CORE Protection Fire System for Pollution Control Unit

Installation, Operation, and Maintenance Manual

RECEIVING AND INSPECTION

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

WARNING!!

Installation of this module should only be performed by a qualified professional who has read and understands these instructions and is familiar with proper safety precautions. Improper installation poses serious risk of injury due to electric shock and other potential hazards. Read this manual thoroughly before installing or servicing this equipment. ALWAYS disconnect power prior to working on module.

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

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WARRANTY

This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 12 months from date of shipment. This warranty shall not apply if:

1. The equipment is not installed by a qualified installer per the MANUFACTURER'S installation instructions shipped with the product,
2. The equipment is not installed in accordance with federal, state and local codes and regulations,
3. The equipment is misused or neglected,
4. The equipment is not operated within its published capacity,
5. The invoice is not paid within the terms of the sales agreement.

The MANUFACTURER shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 12-month warranty period, upon examination by the MANUFACTURER, such part will be repaired or replaced by MANUFACTURER at no charge. The BUYER shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without MANUFACTURER'S prior authorization and all returned equipment shall be shipped by the BUYER, freight prepaid to a destination determined by the MANUFACTURER.

INSTALLATION

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

Mechanical

WARNING: APPLY THE APPROPRIATE WATER PRESSURE AND TEMPERATURE TO ALL FITTINGS TO PREVENT LEAKAGE AND COMPONENT FAILURE

Ensure there is 36 Inches of service clearance to the front of the panel.

Plumbing Connections

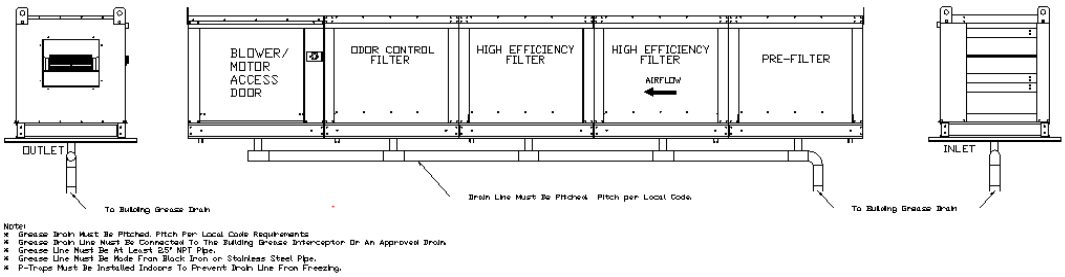
Several field plumbing connections are required for proper Pollution Control Unit CORE operation. It is recommended that all plumbing connections be sealed with pipe dope. Use care not to contaminate the interior surfaces of the water lines when plumbing the unit, as small particulate can clog the orifices of the spray nozzles.

1. Incoming plumbing connections are connected via 1 ½" NPT pipe, or equivalent copper tubing, at the bottom of the control cabinet. This connection must able to provide at least 30 PSI at the panel gauge plus the pressure drop of the PCU and pipe leading to the PCU. The maximum operating pressure at the control package is 70 PSI, with the maximum static pressure being 125 PSI.
2. The connection to the Pollution Control Unit is made via 1 ½" NPT pipe, or equivalent copper tubing, from the top of the cabinet to the Pollution Control Unit. **This line must be sloped back to the CORE panel to ensure the lines drain.**
3. There is also a 1-1/2 inch drain connection that must be piped. This allows the control package to test the incoming water pressure during flow conditions. This should be piped back into the building drain system.
4. Once all supply and drain lines are connected, remove one of the nozzles and flush the lines.
5. The drains on the Pollution Control Unit should be connected back to the building grease interceptor or an approved drain. If PCU assembly has Multiple Modules, the drain line must be 2.5 inch NPT pipe minimum. This must be sloped away from the PCU and sized to handle the fire system water volume.
6. Unions must be field installed before and after the PCU CORE control cabinet.

Note: Water pressure may not drop below 20 PSI at the inlet to the nozzles, and a minimum of 15 PSI at the last nozzle while the Pollution Control Unit is spraying. Operating pressure may not rise above 70 PSI in the control cabinet when the Pollution Control Unit is spraying. If the operating pressure is greater than 70 psi, a water regulator must be connected. Max water static pressure is 125 psi.

IMPORTANT!!

CORE Protection water connection requires a dedicated supply line. This must be connected immediately downstream from the building main shut-off valve. The main shut-off valve must be supervised. A minimum water pressure of 20 psi (while the Pollution Control Unit is spraying) must be achieved at the PCU. Use the chart below to determine the pipe pressure loss between the CORE package and the PCU.



Drain Plumbing for Pollution Control Unit

Piping Loss Calculation for Wall Mount CORE Protection Fire System

To ensure proper operation of the CORE Protection Fire System, a minimum of 30 PSI water pressure during spraying must be achieved at the Pollution Control Unit panel with a minimum of 20 PSI at the PCU inlet. For this to occur, proper sizing of the water line is required. Use the following steps to calculate the piping minimum size.

1. Use the **Pollution Control Unit CORE Water Consumption** table below to determine the CORE water flow rate.
2. Minimum PCU inlet operating pressure is 20 psi, with the PCU-CORE minimum gauge pressure of 30 PSI. Subtract the minimum panel pressure of 30 PSI 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 PCU.
3. Most fittings add an equivalent pipe length to the total run. Use the chart below to calculate the equivalent pipe length for installed fittings. If you have multiple fittings of one type, simply multiply the number below by the total number of the fitting and add to the total run length.

