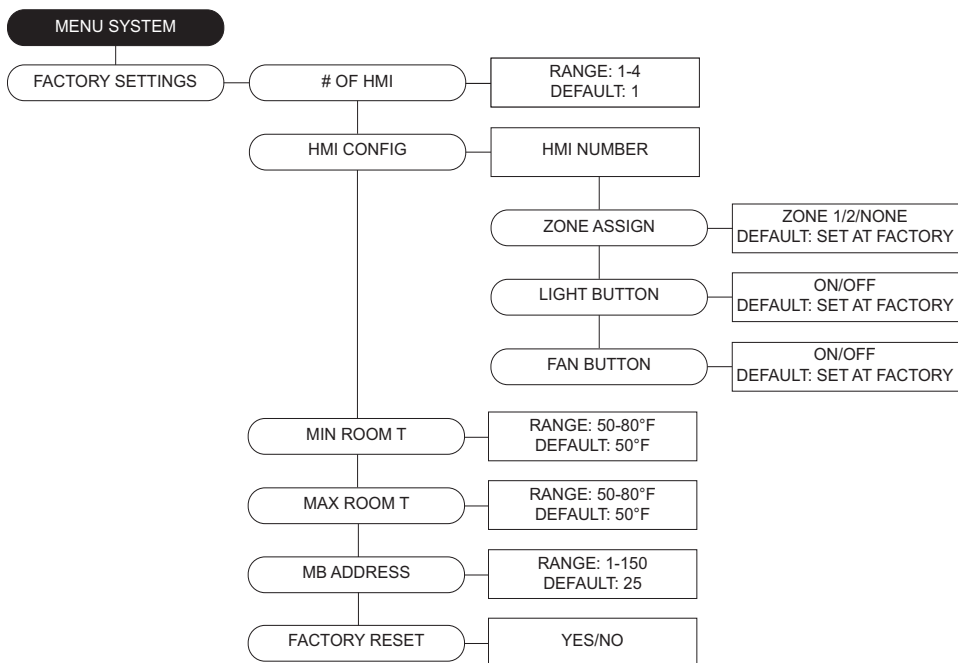
Options



Factory Settings

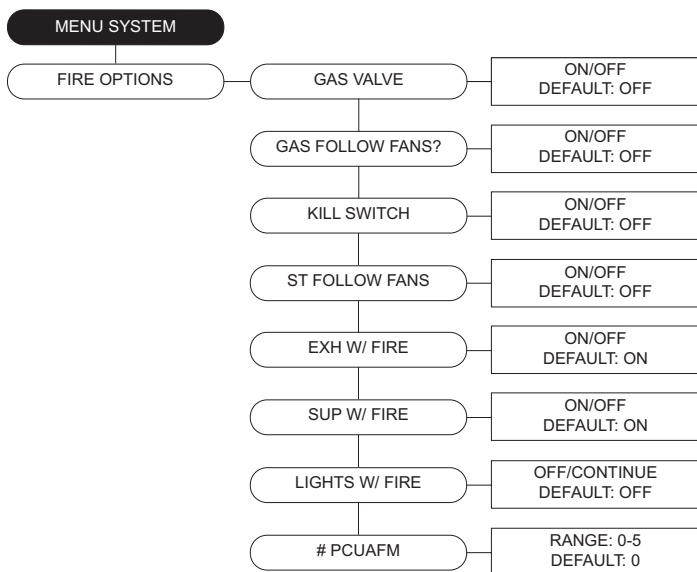
To enter fire options menu, use password 1234