Equivalent Pipe Length For Various Pipe Fittings

Pipe Size Inches	45° Elbow	90° Elbow	Tee Thru Run	Tee Thru Branch
3/4"	1.03	2.21	1.23	4.41
1"	1.31	2.81	1.56	5.62
1 1/2”	2.15	4.31	2.4	8.63
2”	2.59	5.55	3.08	11.6

4. To calculate the total flowing pressure drop between the panel and the PCU, take the total equivalent length found in step 3 and add the total linear field installed pipe length. Multiply this number by the value found in the table below, Pressure Drop (PSI) per Equivalent Foot of Waterline. (Gallons per minute is determined in step 1) This will be the friction pressure drop between the PCU and the panel.
5. Add in the pressure drop due to gravity. This must be evaluated to overcome any rise in pipe elevation between the panel and the PCU. There is 0.43 psi/ft of vertical rise of pressure drop.
6. Now, compare the maximum allowable pressure drop from step 2 to the calculated pressure drop from step 3-5. If the calculated pressure drop exceeds the maximum allowable pressure drop, increase the pipe size and recalculate steps 2 and 5. Continue this step until the calculated pressure drop is below the maximum allowable.
7. The panel contains (2) 1-1/2 inch solenoids, one normally open, and one normally closed, each with a Cv Flow Factor of 22.5. To calculate the pressure drop in PSI through the panel, use this formula: **Panel Pressure Drop = Flowrate^2 / 253.125**, where Flowrate is in gallons per minute. The pressure drop in the panel, downstream of the gauge is half of the calculated entire panel pressure drop.

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

Discharge Coefficient for PCU

The discharge coefficient, or "K Factor", is used to calculate the actual GPM through the system when the incoming pressure is different than what is specified in the table below. This K factor can be applied to the completed Pollution Control Unit assembly. The formula below will provide the Gallons per Minute discharge rate of the PCU fire system.

$$\boldsymbol{Total\ Flowrate = K\ Factor\ x\ Pressure^{0.44}}$$

Fire System Water Consumption Based on PCU Size in GPM					
PCU Size	# of modules				
	1	2	3	4	5
PCU 1	7.5	13.5	19.5	25.5	31.5
PCU 2	10.5	18.0	25.5	33.0	40.5
PCU 3	10.5	18.0	25.5	33.0	40.5
PCU 4	15.0	24.0	33.0	42.0	51.0
PCU 5	16.5	27.0	37.5	48.0	58.5
PCU 6	16.5	27.0	37.5	48.0	58.5

Fire System Discharge Coefficient					
PCU Size	# of modules				
	1	2	3	4	5
PCU 1	2.0	3.6	5.2	6.8	8.4
PCU 2	2.8	4.8	6.8	8.8	10.8
PCU 3	2.8	4.8	6.8	8.8	10.8
PCU 4	4.0	6.4	8.8	11.2	13.6
PCU 5	4.4	7.2	10.0	12.8	15.7
PCU 6	4.4	7.2	10.0	12.8	15.7

Field Pipe Pressure Drop Calculation Example:

Wall mount panel installed with 30 feet of ¾" linear pipe between panel and unit. (2) 90 degree elbows are installed in the pipe run and the pipe run has a vertical rise of 15 feet. A size 6 PF-HE-HE-OC-OC Pollution Control Unit is attached to the package.

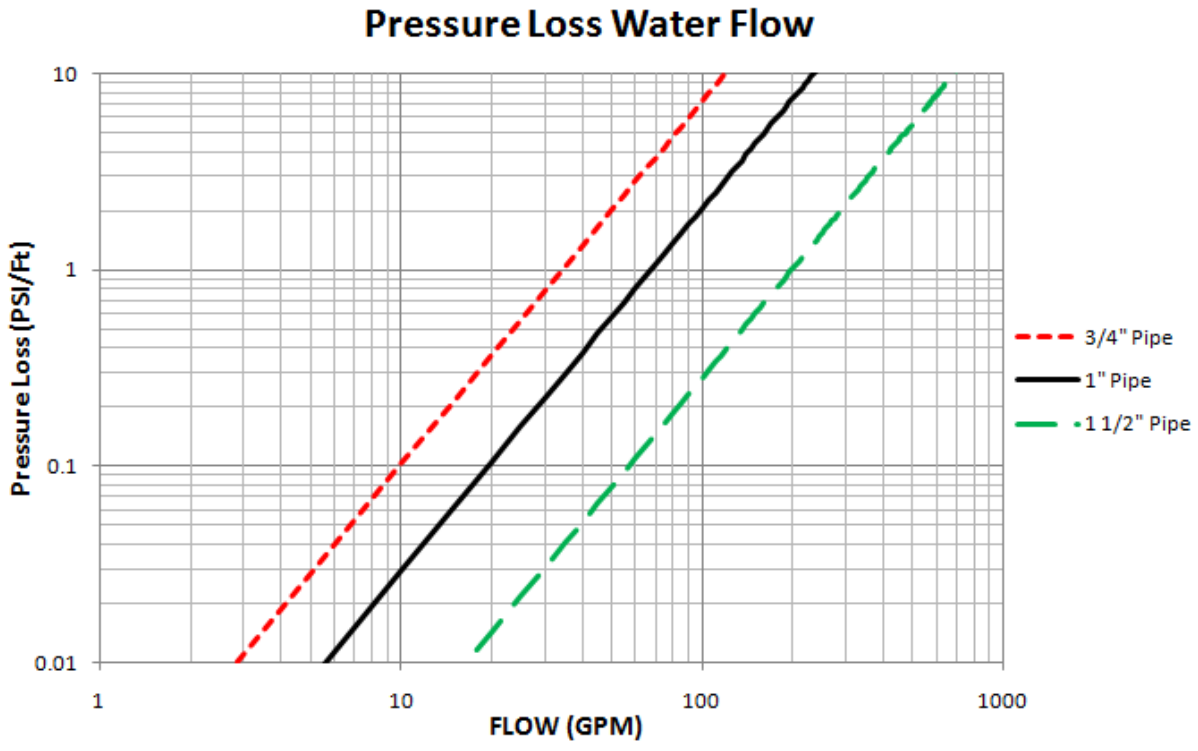
Size 6 PCU-PF-HE-HE-OC-OC (5 modules) = 59 gpm
Operating pressure required at PCU = 20 psi.
Operating pressure at panel gauge = 50 psi.
Allowable pressure drop between panel gauge and unit: 50 psi – 20 psi = **30 psi**

Equivalennt length of pipe = 30 + 2 * 2.21 = 34.42 feet
Friction Pressure Drop through pipe = 34.42 * 2.809 = 96.69 psi
Gravitational Pressure = 0.43 psi/ft * 15 feet = 6.45 psi
Panel pressure drop downstream of gauge = (59 gpm^2 / 253.125) / 2 = 6.87 psi
Total Pressure Drop in Field Pipe between panel gauge and unit = 96.69 + 6.45 + 6.87 = **110.01 psi**
Allowable pressure drop = 30 psi
This system will not work correctly because calculated pressure drop is greater than allowable pressure drop. Pipe size will need to be change to 1-1/2 inch diameter.

Re-calculate with 1-1/2 inch pipe instead of ¾" pipe:

Equivalennt length of pipe = 30 + 2 * 4.31 = 38.62 feet
Friction Pressure Drop through pipe = 38.62 * 0.110 = 4.25 psi
Gravitational Pressure = 0.43 psi/ft * 15 feet = 6.45 psi
Panel pressure drop downstream of gauge = (59 gpm^2 / 253.125) / 2 = 6.87 psi
Total Pressure Drop in Field Pipe between panel gauge and unit = 4.25 + 6.45 + 6.87 = **17.57 psi**
Allowable pressure drop = 30 psi
This system will work correctly because calculated pressure drop is less than allowable pressure drop.

Pressure Loss Through Typical Water Pipe Chart



Electrical

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 either to the door of the unit or provided with the paperwork packet.

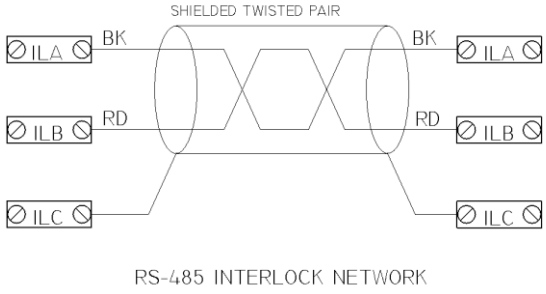
Electrical wiring and connections should be done in accordance with local ordinances and the National Electric Code, ANSI/NFPA 70. Be sure the voltage and phase of the power supply and the wire amperage capacity is in accordance with the unit nameplate.

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

Copper Wire Ampacity

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

1. Always **disconnect power** before working on or near this equipment. Lock and tag the disconnect switch or breaker to prevent accidental power up.
2. **120VAC** should be wired to terminals **H1** and **N1**. **H1** and **N1** should not be connected to a shunt trip breaker.
3. The maximum distance between the Pollution Control Unit CORE Protection System and a Hood CORE Protection System is 1000 feet. Shielded twisted pair cable must be used for this connection.
4. Make certain that the power source is compatible with the requirements of your equipment. The system wiring schematic identifies the **proper phase and voltage** of the equipment.
5. Before connecting control to power source, verify power line wiring is de-energized.
6. Secure the power cable to prevent contact with sharp objects.
7. Do not kink power cable and never allow the cable to come in contact with oil, grease, hot surfaces or chemicals.



RS-485 INTERLOCK NETWORK

8. Pollution Control Unit mounted firestats will need to be wired. The firestats should be wired to terminal blocks as indicated on the wiring schematic. Verify connections on wiring schematic.
9. Before powering up the system, make sure that the interior of the control is free of loose debris or shipping materials.
10. If any of the original internal wire supplied with the system must be replaced, it must be replaced with type THHN wire or equivalent.
11. The battery must be plugged into the connector labeled J1 on the CORE printed circuit board after wiring is complete.
12. It is recommended to use Belden# 6320UL, 18 Gauge, plenum rated wire for the supervised loop.
13. It is recommended to use Belden #88760 for the CORE interlock network or for Modbus communications.
14. All exterior wiring connections to the PCU must be run inside liquid tight conduit. This includes the supervised loop and airflow switch wiring.

IMPORTANT!!
CORE Protection battery backup produces output power even when main power is disconnected from system. When performing major electrical service to the control, the battery backup must be disconnected then reconnected before commissioning.

OPERATION

Prior to starting up or operating the system, check all fasteners for tightness. Ensure that the wiring is installed properly and that all nozzles and panels are installed.

CORE Protection Fire System

In the event of a Pollution Control Unit fire or a fire leading to the Pollution Control unit, CORE Protection is activated.

If the Pollution Control Unit Firestat senses a temperature hotter than its internal setpoint, an electric signal is sent to the CORE Fire System Cabinet. An electric water solenoid is energized allowing the flow of water to the Pollution Control Unit mounted manifold. At the same time, surfactant is continually injected into the water stream to help suppress the fire.

Once the fire system is activated, a “Fire System Activated” light is illuminated on the CORE Fire System Cabinet and an audible alarm sounds. A timer is also energized upon fire system activation. The timer is factory set for 30 minutes and keeps the water spray system running for a minimum of 30 minutes. This is necessary to help extinguish all remaining duct fire potential.

The fire system is electrically operated and thus requires a battery backup system. The battery backup will automatically energize upon a loss of power. The battery backup will monitor the fire system circuit for up to three days and be able to operate the fire system circuit for a minimum of 30 minutes. Once power is restored, the battery will automatically recharge.

CORE Protection Test Mode Overview

The CORE Protection System has an integrated option for testing. This test mode, when active, will shut down the PCU coverage solenoid and prevent the water from spraying on the filters. It will allow activation of the fire system including the discharge water through the drain solenoid, audible alarm, shunt trip breaker (if applicable) and shut-down of appliances via gas valve reset relay. This mode will also activate any additional CORE package attached to the system, including any hood mounted CORE Protection systems and other Pollution Control Unit CORE Protection systems.