Fire Options

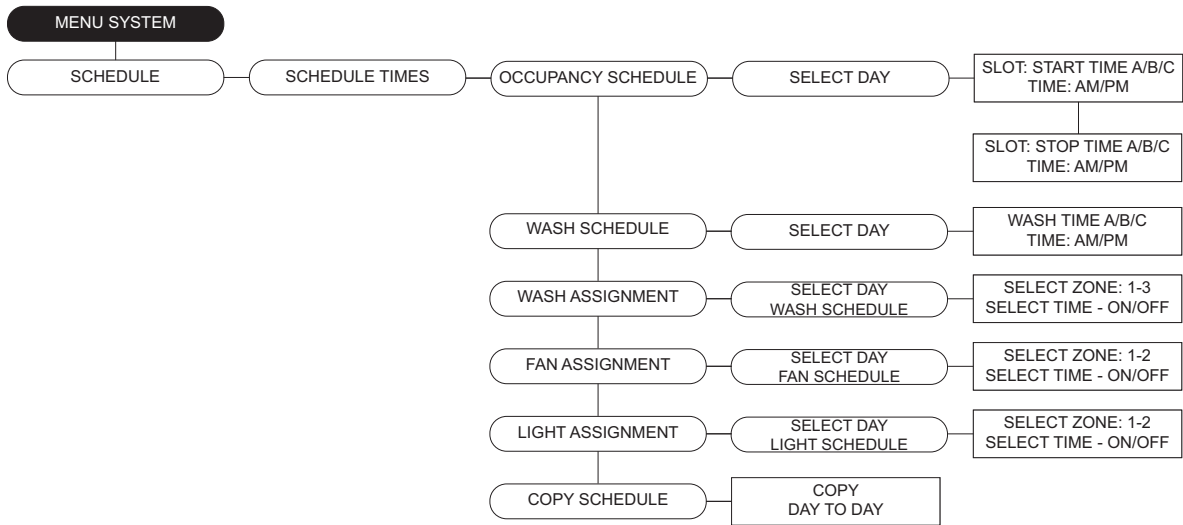
To enter fire options menu, use password 1234



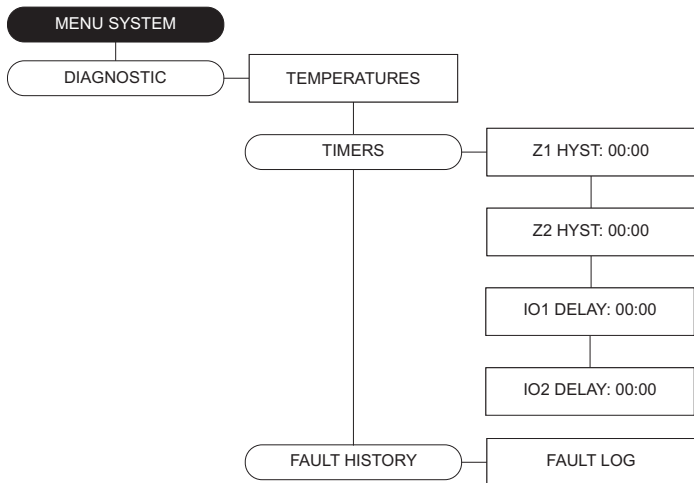
Prime Surfactant



Schedule



Diagnostic



Fault List

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

Fault Message on HMI	Potential Cause	Corrective Action
Overload Zone 1	One of the overload relays for fans associated with zone 1 is tripped.	<ul style="list-style-type: none"> • Check OV1 input for 120V AC. • Check the fan motor amperage is to design specifications. • Check contactor amperage.
Overload Zone 2	One of the overload relays for fans associated with zone 2 is tripped.	<ul style="list-style-type: none"> • Check OV2 input for 120V AC. • Check the fan motor amperage is to design specifications. • Check contactor amperage.
Board Fuse Blown	Fuse is blown or missing.	<ul style="list-style-type: none"> • Check for short circuit. • Verify that the load (120V AC) is below 10 amps. Replace fuse.
Zone 1 Lights Energized	Light output is de-energized, but power is detected on terminal B1.	<ul style="list-style-type: none"> • Verify wiring to schematics. • Check lighting relay and relay contacts. • Check B1 input for a short to power source.
Zone 2 Lights Energized	Light output is de-energized but power is detected on terminal B2.	<ul style="list-style-type: none"> • Verify wiring to schematics. • Check lighting relay and relay contacts. • Check B2 input for a short to power source.
Zone 1 Lights De-energized	Light output is energized, but no power is detected on terminal B1.	<ul style="list-style-type: none"> • Verify wiring to schematics. • Check lighting relay. • Check lighting circuit breaker. • Check B1 input for an open or short circuit.
Zone 2 Lights De-energized	Light output is energized, but no power is detected on terminal B1.	<ul style="list-style-type: none"> • Verify wiring to schematics. • Check lighting relay. • Check lighting circuit breaker. • Check B2 input for an open or short circuit.
Missing Temp Sensor	Temperature sensor x is not wired to the ECPM03 board.	<ul style="list-style-type: none"> • Verify proper wiring to terminals TxA and TxB on the board and wiring to the sensor. • Check for broken wiring or sensor.
Low Surfactant	Surfactant level is low.	<ul style="list-style-type: none"> • Refill surfactant into the tank.
Modbus Communication Fault	One or several components on the Modbus network are not responding.	<ul style="list-style-type: none"> • Verify HMIs are plugged in. • Verify PCUAFM is plugged in. • Check end-of-line resistor is present and not damaged. • Verify configurations (HMI, PCU) numbers are set properly. • Verify the CAT-5 connections. Check for damaged wiring or ends.
Kill Tamper Switch	The Kill Tamper Switch (KTS) signal has been interrupted.	<ul style="list-style-type: none"> • Verify wiring to schematics. • Check component wired to KTS. • Check for open or short circuit in wiring.
ESP x Fault Fault description	Specific fault is present on the PCUAFM x connected to the system.	<ul style="list-style-type: none"> • Refer to the PCUAFM manual for specific fault description.