Please note that the appliances must be started before test mode is entered on any CORE Protection package for proper demonstration of this function.

CORE Protection Reset Overview

There are multiple actions required to reset the fire system. First, the duct Firestat must be cooled to below its internal setpoint. Once the firestats reset, the timer will automatically stop the fire system once its time duration has ended. An alternative method to bypassing the timer is to press the fire system reset button. This will de-energize the timer and reset the system. NOTE: The Firestat must be cool and the remote pull station must be reset for this button to work.

After a fire, full inspection by a certified professional must be conducted prior to restarting the fire system.

CORE Protection Fire System Option Start Up

Special Tools Required

- AC Voltage Meter
- Standard Hand Tools
- Hand-held Heat Source
- Silicone Lubricant, Danco 88693
- Surfactant (Part Number WWDETER for 4 Gallons, WWDETER-1G for 1 Gallon)
- Supervised Loop Wire (Belden Part Number 6320UL or similar)

Start Up Procedure – CORE Protection Fire System

1. Check all nozzles to make sure they are installed and tight.
2. Open the water valve to the control package.
3. Fill surfactant tank with surfactant. The "Add Surfactant" light should not be on. Prime the surfactant pump with the push-button on the face of the control package.
4. The CORE Protection water connection must be 1 1/2" pipe and must be dedicated to the CORE Fire System package. This must be connected to a water supply line immediately downstream from the building main shut-off valve or a water fire system. This main valve must be continuously supervised.
5. The fire system must be tested to ensure proper operation in the event of a fire.
6. Verify CORE Protection nozzle caps are easily removed. If nozzle caps stick on the nozzles during a fire system discharge, apply silicone lubricant to the O-ring. Use Danco 88693 lubricant.
7. Ensure there are no supervision faults being reported by the "Fire System Activated" light and that the light flashes one brief flash every 3 seconds, indicating the CORE system is armed and ready.
8. Ensure that the maximum water static pressure on the panel is less than 125 psi.
9. Verify exterior conduit is liquid tight.

NOTE: Activating a PCU CORE system will also activate any other PCU or HOOD fire system that is connected to this system. Ensure that all other systems are ready to be tested by placing the PCU panels in the test mode and ensuring hood filters and drains are in place.

Start Up Procedure – Firestat Activation

1. Place the PCU CORE panel in "Test Mode"
2. Remove an access door near the Firestat.
3. Use a portable heat source to apply heat to the duct Firestat. Heat should activate the fire system and water should begin to spray.
4. Replace the door and allow the water to flow out of the drain while reviewing the system.
5. Verify that the operating panel pressure is 30 psi minimum plus piping pressure drop, and 70 psi maximum.
6. Verify that surfactant is constantly being injected into the water stream.
7. Verify that the "Fire System Activated" light illuminates on the control panel and that the audible alarm is sounding.
8. If all of the above is confirmed, reset the fire system by pressing the button on the face of the electrical control package.
9. Repeat steps 1-8 for any additional firestats in Pollution Control Unit
10. Place the PCU CORE panel in "Armed Mode"

Start Up Procedure – Battery Back Up

1. Place the PCU CORE panel in “Test Mode”
2. Remove 120VAC to the CORE Fire Protection control panel by shutting down the circuit breaker to the panel. After a few seconds, the “Fire System Activated” light will flash a power failure supervision fault code (11 flashes followed by a pause).
3. Heat the Firestat with a hand-held heat source.
4. Verify that the operating panel pressure is 30 psi minimum plus piping pressure drop, and 70 psi maximum.
5. Verify that surfactant is constantly being injected into the water stream.
6. If all of the above is confirmed, reset the fire system by pressing the button on the face of the CORE Fire Protection control package.
7. Reset the circuit breaker applying power to the PCU panel. “Fire System Activated” light will begin flashing one brief flash every 3 seconds, indicating the CORE system is armed and ready.
8. Place the PCU CORE panel in “Armed Mode”

Start Up Procedure – Final

1. Refill surfactant tank in CORE Fire Protection control package.
2. Verify that the “Fire System Activated” light is flashing one brief flash every 3 seconds, indicating the CORE system is armed and ready.

Reset Procedure – CORE Protection Fire System

1. Fully inspect system to make sure fire is extinguished.
2. If fire is out, Firestat should be cool.
3. CORE system will automatically reset once fire system timer expires after 30 minutes. Alternatively, the fire system reset button in the control package can be pressed to reset system.
4. Refill surfactant tank in CORE Fire Protection control package.

CORE Protection System Start up Checklist

Action	Completed (Yes/No)	Result
Main Water line 1 1/2” or Larger		
Main Water Line from Dedicated Supply		
“Fire System Activated” light flashing ready code (1 short flash every 3 seconds)		
Test Firestat System Activation		
Verify Water Pressure (20 psi) min. @ PCU		
Verify Water Pressure (30 psi) min, @ panel gauge		
Verify Max Water Operating Pressure (70 psi)		
Verify Max Water Static Pressure (125 psi)		
Verify Constant Surfactant Injection		
Fire System Activated Light Illuminates		
Audible Alarm Sounds		
Verify CORE Timer Works Correctly		
Verify Reset Button Works Correctly		
System Activates on Battery Backup		
Verify Surfactant Tank is Full		
Verify Exterior Conduit is Liquid Tight		

CORE Protection System Reset Checklist

Action	Completed (Yes/No)	Result
Ensure Fire is Extinguished		
Press The CORE Reset Button		
Verify Surfactant Tank is Full		

Component Description

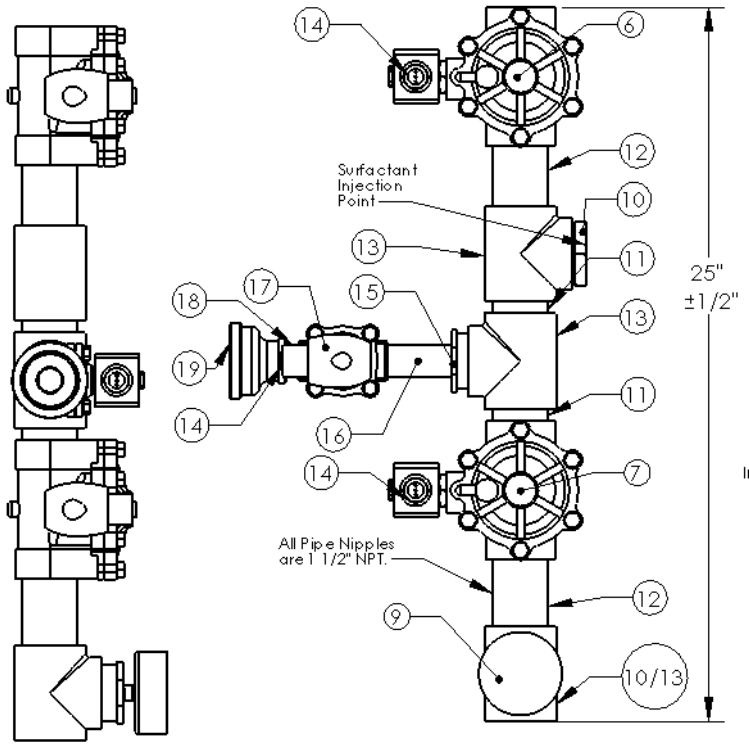
The following section lists the major controls and components used in the Pollution Control Unit CORE Protection fire system.

Water Manifold

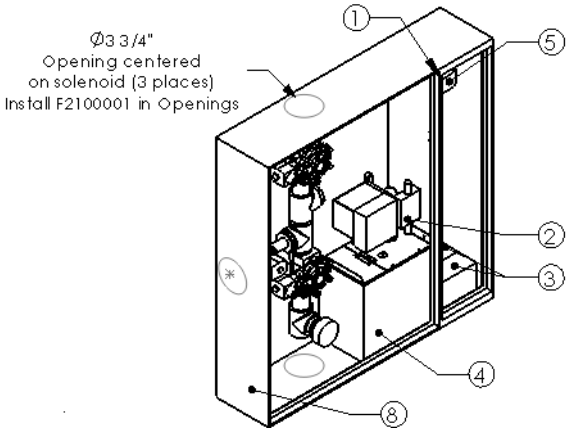
The Pollution Control Unit CORE Fire Protecton System pacakge consists of two normally open valves and one normally closed valve.

Notes:

1. All fittings and pipe will be Brass, except for drain components.
2. Length and width of manifold must match measurements listed on this page.
3. All pipe nipples are close unless otherwise noted.
4. Valves can be rotated for best fit inside cabinet



Item Number	Quantity	Part Number	Description
1	1	PCBCORE	Core Board
2	1	50000-805	24V Detergent pump
3	2	BP7-12	Battery
4	1	VWMSTANK2.0	Detergent tank
5	1	1606-XPL	24v Power Supply
6	1	SC8210D032-24VDC	1 1/2" NPT Normally Open Solenoid valve, 24V
7	1	SC8210G022-24VDC	1 1/2" NPT Normally Closed Solenoid Valve, 24V
8	1	AG5005	30" x 30" x 7" Stainless Cabinet
9	1	AG2516	Temperature and Pressure Gauge
10	2	AG2572	1 1/2" to 1/2" Bushing
11	2	AG2520	1 1/2" Brass Close Nipple
12	2	AG2521	1 1/2" Brass 3" Nipple
13	3	AG2577	1 1/2" Brass Tee
14	3	5J684-251-U80A	Cord Connection, 24V
15	1	AG2573	1 1/2" To 3/4" Bushing
16	1	AG2525	3/4" Brass 3" Nipple
17	1	SC8210G035-24VDC	3/4" NPT Normally Open Solenoid valve, 24V
18	1	4568K191	3/4" Brass Close" Nipple
19	1	4429K746	1 1/2" to 3/4" BrassBell Reducer
Not Shown	4	AG5012	Lift Off Hinges
Not Shown	3	F2100001	Pipe Opening Grommet
Not Shown	1	A0017767	PCU CORE Manual
All Pipe Nipples Are Close, Unless Otherwise Noted.			



CORE Protection Fire System Printed circuit board

The CORE Fire System printed circuit board is a microprocessor based control that provides all the necessary monitoring, timing and supervision functions required for the reliable operation of the CORE Protection Fire System. Under normal conditions the "Fire System Activated" light is flashing one brief flash every 3 seconds, indicating the CORE system is armed and ready. If a fault is detected anywhere in the CORE system the audible alarm will periodically sound and the "Fire System Activated" light will flash a fault code to indicate the fault that was detected. This fault code consists of a series of flashes followed by a pause. Simply count the number of flashes between the pauses and refer to the chart below to find the cause of the fault. Any fault is extremely important and must be dealt with and rectified immediately to insure continued CORE protection.

Catastrophic faults

Number of flashes	Fault condition	Corrective Action
2	CORE water solenoid	Check solenoid and wiring to solenoid, replace as needed
3	Drain solenoid	Check solenoid and wiring to solenoid, replace as needed
4	Not Used	Not Used
5	Microcontroller fault	Replace CORE printed circuit board

Critical faults

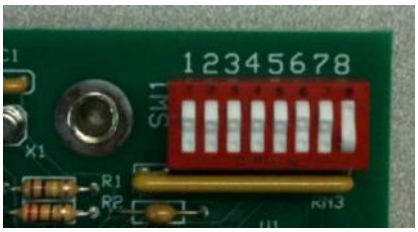
Number of flashes	Fault condition	Corrective Action
6	CORE surfactant pump	Check surfactant pump motor and wiring to the motor, replace as needed
7	Supervised Loop +	Check the wiring to all the pull stations and fire sensors, replace as needed
8	Supervised Loop -	Check the wiring to all the pull stations and fire sensors, replace as needed

Important faults

Number of flashes	Fault condition	Corrective Action
9	Surfactant Low	Add surfactant, check/replace float switch
10	Battery voltage low	Replace batteries, wait for batteries to recharge if there was a power failure
11	AC power failure	Check breakers, call power company
12	Door tamper switch	Close cabinet door
13	PCU Test mode	Place switch in armed position when testing is complete.
14	CORE Interlock	Check Dip Switches on all Boards and RS-485 Network Wires connecting boards
15	Fault on hood in network	Check all hoods in CORE network for faults
16	Fault on PCU in network	Check all PCUs in CORE network for faults

DIP switch Settings

In the photo to the right switches 1 through 7 are shown in there open or OFF positions, switch 8 is shown in its closed or ON position. This is the factory default.