Troubleshooting

The following table lists causes and corrective actions for possible problems with this package. Review this list before consulting manufacturer.

Problem	Potential Cause	Corrective Action
Smoke rollout of hood – Fans do not 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.
No “FANS OFF” button	HMI sensor and hysteresis timer are not satisfied.	Fans are thermostatically controlled. Button will not be displayed.
		Fan/Zone are not set properly.
		Refer to “ Fan Operation ” on page 22 .
Gas valve reset does not show.	Settings not configured properly in HMI.	Refer to “ Gas Operation ” on page 25 .
Heavy Grease build-up	Low Water pressure	Check for leaks in the manifold or along the piping.
		Longer wash time.
		Increase surfactant injection time.
		Increase surfactant injection frequency.
		Make sure solenoids are activating.
Make sure PSI requirements are met for pipe sizing.		
Solenoids are not activating	Loose wiring connections. Verify solenoid is wired to correct wash output.	Recheck connections from ECPM03 board to solenoid(s).

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.

First Week of Operation

Remove and clean the line strainer screen, located in the pressure reducing valve assembly within the plumbing enclosure of the control panel, after the first week of operation. Clogging from line debris, caused by new construction, will happen more frequently until lines are flushed by repeated usage.

Weekly

1. The surfactant level should be checked to keep the surfactant pump from losing its prime. If low, then add surfactant until full. Please see directions for priming the surfactant pump if needed.
2. Monitor the hot water temperature (140 to 170 degrees F) and pressure (30 to 70 PSI) while ventilators are washing. Readings can be accomplished by checking the combination temperature/pressure gauge located within the plumbing enclosure of the control panel.

Every 3 Months

1. Visually inspect the components of the control panels to ensure proper operation.
2. Check all nozzles for proper and evenly distributed water flow. If nozzles are clogged, clean, or replace.

Every 6 Months

1. The line strainer, located in the pressure reducing valve assembly, should be removed and cleaned. Remove the bottom plug and O-ring; the strainer will be attached to the bottom plug and will be extracted when the bottom plug is removed. Remove and clean strainer as required. If the screen is damaged, then a replacement of 80-mesh screen is required.
2. Check all nozzles for proper and evenly distributed water flow. If nozzles are clogged, clean, or replace.

Priming Surfactant Pump

1. Loosen the wing nut on the knurled adjustment cam nut, located behind the clear pump block.
2. Turn the pointer index to the setting number 6 (maximum flow) and then re-tighten the index.
3. Ensure that the strainer is below the surface of the surfactant level.
4. Loosen the tubing connection on top of the clear block.

WARNING: Do not let surfactant spray from the loose fittings. Wrap a rag around loosened fittings to prevent the surfactant from spraying.

5. Press the **Push to Prime** button on the Setup page of the Touch Screen panel or rotate the knurled nut by hand until the surfactant is drawn out of the loosed fitting with no air bubbles in the clear block.
6. Tighten the top fitting and press the pump prime switch or rotate the knurled nut by hand to verify that the surfactant will be pumped beyond the cleat block into the top tubing.
7. Loosen the wing nut and adjust the pointer to the 1.5 or 2 setting. Re-tighten the wing nut. The pump is primed and now ready for use.

Start-Up and Maintenance Documentation

Job Information

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

Cleaning and Maintenance Record

Date	Service Performed

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

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