The Table below describes each switch and its function.

<table>
<tr><th>DIP SWITCH #</th><th>Description</th></tr>
<tr><td>1 through 4</td><td>
<table>
<tr><th colspan="4">Dip Switch position</th><th></th></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>Interlock Network Address of this unit</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>1</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>2</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>3</td></tr>
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<tr><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>6</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>7</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>8</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>9</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>10</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>11</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>12</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>13</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>14</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>15</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>THIS UNIT IS NOT PART OF AN INTERLOCK NETWORK</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>Set this switch to ON if this unit has the highest address on the interlock network, otherwise this switch must be OFF (open)</td></tr>
<tr><td>6</td><td>Factory test, leave OFF (open)</td></tr>
<tr><td>7</td><td>Setting switch 7 to its closed, ON position connects a 120 Ohm terminating resistor to the interlock network. This switch must be ON if this unit is at either physical end of the interlock network cable, otherwise is must be OFF (open).</td></tr>
<tr><td>8</td><td>Setting switch 8 to its closed, ON position connects a 120 Ohm terminating resistor to the ModBus network. This switch is factory set and may be ON or OFF.</td></tr>
</table>

- Each unit has a unique address based on the dip switch 1-4 settings, 15 units max on a network.
- If address is 0 (all switches off) the unit will not accept or send any network traffic.
- The unit that has switch 5 on will be the “master” and be in charge of polling all the units below it and waiting for a reply. The lack of 3 replies in a row will cause an “interlock network supervision fault”. All units will be polled in a burst every 3 seconds.
- For all non master units, the lack of being polled for 10 seconds will cause an “interlock network supervision fault”
- Any unit detecting a fire condition will broadcast the notification once every second for as long as the condition persists
- When the Fire condition is cleared, 10 notifications will be sent, one every second,
- Any unit detecting a supervisory fault will broadcast the notification every 2 seconds until the condition is cleared.
- When the supervisory fault condition is cleared, 10 notifications will be sent, one every 2 seconds

Appliance Shutdown in Fault Conditions

The Core Fire Protection System is equiped to shut down the appliances if a fault condition is pressent. The table below shows which fault condition affects the appliances fuel and power sources, alarm muting, and local trouble relay.

Number Of Flashes	Fault Condition	Gas Valve Shut Down	Shut Down Shunt Trip Breaker and UDS Kill Switch		Mute Local Alarm with 4 Hour Reset	Local Trouble relay
		Networked System	Local System	Networked System		
Catastrophic Faults for CORE Appliance Protection						
2	CORE water solenoid	X	X	X		X
3	CORE Appliance solenoid	X	X	X		X
5	Microcontroller fault	X	X	X		
Critical Faults						
6	CORE surfactant pump				X	X
7	Supervised Loop +	X	X	X		X
8	Supervised Loop -	X	X	X		X
Important Faults						
9	Surfactant Low				X	
10	Battery voltage low				X	X
11	AC power failure	X	X	X		X
12	Door tamper switch				X	
13	CORE Appliance Test mode**	X	X	X		
14	CORE Interlock				X	
15	Fault on hood in network				X	
16	Fault on PCU in network				X	

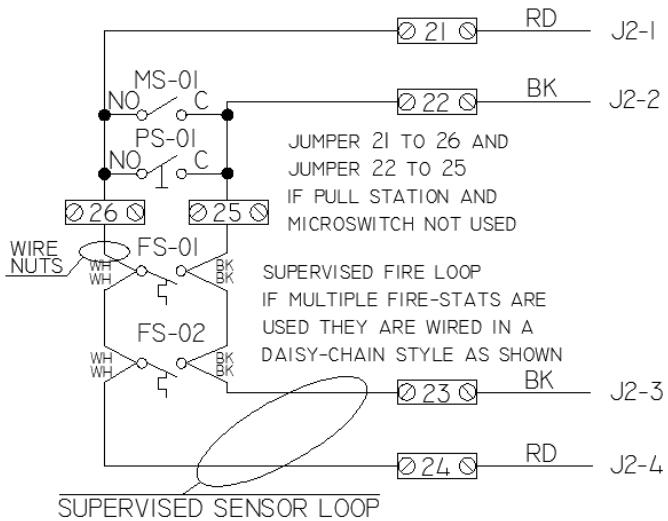
Local Alarm Muting

The local alarm can be muted by depressing the fire system reset button. This will disable the sounder for 4 hours under specific conditions. The table above shows which errors can be muted. It should be noted that the fault will not clear until the fault condition is corrected.

CORE Protection Firestat

The Firestat is a device installed in the PCU duct connection that measures temperature. The standard temperature setting is 360°F. Other temperatures are available. If a temperature higher than the set point is sensed, the Firestat contacts will close and energize the fire system. The fire system will run for a minimum of 30 minutes and then recheck the temperature. If the temperature is still higher than the setpoint, the process restarts immediately.

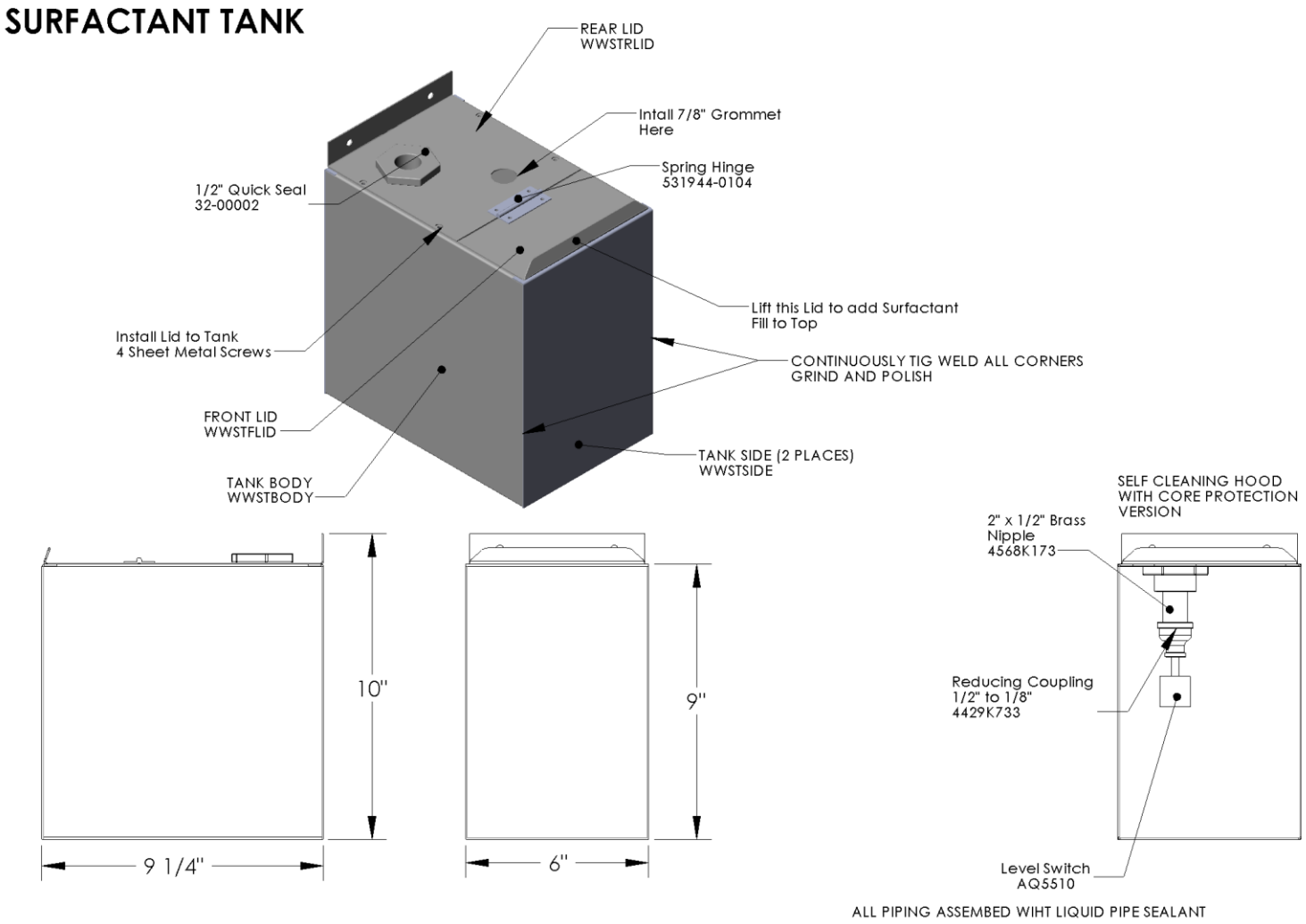
The Firestat has 2 black wires and 2 white wires which must be connected into the supervised loop. High temp wirenuts must be used to connect the sensors into the loop. Multiple sensors are wired in parallel in the supervised loop. All Supervised Loop Connections must be run in Liquid Tight Conduit.



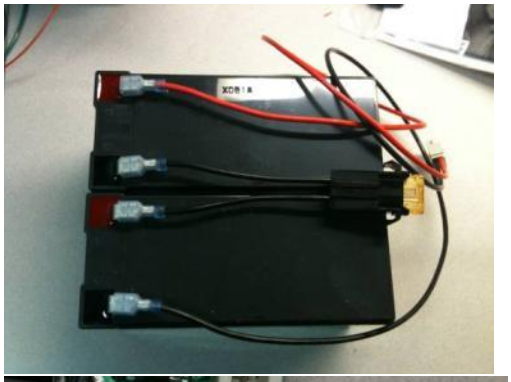
Surfactant Tank

CORE Protection fire system utilizes a two gallon surfactant tank. For this package, the low level control is located at the 1 gallon mark. In the event of a fire, surfactant is continuously injected into the water spray to help suppress the fire. One gallon of surfactant will last for approximately 15 minutes of fire protection. In the event that the low level sensor is activated, an "Add Surfactant" light will illuminate on the control panel. To reset light, simply fill the surfactant tank with surfactant. The drawing below shows tank details.

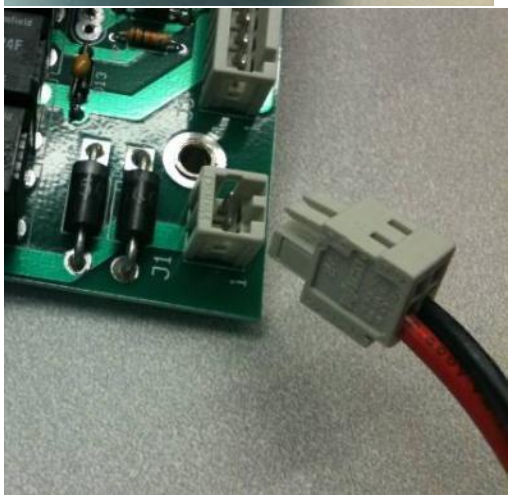
NOTE: SC-5 surfactant from 20/10 Products Incorporated must be used.



Battery Backup



The CORE system contains a battery backup. In the event of a power loss, the battery backup will run the CORE system in its armed and ready state for up to 3 days. In the event of a fire, the battery will keep the fire system energized for a minimum of 30 minutes. During a power loss the "Fire System Activated" light will flash 11 times between pauses indicating the power loss.



The batteries must be replaced every 2 years. Part number BP7-12-T2, two required. Although the batteries are hot swappable, which means they can be replaced while there is input power to the control, for your safety all sources of power must be removed from the control before replacing the batteries. To replace the batteries, unplug the battery cable from the J1 connector on the CORE printed circuit board. Then remove the retaining strap holding the batteries in place. Remove the batteries from the cabinet. Transfer the fuse and cable set from the old batteries to the new batteries being extremely careful to observe the RED and BLACK lead and terminal colors. Reinstall the batteries in the cabinet and reconnect the battery plug to J1. The batteries are lead acid type and are recyclable; please dispose of the old batteries properly.

During extended periods of inactivity where the CORE system will be without AC power for more than 2 days, such as a shutdown or natural disaster, it is best to decommission the CORE system by disconnecting the batteries. This will prevent any damage to the batteries through complete discharge. When the system becomes active again, commission the system by reconnecting the batteries and allowing them to charge for 48 Hrs.

Power Supply Adjustment

To properly charge the batteries, the power supply must be adjusted to output 27.5Vdc. This can be checked with an accurate digital volt meter placed across Terminals H1D and N1D. To adjust the output voltage, place a small flat bladed screwdriver into the yellow dial. By turning this clockwise, you will increase the voltage.

IMPORTANT!!

CORE Protection battery backup system requires that the batteries be changed every 2 years maximum. Failure to do this will result in a void in product reliability and may cause severe damage to facility due to loss of fire protection.

Troubleshooting

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

CORE Protection Fire System Troubleshooting Chart

Problem	Potential Cause	Corrective Action
Add Surfactant Light On	Low Surfactant Level	Add Surfactant
Fire System Activated Light On	Fire System is Activated	Make Sure Fire is Out and Reset Fire System
Audible Alarm is On	Fire System is Activated	Make Sure Fire is Out and Reset Fire System
A fault code is flashing on the “Fire System Activated” light	A fault has been detected in the CORE Protection Fire system	Count the flashes and lookup the fault cause in section “CORE Protection Fire System Printed circuit board” of this manual.
Fire System will not turn off	Duct Sensor is Hot	Heat has activated the duct sensor. Remove heat source or let system extinguish fire. Once Heat source or problem is resolved, press reset button on the face of the electrical control package.
	Remote Pull Station has been pulled	Reset Remote pull station with allen key once fire is out and press reset button on the face of the electrical control package.
	Fire system is running on timer	Make sure duct sensor is cool and pull station is reset, than press reset button on the face of the electrical control package.

MAINTENANCE

To guarantee trouble free operation of this system, the manufacturer suggests following these guidelines. Most problems associated with unit failures are directly related to poor service and maintenance. Record any maintenance or service performed on this equipment in the documentation section located at the end of this manual.

General Maintenance

1. All water connections must be verified for tightness and leak-free operation.
2. The “Add Surfactant” indicating light will illuminate when the surfactant tank is empty. Surfactant must be added immediately to guarantee proper fire system function.

Every 6 months

1. Inspect the surfactant pump for proper operation and ensure liquid level sensor in surfactant tank is operational. Test by manually lowering the sensor to see if the “Add Surfactant” light illuminates.
2. Fill surfactant tank with surfactant. Verify that the surfactant has not congealed or dried out, and that the liquid level sensor operates correctly.
3. Verify that system has proper water pressure and temperature per the labels on the unit.
4. A certified technician should test and inspect the fire system for CORE system. This includes verifying proper operation of the duct Firestat, all remote pull stations, proper surfactant injection and battery backup operation. Refer to the CORE Protection startup procedure to check the proper operation of these components.

Every 2 Years

1. Replace batteries for the CORE Protection Systems. The replacement battery part number is BP7-12-T2, two are required. Once the battery is disconnected, the connected equipment is not protected from power outages. The new battery must be installed immediately. Refer to the replacement battery installation guide for more details.
2. Inspect condition of all wires and plumbing. Plumbing should be free of corrosion and wire insulation must be in good condition.

Decommissioning

1. If it should become necessary to disconnect the CORE system from AC power for an extended period of time (more than 2 days), the batteries should be disconnected to prevent them from being damaged due to complete discharge.

System Discharge

1. All filters in the Pollution Control Unit must be replaced.
2. Drain line and discharge line must be checked for proper drainage. If there is any water accumulation in the lines, the lines could burst due to freezing.
3. Surfactant tank must be refilled.
4. All nozzle caps must be re-installed on the nozzles. This will prevent buildup of grease in the nozzle opening.

Start-Up and Maintenance Documentation

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

Job Information

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

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

Fire System Information (When Supplied)

Refer to the start-up procedure in this manual to complete this section.

Name Plate and Unit Information	
Hood Model Number	
Serial Number	
Volts	
Hertz	

Field Measured Information	
Main Water line 1 1/2” or Larger	
Main Water Line from Dedicated Supply	
Batteries plugged in and light flashes ready	
Test Firestat System Activation	
Verify Water Pressure (20 psi) min.@ PCU	
Verify Water Pressure (30 psi) min. @ Panel	
Verify Max Operating Water Pressure (70 psi)	
Verify Max Water Static Pressure (125 psi)	
Verify Constant Surfactant Injection	
Fire System Activated Light Illuminates	
Audible Alarm Sounds	
Verify CORE Timer Works Correctly	
Verify Reset Button Works Correctly	
System Activates on Battery Backup	
Verify Surfactant Tank is Full	
Verify Exterior Conduit is Liquid Tight	

Maintenance Record

Date	Service Performed

Factory Service Department

Phone: 1-866-784-6900
Fax: 1-919-554-9374